

Independent Reporter

**Annual Return Audit 2007
Final Report**

August 2007

Halcrow Group Limited

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Contents Amendment Record

This report has been issued and amended as follows:

Issue	Revision	Description	Date	Initial
0	1	Draft report compiled	13/06/07	MNG
1	0	Interim report	02/07/07	MNG
1	1	Final report	08/08/07	MNG

1 Executive summary

1.1 Reporter's scrutiny and opinion

Commentary on Annual Return 2007

- 1.1.1 I am pleased to report we have experienced co-operation at all levels within Network Rail which has allowed our audit plan to be delivered to what is this year an accelerated programme. Where additional supporting information has been requested by the audit teams it has in all cases been made available.
- 1.1.2 The figures contained in the Annual Return 2007 indicate that Network Rail has achieved the required regulatory targets, with the exception of Earthworks Failures (M6) and Electrification condition – D.C. traction contact systems (M16).
- 1.1.3 In assessing whether or not Network Rail has achieved the targets set, we have been directed not to take into consideration the tolerance levels detailed in the Annual Return. Similarly to previous years, we have also not taken into account the confidence grades which have been self-assigned by Network Rail to the measures.
- 1.1.4 We believe the Annual Return should be regarded as a consolidated report on the delivery of regulatory measures and specific targets. Taken in this context the Annual Return satisfies that objective. The suite of measures and targets, as currently defined, forms a partial view of Network Rail's activities, but does not provide a detailed view on every aspect of Network Rail's performance and stewardship, particularly where measures are not aligned with Network Rail's management information or priorities. Detailed review, analysis and comment on each of the individual measures which we have audited can be found within the main body of our report.

Reporter's Audit Statement

- 1.1.5 This report, including opinions, has been prepared for use of Office of Rail Regulation and Network Rail and for no other purpose. We do not, in reporting, accept responsibility for any other purpose or to any other person to whom this report is shown. We report our opinion as to whether the Annual Return 2007 gives a representative view and whether the data reported by Network Rail is consistent with evidence provided to us at audit.
- 1.1.6 We confirm Network Rail has prepared the Annual Return for 2007 in accordance with its regulatory and statutory obligations using procedures prepared by Network Rail and agreed with Office of Rail Regulation.
- 1.1.7 We confirm the Annual Return 2007 was submitted in accordance within the timescale required by Condition 15 of Network Rail's Network Licence.
- 1.1.8 We confirm we have completed audits of the data contained in the Annual Return 2007 relating to the measures contained in the "Form of the 2007 Annual Return" prepared by Network Rail and agreed with Office of Rail Regulation as per Paragraph 8 of Condition 15 of the Network Licence. The only exceptions are where we have identified in the text of our report matters which require further clarification. We conducted our audit in accordance with an audit plan. Our audit included examination, on a sample basis, of evidence relevant to the data and disclosures in the Annual Return 2007. We planned and performed our audit so as to obtain information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance on the validity of data in the Annual Return 2007.
- 1.1.9 We confirm that, in our opinion, the reported information is a reasonable representation of performance and data has been properly prepared and reported in accordance with agreed procedures, except as specifically identified in our report commentaries.

1.2 Overview of the Annual Return 2007

Operational Performance

- 1.2.1 **Performance.** The Public Performance Measure (PPM) increased to 88.1%. However, the total delay minutes attributable to Network Rail stayed steady at around 10.5 million minutes. Delay to franchised operators reduced by 0.5% to 1.92 minutes per 100 train km; targets exclude delay to non-franchised operators. Delay for all passenger operators remained broadly static at 1.91 minutes per 100 train km.
- 1.2.2 **Regulatory target.** The regulatory target for these measures has been met.
- 1.2.3 **Reliability grade.** The definition of these measures is documented. Network Rail has established procedures to report and analyse delay information. During the latter part of 2006, Network Rail has significantly reorganised the structure and reporting lines of performance management teams. We believe the full benefit of this should be felt during 2007. In all the Routes we sampled there was evidence of not only consistent performance management procedures but also a sharing and seeking out of best practice and a genuine desire for even further improvement. Given the newness of the new management arrangements, and the number of improvement initiatives in place, we believe operational performance measures should have a reliability grading of B.
- 1.2.4 **Accuracy grade.** Network Rail has the processes in place to monitor the quality of the data input via the TRUST reporting points and has demonstrated how changes are managed. The delay attribution process is carried out competently with different levels of audit in the Routes we sampled. All the Routes we sampled demonstrated to us significant improvements in the accuracy of delay attribution. We believe the range of initiatives currently being implemented should improve this still further in 2007. We believe operational performance should have an accuracy grade of 2.

Customer & Supplier Satisfaction

- 1.2.5 **Performance.** The 2006/07 results show improvement in all categories. The score for Suppliers has moved into the positive and that for Freight Operators is now neutral. Whilst the perception of Rail Operators remains negative, this too has improved during the year.
- 1.2.6 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.7 **Reliability grade.** We are satisfied that Network Rail has demonstrated to us a statistically-reliable process for conducting the customer and stakeholder surveys. We believe the satisfaction measure should have a reliability grade of A with the caveat that this is a qualitative measure and as such should be considered as only one of a range of KPIs for judging customer and stakeholder satisfaction.
- 1.2.8 **Accuracy grade.** We are satisfied that the weighting processes applied to the response rates are appropriate. We believe the accuracy grade should have a reliability grade of 2.

Joint Performance Improvement Plans (JPIPs)

- 1.2.9 **Performance.** In 2006/07, Network Rail has produced a set of governance structures with individual train operators, including process documentation and output templates, maintained sufficient staff to develop the JPIPs, and maintained JPIPs for twenty-four train operators, incorporating all the franchised passenger train operators and four open-access passenger train operators.
- 1.2.10 **Regulatory target.** There is no regulatory target for this measure.

- 1.2.11 **Reliability grade.** JPIPs were in place and being proactively developed and monitored in the areas under audit. Our principal area of concern relates to target setting for the JPIPs. To some extent, JPIPs appeared to be partly passive; that is, local teams were told what infrastructure schemes and other initiatives were being planned, and the delay minutes this was expected to save. As the established means of formalising joint working between Network Rail and TOCs on performance issues we would expect JPIPs to become even more influential, with a formal link into the business planning and investment prioritisation process. We therefore expect to see this evolve in the future, whilst recognising this is the first full year of JPIPs. We also have concerns about the joint PPM and delay minutes targets. We recognise that under the current industry structure, PPM remains the primary concern of TOCs. However, we believe that pure delay minutes (coupled with a cancellation measure) give a more accurate picture of network performance and help to focus on key priorities for improvement. We would not want to see performance improvement initiatives subverted to 'play the PPM game'. Moreover, the relationship between absolute delay minutes and PPM is a difficult one for many managers to understand. Recognising both these issues we believe the JPIP measure should have a reliability grade of B.
- 1.2.12 **Accuracy grade.** The data reported by Network Rail in the Annual Return is accurate – JPIPs are in place for audited Routes and are leading to significant reductions in delay minutes. We believe the accuracy grade for the JPIP measure as presented in the Annual Return is therefore 1. However, consequent on the remarks in our audit report, we feel that there is still some way to go before accuracy of the forecasting in JPIPs is proven. We therefore deem it appropriate to give JPIPs an accuracy grade of 2.

Route Utilisation Strategies (RUSs)

- 1.2.13 **Performance.** During 2006/07, the development of each RUS has followed a standard flow of technical work, including demand forecasting, base-lining, optioneering and appraisal. Whilst the production of the RUSs has placed significant demand on resources, it does not appear that this has been to the detriment of individual RUS. A RUS Manual is published and a programme of work has been agreed with the ORR.
- 1.2.14 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.15 **Reliability grade.** The requirements of this measure are both qualitative and quantitative. Network Rail is required to produce and maintain RUSs, in support of which is required to provide sufficient resources and to develop documented processes. With experience behind them, Network Rail are seeking to template processes as far as possible, and to re-document the process in a revised RUS Technical Guide. Both these, are however, very much work in progress. As such, we believe the RUS measure should continue to have a reliability grade of B. This should not be taken as a failing in effort by Network Rail, but as recognition of the complex nature of the work being undertaken; we have no doubt that individually, some of the RUS would stand scrutiny as an 'A'. The challenge is to continue to develop the process and organisation to that consistently and in particular, to ensure that processes to maintain and revisit the RUS are fully developed and documented.
- 1.2.16 **Accuracy grade.** The data reported by Network Rail in the Annual Return is accurate – a RUS Manual is published, resources allocated, a programme developed and thirteen of nineteen RUS commenced or completed. We believe the accuracy grade for the RUS measure is therefore 1, however the confidence grading system (Appendix D) does not allow for a B1 score to be awarded. Network Rail have made significant steps forward during the year and do not warrant a score worse than that awarded the previous year. A B2 score is therefore inappropriate. At the same time, we do not believe the reliability score yet warrants an A. We therefore choose to award an accuracy grade of X.

Linespeed capability (C1)

- 1.2.17 **Performance.** The net change in reported total kilometres of track compared with last year is a reduction of 0.1%, comprising 26.2km of new line and a net value of 68.2km of track removed due to data cleansing.

- 1.2.18 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe measure C1 should have a reliability grade of B.
- 1.2.19 **Accuracy grade.** The variation of 0.1% in the reported total track kilometres was almost entirely due to data cleansing. We believe C1 should have an accuracy grade of 2..

Gauge capability (C2)

- 1.2.20 **Performance.** The reported net change in total kilometres of route is a reduction of 0.1%; this has been caused by data cleansing.
- 1.2.21 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C2 should have a reliability grade of B.
- 1.2.22 **Accuracy grade.** Our sampling found no errors in changes to gauge made in 2006/07, but there were errors identified in 2 ELRs for changes made in previous years which do not seem to be correctly reflected in the Capabilities Database. We believe that measure C2 should have an accuracy grade of 2.

Route availability value (C3)

- 1.2.23 **Performance.** Track in all 3 RA bands have decreased marginally during 2006/07. The net change in reported total kilometres of track is due to 26.2km of new line and a net value of 68.2km of track removed due to data cleansing.
- 1.2.24 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C3 should have a reliability grade of B.
- 1.2.25 **Accuracy grade.** Our sampling found no errors. We were unable to verify the impact of data cleansing on gauge capability; however, our C1 audit found the net variation due to cleansing on the total network kilometres was 0.1%. We believe that measure C3 should have an accuracy grade of 2.

Electrified track capability (C4)

- 1.2.26 **Performance.** The reported net change in total electrified track kilometres is a 0.7% increase; this variance has been caused by new sections of electrified track opened due to the revised St Pancras station and new platforms at Edinburgh Waverley and Haymarket, closure of 11km of d.c. 3rd rail electrified track between Stratford and North Woolwich and data cleansing.
- 1.2.27 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C4 should have a reliability grade of B.
- 1.2.28 **Accuracy grade.** During last year's audit we had observed discrepancies in the reporting of electrified track capability in GEOGIS for certain section of the network, and hence given this measure an accuracy grade of 3 in our 2006 report. This year we observe that Network Rail seem to have undertaken a data cleansing exercise, and hence we believe that the accuracy grade for C4 should be upgraded to 2.

Mileage

- 1.2.29 **Performance.** Passenger train miles have increased by 0.4%, whilst the freight miles decreased by 3.3%. Total train mileage has decreased by 0.1% to 302.8 million train miles.
- 1.2.30 **Passenger Train Miles Reliability grade.** The definition and procedure for this measure is not documented. A reasonable process has been followed to collect and report this measure, using industry standard sources of data. We believe that Passenger Train Miles should have a reliability grade of B.

- 1.2.31 **Passenger Train Miles Accuracy grade.** We found uncertainties in the data arising from inclusion of Chiltern Railways services running on LUL infrastructure. We believe that Passenger Train Miles should have an accuracy grade of 3.
- 1.2.32 **Freight Train Miles Reliability grade.** The definition and procedure for this measure is not documented. A reasonable process has been followed to collect and report this measure, using industry standard sources of data. We believe that Freight Train Miles should have a reliability grade of B.
- 1.2.33 **Freight Train Miles Accuracy grade.** We found that extracting the data from BIFS by two different sources in Network Rail gave rise to two different sets of train miles. Further, we found significant differences between the freight train miles sourced from BIFS and from PALADIN. We believe that Freight Train Miles should have an accuracy grade of 3.

Freight Gross Tonne Miles

- 1.2.34 **Performance.** Freight gross tonne miles (GTM) have decreased by 1.7% to 30.25 million gross tonne miles.
- 1.2.35 **Reliability grade.** The definition and procedure for this measure is not documented. A rational process has been followed to collect and report this measure, using industry standard sources of data. We believe Freight Gross Train Miles should have a reliability grade of B.
- 1.2.36 **Accuracy grade.** We believe Freight Gross Train Miles should have an accuracy grade of 2.

Management of Congested Infrastructure

- 1.2.37 **Performance.** During 2006/07, three congested areas were declared. Capacity analysis was undertaken for each one and capacity enhancement plans are in development for submission to the Secretary of State and Scottish Ministers for approval.
- 1.2.38 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.39 **Reliability & Accuracy grades.** The new measure cannot really be said to have yet been proven. As such, the allocation of a confidence grade is not appropriate this year.

Number of broken rails (M1)

- 1.2.40 **Performance.** 192 broken rails were reported for 2006/07. This has continued the downward trend of this measure since 2000/01. The result for 2006/07 is a 39.5% improvement on 2005/06.
- 1.2.41 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.42 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The process is closely managed and the figures internally reported on a daily, 4-weekly and annual basis. We believe that M1 should have a reliability grade of A.
- 1.2.43 **Accuracy grade.** Two parallel systems are used to identify broken rails for this measure and a reconciliation process is used to increase accuracy. The process would have to misreport two broken rails or more in 2006/07 to have an inaccuracy of 1% or higher; our assessment is that the accuracy of this process would not allow this level of misreporting. We believe that M1 should have an accuracy grade of 1.

Rail defects (M2)

- 1.2.44 **Performance.** In 2006/07, the number of isolated defects was 21,432, which is 4.0% more defects than in 2005/06; the length of continuous rail defects was 2,195,541 yards, an increase of 9.1% yards of defects than in 2005/06.
- 1.2.45 **Regulatory target.** There is no regulatory target for this measure.

- 1.2.46 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect this measure; however the process for reporting the measure has not been as per the procedure. Data correction has been required at the start of each reporting year for the last five years, including for 2006/07. We believe that M2 should have a reliability grade of B.
- 1.2.47 **Accuracy grade.** Although much work has been done to improve the accuracy of the databases, we still have concerns regarding the level of data correction required at the start of the 2006/07 reporting year. We believe that M2 should have an accuracy grade of 3.

Track geometry (M3 & M5)

- 1.2.48 **Performance – National SDs.** The results for 2005/06 for all twelve national standard deviation (SD) parameters are at the highest level of track geometry since before 2000/01.
- 1.2.49 **Performance – PTG.** The trends for poor track geometry show a continuing improvement for 2006/07 across all Routes except Anglia, Sussex and Wessex.
- 1.2.50 **Performance – speed band data.** The speed band results show a decrease for all measures compared with 2005/06, except for 35m Line in the 75-110mph linespeed range and 70m Line in the 115-125mph linespeed range.
- 1.2.51 **Performance – L2 exceedences.** This year, all Routes except for Sussex and Wessex had the lowest level of Level 2 exceedences per track mile for the last five years.
- 1.2.52 **Regulatory target.** The regulatory targets for the twelve elements of the national standard deviation data and level 2 exceedences have been met. There are no regulatory targets for poor track geometry or speed band measures.
- 1.2.53 **Reliability grade.** The definition for this measure is clearly documented. The procedure is clearly defined and is well controlled. The collection and reporting of this measure is a closely managed process which has been in operation for a number of years. We believe that both M3 & M5 should have reliability grades of A.
- 1.2.54 **Accuracy grade.** The data shows considerable consistency between measurement runs; the calculations are subject to checking. We believe that both M3 & M5 should have accuracy grades of 1.

Condition of asset temporary speed restriction sites (M4)

- 1.2.55 **Performance.** Network Rail report that for 2006/7 there were 710 condition of asset TSRs on the network reportable for this measure with a total of severity score of 3,246. This betters the regulatory target by 25% for the number of sites and by 30% for the severity score.
- 1.2.56 **Regulatory target.** The regulatory targets for this measure have been met.
- 1.2.57 **Reliability grade.**
- 1.2.58 **Accuracy grade.** The PPS system provides a high degree of accuracy for the base data, as it is the source material for the Weekly Operating Notice (a key document for both engineering and operations staff which is subject to rigorous oversight). However, the accuracy of the process is impacted by risks from (a) ESRs being incorrectly input to PPS, and (b) the continuing degree of manual manipulation of raw data to produce the result. In line with our findings last year, we believe M4 should continue to have an accuracy grade of 2.

Earthworks Failures (M6)

- 1.2.59 **Performance.** There was a 119.5% increase in earthworks failures from 2005/06 to 90. Earthworks failures causing train derailment have increased from 2 to 3.
- 1.2.60 **Regulatory target.** The regulatory target for this measure has not been met.

- 1.2.61 **Reliability grade.** The definitions for these measures are clearly documented. A single documented process has been followed to collect and report on these measures. The process of correctly identifying the root cause of incidents attributed to earthwork failures is not a simple process and takes time to analyse correctly. However, this has been successfully achieved for the year end deadline. Therefore, we believe that M6 should have a reliability grade of A.
- 1.2.62 **Accuracy grade.** The process is not sufficiently robust to ensure that the number of reported incidents is within 1%. The process is over-reliant on the national operations log as the sole source of information; if the local track engineer/ manager does not declare track movement is related to an embankment failure at the time of the incident, which is known to occur, then it can be overlooked if it becomes a reportable embankment failure. Furthermore, multiple failures caused by a single event are without a clear definition in the Asset Reporting Manual which would otherwise ensure the accuracy of reporting is maintained. Therefore, we believe that M6 should have an accuracy grade of 2.

Bridge condition (M8)

- 1.2.63 **Performance.** 4,344 bridges were entered into the tool for 2006/07. 78% of bridges are in the top two (out of five) condition grades, 98% are in the top three grades.
- 1.2.64 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.65 **Reliability grade.** The definition for this measure is documented. The process of condition inspections is subjective. We believe the M8 measure should have a reliability grade of B.
- 1.2.66 **Accuracy grade.** We found a few SCMI upload errors in one Territory, which raised concern regarding the local procedure for handling the SCMI uploads to the database. This may also relate to the level of SCMI examinations from previous years which are being reported as new condition grades in 2006/07. We believe the M8 measure should have an accuracy grade of 2.

Signalling failures (M9)

- 1.2.67 **Performance.** There were 22,704 incidents attributed to signalling failures causing more than 10 minutes delay; this is an improvement of 2.8% from 2005/06.
- 1.2.68 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.69 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The commentary is based on data from the FMS system, which does not correlate well with TRUST, because there are faults which cause less than 10 minutes delay to trains or no delay. The explanation for the improvements given by Network Rail, are general comments rather than the result of precise analysis of the data reported. We believe that M9 should have a reliability grade of C.
- 1.2.70 **Accuracy grade.** The process of delay attribution is a subjective process often undertaken with considerable time pressure. Systematic errors introduced by the mismatch between the definition of this measure and the advice in the Delay Attribution Guide mean that this measure is over-reported but in a consistent manner. We believe that the accuracy of the data and commentary cannot be in any case better than 10%, hence we believe that M9 should have an accuracy grade of 4.

Signalling asset condition (M10)

- 1.2.71 **Performance.** 63% of assets assessed to date using the SICA methodology were in the top two condition grades; 97% were in the top three. Level Crossings are included for the first time and 74% (1203) of crossing are in the band 2 (10 to 20 years remaining life)
- 1.2.72 **Regulatory target.** The regulatory target for this measure has been met.

- 1.2.73 **Reliability grade.** The definition for this measure is clearly documented in a revised ARM document. A documented process has been followed to collect and report this measure. 2006/07 has seen significant progress and improvement in the assessment and management of condition data; the introduction of SIS last year removed a potential source of inaccuracies in collated data. The process has been undertaken by persons with suitable levels of expertise supplemented by documented guidance and oversight by others. We believe that M10 should have a reliability grade of B.
- 1.2.74 **Accuracy grade.** The assessment process for determining remaining asset life is subjective and a further subjective adjustment factor is introduced for SICA2B, pSICA and pSICA3; however, unwanted variation from this subjectivity is significantly suppressed by categorising the results into the five condition categories. The peer review process by the HQ Signalling Principles Engineer provides an independent check on the accuracy of the resulting SICA scores against experience. However, there are still concerns in the management of changes to the number of interlockings. In our audit, 102 interlockings have not been accounted for and about 75 are shown as overdue for their next SICA assessment. The process for carrying out the assessments and producing condition reports remains robust, but subjective to a small extent. The procedures for entry of data are not documented. There is no simple check to confirm that data has been entered correctly. We believe that M10 should have an accuracy grade of 3

Traction power incidents causing train delays (M11 & M12)

- 1.2.75 **Performance – M11.** For 2006/07, the result reported by Network Rail was 69, which is an increase of 41% from the number reported in 2005/06.
- 1.2.76 **Performance – M12.** For 2006/07, the result reported by Network Rail was 11, which is an increase of 83% from the number reported in 2005/06.
- 1.2.77 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.78 **Reliability grade.** The definitions for these measures are clearly documented. A single documented process has been followed to collect and report these measures. The process of correctly identifying the root cause of incidents attributed to overhead line or conductor rail components is not a simple process and the number of minutes attributed to a delay is known to be a subjective process. We believe that M11 and M12 should have a reliability grade of B.
- 1.2.79 **Accuracy grade (M11).** Our samples found the data was recorded accurately in the Headquarters spreadsheet and the Territories could justify their reasoning for the rejected incidents. We believe that M11 should have an accuracy grade of 2.
- 1.2.80 **Accuracy grade (M12).** The number of conductor rail component incidents reported for M12 is insufficiently large to support a numeric assessment of the accuracy of this measure. The accuracy grade for M12 is therefore 'X' to indicate that an accuracy grade cannot be properly ascribed (as stipulated in the confidence grading guidance; Appendix D).

Electrification condition – a.c. traction feeder stations & track sectioning points (M13)

- 1.2.81 **Performance.** 84% of assets assessed using the ECAP methodology were in the top two (out of five) condition grades; 99% were in the top three.
- 1.2.82 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.83 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The process of condition assessment is subjective. We believe that M13 should have a reliability grade of B.
- 1.2.84 **Accuracy grade.** Our samples found the data was recorded accurately in the Headquarters spreadsheet this year. However we are still concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M13 should have an accuracy grade of 2.

Electrification condition – d.c. substations (M14)

- 1.2.85 **Performance.** 90% of assets assessed using the ECAP methodology were in the top two (out of five) condition grades; 100% were in the top three.
- 1.2.86 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.87 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The process of condition assessment is subjective. We believe that M14 should have a reliability grade of B.
- 1.2.88 **Accuracy grade.** Our samples found the data was recorded accurately in the Headquarters spreadsheet this year. However we are still concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M14 should have an accuracy grade of 2.

Electrification condition – a.c. traction contact systems (M15)

- 1.2.89 **Performance.** 92% of assets assessed to date using the ECAP methodology were in the top two (out of five) condition grades; 99% were in the top three.
- 1.2.90 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.91 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The results are subject to extrapolation. We believe that M15 should have a reliability grade of C, as stipulated in the confidence grading guidance (Appendix D).
- 1.2.92 **Accuracy grade.** Our sampling found no errors. However, the process of condition assessment is subjective and the results are extrapolated across 73% of the asset population which has not yet been assessed, and we are concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M15 should have an accuracy grade of 3.

Electrification condition – d.c. traction contact system (M16)

- 1.2.93 **Performance.** 77% of assets assessed to date using the ECAP methodology were in the top two (out of five) condition grades; 96% were in the top three.
- 1.2.94 **Regulatory target.** The regulatory target for this measure has not been met.
- 1.2.95 **Reliability grade.** The definition and procedure for this measure is clearly documented and has been followed this year. The process of condition assessment is subject to extrapolation. We believe that M16 should have a reliability grade of C, as stipulated in the confidence grading guidance (Appendix D).
- 1.2.96 **Accuracy grade.** The calculation of wear is largely extrapolated using historic wear rates for different rail types and estimated levels of wear for when the dates of wear measurements have been lost. The condition grade is directly based on this extrapolated data. We believe that M16 should have an accuracy grade of 4.

Station condition index (M17)

- 1.2.97 **Performance.** 75% of assets assessed to date using the station condition assessment methodology were in the top two (out of five) condition grades; 99% were in the top three.
- 1.2.98 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.99 **Reliability grade.** The definition for this measure is clearly documented except for the methods used for processing the data into a station and network score, although a consistent approach has been adopted for this. The process for condition assessment is subjective. The defined scoring system is non-linear and ensures that averaged scores almost entirely falls in one of three scores. Competency checks of the contractors undertaking the surveys have not been undertaken this year. We believe that M17 should have a reliability grade of B.

- 1.2.100 **Accuracy grade.** We have concerns regarding the subjective nature of this measure and its implementation this year although this is understandable given that the measure is undergoing review and is highly likely to have significant changes introduced for next year. We believe that M17 should have an accuracy grade of 3.

Station facility score (M18)

- 1.2.101 **Performance.** The station facility score has risen steadily over the last five years. There has been a 2.6% increase for the measure this year driven by a 7.6% increase for Category F stations, a 3.4% increase for Category E stations and a 3.1% increase for Category D stations.
- 1.2.102 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.103 **Reliability grade.** The definition for this measure is clearly documented. The factual score is measured using the established procedure albeit from a much smaller sample of stations than required. We believe that M18 should have a reliability grade of B.
- 1.2.104 **Accuracy grade.** Due to the high number of facilities counted (190,269) there would need to be significant error to create a 5% error rate. The process of counting facilities is relatively simple, and compared to other measures, percentage accuracy should be reasonably high; however, the data management processes for this measure are deficient. We believe that M18 should have an accuracy grade of 2.

Light maintenance depot – condition index (M19)

- 1.2.105 **Performance.** 50% of assets assessed to date using the depot condition assessment methodology were in the top two (out of five) condition grades; 93% were in the top three.
- 1.2.106 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.107 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The data from the inspections is subjective although an attempt has been made to assess the asset condition against measurable criteria. We believe that M19 should have a reliability grade of B.
- 1.2.108 **Accuracy grade.** We found discrepancies in the depots inspection reports for this measure which impacts the results. We found shortcomings in both report checking and Headquarters audit. We believe M19 should have an accuracy grade of 4.

Network Rail Asset Stewardship Incentive Index (ASII)

- 1.2.109 **Performance.** The ASII for 2006/07 was reported as 0.72, which represents a 10% improvement in the ASII figure from 2005/06. This reflects an improvement in nearly all of the constituent elements of the index, which is driven by a significant improvement in the number of broken rails. However electrification failures (incidents >500min delay) has shown a slight worsening of the situation.
- 1.2.110 **Regulatory target.** The regulatory target for this measure has been met.
- 1.2.111 **Reliability grade.** We believe that the reliability grade given to ASII should be a weighted average of all its constituent parts. When the reliability grades are given in numeric equivalents (e.g. A=1, B=2, etc.) and these are weighted, the result is 1.7, which equates to a grade B. We therefore believe that the ASII should have a reliability grade of B.
- 1.2.112 **Accuracy grade.** This measure is a composite of other measures in the Annual Return 2007. Due to the inherent nature of the confidence grading system we do not believe it is sensible to provide an accuracy score for ASII based on either weighting the accuracy grades of the constituent measures, or on a subjective assessment. We believe that ASII should have an accuracy grade of 'X', indicating that an accuracy grade cannot be properly ascribed to the measure (as stipulated in the confidence grading guidance: Appendix D).

Track Renewal Volumes (M20, M21, M22, M25)

- 1.2.113 **Performance.** There has been a steady rising trend for non-WCRM sleeper and ballast renewal from 2002/03 to 2006/07. Rail renewals increased between 2004/05 and 2005/06, but once again dropped in 2006/07. Non-WCRM full S&C renewals have risen by 104% over the last five years and by 13% this year to 417 units.
- 1.2.114 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.115 **Reliability grade.** The definition for this measure is clearly documented. While a single documented process has been followed to collect and report the high level summary data for this measure, we have yet to audit the process at the individual job level. An audit of WCRM was also undertaken. We believe that the track renewals measures (M20, M21, M22, M25) should have a reliability grade of B.
- 1.2.116 **Accuracy grade.** The data has been reported by the MP&I teams based on the MBR Reports have been accurate. We have yet to sample the data for cost and volume at an individual job level. Minor discrepancies were found in the volumes of South East Territory. Errors were also found in the data entered into P3e in Scotland territory. An audit of WCRM showed that there were some inaccuracies in reporting of all 4 measures due to the definitions used in the WCRM PCS system. We believe that the track renewals measures (M20, M21, M22, M25) should have an accuracy grade of 2.

Signalling Renewed (M24)

- 1.2.117 **Performance.** There has been an increase in the number of SEUs renewed in 2006/07 as compared to the previous reporting period. A total of 403 SEUs were renewed as compared to the Network Rail Business Plan target of 669.
- 1.2.118 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.119 **Reliability grade.** The definition is now defined in BP001 and the procedure for this measure is clearly documented. The adjustment for partial renewals is carried out at HQ where the details and the nature of the schemes may not be known exactly. However, the process is sufficiently linked to programme management to give a reliability grade of C.
- 1.2.120 **Accuracy grade.** The calculation of SEUs renewed is open to a little interpretation, but should be capable of reasonable accuracy by following the procedure and using the agreed definitions. We believe M24 should have an accuracy grade of 3.

Structures Renewal & Remediation Volumes (M23, M26, M27, M28, M29)

- 1.2.121 **Performance.** There has been a 140% increase in the area of bridge deck replacements undertaken in 2006/07 as compared to the previous year. The area of retaining walls renewed showed an 11% increase in 2006/07. The number of bridges, retaining walls, earthworks and tunnels renewals works undertaken (greater than the threshold values) fell in 2006/07, as compared to 2005/06. The number of culverts renewed however rose.
- 1.2.122 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.123 **Reliability grade.** The definitions for these five measures are clearly documented. A single documented process has been followed to collect and report the data for these measures. We believe that the measures M23, M26, M27, M28, and M29 should have a reliability grade of A.
- 1.2.124 **Accuracy grade.** Our samples found the data for the number of renewals undertaken had been reported accurately. However we found differences in the square area of measure M23. We believe that the measures M26, M27, M28, and M29 should have an accuracy grade of 1, while measure M23 should be given an accuracy grade 3.

Maintenance Efficiency

- 1.2.125 **Performance.** Nine of the eighteen maintenance unit costs measured by Network Rail were considered robust enough to report in the Annual Return.
- 1.2.126 **Regulatory target.** The benchmarks for calculating efficiency levels have not yet been agreed.

- 1.2.127 **Reliability grade.** The processes used to source the data for this measure are documented at a high level, frequently used and subject to a number of layers of internal check and review; the financial data is subject to external audit by others. However, the data quality processes are disjointed and there are known problems with the initial capture of work volumes. There is also use of extrapolation at Area and Territory levels where the volume data is assessed as anomalous; this assessment process is not documented and involves judgement not calculation. We believe the maintenance unit cost data should have a reliability band of C.
- 1.2.128 **Accuracy grade.** The variation in the dataset appears quite large. At Maintenance Area level – which is an intermediate level of aggregation and therefore is already subject to averaging of extreme variation – there is still 9.2% of MUC data and 6.1% of the Efficiency data at Area level more than $\pm 50\%$ from the mean. Statistical analysis of the dataset is required to attribute this variation to collection error or to genuine differences in the underlying unit rates; however, given the known issues with the underlying data collection process, it is likely the larger portion of this variation is from process error not underlying differences in unit costs. We believe the maintenance unit cost data should have an accuracy band of 5.

Renewals Efficiency

Unit Costs – Track

- 1.2.129 **Performance.** 83.4% of track renewals expenditure has been reported as unit costs. Plain line renewals efficiencies (13.5% annual, 17.2% cumulative for CP3) are driving the significant improvement in total track renewals efficiency shown this year (9.8% annual, 15.4% cumulative for CP3); the S&C renewals unit cost efficiency value shows a small reduction year-on-year (-1.4% annual, 10.2% for CP3).
- 1.2.130 **Reliability grade.** The processes used to source the data for this measure are documented, frequently used and subject to a number of layers of internal check and review and to external audit by others. The work-mix impacts the reliability of the efficiency results for the unit costs. We believe the unit cost indices and composite rates should have a reliability grade of B.
- 1.2.131 **Accuracy grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review and to external audit by others. The financial data is not solely based on final accounts, which may mean the reported data is subject to some inaccuracy. We therefore believe the unit cost indices and composite rates should have an accuracy grade of 2.

Unit Costs – Structures

- 1.2.132 **Performance.** 39.9% of structures renewals expenditure has been reported as unit costs. Relatively low levels of efficiencies have been achieved this year (2.3% annual); this is most likely to be due to construction price inflation. However, the cumulative level of efficiency for CP3 is much stronger at 25.3%.
- 1.2.133 **Reliability grade.** The processes used to source the data for this measure are documented, frequently used and subject to a number of layers of internal check and review and to external audit by others. The work-mix and solutions type impact the reliability of the efficiency results for the unit costs. We believe the unit cost indices and composite rates should have a reliability grade of B.
- 1.2.134 **Accuracy grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review and to external audit by others. The financial data is based on final accounts. We therefore believe the unit cost indices and composite rates should have an accuracy grade of 2.

Budget Variance Analysis

- 1.2.135 **Performance.** The total renewals budget shows a 23.0% level of efficiency, comprising strong performances in all asset classes except track which achieved 13.9% efficiency.

- 1.2.136 **Reliability grade.** The procedure for this measure is documented. However, there was evidence of the categorisation process not being followed correctly. We believe the financial efficiency variance analysis should have a reliability grade of B.
- 1.2.137 **Accuracy grade.** There was evidence of systematic errors leading to over-attribution to Scope Change. The internal audit by Network Rail led to re-attribution of some variances; as this process was undertaken post-audit using limited information it is possible that not all cases have been correctly identified. We believe the financial efficiency variance analysis should have an accuracy grade of 2.

Renewals Efficiency

- 1.2.138 **Regulatory target.** Using a combination of the unit cost and renewals budget variance data to assess Network Rail's performance, the regulatory target for renewals efficiency has been met.

Route Expenditure

- 1.2.139 **Performance.** Renewals expenditure including WCRM is £2777.3m against a Business Plan forecast of £2824.8m; this is a -1.7% variance. Enhancements Renewals expenditure including WCRM is £741.7m against a Business Plan forecast of £568.8m; this is a -26.9% variance; this shortfall was comprised of a number of smaller items rather than one large item.
- 1.2.140 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.141 **Reliability grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review; the actual expenditure data is subject to external audit by others. We believe the route expenditure data should have a reliability band of A.
- 1.2.142 **Accuracy grade.** The expenditure data is subject to financial audit by the Regulatory Auditors. Network Rail has identified a small (0.1%) adjustment in attribution which is required to the network renewals figures between non-WCRM and WCRM. We believe the route expenditure data should have an accuracy band of 1.

1.2.143

Debt/ RAB Ratio

- 1.2.144 **Performance.** The results for 2006/07 show that Network Rail's net debt as a percentage of its RAB was 73.5% which meets the requirements of its Network Licence.
- 1.2.145 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.146 **Reliability grade.** The ratio is calculated using data from the Regulatory Financial Statements. We believe the Debt/RAB Ratio should have a reliability band of A.
- 1.2.147 **Accuracy grade.** The calculation, using data audited by the Regulatory Auditor, is correct. We believe the Debt/RAB Ratio should have an accuracy band of 1.

RAB Volume Incentive

- 1.2.148 **Performance.** The current forecast RAB adjustment for the volume incentive in 2008/09 is £338.5m.
- 1.2.149 **Regulatory target.** There is no regulatory target for this measure.
- 1.2.150 **Reliability grade.** This is an indicative measure only – the incentive payment will be calculated at year-end 2008/09. The actuals data is from reliable sources; the forecast data is also used in the production of Network Rail's Business Plan. However, the baseline has been back-calculated following a change to two underlying datasets; this needs to be further investigated as it will change the 2008/09 result. We believe the RAB Volume Incentive should have a reliability band of B.
- 1.2.151 **Accuracy grade.** Some of the data used is forecast. The baseline has been subject to change and the underlying reason has not yet been fully explained. We believe the RAB Volume Incentive should have an accuracy band of 3.

1.3 Confidence grades and results against targets

1.3.1 The ORR Access Charges Review 2003 reset targets for Control Period 3 (2004/05-2008/09); the targets for 2006/07 shown in Figure 1.3.1 are further described in our audit commentaries.

1.3.2 The colour coding in Figure 1.3.1 is based on the targets:

- (a) Red: outside nominal target (target missed);
- (b) Green: inside the nominal target (target achieved).
- (c) Grey: no regulatory target set.

Measure	Confidence Grade	2006/07 Target	2006/07 Result
Operational Performance (NR caused delay (million minutes) & Total delay minutes/100 train km)	B2	≤10.6 ≤2.12	10.5 1.93
Customer & Supplier Satisfaction	A2	n/a	n/a
Joint Performance Process (JPP)	B2	n/a	n/a
Route Utilisation Strategies (RUSs)	BX	n/a	n/a
Linespeed capability (C1)	B2	n/a	n/a
Gauge capability (C2)	B2	n/a	n/a
Route availability value (C3)	B2	n/a	n/a
Electrified track capability (C4)	B2	n/a	n/a
Mileage	B3	n/a	n/a
Freight Gross Tonne Miles	B2	n/a	n/a
Number of broken rails (M1)	A1	≤300	192
Rail defects (M2)	B3	n/a	n/a
Track geometry (M3 & M5)	A1	13 targets	All 13 met
Condition of asset temporary speed restriction sites (M4) (Number & Severity)	B2	≤942 ≤4,622	710 3,246
Earthworks Failures (M6)	A2	≤47	90
Bridge condition (M8)	B2	n/a	n/a
Signalling failures (M9)	C4	≤28,098	22,704
Signalling asset condition (M10)	B3	≤2.5	2.39
Traction power incidents causing train delays (M11)	B2	≤107	69
Traction power incidents causing train delays (M12)	BX	≤30	11
Electrification condition – a.c. traction feeder stations & track sectioning points (M13)	B2	≤2.1	1.88
Electrification condition – d.c. substations (M14)	B2	≤2.2	1.64
Electrification condition – a.c. traction contact systems (M15)	C3	≤1.9	1.7
Electrification condition – d.c. traction contact system (M16)	C4	≤1.8	1.9
Station condition index (M17)	B3	≤2.25	2.24
Station facility score (M18)	B2	n/a	n/a
Light maintenance depot – condition index (M19)	B4	≤2.63	2.56
Network Rail Asset Stewardship Incentive Index (ASII)	BX	≤0.90	0.72
Track Renewal Volumes (M20, M21, M22, M25)	B2	n/a	n/a
Signalling Renewed (M24)	C3	n/a	n/a
Structures Renewal & Remediation Volumes - (M23) (M26, M27, M28, M29)	A3 A1	n/a	n/a
Maintenance Efficiency: Unit Costs	C5	≥22%	n/a
Renewals Efficiency: Unit Costs – Track	B2	≥22%	23%
Renewals Efficiency: Unit Costs – Structures	B2		
Renewals Efficiency: Budget Variance Analysis	B2		
Route Expenditure	A2	n/a	n/a
Debt/ RAB Ratio	A1	n/a	n/a
RAB Volume Incentive	B3	n/a	n/a

Figure 1.3.1 Confidence grades targets and results for measures in Annual Return 2007

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3 Introduction

3.1 Background

3.1.1 As part of the Office of Rail Regulation's Periodic Review of Network Rail's Access Charges for Control Period 2 (2000/01-2005/06), a number of changes were implemented to improve information reporting arrangements through modifications to Network Rail's network licence. In summary, Network Rail was required:

- (a) To prepare more detailed regulatory accounts which are consistent with the basis on which the price controls are established;
- (b) To ensure that enhancement expenditure is separately reported alongside information on those enhancements implemented;
- (c) To appoint Reporters (chosen by the Regulator in consultation with Network Rail) to provide an independent assessment of the robustness of Network Rail's information submissions; and,
- (d) To provide an Annual Return (plus some monthly returns) to report data for the previous year and compares this with both historical data and baselines underlying the periodic review.

3.1.2 In accordance with these requirements, Network Rail produces an Annual Return which contains measures of operational performance, asset condition and serviceability, renewals volumes, network capability, a reconciliation of the forecast expenditure set out in the Business Plan against actual expenditure and other performance indicators by agreement.

3.1.3 As Reporter A, Halcrow was previously responsible for reporting on part of Network Rail's Annual Return (shared with Reporter B, Mouchel Parkman) and Network Rail's Asset Register. Reporter B was also responsible for reporting on WCRM Project. This contract was for October 2002 – November 2005.

3.1.4 Halcrow have been appointed to Parts A and D of the new contract. The contract is for December 2005 – December 2008, with an option for two extensions of one year. The other Reporters are shown in the Figure 3.1.1 below.

Contract Schedule	Reporter
Part A: Annual Return	Reporter A (Halcrow)
Part B: Information Network	Reporter C (Scott Wilson)
Part C: Asset Management	Reporter D (AMCL)
Part D: Major Projects	Reporter A (Halcrow) ¹

Figure 3.1.1 Allocation of Reporting Role to Reporters

¹ Reporter B (Mouchel Parkman) retains WCRM monitoring to Nov-2006.

3.2 This report

- 3.2.1 This report is Reporter A's Final Report on Network Rail's Annual Return 2007 in respect of the 2006/07 financial year.
- 3.2.2 A programme of audits took place in March, April, May and June 2007 at the offices of Network Rail's Headquarters, Territories and Areas as appropriate. At each audit, the personnel responsible for the collection and collation of the data for each measure were interviewed and the data collection systems, written documentation and supporting data made available were reviewed.
- 3.2.3 In order to gain the most value from the audit programme, the audit scope and any data requests for individual meetings were developed by our reporting team in advance of the audits and provided to Network Rail where appropriate.
- 3.2.4 The aims of the Annual Return audits are:
- (a) To give an opinion on the accuracy and reliability of the data reported by Network Rail in the Annual Return, by:
 - (i) Assessing the collection and reporting process against written definitions and procedures or best practice;
 - (ii) Checking the numerical data is correctly published;
 - (iii) Providing a 'confidence grade' for each measure;
 - (b) To compare the reported data with the regulatory target;
 - (c) To provide advice on:
 - (i) Any notable changes or trends in the data;
 - (ii) Context or causation of these changes or trends; and
 - (iii) Asset stewardship implications;
 - (d) Identifying problems, best practice and opportunities for future improvements;
 - (e) To evidence our audit report using soft or hard copy audit trails and meeting notes.
- 3.2.5 The details of all meetings and site visits attended by the reporting team are shown in Appendix C to this report.
- 3.2.6 Due to the transfer of responsibility for the regulatory monitoring of Safety and Environment, from HSE to ORR during 2006/07, it was agreed with ORR and Network Rail, that our mandate for this year would exclude the audit of Section 5 of the Annual Return, Safety & Environment.

4 Assessment of compliance

4.1 Compliance with requirements

Access to information and timing

- 4.1.1 Under the terms of our contract, Network Rail are obliged to provide full access to data, information and personnel required for our reporting team to carry out the audits.
- 4.1.2 We can confirm that we received the necessary co-operation from Network Rail in organising and attending meetings and providing most the information necessary for preparation of our report.
- 4.1.3 We note, however, that due to the timing of the audits, not all the data and evidence was available for some measures prior to or during the audit meetings. For this Final Report we have received all of the data and evidence requested.

Audit organisation and preparation

- 4.1.4 Due to the functional organisation of Network Rail, audit meetings have been organised individually between the auditor(s) and auditee(s) rather than coordinated by Network Rail personnel at each location, or through the HQ champions. Generally, the organisation of the audits with HQ, Territory and Area personnel has been good with minor exceptions.
- 4.1.5 The extent of preparation for audits varied considerably between Network Rail personnel. In some audits it was clear that there had been significant preparation, with copies of the reported figures, local procedures, and in some cases, supporting audit trails provided before or at the meetings. In other cases, the preparation was much less complete.

Form and Content

- 4.1.6 Network Rail's Annual Return 2007 is compliant with ORR's requirements as set out in the "Form of the 2007 Annual Return".
- 4.1.7 In last year's report, we identified the following issues with the general report format of the Annual Return 2006:
- (a) There was an inconsistency in units and the rounding of figures which impacted the ability to discern trends; this was particularly the case for the average condition measures (M6, M8, M13, M14, M15, M16, M17, M19);
 - (b) The format of tables in the Annual Return was subject to change without approval, leading to presentation of data that was not required and loss of data that was required for the purposes of trend analysis.
- 4.1.8 We note that these issues have not been rectified in Network Rail's Annual Return 2007.

4.2 Regulatory targets

4.2.1 The ORR Access Charges Review 2003 set targets for Control Period 3 (2004/05-2008/09); the targets for 2006/07 are further described in our audit commentaries. Figure 4.2.1 shows Network Rail's performance against the regulatory targets reported in the Annual Return.

4.2.2 The colour coding in Figure 4.2.1 is based on the targets:

- (a) Red: outside nominal target (target missed);
- (b) Green: inside the nominal target (target achieved).

Measure	06/07 target	06/07 result
Operational Performance		
Total Network Rail caused delay (million minutes)	≤10.6	10.5
Total delay minutes/100 train kms (franchised passenger operators)	≤2.12	1.92
Number of broken rails (M1)	300	192
Track geometry (M3)		
35mm Top 50%	62.4	70.0
35mm Top 90%	89.2	92.3
35mm Top100%	97	98.1
35mm Alignment 50%	72.7	79.0
35mm Alignment 90%	92.9	95.0
35mm Alignment 100%	96.5	97.5
70mm Top 50%	63.6	72.2
70mm Top 90%	92.4	94.7
70mm Top 100%	95.3	96.7
70mm Alignment 50%	79.5	82.9
70mm Alignment 90%	95.8	97.3
70mm Alignment 100%	97.2	98.3
Track geometry – level 2 exceedences (M5)	0.9	0.72
Condition of asset TSRs (M4)		
Number	≤942	710
Severity	≤4,622	3246
Earthworks Failures (M6)	≤47	90
Signalling failures (M9)	≤28,098	22,704
Signalling asset condition (M10)	≤2.5	2.39
a.c. traction power incidents causing train delays (M11)	≤107	69
d.c. Traction power incidents causing train delays (M12)	≤30	11
Electrification condition – a.c. traction feeder stations & track sectioning points (M13)	≤2.1	1.88
Electrification condition – d.c. substations (M14)	≤2.2	1.64
Electrification condition – a.c. traction contact systems (M15)	≤1.9	1.7
Electrification condition – d.c. traction contact system (M16)	≤1.8	1.9
Station condition index (M17)	≤2.25	2.24
Light maintenance depot – condition index (M19)	≤2.63	2.56
Network Rail Asset Stewardship Incentive Index (ASII)	≤0.90	0.72
Renewal Efficiency: Budget Variance Analysis	≥22%	23%

Figure 4.2.1 Performance against regulatory targets in Annual Return 2007

4.2.3 In 2006/07, Network Rail has bettered nearly all of the targets set in the ORR Access Charges Review 2003.

4.3 Confidence grades

- 4.3.1 Figure 4.3.1 shows the confidence grades our reporting team have assigned to describe the reliability and accuracy of the data in the 2007 Annual Return using the mandated grading system. Details of this grading system are set out in Appendix D of this report.
- 4.3.2 We have assigned confidence grades to each measure in the Annual Return. Our assessments are based on our audit findings which are described for each measure in our audit report and commentary.
- 4.3.3 These confidence grades may change during each audit cycle due to (a) changes in the methodology for collecting and reporting each measure and (b) each cycle adding to our understanding of Network Rail's reporting processes, allowing a more comprehensive application of the confidence grading system. These grades should be viewed in conjunction with the individual audit report and commentary for each measure to understand any variations in data quality year-on-year.

Measure	2007 Confidence Grade
Operational Performance	B2
Customer & Supplier Satisfaction	A2
Joint Performance Process (JPP)	B2
Route Utilisation Strategies (RUSs)	BX
Linespeed capability (C1)	B2
Gauge capability (C2)	B2
Route availability value (C3)	B2
Electrified track capability (C4)	B2
Mileage	B3
Freight Gross Tonne Miles	B2
Number of broken rails (M1)	A1
Rail defects (M2)	B3
Track geometry (M3 & M5)	A1
Condition of asset temporary speed restriction sites (M4)	B2
Earthworks Failures (M6)	A2
Bridge condition (M8)	B2
Signalling failures (M9)	C4
Signalling asset condition (M10)	B3
a.c. traction power incidents causing train delays (M11)	B2
d.c. Traction power incidents causing train delays (M12)	BX
Electrification condition – a.c. traction feeder stations & track sectioning points (M13)	B2
Electrification condition – d.c. substations (M14)	B2
Electrification condition – a.c. traction contact systems (M15)	C3
Electrification condition – d.c. traction contact system (M16)	C4
Station condition index (M17)	B3
Station facility score (M18)	B2
Light maintenance depot – condition index (M19)	B4
Network Rail Asset Stewardship Incentive Index (ASII)	BX
Track Renewal Volumes (M20, M21, M22, M25)	B2
Signalling Renewed (M24)	C3
Structures Renewal & Remediation Volumes - (M23)	A3
(M26, M27, M28, M29)	A1
Maintenance Efficiency: Unit Costs	C5
Renewals Efficiency: Unit Costs – Track	B2
Renewals Efficiency: Unit Costs – Structures	B2
Renewals Efficiency: Budget Variance Analysis	B2
Route Expenditure	A2
Debt/ RAB Ratio	A1
RAB Volume Incentive	B3

Figure 4.3.1 Confidence grades for the measures in Annual Return 2007

5 Audit report and commentary – Operational performance

5.1 Operational Performance

Audit scope

- 5.1.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 1, Operational Performance, including Tables 12 - 40.
- 5.1.2 Operational performance is measured using:
- (a) Public Performance Measure (PPM; ORR KPI 2); the measure provides a simplified measure of lateness at destination of passenger trains and cancellations;
 - (b) Delays to all passenger and freight train services attributable to Network Rail (ORR KPI 3); the measure is defined as the total number of delay minutes (greater than pre-defined thresholds) for which Network Rail is responsible;
 - (c) Delays to franchised passenger train services attributable to Network Rail;
 - (d) Infrastructure incidents recorded for attribution of delay (ORR KPI 4).
- 5.1.3 Following internal consultation within the Reporter team and discussion with Network Rail, the 2007 audit has concentrated not on data analysis as in previous years but on examining the robustness of Network Rail's own processes for ensuring data quality and accuracy of reporting. If the base data is correct (and if it is checked to be so), then any inaccuracies will occur as a result of failure in process. We expect Network Rail to have in place its own processes to monitor this essential part of its activity.
- 5.1.4 The audit comprised:
- (a) Interviews with Headquarters Data Quality Specialist
 - (b) Interviews with three Route Performance Teams: London North Eastern, London North Western and Kent.

Commentary on reported data

Regulatory target

- 5.1.5 There is no regulatory target for PPM. The industry objective for PPM for 2006/07 was to achieve at least 87.6%. The result for 2006/07 is 88.1%. This objective has therefore been met.
- 5.1.6 ORR has set the objective of meeting or improving upon the targets for minutes delay attributed to Network Rail on a declining trajectory as set out in the Access Charges Review 2003.
- (a) The regulatory target for delays to all passenger and freight train services attributable to Network Rail in 2006/07 was 10.6 million delay minutes. The result reported by Network Rail for 2006/07 was 10.5 million delay minutes which would meet the regulatory target. It should, however be noted that this is no better result than the 10.5 million delay minutes in 2005/06, suggesting, when additional train kilometres are taken into account, that the real improvement in reducing train delays in 2006/07 is very small.
 - (b) The regulatory target for delays to franchised operators in 2005/06 was 2.12 minutes per 100 train km. The result reported by Network Rail for 2006/07 was 1.93 minutes per 100 train km which would meet the regulatory target.
- 5.1.7 There is no regulatory target for infrastructure incidents recorded for attribution of delay (ORR KPI 4).

Trend

5.1.8 Figure 5.1.1 shows that the delay per 100 train kilometres for all operators increased by 0.9% compared to 2005/06. In percentage terms, the greatest increase was 133.3% for 'Severe weather/ structures' and the greatest decrease was 16.7% for 'Autumn leaf fall & adhesion'. In numeric terms, the greatest increase was 524,278 minutes for 'External weather impact' and the greatest decrease was 218,569 minutes for 'TSRs due to condition of track'.

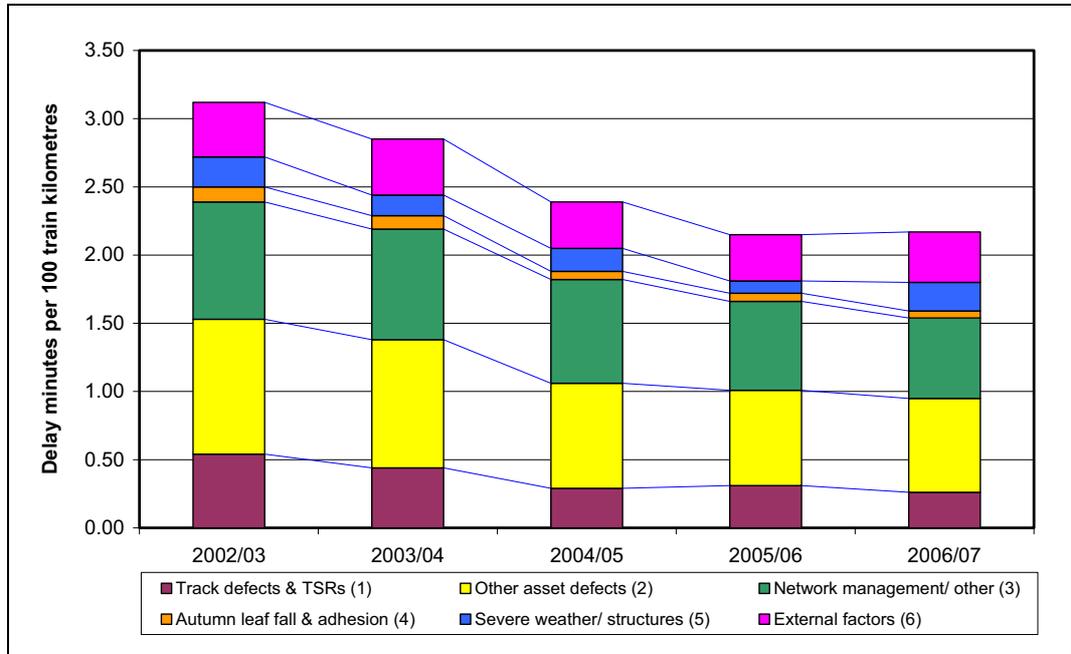


Figure 5.1.1 Delay minutes per 100 train kilometres²

5.1.9 Figure 5.1.2 shows that the number of infrastructure incidents causing delay increased by 3.1% compared to 2005/06. Scotland had the only reduction (3.6%) in total number of infrastructure incidents. Wessex had the highest increase with 22.2%, followed by Sussex with 12.9%.

² Figure 5.1.1: (1) 'Track defects & TSRs' include broken rails, other track faults and speed restrictions for condition of track and rolling contact fatigue. (2) 'Other asset defects' include points, track circuits, signal and signalling system failures, overhead power/third rail supply etc. (3) 'Network management/ other' includes possessions, signalling errors, timetabling, dispute resolution and unexplained. (4) 'Autumn leaf fall & adhesion' include leaf fall related delays and Network Rail's share of industry adhesion delays. (5) 'Severe weather/ structures' includes direct delays due to severe weather and all structures delays, which include weather related delays due to embankment instability risks, bridge scour and flooding; heat-related speed restrictions are also shown within this category. (6) 'External factors' include road-related incidents, fires, trespass and vandalism, security alerts, suicides and other external events.

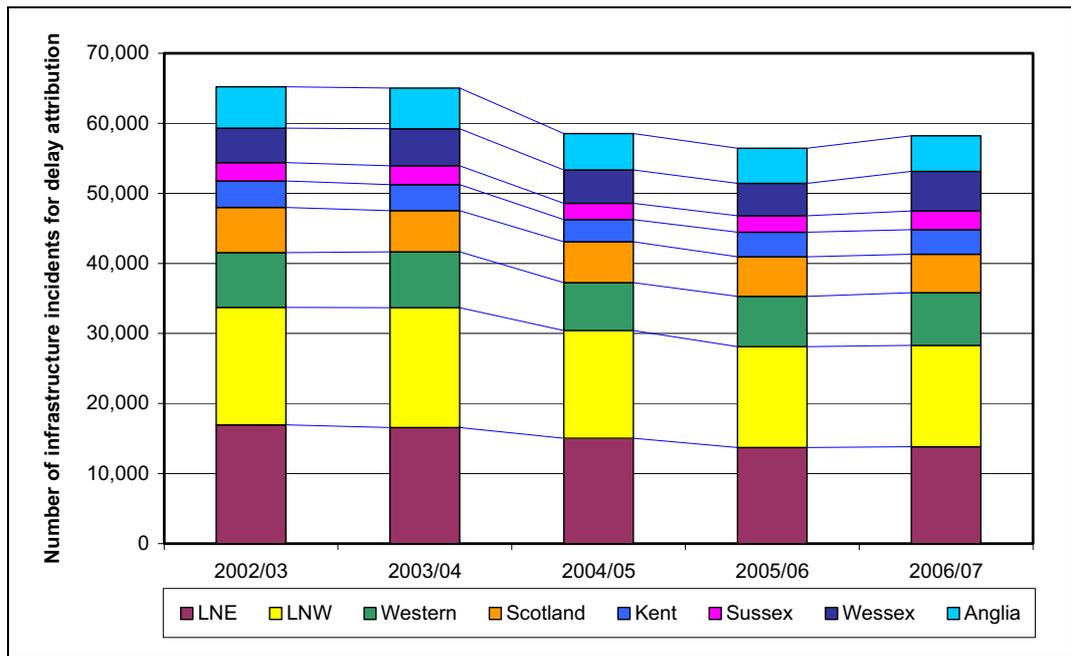


Figure 5.1.2 Number of infrastructure incidents per Route recorded for delay attribution

5.1.10 For the following categories the numbers of incidents for 2006/07 are at their lowest level reported within the last 5 years:

- (a) 103 – Level Crossing failures;
- (b) 104A - TSR's Due to Condition of Track
- (c) 301A – Signal failures;
- (d) 301B – Track Circuit failures;
- (e) 302B – Other signal equipment failures.

5.1.11 In contrast, the following elements are at their highest level for 5 years:

- (a) 104B – Track faults, including broken rails
- (b) 106 - Other infrastructure
- (c) 108 - Mishap - infrastructure causes
- (d) 201 – Overhead line/third rail faults
- (e) 302A - Signalling System & Power Supply Failures
- (f) 303 - Telephone failures
- (g) 304 - Cable faults (signalling & comms.)

5.1.12 Some of these categories can be explained in relation to external factors, such as cable theft. Moreover, when delay minutes are looked at, rather than number of incidents, none of these factors turn in a similarly poor performance, suggesting that Network Rail may be prioritising resources at the areas of greatest impact. Alternatively, service recovery may be improving.

Audit Findings

Process

- 5.1.13 **Collection of base data.** Delay and incident data for these measures is collected within TRUST (Train Running System). Actual train running is recorded at a number of pre-determined points on the network. Monitoring points are graded Gold, Silver or Bronze, according to their relative significance in terms of train service performance. Inputs from these points are either delivered automatically (for example, by a train triggering a track circuit) or have to be made manually (by signallers or other railway staff such as shunters in freight yards). Network Rail estimate that around 80% of the network is covered by automatic recording; for the rest, manual intervention is required, either from an individual entering the data into a TRUST terminal, or by an individual telephoning or faxing a centralised office where the data is entered.
- 5.1.14 **Delay Attribution.** Initial attribution for all delay over 3 minutes is made by Network Rail Train Delay Attribution Staff (Level1). If the delay is a result of a TOC cause, delay is passed to the TOC for acceptance. If the delay is attributed to a Network Rail cause, then the responsible manager has the opportunity to challenge the attribution. The target is to attribute Level One delays on the day they occur, and to resolve any issues over attribution by the end of day 2. Failing resolution, they pass to stage 2 of the process. At Level 2, incidents are reviewed daily by the Level 2 team. All decisions taken are reviewed, together with evidence on the incident. Where appropriate, dialogue is continued with an Operator in an attempt to establish the root cause of the incident, leading eventually to an agreed attribution. Under the industry process, incidents must be cleared by Day 8, or pass to Level 3, where any contractual issues and interpretation of the Network Code is handled. If no resolution can be found at Level 3, then the incident passes to an appointed Level 4 manager, and then to the Delay Attribution Board. If there is still no agreement, then the Access Dispute Panel is the final arbiter.
- 5.1.15 Specific guidelines for delay attribution are contained in the Delay Attribution Guide (DAG). This attempts to define situations in which delay may occur, and specify the appropriate allocation of responsibility in each case to ensure that delay is attributed in a manner that is accurate and consistent. However, issues over interpretation do arise.
- 5.1.16 **Systems.** The data is managed and reported using a variety of systems including TRUST, PALADIN (the archive of TRUST data) and "PUMPS". PALADIN is used to monitor Network Rail's targets in relation to absolute delay minutes. In addition, TOCs use the "Bugle" system to monitor PPM performance. Use of PALADIN / "PUMPS" is now being replaced by a new data warehouse (PSS) and reporting tools.

Quality and accuracy checks – TRUST

- 5.1.17 **Completeness of data.** The integrity of the performance reporting system depends in the first instance on data within TRUST being as complete as possible. Each Route covered by the audit had in place a process to ensure that TRUST is reporting as required. Typically, this involved the monitoring of the most important reporting points, ensuring that every train is picked up at that point as it should be. However, with around 20% of reporting points relying on manual reporting, there is potential for errors to occur.
- 5.1.18 **Berthing times.** Each TRUST berthing time is audited under a 5-year programme (current programme started 2007). TRUST records the time each train steps into and out of each TRUST berth and compares them with the times programmed into the system. This base timing data is being audited to check that the times programmed are accurate. This is particularly important as TRUST was originally set up in minutes and now records to the second. Audits are done for a representative sample of trains across each berth step. Where differences are found between the TRUST time and the audited time, a Recording Point Change Request form is completed. In the short term, the timing will be treated as a Network Delay and local delay attribution staff will be advised to make a manual adjustment to the timings. The process is thus to highlight an error, prove the error and change the base berth timings within TRUST to remove the error.

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- 5.1.19 Berthing errors are also sometimes highlighted by TOCs for example, where TOC staff are themselves monitoring timings at a station. Where a TOC brings this to Network Rail's attention, the timings are firstly verified. Where it is proven that there is a discernible error within TRUST the location is listed as a priority in the berth checking programme (see above).
- 5.1.20 Berth timings are also checked when new signalling schemes are implemented.
- 5.1.21 **Junction timings.** Key junction timings within TRUST are also monitored. Where junctions are highlighted as potentially having incorrect timings (perhaps as a result of TOC monitoring), then Network Rail will do a performance audit at the location. If the error is proven, then in the short term it will be treated as Network Delay and adjusted manually; in the longer term, it will go through the Change Request process allowing it to be permanently corrected within TRUST.
- 5.1.22 **TRUST sections.** Although recording points are predetermined (see 5.1.13 above), review of performance data (for example, key points at which delay is occurring) is leading Network Rail to highlight over points on the network at which it is desirable to undertake detailed reporting in order to identify why delay is occurring. Evidence gathered during our audit suggests that proactive Route Performance Teams keep adding additional reporting points where benefit from this can be identified.
- 5.1.23 London North Western is currently reviewing all TRUST sections with a view to breaking them down into smaller units thereby improving delay attribution data quality.

Quality and accuracy checks – 1st level attribution

- 5.1.24 **Role of data quality specialists.** Each Route has data quality specialists within the performance team, with the specific remit of ensuring that delay is allocated in accordance with the Delay Attribution Guide. Their remit additionally includes ensuring adherence with the DAG and the Network Code. Our audit suggests that processes and tools for this vary very slightly from Route to Route, although common strands run throughout. These include reviewing all Day 2 incidents in dispute and their attributions, with feedback to Level one staff via their line manager where delay has been attributed incorrectly; audit on the history of the attribution of delay to an incident, allowing decisions to be re-examined and; the production of regular data quality reports detailing statistics and trends.
- 5.1.25 **Iteration with Operators.** The delay attribution process is an iterative one, mandating interaction between Network Rail and the Operator involved. Each day, operators review incidents that have occurred on the previous day and that have been attributed to that operator. When incidents and associated delay minutes are allocated to a TOC by Network Rail at Level One (see 5.1.14 above) then these must be accepted by that Train Operator for the incident to be closed. If this acceptance is not achieved (for example, due to misattribution, or more commonly, insufficient information), then the incident remains open. This level of iteration provides an immediate counter check on the attribution. At present, responsibility must be accepted by the end of Day 2 (that is, the day after it occurs) or go to dispute. In practice, this means that a number of incidents pass into dispute simply because information is not available within 48 hours to resolve the attribution. Routes have found a variety of different means of managing around this restriction. For example, Kent has chosen to extend the period within which issues must be resolved to 8 days, whilst London North Eastern has different codes for attributions awaiting further information and those genuinely in dispute. Where incidents are over a day old and neither accepted nor disputed then the system accepts it on behalf of the operator.

- 5.1.26 **Iteration within Network Rail.** A similar process to that outlined in 5.1.25 above is also in place internally within Network Rail allowing responsible managers against whom incidents and associated delay minutes have been allocated (for example, signalling) to challenge the allocated to their function if they feel it has been allocated inappropriately. Again, this drives further accuracy in attribution. It is unclear to us, however, whether the process is consistent across the network. For example, one Route team has a clear framework of guidance and, for example, has agreed a list with signal performance engineers of what is and is not signal failure in relation to delay attribution. This level of working together is helping to improve delay attribution. However, we are not certain that it is consistent across the network.
- 5.1.27 **“SATIN” and other audits.** Each of the Routes we visited carried out some form of audit on the performance of Level One staff. This monitoring allows the identification of particular types of incidents that repeatedly cause problems and differences in interpretation in terms of attribution, as well as identifying staff who may need extra training and support. London North Eastern undertakes audits on around 5% of incidents, using “SATIN” to trace all interventions in the management of the delay attribution process. Each incident in the sample (which is spread across all Territory Delay Attributors (TDAs)) is checked to ensure it has been treated in accordance with the Delay Attribution Guide. When current management processes were first introduced within LNE during 2006, accuracy was found to be around 70%, that is, around 30% of incidents were being attributed inaccurately. Following the introduction of the audits, using the results in the management and development of Level One staff, London North Eastern’s audits suggest that accuracy is now nearer 95%. Within Kent, the team estimates their accuracy is now 99%. Once the Performance Systems Strategy (PSS) is introduced, Routes are expecting to be able to undertake a 100% audit on Level One decisions.

Quality and accuracy checks – system level.

- 5.1.28 There are a number of cross checks within the system. Firstly, the HQ and Route performance teams monitor the correlation between PPM and Delay minutes which would highlight any major discrepancies that might arise. Secondly, the current data system delivers route data, and incident data from separate runs and the results are cross checked. Thirdly, every period’s worth of data is run at least 3 times, with the runs being checked for consistency. Fourthly, the HQ team draws down a daily report from PALADIN. At the end of the period, the period reports from the Routes are cross checked with the daily reports already received; both sets of reports are drawn from the same reference data but the files are ordered separately. Finally, the data quality specialist within the HQ team runs data quality audits and checks.

Delay Attribution Board

- 5.1.29 The Network Code defines the purpose of the Delay Attribution Board as “to manage and oversee the effectiveness and accuracy of the delay attribution process”. In 2005/6 there were 12 referrals to the Board; in 2006/07, just one. This means that no attribution dispute has gone to the Access Dispute Panel. This reflects the improved relationships between Network Rail and the TOCs in the area of performance management, as well as increasing accuracy in delay attribution (at least in terms of compliance with the Delay Attribution Guide) on the part of Network Rail.

Quality and accuracy checks – 1st level attribution

- 5.1.30 **Removal of small minutes agreements.** The small minutes agreement was introduced in the aftermath of the Hatfield incident, when both TOCs and Network Rail were struggling to manage the amount of delay occurring. The agreements defined a process by which minor delay minutes for which there was no immediate explanation would be allocated between Network Rail and the TOCs. At the time, this was a pragmatic expedient that allowed the industry to focus on principal causes of incidents and associated delay. With performance now vastly improved from the 2001 position, Network Rail is seeking to remove the small minutes agreements in order to move from generic “no obvious cause” allocations to a real understanding of the root cause of delay. One way in success is being monitored is through the reduction in commercial take back minutes (those minutes allocated to a TOC but for which Network Rail agrees to take back responsibility during the dispute resolution process), which are showing considerable reductions.
- 5.1.31 **Other quality improvement initiatives.** Following the 2005 report into Delay Attribution, Network Rail has developed the Delay Attribution Reform Programme. This has a number of workstreams including the improvement of Operations Control and the realigning of reporting lines for Level 1 Delay Attribution Staff to bring them within the Route Performance Teams. It has also led to the introduction of a Headquarters post in September 2006 with a remit to improve the delay attribution process. Work in progress includes the development of KPIs by attribution by TOC by route, looking at numbers of disputes by TOC on Day 2, 8 and 42. This will in future provide some measurement of the accuracy and efficiency of Level 1 staff in particular in relation to delay attribution, although the measure will be influenced by the quality of the relationship between a particular TOC and Network Rail.
- 5.1.32 Also in development is “IDAS”, a system that will automatically allocate reactionary delay to incidents within TRUST; this will both reduce the risk of error during the initial Level 1 attribution process and free resources currently invested in manual reporting to concentrate on investigating route causes and in particular, to attribute delay minutes accurately from the beginning of the process. Initial tests of the system suggest it can allocate around 86% of reactionary delay, and deliver improvements in accuracy of around 3-4%
- 5.1.33 The delay attribution process itself is also under examination. Network Rail is exploring the development of a “zero tolerance” approach to performance, such as is already adopted in the management of safety. This is leading to a more rigorous root cause analysis of delay and is targeted at driving avoidable delay minutes out of the system. Key elements include:
- (a) Automatic allocation of incidents and associated delay (using “IDAS”)
 - (b) Root cause analysis/proposal of new logic to replace DAG
 - (c) Evaluation of systems integration, for example, drawing in data from the Fault Management and Safety Management information systems (FMS, and SMIS) to give analysts a wider range of information.

Organisation

- 5.1.34 The size and precise composition of performance teams was found to vary by Route; however basic structures were the same, and any variation in line with local route characteristics.
- 5.1.35 Organisations typically comprise Level 1, Level 2 and Level 3 staff (reflected in the hierarchy of decision making within the delay attribution process). Some Routes locate Level 1 staff entirely within Control; others split them between Control and major Signal Boxes. There seem to be benefits to both arrangements; in practice, there is no single ideal solution, and location will tend to reflect the size and nature of the route concerned. Until December 2006 Level 1 staff reported through the Operations teams. However, reporting lines are now through the Route Performance Team.

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- 5.1.36 Level 2 staff typically have roles including cross-checking delay attributions made by Level 1 staff and resolving attributions.
 - 5.1.37 Level 3 staff are responsible for the resolution of delay attributions disputes. Again, prior to the recent re-organisation, these staff typically sat within the Commercial organisation, with the result that the focus was often on protecting Network Rail's commercial position, rather than identifying the root cause of delay.
 - 5.1.38 We found unanimous support for the new organisation throughout the audit, along with a general consensus that it is proving instrumental in a step change improvement in train service performance management and improvement, including in the areas of delay attribution and root cause analysis of why delays occur.

Training and briefing

- 5.1.39 Training courses are available for new TDAs and although technical training is not mandatory, feedback from the Route Performance teams suggests that new staff are properly inducted. There are 2 approved formal 5-week courses at Leeds and Watford available for TDAs.
- 5.1.40 Where changes are made to procedures, all Level 1 staff receive a full brief. This will be done electronically initially, to ensure everyone has timely information. In addition, staff receive regular face to face briefings on a monthly cycle. When changes are made to the Delay Attribution Guide, staff are briefed face to face on the key changes.
- 5.1.41 Incidents misallocated during the Level 1 process will be picked up during the Level 2 review where an error has been made, the member of staff concerned will typically be re-briefed.
- 5.1.42 Periodic meetings are held by the Route Performance Managers for all routes. Similar, Performance Measurement Managers (or designated equivalents) also meet regularly. The purpose of the meetings is to discuss current performance issues with a view to obtaining consistency of delay attribution and decision making across the country.
- 5.1.43 During our audit we found a number of examples of exchanging best practice between Routes. This came through both the formal movement of staff between Routes, and through close co-operation between different Route performance teams. We also found an encouraging number of examples where TOCs and Network Rail were working together to improve staff performance.

Assessment of confidence grade

- 5.1.44 **Reliability grade.** The definition of these measures is documented. Network Rail has established procedures to report and analyse delay information. During the latter part of 2006, Network Rail has significantly reorganised the structure and reporting lines of performance management teams. We believe the full benefit of this should be felt during 2007. In all the Routes we sampled there was evidence of not only consistent performance management procedures but also a sharing and seeking out of best practice and a genuine desire for even further improvement. Given the newness of the new management arrangements, and the number of improvement initiatives in place, we believe operational performance measures should have a reliability grading of B.
- 5.1.45 **Accuracy grade.** Network Rail has the processes in place to monitor the quality of the data input via the TRUST reporting points and has demonstrated how changes are managed. The delay attribution process is carried out competently with different levels of audit in the Routes we sampled. All the Routes we sampled demonstrated to us significant improvements in the accuracy of delay attribution. We believe the range of initiatives currently being implemented should improve this still further in 2007. We believe operational performance should have an accuracy grade of 2.

Audit Statement

- 5.1.46 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Operational Performance. We have audited the processes and procedures that create the PPM, delay minute and infrastructure failure measures. We can confirm that those procedures are improving in robustness and quality. We recognise that much work is proceeding to improve the quality of the information. The data has been assessed as having a confidence grade of B2. The regulatory targets for these measures have been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 5.1.47 **Operational Performance recommendation 1.** We have no doubt that the performance initiatives in hand arise in part from the high level of resource (especially people) being dedicated to this area. We recommend that the current resource base continue to be maintained with funding made available for systems improvements (subject to appropriate business cases being made).

Observations relating to spreading of best practice and/or improvements to process

- 5.1.48 **Operational Performance observation 1.** We found significant examples of good practice in the Routes sampled. Whilst some information exchange does occur through cross-route forums, we found no formal mechanisms for exchanging this Best Practice (for example, through staff placements, or best practice forums), with exchange tending to rely on proactive individuals. We consider that during 2007 Network Rail should identify and recognise specific areas of best practice, leading to the development and trial of mechanisms to deliver exchange.
- 5.1.49 **Operational Performance observation 2.** At present, there is no regular and on-going benchmarking between Routes although Network Rail route targets for 2007/8 have been based on benchmarked information. It is therefore difficult to judge where the best performance is occurring both in terms of ensuring data quality and in terms of performance management. We consider that Network Rail should examine the benefits of developing a periodic report benchmarking Route Performance (arguably the PPM measure already delivers this for TOCs, but not Routes).
- 5.1.50 **Operational Performance observation 3.** At present, analysis and reporting is based on all delays over three minutes. Whilst this has helped to ensure that causes of major delay have been identified and tackled, parallels from railway safety suggest that pre-cursors may be important in terms of identifying future issues (rather than events that have already happened). There may, therefore, be a case for evaluating the merit in extending analysis to all delay.
- 5.1.51 **Operational Performance observation 4.** Current targets are based on the assumption that infinite improvement in performance is achievable and desirable. In practice, this may not be the case. Operational performance is a complex issue and we are aware that there is no such thing as a "base case", that is, no one has been able to define what the optimal performance level is for the current network and mix of services. The fact that performance this year has been stable, despite valiant efforts by Network Rail to improve, suggests that equilibrium point may be being reached. If this is the case, then simply doing more of the same will not obtain improvements in future years.

5.2 Customer & Supplier Satisfaction

Audit scope

- 5.2.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 1, Customer and Supplier Satisfaction, including Tables 41 - 43.
- 5.2.2 These three measures provide an indication of the way in which Network Rail is regarded by some of its primary stakeholders. The data to produce the measures is gathered through primary research and specifically:
- (a) A survey of levels of satisfaction with Network Rail's performance as a supplier, as perceived by passenger train operators;
 - (b) A survey of levels of satisfaction with Network Rail's performance as a supplier, as perceived by freight train operators;
 - (c) A survey to measure levels of satisfaction amongst Network Rail's key suppliers.
- 5.2.3 Network Rail measures satisfaction using externally-administered multi-question opinion surveys. The surveys contain a number of questions, designed to help Network Rail understand how customers and suppliers feel about doing business with the company. A single question from this survey is used to provide the data reported in the Annual Return; this question is "Which of these best describes how you feel about Network Rail?" and the possible responses are:
- (a) I would be critical without being asked (scores -2);
 - (b) I would be critical if someone asked my opinion (scores -1);
 - (c) I would be neutral if someone asked my opinion (scores 0);
 - (d) I would speak highly if someone asked my opinion (scores +1);
 - (e) I think so much that I would speak highly of them without being asked (scores +2).
- 5.2.4 The reported data is the average of the scores associated with the respondents' answers weighted for the population of respondents.
- 5.2.5 This audit was undertaken at Network Rail Headquarters and at the premises of Ipsos MORI who carry out the customer and suppliers surveys on behalf of Network Rail.

Commentary on reported data

Regulatory target

- 5.2.6 There is no regulatory target for these three measures. However, Network Rail's 2005 Business Plan sets an internal target of "year on year improvement".

Trend

- 5.2.7 Figure 5.2.1 below shows improvement in all categories this year. In particular, the score for Suppliers has moved into the positive and that for Freight Operators is now neutral. Whilst the perception of Rail Operators remains negative, this too has improved during the year. However, it should be noted that the graph does not strictly compare like with like; adjustments were made to the methodology of both the Suppliers and Operators survey this year that could potentially have influenced the results positively. The changes to the survey methodology make it very difficult to compare the year on year result. It should also be noted that the 2006/07 survey was conducted just six months after the 2005/06 survey as compared with previous years when there was a twelve month time period.

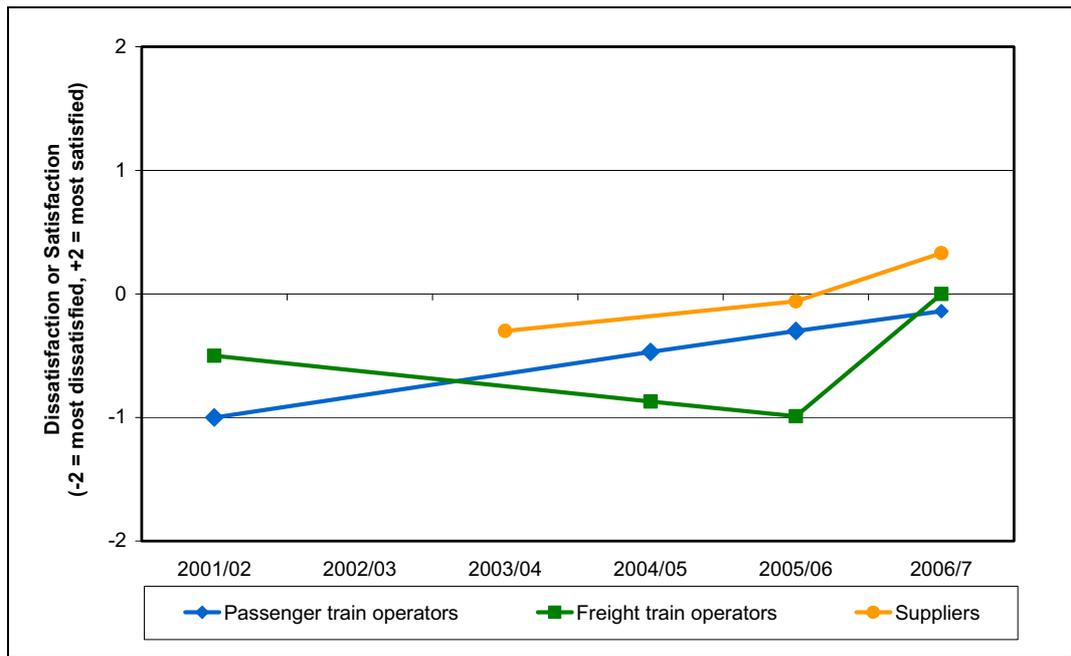


Figure 5.2.1 Customer & Supplier Satisfaction

Audit Findings

Process

- 5.2.8 The data which comprises the customer and supplier satisfaction survey is collected by an external market research company, Ipsos MORI who have particular expertise in this area of work. Survey work is undertaken annually and content is structured such that changes in opinions and attitudes can be monitored.
- 5.2.9 For the customer survey, the 2006 survey was undertaken on a total population basis in that all Network Rail’s TOC and Rail Freight Customers were included in the sample. However, it was not practical to undertake a total population survey of all individuals within those companies who work with Network Rail on a regular basis. A sampling frame was therefore designed to be representative of the relationships between Network Rail and its customers.
- 5.2.10 244 TOC and FOC managers were interviewed by phone (against a target of 182), with each interview lasting in the region of 20 to 25 minutes. This is a change to last year’s methodology, which relied on self-completion surveys. This has both increased the response rate and the level of detail in the data collected. Results were weighted in terms of the percentage of network kilometres by operator, so that TOCs who use the network most heavily were represented more strongly in the survey sample than lighter users.
- 5.2.11 For the supplier survey, the sample comprised those suppliers identified by Network Rail as most important to its business, whether in terms of volumes of work undertaken, or specialist skills supplied. The sample is structured, based on a matrix which covers a representative sample not only of companies, but also different geographical and technical areas. 57 interviews were conducted with CEOs and other senior managers and technical experts. Interviews were face to face, or where this wasn’t possible, over the telephone. Again, this represents a change from last year’s methodology, where interviews were done solely by telephone. The survey was run as a joint initiative with the Rail Industry Association (RIA). The RIA provides an independent check of questionnaires and of the sample.

- 5.2.12 All research is carried in accordance with best practice and in line with the Code of Conduct of the Market Research Society. Responses are anonymous, although respondents are invited to identify themselves if they wish. All data was collected and analysed through Ipsos MORI who have strong data and other quality processes in place.
- 5.2.13 Network Rail recognises that such surveys only provide one indicator of the strength of their relationships with customers and suppliers, a snapshot on a single day. However, it does provide guidance for managers. Data is analysed down to individual route level and disseminated to managers as part of the background to target setting and decision making in the company.

Commentary

- 5.2.14 The customer survey represents a shift from previous years in terms of the methodology employed. In particular, the sample was smaller and the technique employed allowed for a much more in depth investigation of issues. We believe this move to a more qualitative approach is appropriate. We note however, that one result of the changes is that the opinions of train drivers were not featured in the same way as previous years. Network Rail does additionally conduct other surveys to supplement the results of the satisfaction survey in terms of understanding its customers and we are satisfied that should there be particular issues in relationships to the interface between train drivers and infrastructure operators in the future then a custom designed supplementary survey would be an appropriate tool. We note that Network Rail is adding a survey of third party (enhancement) funders to the research programme for 2007/08.
- 5.2.15 Both supplier and customer surveys are designed to help Network Rail understand where business and managerial effort needs to be targeted. As such, the results are only a single measure within a range of KPIs. Only one measure – the advocacy score – is reported on, although Network Rail are considering the use of a composite measure which reflects scores across a range of individual questions.
- 5.2.16 Satisfaction surveys can be affected by a range of issues and represent how individuals feel about Network Rail on a particular day. We are satisfied that the methodologies used by Network Rail are appropriate.
- 5.2.17 This measure seeks to both measure and to understand how the individuals with whom Network Rail does business feel about the company. As such, it will always be an “imperfect” measure as people’s emotions affect their responses on any one given day. In the application of the surveys, and in the dissemination of the survey results, Network Rail are recognising the importance of customers and suppliers to their daily work and using feedback from them as the basis for improvement.

Assessment of confidence grade

- 5.2.18 **Reliability grade.** We are satisfied that Network Rail has demonstrated to us a statistically-reliable process for conducting the customer and stakeholder surveys. We believe the satisfaction measure should have a reliability grade of A with the caveat that this is a qualitative measure and as such should be considered as only one of a range of KPIs for judging customer and stakeholder satisfaction.
- 5.2.19 **Accuracy grade.** We are satisfied that the weighting processes applied to the response rates are appropriate. We believe the accuracy grade should have a reliability grade of 2.

Audit Statement

- 5.2.20 We have audited the reliability and accuracy of data and commentary presented in Network Rail’s Annual Return 2007 for Customer and Supplier Satisfaction. We have examined the process used to produce the customer and stakeholder satisfaction report and we are satisfied that the survey process is robust and the results are statistically reliable. The data has been assessed as having a confidence grade of A2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 5.2.21 **Satisfaction recommendation 1.** The measure reported is a single element in a much wider survey. We believe there may be benefit in the development of a second score, potentially a composite measure based on a number of attitudinal questions. However, we believe the true value of this survey lies not in the scores themselves, but in the changes and improvements that Network Rail make based on this and other KPIs.

Observations relating to spreading of best practice and/or improvements to process

- 5.2.22 We have no observations for this measure.

5.3 Joint Performance Process (JPP)

Audit scope

- 5.3.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 1, Joint Performance Process (JPP), including Tables 44 - 45.
- 5.3.2 The measure reports progress on the production of annual Joint Performance Improvement Plans (JPIPs) as part of the Joint Performance Process (JPP); this measure does not report on the content of JPIPs. The requirement to undertake a Joint Performance Process with train operators and create the associated JPIPs was included in the Network Code (condition LA) on 27 March 2006; all franchised TOCs opted-in from that date.
- 5.3.3 The audit comprised meetings with Headquarters and local managers responsible for the production and maintenance of JPIPs. Three JPIPs for individual train operators were sampled. The sample was not random but was representative of both service mix and size of activity. We held interviews with Route commercial & performance teams responsible for First Great Western, Merseyrail and Kent.

Commentary on reported data

- 5.3.4 There is no regulatory target for this measure as part of the Annual Return.
- 5.3.5 Notwithstanding this, our summary of the regulatory requirements on Network Rail in respect of this measure is:
- (a) Maintain governance arrangements for the process, including process/ procedural documentation;
 - (b) Maintenance of sufficient resources to develop JPIPs;
 - (c) Production of a programme for the annual production of JPIPs;
 - (d) Production of the JPIPs to meet the programme.
- 5.3.6 Network Rail has produced a set of governance structures with individual train operators, including process documentation and output templates, maintained sufficient staff to develop the JPIPs, and maintained JPIPs for twenty train operators, incorporating all the franchised passenger train operators. Network Rail is also evolving joint activity with four open-access passenger train operators.

Audit Findings

- 5.3.7 The Joint Performance Improvement Plan (JPIP) process forms a key part of the Joint Performance Process (JPP) which requires Network Rail and the train operators to establish combined plans to deliver coherent performance improvements. Individual JPIPs are produced for each train operator. The primary metric for measuring the success of JPIPs is the Public Performance Measure (PPM); delay minutes are secondary metrics.
- 5.3.8 The process requires both parties to analyse jointly their current performance, identify and agree individual and joint actions in order for each party to deliver agreed targets based on (amongst other things) franchise commitments for train operators and regulatory obligations for Network Rail.

- 5.3.9 At the time of our previous audit for 2005/6, the JPIP was still a relatively new concept; activity that year concentrated on the development of process and the development and issue of procedural documentation. In contrast, 2006/07 has seen the further development of JPIPs by both Network Rail and TOCs as tools to develop a shared goal for performance improvement and a means of monitoring progress. Having said that, both the Merseyrail and Great Western JPIPs were new ventures; the first was established during 2006/07 as part of an initiative to answer the concerns of MerseyTravel with regard to the local management of the network; the second reflects major changes in the franchise structure during the year. In each case, however, in establishing the JPIP teams benefited from the processes already established and the experience within Network Rail's team.
- 5.3.10 Within each of the Route teams we talked to, the JPIP was seen as a continuous process. The written plan, captured at year end, forms the basis for the management of the next year's improvements, but is subject to flex depending on emerging performance issues.

Organisation.

- 5.3.11 Our sample of Routes covered a variety of operations from London to regional and from main line to urban. As such, responsibility for the JPIP varied; for one Route in the sample the JPIP was the responsibility of the Customer Account team, whilst for the other two it lay within the performance team. We include Merseyrail in the latter category, although the organisation here was developed in direct response to the needs of MerseyTravel. In this case, the JPIP is the responsibility of a dedicated Performance Manager who nevertheless works very closely with the Customer Relations Executive. In each case, adequate and competent resources were available for the development and maintenance of the annual JPIP.

Joint working.

- 5.3.12 The JPIP process seems to be proving effective in developing a shared focus on performance across organisational and contractual divides. All the Route staff we talked to appear to have developed constructive working relationships with the relative Train Operators; two of the three we talked to were located in the same building and had developed strong informal communications processes. In each case, it was stressed that the JPIP provided a "lower level" process that allowed both parties to concentrate on performance improvement even when there may be contractual issues between other parts of their businesses. In particular, joint working gives Network Rail access to the "Bugle" system used by TOCs to manage performance, which provides additional insights into performance not available from Network Rail's own systems.

Process.

- 5.3.13 We found that JPIPs were generally being developed to a similar format, although variations in process and indeed content occurred according to the different natures of Routes. Thus in Merseyside where the TOC maps closely onto the Network Rail Route, a single plan, dual set of measures and shared reports have been developed. In contrast, within Great Western and Kent, dual reporting is in place although the latter aspires to joint reporting. JPIPs are generally being used within the Routes we visited as a shared tool that helps Network Rail and the TOC deliver against their individual internal targets.
- 5.3.14 In developing the plans, we found the teams generally following a consistent process, that is, data analysis to identify performance issues, a baselining exercise to identify schemes and initiatives already in place that are likely to impact on performance and a gap analysis with feedback to infrastructure teams. What is not clear, however, is the extent to which this process is formalised. In particular, the links between the production and monitoring of JPIPs and prioritisation of investment is not clear to us, although at least one of the Routes we reviewed had strong albeit informal processes in place. Generally, infrastructure and other improvements were taken as givens in the plans. We recognise that this is the first full year of JPIPs and would expect the links between JPIPs and investment to continue to evolve as the process matures.

Baselines.

- 5.3.15 We are pleased to see that the periodic moving average has been introduced as the baseline for JPIPs.

Reporting and monitoring.

- 5.3.16 Each of the three Routes audited had firm processes in place for reporting and monitoring on progress. Typically, this consisted of joint four-weekly reporting between Network Rail and the TOC, reviewed formally at internal meetings by both Network Rail and the TOC. These arrangements are typically documented within the JPIP. The JPIP itself is formally reviewed and signed off at the highest level within Network Rail.

Performance Improvement.

- 5.3.17 In each of the cases we examined, the JPIP process has led to focus on specific performance issues, typically using Six Sigma processes to investigate key causes of delay. It was felt by the teams we talked to that the process has led to firm improvements that would otherwise not have been attained.

Delivery of infrastructure and other enhancements.

- 5.3.18 In many cases performance improvement requires some form of improvement action. In some instances, this has been about process and implementation, in particular, the continued focus of front-line staff on performance delivery. However, in some case, infrastructure investment is also required. We were encouraged to find evidence of close working between those within Network Rail responsible for maintaining the JPIPs and various infrastructure managers. In at least one of the Routes we considered, the JPIP process is used to help prioritise investment in maintenance and renewal.

Targets.

- 5.3.19 Targets within the JPIPs are set both in PPM (reflecting TOC targets) and actual delay minutes (reflecting Network Rail's own internal targets). In general, targets were challenging, but achievable.

Delivery.

- 5.3.20 There is evidence that the development of JPIPs is leading to significant performance improvement in the three Routes we sampled. For example, Merseyrail has seen performance against target improve steadily in the periods following the introduction of the JPIP.

Assessment of confidence grade

- 5.3.21 **Reliability grade.** JPIPs were in place and being proactively developed and monitored in the areas under audit. Our principal area of concern relates to target setting for the JPIPs. To some extent, JPIPs appeared to be partly passive; that is, local teams were told what infrastructure schemes and other initiatives were being planned, and the delay minutes this was expected to save. As the established means of formalising joint working between Network Rail and TOCs on performance issues we would expect JPIPs to become even more influential, with a formal link into the business planning and investment prioritisation process. We therefore expect to see this evolve in the future, whilst recognising this is the first full year of JPIPs. We also have concerns about the joint PPM and delay minutes targets. We recognise that under the current industry structure, PPM remains the primary concern of TOCs. However, we believe that pure delay minutes (coupled with a cancellation measure) give a more accurate picture of network performance and help to focus on key priorities for improvement. We would not want to see performance improvement initiatives subverted to 'play the PPM game'. Moreover, the relationship between absolute delay minutes and PPM is a difficult one for many managers to understand. Recognising both these issues we believe the JPIP measure should have a reliability grade of B.

- 5.3.22 **Accuracy grade.** The data reported by Network Rail in the Annual Return is accurate – JPIPs are in place for audited Routes and are leading to significant reductions in delay minutes. We believe the accuracy grade for the JPIP measure as presented in the Annual Return is therefore 1. However, consequent on the remarks in our audit report, we feel that there is still some way to go before accuracy of the forecasting in JPIPs is proven. We therefore deem it appropriate to give JPIPs an accuracy grade of 2.

Audit Statement

- 5.3.23 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for The Joint Performance Process. We have audited the Network Rail JPP process against the requirements set out in the Network Code and against their own procedures. As in 2005/6, we confirm that the basic process is in place and that a high degree of commitment to the joint Network Rail/ train operator element of the activity was found. We assess the confidence grade as B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 5.3.24 **JPIP recommendation 1.** We recommend the continued development of the challenge process for standard and stretch targets. We also recommend the continuing development of reporting such that forecasting accuracy can be monitored enabling Routes that may require support in this area to be identified.
- 5.3.25 **JPIP recommendation 2.** We recommend that the links between the JPIP process and infrastructure maintenance and renewal plans be formally strengthened. The JPIP has the potential to become a powerful tool for driving performance improvement, but is at risk of being seen as a bolt-on, rather than a process that could be influential in business planning.

Observations relating to spreading of best practice and/or improvements to process

- 5.3.26 **JPIP observation 1.** It is very hard to draw the link between Delay Minutes and PPM. Whilst recognising that the current contractual structure of the industry means the latter are of primary importance to TOCs we consider that Network Rail's focus should remain on the former. In several instances during the audits we were told of cases where focussing on delay minutes rather than PPM had led to above-expected returns in PPM improvement. We recognise that this is difficult for Network Rail given the current financial incentive structures but strongly recommend that delay minute focus is not lost in pursuit of PPM.

5.4 Route Utilisation Strategies (RUSs)

Audit scope

- 5.4.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 1, Route Utilisations Strategies (RUSs), including Table 46.
- 5.4.2 Network Rail is required to produce and maintain RUSs as a condition of its network licence (Condition 7 para 3A.1). A RUS is a documented strategy in compliance with Network Rail's Licence Condition 7 to promote "the effective and efficient use and development of the capacity available, consistent with funding that is, or is reasonably likely to become available, during the period of the route utilisation strategy and the licence holder's performance of the duty." The measure reports progress on the production and update of Route Utilisation Strategies, and their compliance with the processes laid down for their production.
- 5.4.3 The Office of Rail Regulation has issued guidelines specifying how Network Rail should develop RUSs. ORR's guidelines identify two purposes of RUSs, namely, to:
- (a) Enable Network Rail and persons providing services in relation to railways to better plan their businesses and funders to better plan their activities; and
 - (b) Set out feasible options for network capacity, timetable outputs and network capability, and funding implications of those options for persons providing services to railways and funders.
- 5.4.4 The ORR additionally requires Network Rail to have regard to the following in the development of RUS:
- (a) Statements from funders in relation to available funds, key outputs being sought and options they would like to see tested;
 - (b) Development of demand forecasting assumptions, including engaging with operators and other stakeholders and regional planning assessments;
 - (c) Establishing what can be done (base-lining);
 - (d) Option Selection;
 - (e) Appraisal Criteria;
 - (f) Governance Arrangements, to ensure the involvement of key stakeholders and the production of a RUS manual that can be used by stakeholders;
 - (g) Development of a programme for RUS for approval by ORR;
 - (h) Allocation of sufficient resources to develop route plans and RUSs.
- 5.4.5 Licence Condition 7.3 A7 also states that the RUS shall from time to time be reviewed by Network Rail.
- 5.4.6 The audit comprised meetings with Headquarters and local teams associated with the production of RUSs. A sample of three regional RUS teams was interviewed, covering the RUS for Scotland, the North West, and ECML. In addition, a meeting was also held with the team responsible for producing the national Freight RUS. The sample was not random but was representative of both different stages of progress and different types of RUS.

Commentary on reported data

- 5.4.7 There is no regulatory target for this measure as part of the Annual Return. Notwithstanding this, the ORR does place requirements on Network Rail in respect of this measure, as outlined in 5.4.4 above.

- 5.4.8 We have found clear evidence of the involvement of funders and stakeholders in the development of the various RUS in progress during 2006/07. The development of each RUS has followed standard flow of technical work, including demand forecasting, baselining, optioneering and appraisal. Whilst the production of the RUSs has placed significant demand on resources, it does not appear that this has been to the detriment of individual RUS. A RUS Manual is published and a programme of work has been agreed with the ORR.

Programme

- 5.4.9 Four RUS reached completion during 2006/07, and a further one was in the final 60-day consultation period at year end. Progress on all RUS is shown in Figure 5.4.1 below.

RUS	Planned Completion Date	Progress
Cross London	November 2006	Established
Cumbria	April/May 2008	At Gap Analysis Stage
East Coast Main Line	December 2007 (revised date)	In formal consultation
East Midlands	January/February 2009	Not started (starts summer 07)
Freight	May 2007	Established
Great Western	August/September 2009	Not Started (starts 2008)
Greater Anglia	December 2007 (revised date)	In formal consultation
Kent	September/October 2008	Not started (starts summer 07, pending decision on Thameslink)
Merseyrail	September 2008 (revised date)	No started (starts summer 07)
Network	April/May 2007 (revised date)	Started January 07
North West	April/May 2007 (revised date)	Published, in final consultation period
Scotland	March/April 2007	Established
South London	December 2007/January 2008	In formal consultation
South Midlands	January/February 2009	Not Started (starts summer 07)
South West Main Line	May 2006	Established
Sussex	August/September 2009	Not Started (starts 2008)
Wales	April/May 2008	At baselining stage
West Coast Main Line	January/February 2009	Not Started (starts summer 07)
Yorkshire and Humber	December 2007/January 2008 (revised date)	At Gap Analysis Stage

Figure 5.4.1 Progress in developing Route Utilisation Strategies at year end 2006/07

Audit Findings

Statements from funders, in relation to funds, key outputs and options.

- 5.4.10 The RUS operate within a wider transport context, including the development of franchise specifications, and contribution to High Level Output Statements (HLOS). The programme was devised as far as possible, to deliver inputs to these processes and to draw on Regional Planning Assessments (RPAs). In practice, timescales have not always allowed for optimal integration between processes. For example, the unplanned re-tendering of the ECML franchise has meant that the RUS was not complete for the franchise process; elsewhere, RUSs have informed RPAs, rather than the other way round. Where RPAs and other strategic guidance has been available, we found evidence that these have been taken into account. Moreover, there has been strong involvement from key stakeholders in the development of each RUS, facilitating compliance with this requirement.

Development of demand forecasting assumptions, including engaging with operators and other stakeholders and regional planning assessments.

- 5.4.11 Each RUS has clearly implemented this, although not all have been able to take RPAs into account (see 5.4.10 above). One RUS in particular, encountered specific issues in relation to Demand Forecasting, where localised market conditions were generating rapid growth that was difficult to account for using generalised demand forecasting techniques. In this case, close involvement with the Train Operator, and a willingness by Network Rail to challenge traditional thinking led to a successful outcome.

Base-lining, Optioneering and Appraisal.

- 5.4.12 From discussions with the four RUS teams interviewed it appears that the methodology for these parts of work has been applied in line with that outlined in the RUS technical guide. As one would expect, some minor variations occur in detailed application, appropriate to local circumstances.

Governance arrangements, including development of a Manual.

- 5.4.13 Network Rail has produced a RUS Manual as required by the Licence Condition. However, this is now two years' old. The document requires updating, in particular to take account to the considerable experience that has been developed by Network Rail in the area of demand forecasting for regional services (which has led to the development of a new approach by Network Rail's in-house demand forecasting team). Our audit last year identified the value of the Manual, and the potential benefits of aligning it with other business process manuals, once the target audience for the Manual (internal employees involved in the production of RUSs or external stakeholders) had been identified. We understand that it has been difficult to resource the updating of the manual, but would recommend that once the planned additional staff are in place, that this is done.
- 5.4.14 Stakeholder management and involvement has been a key part of the governance process for each RUS and engaging with stakeholders has been one of the key challenges of the RUS process. Routes vary in character, with some having a very wide range of stakeholders whilst others have a relatively simple stakeholder structure. For all, however, engaging with stakeholders has been a time-consuming process. In the case of the four RUS we reviewed, there were differences between their approaches to stakeholder management, depending on the nature of the RUS (in particular, local geographic and political considerations). However, all had a regular meeting structure, with close involvement over and above this of the most important stakeholders as partners in the development of the RUS. In all cases, a hierarchy of stakeholders has been identified. Those with the greatest stake in the programme (notably operators and key funders) sit on the Stakeholder Management Group for a RUS throughout its span. Wider stakeholders such as local authorities and user groups were consulted through wider stakeholder meetings held 3-4 times during the process for each RUS. Everyone interviewed under the audit stressed how important the involvement of stakeholders has been to the process, and the many benefits that have flowed and are flowing as a result.

RUS Programme.

- 5.4.15 The RUS programme was changed after a pilot phase, in consultation with ORR. Six RUS were re-programmed, with five delivered later than originally planned. Of these, one encountered technical issues during the demand forecasting phase; a second was affected by open access and other stakeholder issues; the remaining three were adjusted in line with resources and/or as a result of connectivity with another RUS. One has been brought forward at the request of a major stakeholder.

Resources.

- 5.4.16 The process is under the management of Director Planning & Regulation. The Head of Route Planning and a Headquarters team lead the process and provide extensive support to the out-based teams.

- 5.4.17 Key responsibilities for delivery of geographic RUS lie with out-based Route Planning teams. A wide range of skills is required to deliver a RUS including project management, knowledge of relevant local operational issues, demand forecasting strategic thinking and stakeholder management, not all of which can be found within Route Planning team resources. Moreover, the RUS programme has made significant resource demands on Route Management teams. Network Rail have recognised this as an issue and are developing a new centralised team of project managers to support Route Teams in the development of RUSs.
- 5.4.18 From our audit, it is evident that Network Rail was initially unable to supply all of the specialist skills and resources it required from within. Shortages were mitigated by the use of external consultants and/or recruitment and development of internal resources. However, as the programme has matured, internal experience has developed. This has meant that the teams developing later RUSs have been able to build on experience, avoiding technical and other issues that initially led to delay.

Connectivity between RUSs.

- 5.4.19 In nearly all cases, an individual RUS impacts on the Routes around it. This is particularly so in the case of the Main Lines, but also in the National Freight RUS. Connectivities are being managed in a number of ways. Firstly, where connectivity is geographic, it may fall to the same Route Planning Team to undertake both RUS (as is the case with the ECML and Yorkshire and Humber RUSs). Secondly, communication between the RUS teams leads to an exchange of information. Our audit suggested that at least in the cases we reviewed, this worked well, with evidence of direct feed from the Freight to the ECML RUS. Moreover, some stakeholders are common to a number of different RUS. Nevertheless, the exchange of information relies more on culture than process.

Maintaining, updating and monitoring RUSs.

- 5.4.20 Throughout our audit we were interested to understand how each RUS will be maintained and implemented. As yet, there is no common approach to this within Network Rail although four RUS are completed. However, Network Rail is developing a process for tracking recommendations, as well as considering how RUSs should be maintained. At present, RUS documentation assumes that the development of a RUS is a one-off process; there is no agreed process for repeat and renewal. We think it is important that this should become a "live" process, potentially integrated with other key process (such as Network Rail's business plan), and fulfilling a role as a single, agreed strategy for the rail network, developed with and supported by stakeholders.
- 5.4.21 Network Rail would like to maintain the benefits it has achieved from close working with stakeholders during the development of the RUSs. One option being explored is maintaining consultation for the top tier of stakeholders, continuing with stakeholder management groups after a RUS has been completed. Again, the exact format this will take may vary from Route to Route, depending on the number and nature of stakeholders. The South West RUS has evolved into an implementation group around the Waterloo upgrade, whilst in Scotland a review of the RUS has been structured into the Route Investment Review Group cycle, where two of the four meetings each year will review the implementation of RUS schemes.

Implementation.

- 5.4.22 Without firm implementation plans, the investment of time and resource that has gone into the development of each RUS may be wasted. At present, the Technical Guide draws no link between the RUS and actual improvements to the network and during our discussions we find a range of views within Network Rail as to how the strategy can be implemented, although each RUS team obviously saw a RUS as only the beginning of a process which ultimately led to delivery in some kind. In the case of Scotland, the RUS has led to a list of agreed schemes which is being progressed and monitored by the Route Investment Review Group and work has already begun on the next stages of development for a number of recommended options. In the North West, it is expected that the Stakeholder Management Group will become an implementation group, with funding for schemes coming through NRDF, HLOS, CP4 or even CP5. In the case of the East Coast Main Line (ECML), all schemes in the RUS are in the initial strategic business plan, with funding likely to depend on HLOS and to come through CP4.

Results.

- 5.4.23 Four RUS have now been established and a fifth will be established very shortly. It is still too early to say how effective these will be in terms of setting out feasible outputs. However, Network Rail have developed and followed a consistent process based on technical best practice. Moreover, that process continues to be refined in the light of experience, for example, with improvements to demand forecasting techniques. In terms of stakeholder engagement, there is clear evidence that stakeholders have had significant input to the development of the RUSs. This has not always led to immediate acceptance of RUS but in general has given benefits in terms of more robust outputs and most of all, in the development of a shared industry vision.

Reporting in Annual Return.

- 5.4.24 We are pleased to note as last year that there has been no attempt to produce a single capacity utilisation index figure; any such attempt should be resisted. We note that the team recognises the importance of presenting options through normal business investment criteria. However, we would encourage Network Rail to report in the Annual Return the year-end position for each RUS against the milestones in its delivery programme.

Assessment of confidence grade

- 5.4.25 **Reliability grade.** The requirements of this measure are both qualitative and quantitative. Network Rail is required to produce and maintain RUSs, in support of which is required to provide sufficient resources and to develop documented processes. With experience behind them, Network Rail are seeking to template processes as far as possible, and to re-document the process in a revised RUS Technical Guide. Both these, are however, very much work in progress. As such, we believe the RUS measure should continue to have a reliability grade of B. This should not be taken as a failing in effort by Network Rail, but as recognition of the complex nature of the work being undertaken; we have no doubt that individually, some of the RUS would stand scrutiny as an 'A'. The challenge is to continue to develop the process and organisation to that consistently and in particular, to ensure that processes to maintain and revisit the RUS are fully developed and documented.
- 5.4.26 **Accuracy grade.** The data reported by Network Rail in the Annual Return is accurate – a RUS Manual is published, resources allocated, a programme developed and thirteen of nineteen RUS commenced or completed. We believe the accuracy grade for the RUS measure is therefore 1, however the confidence grading system (Appendix D) does not allow for a B1 score to be awarded. Network Rail have made significant steps forward during the year and do not warrant a score worse than that awarded the previous year. A B2 score is therefore inappropriate. At the same time, we do not believe the reliability score yet warrants an A. We therefore choose to award an accuracy grade of X.

Audit Statement

- 5.4.27 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for the Route Utilisation Strategies. We have audited the process supporting the creation of Route Utilisation Strategies in accordance with Network Rail's Licence and the ORR's guidelines for the development of RUSs. We can confirm that Network Rail has a programme in place and the process conforms to the guidelines. A manual is also in existence as required albeit it is in need of updating. The statements made in the Annual Return reflect our findings of the current situation. We recognise the significant effort being made to create high quality RUSs, however, we believe there is still room for even further improvement. We assess the confidence grade as BX.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 5.4.28 **RUS recommendation 1.** We recommend that processes be developed to ensure the on-going maintenance of RUS including clear documentation of the types of triggers and circumstances that would cause a RUS to be re-visited.
- 5.4.29 **RUS recommendation 2.** The Technical Guide should be updated. Areas for update include a revision of the demand forecasting text, in light of experience and lessons learned; documentation of process for maintenance of a RUS; reference to Network Rail's organisation and structure for the development and maintenance of a RUS, including the new roles of HQ Project Manager; reference to project management processes.
- 5.4.30 **RUS recommendation 3.** We recommend that Network Rail sets out how the RUS process will be internalised into the route development and business planning processes to ensure it does not become a stand-alone exercise. The Business Planning Criteria might be an appropriate vehicle for this. However, the process should also be documented within the Technical Guide.

Observations relating to spreading of best practice and/or improvements to process

- 5.4.31 We have no observations for this measure.

6 Audit report and commentary – Network capability

6.1 Linespeed capability (C1)

Audit scope

- 6.1.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Linespeed capability (C1), including Tables 47 - 50.
- 6.1.2 The measure reports the length of running track in kilometres in the following speed bands:
- (a) Up to 35 miles per hour;
 - (b) 40-75 miles per hour;
 - (c) 80-105 miles per hour;
 - (d) 110-125 miles per hour;
 - (e) Over 125 miles per hour.
- 6.1.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/C1DF (issue 5) and NR/ARM/C1PR (issue 5).
- 6.1.4 The audit was undertaken at Network Rail headquarters and at London North Western and Western Territories.

Commentary on reported data

Regulatory target

- 6.1.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any route for broadly existing use from April 2001 levels.
- 6.1.6 In April 2001 the network consisted of 30,846km of track, of which 3,603km were in speed band <35mph, 17,214km were in speed band 40-75mph, 7,476km were in speed band 80-105mph, 2,553km were in speed band 110-125mph, and 0km were in speed band 125+mph.
- 6.1.7 Network Rail have not commented on their results for 2006/07 against this regulatory target.

Trend

- 6.1.8 Figure 6.1.1 shows the reported linespeed capability, in kilometres, for each speed band, in miles per hour.

Speed band	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
<35	5,289	5,570	4,163	3,821	3,787	-0.9%
40-75	16,978	16,585	16,927	16,895	16,856	-0.2%
80-105	7,106	6,994	7,650	7,482	7,488	0.1%
110-125	2,393	2,415	2,741	2,907	2,932	0.9%
125+	-	-	-	-	-	-
Total	31,766	31,564	31,482	31,105	31,063	-0.1%

Figure 6.1.1 Linespeed capability (speed band in mph, capability per annum reported in km) (C1)

- 6.1.9 The net change in reported total kilometres of track compared with last year is a reduction of 0.1%, comprising of 26.2km of new line and a net value of 68.2km of track removed due to data cleansing or line closures.
- 6.1.10 The Annual Return 2007 lists 50 linespeed changes:
- (a) 28 linespeed increases totalling 82.9km of track;
 - (b) 22 linespeed decreases totalling 24.2km of track.

Audit Findings

Process

- 6.1.11 The process of reporting the network capability measures has not changed from the 2005/06 reporting year, although this year we did visit 2 Territories to understand the processes by which they collated linespeed change data. Linespeed data is contained in Network Rail's Geography & Infrastructure System (GEOGIS) database. This is updated regularly by the MP&I, maintenance and engineering organisations. The National Engineering Information Analyst has developed a spreadsheet whereby all Territories can report their linespeed changes occurring during the year in a consistent manner. This has however not been adopted uniformly by all Territories.
- 6.1.12 Permanent changes in linespeeds, as recorded in the Weekly Operating Notices (WONs) and the Periodic Operating Notices (PONs), are updated in GEOGIS by the Territory Engineering Knowledge Managers. GEOGIS is interrogated annually by Network Rail HQ to produce the data reported in the Annual Return.
- 6.1.13 In the Annual Return Report 2006, we had recommended that the data tables in the Annual Return are presented in consistent units. We note that this recommendation has not been implemented in 2007.

Accuracy of the reported data

- 6.1.14 We undertook the following sampling activities:
- (a) Visits were made to 2 Territories, London North Western and Western. A sample of the linespeed changes during the year were checked against the relevant WONs and were found to have been accurately captured.
 - (b) At HQ, a sample of linespeeds for 12 locations covering all Territories was selected from the Sectional Appendices. These linespeeds were then checked against the GEOGIS records and found to be correctly reported in the database.
 - (c) A sample of 5 changes to linespeeds (in 2006/07) was selected from the Annual Return. These linespeeds were checked and found to be accurately reflected in GEOGIS.
 - (d) The total track kilometres generated from GEOGIS was equal to the total track kilometres shown in the Annual Return.

Assessment of confidence grade

- 6.1.15 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe measure C1 should have a reliability grade of B.
- 6.1.16 **Accuracy grade.** The variation of 0.1% in the reported total track kilometres was almost entirely due to data cleansing. We believe C1 should have an accuracy grade of 2.

Audit Statement

- 6.1.17 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for linespeed capability (C1). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The variation of 0.1% in the reported total track kilometres was almost entirely due to data cleansing. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.1.18 **C1 recommendation 1.** We recommend that the data tables in the Annual Return be presented in consistent units, rather than in a confusing mix of Imperial and SI units. This recommendation was also made in our 2006 report, but has yet to be implemented.

Observations relating to spreading of best practice and/or improvements to process

- 6.1.19 **C1 observation 1.** For the purpose of gap analysis, the National Engineering Information Analyst has developed a spreadsheet whereby all Territories can report their linespeed changes occurring during the year in a consistent manner. This has however not been adopted uniformly by all Territories, and we consider that this should be implemented across all Territories.

6.2 Gauge capability (C2)

Audit scope

- 6.2.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Gauge capability (C2), including Tables 51 - 52.
- 6.2.2 The measure reports the length of route in kilometres capable of accepting different freight vehicle types and loads by reference to size (gauge). This measurement is reported against the following 5 gauge bands:
- (a) W6: (h)3338mm – (w)2600mm;
 - (b) W7: (h)3531mm – (w)2438mm;
 - (c) W8: (h)3618mm – (w)2600mm;
 - (d) W9: (h)3695mm – (w)2600mm;
 - (e) W10: (h)3900mm – (w)2500mm.
- 6.2.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/C2DF (issue 5) and NR/ARM/C2PR (issue 5) plus Railway Group Guidance Note GE/GN8573 (October 2004) 'Guidance on Gauging' Appendices 1 to 5.
- 6.2.4 The audit was undertaken in Network Rail Headquarters and the Gauging Network Specialist Team (NST) in York.

Commentary on reported data

Regulatory target

- 6.2.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any route for broadly existing use from April 2001 levels.
- 6.2.6 In 2001 the Annual Return data was not reported on a comparable basis, hence it is not confirmable as to whether or not the regulatory target has been met.

Trend

- 6.2.7 Figure 6.2.1 shows the reported net change in the total kilometres of route, compared with last year is a reduction of 0.1%.

Gauge	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
W6	5,379	5,223	4,955	4,771	4,746	-0.5%
W6 & W7	1,632	2,284	2,794	2,741	2,720	-0.8%
W8	7,126	6,340	5,648	5,504	5,496	-0.1%
W9	2,370	2,483	1,714	1,615	1,618	0.2%
W10 & W6	-	-	6	6	6	0%
W10 & W8	-	-	60	73	65	-11%
W10 & W9	163	163	939	1,100	1,138	3.5%
Total	16,670	16,493	16,116	15,810	15,789	-0.1%

Figure 6.2.1 Gauge capability (kilometres) (C2)

- 6.2.8 Network Rail stated these variances have been caused by either:

- (a) Data cleansing activity;
- (b) Physical changes to the network leading to alterations in the loading gauge;
- (c) New lines;
- (d) Line closures.

Audit Findings

Process

6.2.9 The process of reporting the network capability measures has not changed from the 2005/06 reporting year. Authorised changes to the gauge are recorded by the National Engineering Reporting team in the Capabilities Database. Changes to the freight loading gauge on the network are authorised by the Track Geometry and Gauging Engineer using Certificates of Gauging Authority. The National Engineering Reporting team uses a database query to identify the total route length for each gauge band from GEOGIS.

Accuracy of the reported data

6.2.10 We visited the Gauging NST in York to understand the process by which changes to the gauge are authorised recorded in the National Gauging Database. We obtained a sample of 4 historical Certificates of Gauging Authority for London North Eastern Territory as well as a sample of 3 Certificates of Gauging Authority issued during 2006/07. We were also informed by the Gauging NST that historical Certificates of Gauging Authority issued are not stored centrally at York, but at the individual Territories.

6.2.11 We undertook the following sampling activities:

- (a) The Certificates of Gauging Authority provided to us by the Gauging NST pertained to changes in the loading gauge mentioned in the commentary of the Annual Return 2007. A check confirmed that these changes were correctly recorded in the Capabilities Database.
- (b) A sample of loading gauges for various Engineering Line References (ELRs) were taken from the historical Certificates of Gauging Authority obtained by us. The following were found:
 - (i) For 2 ELRs the gauge in the Certificate was given as W9, but the gauge in the Capabilities Database was given as W8. Network Rail have agreed that this is a mistake and stated that a data cleansing exercise is ongoing;
 - (ii) For 4 ELRs, the gauge in the Certificate was given as W10, but the gauge in the Capabilities Database was given as W8 & W10. Network Rail stated that W10 is taller than W8, but W8 is wider than W10 in some places. Therefore if a W8 route receives a W10 certificate it will become W8 & W10 and hence reported as W8 & W10.
 - (iii) For 2 ELRs the gauge in the Certificate was given as W10, but the gauge in the Capabilities Database was given as W9 & W10. In reply Network Rail stated that the Certificate allowed "tall" W10 freight vehicles to run but this did not reflect the fact that the route already had W9 status which is "wider" and hence reported as W9 & W10.
- (c) Our C1 audit found GEOGIS has been subject to data cleansing, contributing towards a net reduction in total track kilometres.

Assessment of confidence grade

6.2.12 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C2 should have a reliability grade of B.

- 6.2.13 **Accuracy grade.** Our sampling found no errors in changes to gauge made in 2006/07, but there were errors identified in 2 ELRs for changes made in previous years which do not seem to be correctly reflected in the Capabilities Database. We believe that measure C2 should have an accuracy grade of 2.

Audit Statement

- 6.2.14 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for gauge capability (C2). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. Our C1 audit found the net variation due to cleansing on the total network track kilometres was -0.1%. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.2.15 **C2 recommendation 1.** We recommend that Network Rail undertakes a thorough data cleaning exercise of the Capabilities Database to ensure that the gauge given for all sections of the network reflect those that are in the National Gauging Database and all Certificates of Gauging Authority issued.

Observations relating to spreading of best practice and/or improvements to process

- 6.2.16 **C2 observation 1.** During our visit to the Gauging NST we were informed that historical Certificates of Gauging Authority issued are not stored centrally at York, but are at the individual Territories. We consider that efforts should be made to ensure that copies of all Certificates issued are stored centrally, even if only in electronic format.

6.3 Route availability value (C3)

Audit scope

- 6.3.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Route availability value (C3), including Tables 53 - 54.
- 6.3.2 The measure reports the length of track in kilometres capable of accepting differently loaded vehicle types by reference to the structures Route Availability (RA). This measurement is reported against the following 3 RA bands:
- RA 1-6: up to 20.3 tonne axle load;
 - RA 7-9: up to 24.1 tonne axle load;
 - RA 10: up to 25.4 tonne axle load.
- 6.3.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/C3DF (issue 5) and NR/ARM/C3PR (issue 5).
- 6.3.4 The audit was undertaken at Network Rail headquarters.

Commentary on reported data

Regulatory target

- 6.3.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any Route for broadly existing use from April 2001 levels.
- 6.3.6 In April 2001 the network consisted of 2,725km of track in RA band 1-6, 14,729km in RA band 7-9, and 13,392km in RA band 10.
- 6.3.7 Network Rail have not commented on their results for 2006/07 against this regulatory target.

Trend

- 6.3.8 Figure 6.3.1 shows the reported net change in the total kilometres of track for three RA bands. Track in all 3 RA bands have decreased marginally during 2006/07.

RA Band	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
RA 1-6	2,411	2,375	2,529	2,309	2,296	-0.6%
RA 7-9	24,262	26,297	26,319	25,935	25,928	-0.03%
RA 10	4,734	2,585	2,634	2,861	2,839	-0.8%
Total	31,407	31,257	31,482	31,105	31,063	-0.1%

Figure 6.3.1 Structures Route availability (C3)

- 6.3.9 Network Rail have advised us that these variances have been caused by either:
- Data cleansing activity;
 - Physical changes to the network leading to alterations in the route availability;
 - New lines;
 - Line closures.

Audit Findings

Process

- 6.3.10 The process of reporting the network capability measures has not changed from the 2005/06 reporting year. Authorised changes to the RA are recorded by the National Engineering Reporting team in the Capabilities Database, on the advice of Territory Structure Assessments Engineers. The National Engineering Reporting team uses a database query to identify the total track length for each RA band from GEOGIS. Further, NR is currently undertaking a Route Availability Verification Project (Phase 1). A list of ELRs where RA values have been checked as part of this project was provided to us.

Accuracy of Reported Data

- 6.3.11 We undertook the following sampling activities:
- (a) A sample of 5 Routes (ELRs) checked by Network Rail as part of the Route Availability Verification Project (Phase 1) was checked against the Capabilities Database. The RA values were found to be correctly recorded in the Capabilities Database.
 - (b) A sample of Route availabilities was selected from the Sectional Appendices. These were found to be correctly recorded in the Capabilities Database and in GEOGIS.

Assessment of confidence grade

- 6.3.12 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C3 should have a reliability grade of B.
- 6.3.13 **Accuracy grade.** Our sampling found no errors. We were unable to verify the impact of data cleansing on gauge capability; however, our C1 audit found the net variation due to cleansing on the total network kilometres was 0.1%. We believe that measure C3 should have an accuracy grade of 2.

Audit Statement

- 6.3.14 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for route availability value (C3). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. Our C1 audit found the net variation due to cleansing on the total network kilometres was -0.1%. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.3.15 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 6.3.16 We have no observations for this measure.

6.4 Electrified track capability (C4)

Audit scope

- 6.4.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Electrified track capability (C4), including Tables 55 - 56.
- 6.4.2 The measure reports the length of electrified track in kilometres for:
- 25 kV a.c. overhead;
 - 650/750 V d.c. 3rd rail;
 - Dual a.c. overhead & d.c. 3rd rail;
 - 1500V d.c. overhead.
- 6.4.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/C4DF (issue 5) and NR/ARM/C4PR (issue 5).
- 6.4.4 The audit was undertaken at Network Rail headquarters.

Commentary on reported data

Regulatory target

- 6.4.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any route for broadly existing use from April 2001 levels.
- 6.4.6 In April 2001 there were 7,578km of 25 kV a.c. overhead electrified track and 4,285km of 650/750 d.c. 3rd rail electrified track, giving a total of 11,863km of electrified track.
- 6.4.7 Network Rail have not commented on their results for 2006/07 against this regulatory target.

Trend

- 6.4.8 Figure 6.4.1 shows the reported net change in the total kilometres of electrified track.

Electrification	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
25 kV a.c. overhead	7,751	7,780	7,748	7,882	7,980	1.2%
650/750 V d.c. 3rd rail	4,463	4,483	4,497	4,493	4,484	-0.2%
Dual a.c. OHL & d.c. 3rd rail	33	33	35	39	38	-2.6%
1500V d.c. overhead	19	19	39	39	39	0%
Electrified	12,266	12,315	12,319	12,453	12,541	0.7%

Figure 6.4.1 Electrification capability (C4)

- 6.4.9 Network Rail advised us that these variances have been caused by either:
- Data cleansing activity;
 - New sections of electrified track opened due to the revised St Pancras station and new platforms at Edinburgh Waverley;

- (c) Closure of 11km of d.c. 3rd rail electrified track between Stratford and North Woolwich.

Audit Findings

Process

- 6.4.10 The process of reporting the network capability measures has not changed from the 2005/06 reporting year. Electrification capability is updated in GEOGIS by the National Engineering Reporting team as and when new electrified lines are incorporated into the network.

Accuracy of reported data

- 6.4.11 We undertook the following sampling activities:
 - (a) A sample of 4 electrified and non-electrified lines was selected from the Sectional Appendices. These were checked against the GEOGIS records. All were found to be correctly reported in the database.
 - (b) The new electrified sections at Edinburgh Waverley and Haymarket had been correctly entered into GEOGIS.
 - (c) The section of track closed between Stratford and North Woolwich had been correctly deleted from GEOGIS.

Assessment of confidence grade

- 6.4.12 **Reliability grade.** The definition for this measure is clearly documented. A reasonably well documented process has been followed to collect and report this measure. We believe that measure C4 should have a reliability grade of B.
- 6.4.13 **Accuracy grade.** During last year's audit we had observed discrepancies in the reporting of electrified track capability in GEOGIS for certain section of the network, and hence given this measure an accuracy grade of 3 in our 2006 report. This year we observe that Network Rail seem to have undertaken a data cleansing exercise, and hence we believe that the accuracy grade for C4 should be upgraded to 2.

Audit Statement

- 6.4.14 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for electrified track capability (C4). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.4.15 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 6.4.16 We have no observations for this measure.

6.5 Mileage

Audit scope

- 6.5.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Mileage, including Tables 57 - 58.
- 6.5.2 The measure reports the following:
- (a) The number of miles travelled by (i) franchised passenger trains and (ii) open access passenger trains; empty coaching stock is excluded;
 - (b) Freight train mileage defined as the number of miles travelled by freight trains.
- 6.5.3 There is no formal definition or procedure for this measure.
- 6.5.4 The audits were undertaken at Network Rail headquarters.

Commentary on reported data

Regulatory target

- 6.5.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any route for broadly existing use from April 2001 levels.
- 6.5.6 Network Rail have not commented on their results for 2006/07 against this regulatory target.

Trend

- 6.5.7 Figure 6.5.1 shows total passenger train miles have increased by 0.4% between 2005/06 and 2006/07, whilst the freight miles decreased by 3.3% during the same period.

Measure	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
Passenger train mileage (franchised)	263.6	262.9	267.8	268.8	0.4%
Passenger train mileage (open access)	3.9	3.5	4.1	4.1	0.1%
Freight train mileage	29.3	27.9	31.0	29.9	-3.3%
Total Mileage	296.8	294.3	302.9	302.8	-0.01%

Figure 6.5.1 Train Mileages (million miles; empty coaching stock excluded)

Audit Findings

Process

Passenger Miles

- 6.5.8 Passenger train miles data is compiled at Network Rail headquarters from PALADIN, the computerised system for recording train performance data. It extracts train mileage (for both passengers and freight) from TRUST, by operators, on a period-by-period basis. At the end of each period, the PALADIN queries are run for 79 different operators (including freight operators) who use NR infrastructure.
- 6.5.9 The data from PALADIN gets extracted into the Train Mile database, as .txs files. These files are however in machine code and cannot be used for data analysis. Hence the "PUMPS" software package is used to convert the .txs files into Excel format. A summary spreadsheet summarises the train miles data by operator on a period-by-period basis.

Freight Miles

- 6.5.10 The freight train mileage is compiled at Network Rail headquarters from the Billing Infrastructure Freight System (BIFS). BIFS is a centrally managed computerised system that invoices freight train operators, based on information generated by train reporting systems (i.e. the TOPS system).
- 6.5.11 Network Rail has developed a database query to extract the freight mileage data from BIFS. The query is run at the end of every period and entered into a spreadsheet, which summarises the data at the end of the year. Data is aggregated by freight operator and by commodity.

*Accuracy of reported data***Passenger Miles**

- 6.5.12 The query used to extract the data from PALADIN was checked and found to be reasonable. The summary spreadsheet used to compile the data was also checked and found to be accurate.
- 6.5.13 A sample of train miles (for both franchised and open access operators) from the summary spreadsheet was checked against the figures reported in the Annual Return. All were found to be correct.
- 6.5.14 During 2006/07 there were certain changes that occurred in the franchise structure, with TOCs being merged or reorganised. We checked and confirmed that the data reported accurately reflected these changes.
- 6.5.15 Network Rail confirmed that the figures reported do not include Class 0 (light engines), Class 3 (parcels), and Class 5 (empty coaching stock) trains. It was checked and confirmed that the database query does not include these classes of trains.
- 6.5.16 It was understood from discussions held as part of the audit that train miles for Chiltern Railways services running on LUL infrastructure have not been excluded from the train miles reported in the Annual Return. The reported data is therefore overstated by a small (unquantified) amount. Network Rail have confirmed this. The Annual Return Report 2006 recommended that Network Rail exclude mileage for Chiltern railway services running over LUL infrastructure. This has however not been implemented.

Freight Miles

- 6.5.17 The query used to extract train miles data from BIFS was checked and found to be reasonable. The summary spreadsheet was also checked and found to be accurate.
- 6.5.18 While auditing passenger miles, the Performance Reporting Analyst extracted freight train miles from BIFS for a sample of operators for 2006/07. We however found there were significant differences between these figures and those reported by the Freight Billing Team (which we audited), even though they were both extracted from the same database (i.e. BIFS). These differences varied between +21% to -13%.
- 6.5.19 Further while auditing passenger miles, we also checked the freight train miles generated from PALADIN. There were significant differences in the miles generated from PALADIN, against those reported in the Annual Return (which were generated from BIFS).
- (a) The total train miles from BIFS is 29.92 million miles, while the total generated from PALADIN is 27.04 million miles, which is 9.6% lower.
 - (b) For particular operators the percentage differences are even greater; for example, for Freightliner Heavy Haul, the PALADIN figure is lower by 23%, and for GB Railfreight it is higher by 4%.
- 6.5.20 Network Rail clarified that the data from PALADIN was for PFPI (Process for Performance Improvement) trains only, whereas the BIFS extract used in reporting included these trains. Hence it was suggested that these differences might be explained by this reason. We also understand that the BIFS data includes all freight services for billing purposes. This will include light locomotives and infrastructure trains which are excluded from the train mileage used for performance monitoring.

Assessment of confidence grade

- 6.5.21 **Passenger Train Miles Reliability grade.** The definition and procedure for this measure is not documented. A reasonable process has been followed to collect and report this measure, using industry standard sources of data. We believe that Passenger Train Miles should have a reliability grade of B.
- 6.5.22 **Passenger Train Miles Accuracy grade.** We found uncertainties in the data arising from inclusion of Chiltern Railways services running on LUL infrastructure. We believe that Passenger Train Miles should have an accuracy grade of 3.
- 6.5.23 **Freight Train Miles Reliability grade.** The definition and procedure for this measure is not documented. A reasonable process has been followed to collect and report this measure, using industry standard sources of data. We believe that Freight Train Miles should have a reliability grade of B.
- 6.5.24 **Freight Train Miles Accuracy grade.** We found that extracting the data from BIFS by two different sources in Network Rail gave rise to two different sets of train miles. Further, we found significant differences between the freight train miles sourced from BIFS and from PALADIN. We believe that Freight Train Miles should have an accuracy grade of 3.

Audit Statement

- 6.5.25 **Passenger Train Miles.** We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Passenger Train Miles. Our audit found one source of error in the results. The data has been assessed as having a confidence grade of B3.
- 6.5.26 **Freight Train Miles.** We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Freight Train Miles. Our audit found significant differences between data extracted from the same database from two different teams, as well as between the reported data and another standard source of industry data. The data has been assessed as having a confidence grade of B3.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.5.27 **Mileage recommendation 1.** We recommend that Chiltern Railways running on LUL infrastructure be excluded from the figure reported.
- 6.5.28 **Mileage recommendation 2.** We recommend that Network Rail rationalises the significant differences between data extracted from BIFS by the Performance Reporting Analyst and the Freight Billing Team.
- 6.5.29 **Mileage recommendation 3.** We recommend Network Rail rationalises the significant differences between the BIFS and PALADIN train mileages.
- 6.5.30 **Mileage recommendation 4.** We recommend that a Network Rail adopt a formal procedure for reporting this measure.

Observations relating to spreading of best practice and/or improvements to process

- 6.5.31 We have no observations for this measure.

6.6 Freight Gross Tonne Miles

Audit scope

- 6.6.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Freight Gross Tonne Miles, including Table 59.
- 6.6.2 This measure reports the mileage for each freight locomotive, wagon or coaching stock multiplied by the weight of the relevant vehicle.
- 6.6.3 There is no formal definition or procedure for this measure.
- 6.6.4 The audits were undertaken at Network Rail headquarters.

Commentary on reported data

Regulatory target

- 6.6.5 The regulatory target for network capability, set in ORR's Access Charges Review 2003, is for no reduction in the capability of any route for broadly existing use from April 2001 levels.
- 6.6.6 Network Rail have not commented on their results for 2006/07 against this regulatory target.

Trend

- 6.6.7 Figure 6.6.1 shows freight gross tonne miles (GTM) have decreased by 1.7% between 2005/06 and 2006/07.

Measure	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
Million Gross Tonne Miles	27.235	28.392	30.305	30.252	-1.7%

Figure 6.6.1 Freight Gross Tonne Miles

Audit Findings

Process

- 6.6.8 GTM data is compiled at Network Rail headquarters, derived from the Billing Infrastructure Freight System (BIFS). BIFS is a centrally managed computerised system that invoices freight train operators, based on information generated by train reporting systems (i.e. the TOPS system).
- 6.6.9 Network Rail has developed a database query to extract the freight GTM data from BIFS. The actual miles are multiplied by the gross weight to get gross tonne miles. The query is run at the end of every period and entered into a spreadsheet, which summarised the data at the end of the year. Data is extracted by freight operator and by commodity.

Accuracy of reported data

- 6.6.10 The query used to extract GTM data from BIFS was checked and found to be rational. The summary spreadsheet was also checked and found to be accurate.
- 6.6.11 The data reported is a sum of the period-by-period train miles extracted from BIFS.

Assessment of confidence grade

- 6.6.12 **Reliability grade.** The definition and procedure for this measure is not documented. A rational process has been followed to collect and report this measure, using industry standard sources of data. We believe Freight Gross Train Miles should have a reliability grade of B.
- 6.6.13 **Accuracy grade.** We believe Freight Gross Train Miles should have an accuracy grade of 2.

Audit Statement

- 6.6.14 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for freight gross tonne miles. We can confirm the data has been collected and reported in accordance with best industry practice. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.6.15 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 6.6.16 We have no observations for this measure.

6.7 Management of Congested Infrastructure

Audit scope

- 6.7.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 2, Management of Congested Infrastructure.
- 6.7.2 The purpose of the measure is to ensure that areas of specific congestion on the network which are preventing operator access are identified together with potential remedial actions.
- 6.7.3 The audit was undertaken at Network Rail Headquarters.

Audit Findings

Definition

- 6.7.4 The measure arises as a result of measures to enact an EU Directive associated with the enhancement of open access regimes across the European rail network. Part 3 of the Regulation requires the production of annual business plans and network statements which demonstrate "optimal and efficient use and development of infrastructure" and supporting financial statements.
- 6.7.5 Regulation 23 of the Railways Infrastructure (Access and Management) Regulations 2005 (the Access and Management Regulations) requires Network Rail to declare areas of its infrastructure to be congested in cases:
- (a) where, after the co-ordination of requests for capacity and consultation with the applicants, it is not possible for the infrastructure manager to satisfy requests for infrastructure adequately, the infrastructure manager must declare that element of the infrastructure on which such requests cannot be satisfied to be congested;
 - (b) where, during the preparation of the working timetable for the next timetable period, the infrastructure manager considers that an element of the infrastructure is likely to become congested during the period to which that working timetable relates, he must declare that element of the infrastructure to be congested.
- 6.7.6 The regulation additionally requires the infrastructure manager to have specific processes to eliminate network congestion and to set out steps that must be taken when congestion prevents network access. When congestion is identified, the infrastructure manager must create, through systematic analysis, appropriate enhancement plans to remove that congestion. It is our understanding of the regulation that if an operator who has existing rights of access to the network is unable to exercise those rights because of network congestion, the infrastructure manager is required to develop enhancement plans supported with appropriate analysis of options to remove the congestion.

Process

- 6.7.7 In October 2006, Network Rail published its 2008 Network Statement in which it declared three sections of its infrastructure to be congested in accordance with the definition set out in the Access and Management Regulations. These sections were as follows:
- (a) Barassie Junction/Kilmarnock/Newton Junction/Mauchline Junction to Gretna Junction;
 - (b) Gospel Oak to Barking; and
 - (c) Reading to Gatwick Airport.

- 6.7.8 In accordance with the requirement of the Access and Management Regulations, following the making of such a declaration, Network Rail is required to undertake capacity analysis studies for each of these sections. These studies must identify the reasons for the congestion and the measures which might be taken in the short and medium term to ease that congestion.
- 6.7.9 The capacity analysis studies for each of these routes were published on 13 April 2007, following consultation with both the Department for Transport and Transport Scotland.
- 6.7.10 Network Rail is now producing capacity enhancement plans for each of these sections of the network. The capacity enhancement plan will identify:
- (a) the reasons for the congestion;
 - (b) the future likely development of traffic;
 - (c) the constraints on infrastructure development; and
 - (d) (the options and costs for enhancing the capacity, including the potential effect on access charges.
- 6.7.11 Network Rail is required, in accordance with the Regulations to publish these capacity enhancement plans by 12 October 2007 and at least one month before this deadline submit a copy of these plans to the Secretary of State and Scottish Ministers for approval.

Accuracy of Data Reported

- 6.7.12 Under the process now in place, a location is only declared congested when an operator makes a bid to run through it and cannot be accommodated. In 2006, there have been only three such occurrences, which has made it relatively simple for Network Rail to undertake detailed analysis and produce business cases for improvement measures. Should the number of instances increase in the future, then there may be issues over re-sourcing amelioration plans. Nevertheless, we agree that this is a better measure than the previous capacity utilisation index which took no account of market demand.

Assessment of confidence grade

- 6.7.13 **Reliability & Accuracy grades.** The new measure cannot really be said to have yet been proven. As such, the allocation of a confidence grade is not appropriate this year.

Audit Statement

- 6.7.14 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Management of Congested Infrastructure. We are satisfied that Network Rail's process complies with its obligations under the regulation.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 6.7.15 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 6.7.16 We have no observations for this measure.

7 Audit report and commentary – Asset Management

7.1 Number of broken rails (M1)

Audit scope

- 7.1.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Broken Rails (M1), including Table 60.
- 7.1.2 The measure reports the number of broken rails. A broken rail either has a fracture through the full cross section or has a piece broken from it exceeding 50mm in length.
- 7.1.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M1DF (issue 3) and NR/ARM/M1PR (issue 5).
- 7.1.4 Audits were undertaken at Network Rail Headquarters and a sample Area in each Territory: North Eastern Area for London North Eastern, West Midlands & Chilterns Area for London North Western, Scotland East Area for Scotland, Sussex Area for South East and Thames Valley Area for Western.

Commentary on reported data

Regulatory target

- 7.1.5 The regulatory target for broken rails set in ORR's Access Charges Review 2003 is "no more than 300 broken rails pa within two years". We have interpreted this as meaning the number of broken rails reported for the period 2005/06 to 2008/09 should be no greater than 300 per annum.
- 7.1.6 Network Rail reported 192 broken rails for 2006/07 which would meet the regulatory target of 300.

Trends

- 7.1.7 Figure 7.1.1 shows the number of rail breaks for 2006/07 has continued the downward trend of this measure since 2000/01. The result for 2006/07 is a 39.5% improvement on 2005/06.
- 7.1.8 The reasons for the lower result this year have been attributed to a combination of improving testing processes which are permitting early detection of rail defects before breaks occur, plus the mild winter and the absence of peak periods of breakages due to cold snaps.
- 7.1.9 The national downward trend in the number of broken rails reported for 2006/07 has been experienced across all five Territories. This trend can be seen in Figure 7.1.2. The Territories with the largest decreases are Western and Scotland, with decreases of 65% and 54% respectively. Historical numbers have been restated for the new Territory boundaries.

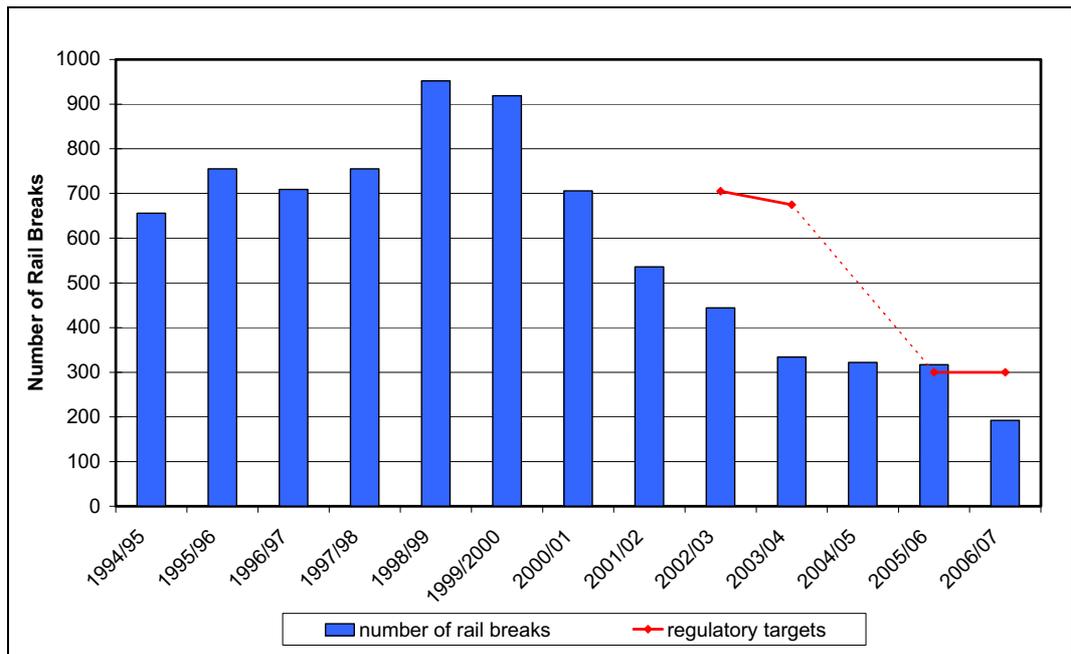


Figure 7.1.1 Number of broken rails (M1)

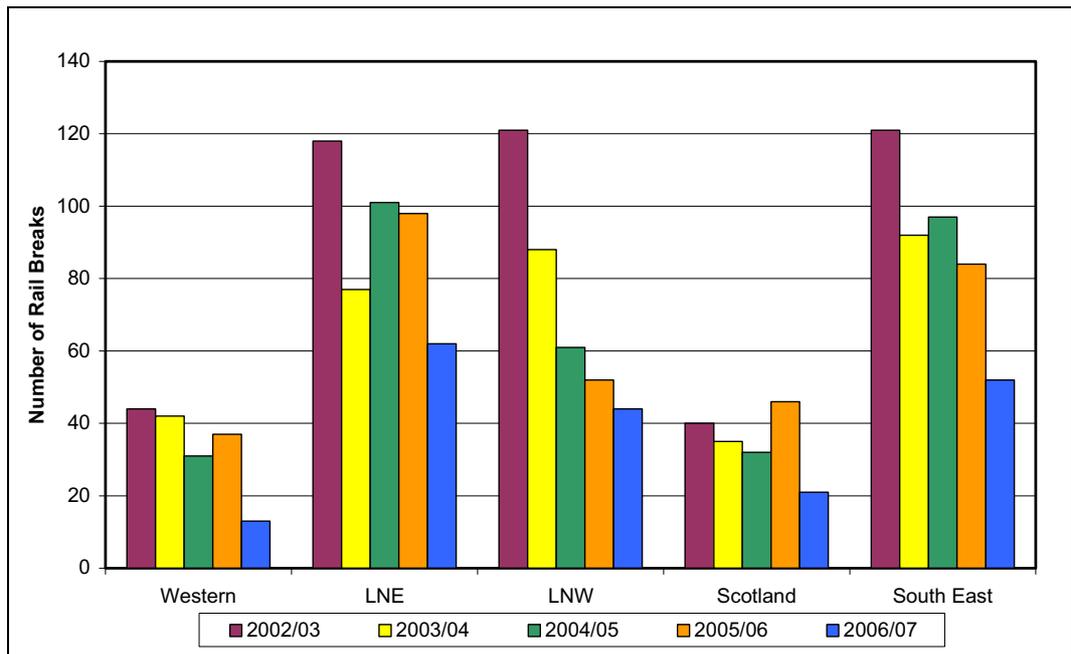


Figure 7.1.2 Number of broken rails by Territory (M1)

- 7.1.10 Engineers in the Areas audited attributed the decreased number of rail breaks in their Areas to improved testing, the ongoing effect of re-railing and grinding programmes.
- 7.1.11 Rail End breaks have increased as a proportion to the overall number of breaks compared to last year, but had reduced in volume by 26%. Breaks due to corrosion pitting in the underside of the rail foot are still a problem largely due to the deterioration of Rail Pads.

- 7.1.12 For comparative purposes we have normalised the number of rail breaks using Equated Track Miles (ETM). Figure 7.1.3 shows the number of broken rails per 1000 ETM for each Area and a Network average for 2006/07 as coloured bars and for comparison purposed, 2005/06 results are also shown on the figure as grey bars.
- 7.1.13 There has been some big improvements in Thames Valley, Wessex, Scotland (East & West) and North Eastern (London North Eastern) with only Sussex remaining above the previous year's network average. The conclusions for comparisons within London North Western are less reliable as significant boundary changes have taken place, however taking the Territory as a whole, there has been a marked improvement there also.

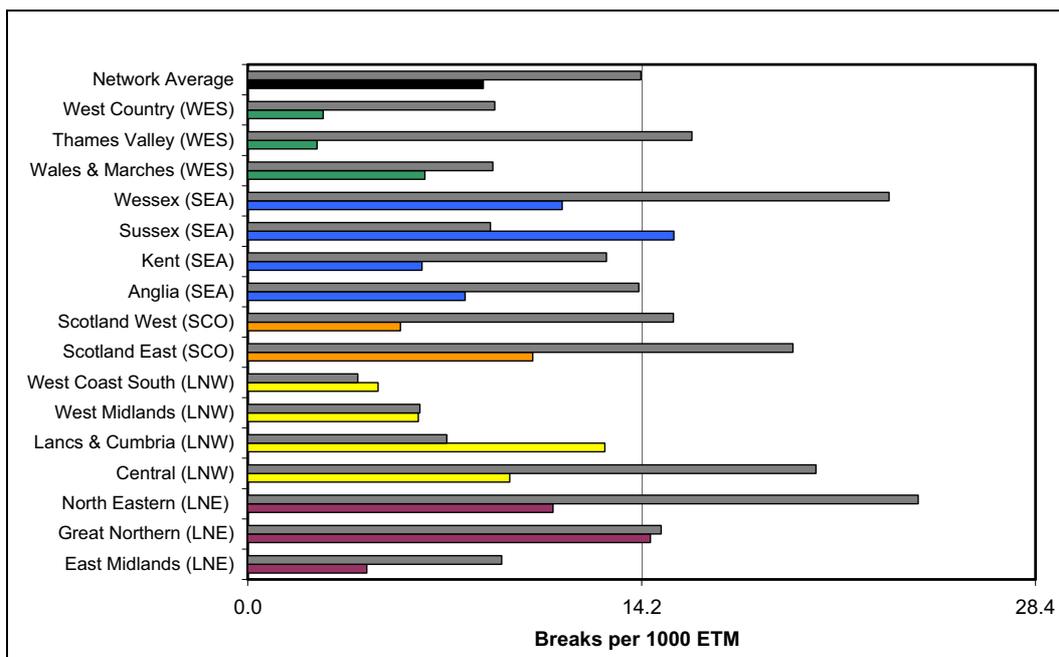


Figure 7.1.3 Rail breaks per 1000 equated track miles for 2006/07 with 2005/06 results in grey (M1)

Audit findings

Process

- 7.1.14 When broken rails are identified on the network, they are recorded at depot level using a broken rail incident form. The details of each rail break are entered into the Area defect database. Four of the five of our sample Areas are still using the legacy databases developed by the former IMCs (Infrastructure Maintenance Contractors) and the fifth (Thames Valley) are using the new Rail Defect Tracker (RDT) system.
- 7.1.15 In 2006 Rail Defect Tracker (RDT) was being rolled out to the 17 Areas to replace the former IMC contractor's legacy systems. However, it was rolled out to 10 Areas when it became apparent that the end users could not support the new system. There were significant drawbacks to the system and it was not compatible with the recording of Rolling Contact Fatigue type defects either.
- 7.1.16 Maintenance has now been given responsibility by Engineering for introducing a replacement rail data system (to be known as Rail Defect Management System (RDMS)). Network Rail plan to have a prototype in place by Sept. 2007 with a roll out scheduled to be complete by June 2008. In the interim most Areas have reverted back to their legacy systems; this means that Network Rail still has a diverse set of Defect Databases across its Areas.

- 7.1.17 Furthermore, in some Territories Raildata (the original British Rail Database), has been maintained. In these Territories, the data from Raildata is used by the National Reporting Team to gather broken rail data for network wide reporting.
- 7.1.18 In parallel, details of broken rails reported in the daily national control log are also recorded by the National Reporting Team in the 'Broken Rail Information' spreadsheet.
- 7.1.19 At Territory level, broken rails are being managed through the Hazard reporting system. Along with other incidents that feature on the daily national log, broken rails are awarded a hazard rating according to the severity of the break, apparent risk level of the location and the importance of the route. This system is used as a back-check by the Territory rail management engineer to review broken rails reported by the Areas/ Depots.
- 7.1.20 Every 4 weeks, the National Engineering Reporting Manager instigates a check by Territory Rail Management Engineers to reconcile the data in the Broken Rail Information spreadsheet and the data in the Area defect databases and to formally confirm the number of breaks.
- 7.1.21 Once any discrepancies between the Broken Rail Information Spreadsheet and the data in the Area defect databases are resolved, the National Engineering Reporting Manager stores the details of each rail break in the HQ Railfail database.
- 7.1.22 The HQ Railfail database is used to generate 4-weekly Period KPI Reports and the data at year end for the Annual Report.
- 7.1.23 NR is currently considering splitting Broken Rails into route classifications so that a more detailed understanding of the relationship to traffic types is better understood.

Accuracy of reported data

- 7.1.24 At each sample Area/ Depot, for 100% of the reported breaks, we successfully matched the location, date and break description of the broken rails from the incident forms/ broken rail reports with the records in the Area Defect Database.
- 7.1.25 For each sample Area, we matched the number of broken rail incident forms with the number of records in the Area Defect database and the number of broken rails in the year-end Broken Rail report for 2006/07 (i.e. the number of broken rails in the HQ Spreadsheet) and the number of broken rails in the Annual Return 2007.

Assessment of confidence grade

- 7.1.26 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The process is closely managed and the figures internally reported on a daily, 4-weekly and annual basis. We believe that M1 should have a reliability grade of A.
- 7.1.27 **Accuracy grade.** Two parallel systems are used to identify broken rails for this measure and a reconciliation process is used to increase accuracy. The process would have to misreport two broken rails or more in 2006/07 to have an inaccuracy of 1% or higher; our assessment is that the accuracy of this process would not allow this level of misreporting. We believe that M1 should have an accuracy grade of 1.

Audit Statement

- 7.1.28 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Number of Broken Rails (M1). We can confirm the data has been collected in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of A1. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.1.29 **M1 recommendation 1.** We recognise that there has been some good practice in some of the Territories to carry out an analysis of rail break classifications to compare with previous years. We recommend that a retrospective network-wide analysis of the individual classifications of rail breaks is carried out. This will add significant value if year-on-year trends, geographical trends, or other trends which may be established. In our opinion, this is an essential part of Network Rail's rail asset management process which is currently not being managed on a consistent network-wide basis.

Observations relating to spreading of best practice and/or improvements to process

- 7.1.30 We have no observations for this measure.

7.2 Rail defects (M2)

Audit scope

- 7.2.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Rail Defects (M2), including Tables 61 - 66.
- 7.2.2 The measure reports the number of rail defects. A defective rail is a rail which is not broken but has another fault requiring remedial action to make it fit for purpose in accordance with Network Rail standards. Rail defects are reported as either isolated defects or continuous defects.
- 7.2.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M2DF (issue 4) and NR/ARM/M2PR (issue 5) respectively.
- 7.2.4 Audits were undertaken at Network Rail Headquarters and a sample Area in each Territory: North Eastern Area for London North Eastern, West Midlands & Chilterns Area for London North Western, Scotland East Area for Scotland, Sussex Area for South East and Thames Valley Area for Western.

Commentary on reported data

Regulatory target

- 7.2.5 There is no regulatory target for M2 rail defects.

Trend

- 7.2.6 In 2006/07, the number of isolated defects was 21,432, which is 15.7% fewer defects than in 2005/06; the length of continuous rail defects was 2,195,541 yards, an increase of 9.1% yards of defects than in 2005/06. Both Isolated and Continuous defects have increased mainly due to the increased testing by the Ultrasonic Test Unit (UTU)
- 7.2.7 For the last five years the reported data for rail defects from the previous year has been subsequently restated (corrected) in the Annual Return. The analysis that follows includes trends of both subsequently restated data and initially reported data, as the reported data for 2006/07 is (as yet) uncorrected.
- 7.2.8 **Isolated Rail Defects.** Figure 7.2.1 shows the number of isolated defects reported in the Annual Return. The performance for 2006/07 shows 15.7% fewer defects than the initially reported figure for 2005/06 but shows there were only 0.5% fewer than the subsequently restated figure for 2005/06.
- 7.2.9 **Continuous Rail Defects.** Figure 7.2.2 shows the length of continuous defects reported in the Annual Return. The performance for 2006/07 shows a 9.1% increase in defects than the initially reported figure for 2005/06 and a 10.0% increase from the subsequently restated figure.

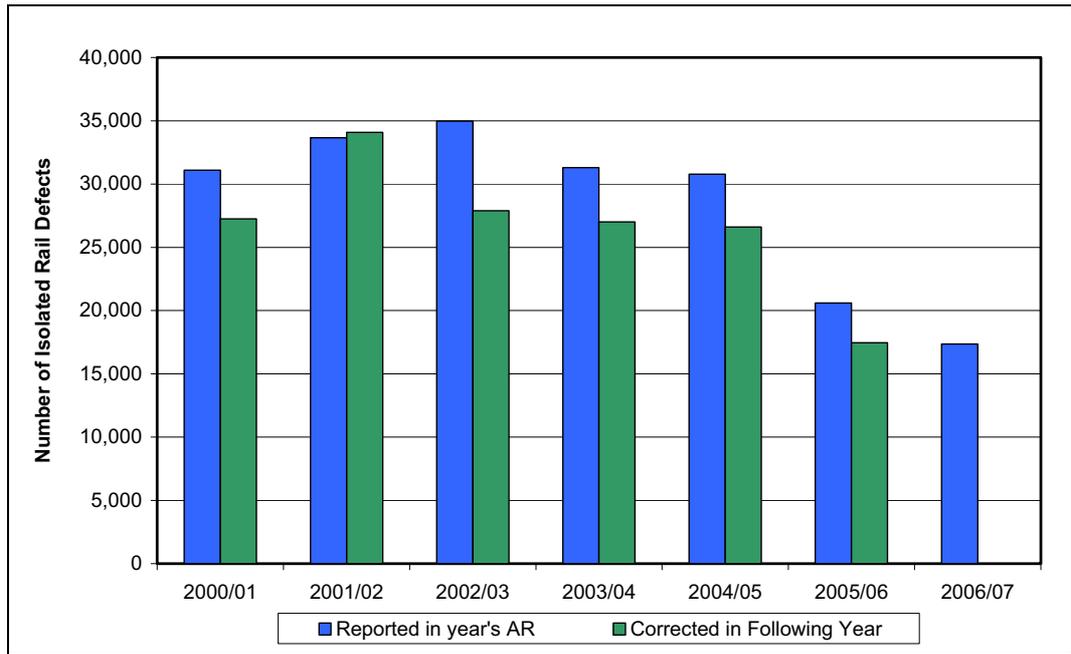


Figure 7.2.1 Numbers of isolated rail defects (M2)

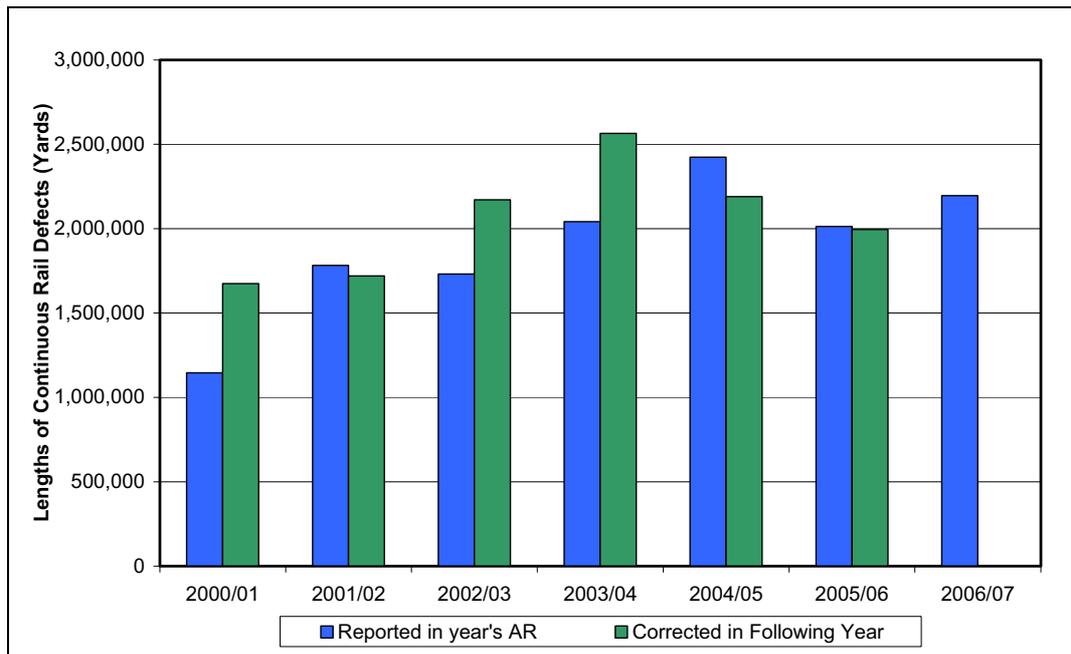


Figure 7.2.2 Length of continuous rail defects (M2)

Audit Findings

Area process

7.2.10 The methods of data collection for this measure are by ultrasonic non-destructive inspection and by visual inspection. When a defect is identified it is recorded on a standard inspection form. Figure 7.2.3 shows the method of detection of each type of defect.

Defect Type	Method of Detection
Ultrasonic Defects (Pedestrian)	Ultrasonic Teams
Ultrasonic Defects (Non-Pedestrian)	Ultrasonic Test Unit (UTU)
Visual Defects	Patroller & TSM Inspections
S&C damage/cracks	TSM (053 Inspections etc.)
Defective Welds	Welding Inspector
Non Compliant Welds	Welding Inspector, TSM
Corroded and Short Circuit defects	Patroller & TSM Inspections

Figure 7.2.3 Defect detection methods (TSM is Track Section Manager) (M2)

- 7.2.11 Network Rail have a strategy to use the Ultrasonic Test Unit (UTU) to replace the routine pedestrian testing on the main line routes in compliance with the standard frequencies for testing. Additional pedestrian testing resource can then be used to target defects – such as wheelburns, vertical longitudinal splits, lipping – outside of the UTU field of testing. Network Rail are now carrying out 4000 miles of compliant testing compared to 1000 miles during last year. Network Rail are aiming to have Track Category 1A, 2 & 3 routes covered with compliant UTU testing by October 2007 (with some Cat.3 exceptions in the London area).
- 7.2.12 **Rolling Contact Fatigue (RCF) continuous rail defects.** Results from the RCF inspection process are entered onto a variety of Area RCF tracking systems. Every 4 weeks the Areas forward this RCF data to the Territory Rail Management Engineer who compiles this data in a standard RCF defect spreadsheet, which is forwarded to the National Engineering Reporting Team for storage.
- 7.2.13 **Isolated defects and other continuous rail defects.** Details of these defects are entered into the Area Defect Database. The Areas use these databases throughout the process of defect management from identification to remediation. Four of the five of our sample Areas are still using the legacy databases developed by the former IMCs (Infrastructure Maintenance Contractors) and the fifth (Thames Valley) are using the new RDT system. As each system was developed separately, each one has different built-in functionality for asset management; however, all the systems inspected provided reports for the ages of defects and the defects overdue for remediation.
- 7.2.14 The new Rail Defect Tracker (RDT) System, which was progressively being rolled-out across all Areas during 2005/06 to replace the former IMC contractor's legacy systems, has been discontinued as it became apparent that the end users could not support the new system. There were significant drawbacks to the system and neither was it compatible with the recording of Rolling Contact Fatigue type defects.
- 7.2.15 Maintenance has now been given responsibility by Engineering for introducing a replacement rail data system (to be known as Rail Defect Management System (RDMS)). Network Rail plan to have a prototype in place by Sept. 2007 with a rollout scheduled to be complete by June 2008. In the interim Areas have reverted to their legacy systems.
- 7.2.16 Figure 7.2.4 shows the variety of different Area Defect Databases in operation at our sample Areas.

Territory	Sample Area	Defect Database	Former IMC owner of Defect Database
Scotland	Scotland East	Tardis	First Engineering
LNE	North Eastern	Railfail	Jarvis
Western	Thames Valley	RDT	New Network Rail System
LNW	West Midlands	Railflaws	Amey Rail
South East	Sussex	Radar	AMEC

Figure 7.2.4 Defect databases in sample Areas (M2)

7.2.17 In all Areas data from the inspection forms are entered into the Area Defect Database by personnel in the Depots rather than the Area office. The method for reporting rail defects to headquarters varied; this is discussed further below.

HQ process

7.2.18 Following previously identified issues with the rail defect reporting and recent efforts by many Areas to “cleanse” defect data prior to the transition from the legacy systems to RDT, the headquarters team is confident that the accuracy of defective rail reporting has improved considerably. We recognise this and can confirm that from the discussions with the Territories there has been a lot of work done to remove ‘double counting’ of defects and the removal of ‘rogue’ entries from the various rail defect databases.

7.2.19 In order to provide the most accurate information for reporting this year, Network Rail’s National Engineering Reporting Team approached the local responsible managers in the Territories and Areas, requesting 2006/07 defect data from the ‘best source’ of data available. A data-dump of Raildata was provided as a comparator.

7.2.20 Figure 7.2.5 shows the variety of sources from which data was provided by our sample Areas to HQ for the reporting.

Territory	Sample Area	Isolated		Continuous “Other”		RCF	
		Source	Supplier	Source	Supplier	Source	Supplier
Scotland	Scotland East	TARDIS	ARME	TARDIS	ARME	Spread Sheet	ARME
LNE	North Eastern	Railfail	ARME	Railfail	ARME	Database	ARME
Western	Thames Valley	RDT	ARME	RDT	ARME	Database	ARME
LNW	West Midlands	Railflaws	ARME	Railflaws	ARME	Database	ARME
South East	Sussex	RADAR	ARME	RADAR	ARME	Spread Sheet	ARME

Figure 7.2.5 Defect databases in sample Areas (ARME is Area Rail Management Engineer) (M2)

7.2.21 Procedurally, there is no requirement for the defect data to be signed off by the Areas, who are the actual owners of the defect data; however, most of the sample Areas we audited had been approached by the Territory for comment on the defect numbers before they were signed-off by the Territory.

Accuracy of reported data

7.2.22 We sought evidence of an audit trail from data collection in the sample Areas through to the figures reported in the annual report. We did this by (a) comparing sample inspection forms with the Area Defect Databases; (b) comparing totals from Area Defect Databases with Raildata/ HQ spreadsheets; (c) comparing totals from Raildata/ HQ spreadsheets with the published Annual Return.

Sampling

7.2.23 Samples of five inspection reports were inspected at each sample Area and compared to the records in the Defect Databases. All samples inspected were completed in accordance with the procedure and had been entered correctly into the databases. The Area Defect Databases are an integral part of the defect management process; Engineers in each sample Area were confident regarding the accuracy of the defect data within their database and our sample audit concurred with this assertion.

7.2.24 During our audit at Network Rail HQ, we examined the spreadsheet used for compiling the data received from the Territories and producing the numbers reported in the Annual Return. Each Area’s sheet in the spreadsheet contains references of where the data has come from (document name) and who supplied the information.

- 7.2.25 A check of the numbers within this spreadsheet against the ones reported in the Annual Return was done and all numbers were found to be correctly reported.

Asset Management

- 7.2.26 We were pleased to note that Network Rail is currently engaged in the following improvements to rail defect management:
- (a) IRIS (Integrated Railway Information System) is being trialled in Anglia together with the New Measurement Train so that both rail defects and track geometry can be co-ordinated. The UTUs are also measuring rail depths;
 - (b) There is some work taking place to simulate lateral and vertical dynamic forces of vehicles in relation to site specific track geometry faults and how this becomes a driver for the propagation of Rolling Contact Fatigue (RCF). This is called Track-Ex;
 - (c) An initiative to use the 'noise' from the Sperry detection data to identify RCF is also in progress as is looking at 'Magnetic Flux Leakage' to detect RCF.

Assessment of confidence grade

- 7.2.27 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect this measure; however the process for reporting the measure has not been as per the procedure. Data correction has been required at the start of each reporting year for the last five years, including for 2006/07. We believe that M2 should have a reliability grade of B.
- 7.2.28 **Accuracy grade.** Although much work has been done to improve the accuracy of the databases, we still have concerns regarding the level of data correction required at the start of the 2006/07 reporting year. We believe that M2 should have an accuracy grade of 3.

Audit Statement

- 7.2.29 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Number of Rail Defects (M2). We can confirm the data has been collected in accordance with the relevant definition and procedure, however the reporting of this measure is not inline with the procedure. We have noted a number of concerns in our audit report. The data has been assessed as having a confidence grade of B3.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.2.30 **M2 recommendation 1.** We still remain concerned as to the accuracy of data reported and the extent of 'data refreshes' at the start of each year for the M2 measure which has directly led to the confidence grade of B3. We recommend that Network Rail ensure that the data that is transferred to the new national system, RDMS, is from the most accurate source and is systematically checked by the Territories and Areas.
- 7.2.31 **M2 recommendation 2.** We have recognised the concentrated effort to reduce RCF type defects with rail grinding and re-railing particularly. However, the visibility of the results of this work is not reflected in the continuous rail defect figures. Therefore, to make this more visible, we recommend again that an RCF Heavy & Severe category is reported separately in order to make visible the removal of Heavy & Severe RCF defects. This would enable the benefit of the rail grinding and rerailing work to be assessed.

Observations relating to spreading of best practice and/or improvements to process

- 7.2.32 **M2 observation 1.** We recognise the progress being made on the initiative to apply the Ultrasonic Test Unit (UTU) testing to lines which are Track Category 1A, 1, 2 and 3 and the aim to comply with the mandatory testing requirements using the UTU instead of pedestrian ultrasonic testing, where practicable. As part of this process Network Rail have a wish to separate reportable defects from non-reportable defects in order to manage the data. We recognise that the testing process, as it improves, will most likely increase the overall volume of defects found, particularly if more non-reportable defects are being discovered which were previously not picked up. Therefore we support and endorse the initiative to separate actionable defects from non-actionable defects so that in the future, trend analysis will be possible for both actionable defective rail volumes and non-actionable defective rail volumes. If the new RDMS is capable of being coded to make this split visible, then all rail defects (both UTU and pedestrian ultrasonic generated defects) can be analysed in this way.

7.3 Track geometry (M3 & M5)

Audit scope

- 7.3.1 These audits were undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Track geometry:
- National standard deviation data (M3), including Tables 67 - 68. National standard deviation (SD) data is expressed in terms of the percentage of track within the 100% ('poor' or 'better'), 90% ('satisfactory' or 'better') and 50% ('good') bands for four track geometry parameters.
 - Poor track geometry (M3), including Table 69. This index is calculated using the national SD data results for four track geometry parameters together with the percentage of track defined as 'very poor' or 'super-red'.
 - Speed band data (M3), including Tables 70 - 76. This is distribution of standard deviation values by national speed bands for different track geometry bands.
 - Level 2 exceedences (M5), including Table 80. Level 2 exceedences are distortions in track geometry identified for short lengths of track using the 35m wavelength measurements.
- 7.3.2 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M3DF (issue 4), NR/ARM/M5DF (issue 3) and NR/ARM/M3PR (issue 4).
- 7.3.3 These measures use a common data collection process; we have therefore audited and reported on these measures together. Audits were undertaken at Network Rail Headquarters, London North Western Territory at Preston and the South East Territory at Croydon (Sussex Area).

Commentary on reported data

Regulatory target

- 7.3.4 The regulatory target for M3 track geometry for 2004/05 to 2008/09 (Control Period 3) is set in ORR's Access Charges Review 2003; the target is to maintain the network at or below the baseline level recorded in 2003/04.

National standard deviation data (M3)

- 7.3.5 The track geometry results for the 2006/07 reporting year are presented in Figure 7.3.1.

Geometry parameter	35m Top (Vertical Deviation)			35m Alignment (Horizontal Deviation)			70m Top (Vertical Deviation)			70m Alignment (Horizontal Deviation)		
	50%	90%	100%	50%	90%	100%	50%	90%	100%	50%	90%	100%
Results for 2006/07	70.0%	92.3%	98.1%	79.0%	95.0%	97.5%	72.2%	94.7%	96.7%	82.9%	97.3%	98.3%
Regulatory target	62.4%	89.2%	97.0%	72.7%	92.9%	96.5%	63.6%	92.4%	95.3%	79.5%	95.8%	97.2%
Result against target	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Figure 7.3.1 National SD data (M3)

- 7.3.6 Network Rail reported that all twelve of the regulatory targets for M3 track geometry national standard deviation data had been met in 2006/07.

Poor track geometry (M3)

7.3.7 There are no regulatory targets for poor track geometry.

Speed band data (M3)

7.3.8 There are no regulatory targets for speed band measures.

Level 2 Exceedences (M5)

7.3.9 The regulatory target for M5 track geometry for 2004/05 to 2008/09 (Control Period 3) is set in ORR’s Access Charges Review 2003; the target been set as “no more than 0.9 Level 2 exceedences per track mile within two years”.

7.3.10 Network Rail reported 0.72 L2 exceedences per track mile for 2006/07 which would have met the regulatory target of 0.9.

Trends

7.3.11 The Annual Return Commentary attributes this continued improvement in track geometry to the effective targeting of maintenance efforts and renewals, especially on S&C.

National standard deviation (SD) data

7.3.12 Figure 7.3.2 shows the national SD results for each of the twelve track geometry measures over the last five years. The results for 2006/07 for eleven measures are at the highest level of track geometry level since 2000/01. Measure 70m Alignment 50% has deteriorated slightly on 2005/06 levels but is still above the regulatory target.

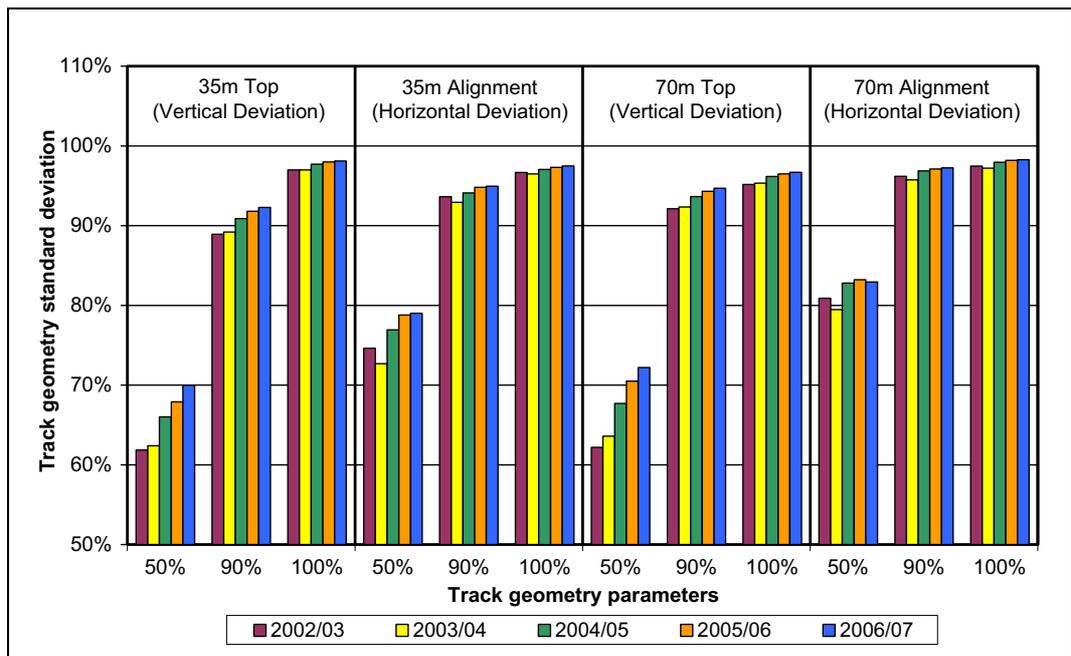


Figure 7.3.2 Track geometry standard deviation 2000/01 – 2006/07 (M3)

Poor track geometry

7.3.13 The poor track geometry (PTG) index is calculated using the national SD data results for each of the four track quality parameters together with the percentage of track defined as:

- (a) ‘Very poor’: track which fails to meet the 100% (‘poor’ or better) standard;
- (b) ‘Super-red’: track which exceeds the maximum standard deviation thresholds for the 35m vertical and horizontal alignments.

7.3.14 The trends for poor track geometry on each Route are shown in Figure 7.3.3; this shows a continuing improvement for all Routes except Anglia, Sussex and Wessex Routes. The very hot summer in 2006 has caused prolonged ground/embankment shrinkage, therefore those Areas which are more prone to this such as Anglia, Sussex and Wessex have suffered because of the local geology.

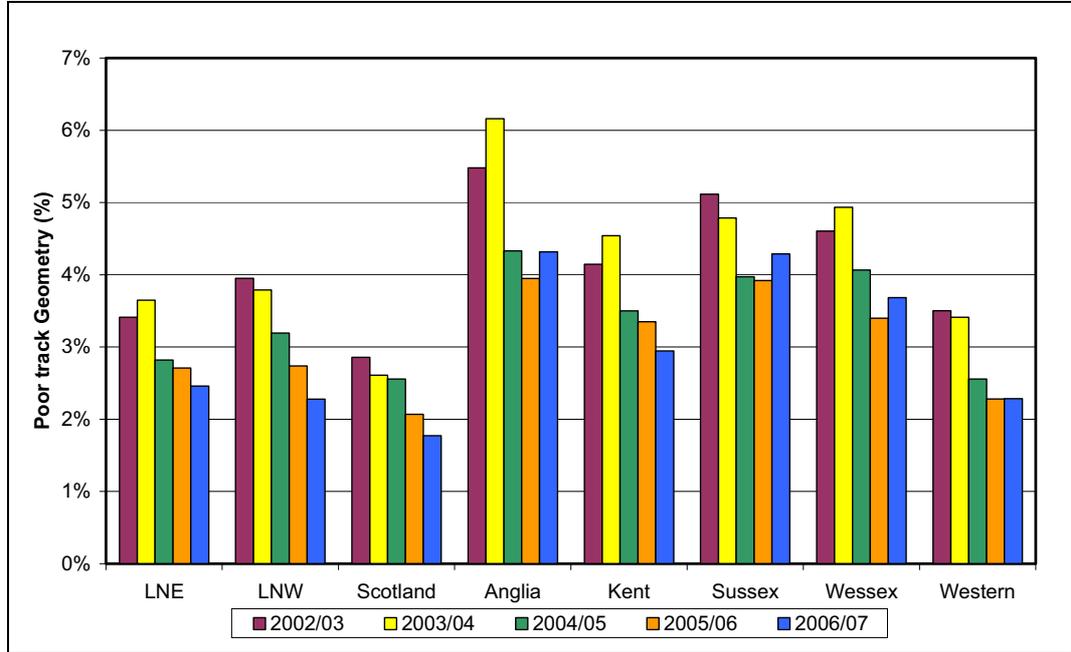


Figure 7.3.3 A comparison of Route PTG 2002/03 - 2006/07 (M3)

Speed band data

7.3.15 Figure 7.3.4 shows the overall SD results for each track geometry parameter against the speed bands for that parameter; there is a decrease for all measures compared with 2005/06, except for minor increases for line in the 80-110mph linespeed ranges. These increases are below 0.01, which is close to the limit of accuracy of the data, and thus is not a significant variance.

Track geometry parameter	Linespeed range(mph)	Overall SD at year-end (mm)					Variance (05/06 vs. 06/07)
		2002/03	2003/04	2004/05	2005/06	2006/07	
35m Top	15-125	3.04	3.02	2.93	2.87	2.81	-0.06
	15-40	4.24	4.28	4.23	4.16	4.09	-0.07
	45-70	3.34	3.34	3.25	3.20	3.12	-0.08
	75-110	2.52	2.5	2.4	2.34	2.30	-0.04
	115-125	1.82	1.81	1.73	1.68	1.63	-0.05
35m Line	15-125	1.97	1.98	1.89	1.84	1.82	-0.02
	15-40	4.09	4.08	4.06	3.93	3.85	-0.09
	45-70	2.01	2.04	1.94	1.88	1.86	-0.02
	75-110	1.22	1.27	1.17	1.14	1.15	0.01
	115-125	0.83	0.9	0.79	0.76	0.75	-0.01
70m Top	80-125	3.26	3.21	3.06	2.97	2.92	-0.05
	80-110	3.37	3.32	3.19	3.12	3.07	-0.05
	115-125	2.48	2.49	2.43	2.35	2.29	-0.06
70m Line	80-125	2.19	2.23	2.07	2.03	2.02	-0.01
	80-110	2.28	2.33	2.18	2.15	2.16	0.00
	115-125	1.48	1.61	1.49	1.52	1.48	-0.03

Figure 7.3.4 Speed Band standard deviations (M3)

Level 2 Exceedences

7.3.16 The Annual Return reported a network average of 0.72 L2 exceedences per track mile, which is a 12.2% improvement on the figure reported in 2005/06. Figure 7.3.5 shows that this year all Routes except for Sussex and Wessex had the lowest level of Level 2 exceedences per track mile for the last five years. Both Sussex and Wessex main lines have many junctions and S&C layouts on the areas of ground/embankments which suffered from the shrinkage problem in the summer of 2006. This is thought to have contributed to the problem of discrete top and alignment faults developing within Switches and Crossings layouts.

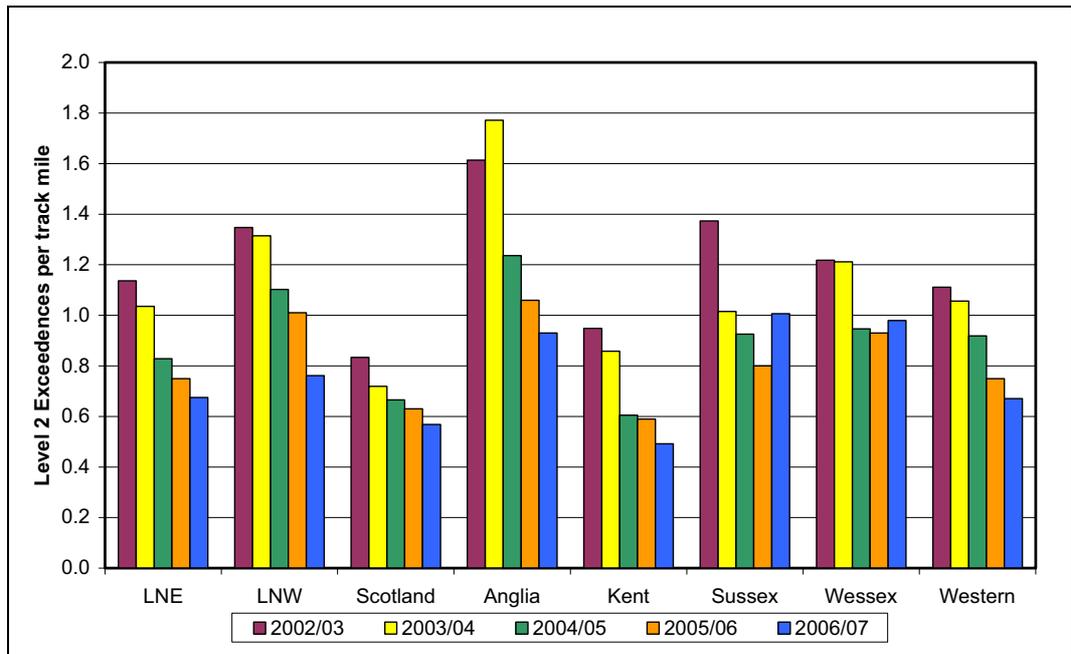


Figure 7.3.5 Level 2 exceedences for 2001/02 - 2006/07 (M5)

Audit findings

7.3.17 Network Rail now have four track recording vehicles operating across the network which conduct the ‘compliant runs’ in accordance with the frequencies set out in the PWay Inspection Standard. The fourth addition is the New Measurement Train (NMT), fitted with the Laser Rail 3000 system which was approved to carry out compliant runs this year. Of the three other trains, two are fitted with Serco-Lewis measuring equipment and one with Plasser measuring equipment. The annual track measurement plan for 2006/07 was completed using all four trains.

Calibration

7.3.18 All track recording vehicles are calibrated on a six-monthly basis and annually for cross-vehicle validation of recording data. For the six-monthly calibrations the transducers and lasers are removed, cleaned, visually examined and a sensitivity check carried out. For the annual cross-vehicle validation checks, the results from recording runs on all three vehicles were compared using the track between Derby and Sheffield.

Process

7.3.19 On completion of a recording run, the information is downloaded from the train’s recording system and uploaded to the CDMS system at the Engineering Support Centre in Derby. Each upload is a pack of files, containing measurements common to the range of parameters recorded on each vehicle. A team of analysts compares traces from every run with traces from previous runs on that line to identify any unexpected changes which may indicate errors in the data.

- 7.3.20 Following checking, the standard deviations for each eighth-of-a-mile are uploaded to the Track Quality Main Frame (TQMF) and to the new Condition Data Distribution System (CDDS). From the TQMF, the National Engineering Information Analyst extracts the latest data to produce the four-weekly track geometry reports. The reports are checked for irregularities which are investigated. Reports are distributed to Territory and Area track engineers who use the information for developing track maintenance programmes. The reports are also uploaded onto the Portal Engineering Knowledge Hub.
- 7.3.21 Area track engineers also obtain track geometry information directly using CDDS. CDDS is fed with information from TQMF and provides the Area end-users with the information they require to enable them to manage, inspect and plan work arising from the track quality exceedences recorded.
- 7.3.22 At the end of the year, the annual track geometry report is produced by the National Engineering Information Analyst and passed to the National Track Geometry and Gauging Engineer for sign-off.
- 7.3.23 We verified the process described above and inspected the spreadsheets used by the National Engineering Information Analyst.

Assessment of confidence grade

- 7.3.24 **Reliability grade.** The definition for this measure is clearly documented. The procedure is clearly defined and is well controlled. The collection and reporting of this measure is a closely managed process which has been in operation for a number of years. We believe that both M3 & M5 should have reliability grades of A.
- 7.3.25 **Accuracy grade.** The data shows considerable consistency between measurement runs; the calculations are subject to checking. We believe that both M3 & M5 should have accuracy grades of 1.

Audit Statement

- 7.3.26 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Track Geometry (M3 and M5). We can confirm the data has been collected in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of A1 for both measures. All targets for these measures were met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.3.27 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.3.28 **M3&M5 observation 1.** In the London North Western and South East Territories we have witnessed some good practice with sub dividing PTG information down to Track Section Manager level. We believe that this practice should be rolled out to the rest of the network.

7.4 Condition of asset temporary speed restriction sites (M4)

Audit scope

- 7.4.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Condition of asset temporary speed restriction sites (M4), including Tables 77 - 79.
- 7.4.2 The measure reports:
- (a) The total number of emergency speed restrictions (ESRs) and planned temporary speed restrictions (TSRs) arising from the condition of track, structures and earthworks, in place for 4 weeks or more;
 - (b) The total 'severity scores' for planned TSRs and ESRs (jointly referred to as 'TSRs'), which are derived using an algorithm based upon the length, duration and speed limit imposed compared with the prevailing line speed;
- 7.4.3 The measure is a proxy for the condition of the assets and the quality of Network Rail's asset stewardship. The impact of TSRs on train performance is not reflected.
- 7.4.4 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents RT/ARM/M4DF (issue 5) and RT/ARM/M4PR (issue 6) respectively.
- 7.4.5 The audit was undertaken at Leeds, where the collection and reporting of track TSRs is undertaken, and Swindon offices, where the collection and reporting of structures and earthworks TSRs is undertaken.

Commentary on reported data

Regulatory target

- 7.4.6 The regulatory target for M4 condition of asset temporary speed restriction sites for 2004/05 to 2008/09 (Control Period 3) is set in ACR2003; the target is "annual reduction required" which we have interpreted as a requirement to maintain the network at or below the baseline level recorded in 2004/05.
- 7.4.7 In numeric terms, the regulatory target is therefore:
- (a) Number of sites not greater than 942;
 - (b) Severity score not greater than 4,622.
- 7.4.8 In 2006/07 Network Rail report that there were 710 condition of asset TSRs on the network reportable for this measure with a total of severity score of 3,246, bettering the regulatory target by 25% for the number of sites and by 30% for the severity score.

Trend

- 7.4.9 Figure 7.4.1 shows the reported TSRs are dominated by track-related faults, accounting for 94% of the total number and 97% of the total severity score.
- 7.4.10 Figure 7.4.2 shows the number of TSRs has improved significantly in every category with structures achieving the highest reduction of 60% for the number of sites and track achieving the highest reduction of 25% for severity scores.

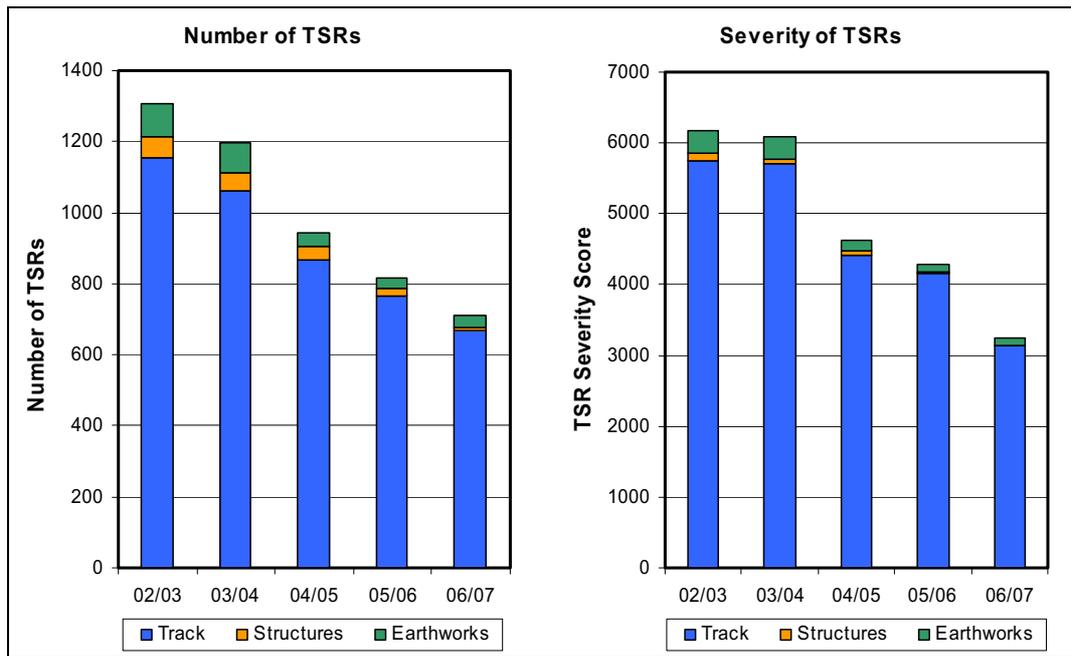


Figure 7.4.1 Number and severity of temporary speed restrictions (M4)

Measure (M4)	Cause of TSR	Variance (03/04-04/05)	Variance (04/05 - 05/06)	Variance (05/06 - 06/07)
Number	Track	-18%	-12%	-13%
	Structures	-28%	-47%	-60%
	Earthworks	-56%	-24%	18%
	Total	-21%	-13%	-13%
Severity Score	Track	-23%	-6%	-25%
	Structures	-17%	-62%	-12%
	Earthworks	-51%	-26%	-16%
	Total	-24%	-7%	-24%

Figure 7.4.2 Variance in Severity Score and Number of TSRs (M4)

7.4.11 Figure 7.4.3 and Figure 7.4.4 shows that, whilst nationally there is improvement in both TSR numbers and severity scores, the situation in South East Territory has got worse, with the number of TSR sites reportable to M4 measure increasing by 18% and the severity score increasing by 8%. The national improvement this year has been driven by Scotland, with the number of TSRs sites reduced by 52% and the severity score reduced 45%. We have found no evidence as to the causation of these differences.

Former Region/ Present Territory	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
East Anglia & Southern/ South East	200	215	122	99	117	18%
Great Western/ Western	193	199	130	95	87	-8%
LNE & MD & NW/ LNE & LNW	756	703	612	532	463	-13%
Scotland/ Scotland	159	82	78	89	43	-52%
Total	1308	1199	942	815	710	-13%

Figure 7.4.3 Number of temporary speed restrictions (M4); grouped for comparison (M4)

Former Region/ Present Territory	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
East Anglia & Southern/ South East	484	530	166	142	154	8%
Great Western/ Western	868	908	591	538	472	-12%
LNE & MD & NW/ LNE & LNW	4389	4410	3756	3451	2436	-27%
Scotland/ Scotland	428	241	111	154	84	-45%
Total	6169	6089	4624	4285	3246	-24%

Figure 7.4.4 Severity of temporary speed restrictions (M4) ; grouped for comparison (M4)

7.4.12 For each track classification (Primary, Secondary, Rural, Freight, London & South East Commuter), Figure 7.4.5 shows the total number of Track TSRs per track mile and severity score per track mile.

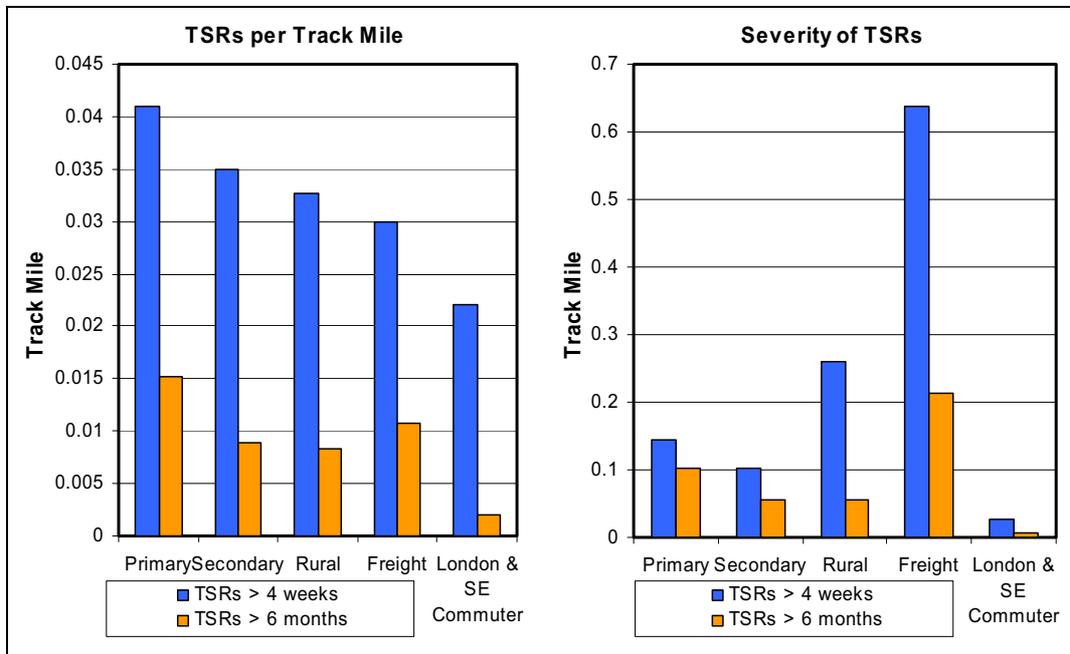


Figure 7.4.5 Number of Severity of track temporary speed restrictions (M4)

7.4.13 Given the incentive regime in place, the results shown in Figure 7.4.5 are as we would expect – Network Rail focuses its effort on removing TSRs from London & South East Commuter and Primary routes which attract the greatest quantum of performance penalty payments:

- (a) For both TSRs >4weeks and for TSRs >6months, Primary routes incur the highest rate of TSRs per mile and while Freight routes incur the highest severity score per mile; whilst London & South East Commuter incur the least for both measures.
- (b) The number TSRs per mile is comparatively high for Rural routes, despite the fact that they have relatively low traffic and wear rates. Furthermore these routes show comparatively high severity scores on TSRs >4weeks.

- 7.4.14 Our underlying concern is that whilst standards on primary routes are improving, it is at the disproportionate expense of minor routes. We are aware that there are regularly Emergency Speed Restrictions on L&SE Commuter and Primary routes but these, understandably, seldom remain for long periods with the cause being repaired long before the qualifying 4-week period for this measure. If measure M4 were to be altered to remove the qualifying period, the data would more closely reflect the reality on the ground and allow more instructive analysis of the impact of Network Rail's track management regime. The current measure does not reveal the extent to which the management of track maintenance is reducing or otherwise the incidence of speeds restrictions. Consequently, our position has not changed from last year in that we believe the measure is flawed as an indicator of asset condition. The measure says more about maintenance resource availability and the priority of maintenance managers than the condition of assets.
- 7.4.15 A number of these sites have been in place for very long periods with TSRs in place for long periods – particularly on freight and rural routes. In the case of London North Eastern, for example, five of the TSRs in last year's figures also occur in the current report. Pragmatically, we recognise the need to prioritise resources to areas where they will have the greatest impact. However, we expect Network Rail to have policies in place to deal with these situations.

Audit Findings

- 7.4.16 Much of the data for the measure is taken directly from the Possession Planning System (PPS). Thus as long as that data set is comprehensive then the base data used to calculate the Annual Return figures should be correct. However, there are some omissions, such that the M4 measure cannot be wholly produced using PPS without manual interventions. These include the manual inputting of line speeds, an essential component of the severity score. Moreover, manual analysis of the data is required to match different (and consecutive) entries against the same location. Records change if for example, a speed restriction is worsened to allow for temporary track work to prevent further degradation of the asset before full repair can be affected. The necessity for manual intervention leaves the measure open to error.
- 7.4.17 Some checks are built into the system. Both the analyst for track TSRs and the analyst for earthworks and structures run cross-checks on the data they receive to ensure it is accurate. Moreover, automatic checks are built into the spreadsheet that calculates the severity score. In the absence of an internal audit on manual data entry into that spreadsheet, we undertook a spot audit and the results were satisfactory.

Process

- 7.4.18 The information for the measure is derived from PPS. TSRs details are entered into the system by the local Possession Planning Teams as either (a) TSRs are planned and approved or (b) converted from Emergency Speed Restrictions to TSRs.
- 7.4.19 Data input to PPS is done by Area Delivery Planning Teams (ADPT). Data initially comes from track engineers and is reported to the local depot. The depot completes a form which goes to the ADPT for publication of information in weekly operating notices (WONs). We note that there is no national documented process for this, although we understand that there are some programmes within Network Rail aimed at standardising maintenance and associated procedures.
- 7.4.20 Emergency speed restrictions (ESRs) are an issue. The process should be that any ESR longer than a week should be formally documented and included in the WON. The purpose of the measure, the TSR should be backdated to the beginning of the ESR within PPS. However, in practice, not all ESRs are documented in this way – ESR information is not therefore fully comprehensive. Where possible, this is mitigated by the analyst for track incidents via a manual check.

- 7.4.21 At year end, the reportable TSR data is sourced from PPS by the Headquarters TSR Planner and is manually manipulated and supplemented before entry into a calculation spreadsheet which contains algorithms for calculating the severity scores and number of planned TSRs from the input data.

Results

- 7.4.22 There are two main areas of risk to the reliability of the process and accuracy of the resulting data:
- (a) The local teams might not correctly backdate an unplanned TSR when it is entered into PPS to reflect the actual date of commencement of the original ESR;
 - (b) The degree of manual data intervention requires (i) a good knowledge of railway geography and naming conventions, and (ii) considerable diligence.
- 7.4.23 **Manual Processing.** As was the case last year, from our interviews with the analysts undertaking the manual processing, we observed the manual data processing for Structures and Earthworks TSRs is undertaken using a different process from that used for Track TSRs. In the case of track TSRs the analyst is required to do manual work for the cleansing of PPS records so only the ones that comply with M4 measure requirements are included. In contrast, in the case of Structures and Earthworks TSRs the analyst receives the data in the form of an Excel spreadsheet from the Area Assurance Engineers at the end of every period. The Assurance Engineers derive the data either from PPS or ground engineers. The data is then copied into another Excel spreadsheet, where TSRs are checked for compliance with M4 measure requirements and the calculation of the severity score if TSRs comply. In the case of Track TSRs, required to be entered manually, generally using Sectional Appendices; in the case of structures and earthworks, line speeds are given to the analyst by the Assurance Engineers. Where these are missing, they are sourced from GEOGIS.
- 7.4.24 Both analysts undertake quality checks on the data they receive. In the case of Track TSRs, data is manually checked against WON, in particular to check beginning and end dates. Earthworks and Structures inputs are also checked against WON, with particular attention paid to attribution.
- 7.4.25 **Sampling.** At time of our audit, analysis of Track TSRs had yet to be completed. However, we undertook a spot audit of work to that point, following samples through from the WON and PPS inputs to the spreadsheet. No errors were found. We also checked the calculation spreadsheet and the formulae used to calculate the severity score. We are satisfied that the process is carried out conscientiously and knowledgeably. Significant efforts are made to by the Headquarters TSR Planner to check data accuracy of Track TSRs.

Assessment of confidence grade

- 7.4.26 **Reliability grade.** The definition of the measure is clearly documented. Though the procedure requires updating, it is applicable and has been demonstrably followed; however, we continue to judge that the manual processing and inputs remain a risk, albeit one that is currently mitigated by conscientious staff. We believe M4 should continue to have a reliability grade of B.
- 7.4.27 **Accuracy grade.** The PPS system provides a high degree of accuracy for the base data, as it is the source material for the Weekly Operating Notice (a key document for both engineering and operations staff which is subject to rigorous oversight). However, the accuracy of the process is impacted by risks from (a) ESRs being incorrectly input to PPS, and (b) the continuing degree of manual manipulation of raw data to produce the result. In line with our findings last year, we believe M4 should continue to have an accuracy grade of 2.

Audit Statement

- 7.4.28 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Condition of Asset Temporary Speed Restriction Sites (M4). We can confirm that the data has been collected and reported in accordance with the relevant definition and procedure with the minor risks outlined regarding ESRs and manual data manipulation. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.4.29 **M4 recommendation 1.** We recommend the additional process notes currently in development to document the manual manipulation and checking be incorporated within the RT/ARM/M4PR as further guidance to correct compilation of the measure.
- 7.4.30 **M4 recommendation 2.** We recommend the PPS system is considered for further enhancement to further automate the generation of the measure.
- 7.4.31 **M4 recommendation 3.** We recommend instructions be re-issued to all local teams regarding the correct procedure for inputting Emergency Speed Restrictions to PPS.
- 7.4.32 **M4 recommendation 4.** We recommend the definition of the measure be amended to remove the qualifying time period of >4weeks.

Observations relating to spreading of best practice and/or improvements to process

- 7.4.33 **M4 observation 1.** The process for calculating the score is documented. It is also embedded into a spreadsheet. However, we saw no evidence that these instructions are communicated other than by verbal delivery. It may be helpful to codify these in writing, covering for any future personnel changes.

7.5 Earthworks Failures (M6)

Audit scope

- 7.5.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Earthworks Failures (M6), including Table 81.
- 7.5.2 This measure reports the number of rock fall or soil slip, slide or flow in a cutting or natural slope, or soil slide or slip in an embankment or natural slope. Failures causing a passenger or freight train derailment are recorded separately.
- 7.5.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M6DF (issue 5) and NR/ARM/M6PR (issue 4)
- 7.5.4 Audits were undertaken at Network Rail Headquarters and at London North Eastern, London North Western, Scotland, South East and Western Territories.

Commentary on reported data

Regulatory target

- 7.5.5 The regulatory target for earthworks failures set in ORR's Access Charges Review 2003 is to be no deterioration from the 2003/04 levels, which is 47 network wide earthworks failures.
- 7.5.6 For 2006/07, the reported Earthworks failures were 90 which would not meet the regulatory target for the year.

Trend

- 7.5.7 Figure 7.5.1 shows the 90 earthworks failures for 2006/07. There was a 119.5% increase in failures compared to 2005/06, 91.5% over the regulatory target. Earthworks failures causing train derailment increased from 2 in 2005/06 to 3 for the year ended 2006/07.

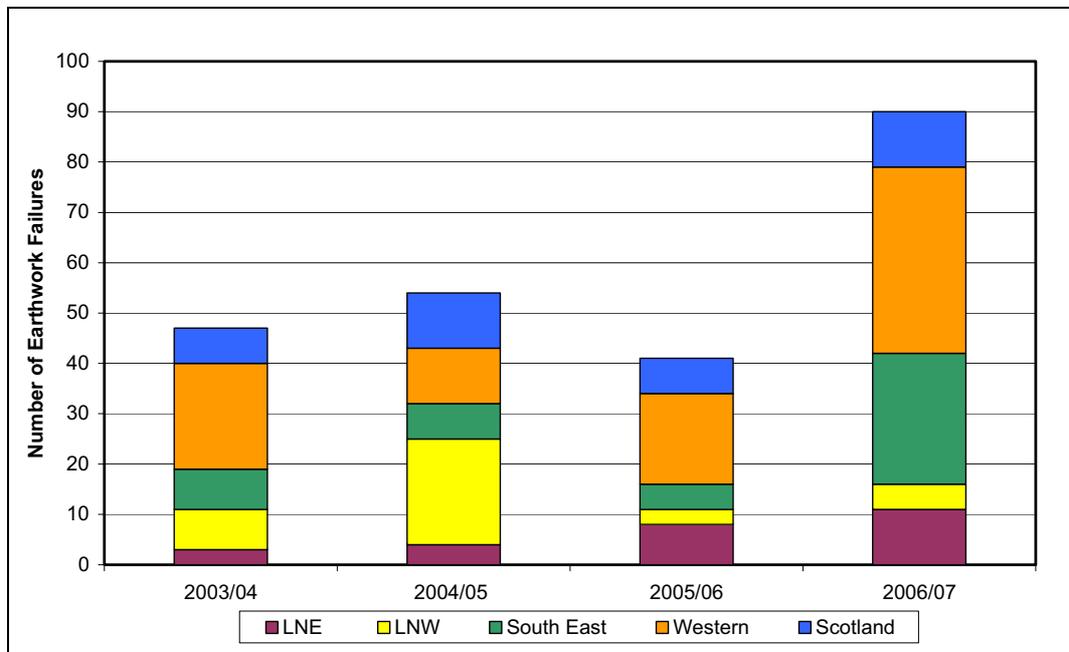


Figure 7.5.1 Number of Earthwork failures reported during the last four years (M6)

7.5.8 Figure 7.5.2 shows the increase in Earthwork Failures in 2006/07 has been driven by South East and Western Territories. Figure 7.5.3 shows the difference in the types of failures reported. Cutting slips, embankment slips and rock falls have been the main contributors for the year ended 2006/07. The increases in these types of failures has been attributed to a number of severe storms and wetter than normal weather patterns.

Territory	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
LNE	3	4	8	11	37.5
LNW	8	21	3	5	66.7
South East	8	7	5	26	420.0
Western	21	11	18	37	105.6
Scotland	7	11	7	11	57.1
Total	47	54	41	90	119.5

Figure 7.5.2 Variance of Earthwork failures (M6)

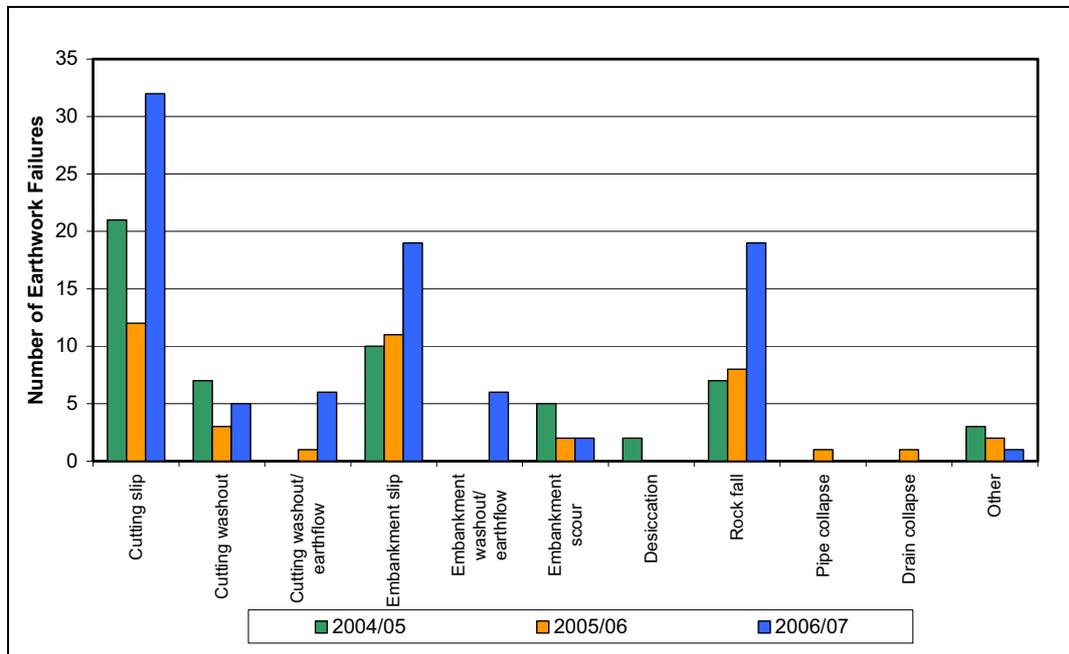


Figure 7.5.3 Earthwork failures by type (M6)

Audit findings

Process

7.5.9 The data acquisition, verification and reporting mechanisms for this measure have not materially changed this year, although the reporting definitions were updated to incorporate the recommendation from last year regarding the consistency of reporting embankment failures; reports of track geometry movement where no subsequent physical works are required to remediate the embankment are now excluded. This change will affect the results of trend analysis.

7.5.10 On a daily basis, the Headquarters Civil Engineer (Geotechnics) reviews and collates earthworks failures from the national incident log into a single spreadsheet. The results are summarised by the National Engineering Reporting team.

- 7.5.11 Every four weeks, the spreadsheet is sent to the Territory Earthworks & Drainage Engineers for verification that these failures meet the definition for measure M6; a commentary is provided for each incident as appropriate. The Territories use a variety of data sources to verify the incidents including Daily Logs, routine and incident specific reports from the local Permanent Way organisation, earthworks examination reports and contact with personnel involved in the incident and its remediation.
- 7.5.12 The spreadsheet is returned to the National Engineering Reporting team for reporting on a four-weekly basis. At year-end Territory Earthworks & Drainage Engineers formally sign-off the data to be reported.

Accuracy of reported data

- 7.5.13 For each Territory, we reviewed each of the M6 failures reported.
- 7.5.14 In the Scotland and London North Western Territories we found that the reporting process for multiple failures had been dealt with by grouping them together and treating them as one reported failure if they had been caused by a single event on the same day. This places a different emphasis on the definition of reportable failures, using the number of causes rather than the number of failures. However, the cause maybe a failed crest drain or slope drain which has resulted in a number of washdowns of material and therefore could be deemed as one failure (i.e. one failed drain).
- 7.5.15 In the London North Western Territory we found that eight failures were questionable regarding whether they fell within the definition for this measure. We are still awaiting a response from Network Rail on these eight failures, and will comment further in our final report. Depending on the outcome we may have to review the accuracy grade we assign.

Assessment of confidence grade

- 7.5.16 **Reliability grade.** The definitions for these measures are clearly documented. A single documented process has been followed to collect and report on these measures. The process of correctly identifying the root cause of incidents attributed to earthwork failures is not a simple process and takes time to analyse correctly. However, this has been successfully achieved for the year end deadline. Therefore, we believe that M6 should have a reliability grade of A.
- 7.5.17 **Accuracy grade.** The process is not sufficiently robust to ensure that the number of reported incidents is within 1%. The process is over-reliant on the national operations log as the sole source of information; if the local track engineer/ manager does not declare track movement is related to an embankment failure at the time of the incident, which is known to occur, then it can be overlooked if it becomes a reportable embankment failure. Furthermore, multiple failures caused by a single event are without a clear definition in the Asset Reporting Manual which would otherwise ensure the accuracy of reporting is maintained. Therefore, we believe that M6 should have an accuracy grade of 2.

Audit Statements

- 7.5.18 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for earthwork failures (M6). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure but needs a further review to include a new definition for multiple failures. The data has been assessed as having a confidence grade of A2. The regulatory target for this measure has not been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.5.19 **M6 recommendation 1.** Reporting of multiple failures caused by a single event needs to be clearly defined. Currently all Territories are reporting failures such as this consistently but it would be useful for this to be defined within Network Rail's Asset Reporting Manual. Such a review should consider the process of reporting to ensure it is consistently applied across the Territories by all those involved. We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.5.20 We have no observations for this measure.

7.6 Bridge condition (M8)

Audit scope

- 7.6.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Bridge condition (M8), including Tables 82 - 84.
- 7.6.2 This measure assesses Network Rail's stewardship of bridges. The condition of each bridge is assessed using the Structures Condition Marking Index (SCMI) at the same time as it receives its six-yearly detailed examination. Each element of the structure is given separate severity and extent scores which produces a condition score from 1 to 100; these are converted into condition grades which are integers from 1 to 5, where 1 is good condition and 5 is poor condition, using a linear scoring mechanism: 100-80 is condition grade 1, 79-60 is condition grade 2, 59-40 is condition grade 3, 39-20 is condition grade 4, 19-1 is condition grade 5.
- 7.6.3 The definition and procedure for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M8DF (issue 5) and NR/ARM/M8PR (issue 5).
- 7.6.4 Audits were undertaken at Network Rail Headquarters and at each of the five Territories.

Commentary on reported data

Regulatory target

- 7.6.5 The regulatory target for structure condition set in ORR's Access Charges Review 2003, was for the condition of the structures assets to be maintained at a level equal to the baseline level recorded in 2001/2002. In numerical terms, the regulatory target was an average condition score of not greater than 2.1, however, Network Rail have discussed and agreed with ORR that a full target cannot be established until all bridges have been assessed, which is anticipated to be 2008/09.
- 7.6.6 Therefore, there is currently no regulatory target for this measure.

Trends

- 7.6.7 SCMI scores for 4,344 bridges were entered into the tool for the 2006/07. This brings the cumulative total of bridges with an SCMI scores up to 24,644. This total includes some bridges that have had second cycle examinations in 2006/07.
- 7.6.8 The total bridge population is recorded in GEOGIS as 41,251, however this includes tenanted arch bridges, complex structures and major structures which are excluded from the M8 definition, however, until the much anticipated national database (CARRS) is implemented this is the best source of information regarding the total population of bridges. This is discussed in further detail in a later section.
- 7.6.9 Figure 7.6.1 shows the average condition reported for the last 5 years along with the percentage of the population surveyed (as recorded in GEOGIS).

Period	2000/03	2000/04	2000/05	2000/06	2000/07
Cumulative Average Condition Score	2.0	2.0	2.0	2.0	2.1
Based on survey % (GEOGIS)	16%	25%	37%	50%	60%

Figure 7.6.1 Average bridge condition reported 2002/03 – 2006/07 with the percentage surveyed (M8)

- 7.6.10 As the full asset population has not yet been inspected and the programme has not been conducted on a fully randomised basis we are unable to draw conclusions regarding a trend.
- 7.6.11 Figure 7.6.2 illustrates the cumulative distribution of grades for the past five years. Currently 60% of bridges scored are in condition grade 2, 78% are in the top two grades, 98% are in the top three grades.

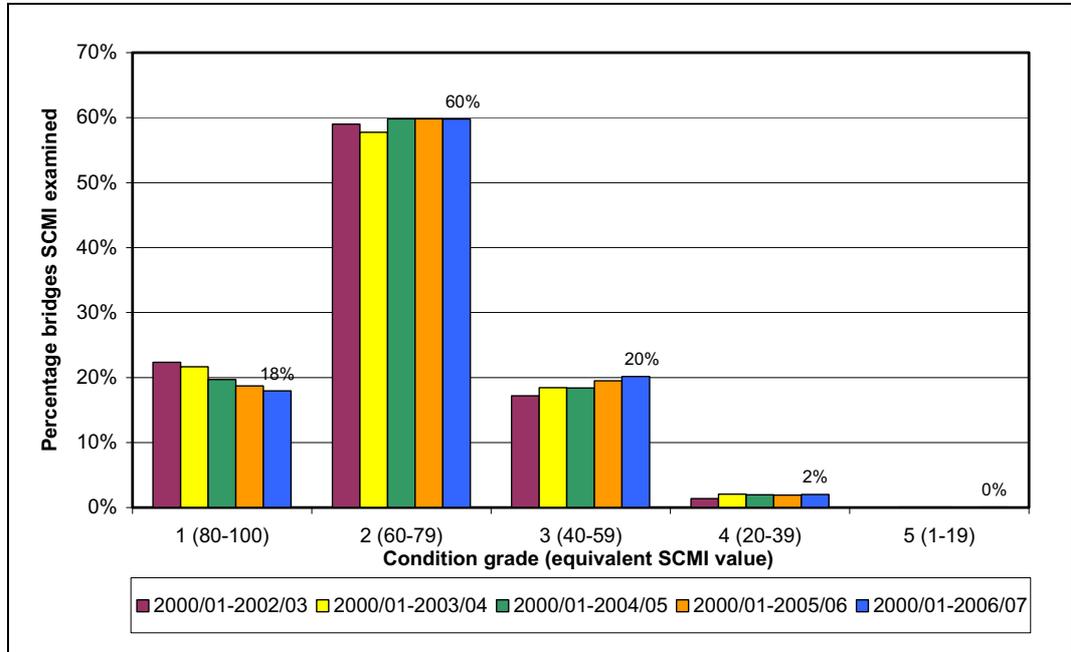


Figure 7.6.2 Bridge condition reported during the last five years (M8)

Audit findings

Process

- 7.6.12 The data acquisition, verification and reporting mechanisms for this measure have not materially changed for the reporting year 2006/07 and Network Rail confirmed that no changes have been made to the definition and procedures for this measure since last year.
- 7.6.13 The bridge SCMI examination is undertaken at the same time as a detailed examination, which are generally on a historically pre-defined six-year cycle.
- 7.6.14 Certain structures do not receive SCMI inspections. These include footbridges, culverts, tunnels and retaining walls. A significant proportion of tenanted arches which are programmed to receive a SCMI examination and score have not due to access and tenancy equipment issues.
- 7.6.15 Both the detailed and SCMI exams are undertaken by structures examination contractors (SECs). The ten year SEC contracts are managed by MP&I in all Territories except Western, which has retained the contract management role. Regardless of the transfer of the contract management in the other Territories, engineering have retained ownership of the process, and are in regular contact with the SECs.

- 7.6.16 The SCMI examination involves dividing an individual bridge into a number of elements and then allocating each element a score for both severity and extent within a pro-forma Excel spreadsheet. Using an upload function of the SCMI database, these scores are loaded to the database and an algorithm derives an SCMI score for the overall structure and consequently the condition grade. As part of a recent update to the SCMI tool the Territory are now able to upload multiple SCMI files at the same time, and will only receive a warning if there are any issues with the upload.
- 7.6.17 Prior to sending the SCMIs to Network Rail, the SECs run them through a test version of the database to ensure they will upload correctly. Most Territories receive a CD of SCMI files every 4 weeks.
- 7.6.18 The Territory process owner, or delegate, uploads the SCMIs once they have been checked. The SCMI database is hosted by Network Rail Headquarters on the national server, from where each of the Territories has access to it.
- 7.6.19 At the end of the year, the M8 Champion takes the results from the database to produce the numbers for the annual return.

Accuracy of reported data

Programme

- 7.6.20 Based on the GEOGIS data from March 2005 downloaded into the National Bridge & Culvert Books (issue 2), 60% of the total bridge population has now had at least one SCMI conducted. However as stated in paragraph 7.6.8 earlier, the GEOGIS data is known to contain inaccuracies within the data.
- 7.6.21 The Civils Asset Register and electronic Reporting System (CARRS) and Central Asset Inventory (CAI) Projects, which last year were reported as programmed for implementation in January 2007, are now expected by Network Rail to be rolled out in October/ November 2007.
- 7.6.22 It is still expected that these databases will assist in the asset management of structures, and provide a national database of bridge structures.
- 7.6.23 We note that the expected completion of all first cycle SCMI examinations by April 2008, made by Network Rail in last year's Annual Return, has now been restated as being anticipated to be completed in 2008/09.

Inspections undertaken in previous years but reported for 2006/07

- 7.6.24 As discussed in last years report, the data reported each year in the Annual Return is based on the inspections input to the SCMI tool for the twelve months ending on 31st March each year.
- 7.6.25 Figure 7.6.3 shows that, of the SCMIs reported for 2006/07, the average time to enter an examination into the SCMI tool is 162 days. This is in comparison with the contractual requirement for the SEC to provide the examination report (including SCMI) to Network Rail within 28 days of examination.

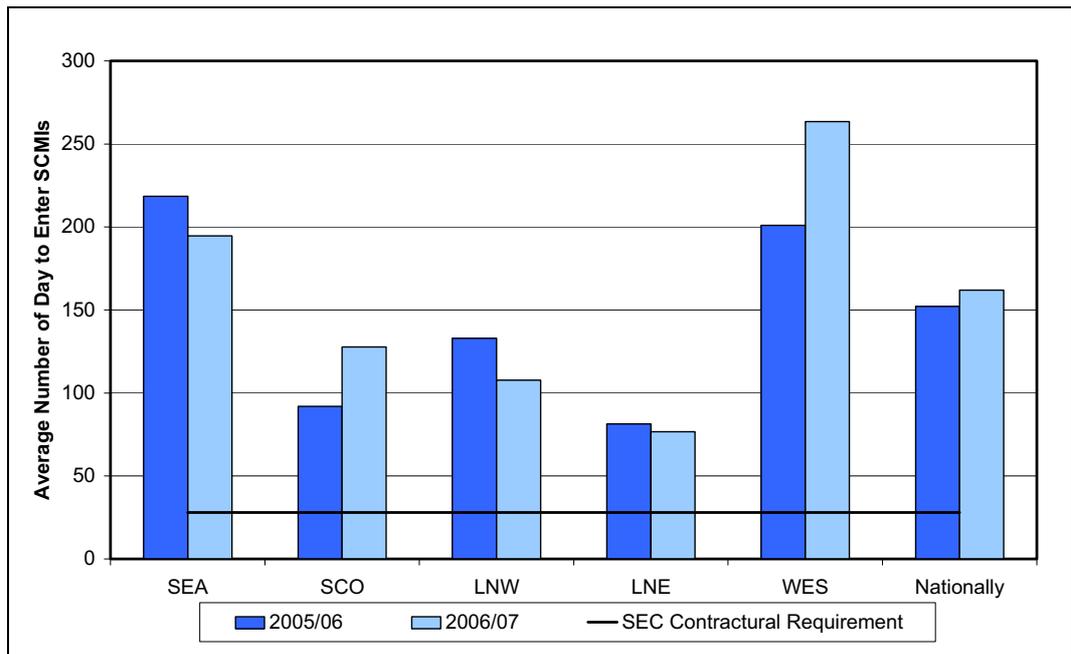


Figure 7.6.3 Average Number of Days from Examination to Entry into SCMI by Territory (M08)

7.6.26 The average days for the Territories range from 77 to 263. Three of the Territories, South East, London North Eastern and London North Western, have improved on the average time taken in 2005/06. The average time to enter SCMIs for the remaining two Territories, Western and Scotland, has got longer.

7.6.27 Figure 7.6.4 shows that 34% of the 4,344 examinations reported for 2006/07 were from a previous examination year. Over 50% of the SCMIs from previous years were from the Western Territory.

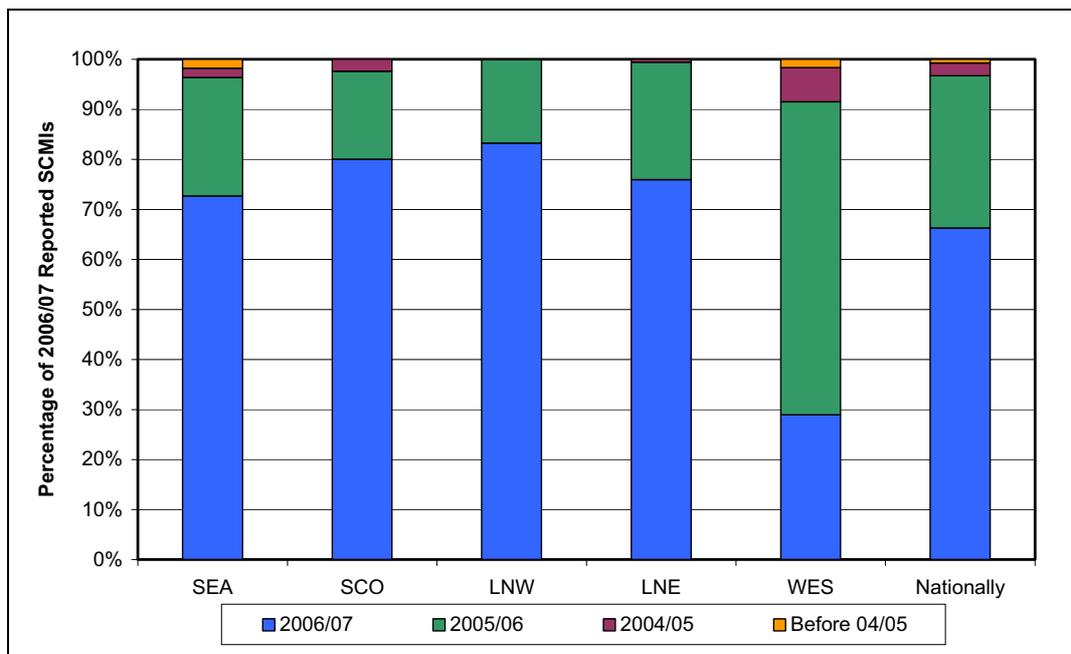


Figure 7.6.4 Percentage of 2006/07 Reported SCMI from previous years by Territory (M8)

- 7.6.28 As the SECs have 28 days to provide the SCMI to Network Rail, which then needs to be checked alongside the detailed report, it can be expected that there will be a delay in entering the SCMIs. However, we feel that this delay should be, at most, 12 weeks. Assuming that the examinations are evenly spread across the year, this would mean that at least 77% of SCMIs reported would be from that reporting year.
- 7.6.29 We have been given no adequate explanation as to why examinations from 2004/05 and before are still being entered into the SCMI tool years later and reported as 2006/07 condition data.

Inspections reported for 2006/07

- 7.6.30 The Annual Return 2007 identified 4,344 SCMI examinations for 2006/07. The data supplied separately from the SCMI database agreed with this total. We do note that there are a number of minor errors in the database such as the date examined being later than the date entered, or obvious typing errors. Although this does not affect the accuracy of the resulting condition grade, it may cause problems when trying to conduct data analysis.
- 7.6.31 We requested a sample of two detailed examination reports and accompanying SCMI for each Territory, which we randomly selected from the SCMI tool. All of these were received and reviewed. We are satisfied, from the evidence provided, that these examinations were undertaken and the actual conditions of each bridge were accurately reflected in the condition grade.
- 7.6.32 During the audit, we selected a random sample of five SCMIs, either in hardcopy or from CDs, and cross-checked that these were in the national database. We found in all Territories except one, Western Territory, that all SCMIs checked had been uploaded successfully.
- 7.6.33 During our audit at Western Territory it was found that out of the six files that were checked, three had not been uploaded. A second CD was selected and all files were found to have been uploaded. We were later advised that an earlier copy of the first CD hadn't worked, and the one that we check had been a new one from the SEC, received only days earlier.
- 7.6.34 Despite this explanation, we are still concerned by the underlying process, which can allow this to occur. We are also concerned by the fact that 71% of Western Territory's SCMIs reported for 2006/07 were from examinations undertaken in previous years and what impact the local process has had on this result.
- 7.6.35 We suggest that this is investigated by Western Territory and a local procedure for the input of SCMIs is agreed and documented, which includes a level of self checking and sign-off and provides some guidelines on expected timeframes for uploading to the database.
- 7.6.36 We have been advised by Network Rail Headquarters that the roll-out of CARRS Phase 2 may allow the SECs to input the SCMIs directly into the database, as unapproved, and then these would be approved in the system by the Territory. If this functionality is built into CARRS it would reduce the issue with the time taken to input the SCMIs into the database and would eliminated the need for SECs to send CDs of SCMIs to the Territory.

SEC checks and audits

- 7.6.37 Most of the SEC's have two levels of checking the accuracy of the detailed examination reports and SCMIs, which are normally conducted by one of the SECs engineers:
- (a) A desk-top check of the detailed exam report and SCMI prior to being submitted to Network Rail. In most cases this is a 100% check. It is at this stage that any issues with either the structure or the report are highlighted and fed back to the examiner for his clarification. This process is successfully operated in all Territories.
 - (b) An annual site-based check of examiner's competency. For the 2006/07 reporting year not all the SEC's carry out annual site checks of their examiners. We feel that a minimum number of on site-based checks should be mandated by Network Rail

to ensure the examiner's competency in carrying out and recording the structure condition. Some SEC's at present aim to complete two site-based checks per year and we feel that this should be adopted as the required minimum.

- 7.6.38 Where conducted, we are satisfied that the standard of these checks are to a sufficient level for the SECs to ensure the quality of their reports. However, we do note that there is no agreed standard for conducting these checks from one SEC to another.

Network Rail checks and audits

- 7.6.39 Unlike previous years, for 2006/07, no national audit was commissioned by Network Rail Headquarters. However, Lloyd's Register Rail was commissioned to review SECs site checks, through a desktop study.
- 7.6.40 It was mentioned in last year's report that Network Rail had planned to appoint a Headquarters' Structures Specialist, who would provide SCMI support to the Territories and would take over the audit role previously conducted by Lloyd's Register Rail. However, at the time of this year's audits, this position had still not been filled.

National comparability

- 7.6.41 Due to the absence of an Headquarters' Structure Specialist, of whom we would envisage a role of sharing best practice across the Territories/ SECs, and the historic differences in local processes, we are concerned about the comparability of the SCMI results from different Territories/ SECs. Some SECs do have forums for their examiners to interact and share, but there is no forum for examiners from different SECs to compare examination results.
- 7.6.42 We feel that it would be useful for Network Rail Headquarters to arrange a SCMI examiner's workshop, which would involve a few examiners from each SEC, at which they could each assess the same sample of bridges. The resulting SCMIs could then be compared to see if there were any underlying trends in the scores awarded by each SEC's examiners. Depending on the outcome of the initial session, it may be beneficial for the workshop to become a regular event.

Training and Competence

- 7.6.43 Following the recommendation we made last year regarding the re-introduction of competency standards for SCMI assessments, we have been advised that a new Network Rail's specification, NR/SP/CTM/017 (June 2006), has been introduced for the examination of civil structures. However, in this version of the specification the only direct mention of SCMI is one reference on page 37.
- 7.6.44 The specification refers to the general requirement of an assessment of competence to be required within twelve months of the examiners training, and an annual review to ensure on-going compliance. SECs are required to establish competence records to provide auditable records of their examiners' on-going training and competence.
- 7.6.45 The SEC's have confirmed that their existing examiners are trained and are in possession of the bridge examiners competence certificate in accordance with the original Network Rail Requirements.
- 7.6.46 Two of the SECs' are continuing to provide training based on the original Network Rail Bridge examiners course. But they have not reported any direction being given for the future development of the training or assessment of examiners within the industry.

Assessment of confidence grade

- 7.6.47 **Reliability grade.** The definition for this measure is documented. The process of condition inspections is subjective. We believe the M8 measure should have a reliability grade of B.

- 7.6.48 **Accuracy grade.** We found a few SCMI upload errors in one Territory, which raised concern regarding the local procedure for handling the SCMI uploads to the database. This may also relate to the level of SCMI examinations from previous years which are being reported as new condition grades in 2006/07. We believe the M8 measure should have an accuracy grade of 2.

Audit Statements

- 7.6.49 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for bridge condition (M8). We can confirm the data has generally been collected and reported in accordance with the relevant definition and procedure. We still have concerns regarding the level of SCMI examinations from previous years which are being reported as new condition grades in 2006/07. The data has been assessed as having a confidence grade of B2.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.6.50 **M8 recommendation 1.** We recommend that the competency standard is revised to include SCMI examinations, and that Network Rail ensure that the training and assessment standards for both SCMI and Examiners Competence, that satisfy NR/SP/CTM/01, are agreed by the Industry.

Observations relating to spreading of best practice and/or improvements to process

- 7.6.51 **M8 observation 1.** To establish the level of national comparability within the SCMI scores, Network Rail Headquarters should arrange a SCMI examiner's workshop involving a few examiners from each SEC assessing the same sample of bridges. The resulting SCMIs could then be compared to see if there were any underlying trends in the scores awarded by each SEC's examiners.

7.7 Signalling failures (M9)

Audit scope

- 7.7.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail’s Annual Return 2007, Section 3, Signalling failures (M9), including Table 85.
- 7.7.2 This measure reports the total number of signalling failures that cause more than 10 minutes delay on Network Rail’s infrastructure (referred to as ‘signalling failures’).
- 7.7.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M9DF (issue 6) and NR/ARM/M9PR (issue 4) both dated 2 March 2007.
- 7.7.4 Audits were undertaken at Network Rail Headquarters and selected Areas of Scotland East, West Coast South, East Midlands and three fault controls, Western at Swindon, Sussex at Croydon and London North Eastern at York.

Commentary on reported data

Regulatory target

- 7.7.5 The regulatory target for signalling failures set in ORR’s Access Charges Review 2003 is to maintain the network at or below the baseline level recorded in 2003/04. Failures qualify if they cause more than 10 minutes delay. In numerical terms, the regulatory target is to not exceed 28,098 qualifying signalling failures per annum.
- 7.7.6 In 2006/07, Network Rail reported 22,704 qualifying incidents attributed to signalling failures, which would meet the regulatory target for Control Period 3.

Trend

- 7.7.7 Figure 7.7.1 shows performance 2000/01 to 2006/07; there has been an improvement of 2.8% on signalling failures in 2006/07.

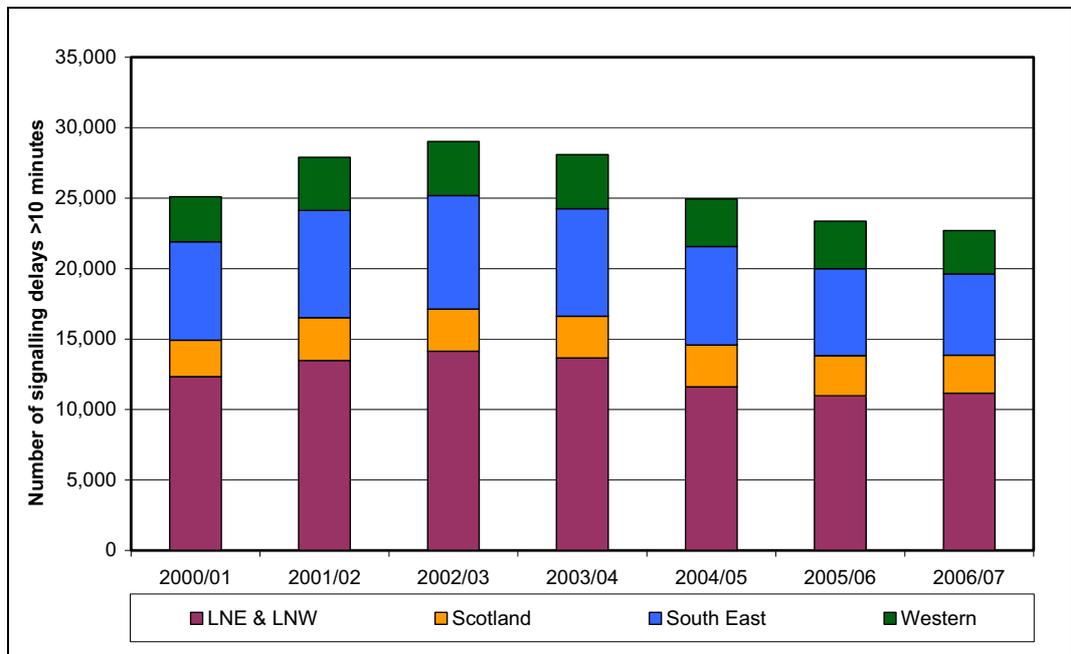


Figure 7.7.1 Number of signalling failures >10 minutes (M9)

- 7.7.8 Analysis on a geographical basis is less easy for the years before the regional mergers and boundary changes during 2005/6; however, by grouping some of the former Regions and present Territories it is possible to create comparable datasets with similar geographical boundaries. Using these datasets, Figure 7.7.2 shows that steady improvement has occurred except in London North Eastern and London North Western. This is due to the increase on London North Western, probably due to the WCML upgrade and the initial settling in period. As noted in the NR commentary, this figure is a significant improvement on the regulatory target.

Territory	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Variance (05/06 vs. 06/07)
LNE & LNW	13,494	14,144	13,662	11,616	10,981	11,161	1.6%
Scotland	3,025	2,988	2,948	2,968	2,843	2,697	-5.1%
South East	7,610	8,043	7,641	6,993	6,175	5,764	-7.1%
Western	3,776	3,838	3,847	3,373	3,368	3,082	-8.5%
Total	27,905	29,013	28,098	24,950	23,367	22,704	-2.8%

Figure 7.7.2 Variance from 05/06 of signalling failures >10 minutes (M9)

- 7.7.9 Network Rail has attributed the improved performance to the installation of 8000 hour lamps and LED long range signals with the consequent reduction in lamp failures. An increasing number of High Performance Switch Systems (HPSS) for point operation has also contributed to the reduction in failures causing more than 10 minutes delay. Our Audits at selected Areas demonstrated well established performance monitoring and action plans in place for the particular problems in the Area, with resources being targeted appropriately.
- 7.7.10 The number of signalling failures per million train kilometres is also presented in the Annual Return. This statistics does not form part of measure M9 nor was it requested by ORR in the agreed Form and Content for the Annual Return. They have not been subject to audit.

Audit findings

- 7.7.11 The updated procedures are described in NR/ARM/M9PR Issue 4 dated 2 March 2007 and the associated definitions are contained in NR/ARM/M9DF issue 6 dated 2 March 2007. Updated copies were provided to Halcrow and reached the auditor on the day of the HQ audit (14 May 2007). This change has no effect on the trend analysis going forward.

Data sourced from TRUST

- 7.7.12 The data for this measure is sourced from TRUST (Train Running System), the rail industry's delay measurement and attribution system, using delay categories specified in the definition of the measure. Attribution is undertaken by trained staff; data quality is monitored by a process of supervision and spot-audit. Allocation of delay to a particular company and delay category is based on the Delay Attribution Guide (DAG) and the delay attributor's knowledge of the root cause. Auditing of the delay attribution process has been done as part of the performance measures (Section 5 of this report) and so will not be repeated within this section.
- 7.7.13 As noted in previous years, attribution of delay to signalling delay categories as defined in the DAG is not always appropriate for this measure, leading to a systematic over-reporting of signalling failures for measure M9; for example:
- Track faults which cause points failure are categorised as signalling failures even if there is no signalling fault. These can actually be successful detections of unsafe situations by the signalling system, not failures of the signalling system.

- (b) Track faults which cause track circuit failures are categorised as signal failures. Again, this is a successful detection by the signalling system, not a failure of the signalling system.
- 7.7.14 As TRUST holds live data for eight days, before it is archived, any updates to an incident, such as reallocation of a delay, are dealt with separately in “PMR-PUMPS”.
- 7.7.15 At the end of 2006/07, following the 42-day refresh of the TRUST system, a summary of delays by type, Area and period is sent to the National Engineering Reporting Team. From this summary, the delays coded as attributed to signalling failures are summarised and forwarded to the HQ Signalling team for reporting.

Commentary sourced from FMS

- 7.7.16 The HQ signalling team does not analyse or investigate the data from TRUST. The commentary provided by the HQ signalling team in the Annual Return is based on data from the Fault Management System (FMS), and information from the Signalling Performance Group in which issues and trends are highlighted in both a monthly and 6 monthly Review of Signalling Failures.

Use of FMS

- 7.7.17 FMS is divided into “local” and “Central” sub systems. The local sub systems are used by the fault control centres to enter and manage the rectification of faults. The local systems then upload the fault information to the central system on a nightly basis. There is a mismatch between FMS local and FMS central in that certain fields are not uploaded to the central system. This was not seen as great issue by NR HQ, in that if additional data was required, it would be specially requested from the Area concerned. A fault can only be attributed and coded to a ‘verified asset’, i.e. an asset already entered into FMS.
- 7.7.18 This raises the following issues:
 - (a) Not all assets have been entered into FMS as verified. This is a transient situation and Network Rail estimates that 90% assets are in fact being verified. This lack of documented verification impacts on the veracity of data and analysis being sourced from FMS.
 - (b) Engineers use a data analysis tool called Discoverer to obtain information from FMS. The functionality of the system has been improved since last year and experience has been gained by the users.
 - (c) We still believe that the ability of engineers to analyse the causes of signalling failures has been reduced by the implementation of FMS and the associated data analysis tool. It is understood that Network Rail is in the early stages of outlining a replacement system.

Correlation between FMS and TRUST reportable failures

- 7.7.19 Last year we undertook analysis of the two data sources – FMS and TRUST to determine what level of correlation existed. We tried to link the data from FMS and TRUST but were unable to do so due to significant levels of incomplete data fields. During our visits to two Integrated Control Centres it became clear that the co-operation and checking between Operations Control functions and Fault Control functions worked together to ensure that delays were as accurately attributed as possible, with a check taking place to ensure that incidents were associated with equipment failures in both FMS and TRUST. The Integrated Control Centres appear to provide a significant improvement in communication between operations and fault control.

Assessment of confidence grade

- 7.7.20 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The commentary is based on data from the FMS system, which does not correlate well with TRUST, because there are faults which cause less than 10 minutes delay to trains or no delay. The explanation for the improvements given by Network Rail, are general comments rather than the result of precise analysis of the data reported. We believe that M9 should have a reliability grade of C.
- 7.7.21 **Accuracy grade.** The process of delay attribution is a subjective process often undertaken with considerable time pressure. Systematic errors introduced by the mismatch between the definition of this measure and the advice in the Delay Attribution Guide mean that this measure is over-reported but in a consistent manner. We believe that the accuracy of the data and commentary cannot be in any case better than 10%, hence we believe that M9 should have an accuracy grade of 4.

Audit Statement

- 7.7.22 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for signalling failures (M9). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure except for minor shortcomings which have had no material impact. Due to the inherent reliability and accuracy of the data collection process and level of analysis backing the commentary, the data and commentary has been assessed as having a confidence grade of C4. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.7.23 **M9 recommendation 1.** We recommend that the Fault Management System should be reviewed. This review should cover known deficiencies in respect of FMS verified assets, FMS data entry, FMS data coding, FMS data extraction/ analysis. We suggest that analysis of the data-entry process might usefully include a human factors study to assess how the non-technical Controllers interact with the data-entry tree. This will be particularly relevant to any system design for a replacement for FMS.

Observations relating to spreading of best practice and/or improvements to process

- 7.7.24 We have no observations for this measure.

7.8 Signalling asset condition (M10)

Audit scope

- 7.8.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Signalling Asset Condition (M10), including Tables 86 - 88.
- 7.8.2 This measure assesses the condition of signalling assets, based on the residual life of equipment in a signalling interlocking area, using a methodology called Signalling Infrastructure Condition Assessment (SICA) which provides a condition grade from 1 to 5 where 1 is good condition and 5 is poor condition. SICA focuses on the interlocking and lineside equipment; there are separate assessments being undertaken to assess the condition of all Level Crossings and these are now included in the return.
- 7.8.3 At the start of the audit, the definition and procedures for this measure were documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M10DF (issue 4) and NR/ARM/M10PR (issue 4). Both refer to previous organisational structures and systems, such as Regions, Regional Asset Register, the transfer and checking of data which are now all irrelevant. These procedures had been updated to incorporate changes in Network Rail's organisation and the implementation of the Signalling Information System (SIS) but were not approved. Last year's audit recorded the fact that these procedures were out of date and were in the process of being revised.
- 7.8.4 A revised definition and procedure (NR/ARM/M10DF (issue 5) and NR/ARM/M10PR (issue 5)) dated 23 February 2007 and approved on 14 May 2007 were received during June 2007 and Network Rail is generally compliant with this revised procedure.
- 7.8.5 Audits were undertaken at Network Rail Headquarters, four of the five Territories and selected Areas: North East Area for London North Eastern, Scotland West Area for Scotland, Waterloo Area for South East and Thames Valley Area for Western. Two SICA Assessments were attended; one in the Western Territory and one in the South East Territory.

Commentary on reported data

Regulatory target

- 7.8.6 The regulatory target for signalling asset condition set in ORR's Access Charges Review 2003 is to maintain the network at or below the baseline level recorded in 2003/04. In numerical terms, the regulatory target is not greater than an average condition grade of 2.5.
- 7.8.7 In 2006/07, Network Rail reported the average condition band to be 2.39, which would meet the regulatory target.

Trend

- 7.8.8 Figure 7.8.1 shows the trend for asset condition. The reported proportion of assets in all grades has remained relatively the same with the exception of condition grade 3 (3-10 years) and condition grade 5 (life expired) both increasing by 1%.
- 7.8.9 Level Crossings are included for the first time and 74% (1203) of crossing are in the band 2 (10 to 20 years remaining life). There are 213 crossings with less than 10 years remaining life. This represents an average workload of 21 crossing renewals each year for the next 10 years, which would seem to represent an achievable programme. The large number (1203) with an estimated remaining life of between 10 and 20 years would indicate a renewal programme of 120 per year, starting in 2017, which will require a major increase in effort.

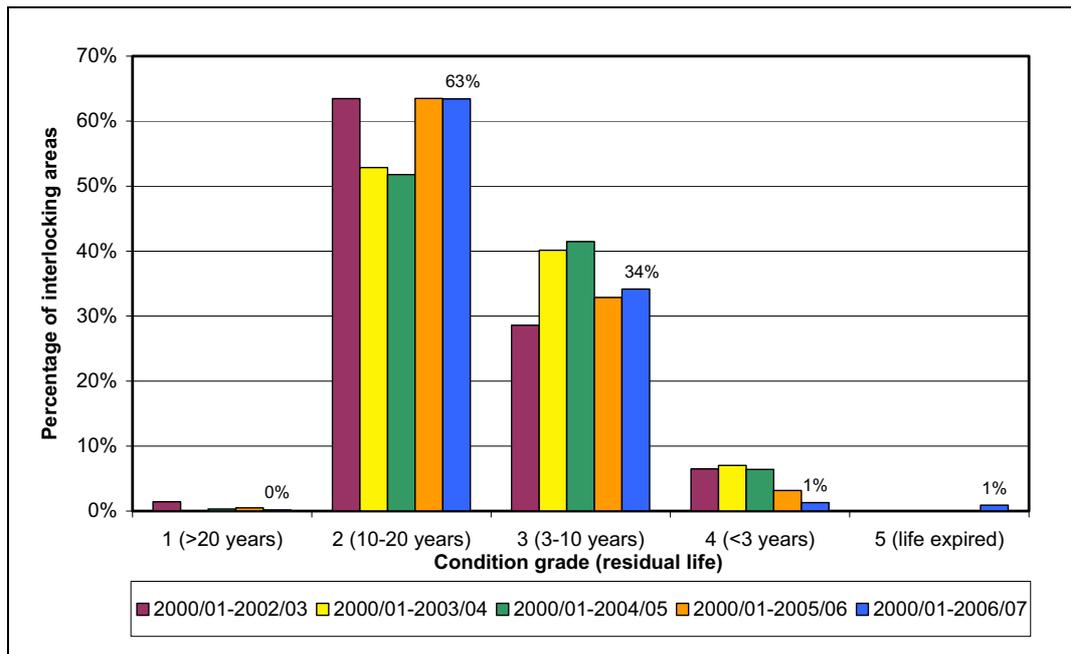


Figure 7.8.1 Average signalling asset condition (M10)

Audit findings

7.8.10 During the initial HQ audit, a draft revised procedure NR/ARM/M10PR (issue 5) was provided. It has been updated to reflect the new organisation structure and the introduction of SICA3 and SIS. This version was awaiting approval at the time of our audits. It was approved on 14 May 2007.

Programme

7.8.11 Network Rail’s SICA Information System (SIS) provides transparent data storage and facilitates the reporting process. There are relatively few users of use of SIS, but its features and use are not documented. There is no subsequent process to check that the data entered into SIS is accurate.

7.8.12 The population of interlockings in each Territory changes each year as signalling schemes are commissioned and old interlockings replaced. There has been a process of cross-checking and clarifying the number of interlockings recorded in the interlocking Data Cards (IDCs) and within the SIS system. There has also been a rationalisation in respect of interlockings located at level crossings. Previously, many installations where an interlocking was located at a level crossing would only have one SICA assessment. With the decision to undertake a major programme of level crossing SICAs during 2006/07, assessments for interlockings and level crossings are recorded separately.

7.8.13 There is a discrepancy between the number of interlockings HQ has reported with separate interlocking data cards and the number of interlockings recorded in SIS. The discrepancy in numbers is said to arise from the fact that some signalling control points with many interlockings are included as a single SICA assessment. Two large installations (Liverpool Street and Upminster) known to be over 5 years old (the requirement for a SICA assessment is 5 years old) were found not to have entries in SIS.

7.8.14 NR/SP/SIG/13251 requires each Territory to maintain a register of all its installations to enable the current status of SICA assessment to be viewed. NR/ARM/M10DF (issue 5) requires assessment when it is the condition of an interlocking until it is 5 or more years old.

- 7.8.15 The steady state in the average condition can be attributed to the condition rating categories having a wide range and most interlockings are contained in the condition 2 band (10 to 20 years remaining life). The rationalisation of the data set started last year has continued, but is not yet complete. Some quite large, fairly new installations were previously held as a single SICA assessment were rationalised and held as separate interlockings. Because a single installation in good condition is replaced by several records of installations in good condition this tends to skew the average towards a better average condition. The more meaningful statistic is that there are 520 interlockings which have an estimated remaining life of between 3 and 10 years, representing a notional renewal rate of about 74 per year.
- 7.8.16 Network Rail's procedure NR/ARM/M10PR set a target to assess 100% of interlockings by March 2006. There is no revised target set in Section 1.4 of the Asset Reporting manual. This requirement was not quite achieved, as Figure 7.8.2 shows: 93.8% of interlockings have been assessed in the 2006/07 year; 102 interlockings remain to be assessed. The number of interlockings under 5 years old is referenced because the cycle of assessment commences when installations are more than 5 years old.

Territory	Interlocking population ³	Number assessed (or under 5 years old)	Percentage assessed	Number still to be assessed
LNE	446	444	99.6%	2
LNW	374	343	91.7%	31
Scotland	172	170	98.8%	2
South East	368	318	86.4%	50
Western	290	247	85.2%	43
Total	1,650	1,522	92.2%	128

Figure 7.8.2 Interlocking population and SICA assessments (M10)

SICA3

- 7.8.17 For 2006/07, condition assessments have been undertaken using SICA3 which provides either an overview of condition ('primary SICA3' or pSICA3) or a more detailed assessment of condition (a 'secondary SICA3' or sSICA3).
- 7.8.18 One of our technical experts observed two SICA3 assessments being undertaken in Cardiff and Arundel/Ford. The assessment process was in both cases observed to be thorough and systematic. There was a common methodical approach to the assessment of a representative selection of equipment. In most cases assessment is carried out under the IWA (Individual Working Alone) regulations and the presence of an observer thus prevented some lineside assessment being witnessed. One of the assessors indicated that other samples would form part of the assessment. The maintenance engineers would also be consulted to determine any immediate plans for patch renewals or areas of concern that were not sampled but might have a bearing on the remaining life of the installation.
- 7.8.19 The ability to record the state of much of the equipment that was assessed in the form of digital photographs much improves the subsequent use of the assessment reports by Territory. It was apparent that the user group had done much to build a common team approach to the assessment process, with a common understanding of the assessment of the more difficult situations and equipment.

³ Based on reconciliation from number of interlocking Data Cards and interlockings in SIS

Collection Process

- 7.8.20 For 2006/07, assessments have been mostly undertaken by dedicated Network Rail signalling assessment engineers, whose primary role is to conduct SICA assessments. SICA reports include a spreadsheet which is used to upload the data to SIS (see below). One Territory employed a contractor to cover a vacancy gap, where there were insufficient other competent staff available to maintain the assessment programme. Changes of staff occur in all organisations, and development of assessor competence is generally by coaching and mentoring once appointed.
- 7.8.21 Peer reviews of assessments were undertaken by senior HQ signalling engineers; at least one review was conducted for each Territory in 2006/07. We sampled the output of these Peer Reviews; the scope and approach to the review was appropriate.
- 7.8.22 From our audits, the key issues with regards to the collection process are:
- (a) The SICA users' group (SUG) has met on several occasions. This group involves SICA practitioners across the nation in exchange of ideas, consistency of application and solution to issues arising from use of the tool. The users' group also carry out a sample of SICA assessments together to ensure a consistent approach in using the tool. Minutes from various SUG meetings were provided which highlighted the beneficial actions coming out of the meetings.
 - (b) None of the Territories undertake formal audits on practitioners. The only 'audit' type process being carried out is the HQ Peer Review by senior HQ engineers, and reference is made to this in the revised draft procedure.
 - (c) The greatest difference between the Territories is in their approach to competence, training and succession issues. Most Territories had one Signal Assessment Engineer and a number of other staff who could act as assessors and a continuity of experience was maintained. One Territory had effectively lost the main Signal Assessment Engineer and other assessors (due to promotions), leaving a very limited capability to provide training and mentoring from busy senior engineers. A contractor was employed to overcome the shortfall in resource.
- 7.8.23 The national database, SICA Information System (SIS) allows for (amongst other things) (a) automated upload of SICA results directly from the summary spreadsheet and (b) reporting of the data for the Annual Return. SIS is securely available across the Network Rail intranet and thus is accessible at all levels of the organisation. Generally a separate condition assessment report is produced for use at Territory level. This will typically contain photographs, examples of specific problems noted and a record of any known minor renewals. This provides invaluable evidence to support and prioritise renewals projects.
- 7.8.24 As for previous years, the scores for primary SICAs are altered by Headquarters for the purposes of reporting, such that the remaining asset life is reduced by 22.5%, as Network Rail believes pSICA assessments over-estimate asset life. Though this clearly reflects a precautionary approach, there is no documented evidence to support the level of adjustment and the adjustment factor is not recorded in the definition or procedure as recommended after the 2005/06 audit. The adjustment factor is applied as part of the reporting function of SIS.
- 7.8.25 A sample of five SICA assessments undertaken during 2006/07 were selected in each Territory and the scores of the SICA assessments were checked against information in SIS:
- (a) The data in SIS was found not to be correctly recorded for our sample of twenty SICA reports. Two assessments were missing from the system at HQ level while more than 5 had not been loaded into the Territory SIS databases.
 - (b) One of the Territories also keeps a local spreadsheet. For our sample, we discovered a number of inconsistencies with the data stored in these local spreadsheets. This is of concern, as the Territories were using this data for

planning purposes, a function that SIS provides. We recommend that the use of the local spreadsheets is abandoned in favour of SIS.

- 7.8.26 The checking process for the SIS data, however, is not yet complete, such that when we analysed the number of interlocking records reported from SIS and the interlocking data cards there were discrepancies; the asset population is not yet fully agreed.

Territory	Interlocking population (as reported by HQ)	Interlocking population (as reported by Territories)	Variance
LNE	446	454	8
LNW	374	389	15
Scotland	172	168	-4
South East	368	345	-23
Western	290	254	-36
Total	1,650	1,610	-40

Figure 7.8.3 Interlocking population as reported by HQ and Territory (M10)

Asset Management

- 7.8.27 The assessment process using SICA has been used as the basis for scoping and prioritising Network Rail's renewals programmes, both at local and national levels. This has been assisted by the roll-out of SIS, which has made the data easier to access and use. Prioritisation of major schemes, which affect the renewals plans for those areas, has been much facilitated by the advent of SIS and its ability to facilitate adjustment and review of the overall signalling strategy and individual elements of the renewals programme.
- 7.8.28 The overall condition summary shows that about one third of the signalling assets will need to be renewed in between 3 and 10 years time and about two thirds of the asset will remain serviceable for between 10 and 20 years. On a broad basis this would appear to be an achievable programme. Network Rail has an outline renewals plan covering Control Periods 4, 5 and beyond, into which the plans for introduction of ERTMS will need to be incorporated.

Assessment of confidence grade

- 7.8.29 **Reliability grade.** The definition for this measure is clearly documented in a revised ARM document. A documented process has been followed to collect and report this measure. 2006/07 has seen significant progress and improvement in the assessment and management of condition data; the introduction of SIS last year removed a potential source of inaccuracies in collated data. The process has been undertaken by persons with suitable levels of expertise supplemented by documented guidance and oversight by others. We believe that M10 should have a reliability grade of B.
- 7.8.30 **Accuracy grade.** The assessment process for determining remaining asset life is subjective and a further subjective adjustment factor is introduced for SICA2B, pSICA and pSICA3; however, unwanted variation from this subjectivity is significantly suppressed by categorising the results into the five condition categories. The peer review process by the HQ Signalling Principles Engineer provides an independent check on the accuracy of the resulting SICA scores against experience. However, there are still concerns in the management of changes to the number of interlockings. In our audit, 102 interlockings have not been accounted for and about 75 are shown as overdue for their next SICA assessment. The process for carrying out the assessments and producing condition reports remains robust, but subjective to a small extent. The procedures for entry of data are not documented. There is no simple check to confirm that data has been entered correctly. We believe that M10 should have an accuracy grade of 3

Audit Statement

- 7.8.31 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for signalling asset condition (M10). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of B3. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.8.32 **M10 recommendation 1.** We recommend that the current practice of applying adjustment factors to primary SICA scores should be documented to justify and provide evidence for the level of the adjustment factor. The procedure and definition should be updated to include an explanation of this practice.
- 7.8.33 **M10 recommendation 2.** We recommend that a concerted management effort is undertaken to ensure that the SIS data is checked against the interlocking data cards, to ensure that the number of interlockings is correct for 2007/08 and that any differences can be detailed and attributed to new interlockings not yet due for assessment or to assessments not carried out when planned. We recommend that a documented process for making changes to SIS is produced.

Observations relating to spreading of best practice and/or improvements to process

- 7.8.34 **M10 observation 1.** We consider that a simple check be introduced to ensure that the data produced by the assessment process is correctly entered into SIS.

7.9 Traction power incidents causing train delays (M11 & M12)

Audit scope

- 7.9.1 These audits were undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, traction power incidents:
- (a) Alternating current traction power incidents causing train delays (M11), including Table 89;
 - (b) Direct current traction power incidents causing train delays (M12), including Table 90.
- 7.9.2 These measures report the number of overhead line equipment (OLE) component failures (M11) and conductor rail component failures (M12) that lead to incidents causing more than 500 minutes delay. Both measures exclude incidents caused by defective train equipment, outside parties, vandalism, animals and those arising as a direct result of extreme weather. The measure also excludes incidents caused by failures of other electrification equipment in the power supply system.
- 7.9.3 The definitions and procedure for these measures are documented in the Network Rail Asset Reporting Manual documents:
- (a) NR/ARM/M11DF (issue 3);
 - (b) NR/ARM/M12DF (issue 3);
 - (c) NR/ARM/M11PR (issue 4).
- 7.9.4 These measures have a common procedure and data collection process; we have therefore audited and reported on these measures together. Audits were undertaken at Network Rail Headquarters and London North Eastern, London North Western, Scotland and South East Territories. The London North Western Territory is responsible for reporting these measures for Western Territory.

Commentary on reported data

Regulatory target

- 7.9.5 The regulatory target for traction power failures set in ORR's Access Charges Review 2003 was to maintain the network at or below the baseline level recorded in 2001/02.
- 7.9.6 **M11.** In numerical terms, the regulatory target is to not exceed 107 OLE component failures causing train delay. For 2006/07, the result reported by Network Rail was 69, which would meet the regulatory target.
- 7.9.7 **M12.** In numerical terms, the regulatory target is to not exceed 30 conductor rail component failures causing train delay. For 2006/07, the result reported by Network Rail was 11, which would meet the regulatory target.

Trend

- 7.9.8 Figure 7.9.1 shows the number of reportable traction power incidents for 2006/07 has reversed the downward trend of these measures over the last few years. The results for 2006/07 are increases of 41% and 83% for a.c. and d.c. incidents respectively; however these results are lower than those recorded in 2004/05.

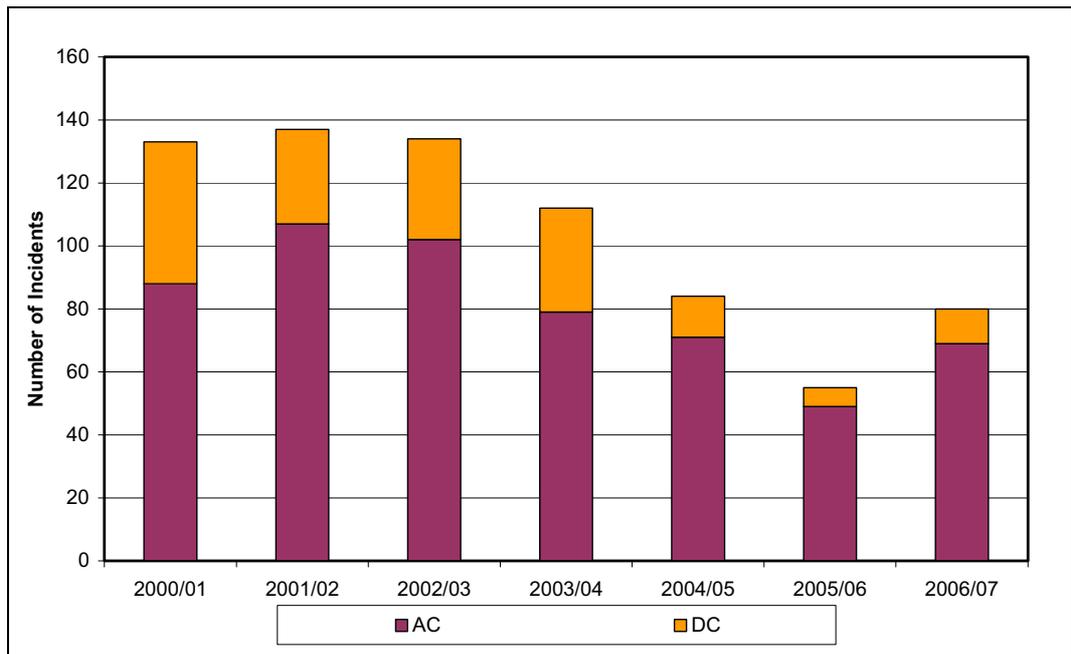


Figure 7.9.1 Traction power incidents causing over 500 minutes (M11 & M12)

7.9.9 Despite the national increase in incidents, Figure 7.9.2 shows that South East – Sussex Route has had a reduction in the number of incidents, with Scotland also showing a small reduction albeit from a previously low number of incidents. Western has continued to have zero incidents reported. Three of the Routes with an increase in incidents from 2005/06, South East (Anglia), London North Western and South East (Wessex), also show an increase from the numbers reported in 2004/05.

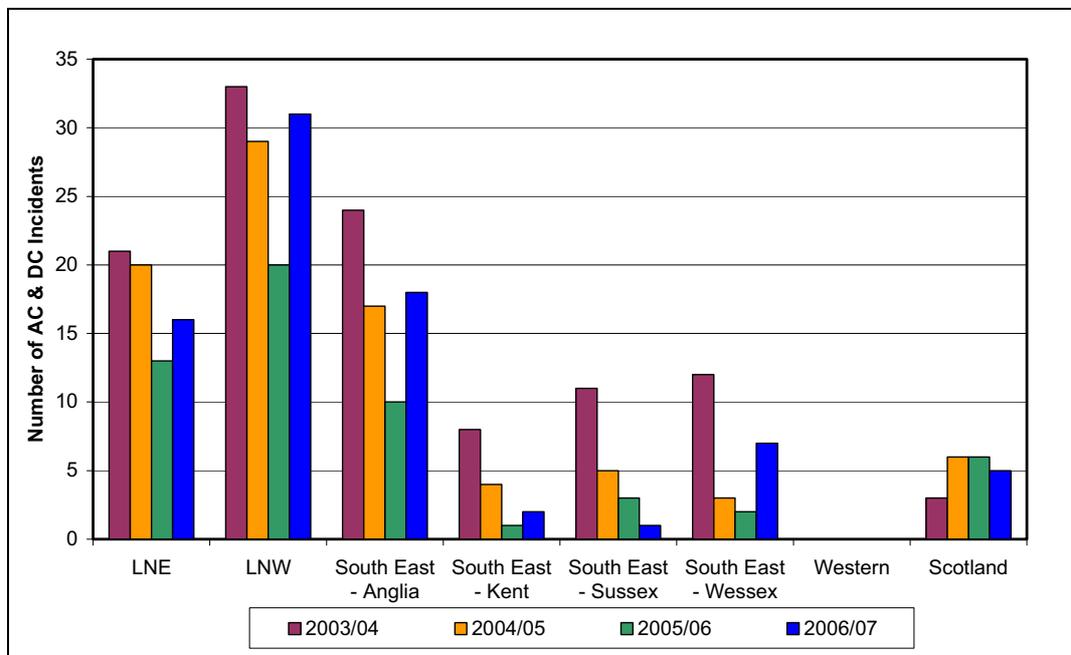


Figure 7.9.2 Number of a.c. and d.c. Incidents causing over 500 minutes delay (M11 & M12)

7.9.10 Review of the reasons behind the reported failures shows that there are a variety of causes, including bird strikes and vegetation incursion as well as a diverse range of individual component failures. It is worth noting that the contact systems by their nature do not have much scope for redundancy; failure at component level tends to lead to consequential system failure. Possible reasons for the increase in failures compared to 2005/2006 are effects of higher average speed running on the West Coast Main Line, of ageing and imminently due for replacement OHLE on sections of the Great Eastern, and of a number of failures related to high ambient temperatures experienced during the period.

7.9.11 For comparative purposes we have normalised the number of incidents using the km of electrified track. Figure 7.9.3 shows the number of incidents, causing over 500 minutes delay, per 1000km of electrified track for each Route for 2006/07. It can be seen that London North Western and South East (Anglia) are significantly above the network average.

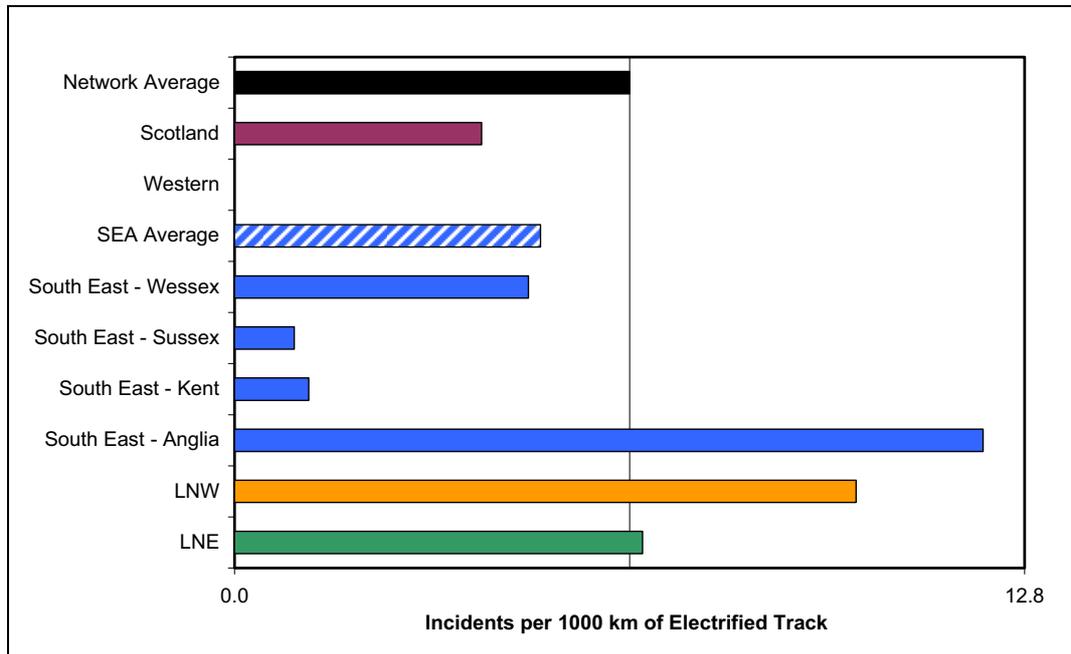


Figure 7.9.3 Number of a.c. & d.c. Incidents over 500 minutes per 1000km of Electrified Track (M11 & M12)

Audit findings

Process

- 7.9.12 The data acquisition, verification and reporting mechanisms for this measure have not materially changed this year.
- 7.9.13 On a daily basis, the National Engineering Reporting team collate OLE and conductor rail component incidents from the national incident log into a single spreadsheet. Every four weeks, the spreadsheet is sent to the Territory E&P Engineers for verification that each incident meets the definition for measure M11 or M12; a commentary is provided as appropriate.
- 7.9.14 The Territories use a variety of data sources to verify the incidents including Production Logs, TRUST and contact with personnel involved in the incident and its remediation.
- 7.9.15 The spreadsheet is returned to the National Engineering Reporting team for reporting on a four-weekly basis. In parallel, for asset management purposes the Territory E&P teams provide a formal report to the Headquarters E&P team on the incident. At year-end Territory Engineers formally sign-off the data to be reported.

Accuracy of reported data

- 7.9.16 We undertook a 100% desktop check of traction power incidents causing greater than 500 minutes of delay using the Headquarters spreadsheet, which included details of whether or not each large power incident had been accepted or rejected by the Territory E&P Engineers as falling within the definition of the M11 and M12 measures. From the limited description provided in the spreadsheet, we did not identify any errors in the allocation of incidents to electrification.
- 7.9.17 During the audit at each Territory, we also selected a sample of five incidents that had been rejected and asked for explanation about the incident and reasons for rejection. Where required we asked for further documented evidence. We found for all the selected incidents, that the Territory E&P Engineer was able to justify the reasoning behind the rejection of the incident and provide evidence where required.
- 7.9.18 We note that at the time the data was finalised for the annual return, there were four a.c. and five d.c. incidents still under investigation. As per the definitions for these measures, these nine incidents are taken to be traction power incidents, and are included in the reported figures.

Assessment of confidence grade

- 7.9.19 **Reliability grade.** The definitions for these measures are clearly documented. A single documented process has been followed to collect and report these measures. The process of correctly identifying the root cause of incidents attributed to overhead line or conductor rail components is not a simple process and the number of minutes attributed to a delay is known to be a subjective process. We believe that M11 and M12 should have a reliability grade of B.
- 7.9.20 **Accuracy grade (M11).** Our samples found the data was recorded accurately in the Headquarters spreadsheet and the Territories could justify their reasoning for the rejected incidents. We believe that M11 should have an accuracy grade of 2.
- 7.9.21 **Accuracy grade (M12).** The number of conductor rail component incidents reported for M12 is insufficiently large to support a numeric assessment of the accuracy of this measure. The accuracy grade for M12 is therefore 'X' to indicate that an accuracy grade cannot be properly ascribed (as stipulated in the confidence grading guidance; Appendix D).

Audit Statements

- 7.9.22 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for alternating current traction power incidents causing train delays (M11). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of B2. The regulatory target for this measure has been met.
- 7.9.23 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for direct current traction power incidents causing train delays (M12). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of BX. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.9.24 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.9.25 **M11 observation 1.** As reported last year, London North Eastern have initiated a failure/trends database system and have expended some energy in recovering data from historic systems to produce this useful monitoring tool. We believe that this approach should be standardised and introduced nationally.

7.10 Electrification condition – a.c. traction feeder stations & track sectioning points (M13)

Audit scope

- 7.10.1 These This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Electrification condition – a.c. traction feeder stations and track sectioning points (M13), including Tables 91 - 92.
- 7.10.2 This is a condition measure for alternating current (a.c.) traction feeder stations (FSs) and track sectioning points (TSPs), using an assessment methodology called Electrification Condition Assessment Process (ECAP) to provide a condition grade from 1 to 5, where 1 is good condition and 5 is poor condition. ECAP for a.c. traction feeder stations and track sectioning points (M13-ECAP) is based on visual inspection, design, maintenance history, refurbishment history and performance of the 25kV switchgear.
- 7.10.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M13DF (issue 3) and NR/ARM/M13PR (issue 6).
- 7.10.4 Audits were undertaken at Network Rail Headquarters and London North Eastern, London North Western, Scotland and South East Territories. The London North Western Territory is responsible for reporting these measures for Western Territory.

Commentary on reported data

Regulatory target

- 7.10.5 The regulatory target for electrification condition set in ORR's Access Charges Review 2003 was to maintain the network at or below the baseline level recorded in 2001/02. In numerical terms, the regulatory target was an average condition score of not greater than 2.1.
- 7.10.6 The average condition score reported by Network Rail for year-end 2006/07 was 1.88, which would meet the regulatory target.

Trend

- 7.10.7 Figure 7.6.1 and Figure 7.10.2 show the average asset condition has remained relatively stable over the last five years. The slight increase in 2006/07 is due to the resurvey of the initial inspections, which were purposely aimed at the worst condition.

Year	2002/03	2003/04	2004/05	2005/06	2006/07
Average Condition Score	1.9	1.9	1.87	1.85	1.88
% of asset surveyed (resurvey)	49%	70%	90%	100%	100% (21%)

Figure 7.10.1 Average condition a.c. traction feeder stations & track sectioning points (M13)

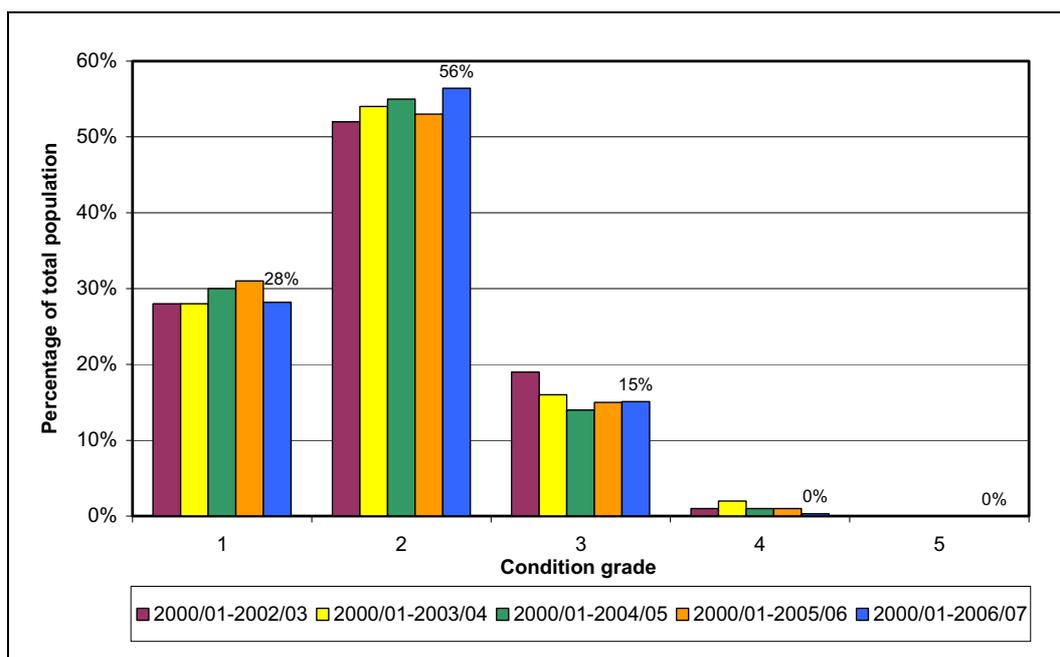


Figure 7.10.2 condition a.c. traction feeder stations & track sectioning points (M13)

Audit findings

- 7.10.8 The procedure NR/ARM/M13PR was revised in November 2006 to update the percentage sample rates. This has not had a material change on the data acquisition, verification and reporting mechanisms for this measure.
- 7.10.9 We do note however that the requirement for the E&P Engineer (Electrical Distribution) to initiate one audit per year per maintenance Area has been reduced in the new procedure to a statement that “the E&P Engineer (Electrical Distribution) may initiate audits”, with no minimum number per annum given.

Process

- 7.10.10 As 2006/07 is the first year of the second cycle of assessments, the FSs and TSPs selected were based of Headquarters requirement to assess 20% of the population and to repeat the programme of the first cycle of assessments.
- 7.10.11 M13-ECAP questionnaires were completed on site by either a Territory engineers or a Area E&P engineer (or senior inspector). All Territories have made some progress toward handover of the assessments to the maintenance organisation as per the plans mentioned in last year’s report, however each Territory is at different stages in this process.
- 7.10.12 Only one Territory, London North Western, has completely handed over these assessments. Once they receive the completed questionnaires from the Area, the Territory are conducting a desktop check of the results.
- 7.10.13 Once a Territory has all the M13-ECAP questionnaires completed, they are sent electronically to the Headquarters Distribution Engineer. All Territories, except for South East, also send a signed hardcopy of the questionnaire to headquarters. Due to the proximity of the South East Territory Office to Headquarters, the signed hardcopies are retained at the Waterloo Offices and are randomly checked by the Headquarters Distribution Engineer.
- 7.10.14 The Headquarters Distribution Engineer manually inputted the scores he receives into the HQ summary spreadsheet and then sends this to the Territory Distribution Engineers to be checked.

- 7.10.15 Within London North Western Territory, where Maintenance conducted the assessment, the Territory Distribution Engineer provided training in use of the M13-ECAP questionnaires for the maintenance personnel undertaking assessments and the guidance note for the questionnaire was provided.
- 7.10.16 There was no formal Headquarters audit undertaken during 2006/07.

Accuracy of reported data

- 7.10.17 We inspected a sample of five M13-ECAP questionnaires per Territory, which we found were completed in accordance with the guidance note, and the scores on the questionnaires aligned with those reported in the Headquarters' summary spreadsheet.
- 7.10.18 It is noted that the M13-ECAP questionnaire spreadsheet has no cell protection for the cells in the spreadsheet that contain the algorithms that calculate the score. We suggest that a new version of the spreadsheet is issued, which has all but the input cells protected.
- 7.10.19 We also reviewed the calculation within the Headquarters' summary spreadsheet used to produce the numbers for the Annual Return. We found there were no errors and that the numbers reported in the Annual Return were correct.
- 7.10.20 As noted in previous years, we are concerned the condition score is always rounded down in the reporting process. We were advised that Network Rail don't consider that this is an issue, as the condition scores represent a defined condition range rather than being a measurable value, however we are still concerned by the impact this has on the reported score.
- 7.10.21 As an example, assume there are five equally weighted condition questions with the answer options of "Good", "Fair", "Poor", "Very Poor" or "Unacceptable", which are assigned scores of 1 to 5 respectively. If the assessor answers for the five questions are one "Good" (1x1) and four "Fairs" (4x2), the natural average of the scores would be 1.8. However, by using Network Rail's approach, this would then be rounded down to a score of 1, representing a "Good" condition, even though 80% of the questions resulted in a "Fair" condition, and only 20% was "Good".
- 7.10.22 Figure 7.10.3 shows the impact of this method of rounding on the aggregated score being reported for the Territories and nationally for 2006/07.

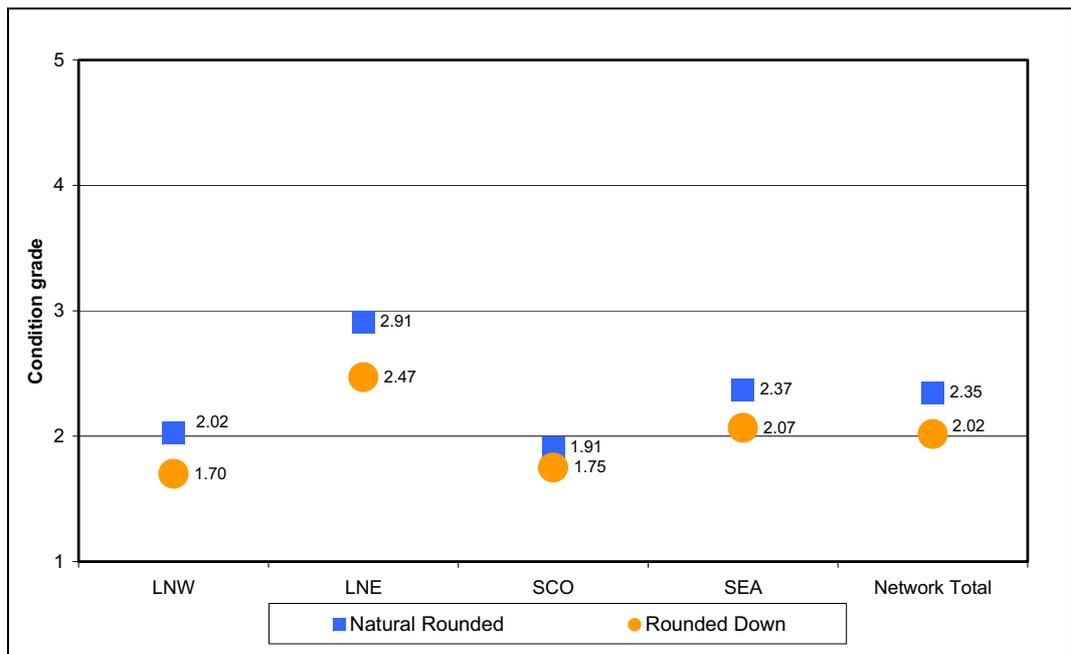


Figure 7.10.3 Results of Natural Rounding for 2006/07 surveys (M13)

- 7.10.23 Based on this analysis, we once again suggest that the entire dataset should be recalculated using natural rounding to 2 decimal places.

Proposed changes to process

- 7.10.24 We have been advised by Headquarters that an upcoming organisation change will see the responsibility of this measure transferring to the maintenance organisation. To enable this transfer, Headquarters has been working with Maintenance to redesign ELLIPSE to ensure that the information required for this measure can be taken directly from the information gathered during the standard maintenance inspections. This transfer will also move the accountability of this measure's reliability and accuracy to the Area E&P Engineers.

Assessment of confidence grade

- 7.10.25 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The process of condition assessment is subjective. We believe that M13 should have a reliability grade of B.
- 7.10.26 **Accuracy grade.** Our samples found the data was recorded accurately in the Headquarters spreadsheet this year. However we are still concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M13 should have an accuracy grade of 2.

Audit Statement

- 7.10.27 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Electrification condition of a.c. traction feeder stations and track sectioning points (M13). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. We are still concerned by the method of calculation the Network average by rounding down of individual scores. The data has been assessed as having a confidence grade of B2. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.10.28 **M13 recommendation 1.** We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.

Observations relating to spreading of best practice and/or improvements to process

- 7.10.29 **M13 observation 1.** If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect any change in the process for collection and reporting of the data and the new responsibilities for this process to ensure continued ownership.

7.11 Electrification condition – d.c. substations (M14)

Audit scope

- 7.11.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Electrification condition – d.c. substations (M14), including Tables 93 - 94.
- 7.11.2 This is a condition measure for direct current (d.c.) substations, using an assessment methodology called Electrification Condition Assessment Process (ECAP) to provide a condition grade from 1 to 5, where 1 is good condition and 5 is poor condition. ECAP for d.c. substations (M14-ECAP) is based on visual inspection and the robustness of design, maintenance history, refurbishment history and performance of the high voltage switchgear, rectifier transformers, rectifiers and d.c. switchgear.
- 7.11.3 The definition and procedure for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M14DF (issue 3) and NR/ARM/M14PR (issue 6).
- 7.11.4 Audits were undertaken at Network Rail Headquarters and London North Eastern, London North Western and South East Territories. Scotland and Western Territories do not have conductor rail traction systems.

Commentary on reported data

Regulatory target

- 7.11.5 The regulatory target for electrification condition set in ORR's Access Charges Review 2003 was to maintain the network at or below the baseline level recorded in 2001/02. In numerical terms, the regulatory target was an average condition score of not greater than 2.3.
- 7.11.6 The average condition score reported by Network Rail for year-end 2005/06 was 1.64, which would meet the regulatory target.

Trend

- 7.11.7 Figure 7.11.1 and Figure 7.11.2 show that despite that reassessment of the initial substations, which were general the assets in the worst condition, the overall condition score has continued to improve. This continued improvement is due to a number of campaign changes over the last five years,

Year	2002/03	2003/04	2004/05	2005/06	2006/07
Average Condition Score	2.1	1.9	1.82	1.78	1.64
% of asset surveyed (resurvey)	21%	79%	89%	100%	100% (21%)

Figure 7.11.1 Average condition of d.c. sub-stations (M14)

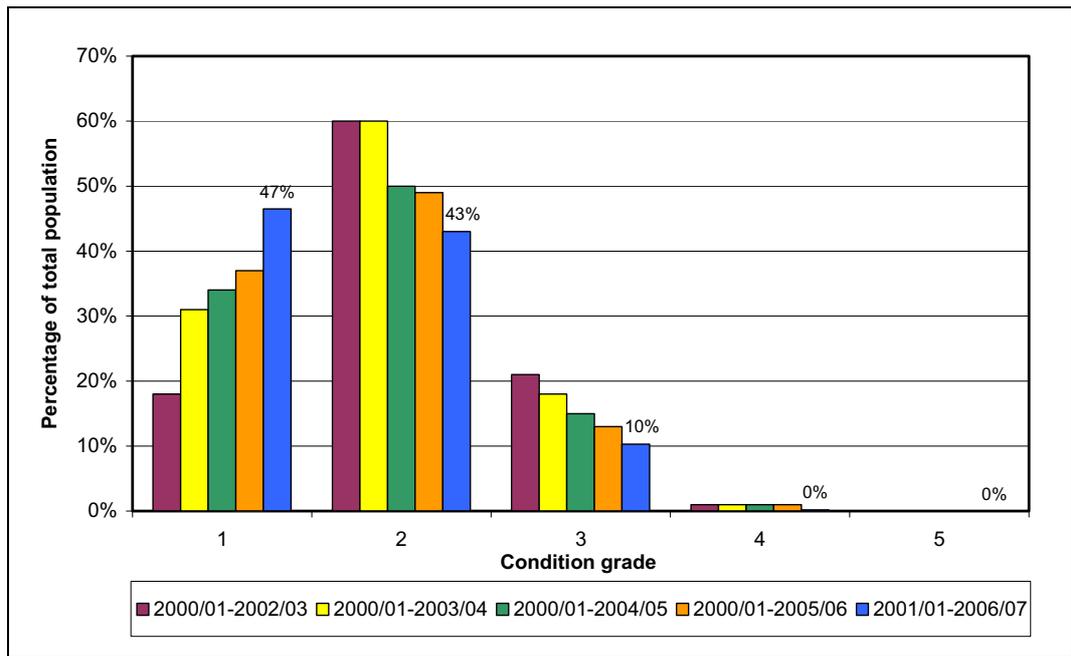


Figure 7.11.2 Average condition grades for d.c. sub-stations (M14)

Audit findings

- 7.11.8 The procedure NR/ARM/M14PR was revised in November 2006 to update the percentage sample rates. This has not had a material change on the data acquisition, verification and reporting mechanisms for this measure.
- 7.11.9 We do note however that the requirement for the E&P Engineer (Electrical Distribution) to initiate audits has been reduced in the new procedure to a statement that “the E&P Engineer (Electrical Distribution) may initiate audits”.

Process

- 7.11.10 As 2006/07 is the first year of the second cycle of assessments, the substations selected were based of Headquarters requirement to assess 20% of the population and to repeat the programme of the first cycle of assessments.
- 7.11.11 This process is similar to the process for M13 described elsewhere in this report, except that the ECAP questionnaire is for d.c. traction substations. The process is also run by the Headquarters Distribution Engineer.
- 7.11.12 Similar to M13, only one Territory, London North Western, has completely handed over these assessments to the maintenance organisation. As part of this handover the Territory Distribution Engineer provided training in use of the M14-ECAP questionnaires for the maintenance personnel undertaking assessments and the guidance note for the questionnaire was provided.
- 7.11.13 There was no formal Headquarters audit undertaken during 2006/07.

Accuracy of reported data

- 7.11.14 We inspected a sample of five M14-ECAP questionnaires per Territory, which we found were completed in accordance with the guidance note and the scores on the questionnaires aligned with those reported in the Headquarters’ summary spreadsheet.
- 7.11.15 We also reviewed the calculation within the Headquarters’ summary spreadsheet used to produce the numbers for the Annual Return. We found no errors and that the numbers reported in the Annual Return were correct.

- 7.11.16 As noted in previous years and as analysed for M13 elsewhere in this report, we are concerned the condition score is always rounded down in the reporting process. We suggest that the entire dataset should be recalculated using natural rounding now that all of the population has been assessed.

Proposed changes to process

- 7.11.17 We have been advised by Headquarters that an upcoming organisation change will see the responsibility of this measure transferring to the maintenance organisation. To enable this transfer, Headquarters has been working with Maintenance to redesign ELLIPSE to ensure that the information required for this measure can be taken directly from the information gathered during the standard maintenance inspections. This transfer will also move the accountability of this measure's reliability and accuracy to the Area E&P Engineers.

Assessment of confidence grade

- 7.11.18 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The process of condition assessment is subjective. We believe that M14 should have a reliability grade of B.
- 7.11.19 **Accuracy grade.** Our samples found the data was recorded accurately in the Headquarters spreadsheet this year. However we are still concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M14 should have an accuracy grade of 2.

Audit Statements

- 7.11.20 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for electrification condition of d.c. substations (M14). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of B2. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.11.21 **M14 recommendation 1.** We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.

Observations relating to spreading of best practice and/or improvements to process

- 7.11.22 **M14 observation 1.** If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect the new responsibilities and ensure continued ownership.

7.12 Electrification condition – a.c. traction contact systems (M15)

Audit scope

- 7.12.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Electrification condition – a.c. traction contact systems (M15), including Tables 95 - 96.
- 7.12.2 This is a condition measure for a.c. traction contact systems, using an assessment methodology called Electrification Condition Assessment Process (ECAP) to provide a condition grade from 1 to 5, where 1 is good condition and 5 is poor condition. ECAP for a.c. contact systems is based on physical wear measurement of contact wire and visual inspection of a tension length (TL), such as contact wires, catenary wires, registration assemblies and structures; the measure excludes track related earthing, bonding and traction return circuits.
- 7.12.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M15DF (issue 4) and NR/ARM/M15PR (issue 5).
- 7.12.4 Audits were undertaken at Network Rail Headquarters and London North Eastern, London North Western, Scotland and South East Territories. The London North Western Territory is responsible for reporting these measures for Western Territory.

Commentary on reported data

Regulatory target

- 7.12.5 The regulatory target for electrification condition set in ORR's Access Charges Review 2003 was to maintain the network at or below the baseline level recorded in 2001/02. In numerical terms, the regulatory target was an average condition score of not greater than 1.8.
- 7.12.6 The extrapolated average condition score reported by Network Rail for year-end 2006/07 was 1.7, which would meet the regulatory target.

Trend

- 7.12.7 Figure 7.12.1 and Figure 7.12.2 show the trend for average asset condition of a.c. contact systems has been largely static over the last five years.

Period	00/01-02/03	00/01-03/04	00/01-04/05	00/01-05/06	00/01-06/07
Average Condition Score	1.8	1.7	1.7	1.7	1.7
% of Asset Surveyed	11%	15%	17%	21%	27%

Figure 7.12.1 a.c. traction contact systems (M15)

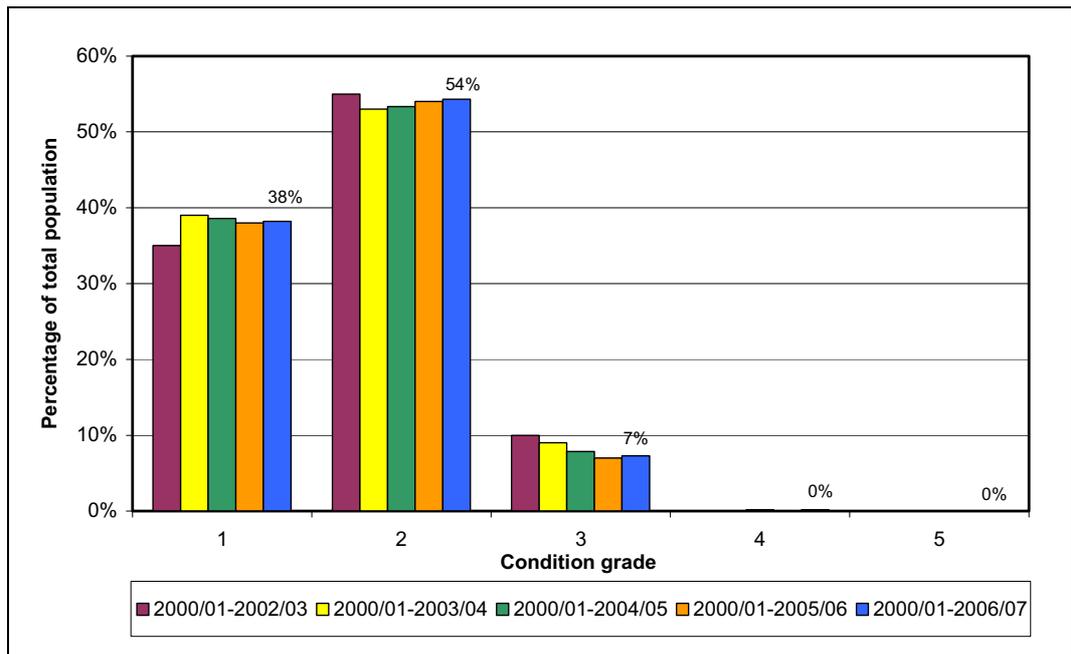


Figure 7.12.2 a.c. traction contact systems (M15)

Audit findings

Process

7.12.8 Both the definition and procedure for this measure were revised in November 2006. These changes were to update the annual sample rate and correct a few out of date references. These changes are not material and will not affect trend analysis. It is noted that both these new documents still contain reference to the old organisation structure (Zones and Regions). We are disappointed that this was not identified and amended while these documents were under review.

7.12.9 Inspections are undertaken by maintenance staff using the M15-ECAP questionnaire. Once the questionnaire's completed and checked by the Territory E&P Engineer, they are sent electronically to the Headquarters' Contact Systems Engineer. All Territories, except for South East, also send a signed hardcopy of the questionnaire to headquarters. Due to the proximity of the South East Territory Office to Headquarters, the signed hardcopies are retained at the Waterloo Offices and are randomly checked by Headquarters.

7.12.10 There was no formal Headquarters audit undertaken during 2006/07.

Accuracy of reported data

7.12.11 We inspected a sample of five M15-ECAP questionnaires per Territory, which we found were completed in accordance with the Procedure; the scores on the questionnaires aligned with those reported by Headquarters personnel and in the Annual Return.

7.12.12 We audited of the Headquarters spreadsheet for calculating the condition grades, and found the calculations to be in order, however as per our analysed for M13 elsewhere in this report, we are concerned the condition score is always rounded down in the reporting process. We were advised that Network Rail don't consider that this is an issue, as the condition scores represent a defined condition range rather than being a measurable value, however we are still concerned by the impact this has on the reported score.

7.12.13 Using the complete M15 dataset received from Network Rail Headquarters, we have conducted the same analysis done for M13 elsewhere in this report. Figure 7.10.3 shows the impact of this method of rounding on the aggregated score being reported for the Territories and nationally.

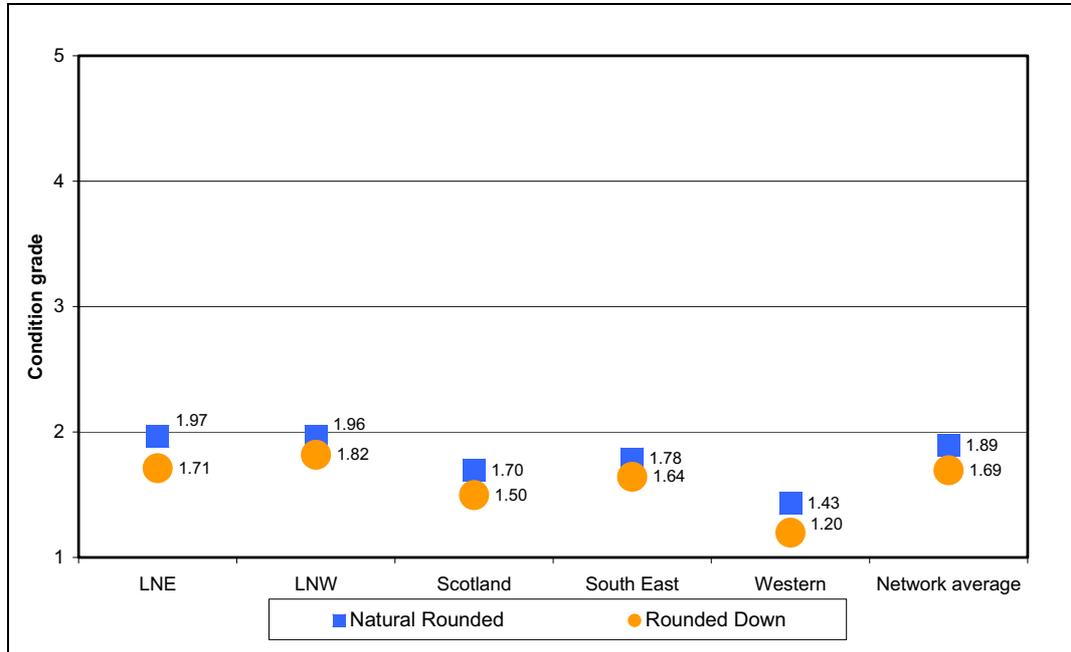


Figure 7.12.3 Results of Natural Rounding for complete dataset (M15)

7.12.14 Based on this analysis, we suggest that the entire dataset should be recalculated using natural rounding to 2 decimal places.

Proposed changes to process

7.12.15 We have been advised by Headquarters that an upcoming organisation change will see the responsibility of this measure transferring to the maintenance organisation. To enable this transfer, Headquarters has been working with Maintenance to redesign ELLIPSE to ensure that the information required for this measure can be taken directly from the information gathered during the standard maintenance inspections. This transfer will also move the accountability of this measure’s reliability and accuracy to the Area E&P Engineers. The revised system is expected to deliver significant benefits in terms of the amount of data available for analysis and we look forward to reporting on this next year.

Assessment of confidence grade

7.12.16 **Reliability grade.** The definition for this measure is clearly documented. A single documented process has been followed to collect and report this measure. The results are subject to extrapolation. We believe that M15 should have a reliability grade of C, as stipulated in the confidence grading guidance (Appendix D).

7.12.17 **Accuracy grade.** Our sampling found no errors. However, the process of condition assessment is subjective and the results are extrapolated across 73% of the asset population which has not yet been assessed, and we are concerned by the method of calculation the Network average by rounding down of individual scores. We believe that M15 should have an accuracy grade of 3.

Audit Statements

- 7.12.18 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for electrification condition of a.c. traction contact systems (M15). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure; however, it is based on extrapolation. The data has therefore been assessed as having a confidence grade of C3. The regulatory target for this measure has been met.

Observations

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.12.19 **M15 recommendation 1.** We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.

Observations relating to spreading of best practice and/or improvements to process

- 7.12.20 **M15 observation 1.** If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect any change in the process for collection and reporting of the data and the new responsibilities for this process to ensure continued ownership.

7.13 Electrification condition – d.c. traction contact system (M16)

Audit scope

- 7.13.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Electrification condition – d.c. traction contact systems (M16), including Tables 97 - 98.
- 7.13.2 This is a condition measure for conductor rail contact systems, based on (a) wear measurements of conductor rails and (b) extrapolation using a series of assumptions, to provide a condition grade from 1 to 5, where 1 is good condition and 5 is beyond the maximum allowable wear of 33%. The measure excludes all equipment other than the conductor rail itself.
- 7.13.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M16DF (issue 3) and NR/ARM/M16PR (issue 4).
- 7.13.4 Audits were undertaken at Network Rail Headquarters and London North Eastern, London North Western and South East Territories. Scotland and Western Territories do not have conductor rail traction systems.

Commentary on reported data

Regulatory target

- 7.13.5 The regulatory target for electrification condition set in ORR's Access Charges Review 2003 was to maintain the network at or below the baseline level recorded in 2001/02. In numerical terms, the regulatory target was an average condition score of not greater than 1.8.
- 7.13.6 The average condition score for all assets assessed by Network Rail to year-end 2006/07 was 1.9 which would not meet the regulatory target. This value is however obtained with limited confidence due to the difficulties in obtaining accurate meaningful results, as discussed below.

Trend

- 7.13.7 Figure 7.13.1 and Figure 7.13.2 show the trend for average asset condition of conductor rails has remained largely static for the last five years. This apparent stability is not surprising as only 9% of the conductor rail population has been surveyed in the last five years and a large proportion of the information reported for this measure is based upon old wear measurements, extrapolated to reflect an estimate of current wear. Rail replacement programmes are being undertaken based on the age and usage of the asset and also to coincide with running rail replacement. This should have a positive or at worst neutral effect on future scoring, but this is dependent on the ability to improve the measuring process.

Period	00/01-02/03	00/01-03/04	00/01-04/05	00/01-05/06	00/01-06/07
Average Condition Score	1.8	1.8	1.9	1.8	1.9
% Surveyed	61%	64%	68%	69%	70%

Figure 7.13.1 Average condition of conductor rails (M16)

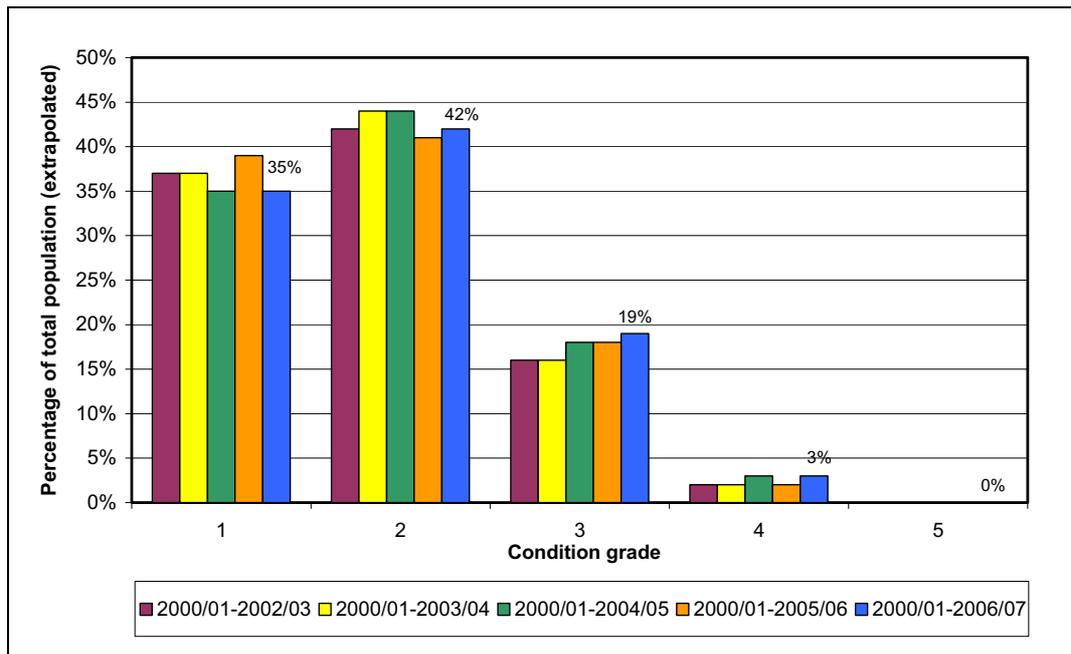


Figure 7.13.2 Average condition of conductor rails (M16)

Audit findings

Process

7.13.8 The definition and procedure have not been changed this year. Wear measurement is undertaken by manual gauging in accordance with the work instruction NR/E/WI/27222 or by an approved conductor rail measurement system. Measurements are entered into a standardised spreadsheet for storage by Territory personnel. The standardised spreadsheet contains:

- Details of wear measurements undertaken in the current and previous years;
- Lookup tables with standard wear rates, so that the current level of wear can be estimated from wear measurements corresponding to previous years;
- Lookup tables with age estimates for particular levels of wear, so that the age of data can be back-calculated from the level of wear recorded; this is used when the date of a historic wear measurement has been lost;
- Algorithms for calculating the condition grades from the wear measurements.

7.13.9 A reporting spreadsheet is administered by the Headquarters Business Planning Manager (E&P) for the Principal Engineer (Contact Systems). The reported data was subject to sign-off by the Territory E&P Engineers.

Accuracy of reported data

7.13.10 No data was reported this year by London North Eastern Territory, although it should be noted that they only have a very small area of conductor rail.

7.13.11 We checked a sample of calculation sheets and correctly matched the resulting wear measurements with those reported in the Territories' spreadsheets and the Territories' summary spreadsheets were found to correlate with that in the Headquarters spreadsheet and with the data presented in the Annual Return.

Developments

- 7.13.12 As mentioned in last year's report, access to the d.c. conductor rail to obtain data is a significant problem for Network Rail as manual gauging on live conductor rails is not justifiable under the Electricity at Work Regulations. To rectify this, a train-borne conductor rail gauging system has been developed to measure the position and cross-sectional profile of contact rails for wear calculations. This system has been integrated into the Southern Measurement Train (SMT).
- 7.13.13 Despite comments made last year that some of 2006/07's data may have been collected from the train, at the time of the audits (May 2007), the system was still undergoing validation. It is envisaged that some of 2007/08's data will come from the train recordings.
- 7.13.14 Once the train is operational, data will be collected at a much greater rate than currently possible through manual collection – measurements can be made at 300mm intervals compared to the standard 5 chains for manual measurement. This should increase the reliability and accuracy of the data for this measure, although a revised strategy will need to be in place to enable proper verification and analysis of the wealth of data generated.
- 7.13.15 We have been advised by Headquarters that they are unsure if the train will be deployed in any Territory other than South East, for the collection of conductor rail wear measurements. We would suggest, subject to route/ gauge acceptance, that the programming of this new machine should include at least one pass of the southern section of conductor rail in London North Western Territory.

Assessment of confidence grade

- 7.13.16 **Reliability grade.** The definition and procedure for this measure is clearly documented and has been followed this year. The process of condition assessment is subject to extrapolation. We believe that M16 should have a reliability grade of C, as stipulated in the confidence grading guidance (Appendix D).
- 7.13.17 **Accuracy grade.** The calculation of wear is largely extrapolated using historic wear rates for different rail types and estimated levels of wear for when the dates of wear measurements have been lost. The condition grade is directly based on this extrapolated data. We believe that M16 should have an accuracy grade of 4.

Audit Statements

- 7.13.18 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for electrification condition of d.c. traction contact systems (M16). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The condition grade is based on extrapolated data. The data has been assessed as having a confidence grade of C4. The regulatory target has not been met.

Observations

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.13.19 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.13.20 **M16 observation 1.** We would suggest that, subject to route / gauge acceptance, the programming of the new SMT should include at least one pass of the southern section of conductor rail in London North Western Territory.

7.14 Station condition index (M17)

Audit scope

- 7.14.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Station condition index (M17), including Tables 99 – 101.
- 7.14.2 This measure is intended to assess Network Rail's stewardship of stations. The condition of assets at each station is scored during visual inspections by comparing the assessed remaining asset life as a percentage of a benchmark full asset life for 34 types of asset which may be present at the station. The percentage of remaining asset life is averaged (unweighted) and converted into a condition grade for each of the 34 elements. The condition grades are integers from 1 to 5, where 1 is good condition and 5 is poor condition. The condition grades are then averaged (unweighted) for each station and presented as an average (unweighted) for all stations.
- 7.14.3 The definition and procedure for this measure is documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M17DF (issue 3) and NR/ARM/M17PR (issue 4). There is also a supplementary manual, NR/ARM/M17MN (Issue 3)
- 7.14.4 Audits were undertaken at Network Rail Headquarters, at South East Territory MP&I Office and with the Territory Building Engineer in Scotland.

Commentary on reported data

Regulatory target

- 7.14.5 The regulatory target for the station condition index was set to be no deterioration from the 2003/04 levels, which was to maintain the average condition grade at 2.25.
- 7.14.6 For 2006/07 the Network Rail reported result of the national average condition grade for the complete portfolio is 2.24 which would meet the regulatory target for the year.

Trend

- 7.14.7 Figure 7.14.1 shows that the trend of the reported figures for 2006/07 is slightly worse than the previous two years.

Period	2002/03	2003/04	2004/05	2005/06	2006/07
Average Condition Score	2.25	2.25	2.23	2.22	2.24

Figure 7.14.1 Average condition of Stations (M17)

- 7.14.8 The number of stations achieving grades 1-5 across the entire network in the last 7 years is shown in Figure 7.14.2. Grade 2 represents 70% of the inspected population; grades 1-3 represent 100% of the inspected population.
- 7.14.9 The procedure requires that 20% of stations are surveyed each year on a rolling programme. However, due to the impending amendment to the measure, a reduced level of inspections was agreed with ORR for 2006/07, mainly by excluding the F category stations. Thus a total of 326 stations were surveyed, which represents 12.9% of the station population.

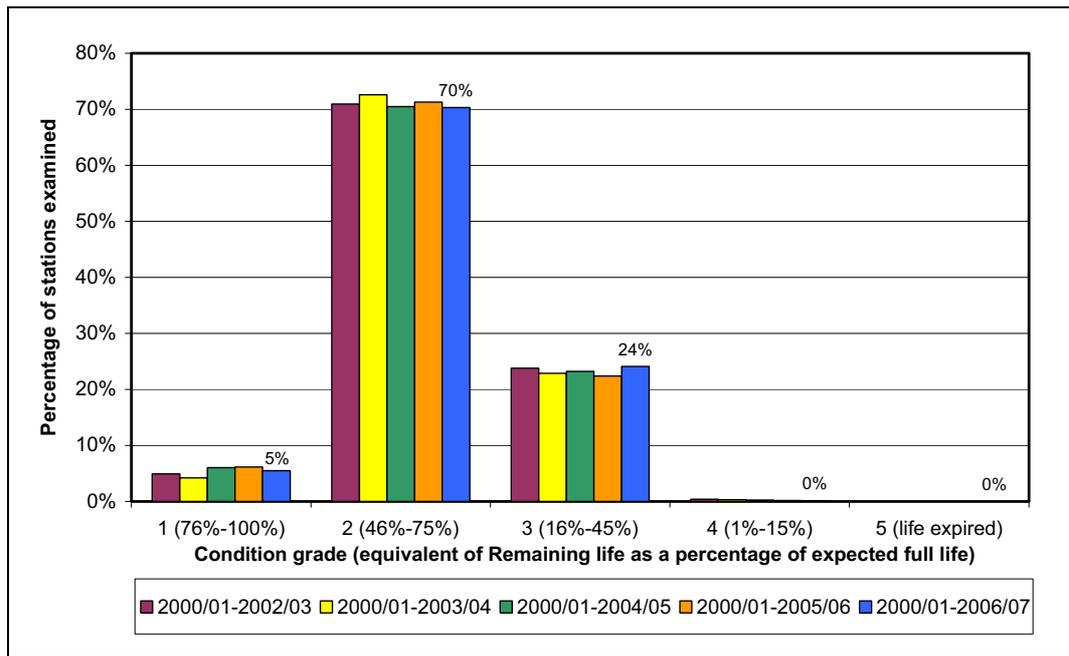


Figure 7.14.2 Station condition reported during the last seven years (M17)

Audit findings

Definition

- 7.14.10 The definition and procedure have not changed this year despite this being identified as an issue since 2003/04. We understand that the measure is under review with ORR with a view to implementing significant changes next year.
- 7.14.11 As reported in previous years, we have the following concerns with the definition of the measure:
 - (a) The inspections should cover physical integrity as well as cosmetic appearance.
 - (b) The average percentage remaining asset lives for each of the assets are equally weighted when producing the condition score for each of the 34 asset types; we suggest these should be weighted to reflect their relative importance to customers or differing levels of maintenance and renewal expenditures.
 - (c) The scores for each of the 34 asset types are equally weighted when producing the average condition score for each station; we suggest these should be weighted to reflect the relative volume of assets or their relative importance to customers or differing levels of maintenance and renewal expenditures.
 - (d) The scores for each station are equally weighted when producing the average condition score for the network; we suggest these should be weighted to reflect their importance or passenger footfall.
 - (e) Grades 1-3 dominate the results partly due to the non-linear nature of the grade bands. The gaps between the grades are 25% (grade 1-2), 30% (grade 2-3), 30% (grade 3-4), 15% (grade 4-5) of residual life, i.e. grades 1-3 cover 85% of the possible range of condition. We have found no reason why the grades are not linear, with equal gaps between the grades.
 - (f) It is improbable that Grade 5 will ever be used, as the grade for a station is derived from the asset condition of 34 different types of station asset. In order for a station to score a grade 5, virtually all of its assets would have to be life expired, which is highly unlikely. It would be more useful if grade 5 was expanded to cover a range of asset life so that it becomes a useful part of the measure.

Process

- 7.14.12 During the year, responsibility for managing the collection of data for the measure has been transferred from the Territories to MP&I, although the inspection results are still submitted via the Territory Building Engineers.
- 7.14.13 The station condition inspections are undertaken by contractors, procured and managed by MP&I.
- 7.14.14 We have the following concerns regarding the implementation of this measure this year:
- (a) The MP&I project managers did not have a full understanding of the inspection and scoring process for the measure. Instead, they were administering the awarding of purchase orders to carry out surveys whilst relying on the contractors internal QA to ensure compliance with procedures.
 - (b) The procedure requires that all surveys are carried out by approved inspectors. No such checks were carried out and new inspectors have been used with no evidence of briefing or training for the last three years to ensure consistency.
- 7.14.15 As part of a wider initiative, Network Rail has been attempting to introduce collection of data using handheld computers for several years but ongoing technical difficulties have led to long delays of this initiative. We understand that it is planned to implement a new system during 2007. It is hoped that further technical problems will not occur and that the system is fully trialled in order to optimise the system before it is implemented. Some Territories expressed concern that there may be no benefit in terms of the time to input data directly into a handheld computer, and that the quality of information recorded may be reduced.
- 7.14.16 We found little use of the data from this measure by Territories in the planning and management of maintenance or renewals work banks. It is a measure collected only for reporting to ORR.

Accuracy of reported data

- 7.14.17 We reviewed the calculation within the Headquarters' database used to produce the numbers for the Final Annual Return. We found no errors and that the numbers reported in the Annual Return were generally correct, except for the minor error noted below. We do note that there are minor errors in the database such the no inspection dates being entered, or obvious typing errors. Although this does not affect the accuracy of the resulting condition grade, it may cause problems when trying to conduct data analysis.
- 7.14.18 In reviewing the numbers published in the Final Annual Return, we have noted that in Table 100, the totals for 2006/07 in category C & F do not add up correctly. We believe that this is due to the inclusion, within the Total figures, of one category C and six category F stations that have not been surveyed. This error is not carried through to the 2006/07 total for "All stations".
- 7.14.19 Network Rail HQ appointed Davis Langdon LLP to conduct an audit of the station condition inspection for 2006/07. We have received a copy of the Final Audit report, dated July 2007, which found many instances where data had been recorded incorrectly. The findings of most concern are the incorrect recording of remaining asset life and condition grades and the lack of inspector briefings and competency assurance. Due to timing of this report, we have not had time to discuss these audit findings with Davis Langdon LLP, however the follow up to these audit finding will form part of our audit for 2007/08.

Assessment of confidence grade

- 7.14.20 **Reliability grade.** The definition for this measure is clearly documented except for the methods used for processing the data into a station and network score, although a consistent approach has been adopted for this. The process for condition assessment is subjective. The defined scoring system is non-linear and ensures that averaged scores almost entirely falls in one of three scores. Competency checks of the contractors undertaking the surveys have not been undertaken this year. We believe that M17 should have a reliability grade of B.
- 7.14.21 **Accuracy grade.** We have concerns regarding the subjective nature of this measure and its implementation this year although this is understandable given that the measure is undergoing review and is highly likely to have significant changes introduced for next year. We believe that M17 should have an accuracy grade of 3.

Audit Statements

- 7.14.22 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for station condition index (M17). The data has been collected and processed generally in accordance with the procedures but with some significant omissions to ensure the consistency of surveys. The data has been assessed as having a confidence grade of B3. However, we would note that this does not reflect the value of this measure as a true score of station condition. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.14.23 **M17 recommendation 1.** If the use of MP&I for management of the inspection contracts is continued, we recommend that this is applied consistently across the Territories and is documented in an updated procedure, which clearly outlines the responsibilities and ownership for this measure.
- 7.14.24 **M17 recommendation 2.** To ensure consistency across the Network, we recommend that Network Rail check that inspection contractor's staff are suitably qualified and fully briefed on the procedure for this measure. This should also include keeping a register of the names of inspectors used to collect the data for this measure.
- 7.14.25 **M17 recommendation 3.** We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay.

Observations relating to spreading of best practice and/or improvements to process

- 7.14.26 We have no observations for this measure.

7.15 Station facility score (M18)

Scope of audit

- 7.15.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Station Facilities Index (M18), including Tables 102 - 107.
- 7.15.2 The measure reports the level of facilities present at stations broken down by station category and by theme. The score is calculated by counting the number of specific items at each station. It is entirely quantitative, and makes no attempt to assess the quality of facilities or whether they are available for use. The Facilities scores for each station are added and reported by theme and station category for the entire network, both by total number and indexed compared to a value of 100 in 2000/01.
- 7.15.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M18DF (issue 4) and NR/ARM/M18PR (issue 6)
- 7.15.4 Audits were undertaken at Network Rail Headquarters and at London North Eastern and Scotland Territories with the Operational Estate Managers.

Commentary on reported data

Regulatory target

- 7.15.5 No regulatory target has been set for this measure.

Trend

- 7.15.6 The station facility score has risen steadily over the last five years, showing a 7.0% increase. There has been a 2.6% increase for the measure this year driven by a 7.6% increase for Category F stations, a 3.4% increase for Category E stations and a 3.1% increase for Category D stations. Figure 7.15.1 shows that this increase is dominated by the safety & security theme, which also accounts for over 62% of the total score.

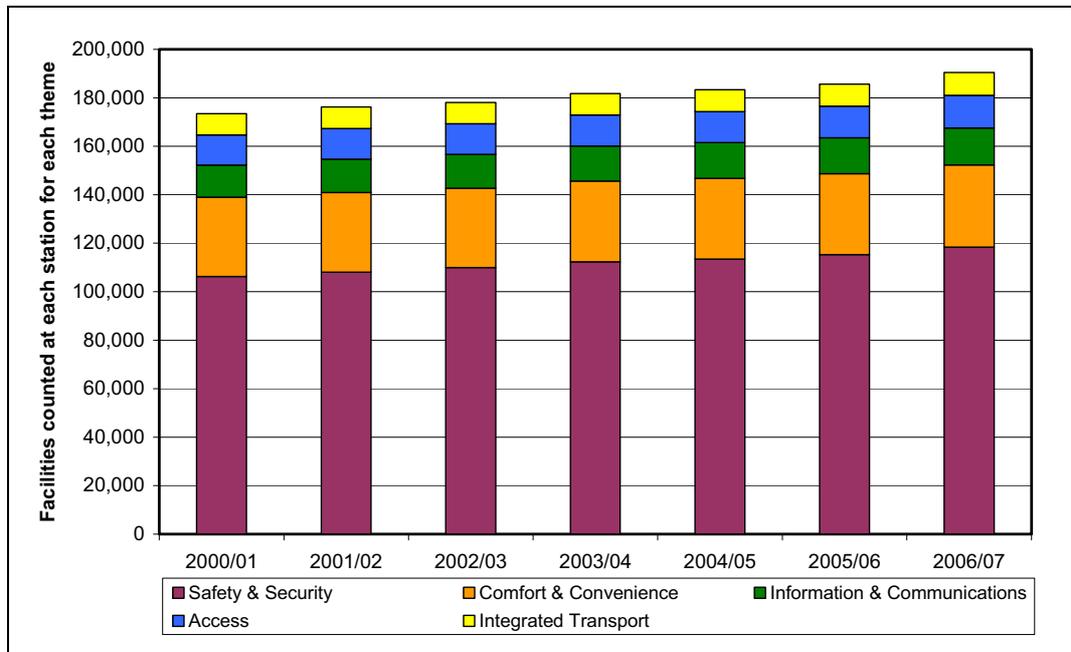


Figure 7.15.1 Station facility scores (M18)

Audit findings

- 7.15.7 The definition and procedure have not changed this year despite this being identified as an issue since 2003/04. We understand that the measure is under review with ORR.
- 7.15.8 As we have reported in previous years, we have the following concerns with the definition of the measure:
- (a) The scoring system is arbitrary in nature. The score comprises 67 different elements grouped into broad categories. Items counted on platforms have a dominant effect on the overall score. Previous audits identified that the facilities score was dominated by lamp-heads which accounted for 54% of the entire score even though the number of lamp-heads is not proportional to the luminance level or coverage. We have previously identified other situations where individual scores have a disproportionate effect on the total score.
 - (b) The scores are entirely unweighted for the size of a facility, its importance to customers or the size/ footfall of the station at which the facility is provided.
 - (c) The score focuses entirely on quantity rather than quality; no account is taken of whether the facilities are functional and in use or not. The relevance of items counted towards the overall score is not assured casting doubt on the usefulness of the measure in both relative and absolute terms.
- 7.15.9 Given these unresolved misgivings, we have not sought to undertake a detailed site audit of asset inspections made under this measure.

Process

- 7.15.10 The count of facilities at stations is collected by Network Rail Account Surveyors and comes from a number of sources:
- (a) Site visits to 20% of stations each year on a rolling programme, including surveys undertaken as part of the franchise change processes;
 - (b) Information about changes to the number of facilities, provided by station facility owners through landlord's approvals and station change procedures;
 - (c) Information about changes to the number of facilities, provided by project managers and building surveyors.
- 7.15.11 The reports are assessed and stored locally; the results forwarded to Headquarters for storage and reporting.
- 7.15.12 We have the following concerns regarding the implementation of this measure this year:
- (a) Following the loss of the entire database in Scotland Territory last year, they are now carrying out a process of resurveying every station, and until this is completed, no updated results for Scotland will be available.
 - (b) The undertaking of facility count surveys during specific visits to stations is clearly inefficient as surveys can be conducted as part of normal visits to stations and only supplemented with additional surveys as necessary.

Accuracy of reported data

- 7.15.13 The data reported is changed in two ways – from a resurvey or from known changes delivered by the station facility owner or Network Rail; this latter approach, whilst capturing useful information, is only incremental and therefore depends on the veracity of the original facilities count at that station.

Confidence grade

- 7.15.14 **Reliability grade.** The definition for this measure is clearly documented. The factual score is measured using the established procedure albeit from a much smaller sample of stations than required. We believe that M18 should have a reliability grade of B.

- 7.15.15 **Accuracy grade.** Due to the high number of facilities counted (190,269) there would need to be significant error to create a 5% error rate. The process of counting facilities is relatively simple, and compared to other measures, percentage accuracy should be reasonably high; however, the data management processes for this measure are deficient. We believe that M18 should have an accuracy grade of 2.

Audit Statement

- 7.15.16 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for station facilities index (M18). The data has been collected and processed generally in accordance with the procedures apart from the previous loss of data in Scotland Territory. However, due to the nature of this measure this has not significantly impacted the results. The data has been assessed as having a confidence grade of B2. There is no regulatory target for this measure.

Recommendations

Recommendations essential for the accuracy and/or reliability of the measure

- 7.15.17 **M18 recommendation 1.** We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay. Issues to be considered should include: (a) review relevance and purpose of measure, (b) take account of split responsibility for providing facilities between Network Rail and train operators, (c) introduce weighting of the scores to reflect importance to public e.g. disabled access and security; (d) review scoring of facilities to reflect quality as well as/ rather than quantity; (e) review scoring for facilities which are not currently operational; (f) introduce benchmark for what facilities stations of various categories/footfalls should have; (g) consider combining collection of data with other surveys; (h) ensuring that the list of facilities included in the measure is flexible to ensure redundant technologies can be removed, and new technologies can be added.
- 7.15.18 **M18 recommendation 2.** We suggest that it may be beneficial for Network Rail to redirect the resources planned for the collection of this measure in 2007/08, to the development of a better measure, and with the agreement of ORR, not report this measure in the Annual Return 2008.

Observations relating to spreading of best practice and/or improvements to process

- 7.15.19 We have no observations for this measure.

7.16 Light maintenance depot – condition index (M19)

Audit scope

- 7.16.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 3, Light maintenance depot – condition index (M19), including Tables 108 - 109.
- 7.16.2 This measure assesses the average condition for each Light Maintenance Depot (LMD), using a methodology which provides a condition grade from 1 to 5, where 1 is good condition and 5 is poor condition. The target is for 20% of the population to be inspected per annum thus enabling a 5 year rolling programme to be established. The individual score for each LMD is calculated as the average of the scores given to the following eleven asset elements:
- (a) Track;
 - (b) External lighting;
 - (c) Shore supplies;
 - (d) Fuelling facilities;
 - (e) Carriage washer;
 - (f) Wheel lathe;
 - (g) Gantry crane;
 - (h) Shed doors;
 - (i) Internal lighting;
 - (j) Superstructure;
 - (k) Facilities & accommodation;
- 7.16.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents NR/ARM/M19DF (issue 3) and NR/ARM/M19PR (issue 4). There is also a supplementary manual, NR/ARM/M19MN (Issue 2).
- 7.16.4 Audits were undertaken at Network Rail Headquarters and on-site at a selection of depots.

Commentary on reported data

Regulatory target

- 7.16.5 The regulatory target for the light maintenance depot condition measure, set in ORR's Access Charges Review 2003, was to maintain the network at or below the baseline level recorded in 2003/04.
- 7.16.6 In numerical terms, the regulatory target was set at not exceeding an average condition grade of 2.7, which was reported in the 2003/04 Annual Return as the 2000/04 average condition grade. However, this figure has since been restated in table 107 of the 2005/06 Annual Return as 2.63.
- 7.16.7 In 2006/07, the average condition grade reported by Network Rail was 2.56, which would meet the regulatory target.

Trend

- 7.16.8 Figure 7.6.1 shows that the average LMD condition score has continually improved over the last 5 years, in which the percentage of depots inspected has approached 100% (based on a population of 89, as listed in the procedure).

Period	00/01-02/03	00/01-03/04	00/01-04/05	00/01-05/06	00/01-06/07
Average Condition Score	3.04	2.63	2.63	2.58	2.56
% of depot survey	25%	46%	46%	64%	91%

Figure 7.16.1 Average condition of LMD (M19)

7.16.9 Figure 7.16.2 shows the trend for asset condition. Over the last five years, there has been an increase in the percentage of assets in condition grade 3 and decreases in the other condition grades, except grade 5 which has remained as zero percent.

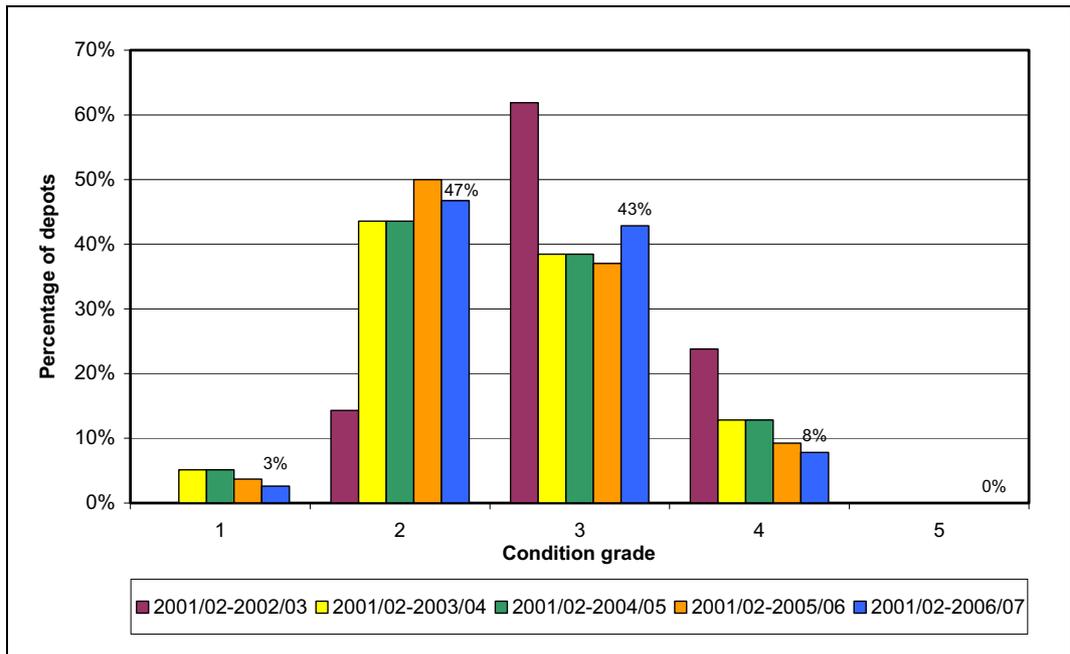


Figure 7.16.2 Average LMD asset condition (M19)

7.16.10 However, until now the full asset population had not been inspected and the programme was not conducted on a randomised basis; therefore we are unable to draw conclusions regarding a trend.

7.16.11 The target in the procedure is for 20% of the population to be inspected every financial year, such that the whole population is inspected within 5 years. This is the seventh year of undertaking inspections; however, 85 of the revised population from 91 to 87 have been reported for year end 2006/07. We do note that 12 of the Depots reported for 2006/07 were actually survey at the beginning of the 2007/08 year.

Audit Findings

7.16.12 We have the following concerns with the measure itself:

- (a) The 11 asset elements include many but not all the significant assets of an LMD; other elements such as security systems, fire protection systems, safety systems, drainage, motive power supplies & equipment (25kv and 3rd rail), wheel/ bogie drops or jacks, train servicing equipment such as water, CET, sand, etc, data acquisition and other IT systems should also be considered.
- (b) The scores for each of the 11 asset types are equally weighted when producing the average condition score for each depot; this means track is given an equal weighting to internal lighting. We suggest these should be weighted to reflect the

relative volume of assets or their relative importance to depot facilities operators or differing levels of maintenance and renewal expenditures.

- (c) The scores for each depot are equally weighted when producing the average condition score for the network; we suggest these should be weighted to reflect their size.
- (d) Grades 1-3 dominate the results partly due to the non-linear nature of the grade bands. The gaps between the grades are 25% (grade 1-2), 30% (grade 2-3), 30% (grade 3-4), 15% (grade 4-5) of residual life, i.e. grades 1-3 cover 85% of the possible range of condition. We have found no reason why the grades are not linear, with equal gaps between the grades.
- (e) It is improbable that Grade 5 will ever be used, as the grade for a depot is derived from the asset condition of 11 different types of depot asset. In order for a depot to score a grade 5, virtually all of its assets would have to be life expired, which is highly unlikely. It would be more useful if grade 5 was expanded to cover a range of asset life so that it becomes a useful part of the measure.

Process

- 7.16.13 This year inspections were outsourced using an existing framework agreement. Each Territory plans for 20% of their LMDs to be inspected each year. Headquarters are advised and works orders are issued by them. Reports are emailed to Headquarters and stored in a database for reporting purposes. The original reports are retained in the Territory.
- 7.16.14 During 2006/07, condition inspections were undertaken at 27 LMDs, 3 in Scotland, 7 in London North Western, 6 in London North Eastern, 2 in Anglia, 2 in Sussex, 3 in Wessex, 3 in Kent and 1 in the Western Territory, each commissioned under specific works orders with the framework contractors.
- 7.16.15 We have the following observations regarding the implementation of this measure during this past year:
 - (a) The Headquarters Champion position has been filled, however there has been a steep learning curve and the majority of the inspection were not conducted until the final months of the reporting period with some occurring following the end date of 31 March 07.
 - (b) The procedure specifies a 5% Headquarters audit which has, once again, not been undertaken.
 - (c) The depots population is shown in this years Annual Return as 85; the procedure still lists 89. Network Rail have a revised list of LMD's which continually fluctuates and appears to be uncertain and unclear about whether or not to include those depots which have full maintenance, repair and renewal contract agreements, or those managed by 3rd parties.

Accuracy of reported data

- 7.16.16 Of the 27 inspections conducted, Headquarters received a full electronic copy of the reports; we verified that the data in the Headquarters database was correct for all the 2006/07 inspections reports.
- 7.16.17 A sample of three reports were taken, one for each category, a small depot (Sheffield LMD), a medium depot (Blechley LMD) and a large depot (Ramsgate LMD), and site visits confirmed the inspection reports were generally accurate in the assessment of the condition of the asset. A few errors and minor discrepancies were found which would affect the final scores for some of the elements of the measure. This suggested that the report review and checking process undertaken by Network Rail was not thorough enough.

Assessment of confidence grade

- 7.16.18 **Reliability grade.** The definition for this measure is clearly documented. A documented process has been followed to collect and report this measure. The data from the inspections is subjective although an attempt has been made to assess the asset condition against measurable criteria. We believe that M19 should have a reliability grade of B.
- 7.16.19 **Accuracy grade.** We found discrepancies in the depots inspection reports for this measure which impacts the results. We found shortcomings in both report checking and Headquarters audit. We believe M19 should have an accuracy grade of 4.

Audit Statement

- 7.16.20 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for light maintenance depot – condition index (M19). We can confirm the data has generally been collected in accordance with the relevant definition and procedure. However, we found minor shortcomings in its administration. The 5 yearly inspection target has not been achieved. It is now the end of year 7, since the start of the inspection programme, and still a number of LMD's have not been visited and no second round inspections have been conducted. The data has been assessed as having a confidence grade of B4. The regulatory target for this measure has been met.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.16.21 **M19 recommendation 1.** We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay.
- 7.16.22 **M19 recommendation 2.** To ensure consistency across the Network, we recommend that Network Rail check that inspection contractor's staff are suitably qualified and fully briefed on the procedure for this measure. This should also include keeping a register of the names of inspectors used to collect the data for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.16.23 We have no observations for this measure.

7.17 Network Rail Asset Stewardship Incentive Index (ASII)

Audit scope

- 7.17.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail’s Annual Return 2007, Section 3, Network Rail Asset Stewardship Incentive Index (ASII), including Tables 110 - 111.
- 7.17.2 This measure is an aggregate index comprising measures of condition and performance of track, signalling, electrification, structures and earthworks. The index is compiled nationally and is a calculated measure, based on the results for measures reported elsewhere in the Annual Return and the associated targets from ACR2003 for these measures, such that if the results are exactly equal to the ACR2003 targets then the ASII is equal to one.
- 7.17.3 The definition and procedures for this measure are documented in Level 1 of Network Rail’s KPI Manual (December 2005).
- 7.17.4 The audit was based on data supporting calculations and index definitions provided by Network Rail National Engineering Reporting Team. Our audit focused on ensuring the data used in calculation was consistent with that reported elsewhere in the Annual Return and that the calculation was correct.

Commentary on reported data

Regulatory target

- 7.17.5 The regulatory target for this measure is an ASII value of 0.90 for the end of the control period (2008/09); this target forms an incentive for Network Rail to outperform the ACR2003 targets. No annual targets have been set for ASII.
- 7.17.6 The 2006/07 result of 0.72 would meet the end of control period regulatory target.

Trend

- 7.17.7 Figure 7.17.1 shows the trend for the constituent parts of the index.

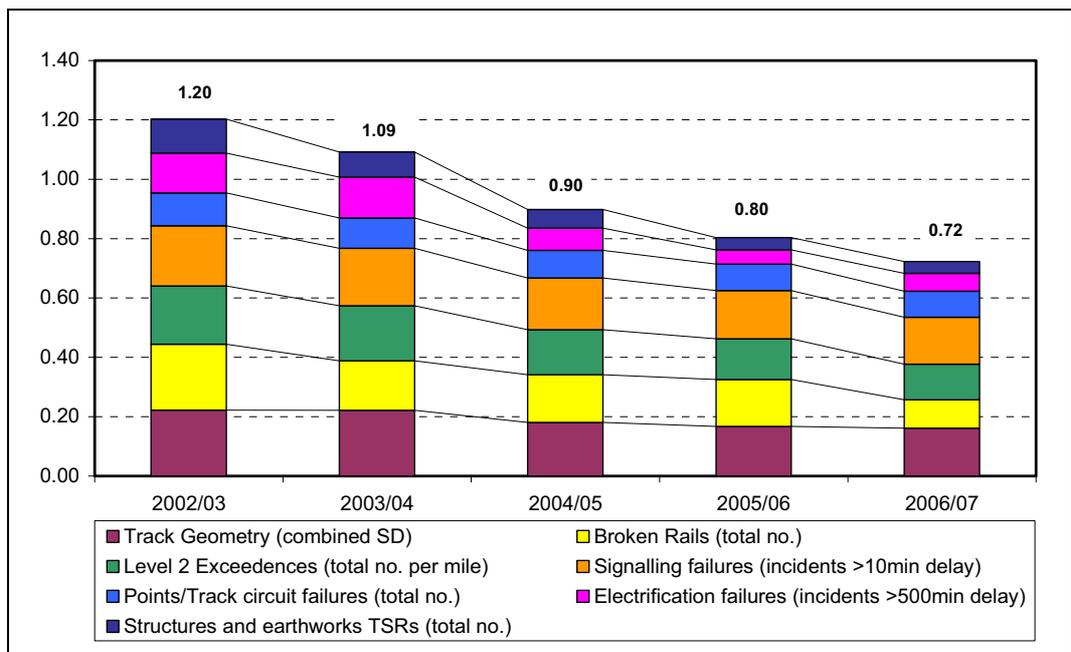


Figure 7.17.1 Asset Stewardship Incentive Index (ASII)

- 7.17.8 This year, Network Rail has reported a 10% improvement in the ASII reported figure. This reflects an improvement in nearly all of the constituent elements of the index, which is driven by a significant improvement in the number of broken rails. However electrification failures (incidents >500min delay) has shown a slight worsening of the situation.

Audit findings

Process

- 7.17.9 Collection and reporting processes for each of the ASII elements are reported against relevant measures:
- Asset Failures (network-wide totals);
 - M1 (broken rails);
 - M3 (track geometry - national standard deviation);
 - M4 (condition of asset temporary speed restrictions);
 - M5 (level 2 exceedences);
 - M9 (Signalling failures);
 - M11 and M12 (traction power incidents causing >500min train delays).
- 7.17.10 The only element which does not come directly from the Tables given in the Annual Return is that of the Track Geometry Index. This index is calculated using the twelve standard deviation measures given as part of M3 in Table 67; it is based on twelve baselines and twelve targets defined by the ORR and averaged to provide the index.
- 7.17.11 The National Engineering Reporting Manager is responsible for inputting the results for these measures into a spreadsheet which contains an algorithm for calculating and reporting the results.

Accuracy of reported data

- 7.17.12 We audited Network Rails calculation spreadsheet and have verified the values and calculation of the ASII against the target values. Figure 7.17.2 shows the checks that were performed for each element of the ASII.

Asset Measure (NR KPI)	Value	Check
Track geometry index (6.10)	0.806	Index calculated using M3, Table 67
Broken rails (6.1)	192	Checked against M1, Table 60
Level 2 exceedences (6.2)	0.72	Checked against M5, Table 80
Points/ track circuit failures	17,043	Checked against Table 32, minor error
Signalling failures causing delay of 10min or more (6.3)	22,704	Checked against M9, Table 85
Traction power supply failures causing 500min delay or more (6.7 & 6.8)	80	Checked against M11, Table 89 Checked against M12, Table 90
Structures & earthworks temporary speed restrictions (6.5 & 6.6)	40	Checked against M4, Tables 78 & 79
Asset Stewardship Incentive Index	0.72	Index calculated, ASII, Table 110

Figure 7.17.2 Checks performed for ASII using data sourced from Annual Return 2007 (ASII)

- 7.17.13 For points and track circuit failures, the total number used in the calculation spreadsheet is 17,038, against a reported value of 17,043. This minor discrepancy however does not have a material affect on the overall ASII value of 0.72.

Assessment of confidence grade

- 7.17.14 **Reliability grade.** We believe that the reliability grade given to ASII should be a weighted average of all its constituent parts. When the reliability grades are given in numeric equivalents (e.g. A=1, B=2, etc.) and these are weighted, the result is 1.7, which equates to a grade B. We therefore believe that the ASII should have a reliability grade of B.
- 7.17.15 **Accuracy grade.** This measure is a composite of other measures in the Annual Return 2007. Due to the inherent nature of the confidence grading system we do not believe it is sensible to provide an accuracy score for ASII based on either weighting the accuracy grades of the constituent measures, or on a subjective assessment. We believe that ASII should have an accuracy grade of 'X', indicating that an accuracy grade cannot be properly ascribed to the measure (as stipulated in the confidence grading guidance: Appendix D).

Audit Statement

- 7.17.16 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for the Asset Stewardship Incentive Index (KPI 6). We can confirm the data has been calculated in accordance with the relevant procedure. We believe these calculations have not materially impacted the reliability and accuracy of the data reported. Based on the lowest grade of the its constituent parts, the ASII has been assessed as having a confidence grade of BX.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 7.17.17 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 7.17.18 We have no observations for this measure.

8 Audit report and commentary – Activity Volumes

8.1 Track Renewal Volumes (M20, M21, M22, M25)

Audit scope

- 8.1.1 These audits were undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail’s Annual Return 2007, Section 4, Track Renewal Volumes which comprises the renewals volumes for rails (M20), sleepers (M21), ballast (M22) and switches & crossings (M25), including Tables 112 - 123.
- 8.1.2 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents:
- (a) NR/ARM/M20DF (issue 5);
 - (b) NR/ARM/M21DF (issue 5);
 - (c) NR/ARM/M22DF (issue 5);
 - (d) NR/ARM/M25DF (issue 2);
 - (e) NR/ARM/M20PR (issue 4).
- 8.1.3 These measures have a common procedure and data collection process; we have therefore audited and reported on these measures together. The Audit was undertaken at Network Rail’s Major Project & Investment (MP&I) track renewals team, and the West Coast Route Modernisation (WCRM) team. We also undertook an audit of how the data is collated for maintenance delivered renewals. For MP&I delivered projects, we also undertook audits in two territories, Scotland and Western.

Commentary on reported data

Regulatory targets

- 8.1.4 There are no regulatory targets for these measures.

Trend

- 8.1.5 Figure 8.1.1 shows a steady rising trend for non-WCRM sleeper and ballast renewal from 2002/03 to 2006/07. Rail renewals increased between 2004/05 and 2005/06, but once again dropped in 2006/07.

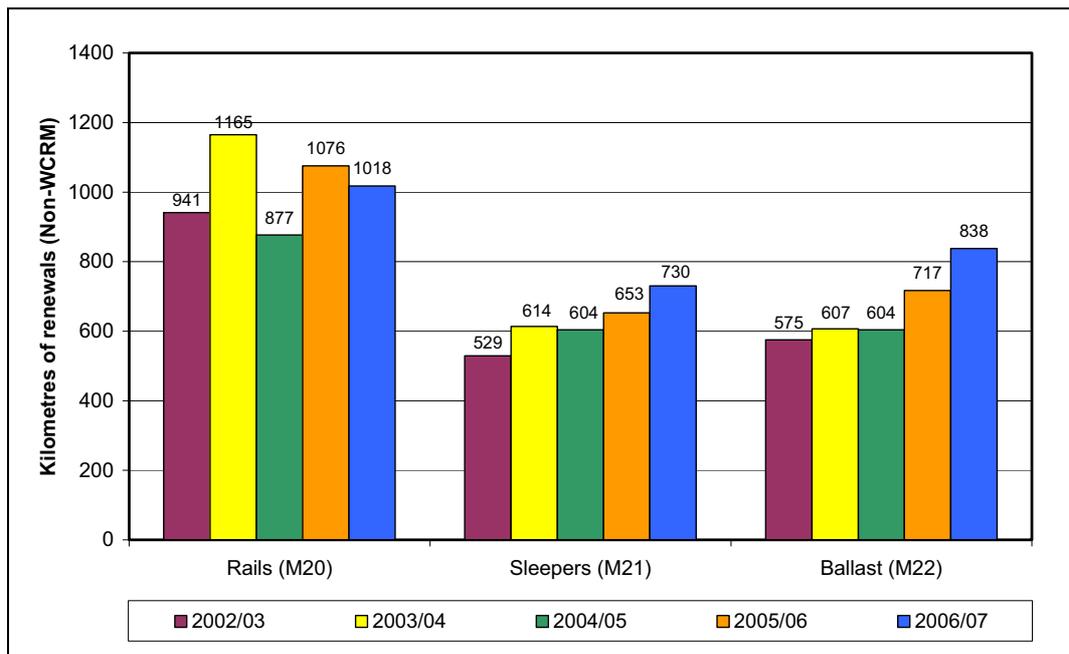


Figure 8.1.1 Track renewal volumes excl. WCRM (M20, M21, M22)

8.1.6 Figure 8.1.2 shows non-WCRM full S&C renewals have risen by 104% over the last five years and by 13% this year. This is due to a change in Network Rail's asset management practices for S&C over this 5-year period.

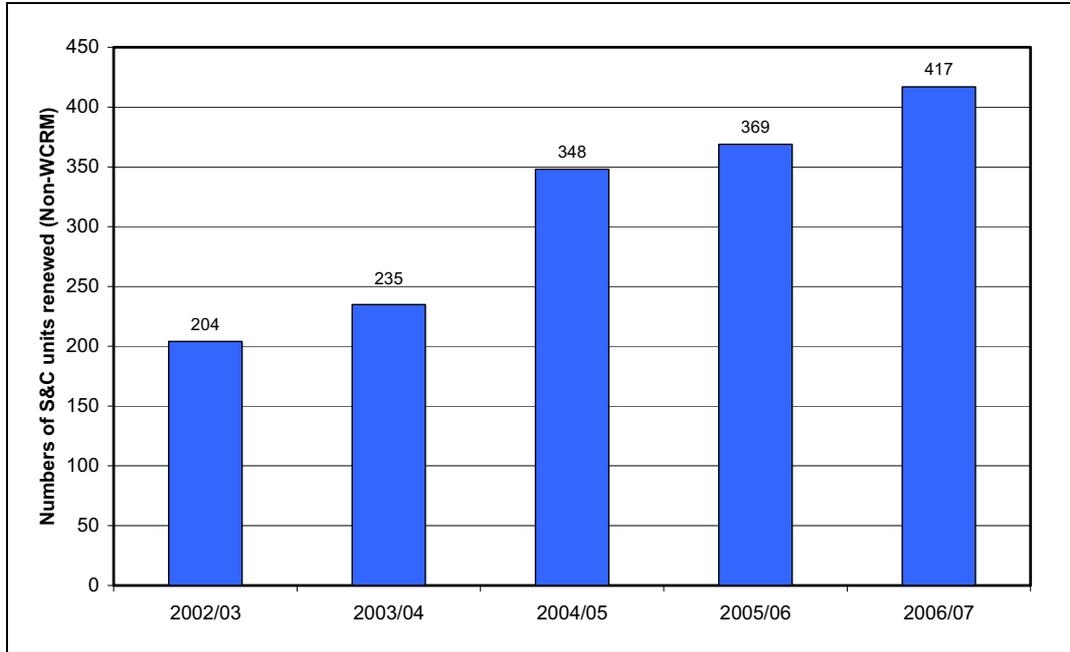


Figure 8.1.2 Switch and crossing full renewals excl. WCRM (M25)

8.1.7 Figure 8.1.3 shows the non-WCRM S&C renewals by type of renewals undertaken over the last 5 years. Overall S&C renewals have shown an increasing trend over the last 5 years.

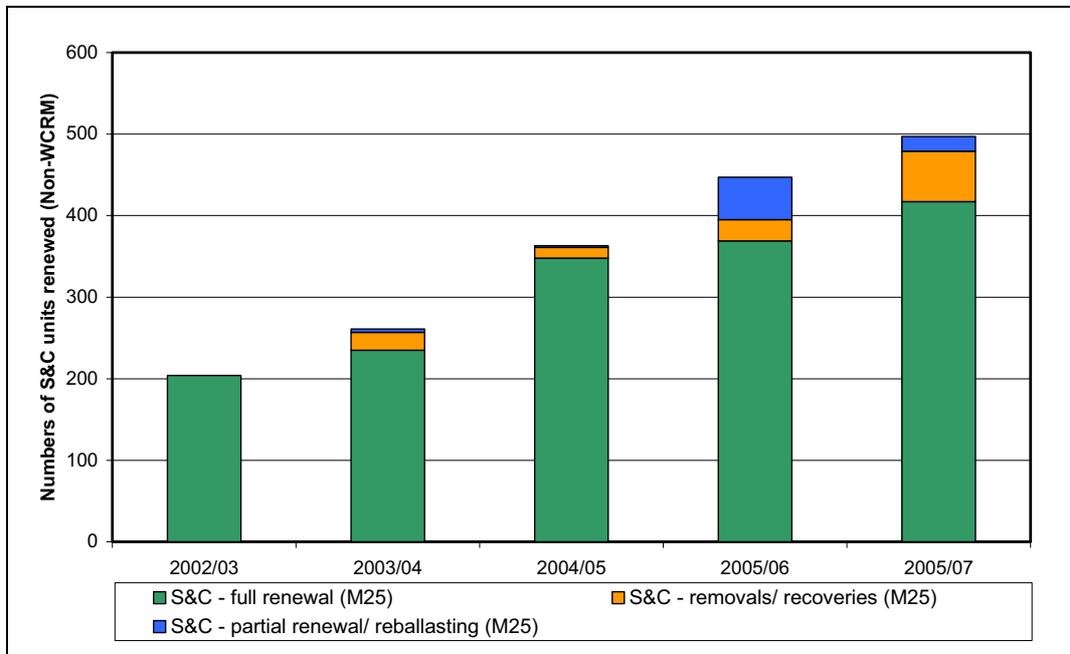


Figure 8.1.3 Switch and crossing renewal excl. WCRM by type (M25)

Audit findings

Process

MP&I track renewals

- 8.1.8 Data for renewals undertaken is found in the P3e database. The data entry into P3e is done by the planners in the Territories, after they have received specifications from Engineering. Weekly review meetings are held between the planners and Engineering to determine volume of renewals delivered and subsequent entry into P3e.
- 8.1.9 At the end of every period, the Track Renewals Programme team in each Territory compile Management Business Review (MBR) Reports, which include data on renewals volumes and costs. The central Track Renewals Team in York collate the annual return data from the MBR reports.
- 8.1.10 Each report has a summary page, which summarises year-to-date renewals of rail, sleepers, ballast and S&C, in terms of both cost and volumes. However the MBR report does not disaggregate the sleepers or ballast data by category. These are split in accordance with defined category rules.
- 8.1.11 For South East Territory the volumes have to be reported by four distinct Routes, i.e. Anglia, Kent, Sussex and Wessex. As the MBR reports do not disaggregate the data by Route, the Financial Analyst Track took the volumes for individual depots (from P3e) and added them to give the Route totals. However the aggregate volumes for all depots did not match exactly with the South East Territory totals taken from the MBR pack.
- 8.1.12 We undertook audits of individual schemes from 2 territories, Scotland and Western. In both territories, on completion of a renewals work the contractor prepares a GEOGIS 'Construction Details' report which is sent to the Programme Controls Manager. When the follow-up work has been completed a 'Correlation' drawing is prepared. The Network Rail Site Manager checks the GEOGIS report against the 'Correlation' drawing before it is submitted for input into the P3e database.

West Coast Route Modernisation track renewals

- 8.1.13 Each week renewals volumes are entered into the WCRM Project Control System (PCS) database by project teams using 97 unique WCRM activity codes (for 2006/07) which align with the WCRM cost control system. There are currently around 40-50 project teams on the West Coast project. The data entered into PCS is verified by West Coast Engineering, Project Controls Managers, and the Project Manager.
- 8.1.14 For the track renewals measures, the WCRM Performance Measurement Manager used bespoke queried to collate the appropriate data from PCS.

Maintenance delivered track renewals

- 8.1.15 Based on the recommendations contained in the investment papers, the Investment Panels decide which renewal schemes will be delivered by the Maintenance organisation. The maintenance team in HQ maintain a work bank of projects for the year which contain projects by value. A tracker spreadsheet is used to monitor progress of projects on a period-by-period basis for each Territory.

Accuracy of Reported Data

MP&I track renewals

- 8.1.16 We checked the P3e database and the processes used to consolidate all the information for reporting purposes, and found this to be correct.
- 8.1.17 For South East Territory, there were however minor discrepancies between the total volume given in P3e, and the aggregate volumes obtained from summing volumes for individual depots.

- 8.1.18 During the site visit to Scotland territory, a sample of 6 plain line renewal projects was audited, and in 2 of them we found errors in the yardage entered in P3e. A total of 373 yards of rail renewal and 555 yards of sleeper renewal were wrongly reported. Network Rail confirmed that these were data entry errors. For Western, a sample of 6 plain line renewals was audited and no errors were found in data reported in P3e.

West Coast Route Modernisation track renewals

- 8.1.19 We inspected the PCS query output for M20, M21, M22 and M25, and used it to verify the nationally reported figures. The PCS database reports renewals data in yardage, which are converted to Kms for the Annual Return.
- 8.1.20 The following issues with the collection and reporting process were identified:
- (a) M20 Rail: The definition requires reportable rail renewal works to be of 200 yards or more. WCRM record all rail renewals in PCS which may have led to some minor over-reporting.
 - (b) M21 Sleepers: PCS has not been configured to record sleepers by type (i.e. concrete, timber, or steel), as required in the Annual Return. All sleeper renewals are classified as concrete sleepers. Given the nature of renewals undertaken by WCRM, this is a reasonable assumption.
 - (c) M22 Ballast: The type of re-ballasting (i.e. full ballast renewal, partial re-ballast, or scarify) was not recorded by PCS. All re-ballasting has been classified as full ballast renewals.
 - (d) M25 S&C: PCS records WCRM S&C renewals as either 'Install/Renew' or 'Heavy Maintenance'. WCRM report only Install/Renew yardage under 'S&C full renewals', in Table 120 of the Annual Return 2006. However these 'full' renewals also include some 'partial' renewals, which have not been reported separately. This has led to over reporting of S&C full renewals and under reporting of S&C partial renewals.

Assessment of confidence grade

- 8.1.21 **Reliability grade.** The definition for this measure is clearly documented. While a single documented process has been followed to collect and report the high level summary data for this measure, we have yet to audit the process at the individual job level. An audit of WCRM was also undertaken. We believe that the track renewals measures (M20, M21, M22, M25) should have a reliability grade of B.
- 8.1.22 **Accuracy grade.** The data has been reported by the MP&I teams based on the MBR Reports have been accurate. We have yet to sample the data for cost and volume at an individual job level. Minor discrepancies were found in the volumes of South East Territory. Errors were also found in the data entered into P3e in Scotland territory. An audit of WCRM showed that there were some inaccuracies in reporting of all 4 measures due to the definitions used in the WCRM PCS system. We believe that the track renewals measures (M20, M21, M22, M25) should have an accuracy grade of 2.

Audit Statements

- 8.1.23 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for the track renewals measures (M20, M21, M22, M25). We can confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of B2. There are no regulatory targets for these measures.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 8.1.24 **M20-M22, M25 recommendation 1.** The PCS database should be modified to classify S&C renewals as 'full' and 'partial' renewals separately.

8.1.25 **M20-M22, M25 recommendation 2.** Network Rail should investigate why for South East Territory, when volumes for individual depots (from P3e) were aggregated, they did not correspond accurately to the totals for South East Territory obtained from the MBR reports, and remedy the discrepancy.

8.1.26 **M20-M22, M25 recommendation 3.** We recommend that Scotland territory take steps to ensure that data is accurately entered into P3e.

Observations relating to spreading of best practice and/or improvements to process

8.1.27 We have no observations for this measure.

8.2 Signalling Renewed (M24)

Audit scope

- 8.2.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 4, Signalling Renewed (M24), including Table 124.
- 8.2.2 This measure reports the volume of signalling renewed in Signalling Equivalent Units (SEUs). An SEU is a single trackside output function controlled by an interlocking. The number of SEUs reported as renewed is dependent on the extent of work. A percentage reduction is applied for partial renewals
- 8.2.3 The definition and procedure being used for this measure are contained within Network Rail's Definition of Signalling Equivalent Units (SEU) and Volume Reporting (BP001).
- 8.2.4 Audits were undertaken at Network Rail HQ, and at South East, London North Eastern and London North Western Territories.

Commentary on reported data

Regulatory target

- 8.2.5 There is no regulatory target for this measure.

Trend

- 8.2.6 Figure 8.2.1 shows there has been a reported increase in the number of SEUs renewed in 2006/07 as compared to 2005/06. A total of 401 SEUs were reported as being renewed as compared to the Network Rail Business Plan target of 669. The main reason for the shortfall was the delayed commissioning of the major re-signalling scheme at Portsmouth.

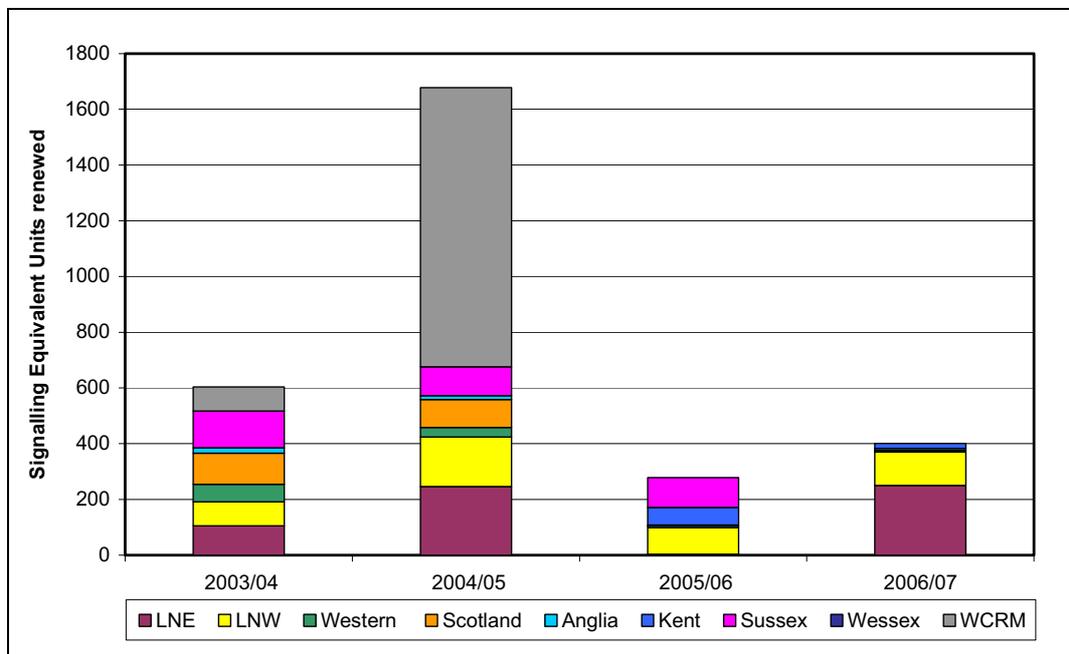


Figure 8.2.1 Signalling renewals (M24)

Audit findings

Definition

- 8.2.7 During our audit Network Rail stated that they now report on SEU volumes using Network Rail's Definition of Signalling Equivalent Units (SEU) and Volume Reporting (BP001, Issue 4 dated 26 June 2006), and not the definition documented in the Network Rail Asset Reporting Manual, NR/ARM/M24DF (issue 4).
- 8.2.8 BP001 provides the weightings for the different categories of renewals as:
- (a) Full Renewal -100%;
 - (b) Interlocking Renewal - 45%;
 - (c) Outside equipment - 50%;
 - (d) Control system - 5%.

Process

- 8.2.9 The procedure being used for this measure is in line with BP001, however this has not been separately documented.
- 8.2.10 The signalling engineers in the renewals teams used as-built drawings to count the number of renewed SEUs commissioned into use. The SEU count for each interlocking is stored in the Interlocking Data Cards (IDCs). The SEU data for individual projects is input into the P3e database by the Programme Control Managers in the Territories. The final Annual Return numbers are collated from P3e and adjusted by the HQ team to account for partial renewals in accordance with BP001.
- 8.2.11 The procedure documented within the Network Rail Asset Reporting Manual, NR/ARM/M24PR (issue 1), has not been updated to reflect the changes in the process and the assigned responsibilities for reporting this measure.

Accuracy of data reported

- 8.2.12 The P3e database output (to end of period 11, 2006/07) was viewed at HQ. We also looked at how data is input into P3e with the project team at London North Eastern.
- 8.2.13 A sample of 4 projects (1 each from South East and London North Western, and 2 from London North Eastern) were selected for a more detailed audit with the project teams at in the Territories. For all the schemes the number of SEUs in the scheme plan matched those in the P3e database.

Assessment of confidence grade

- 8.2.14 **Reliability grade.** The definition is now defined in BP001 and the procedure for this measure is clearly documented. The adjustment for partial renewals is carried out at HQ where the details and the nature of the schemes may not be known exactly. However, the process is sufficiently linked to programme management to give a reliability grade of C.
- 8.2.15 **Accuracy grade.** The calculation of SEUs renewed is open to a little interpretation, but should be capable of reasonable accuracy by following the procedure and using the agreed definitions. We believe M24 should have an accuracy grade of 3.

Audit Statement

- 8.2.16 We have audited the reliability and accuracy of the available data and commentary. We confirm the data has been collected and reported in accordance with the relevant definition and procedure. The data has been assessed as having a confidence grade of C3. There is no regulatory target for this measure.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 8.2.17 **M24 recommendation 1.** It was apparent from our meetings at Network Rail that the Champion identified for this measure did not deal with this matter directly. We recommend that Network Rail ensure that the Champion's for this and other measures do relate to the measure directly.
- 8.2.18 **M24 recommendation 2.** We recommend the procedure for this measure is revised to reflect the new reporting process in use and update the assigned responsibilities for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 8.2.19 We have no observations for this measure.

8.3 Structures Renewal & Remediation Volumes (M23, M26, M27, M28, M29)

Audit scope

- 8.3.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 4, Structures Renewal & Remediation Volumes which comprises the renewals & remediation volumes for bridges (M23), culverts (M26), retaining walls (M27), earthworks (M28) and tunnels (M29), including Tables 125 - 131.
- 8.3.2 For bridges and earthworks, only schemes above £100k are reported, while for culverts, retaining walls and tunnels, schemes over £50k are reported.
- 8.3.3 The definition and procedures for this measure are documented in the Network Rail Asset Reporting Manual, documents:
- (a) NR/ARM/M23DF (issue 3);
 - (b) NR/ARM/M26DF (issue 2);
 - (c) NR/ARM/M27DF (issue 3);
 - (d) NR/ARM/M28DF (issue 1);
 - (e) NR/ARM/M29DF (issue 1);
 - (f) NR/ARM/M23PR (issue 1).
- 8.3.4 These measures have a common procedure and data collection process; we have therefore audited and reported on these measures together. The audit was undertaken with the Network Rail Civils MP&I team in Swindon, as well as with the Civils Renewals teams at London North Eastern and Western Territories.

Commentary on reported data

Regulatory targets

- 8.3.5 There are no regulatory targets for these measures.

Trend

- 8.3.6 Figure 8.3.1 shows the total number of reported renewals undertaken for bridges, culverts, retaining walls, earthworks and tunnels since 2002/03, subject to the relevant cost thresholds.

Measure	2002/03	2003/04	2004/05	2005/06	2006/07
Bridges (M23)	97	195	260	157	154
Culverts (M26)	49	9	16	9	10
Retaining Walls (M27)	n/a	9	10	10	7
Earthworks (M28)	n/a	146	106	76	68
Tunnels (M29)	n/a	13	38	39	19

Figure 8.3.1 Annual number of structures renewed (M23, M26-M29)

- 8.3.7 The number of bridges, retaining walls, earthworks and tunnels renewals works undertaken (greater than the threshold values) fell in 2006/07, as compared to 2005/06. The number of culverts renewed however rose.

8.3.8 Figure 8.3.2 shows bridge renewals and remediation by task category (for schemes over £100k) undertaken for the last 4 years. The total number of schemes has fallen marginally in 2006/07.

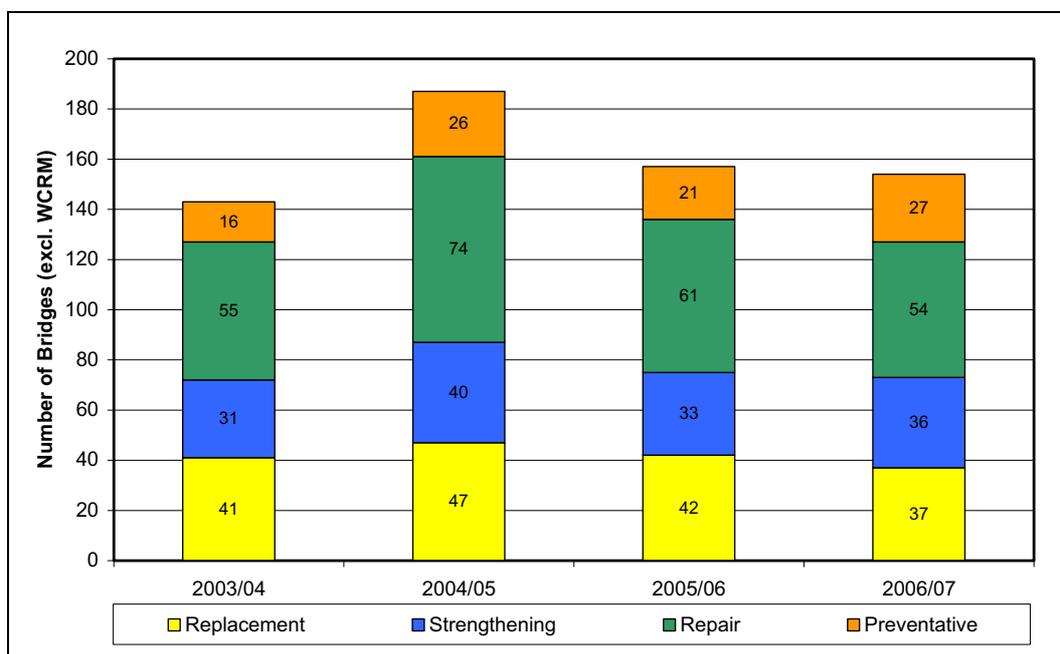


Figure 8.3.2 Bridge renewals by task category (M23)

8.3.9 Figure 8.3.3 shows the area (in terms of square metres) of bridge deck renewals (M23) and retaining wall remediation (M27), for schemes over the reporting thresholds.

Work Type	2002/03	2003/04	2004/05	2005/06	2006/07
Bridges (M23)	n/a	5,611m ²	10,222m ²	5,433m ²	13,040m ²
Retaining Walls (M27)	1,208m ²	8,811m ²	2,635m ²	2,016m ²	2,240m ²

Figure 8.3.3 Area of works renewed (M23, M27)

8.3.10 There has been a 140% increase in the area of bridge deck replacements undertaken in 2006/07 as compared to the previous year. The area of retaining walls renewed showed an 11% increase in 2006/07.

Audit findings

Process

- 8.3.11 This year there has been a change in the way data for this measure is collated. But the definitions and procedures have not been updated to reflect this. The data for the Annual Return is taken from the Cost Analysis Framework (CAF). The Programme Commercial Managers in the Territories are responsible for data entry into the CAF. Data is collected both at GRIP stages 4 and 7. Volumes are reported through the P3e database. Territory Civil Engineering teams verify that the volumes are accurate and categorised correctly. After each Territory submits their CAF return, data for individual projects are collated and populated into a summary spreadsheet by the MP&I Programme Efficiency Analyst.
- 8.3.12 The MP&I Programme Efficiency analyst in Swindon also checks the data CAF against that in the business plan. The business plan is a dynamic document, updated every period.

Accuracy of reported data

- 8.3.13 For the audit we compared the data in CAF for each measure and ensured that they were accurately reported. This was confirmed for all measures. Further, for each measure we also compared the total volumes and costs in CAF with the Business Plan (2006/07). We also audited the summary spreadsheet used to compile the Annual Return data from CAF and found it to be accurate.
- 8.3.14 For each measure, we selected a sample of individual schemes and compared the volumes and costs in the SBMT with the Business Plan (2006/07). The data was found to be accurately recorded.
- 8.3.15 A total of 5 schemes (3 in London North Eastern and 2 in Western Territory) and were audited in detail with the relevant Senior Commercial Managers. This included a review of the construction and as-built drawings to check whether volumes/area renewed matched those given in CAF.
- 8.3.16 For one of the schemes in London North Eastern bridge schemes, the reported (CAF) volumes (square metres renewed) was 10% lower than that given in the relevant as-built drawings.
- 8.3.17 We also observed inconsistencies in the way in which walkways were considered while calculating total deck areas of bridges renewed. In Western, walkways were included in the calculation of deck area, while in London North Eastern they were not. This leads to inconsistencies in the square area reported for measure M23.
- 8.3.18 We also found that when square areas are entered into CAF, no record is made of which drawings these areas have been derived from. This makes the auditing process difficult.
- 8.3.19 CAF also does not indicate why any significant changes to volumes have taken place in relation to the business plan.

Assessment of confidence grade

- 8.3.20 **Reliability grade.** The definitions for these five measures are clearly documented. A single documented process has been followed to collect and report the data for these measures. We believe that the measures M23, M26, M27, M28, and M29 should have a reliability grade of A.
- 8.3.21 **Accuracy grade.** Our samples found the data for the number of renewals undertaken had been reported accurately. However we found differences in the square area of measure M23. We believe that the measures M26, M27, M28, and M29 should have an accuracy grade of 1, while measure M23 should be given an accuracy grade 3.

Audit Statements

- 8.3.22 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for civils renewals and remediation measures (M23, M26, M27, M28 and M29). The data for measures M26, M27, M28 and M29 has been assessed as having a confidence grade of A1, while the data for measure M23 has been assessed as having a confidence grade of A3. There are no regulatory targets for these measures.

Recommendations arising*Recommendations essential for the accuracy and/or reliability of the measure*

- 8.3.23 **M23, M26-M29 recommendation 1.** We recommend that Network Rail develops a revised definition and procedures for these measures. This to include a consistent policy of whether or not to include walkways while reporting bridge deck area renewed Also when square areas are entered into CAF, a record is made of which drawings there areas have been derived from.
- 8.3.24 **M23, M26-M29 recommendation 2.** We recommend that CAF should indicate why any significant changes to volumes have taken place in relation to the business plan.

Observations relating to spreading of best practice and/or improvements to process

8.3.25 We have no observations for this measure.

9 Audit report and commentary – Expenditure and Efficiency

9.1 Maintenance Efficiency

Audit scope

- 9.1.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Maintenance Unit Costs, including Table 174.
- 9.1.2 This measure reports unit cost rates for maintenance activities. Network Rail has commenced collecting data for eighteen maintenance unit cost rates – fifteen for track and three for signalling. In the 2006/07 reporting year, nine of the eighteen maintenance unit costs have data which Network Rail considers suitably robust to be presented in the Annual Return:
- (a) Rail Changing;
 - (b) Re-Sleepering;
 - (c) S&C Unit Renewal;
 - (d) Replacement of S&C Bearers;
 - (e) Visual Inspection (Patrolling);
 - (f) Manual Correction of Plain Line Track Geometry;
 - (g) Point End Routine Maintenance;
 - (h) Signals Routine Maintenance;
 - (i) Track Circuits Routine Maintenance.
- 9.1.3 The definition and procedure are documented in Network Rail Company Specification FRM702 *Reporting of Maintenance Unit Costs*.
- 9.1.4 The audit was undertaken at Network Rail Headquarters, Maintenance National Specialist Team (NST), East Midlands Maintenance Area and Sussex Maintenance Area.

Commentary on reported data

- 9.1.5 As this is the first year the data has been reported externally, there is no benchmark data from which to assess trends or regulatory targets.

Audit Findings

Process – Overview

- 9.1.6 In principle, the method used to generate maintenance unit costs is:
- (a) The units (volume) of each type of maintenance activity is recorded using Ellipse (Network Rail's maintenance work management system for planning and recording hours and volumes for work activities);
 - (b) Total Direct Staff costs and Direct Agency Labour costs are captured at a Maintenance Delivery Unit level in EBS (Network Rail's finance management system) and apportioned using the ratio of hours booked against each type of maintenance activity in Ellipse; the hours booked in Ellipse are productive 'time on tools' hours only, not incorporating travel time etc;
 - (c) Other costs are captured in EBS and allocated directly to each type of maintenance activity.
- 9.1.7 Network Rail has identified shortcomings in the levels of data quality being achieved and actions are in place for 2007/08 to improve processes and documentation. Actions are also in place to increase the coverage of the maintenance unit costs to greater than half the maintenance spend. Milestones for these actions form part of Network Rail's 'World Class Finance' workstream.

Process – Ellipse Database

- 9.1.8 Section Managers plan maintenance work for the week ahead; Schedulers enter the work into Ellipse. Hard-copy work orders are used by Supervisors/ Track Chargemen to record hours worked and volumes delivered. Time-keepers and Section Managers check the completed work orders; Data-inputters enter the work order details into Ellipse. Approximately 80,000 work orders are closed per week.
- 9.1.9 On a weekly basis, Maintenance NST runs a series of thirty-six Ellipse data quality tests which are made available to Territories, Areas and Delivery Units. These reports identify data entered into Ellipse which has failed each test; however, these reports do not assess the levels of data quality achieved or required. Delivery Units are responsible for checking/correcting data which has failed data quality tests. Maintenance NST does not confirm close-out of corrective actions arising nor further confirmatory data quality checks. We found evidence that the complete series of data quality test reports had not been run in four out of five sampled weeks.
- 9.1.10 On a weekly basis, Maintenance NST runs an Ellipse Improvement Programme report containing a series of:
- (a) Twelve data quality indicators which assess performance against targets;
 - (b) Two indicators ('work backlog jobs as a percentage of workbank jobs' and 'business critical work backlog jobs as a percentage of workbank jobs') which assess a mixture of work performance and data quality.
- 9.1.11 We viewed documentary evidence of the work order input and work order closing process; no anomalies or inconsistencies were found which would materially impact the unit cost data. However, the data quality processes we viewed were disjointed, were not sufficiently documented and were not being conducted with sufficient diligence to achieve consistent improvement in data quality.

Process – EBS Database

- 9.1.12 Non-staff costs are allocated to each type of maintenance activity in EBS:
- (a) For bulk material supplied by National Delivery Service (NDS), the costs are directly entered into EBS by the NDS Management Accountant; Depot Accountants make manual adjustments to post the bulk material costs to the correct maintenance activities (MNT codes);
 - (b) For other materials and agency labour, maintenance engineers prepare a requisition form; Network Rail Procurement places the order and enters details, including costs to the correct maintenance activities (MNT codes);
 - (c) On-Track Machines and Road-Rail Vehicles (RRVs) are leased on an annual basis. Planning & Resource Managers allocate each machine to work on a per-shift basis; Depot Accountants run manual journals to post the costs to the correct maintenance activities (MNT codes).
- 9.1.13 We viewed documentary evidence confirming these processes; no anomalies or inconsistencies were found which would materially impact the unit cost data except:
- (a) Some financial data is reported on accrued basis not a final account basis: NDS (two periods accrued), Contractors & RRV (identified accruals), S&C spares/components (estimated accruals); this source of inaccuracy is not likely to be material;
 - (b) The costs for hire of small plant and equipment are pro-rated across the maintenance activities in the same proportions as direct labour costs, based on the assumption that the costs for small plant and equipment follow people costs equally for all maintenance activities; we will further investigate materiality for our full report on Network Rail's Annual Return 2007;

- (c) Machines and materials costs are discrete spend items, sometimes bought/ paid for in bulk, (i.e. in amounts greater than necessary for work in one reporting period) which means the costs allocated in a period are sometimes not in direct proportion to the amount of work undertaken, so distorting the unit cost; naturally, this distortion is greatest in the first week of the financial year and at its least at the end of the year; the resulting inaccuracy could be largely eliminated by using a rolling year;
- (d) Direct Labour costs for each discipline are totalled and allocated to maintenance activities (MNT codes) in accordance with the proportions of productive hours; however, this may lead to some inaccuracy due to:
 - (i) Staff grades – all grades below Section Manager are classed as Direct Labour, but some MNT activities will require more senior (i.e. more expensive) Direct Labour grades than other MNT activities; and
 - (ii) The data quality in HRMS (Network Rail's human resources database) – if employees are incorrectly allocated to cost centres in HRMS then the total Direct Labour costs will be incorrect; for example, in 2006/07, the East Midlands Area requested 654 changes to HRMS but only 26 were actioned; we will further investigate materiality for our full report on Network Rail's Annual Return 2007.

Process – Reporting

- 9.1.14 At Headquarters, the data from Ellipse and EBS are combined to create the maintenance unit costs on a year-to-date basis; this task is performed using a bespoke spreadsheet macro.
- 9.1.15 The results, grouped by Maintenance Area and by Territory are reviewed by the Senior Financial Analyst (Maintenance), and processed separately before reporting:
 - (a) **Stage 1: Replacement of reported data with estimates.** Possible errors are trapped by identifying (for each unit rate) where a Maintenance Area has a $\pm 4\%$ variance or greater between the area's percentage of the total national hours and the area's percentage of the total national volumes. Where the data trapped in this way is assessed as anomalous, the volumes are assumed to be incorrectly reported (as this is the data most subject to error) and the reported volumes are replaced with estimated volumes. The estimated volumes are back-calculated using the Maintenance Area's reported hours and the ratio of total national hours and total national volumes.
 - (b) **Stage 2: Elimination of outliers.** Data which appears to be an outlier (i.e. data points that are not from the same underlying statistical distribution as the other data points) are assessed as anomalous and removed from the dataset. Outliers are identified 'by eye', i.e. by placing the data points in size-order and identifying where there is a noticeable numerical gap between data points at the extremities of the ordered dataset.
- 9.1.16 The methods for processing the data in these two stages, including the decision criteria for assessing the data as anomalous, are not yet formalised in documentation.

Data accuracy

- 9.1.17 We compared sampled work orders with the data in Ellipse in two Maintenance Areas and found no errors.
- 9.1.18 **Asset Data.** The regular Maintenance NST data quality reports show that at Period 8 there were 478,016 errors in Ellipse for seven key asset data fields (Figure 9.1.1); as there were 1,456,003 assets in Ellipse at the time, this represents a 5% error rate. These errors have a number of impacts on the efficient use of work orders including the correct identification of assets on site; however, this is unlikely to be a material source of inaccuracy to the unit cost rates.

Source of inaccuracy	Number of inaccuracies
Item Name 2 at variance with Description	13,030
Rail ID entered incorrectly	76,663
Item Name 1 entered incorrectly	76,105
Position Code is blank on the Classification Tab	202,188
Delivery Unit Code is blank on the Classification Tab	44,124
Start/ End Mileage inconsistencies	65,899
Signalling Assets without Signal Sighting Cab Ride checked	7
Total	478,016

Figure 9.1.1 Ellipse data quality (Periods 1 to 8, 2006/07) from Maintenance NST reports

- 9.1.19 **Work Orders.** Maintenance NST data quality reports to Period 8 shows:
- 7,048 work orders had volumes or work hours which were zero or work hours which were entered as 1 minute; this represents less than 0.3% of the total work orders to Period 8; this source of inaccuracy is not material;
 - 20,072 work orders had volumes or hours which were obviously too large; this represents less than 1% of the total work orders to Period 8 but can have a significant effect on the reported unit cost rate when the error is systematic and large (for example a common error is entering data in the wrong unit, such as using yards *versus* miles); this is a material source of inaccuracy to the unit cost rates some but not all of which is eliminated manually in the data reporting process.
- 9.1.20 The data for Period 13 was not available for audit.
- 9.1.21 There are known sources of material error in the reporting of volumes from insufficient standardisation of the output definition. For example, when two discrete rail defects are removed from one rail near to each other in one shift, these should be identified either as count data (two defects removed) or a standardised length of defect used to denote a discrete defect (e.g. discrete defects are always valued at 1 yard) – this should not be recorded as the length of track between the two defects as is known to occur presently.
- 9.1.22 **Unit Cost Rates and Efficiency Calculations.** As expected, the data from the Maintenance Areas showed a wide distribution; as the maintenance unit costs reporting process has not yet reached maturity the most likely and overriding cause of the wide distribution is data quality. This is further discussed in paragraph 9.1.26 below.
- 9.1.23 For the nine maintenance unit cost rates presented in the Annual Return, Figure 9.1.2 shows 7 of 162 data points (4.9%) were estimated by calculation and 13 of 162 data points (9%) were eliminated as outliers; 91% remained in the dataset.
- 9.1.24 For the nine maintenance unit cost rates presented in the Annual Return, Figure 9.1.3 shows the extent of variation in the datasets for maintenance unit cost rates and the resulting efficiency calculations. For the maintenance unit cost rates, 91% of the data points are within $\pm 50\%$ of the national average (after outliers are removed). For the resulting efficiency calculations, 94% of the data points are within $\pm 50\%$ of the national average (after outliers are removed).

Maintenance Activities (Population = 16 Maintenance Areas)	Errors replaced	Outliers Eliminated	Areas in final dataset
Rail Changing	0	2	14
Re-Sleepering	0	2	14
S&C Unit Renewal	1	0	16
Replacement of S&C Bearers	0	1	15
Visual Inspection (Patrolling)	1	3	13
Manual Correction of PL Track Geometry	2	0	16
Point End Routine Maintenance	0	1	15
Signals Routine Maintenance	2	3	13
Track Circuits Routine Maintenance	1	1	15
Total as percentage of data points	4.9%	9%	91%

Figure 9.1.2 Manual intervention in the reported data for Maintenance Unit Costs

Maintenance Activities (Population = 16 Maintenance Areas)	Range as % of average for Unit Cost Rates			Range as % of average for Efficiency Values		
	Within ±25%	Within ±35%	Within ±50%	Within ±25%	Within ±35%	Within ±50%
Rail Changing	10	12	14	8	9	13
Re-Sleepering	9	10	11	5	12	14
S&C Unit Renewal	10	12	14	9	11	13
Replacement of S&C Bearers	10	11	11	13	14	15
Visual Inspection (Patrolling)	9	11	12	10	13	13
Manual Correction of PL Track Geometry	10	12	14	11	11	14
Point End Routine Maintenance	12	13	15	12	12	14
Signals Routine Maintenance	13	13	13	11	13	13
Track Circuits Routine Maintenance	14	15	15	12	14	14
Percentage of data points (no outliers)	74%	83%	91%	69%	83%	94%
Percentage of data points (all 16 Areas)	67%	76%	83%	63%	76%	85%

Figure 9.1.3 Variation of the data reported for Maintenance Unit Cost Rates and Efficiency

- 9.1.25 For the nine maintenance unit cost rates which are collected but were not reported in the Annual Return, the percentage of manual interventions necessary would have been significantly higher.
- 9.1.26 Further to our last two audits on maintenance unit costs⁴, we remain of the opinion that whilst the definition of the MUCs is reasonably clear, in terms of reportable costs and reportable maintenance outputs ('Ellipse Level 3 Items'), the definitions and measurement methods for the output volumes are open to local interpretation. Now that the mechanics of collecting and reporting data from the maintenance teams are in place, Network Rail should consider:
- Further describing the reportable maintenance outputs and the definitions of the output volumes; this should be documented in Company Specification FRM702 *Reporting of Maintenance Unit Costs*; more precise specification of the outputs and their volumes would enable Network Rail to better communicate its requirements to its maintenance teams, so improving the quality of the maintenance unit cost data;
 - Describing the method by which a reportable maintenance output is measured for a reportable maintenance output (i.e. for each maintenance unit cost) and training maintenance teams in these methods; this would improve the quality of data capture.
- 9.1.27 Though not essential for the proper functioning of an output-based maintenance unit cost regime, the work method and resourcing assumptions (inputs) are not currently specified. This is relevant as there are a number of different work methods which can be used to deliver a reportable maintenance output, with local variations apparent in both method and resourcing – as the work inputs are not undertaken or recorded in a standardised manner, Network Rail is not always able to explain the variations in output volumes and costs experienced, even though these variations may be correct. Network Rail should consider further describing the inputs necessary to deliver each of the reportable maintenance outputs by specifying the work method and number/ type of resources expected to be deployed to undertake it. This might be achieved by providing further detail in the maintenance and testing handbooks or separate detailed method statements. More precise specification would enable Network Rail to monitor maintenance team productivity and the impact of work-mix (the different proportions of work methods chosen to deliver the maintenance output) on each maintenance unit cost.

⁴ Paragraph 5.5.1(a) in *Independent Reporter: Audit of Network Rail's Roll-out of Cost Analysis Frameworks and Maintenance Unit Cost Measures*, Halcrow, January 2006 and paragraph 5.5.10 in *Independent Reporter: Preliminary Data on Efficiency 2006/07*, Halcrow, June 2007.

- 9.1.28 Further to our last two audits on maintenance unit costs⁵, we remain of the opinion that a systematic approach is required to eliminate data entry errors, such as automated error-checking in Ellipse to eliminate entry of zero value or very low 'dummy' values (e.g. 1 minute in an 'hours worked' data field);

Assessment of confidence grade

- 9.1.29 **Reliability grade.** The processes used to source the data for this measure are documented at a high level, frequently used and subject to a number of layers of internal check and review; the financial data is subject to external audit by others. However, the data quality processes are disjointed and there are known problems with the initial capture of work volumes. There is also use of extrapolation at Area and Territory levels where the volume data is assessed as anomalous; this assessment process is not documented and involves judgement not calculation. We believe the maintenance unit cost data should have a reliability band of C.
- 9.1.30 **Accuracy grade.** The variation in the dataset appears quite large. At Maintenance Area level – which is an intermediate level of aggregation and therefore is already subject to averaging of extreme variation – there is still 9.2% of MUC data and 6.1% of the Efficiency data at Area level more than $\pm 50\%$ from the mean. Statistical analysis of the dataset is required to attribute this variation to collection error or to genuine differences in the underlying unit rates; however, given the known issues with the underlying data collection process, it is likely the larger portion of this variation is from process error not underlying differences in unit costs. We believe the maintenance unit cost data should have an accuracy band of 5.

Audit Statement

- 9.1.31 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for maintenance unit cost indices. We believe the maintenance unit cost data should have an accuracy band of C5.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 9.1.32 **MUC recommendation 1.** We recommend that responsibilities and accountabilities for the quality of data in Ellipse is reviewed, allocated and documented. This review should include *inter alia* the roles of recording data, approving data, inputting data, checking data, authorising data, reporting data, auditing data, improving data quality at Work Gang, Delivery Unit, Area, Territory and National levels.
- 9.1.33 **MUC recommendation 2.** We recommend that (i) the data quality levels required in Ellipse are identified (and set as targets) in order to optimise the usefulness of the data and the level of resources required to maintain a given level of data quality; (ii) Ellipse data quality reports monitor the level of achievement against these targets; and (iii) MBR packs report the level of achievement against these targets so that those responsible can be held to account by management.
- 9.1.34 **MUC recommendation 3.** We recommend that the work activities (inputs and outputs) and reporting activities should be described in sufficient detail to reduce the opportunity for local interpretation; this would most likely take the form of formal documentation, communication materials and staff training.

⁵ Paragraph 5.5.1(a) in *Independent Reporter: Audit of Network Rail's Roll-out of Cost Analysis Frameworks and Maintenance Unit Cost Measures*, Halcrow, January 2006 and paragraph 5.5.10 in *Independent Reporter: Preliminary Data on Efficiency 2006/07*, Halcrow, June 2007.

Observations relating to spreading of best practice and/or improvements to process

- 9.1.35 **MUC observation 1.** The method for processing the maintenance unit cost and efficiency data before reporting, including the decision criteria for replacing collected data with estimated data, should be reviewed and subsequently formalised in documentation.
- 9.1.36 **MUC observation 2.** The in-year reporting of data using the MBR process would be improved by using a 'rolling-year' rather than a 'year-to-date' calculation; this would encourage better data quality as comparable results (between Delivery Units and time trends) would be available 13 periods-a-year rather than once-a-year as at present.
- 9.1.37 **MUC observation 3.** A systematic approach is required to eliminate data entry errors, such as automated error-checking (such as input masks) in Ellipse to eliminate entry of zero value or very low 'dummy' values (e.g. 1 minute in an 'hours worked' data field).

9.2 Renewals Efficiency

9.2A Introduction

- 9.2.1 There is currently no single way of assessing Network Rail's performance in delivering renewals efficiency against the regulatory target as:
- (a) Access Charges Review 2003 set annual renewals efficiency targets for unit costs but did not set baseline volumes or baseline unit costs;
 - (b) The few unit cost measures with reliable datasets including 2003/04 (which could be used as a benchmark against which to assess Network Rail's performance against the regulatory target) cover an insufficient proportion of the total renewals expenditure.
- 9.2.2 Network Rail's renewals efficiency is therefore assessed using a combination of unit cost indices (mostly with benchmarks more recent than 2003/04) and budget variance analysis:
- (a) Unit costs represent a partial but 'pure' measure of efficiency, by comparing the cost of similar work activities between years; however, this does not take into account volume efficiencies (by eliminating/reducing the amount of work that needs to be undertaken in a given year while maintaining network outputs without compromising network sustainability) or other activity efficiencies (such as by employing different methods/ solutions to deliver similar network outputs for different costs without compromising network sustainability);
 - (b) Budget variance analysis represents the difference between budgets and actual expenditure within each year; for each project this difference is categorised according to the type of efficiency (or inefficiency) which has delivered the variance.
- 9.2.3 Network Rail has implemented a renewals unit cost measurement system – the Cost Analysis Framework (CAF) – for forty-three different repeatable work items covering 39.6% of non-WCRM renewals spend. Data for seventeen repeatable work items (RWI) has been presented in Annual Return 2007, comprising nine for structures, five for signalling, two for track and one for telecoms. We have used track and structures as our audit sample this year. The other twenty-six RWIs have not been presented in Annual Return 2007 as insufficient projects have undertaken these types of work in the 2006/07 year to provide a representative unit cost.
- 9.2.4 The remainder of this section is split into the following four parts:
- (a) Renewals Unit Costs – Track;
 - (b) Renewals Unit Costs – Structures;
 - (c) Renewals Budget Variance;
 - (d) Comparison of results with regulatory targets.
- 9.2.5 Throughout this section, efficiencies are shown as positive values and inefficiencies are shown as negative values.

9.2B Renewals Unit Costs – Track

Audit scope

- 9.2.6 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Renewals Efficiency, including Tables 176-178.
- 9.2.7 For track renewals unit costs, this measure reports:
- Unit costs and unit cost indices for plain line track, switch & crossings track and total track, which are derived by aggregating separate unit costs and unit cost indices for twenty different work activities; each index is the change in unit cost weighted by the volume of each activity in 2006/07; the indices are based on 2003/04 costs = 100;
 - Composite unit cost rates for renewals of plain line track (£/metre) and switch & crossings (£k/ equivalent unit) using weightings to reduce the impact of the mix of activities in the 2006/07 workbank; the rates are compared with 2003/04 cost benchmarks in 2003/04 prices;
 - Percentage efficiency savings based on these measures, which can be compared with the regulatory targets for efficiency.
- 9.2.8 The source data for this measure is Network Rail's:
- Internal Monthly Business Review processes; and
 - Financial reporting processes for the statutory accounts and regulatory accounts which are subject to external audit by others.
- 9.2.9 The audit was undertaken at Headquarters, comprising the Estimating team and Track Renewal Programme team and Head of Investment Efficiency.

Commentary on reported data

Regulatory target

- 9.2.10 The regulatory target for 2006/07 track renewals efficiency savings is 8% per annum (22% cumulative) for the first three years of the Control Period. So that our assessment of efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported in subsection 9.2E below.

Trend – unit cost indices

- 9.2.11 83.4% of track renewals expenditure has been reported as unit costs. Figure 9.2.1 and Figure 9.2.2 show plain line renewals efficiencies (13.5% annual, 17.2% cumulative for CP3) are driving the significant improvement in total track renewals efficiency shown this year (9.8% annual, 15.4% cumulative for CP3); the S&C renewals unit cost efficiency value shows a small reduction year-on-year (-1.4% annual, 10.2% cumulative for CP3).
- 9.2.12 The significant contributors to track renewals efficiencies in 2006/07 were:
- Full track renewal activity (re-rail, re-sleeper, re-ballast) using automatic ballast cleaners (ABC) which delivered 39.6% of total efficiencies;
 - ABC re-ballasting which delivered 29.6% of total efficiencies; and
 - S&C full renewals which delivered 16.0% of total efficiencies.

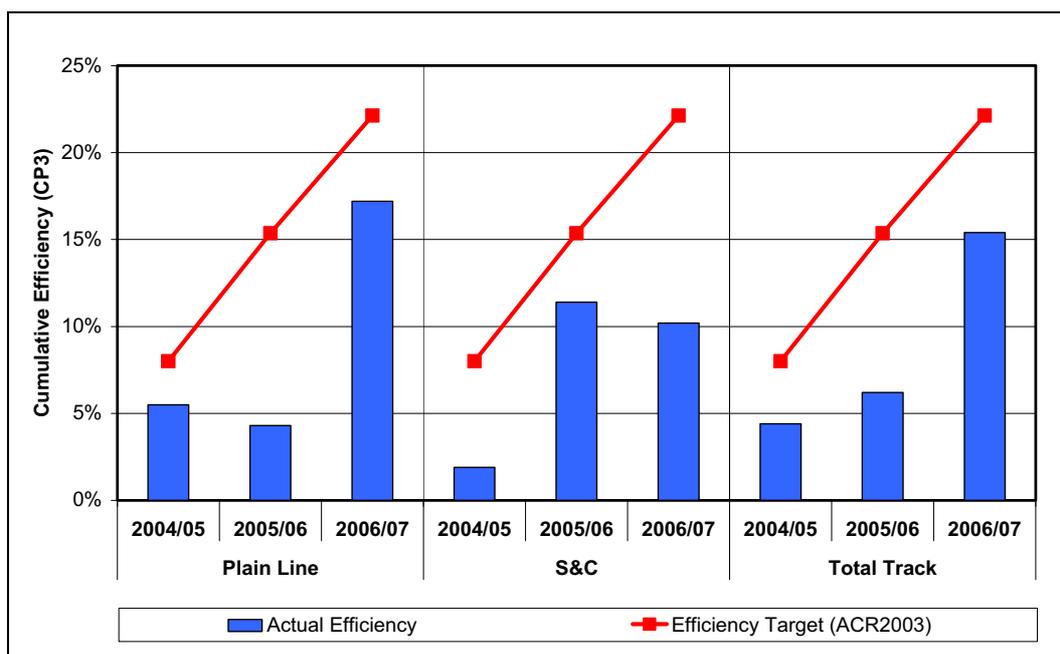


Figure 9.2.1 Efficiencies for Track Renewals (03/04 baseline)

Index (2003/04 = 100)	2004/05	2005/06	2006/07	Efficiency from 05/06	Efficiency from 03/04
Track – plain line	94.5	95.7	82.8	13.5%	17.2%
Track – S&C	98.1	88.6	89.8	-1.4%	10.2%
Track – total	95.6	93.8	84.6	9.8%	15.4%

Figure 9.2.2 Unit cost indices & Efficiencies for Track Renewals

Trend – composite rates

9.2.13 The composite rates are calculated by weighting the constituent work activities (e.g. full renewal of S&C = 1, partial S&C renewal = 1/3) and by using the full track renewals spend, including central overheads such as National Delivery Service. This means that:

- (a) The composite rates reflect work-mix efficiencies as well as unit cost efficiencies;
- (b) The assessment of overall efficiency for track renewals is more complete.

9.2.14 Comparing the unit cost data (Figure 9.2.2) and composite rates data (Figure 9.2.3) for efficiencies generated since 2003/04 suggests work-mix and £110m spend on non-volume activity (including drainage, spot re-sleeping, depots and slab track in tunnels) has had a negative impact upon efficiency for plain line but a positive effect on S&C.

Composite renewal rates at 03/04 prices	2003/04	2004/05	2005/06	2006/07	Efficiency from 05/06	Efficiency from 03/04
Plain line track (£k/ metre)	250	230	229	230	0.6%	9.2%
Switch & Crossing (£k/ equivalent unit)	543	486	432	439	-1.5%	19.2%

Figure 9.2.3 Composite Rates & Efficiencies for Track Renewals

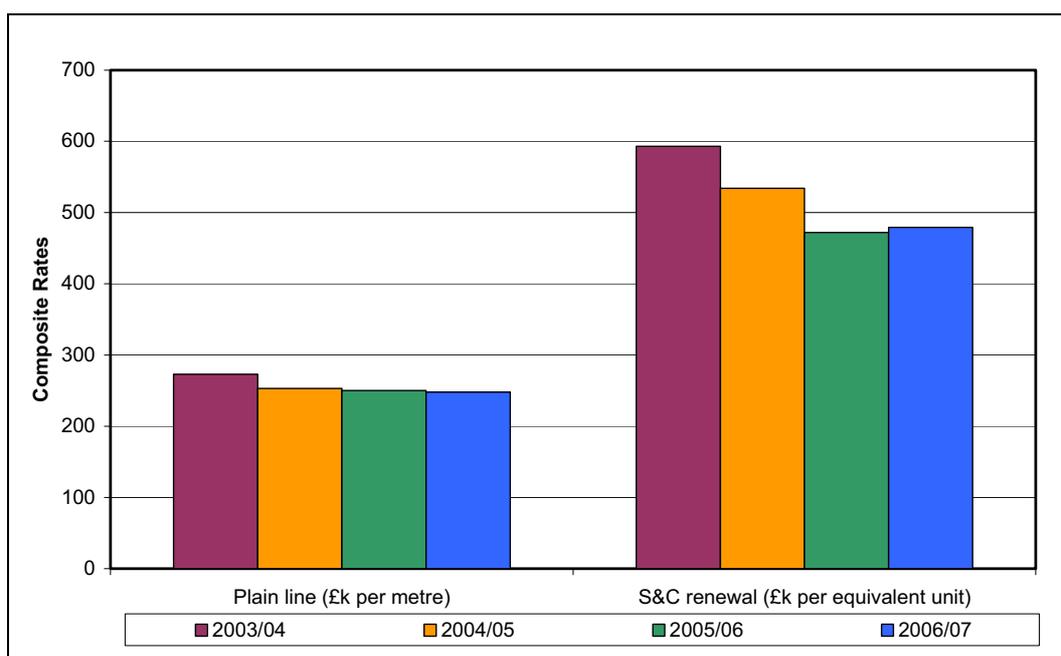


Figure 9.2.4 Composite Rates for Track Renewals (03/04 prices)

Audit findings

Process

- 9.2.15 The renewals unit costs and composite rates for track are reported through the MBR process. This data is collected and monitored by Territory Track Renewals Programme teams and used on a 4-weekly basis by management for monitoring the business, including controlling change and incentivising efficiency. The data is consolidated on a national basis by the national Track Renewals Programme team and monitored by Director Track Renewals (MP&I) and Head of Track (Engineering). Changes to the agreed business plan are jointly authorised at a delegated level within the national Track Renewals Programme team (MP&I) and Head of Track's team (Engineering). Actuals, and any variances to the business plan, are monitored, explained and reported through the MBR process.
- 9.2.16 A process audit was undertaken; no anomalies or inconsistencies were found which would materially impact the unit cost data.

Data accuracy

- 9.2.17 A desk audit was undertaken comprising the investment authorisation papers, business plan, MBR packs, change control logs and a sample of change control forms; no anomalies or inconsistencies were found which would materially impact the unit cost data.
- 9.2.18 The financial data is not solely based on final accounts for each track renewals project; final accounts take 12-16 weeks, so those projects reporting completion for unit costs and composite rates in the final quarter may be subject to approximately $\pm 5\%$ variation.
- 9.2.19 The volume data are reported when work is substantively complete, i.e. before snagging and handback is completed; this is a timing difference and unlikely to change the renewed volume. Contractors are incentivised to complete snagging by retention of payment; the management MBR report has a separate metric on handbacks.

Assessment of confidence grade

- 9.2.20 **Reliability grade.** The processes used to source the data for this measure are documented, frequently used and subject to a number of layers of internal check and review and to external audit by others. The work-mix impacts the reliability of the efficiency results for the unit costs. We believe the unit cost indices and composite rates should have a reliability grade of B.
- 9.2.21 **Accuracy grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review and to external audit by others. The financial data is not solely based on final accounts, which may mean the reported data is subject to some inaccuracy. We therefore believe the unit cost indices and composite rates should have an accuracy grade of 2.

Audit Statement

- 9.2.22 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for track unit cost indices and composite rates. The data has been assessed as having a confidence grade of B2.
- 9.2.23 So that our assessment of renewals efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported separately below.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 9.2.24 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 9.2.25 We have no observations for this measure.

9.2C Renewals Unit Costs – Structures

Audit scope

- 9.2.26 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Renewals Efficiency, including Tables 176-177.
- 9.2.27 For structures renewals unit costs, this measure reports:
- Unit costs and unit cost indices for nine structures renewals activities ('repeatable work items; RWI) and for total structures renewals; the indices are based on 2003/04 costs = 100;
 - The percentage efficiency savings based on these measures, which can be compared with the regulatory targets for efficiency.
- 9.2.28 The source data for this measure is Network Rail's:
- Internal Monthly Business Review processes; and
 - Financial reporting processes for the statutory accounts and regulatory accounts which are subject to external audit by others.
- 9.2.29 The audit was undertaken at Headquarters, comprising the Estimating team and Civils Renewals Programme team and Head of Investment Efficiency.

Commentary on reported data

Regulatory target

- 9.2.30 The regulatory target for 2006/07 structures renewals efficiency savings is 8% per annum (22% cumulative) for the first three years of the Control Period. So that our assessment of efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported in subsection 9.2E below.

Trend

- 9.2.31 39.9% of structures renewals expenditure has been reported as unit costs. Relatively low levels of efficiencies have been achieved this year (2.3% annual); the cumulative level of efficiency for CP3 is much stronger at 25.3%.

2003/04 benchmark	2003/04	2004/05	2005/06	2006/07	Efficiency from 05/06	Efficiency from 03/04
Structures Cost Index	100	85.0	77.0	74.7	2.9%	9.2%

Figure 9.2.5 Composite Rates & Efficiencies for Track Renewals

- 9.2.32 Network Rail has suggested that the relatively low level of efficiencies achieved this year is due to construction price inflation; inflation figures in the Annual Return are quoted correctly. Cost and tender price indices such as those provided by the Royal Institution of Chartered Surveyors (Building Cost Information Service), reports in trade journals, and our own company experience would suggest that this is indeed likely to have been a significant factor.

Audit findings

Process

- 9.2.33 The renewals unit costs and composite rates for civils are reported through the MBR process. This data is collected and monitored by Territory Civils Renewals Programme teams and used on a 4-weekly basis by management for monitoring the business, including controlling change and incentivising efficiency. The data is consolidated on a national basis by the national Civils Renewal Programme team and monitored by Director Civils Renewal (MP&I) and Head of Civil Engineering (Engineering). Changes to the agreed business plan are approved at Territory Change Panels (where both MP&I and Engineering are represented) and subsequently Authorised at Asset Change Panels (where both MP&I and Engineering are represented). Actuals, and any variances to the business plan, are monitored, explained and reported through the MBR process.
- 9.2.34 For projects which undertake work falling within the definitions of the Civils CAF repeatable work items, reports documenting key details of the work are produced using standard formats by members of project team. The HQ Senior Cost Analyst reviews these 'project profile reports' and either accepts the work meets the repeatable work item definition, rejects it or returns the report for correction/further data as appropriate. The decision criteria are documented; all versions of the reports (original, processed, accepted, rejected) are archived for audit purposes. Where a profile is rejected the reason is recorded. Data from accepted reports are entered into RIB (a database) from which the data is subsequently reported.
- 9.2.35 A process audit was undertaken; no anomalies or inconsistencies were found which would materially impact the unit cost data.

Data accuracy

- 9.2.36 A desk audit was undertaken comprising the investment authorisation papers, business plan, MBR packs, change control logs and a sample of change control forms; no anomalies or inconsistencies were found which would materially impact the unit cost data.
- 9.2.37 Eleven projects, representing some £32m (8.7%) of renewals spend have been excluded from the dataset reported in the Annual Return. We have assessed the reasons for their exclusion and concur with Network Rail's explanation at audit: in all cases the projects were excluded as the work was of an unusual or unique nature that militated against their inclusion in the dataset for assessing unit costs due to either:
- (a) The size or complexity of the job or the technical solution utilised;
 - (b) Access costs due to physical location or traffics on the line;
 - (c) The works having emergency status, which impacts contractor costs.
- 9.2.38 In order to increase data accuracy, the CAF unit costs are solely based on final accounts. As final accounts take 12-16 weeks, this means some projects completed in the last few periods of each year will be reported in the next year. This has a positive and not a detrimental effect on the reported data.

Assessment of confidence grade

- 9.2.39 **Reliability grade.** The processes used to source the data for this measure are documented, frequently used and subject to a number of layers of internal check and review and to external audit by others. The work-mix and solutions type impact the reliability of the efficiency results for the unit costs. We believe the unit cost indices and composite rates should have a reliability grade of B.
- 9.2.40 **Accuracy grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review and to external audit by others. The financial data is based on final accounts. We therefore believe the unit cost indices and composite rates should have an accuracy grade of 2.

Audit Statement

- 9.2.41 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for structures unit cost indices. The data has been assessed as having a confidence grade of B2.
- 9.2.42 So that our assessment of renewals efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported separately below.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 9.2.43 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 9.2.44 We have no observations for this measure.

9.2D Budget Variance Analysis

Audit scope

- 9.2.45 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Budget Variance Analysis, including Table 175.
- 9.2.46 This measure reports the variance between budget and actual expenditure for renewals in order to assess the likely volume of efficiency savings to supplement the unit cost information. The data comprises:
- The financial value of budget and actuals for renewals spend;
 - The financial value of eight variance categories for renewals spend in terms of scope changes, activity efficiencies, rescheduled activities;
 - The efficiency savings (incorporating budgeted and additional activity efficiencies) as a percentage of the pre-efficiency budget for each core renewals category.
- 9.2.47 The documentation for this measure (*Investment Budget Variance Reporting Guidelines*, version 1.7, Network Rail, 17 August 2006) sets out the process, requirements and definitions for its collection.
- 9.2.48 We shadowed Network Rail's internal audits of variance analysis in the twelve investment programme teams, undertaking our audit on a sample basis, by participating directly in the following audit meetings:
- MP&I Telecoms programme team;
 - MP&I Civils programme team;
 - MP&I Estates programme team;
 - MP&I Signalling (North) programme team;
- 9.2.49 We sampled the documentation for a number of the other internal audits.

Commentary on reported data

Regulatory target

- 9.2.50 The regulatory target for 2006/07 track renewals efficiency savings is 8% per annum (22% cumulative) for the first three years of the Control Period. So that our assessment of efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported in subsection 9.2E below.

Trend

- 9.2.51 The total renewals budget shows a 23.0% level of efficiency, comprising strong performances in all asset classes except track which achieved 13.9% efficiency. Figure 9.2.6 shows the efficiency savings made in CP3 which are better than the assumptions made in ACR2003.

Category	2004/05	2005/06	2006/07
Track (incl High Output & Modular S&C)	6%	9.6%	13.9%
Signalling	14%	29.7%	25.8%
Structures	12%	26.6%	26.6%
Electrification, Plant & Machinery	7%	37.7%	33.7%
Telecoms	12%	17.8%	32.5%
Estates	8%	24.1%	35.5%
Core Renewals (excl WCRM)	9%	18.1%	23.0%

Figure 9.2.6 Core renewals efficiency savings (03/04 baseline)

Audit findings

Process

- 9.2.52 The twelve teams delivering renewals spend are the six Major Projects & Investment (MP&I) teams responsible for core renewals, plus Engineering, Information Management (IM), MP&I Enhancements, Southern New Trains Programme/ Thameslink (SNTP/TLP), West Coast Route Modernisation (WCRM), GSM-R/ FTN.
- 9.2.53 The financial variances for each project are reported each period in the Monthly Business Review (MBR) pack using the following categories:
- Previous years unbudgeted rollover;
 - Scope changes;
 - Work brought forward, funded later in Control Period (CP);
 - Activity efficiency;
 - Planned slippage to maximise efficiency;
 - Slippage due to a third party, such as train operators and local authorities;
 - Unplanned slippage.
- 9.2.54 Network Rail's primary management information system for project financial control is Oracle Projects (OP). OP shows current budgets subjected to change control rather than year-commencing budgets; in order to monitor variances compared with original budget, the reporting of variances is collected in two parts:
- Banked variances** between the year-commencing budget and the current project budget; these variances are likely to arise from scope changes, substitutions between projects and efficiencies delivered to date.
 - Forecast variances** between the full-year forecast and current project budget. These will include efficiencies delivered during the current phase of the project, such as slippage and below-estimate procurement costs.
- 9.2.55 In 2005/06 the headquarters internal audit team identified in advance to the programme teams the evidence required to be presented at audit; the details are shown in Figure 9.2.7.

Variance category	Criteria	Evidence required
Previous years unbudgeted rollover	Evidence projects were live in 2004/5 and the reported rollover is the delta between actual cost and original budget	OP or Budget spreadsheet
Scope changes	Authorised at Renewals Investment Panel (RIP) or equivalent (not projects where funding brought forward from later in CP, not reductions where volume has slipped later into CP)	RIP minute or Authorised Change Request forms
Work brought forward, funded later in CP	Evidence that works were funded later in CP in 2005/06 Business Plan, and supporting RIP paper	RIP minute or Authorised Change Request forms
Activity efficiency	Credible commentary of source of efficiency to be supplied in MBR report on project by project basis	Efficiency log or sufficient commentary to explain principal sources
Planned slippage to maximise efficiency	Must relate to conscious decisions to re-plan, agreed at MBR/ RIP or equivalent senior level forum	MBR minute or investment authority paper/ minute or equivalent
Slippage due to third party	Must be explicitly driven by instruction from third party	Third party correspondence or meeting minute
Unplanned slippage	All other causes; should correlate with roll-over provisions declared in business plan for 2006/07 or later	Provision in next year's business plan

Figure 9.2.7 Evidence for correct variance attribution

- 9.2.56 This year the audits were undertaken by the individual programme teams' financial controllers which meant the audit techniques varied. However, all the audits we shadowed requested evidence and were able to review authorised change request forms/logs, approved investment authority papers, third party correspondence, explanations of principal sources of activity efficiencies and provisions in the 2007/08 business plan. Where this evidence was not available in the meeting it was requested; formal minutes were produced. In all of our sample audits, we found Network Rail's change control processes and the ability to evidence variances were much improved on last year.
- 9.2.57 Fourteen of the sixteen recommendations from 2005/06 have been closed-out; one is on-going and the other is being considered for roll-out in 2007/08.

Data accuracy

- 9.2.58 The quality of the variance attribution and the evidence available at the audits were significantly higher than in 2005/06. However, there was evidence of systematic misallocation of Planned Slippage, Unplanned Slippage and Work Brought Forward to Scope Change; this was due to delivery teams incorrectly categorising any change to their in-year scope (due to slippage) as Scope Change. This situation was identified by Network Rail in advance of the audits and instructions were issued to ensure that re-attribution occurred as appropriate.
- 9.2.59 The Civils Programme team has developed table showing how change drivers (in 'delivery-speak') are translated into variance categories (in 'regulatory-speak'); this best practice was drawn to the attention of Headquarters for possible dissemination to aid variance attribution in future years.

Assessment of confidence grade

- 9.2.60 **Reliability grade.** The procedure for this measure is documented. However, there was evidence of the categorisation process not being followed correctly. We believe the financial efficiency variance analysis should have a reliability grade of B.
- 9.2.61 **Accuracy grade.** There was evidence of systematic errors leading to over-attribution to Scope Change. The internal audit by Network Rail led to re-attribution of some variances; as this process was undertaken post-audit using limited information it is possible that not all cases have been correctly identified. We believe the financial efficiency variance analysis should have an accuracy grade of 2.

Audit Statement

- 9.2.62 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for variance analysis of the renewals budget. We believe the maintenance unit cost data should have an accuracy band of B2.
- 9.2.63 So that our assessment of renewals efficiency can use both unit costs and variance of outturn against budget, Network Rail's performance in comparison with the regulatory target is reported separately below.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 9.2.64 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

- 9.2.65 **Renewals Budget Variance Analysis observation 1.** We observe that the process was well-managed this year but that some confusion remained regarding the definition of some of the variance categories, primarily arising from the differences in use of terminology between delivery teams and finance/ regulatory teams. Network Rail should (and undoubtedly are already planning to) take steps to improve this understanding, including production of documentation, communication materials and training.

9.2E Comparison of results with regulatory targets

Introduction

9.2.66 Due to the nature of the targets set in Access Charges 2003, Network Rail's renewals efficiency is assessed using a combination of unit cost indices (mostly with benchmarks more recent than 2003/04) and budget variance analysis. This section assesses Network Rail's performance against the regulatory targets for renewals efficiency.

Regulatory target

9.2.67 The regulatory target for 2006/07 track renewals efficiency savings is 8% per annum (22% cumulative) for the first three years of the Control Period.

9.2.68 Figure 9.2.8 compares performance using the unit cost indices and the budget variance analysis. These have been subject to sample audit in subsections 9.2B, C & D above.

Asset	Cumulative Efficiency for CP3			Performance against target
	Budget Variance	Unit Cost	Composite Rate	
Track	13.9%	15.4%	-1.5%	Not met
Signalling	25.8%	37.5%	n/a	Met
Structures	26.6%	25.3%	n/a	Met
Electrification, Plant & Machinery	33.7%	n/a	n/a	Met
Telecoms	32.5%	14.6%	n/a	Met (small dataset for unit costs)
Estates	35.5%	n/a	n/a	Met
Total	23%	25.3%	n/a	Met

Figure 9.2.8 Core renewals efficiency savings (03/04 baseline)

Audit Statement

9.2.69 Using a combination of the unit cost and renewals budget variance data to assess Network Rail's performance, the regulatory target for renewals efficiency has been met.

9.3 Route Expenditure

Audit scope

- 9.3.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Expenditure, including Tables 140-168.
- 9.3.2 This measure reports the levels of expenditure for renewals and enhancements in comparison with the amounts forecast in Network Rail's Business Plan. The renewals and enhancement spends are disaggregated by asset category and by strategic route.
- 9.3.3 There is no specific definition or procedure for this measure.
- 9.3.4 The audit was undertaken at Network Rail Headquarters.

Commentary on reported data

Regulatory targets

- 9.3.5 There is no regulatory target for this measure.

Trend

- 9.3.6 Renewals expenditure including WCRM is £2,777.3m compared with a Business Plan forecast of £2,824.8m; this is a -1.7% variance. Enhancements expenditure including WCRM is £568.8m compared with a Business Plan forecast of £741.7m; this is a -26.9% variance; this shortfall comprised a number of small variances rather than one large item.
- 9.3.7 Figure 9.3.1 and Figure 9.3.2 show the Routes with variances between the actual expenditure and business plan forecast of expenditure which are larger than 1% of the total network expenditure.

Route	Variance (£m)	Variance (%)
Route 18	+12.2	704%
Route 17	-8.2	-35%
Route 3	-8.4	-57%
Route 8	-25.2	-71%
WCRM	-26.7	-16%
Other	-98.8	-42%

Figure 9.3.1 Material Variance of Actuals and Business Plan Forecast for Enhancements⁶

Route	Variance (£m)	Variance (%)
Route 13	37.3	22%
WCRM	-124.3	-26%

Figure 9.3.2 Material Variance of Actuals and Business Plan Forecast for Renewals⁷

- 9.3.8 The overall level of (net or gross) variance between actuals and forecast is not materially different from previous years.
- 9.3.9 Figure 9.3.3 and Figure 9.3.4 show the extent of variation between Actuals and Business Plan Forecast for enhancement and renewals expenditures respectively. This demonstrates the extent to which the workbank specified in Network Rail's published Business Plan is not subsequently delivered as planned.

⁶ Total enhancement business plan forecast is £741.7m; materiality for the table is ±£7.4m.

⁷ Total enhancement business plan forecast is £2824.8m; materiality for the table is ±£28.2m.

9.3.10 It should be noted that, in some cases, actual expenditure on a Route where little spend was forecast creates a large percentage positive variation.

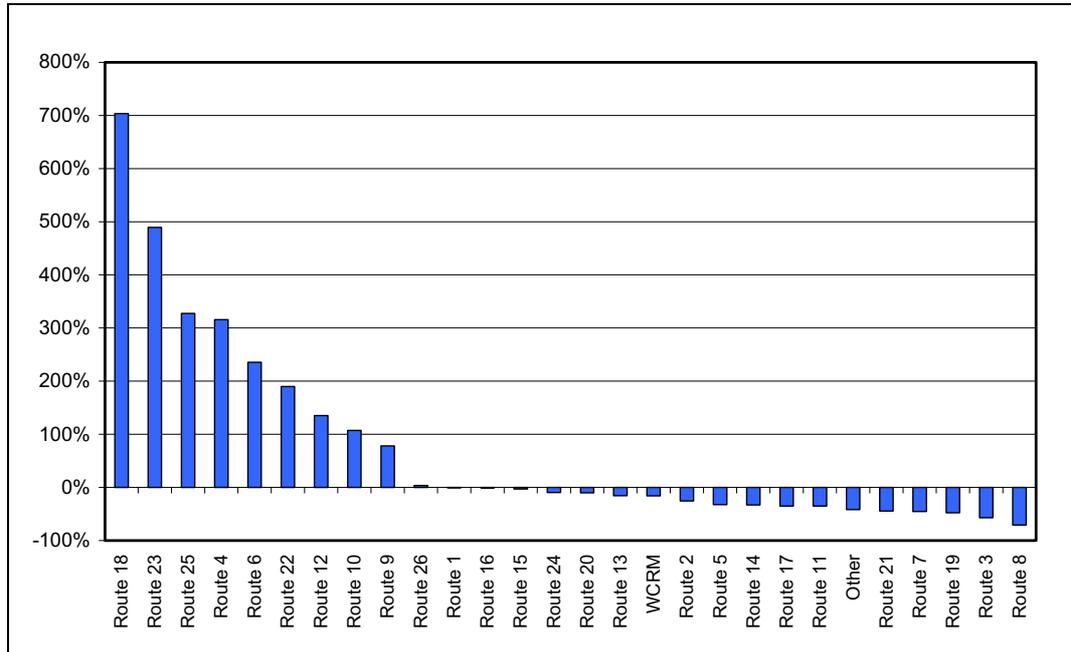


Figure 9.3.3 Variance between Actuals and Business Plan Forecast for Enhancements

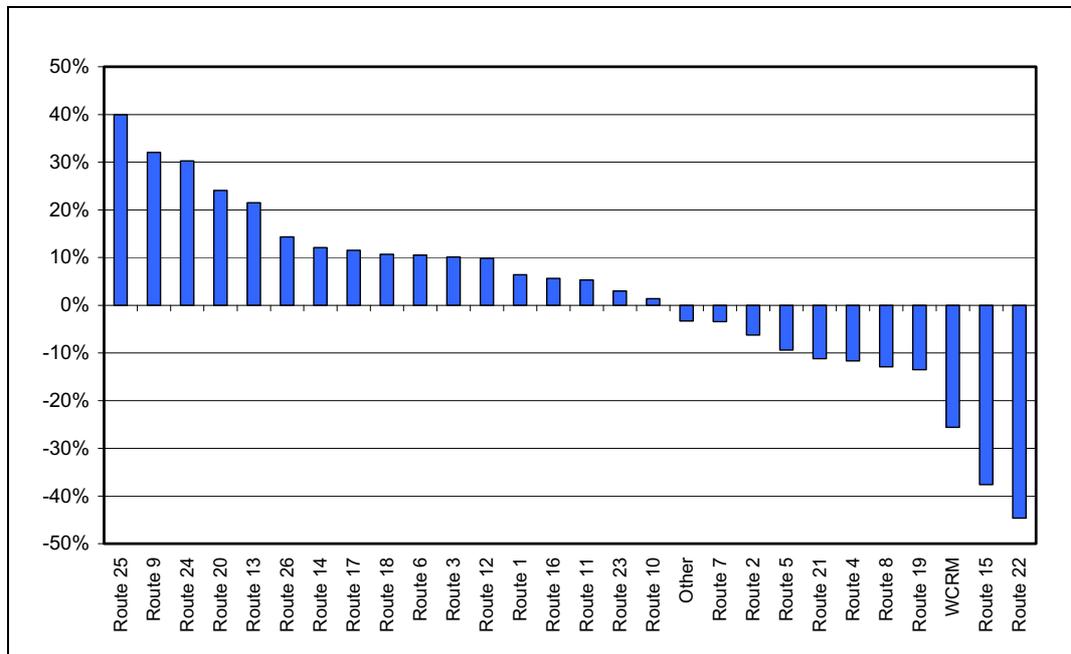


Figure 9.3.4 Variance between Actuals and Business Plan Forecast for Renewals

Audit Findings

Process

- 9.3.11 The actual expenditure data for this measure is collected and reported for the MBR (Monthly Business Review) process under the management of the Financial Controllers for each of the renewals and enhancement programmes; some of this data is also used for the Renewals Budget Variance measure (see section 9.2D).
- 9.3.12 Where a project's spend does not fall entirely within a single Route, the Financial Controllers are also responsible for the disaggregation of data in consultation with the programme team as appropriate.
- 9.3.13 The Business Plan forecast data for this measure is taken from Network Rail's Business Plan; however:
- (a) Annual Return 2007 reports WCRM separately from the 26 strategic routes, whereas the Business Plan 2006 includes the WCRM expenditure in the figures for strategic routes 17, 18, 20, 22, 24 and 26;
 - (b) The enhancement forecasts in the Business Plan 2006 includes local authority and TENs funding, whereas the Annual Return 2007 figures do not include these external sources of funds;

Data accuracy

- 9.3.14 The expenditure data is audited as part of the Regulatory Financial Statement by the Regulatory Auditor. We have therefore sought to understand:
- (a) The differences (if any) between the Business Plan, Regulatory Financial Statement and Annual Return;
 - (b) The attribution of expenditure to each strategic route (on a sample basis).
- 9.3.15 Due to the differences in accounting treatments between the Regulatory Financial Statements and the Statutory Accounts on which the Annual Return figures are based, Network Rail has advised us that there are a number of differences which are identified in Appendices B and E of the Regulatory Financial Statement:
- (a) £13m spend associated with feeder stations for the West Coast Main Line traction power supply is treated as opex in the Regulatory Financial Statement and WCRM renewals in the Annual Return;
 - (b) £179m of enhancements which are excluded from the Regulatory Financial Statement but included in the Annual Return (£144m Third Party Funded Enhancements, £20m Outperformance Fund and £17m Other Enhancements).
- 9.3.16 Network Rail has also advised us that a £3.8m adjustment is required to the Electrification renewals figures in Table 157 (Route 18 Expenditure), Table 168 (WCRM Expenditure) and Table 13 (Network Expenditure). The £3.8m has deliberately been shown as non-WCRM Renewals in the Annual Return in order to be consistent with the published Regulatory Financial Statement; however, the renewals spend was incurred by the Maintenance team on behalf of WCRM using WCRM budget and therefore should have been treated as WCRM renewals spend. This represents a 0.1% error on the total network renewals budget.
- 9.3.17 The differences between the Regulatory Financial Statement and Annual Return have been identified and explained. We reviewed the commentary items and made a number of requests for clarification/ correction.

Assessment of confidence grade

- 9.3.18 **Reliability grade.** The processes used to source the data for this measure are frequently used and subject to a number of layers of internal check and review; the actual expenditure data is subject to external audit by others. We believe the route expenditure data should have a reliability band of A.

9.3.19 **Accuracy grade.** The expenditure data is subject to financial audit by the Regulatory Auditors. Network Rail has identified a small (0.1%) adjustment in attribution which is required to the network renewals figures between non-WCRM and WCRM. We believe the route expenditure data should have an accuracy band of 1.

Audit Statement

9.3.20 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for route expenditures. The data has been assessed as having a confidence grade of A1.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

9.3.21 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

9.3.22 We have no observation for this measure.

9.4 Debt/RAB Ratio

Audit scope

- 9.4.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail's Annual Return 2007, Section 6, Debt/RAB ratio, including Table 179.
- 9.4.2 This measure reports Network Rail's net debt as a percentage of its regulatory asset base (RAB) which provides an indication of Network Rail's financing position.
- 9.4.3 The audit was undertaken at Network Rail Headquarters.

Commentary on reported data

Regulatory targets

- 9.4.4 There is no regulatory target for these measures. However, Condition 29 of the Network Licence requires that:
- (a) Network Rail does not to incur financial indebtedness in excess of 100% of the RAB; and
 - (b) Network Rail must take all reasonable endeavours to keep its net debt as a percentage of its RAB below 85%.
- 9.4.5 The results for 2006/07 show that Network Rail's net debt as a percentage of its RAB was 73.5% which meets the requirements of its Network Licence.

Trend

- 9.4.6 As at 31 March 2007, the RAB was £25,266m and net debt (in the Regulatory Accounts) was £18,572m. The ratio of net debt to the RAB has fallen by 6.2% in comparison with the previous year.

	2004/05	2005/06	2006/07	Variance on 2005/06
Debt/RAB	77.2%	78.1%	73.5%	-6.2%

Figure 9.4.1 Material Variance of Actuals and Business Plan Forecast for Renewals

- 9.4.7 The Business Plan target of 74.8% was not achieved due to higher than forecast RAB inflation, grant income reprofiling and lower than forecast debt-funded expenditure.

Audit Findings

Process

- 9.4.8 The ratio is calculated using data from the Regulatory Accounts. The net debt calculation in the Regulatory Accounts differs from that appearing in the Statutory Accounts, primarily due to IAS39 stipulating non-Sterling Bonds are valued at spot rate whereas the Regulatory Accounting Guidelines value non-Sterling Bonds at the hedged rate. This is further documented in Appendix D of the Regulatory Financial Statements for the year ended 31 March 2007.

Data accuracy

- 9.4.9 The calculation, using data from the Regulatory Financial Statements audited by the Regulatory Auditor, is correct.

Assessment of confidence grade

- 9.4.10 **Reliability grade.** The ratio is calculated using data from the Regulatory Financial Statements. We believe the Debt/RAB Ratio should have a reliability band of A.

9.4.11 **Accuracy grade.** The calculation, using data audited by the Regulatory Auditor, is correct. We believe the Debt/RAB Ratio should have an accuracy band of 1.

Audit Statement

9.4.12 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for Debt/ RAB Ratio. The data has been assessed as having a confidence grade of A1.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

9.4.13 We have no recommendations for this measure.

Observations relating to spreading of best practice and/or improvements to process

9.4.14 We have no observation for this measure.

9.5 RAB Volume Incentives

Audit scope

- 9.5.1 This audit was undertaken to assess the reliability and accuracy of data and commentary reported in Network Rail’s Annual Return 2007, Section 6, RAB Volume Incentives, including Table 180.
- 9.5.2 This measure reports the forecast levels of payment that will be received by Network Rail as an incentive to facilitate growth in passenger and freight volumes. The RAB Volume Incentives are calculated over the Control Period as a whole and are to be added to the RAB at the end of the Control Period.
- 9.5.3 Though the calculations are specified in Access Charges 2003, there are no formal definitions or procedures for the reporting of the RAB Volume Incentives in the Annual Return.
- 9.5.4 The audit was undertaken at Network Rail Headquarters.

Commentary on reported data

Regulatory targets

- 9.5.5 There is no regulatory target for these measures.

Trend

- 9.5.6 Figure 9.5.1 shows the forecast trend of the volume incentive over the control period; however, as noted above, it is only the final year (2008/09) that it is to be used for the calculation of the incentive payment for the Control Period as a whole.

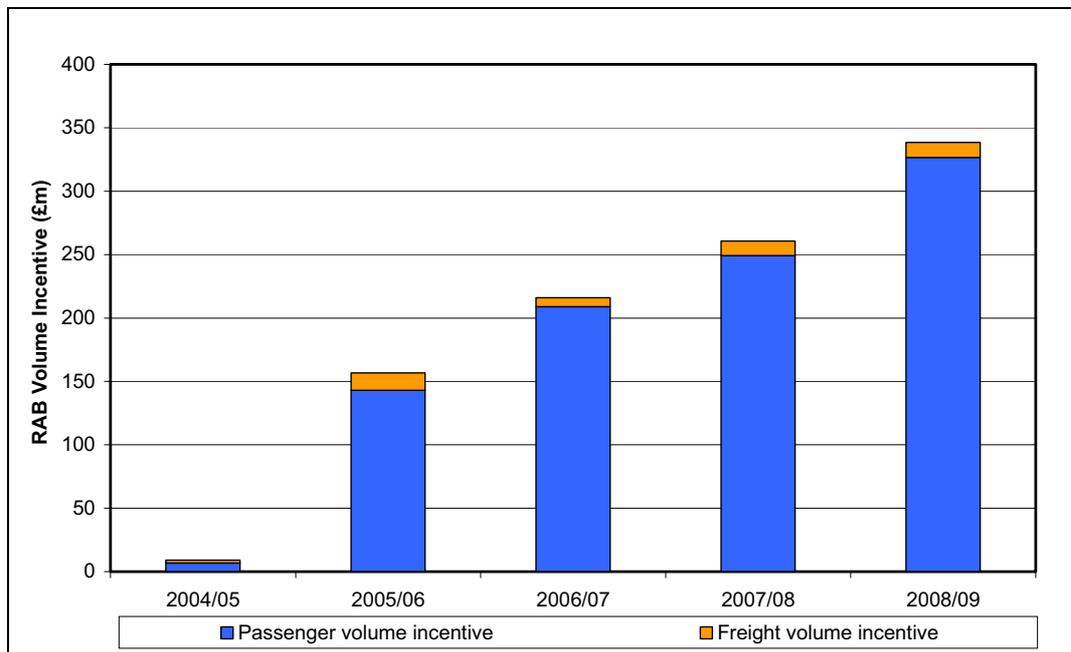


Figure 9.5.1 RAB Volume Incentive

- 9.5.7 The current forecast RAB adjustment for Control Period 3 is £338.5m.

Audit Findings

Process

- 9.5.8 The calculations for the volume incentives are set out in ORR's Access Charges Review 2003 based on incentive rates and the growth in comparison with a baseline volume:
- (a) For the passenger incentive, the baseline volume comprises actual passenger train miles and farebox revenue; only franchised passenger trains are included in the calculation, though the volume growth which Network Rail can most easily influence (arguably) comes from open access operators rather than franchised operators;
 - (b) For the freight incentive, the baseline volume comprises actual freight train miles and freight gross tonne miles (GTM).
- 9.5.9 In respect of the data for the calculation:
- (a) The actual passenger revenue data comes from ORR's National Rail Trends Yearbook 2006/07;
 - (b) The forecast passenger revenue data comes from Rail Industry Forecasting Framework (RIFF v1.2) using Passenger Demand Forecasting Handbook parameters (PDFH 4.1); the demand drivers projection is sourced from OEF, TEMPRO, WebTAG and National Transport Model;
 - (c) The actual train mileage data comes from Network Rail's train performance database PALADIN;
 - (d) The actual freight tonnage data comes from Network Rail's freight billings system (BIFS);
 - (e) The forecast train mileage and tonnage data comes from Network Rail's Business Plan (Polkadot model).

Data accuracy

- 9.5.10 The formulae in the spreadsheet to calculate the RAB Volume Incentive are correct.
- 9.5.11 The actual tonnage, mileage and revenue data used in the calculation match those reported in the Annual Return 2006/07 and National Rail Trends 2006/07.
- 9.5.12 However, the baselines used for freight train mileage and tonnage have been subject to change since they were initially set, due to changes to the method of calculating/reporting the two datasets:
- (a) The time period has altered to include the day after period end; and
 - (b) There have been changes to the chargeable freight service groups.
- 9.5.13 This has resulted in a 0.26% increase in the baseline for the freight train miles and 0.765% increase in the freight gross tonne miles, which in the context of the volume incentive calculation is not in Network Rail's favour.
- 9.5.14 We have requested further explanation of the rebaselining, including the new method of calculating the freight train mileage and tonnage datasets, but at the time of writing these were not available.

Assessment of confidence grade

- 9.5.15 **Reliability grade.** This is an indicative measure only – the incentive payment will be calculated at year-end 2008/09. The actuals data is from reliable sources; the forecast data is also used in the production of Network Rail's Business Plan. However, the baseline has been back-calculated following a change to two underlying datasets; this needs to be further investigated as it will change the 2008/09 result. We believe the RAB Volume Incentive should have a reliability band of B.

- 9.5.16 **Accuracy grade.** Some of the data used is forecast. The baseline has been subject to change and the underlying reason has not yet been fully explained. We believe the RAB Volume Incentive should have an accuracy band of 3.

Audit Statement

- 9.5.17 We have audited the reliability and accuracy of data and commentary presented in Network Rail's Annual Return 2007 for RAB Volume Incentive. The data has been assessed as having a confidence grade of B3.

Recommendations arising

Recommendations essential for the accuracy and/or reliability of the measure

- 9.5.18 **RAB Volume Incentives recommendation 1.** We recommend the specifications of the input data and subsequent calculations are recorded and agreed with ORR.

Observations relating to spreading of best practice and/or improvements to process

- 9.5.19 We have no observation for this measure.

10 Progress on Outstanding Recommendations

10.1 Introduction

- 10.1.1 Each year in our Audit Report, the Reporter makes a number of recommendations with a view to improving the accuracy of the data and information set out in the Annual Return and the quality of the process by which it has been compiled; including the procedures used by Network Rail to measure, collect, prepare, analyse and include data and information. At the half-year period and in the subsequent full-year Audit we seek to determine, in respect of each audit recommendation, the nature of the action being taken by Network Rail and the priority given to that action, and the evidence of completion in order that the recommendation might be closed out.
- 10.1.2 At the time of this year's Audit, substantial gaps still existed in Network Rail's responses to our recommendations and on evidence of their action on recommendations. We set out below our assessment on the current progress of Network Rail in addressing our outstanding recommendations from our Audits in 2005 and 2006.

10.2 Outstanding Recommendations from the Audit of the Annual Return 2005⁸

2004/05 – M09 recommendation 1 & M09 recommendation 2

- 10.2.1 These recommendations related to audit findings for Measure M9 (Signalling Failures). In reporting on progress last year we were able to confirm that Network Rail had agreed with our recommendations to improve the accuracy of data reported under this Measure, but had not identified any actions arising. The situation was unchanged for 2006 and reference made to this issue in a subsequent paragraph.
- 10.2.2 **Update for 2007.** This year's Audit findings confirm our continuing disquiet over the accuracy of data being reported. Unfortunately these deficiencies do not warrant a mention in Network Rail's Annual Return. We have made a strong recommendation on data accuracy in this year's Audit and we will be pressing Network Rail to address this issue without further prevarication. In the meantime this recommendation will remain live and categorised as "No Action & Timescales Identified".

2004/05 - M10 recommendation 7

- 10.2.3 This recommendation related to audit findings for Measure M10 (Signalling Asset Condition) in Network Rail's Western Territory. In reporting on progress in 2006 we were able to confirm that Network Rail had "noted" our recommendation to improve the quality of the assessments upon which data was reported under this Measure in Western Territory, but had not identified any actions arising.
- 10.2.4 **Update for 2007.** This year's Audit findings confirm that deficiencies still exist in the quality of assessment data within Western Territory, (although not exclusive to that Territory). We have made two recommendations to improve data quality in this year's Audit which we will be pressing Network Rail to address before next year's Audit. We will continue to include Western Territory in future audit programmes until we are able to report an improvement in data quality. In the meantime this recommendation will remain live and categorised as "No Action & Timescales Identified".

⁸ All recommendations made as part of the Audit of Network Rail Annual Return 2005, are provided in either: appendix D of Halcrow's Independent Reporter, Annual Return 2005 Final Report; or within section "2005 Audit Recommend" of Mouchel Parkman's, "Annual Return 2005 Final Report, Independent Reporter B". Both documents are available on the ORR Website.

10.3 Outstanding Recommendations from the Audit of the Annual Return 2006⁹

Recommendation 2005/06-002

- 10.3.1 This recommendation related to our audit findings for the Operational Performance Measure. We had recommended that documentation be standardised based on significant examples of documented good practice exposed by our audits. Whilst Network Rail had “noted” our recommendation and undertaken to “look into” the matter, no specific actions arising had been identified.
- 10.3.2 **Update for 2007.** We undertook a thorough process audit of delay attribution and analysis as the main thrust of this year’s Audit. We are satisfied that considerable progress has been made by Network Rail in this field and so we are able to report this recommendation as “Actioned & Verified”.

Recommendation 2005/06-007

- 10.3.3 This recommendation related to our audit findings for the Joint Performance Improvement Programme (JPIP) Measure. We had recommended that the statistical analysis of the data be amended for performance baselining. Whilst Network Rail had “accepted” our recommendation, no specific actions arising had been identified.
- 10.3.4 **Update for 2007.** We undertook a thorough process audit of JPIP arrangements as the main thrust of this year’s Audit. We are satisfied that considerable progress has been made by Network Rail and the Train Operating Companies acting together in this field. Our Audit found that this recommendation has been implemented and so we are able to report this recommendation as “Actioned & Verified”.

Recommendations 2005/06-009 & 2005/06-010

- 10.3.5 These recommendations related to our audit findings for the Route Utilisation Strategy (RUS) Measure. We had recommended that the documentation be aligned with project management and business planning practice. Whilst Network Rail had “accepted” our recommendations and undertaken to “look into” the matter, no specific actions arising had been identified.
- 10.3.6 **Update for 2007.** This year’s Audit found that due to resourcing difficulties on the part of Network Rail this recommendation had still not been actioned. There is however positive progress to report on development of RUSs generally. We have made three recommendations that relate to alignment and associated business-related issues in this year’s Audit and we look forward to reporting further progress in next year’s Audit. In the meantime this recommendation will remain live and categorised as “No Action & Timescales Identified”.

Recommendations 2005/06-015, 2005/06-016, 2005/06-017 & 2005/06-018

- 10.3.7 These recommendations related to our audit findings for the Mileage Measures. We had recommended changes to the way mileage data is analysed and checked. Network Rail had responded that change would require an industry-wide initiative as operators and other infrastructure providers were involved, but no actions arising had been identified on their part.

⁹ A full list of recommendations made as part of the Audit of Network Rail Annual Return 2006, is provided in appendix H of Halcrow’s Independent Reporter, Annual Return 2006 Final Report, available on the ORR Website.

- 10.3.8 **Update for 2007.** This year's Audit found that these recommendations had still not been actioned. We do not accept Network Rail's argument against change and believe that an improvement in data quality could be achieved in house. We have made four recommendations that relate to data quality issues in this year's Audit which we will be pressing Network Rail to address before next year's Audit. In the meantime this recommendation will remain live and categorised as "No Action & Timescales Identified".

Recommendations 2005/06-030 & 2005/06-031

- 10.3.9 These recommendations related to our audit findings for the Measure M6 (Earthworks Failures). We had recommended improvements in the training and competency assessment of earthworks examiners and in the examination process itself. Whilst Network Rail has "noted" our recommendation, no specific actions arising have been identified.
- 10.3.10 **Update for 2007.** This year's Audit found that these recommendations had been implemented and so we are able to report this recommendation as "Actioned & Verified".

Recommendations 2005/06-033, 2005/06-034 & 2005/06-036

- 10.3.11 These recommendations related to our audit findings for Measure M8 (Bridge Condition). We had recommended review of budget sufficiency for inspections in South East Territory, procedural improvements for examinations, and reintroduction of competency standards for assessors. Whilst Network Rail has "accepted" our recommendations and undertook to "review" or "consider" the matters concerned, no specific actions arising have been identified.
- 10.3.12 **Update for 2007.** This year's Audit found that some progress was being made in relation to these recommendations, but we have made a further recommendation in this year's Audit in relation to a revision of the recently-introduced competency standard. As a consequence these recommendations will remain live but we will upgrade the categorisation as "In Progress".

Recommendation 2005/06-038

- 10.3.13 This recommendation related to our audit findings for Measure M9 (Signalling Failures). As in our previous audit (see above), we had recommended review of the Fault Management System to remedy known deficiencies in data entry and verification. Network Rail has not responded to this recommendation to date.
- 10.3.14 **Update for 2007.** This year's Audit findings confirm our continuing disquiet over the accuracy of data being reported. Unfortunately this matter does not warrant a mention in Network Rail's Annual Return. We have made a strong recommendation on data accuracy in this year's Audit and we will be pressing Network Rail to address this issue without further prevarication. In the meantime this recommendation will remain live and categorised as "No Action & Timescales Identified".

Recommendations 2005/06-039 & 2005/06-040

- 10.3.15 These recommendations related to our audit findings for Measure M10 (Signalling Asset Condition). We had recommended concentrated management attention be given to document the methodology of condition assessment scoring and the verification of adjusted data. Network Rail has not responded to this recommendation to date.
- 10.3.16 **Update for 2007.** This year's Audit findings confirm that deficiencies still exist in the quality of assessment data. We have made two recommendations to improve data quality in this year's Audit which we will be pressing Network Rail to address before next year's Audit. In the meantime this recommendation will remain live and categorised as "No Action & Timescales Identified".

Recommendation 2005/06-041

- 10.3.17 This recommendation related to our audit findings for Measure M11 (AC Traction Power Incidents Causing Train Delays). We had recommended that for consistency Territories be directed to use post-incident finalised data from the TRUST system rather than from the NIR Log. Whilst Network Rail has “accepted” our recommendation, no specific actions arising have been identified.
- 10.3.18 **Update for 2007.** Our Audit found that increased attention is being given to the verification of data using a variety of sources. As a consequence so we are able to report this recommendation as “Actioned & Verified”.

Recommendation 2005/06-044

- 10.3.19 This recommendation related to our audit findings for Measure M13 (Electrification Condition - AC Traction). We had recommended that there be a re-calculation of the condition scores data following completion of the assessment programme. Network Rail had stated that the matter would be raised with ORR and the Reporter, to date it has not.
- 10.3.20 **Update for 2007.** This year’s Audit found that this recommendation had still not been actioned. We do not accept Network Rail’s argument against change and believe that an improvement in data quality would arise from implementation of our recommendation. We have restated our recommendation in this year’s Audit which we will be pressing Network Rail to address before next year’s Audit. In the meantime this recommendation will remain live and categorised as “No Action & Timescales Identified”.

Recommendations 2005/06-045 & 2005/06-047

- 10.3.21 These recommendations related to our audit findings for Measure M14 (Electrification Condition - DC Traction). We had recommended that the planned review of assessment documentation incorporate the Reporter’s recommendations from previous audits, and a re-calculation of the condition scores data following completion of the assessment programme. Network Rail had stated that the matter would be raised with ORR and the Reporter, to date it has not.
- 10.3.22 **Update for 2007.** This year’s Audit found that whilst the former recommendation had been actioned, the latter had not. We do not accept Network Rail’s argument against change and believe that an improvement in data quality would arise from implementation of that recommendation. We have restated our recommendation in this year’s Audit which we will be pressing Network Rail to address before next year’s Audit. In the meantime the latter recommendation will remain live and categorised as “No Action & Timescales Identified”.

Recommendation 2005/06-048

- 10.3.23 This recommendation related to our audit findings for Measure M15 (Electrification Condition - AC Contact System). We had recommended that a method be developed to ensure that assessment samples are properly representative of the asset base. Network Rail had stated that the matter would be raised with ORR and the Reporter, to date it has not.
- 10.3.24 **Update for 2007.** This year’s Audit found that this recommendation had still not been actioned. We believe that an improvement in data quality would arise from implementation of our recommendation. We have restated our recommendation in this year’s Audit which we will be pressing Network Rail to address before next year’s Audit. In the meantime this recommendation will remain live and categorised as “No Action & Timescales Identified”.

Recommendation 2005/06-049

- 10.3.25 This recommendation related to our audit findings for Measure M16 (Electrification Condition - DC Contact System). We had recommended that there be a more consistent and logical approach adopted for data handling within the calculation spreadsheets. Whilst Network Rail has “noted” our recommendation and undertaken to “look into” the matter, no specific actions arising have been identified.

- 10.3.26 **Update for 2007.** This year's Audit found that this recommendation had been implemented and so we are able to report this recommendation as "Actioned & Verified".

Recommendation 2005/06-050

- 10.3.27 This recommendation related to our audit findings for Measure M17 (Station Condition Index). We had recommended that wholesale changes to the condition criteria, assessment methodology and data capture be made to improve the usefulness of this Measure. We are aware that much work has now been done in this area to restructure the Measure, but the current criteria and methodology will continue in place for the 2007 Annual Return. We seek a response from Network Rail on how useful data can be reported for the coming year, pending adoption of the new Measure.

- 10.3.28 **Update for 2007.** This year's Audit found that some progress was being made in relation to this recommendation, but we have made further recommendations in this year's Audit on this matter. As a consequence these recommendations will remain live but we will upgrade the categorisation as "In Progress".

Recommendations 2005/06-054 & 2005/06-055

- 10.3.29 These recommendations related to our audit findings for Measure M19 (Light Maintenance Depot Condition Index). We had recommended that work be undertaken to improve the usefulness of this Measure, and that the inspection reports be shared with the depot facility operator with a view of developing joint improvement plans. Whilst Network Rail has "accepted" our recommendation, no specific actions arising have been identified.

- 10.3.30 **Update for 2007.** This year's Audit found that some progress was being made in relation to these recommendations, but we have made further recommendations in this year's Audit on these matters. As a consequence these recommendations will remain live but we will upgrade the categorisation as "In Progress".

Recommendation 2005/06-061

- 10.3.31 This recommendation related to our audit findings for the Financial Efficiency Variance Analysis Measure. We had recommended the full implementation of the recommendations of the Network Rail Investment Financial Variance Year-End Report June 2006. Whilst Network Rail has "accepted" our recommendation, no specific actions arising have been identified.

- 10.3.32 **Update for 2007.** This year's Audit found that these recommendations had been implemented and so we are able to report this recommendation as "Actioned & Verified".

10.4 Next Steps

- 10.4.1 Given that no progress has been reported this year on a significant number of outstanding recommendations, we propose to seek ORR and Network Rail's active support in remedying the fundamental deficiencies identified.

11 Reporter's scrutiny and opinion

11.1 Commentary on Annual Return 2007

Overview

- 11.1.1 I am pleased to report we have experienced co-operation at all levels within Network Rail which has allowed our audit plan to be delivered to what is this year an accelerated programme. Where additional supporting information has been requested by the audit teams it has in all cases been made available.
- 11.1.2 The figures contained in the Annual Return 2007 indicate that Network Rail has achieved the required regulatory targets, with the exception of Earthworks Failures (M6) and Electrification condition – D.C. traction contact systems (M16).
- 11.1.3 In assessing whether or not Network Rail has achieved the targets set, we have been directed not to take into consideration the tolerance levels detailed in the Annual Return. Similarly to previous years, we have also not taken into account the confidence grades which have been self-assigned by Network Rail to the measures.
- 11.1.4 We believe the Annual Return should be regarded as a consolidated report on the delivery of regulatory measures and specific targets. Taken in this context the Annual Return satisfies that objective. The suite of measures and targets, as currently defined, forms a partial view of Network Rail's activities, but does not provide a detailed view on every aspect of Network Rail's performance and stewardship, particularly where measures are not aligned with Network Rail's management information or priorities. Detailed review, analysis and comment on each of the individual measures which we have audited can be found within the main body of our report.
- 11.1.5 In conducting our reporting activity we have identified a number of underlying issues which we believe need to be addressed if the reliability and accuracy of the Annual Return is to be improved. Resolution of these issues would, in many cases, also improve Network Rail's performance and stewardship. We have listed these underlying issues in the following text and provided examples. The examples quoted are not a definitive list of findings and are provided to support our comments. Further specific examples can be found within the main body of our report.

Data Management Systems

- 11.1.6 In undertaking our audit programme we have identified a number of instances where Network Rail's data management systems are failing to provide the necessary support to operational practice on the ground. As a consequence a lack of consistency in approach to data collection has arisen and in some cases has raised concerns over data integrity itself. Specific examples of this are:

- (a) For the purposes of Number of Broken Rails (M1) and Rail Defects (M2) reporting; a serious lack of consistency in the maintenance and analysis of track defect data due to the abandonment of the national roll-out of the RDT system, following its rejection by end-users as not fit for purpose.

This has required Area staff to revert to a number of disparate, formerly abandoned legacy systems for track defect data management, ranging from the historic British Rail "RailData" system to those established independently by the former Infrastructure Maintenance Contractors. This lack of consistency in approach raises concerns over the continuing integrity of this data even after significant efforts on the part of HQ staff to address the issue. Furthermore it limits the opportunity for timely and reliable trending analysis essential to effective network-wide asset management.

The Maintenance organisation has now been mandated to introduce a replacement rail defect data system RDMS against a tight timescale for completion of system

roll-out by June 2008. We have not been given the opportunity to examine RDMS, but in our view it is critical that RDMS is embraced by end-users as fit for purpose, that end-users and analysts alike are properly trained in its functionality and use, and that its implementation is undertaken in a systematic and professional manner. We propose to examine these matters closely in our audits in 2008.

- (b) For the purposes of Bridge Condition (M8) reporting; continuing reliance on the GEOGIS system has led to data inaccuracies which, when coupled with inexplicable delay to SCMI data input, has limited the effective asset management of structures. This is due to delay in the implementation of the CARRS and CAI systems. Our comment above in relation to the roll-out of RDMS is equally applicable in relation to CARRS and CAI, and we again propose to examine this matter closely in our audits in 2008.
- (c) For the purposes of Signalling Failures (M9) reporting; evident widespread inability to undertake effective failure cause analysis and data inconsistencies with that extracted from TRUST, due to deficiencies in data verification and in the functionality of the FMS system and its associated analysis tool "Discoverer". We have been advised that Network Rail is in the early stages of developing a replacement system and we propose to examine progress on this in our audit in 2008.
- (d) For the purposes of Station Condition Index (M17) reporting; unexplained technical difficulties have been reported in the introduction of hand-held computers to expedite condition data collection, validation and management. As the use of such equipment in this way is common practice in other sectors of industry we propose to closely examine progress in resolving these difficulties in our audits in 2008.

11.1.7 Conversely, for the purposes of Signalling Asset Condition (M10) reporting, the introduction of the SIS system has led to substantial improvement in data management and analysis.

11.1.8 On the basis of these findings, we are concerned that there appears to be either a lack of focus or a lack of imperative in the utility of design, timely development, and effective delivery of Network Rail's Information Management Systems so crucial to support effective operational practice on the ground. It is our opinion that a critical examination should be undertaken of the resourcing and effectiveness of these processes, both specific to the systems referred to above, and in generality.

Asset Management Practice

11.1.9 As Reporter A, we has no specific remit from ORR to examine Network Rail's asset management practices as such, the purpose of this report being to independently validate the data collected and analysed by Network Rail's for their Annual Return to demonstrate compliance (or otherwise) with their relevant regulatory and other stakeholder-agreed targets.

11.1.10 In undertaking our audit programme it is clear to us that a considerable investment in staff resource and time is made by Network Rail in the collection, collation and analysis of asset condition and asset performance data specifically for ORR monitoring and Annual Return purposes. What has not been made clear to us is the extent to which that data, so painstakingly obtained, is of practical value to the relevant Network Rail managers in their day-to-day management of the infrastructure assets concerned, or whether parallel data collection and analysis work-streams have had to be established to that end.

11.1.11 It is our opinion that the specific regulatory targets and performance KPIs for which asset condition and performance data is obtained should, for the next Control Period, be much more closely aligned with widely-accepted asset management performance indicator conventions and with Network Rail's business management needs. Adopting this approach could, in our view, provide both Network Rail and ORR with the continued ability to obtain relevant and timely infrastructure asset condition and performance information upon which Network Rail's performance can be judged by its stakeholders, whilst at the same time supporting the efforts of all concerned on the ground and at HQ on focussing upon the exercise of effective asset management practices; with no additional resource or time penalty being incurred.

Data Quality

11.1.12 In undertaking our audit programme we have identified instances where data quality issues are apparent:

- (a) Data cleansing exercises have been necessary on the part of Territory or HQ staff in order to render data collected on the ground fit for purpose, or where. Reference has specifically been made to this in our audit of:
 - (i) Measures which refer to total network kilometres (C1, C2, C3 & C4);
 - (ii) Rail Defects (M2), where data "refreshes" at the start of each year appear to be the norm.
- (b) We have also identified an instance where inconsistencies exist in network parameter data held in separate systems:
 - (i) For the purposes of Mileage reporting; a lack of consistency in equivalent mileage data held in the PALADIN and BIFS systems.
- (c) We have further identified instances where inconsistencies exist in respective Areas' interpretation of data categorisation:
 - (i) Earthworks Failures (M6), particularly where incidents have wide-area, multiple asset and multiple instance consequences, such as that encountered with flooding.
 - (ii) Bridge Condition (M8), particularly as there is no attempt to encourage cross-network consistency in condition reporting
 - (iii) Signalling Asset Condition (M10), despite peer reviews being undertaken

11.1.13 It is our opinion that in these instances firm guidance from HQ is required on data categorisation and more internal check audits undertaken to ensure consistency in achieved in reporting and confidence to be obtained over trend identification and analysis.

Weather-related Incidents

11.1.14 In undertaking our audit programme it has been made clear to us by staff on the ground that infrastructure asset condition has been adversely affected by the increased frequency and intensity of weather-related incidents. We might reasonably expect, given the predicted weather effect of current global warming trends, that the frequency and intensity of weather-related incidents will continue to increase in future. A consequential deterioration in performance against the relevant KPIs should therefore be expected.

11.1.15 It is our opinion that Network Rail should begin to address its response to this matter on a network-wide basis and consider how the network infrastructure could be made more robust and able to withstand a higher level of attack by the elements in future.

11.2 Reporter's Audit Statement

- 11.2.1 This report, including opinions, has been prepared for use of Office of Rail Regulation and Network Rail and for no other purpose. We do not, in reporting, accept responsibility for any other purpose or to any other person to whom this report is shown. We report our opinion as to whether the Annual Return 2007 gives a representative view and whether the data reported by Network Rail is consistent with evidence provided to us at audit.
- 11.2.2 We confirm Network Rail has prepared the Annual Return for 2007 in accordance with its regulatory and statutory obligations using procedures prepared by Network Rail and agreed with Office of Rail Regulation.
- 11.2.3 We confirm the Annual Return 2007 was submitted in accordance within the timescale required by Condition 15 of Network Rail's Network Licence.
- 11.2.4 We confirm we have completed audits of the data contained in the Annual Return 2007 relating to the measures contained in the "Form of the 2007 Annual Return" prepared by Network Rail and agreed with Office of Rail Regulation as per Paragraph 8 of Condition 15 of the Network Licence. The only exceptions are where we have identified in the text of our report matters which require further clarification. We conducted our audit in accordance with an audit plan. Our audit included examination, on a sample basis, of evidence relevant to the data and disclosures in the Annual Return 2007. We planned and performed our audit so as to obtain information and explanations which we considered necessary in order to provide us with sufficient evidence to give reasonable assurance on the validity of data in the Annual Return 2007.
- 11.2.5 We confirm that, in our opinion, the reported information is a reasonable representation of performance and data has been properly prepared and reported in accordance with agreed procedures, except as specifically identified in our report commentaries.

David Simmons

David Simmons,
Independent Reporter,
Halcrow Group Limited,
August 2007.

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13 Appendix B: Glossary of Acronyms

Acronym	Meaning
a.c.	alternating current
ABC	Automatic Ballast Cleaners
ACR2003	Access Charges Review 2003
ADPT	Area Delivery Planning Team
ADRC	Access Dispute Resolution Committee
ARME	Area Rail Management Engineer
ASII	Asset Stewardship Incentive Index
BIFS	Billing Infrastructure Freight System
CAF	Cost Analysis Framework
CARRS	Civils Asset Register and electronic Reporting System
CDDS	Condition Data Distribution System
CDMS	Condition Data Management System
CET	Controlled Emission Toilet
CIA	Central Asset Inventory
CP	Control Period
CP2	Control Period 2 [1 April 2000 to 31 March 2004 (1999/2000 - 2003/04)]
CP3	Control Period 3 [1 April 2004 to 31 March 2009 (2004/05 - 2008/09)]
CP4	Control Period 4 [1 April 2009 to 31 March 2014 (2009/10 - 2013/14)]
CP5	Control Period 5 [1 April 2014 to 31 March 2019 (2014/15 - 2018/19)]
d.c.	direct current
DAG	Delay Attribution Guide
E&P	Electrification & Power
ECAP	Electrification Condition Assessment Process
ECML	East Coast Main Line
ELR	Engineering Line Reference
ERTMS	European Rail Traffic Management System
ESR	Emergency Speed Restriction
ETM	Equated Track Miles
FMS	Fault Management System
FOC	Freight Operating Company
FS	Feeder Stations
GEOGIS	Geography & Infrastructure System
GRIP	Guide to Railway Investment Projects
GTM	Gross Tonne Miles
HLOS	High Level Output Statement
HPSS	High Performance Switch System
HQ	Headquarters
HRMS	Human Resource Management System
IDC	Interlocking Data Cards
IM	Information Management
IMC	Infrastructure Maintenance Company
IRIS	Integrated Railway Information System
IT	Information Technology
IWA	Individual Working Alone
JPIP	Joint Performance Improvement Plan

Acronym	Meaning
JPP	Joint Performance Process
KPI	Key Performance Indicator
kV	kilovolts
L&SE	London & South East
L2	Level 2
LED	Light Emitting Diode
LMD	Light Maintenance Depot
LNE	London North Eastern [Territory]
LNW	London North Western [Territory]
LUL	London Underground Ltd
MBR	Management Business Review
MD	Midlands [Region]
MNT Code	Maintenance Code in Ellipse
MP&I	Major Projects & Investments
MUC	Maintenance Unit Costs
NDS	National Delivery Service
NMT	New Measurement Train
NR	Network Rail
NRDF	Network Rail Discretionary Fund
NRM	Network Rail Monitor
NST	Network Specialist Team
NW	North West [Region]
OFWAT	The Water Services Regulation Authority
OHL	Over Head Line
OHLE	Over Head Line Electrification
OP	Oracle Project
ORR	The Office of Rail Regulation
P3e	Primavera Project Planner Enterprise version
PALADIN	Performance & Loading Database
PCS	Project Control System
PL	Plain Line
PMR	Performance Management Reporting
PMRS	Performance Management Reporting Systems
PON	Periodic Operating Notice
PPM	Public Performance Measure
PPS	Possession Planning System
PSS	Performance Systems Strategy
PTG	Poor Track Geometry
RA	Route Availability
RAB	Regulatory Asset Base
RCF	Rolling Contact Fatigue
RDMS	Rail Defect Management System
RDT	Rail Defect Tracker
RIA	Rail Industry Association
RPA	Regional Planning Assessment
RRV	Road-Rail Vehicles
RUS	Route Utilisation Strategies
RWI	Repeatable Work Items

Acronym	Meaning
S&C	Switches and Crossings
SBMT	Structures Benchmarking Management Tool
SCMI	Structures Condition Marking Index
SCO	Scotland [Territory]
SD	Standard Deviation
SEA	South East [Territory]
SEC	Structures Examination Contractors
SEU	Signalling Equivalent Unit
SICA	Signalling Infrastructure Condition Assessment
SIS	SICA Information System
SMIS	Safety Management Information System
SMT	Southern Measurement Train
SUG	SICA User's Group
TDA	Territory Delay Attributor
TL	Tension Length
TOC	Train Operating Company
TOPS	Total Operations Processing System
TQMF	Track Quality Main Frame
TRUST	Train Running System
TSM	Track Section Manager
TSP	Track Sectioning Points
TSR	Temporary Speed Restriction
UTU	Ultrasonic Test Unit
WCML	West Coast Main Line
WCRM	West Coast Route Modernisation
WES	Western [Territory]
WON	Weekly Operating Notice

14 Appendix C: Audit meeting schedule

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
15/02/07	Network Rail HQ, Melton St, London	Debt/ RAB Ratio	<ul style="list-style-type: none"> Ian Ramshaw, Group Financial Accountant Angelique Tjen, Regulatory Specialist 	<ul style="list-style-type: none"> Duncan Mills
19/02/07	Eversholt Street, London	M1 M2	<ul style="list-style-type: none"> Brian Whitney, National Rail Management Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
19/02/07	Network Rail HQ, Melton St, London	Strategic Route Expenditures	<ul style="list-style-type: none"> Tom Smethers, Senior Finance Accountant Geoff Jones, Regulatory Economist Bill Davidson, Regulatory Economics Manager 	<ul style="list-style-type: none"> Duncan Mills
20/02/07	Network Rail HQ, Melton St, London	M9	<ul style="list-style-type: none"> Ian Griffiths, Senior Signal Performance Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
21/02/07	Network Rail HQ, Melton St, London	M10	<ul style="list-style-type: none"> Paul Mann, Signalling Strategy Engineer Andrew Smith, Business Planning Engineer (Signals) 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
22/02/07	Network Rail HQ, Melton St, London	M6	<ul style="list-style-type: none"> Eiffon Evans, Civil Engineer (Geotechnics) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
22/02/07	Network Rail HQ, Melton St, London	M3 M5	<ul style="list-style-type: none"> Tim Fuller, Acting National Track Geometry & Gauging Engineer John Turner, National Track Geometry Analyst 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
22/02/07	Network Rail HQ, Melton St, London	M8	<ul style="list-style-type: none"> Steve Fawcett, Civil Examinations Engineer 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
27/02/07	Network Rail HQ, Melton St, London	Mileage	<ul style="list-style-type: none"> John Kennedy, Regulatory Economist Martin Hollands, Passenger and Freight Billing Manager Nigel Salmon, Senior Performance Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
27/02/07	Network Rail HQ, Melton St, London	ASII	<ul style="list-style-type: none"> Mary Jordan, National Engineering Reporting Manager Tony Smith, National Engineering Information Analyst Angelique Tjen, Regulatory Specialist 	<ul style="list-style-type: none"> Vidhi Mohan
27/02/07	Network Rail HQ, Melton St, London	RAB volume incentive	<ul style="list-style-type: none"> John Kennedy, Regulatory Economist 	<ul style="list-style-type: none"> Duncan Mills
27/02/07	Network Rail HQ, Melton St, London	Opex Expenditures & Efficiencies	<ul style="list-style-type: none"> David Cook, Group Management Accountant 	<ul style="list-style-type: none"> Duncan Mills
27/02/07	Network Rail HQ, Melton St, London	MUC	<ul style="list-style-type: none"> Erwin Klumpers, Senior Financial Analyst, Maintenance Andy Whittaker, Maintenance Financial Controller 	<ul style="list-style-type: none"> Duncan Mills
27/02/07	Network Rail HQ, Melton St, London	Maintenance Expenditure	<ul style="list-style-type: none"> Erwin Klumpers, Senior Financial Analyst, Maintenance 	<ul style="list-style-type: none"> Duncan Mills
28/02/07	Network Rail HQ, Melton St, London	C1	<ul style="list-style-type: none"> Peter Lander, National Track Geometry & Gauging Engineer Mary Jordan, National Engineering Reporting Manager Tony Smith, National Engineering Information Analyst Angelique Tjen, Regulatory Specialist 	<ul style="list-style-type: none"> Vidhi Mohan

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
28/02/07	Network Rail HQ, Melton St, London	C2	<ul style="list-style-type: none"> Peter Lander, National Track Geometry & Gauging Engineer Mary Jordan, National Engineering Reporting Manager Tony Smith, National Engineering Information Analyst Angelique Tjen, Regulatory Specialist 	<ul style="list-style-type: none"> Vidhi Mohan
28/02/07	Network Rail HQ, Melton St, London	C3	<ul style="list-style-type: none"> Ian Bucknall, Civil Engineer (Bridges) Mary Jordan, National Engineering Reporting Manager Tony Smith, National Engineering Information Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
28/02/07	Network Rail HQ, Melton St, London	C4	<ul style="list-style-type: none"> Nick Snell, Strategy Engineer E&P Mary Jordan, National Engineering Reporting Manager Tony Smith, National Engineering Information Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
01/03/07	Network Rail HQ, Melton St, London	M11 M12 M13 M14 M15 M16	<ul style="list-style-type: none"> Nick Snell, Strategy Engineer E&P Charles Hervey, Business Planning Engineer (E&P) David McQuillan, Systems Acceptance Engineer (E&P) Mick Harlow, Asset Information Engineer (E&P) Glen Wiles, Contact Systems Engineer (E&P) 	<ul style="list-style-type: none"> Megan Gittins Rob Williams Peter Woodruff Ian Scrowston
02/03/07	Network Rail HQ, Melton St, London	M23 M26 M27 M28 M29	<ul style="list-style-type: none"> Kim Teager, Director of Civil Engineering Nimal Anathan, Programme Investment Manager 	<ul style="list-style-type: none"> Vidhi Mohan Ian Ratcliffe
05/03/07	Network Rail HQ, Melton St, London	M24	<ul style="list-style-type: none"> Andrew Smith, Business Planning Engineer (Signals) 	<ul style="list-style-type: none"> Vidhi Mohan Phil Morton
06/03/07	Network Rail HQ, Melton St, London	Renewals Variance & Renewals Units Costs (CAF)	<ul style="list-style-type: none"> Andy Tappern, Financial Controller Renewals Paul Wiseman, Head of Investment Efficiency Bill Davidson, Regulatory Economics Manager 	<ul style="list-style-type: none"> Duncan Mills
07/03/07	Eversholt Street, London	M18	<ul style="list-style-type: none"> Alan Garnell, Franchise Lease & Freight Manager Mark Rose, Lease Specialist 	<ul style="list-style-type: none"> Megan Gittins
08/03/07	Network Rail HQ, Melton St, London	RUS & Congested Infrastructure	<ul style="list-style-type: none"> Richard Eccles, Head of Route Planning 	<ul style="list-style-type: none"> Nicola Forsdike
08/03/07	Network Rail HQ, Melton St, London	Performance and JPIPs	<ul style="list-style-type: none"> John Thompson, Performance Improvement Leader Nigel Salmon, Senior Programme Analyst 	<ul style="list-style-type: none"> Nicola Forsdike
12/03/07	Waterloo Station	M10	<ul style="list-style-type: none"> Tim Weston, Acting Territory Signal Engineer Ken Gray, Territory Signal Renewals Engineer Kevin Leech, Renewals Requirements Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
12/03/07	Network Rail HQ, Melton St, London	M17 M19	<ul style="list-style-type: none"> Tim Stringer, Asset Info Engineer – Operational Property Laura Twitchett, Graduate - Planning and Regulation 	<ul style="list-style-type: none"> Megan Gittins Cliff Buckton Steve Beaumont

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
14/03/07	Network Rail HQ, Melton St, London	Satisfaction	<ul style="list-style-type: none"> Chris Rumfitt, Head of External Communications Pete Allen, Senior Market Research Specialist 	<ul style="list-style-type: none"> Nicola Forsdike
15/03/07	Network Rail HQ, Melton St, London	CAF	<ul style="list-style-type: none"> Robin Hamilton, Senior Cost Analyst 	<ul style="list-style-type: none"> Duncan Mills
15/03/07	Buchanan House, Glasgow	M10	<ul style="list-style-type: none"> Steve Muirhead, Territory Signal Engineer Alan Taylor, Signal Renewals Assessment Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
15/03/07	Buchanan House, Glasgow	M9	<ul style="list-style-type: none"> Steve Muirhead, Territory Signal Engineer Scott Moir, ASSE Scotland Territory 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
15/03/07	Area Office Edinburgh	M9	<ul style="list-style-type: none"> David Stevenson, Signal Performance Engineer Edinburgh Area 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
21/03/07	11 Albion Street, Leeds	M4	<ul style="list-style-type: none"> Chris Myers, TSR Planner 	<ul style="list-style-type: none"> Nicola Forsdike
22/03/07	Sheffield LMD	M19	<ul style="list-style-type: none"> Steve Smith, M&E surveyor (<i>Owen Williams</i>) Dave Dayman, Building Surveyor (<i>Amey</i>) 	<ul style="list-style-type: none"> Steve Beaumont
22/03/07	Area Office Milton Keynes	M9	<ul style="list-style-type: none"> Barney Daley, Area Signal Engineer, West Coast South 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
22/03/07	Network Rail HQ, Melton St, London	M24	<ul style="list-style-type: none"> Paul Mann, Signalling Strategy Engineer Andrew Smith, Business Planning Engineer (Signals) 	<ul style="list-style-type: none"> Vidhi Mohan Phil Morton
23/03/07	George Stevenson House, York	M10	<ul style="list-style-type: none"> William Troth, Territory Renewals Engineer Signals Ron Bowes, Signal Renewals Assessment Engineer – LNE Mark Anness, Signal Technical Clerk 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
23/03/07	Area Office Kelvin House RTC Derby	M9	<ul style="list-style-type: none"> John Cole, Area Signal Performance Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
27/03/07	George Stevenson House, York	CAF (Track)	<ul style="list-style-type: none"> Ian Cloughton, Financial Controller (Track) 	<ul style="list-style-type: none"> Duncan Mills
28/03/07	125 House, Swindon	M10	<ul style="list-style-type: none"> Craig McClintock, Territory Signals Renewals Engineer Lyn Townsend, Signal Renewals Assessment Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
28/03/07	125 House, Swindon	M9	<ul style="list-style-type: none"> Les Vere, Incident Management Specialist 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
29/03/07	Go Ahead House, Croydon	M9	<ul style="list-style-type: none"> Trevor Webb, Route Fault Control Manager 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
30/03/07	George Stevenson House, York	M8	<ul style="list-style-type: none"> Richard Sykes, Civils Assurance Engineer Richard Frost, Territory Structures Engineer Steve Fawcett, Civil Examinations Engineer Steve Hizzet, Examining Engineer (<i>Amey</i>) 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
02/04/07	Waterloo Station	M8	<ul style="list-style-type: none"> Innes Brown, Structures Maintenance Engineer (Wessex) Stephanie Anderson, Civils Assurance Engineer Steve Fawcett, Civil Examinations Engineer Phil Pearson, Area Examination Manager (<i>Atkins</i>) Michael Case, Examining Engineer (<i>Amey</i>) 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
02/04/07	125 House, Swindon	CAF (Civils)	<ul style="list-style-type: none"> Robert Oswald, Programme Efficiency Analyst – Civils 	<ul style="list-style-type: none"> Duncan Mills
03/04/07	MORI offices, 79-81 Borough Road, London SE1	Satisfaction	<ul style="list-style-type: none"> Pete Allen, Senior Market Research Specialist Carole Lehmann, Research Director (<i>MORI</i>) 	<ul style="list-style-type: none"> Nicola Forsdike
04/04/07	Buchanan House, Glasgow	M8	<ul style="list-style-type: none"> Daniel Beveridge, Structures Maintenance Engineer Sean Berry, North Area Manager (<i>Atkins</i>) Ewen Fraser, Examining Engineer (<i>Atkins</i>) Steve Fawcett, Civil Examinations Engineer 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
05/04/07	111 Piccadilly, Manchester	M8	<ul style="list-style-type: none"> Andrew Roberts, Area Structures Maintenance Eng Ian Fairfoot, Structures Maintenance Engineer Robert Wood, Technical Manager (<i>MP</i>) Tim Williams, Contract Compliance Manager (<i>MP</i>) David Ashton, Senior Technician (<i>MP</i>) Steve Fawcett, Civil Examinations Engineer 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
11/04/07	Network Rail HQ, Melton St, London	RUS	<ul style="list-style-type: none"> Peter Northfield, RUS Co-ordinator 	<ul style="list-style-type: none"> Nicola Forsdike
12/04/07	125 House, Swindon	M8	<ul style="list-style-type: none"> Kevin Giles, Territory Civils Renewals Engineer Mike Smith, Territory Structures Engineer David Bryan, SCMI Technician (<i>Amey</i>) Barry Noakes, Assistant Examining Engineer (<i>Amey</i>) Steve Fawcett, Civil Examinations Engineer 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
16/04/07	The Mailbox, Birmingham	M11 M12 M13 M14 M15 M16	<ul style="list-style-type: none"> Alan Haigh, Territory E&P Renewals Engineer Brian Waldron, Territory Distribution Engineer Tim Whitehead, Territory Contact Systems Engineer Michael Dobbs, Territory Assurance Engineer (Cont. Systems) 	<ul style="list-style-type: none"> Megan Gittins Peter Woodruff

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
17/04/07	Buchanan House, Glasgow	M18	<ul style="list-style-type: none"> Alan Muir, Operational Estate Manager Lorraine Harrell, Accounts Surveyor David O'May, Senior Account Surveyor 	<ul style="list-style-type: none"> Megan Gittins Cliff Buckton
17/04/07	Buchanan House, Glasgow	M17	<ul style="list-style-type: none"> Eddie McGloin, Territory Civil Engineer 	<ul style="list-style-type: none"> Megan Gittins Cliff Buckton
17/04/07	Network Rail HQ, Melton St, London	M20 M21 M22 M25	<ul style="list-style-type: none"> Steve Roarty, Principal Programme Planner, Track Renewals 	<ul style="list-style-type: none"> Vidhi Mohan Phil Edwards
18/04/07	The Mailbox, Birmingham	M6	<ul style="list-style-type: none"> Steve Couser, Territory Assurance Engineer Julian Harms, Territory Earthworks & Drainage Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
18/04/07	Waterloo Station	M17	<ul style="list-style-type: none"> Geoff Thorpe, MP&I – Project Manager ADC Chris Booth, MP&I – LNE Territory PM ADC Tim Stringer, Asset Info Engineer – Operational Property 	<ul style="list-style-type: none"> Megan Gittins Cliff Buckton
19/04/07	Lancs & Cumbria Area Office, Preston	M3 M5	<ul style="list-style-type: none"> Steve Odhams, Territory Geometry Engineer Ged Cullinane, LNW Territory Assurance Engineer (Track) Ian Banister, Area Geometry Engineer (Lancs & Cumbria) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
19/04/07	Waterloo Station	MUC	<ul style="list-style-type: none"> James McGee, Programme Manager, NST Maintenance Systems & Data Steven Smith, Business System Sponsor's Agent 	<ul style="list-style-type: none"> Duncan Mills
19/04/07	Arundel/Ford Interlocking	M10	<ul style="list-style-type: none"> Kevin Leech, Renewals Requirements Engineer 	<ul style="list-style-type: none"> Phil Morton
20/04/07	George Stevenson House, York	M6	<ul style="list-style-type: none"> Richard Sykes, Territory Assurance Engineer David Anderson, Territory Earthworks & Drainage Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
20/04/07	Network Rail HQ, Melton St, London	Renewals Variance (Telecoms)	<ul style="list-style-type: none"> Richard Henstock, Senior Analyst 	<ul style="list-style-type: none"> Duncan Mills
20/04/07	George Stevenson House, York	M1 M2	<ul style="list-style-type: none"> Andrew Beeson, Territory Rail Management Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
23/04/07	Trent House, Derby	MUC (East Mids MDUM)	<ul style="list-style-type: none"> Dave Griffiths, Maintenance Delivery Unit Manager, Derby 	<ul style="list-style-type: none"> Duncan Mills
23/04/07	Trent House, Derby	MUC (East Mids AFC)	<ul style="list-style-type: none"> Paul Symons, Maintenance AFC, East Mids Alison French, Maintenance Area Accountant, East Mids 	<ul style="list-style-type: none"> Duncan Mills
23/04/07	Buchanan House, Glasgow	M11 M13 M15	<ul style="list-style-type: none"> Ron Garrett, Territory E&P Engineer Bob MacDonnell, Territory Contact Systems Engineer Frank Seifert, Renewal Engineer E&P Scotland Andrew Banks, Territory Distribution Engineer 	<ul style="list-style-type: none"> Megan Gittins Rob Williams

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
23/04/07	Buchanan House, Glasgow	M6	<ul style="list-style-type: none"> Grant Lisk, Territory Assurance Engineer Tom Thompson, Earthworks Engineer (Scot.West) John Meecham, Asst. Territory Assurance Engineer Jim Brown, Territory Earthworks & Drainage Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
24/04/07	Buchanan House, Glasgow	M1 M2	<ul style="list-style-type: none"> Michele Mullen, Territory Assurance Engineer (Scotland) & TRME Eric Ryder, Area Track Engineer (Scot.West) Faye Steward, Area Rail Management Engineer (Scot.West) Adrian Boal, Area Track Engineer (Scot.East) Matthew Kane, Area Rail Management Engineer (Scot.East) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
24/04/07	125 House, Swindon	Renewals Variance (Civils)	<ul style="list-style-type: none"> Emma Noakes, Financial Controller (Civils & Estates) 	<ul style="list-style-type: none"> Duncan Mills
24/04/07	125 House, Swindon	C1	<ul style="list-style-type: none"> Peter Phillips, Infrastructure Data Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
24/04/07	George Stevenson House, York	M11 M12 M13 M14 M15 M16	<ul style="list-style-type: none"> Paul Ramsey, Territory E&P Engineer Bob Pocock, Territory Distribution Engineer Rob Wilkins, System Support Engineer – NE Area E&P Brian Hatfield, Network Monitoring Manager (ORR) 	<ul style="list-style-type: none"> Megan Gittins Rob Williams Peter Woodruff
24/04/07	Cardiff Interlocking	M10	<ul style="list-style-type: none"> Lyn Townsend, Signal Renewals Assessment Engineer 	<ul style="list-style-type: none"> Phil Morton
25/04/07	Waterloo Station	M11 M12 M13 M14 M15 M16	<ul style="list-style-type: none"> Cliff Elsey, Territory E&P Renewals Engineer Mark Olderman, HV Coordinator Kyle Windsor, Territory Assurance Engineer David Hibbert, Territory Contact Systems Engineer Paul Guest, Territory Renewals Engineer E&P 	<ul style="list-style-type: none"> Megan Gittins Rob Williams Peter Woodruff
25/04/07	The Mailbox, Birmingham	M1 M2	<ul style="list-style-type: none"> Ian Davison, Territory Rail Management Engineer Ged Cullinane, Territory Assurance Engineer (Track) John Bright, Area Track Engineer (West Midlands & Chilterns) Jay Benson, Area Rail Management Engineer (West Midlands & Chilterns) Ted Merricks, Ultrasonic Manager (West Midlands & Chilterns) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
25/04/07	ICC, York Signalling Control Centre	M9	<ul style="list-style-type: none"> Paula Cunningham, Acting LNE Route Fault Control Manager 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
26/04/07	George Stevenson House, York	M24	<ul style="list-style-type: none"> Adrian Robinson, Signalling Development Manager 	<ul style="list-style-type: none"> Phil Morton Vidhi Mohan

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
26/04/07	George Stevenson House, York	C2	<ul style="list-style-type: none"> Steve Valentine, Gauging Engineer Dave Galloway, Gauging Engineer 	<ul style="list-style-type: none"> Vidhi Mohan
26/04/07	Network Rail HQ, Melton St, London	Renewals Variance (Estates)	<ul style="list-style-type: none"> Emma Noakes, Financial Controller (Civils & Estates) 	<ul style="list-style-type: none"> Duncan Mills
26/04/07	125 House, Swindon	M6	<ul style="list-style-type: none"> Peter Muir, Territory Earthworks & Drainage Engineer Andrew Holly, Earthworks Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
26/04/07	George Stevenson House, York	M18	<ul style="list-style-type: none"> John Cooper, Operational Estate Manager, Commercial Property 	<ul style="list-style-type: none"> Cliff Buckton
27/04/07	Network Rail HQ, Melton St, London	CAF (prelim data)	<ul style="list-style-type: none"> Paul Wiseman, Head of Investment Efficiency Andy Tappern, Financial Controller Renewals Bill Davidson, Regulatory Economics Manager Emma Kelso, Senior Economist (ORR) 	<ul style="list-style-type: none"> Duncan Mills
27/04/07	Network Rail HQ, Melton St, London	CAF (final data)	<ul style="list-style-type: none"> Paul Wiseman, Head of Investment Efficiency 	<ul style="list-style-type: none"> Duncan Mills
30/04/07	City Exchange, Leeds	M4	<ul style="list-style-type: none"> Chris Myers, TSR Planner 	<ul style="list-style-type: none"> Nicola Forsdike
01/05/07	The Mailbox, Birmingham	C1	<ul style="list-style-type: none"> Chris Skilton, Infrastructure Data Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
01/05/07	The Mailbox, Birmingham	RUS	<ul style="list-style-type: none"> Paul Banks, Principal Route Planner Richard Donaldson, Senior Route Planner 	<ul style="list-style-type: none"> Nicola Forsdike
02/05/07	125 House, Swindon	Operational Performance, JPIPs	<ul style="list-style-type: none"> Richard Cole, Customer Relationship Executive (FGW) 	<ul style="list-style-type: none"> Nicola Forsdike
02/05/07	125 House, Swindon	M4	<ul style="list-style-type: none"> Rodney Hunt, Infrastructure Data Analyst 	<ul style="list-style-type: none"> Nicola Forsdike
03/05/07	Waterloo Station	M6	<ul style="list-style-type: none"> Derek Butcher, Territory Earthworks & Drainage Engineer Stephanie Anderson, Assurance Engineer (Civils) Simon Abbott, Earthworks Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
03/05/07	Network Rail HQ, Melton St, London	RUS	<ul style="list-style-type: none"> Julie Rickard, Network Planning Manager Chris Rowley, Network Planner 	<ul style="list-style-type: none"> Nicola Forsdike
04/05/07	Buchanan House, Glasgow	RUS	<ul style="list-style-type: none"> Nigel Wunsch, Principal Route Planner Nick Prag, Network Change Co-ordinator 	<ul style="list-style-type: none"> Nicola Forsdike
08/05/07	Network Rail HQ, Melton St, London	M6	<ul style="list-style-type: none"> Efion Evans, Civil Engineer (Geotechnics) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
09/05/07	Friars bridge Court, London	Operational Performance, JPIPs	<ul style="list-style-type: none"> Jasmine Sen, Route Performance Manager 	<ul style="list-style-type: none"> Nicola Forsdike
11/05/07	Network Rail HQ, Melton St, London	M10	<ul style="list-style-type: none"> Paul Mann, Signalling Strategy Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton
11/05/07	Network Rail HQ, Melton St, London	C1 C2 C3 C4	<ul style="list-style-type: none"> Tony Smith, National Engineering Information Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
14/05/07	Carolyn House, Croydon	MUC	<ul style="list-style-type: none"> Chris Davis, Area Financial Controller (Sussex) 	<ul style="list-style-type: none"> Duncan Mills
14/05/07	Network Rail HQ, Melton St, London	M9	<ul style="list-style-type: none"> Ian Griffiths, Senior Signal Performance Engineer 	<ul style="list-style-type: none"> Rebecca Harold Phil Morton

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
15/05/07	Network Rail HQ, Melton St, London	Strategic Route Expenditures	<ul style="list-style-type: none"> Tom Smethers, Senior Finance Accountant 	<ul style="list-style-type: none"> Duncan Mills
15/05/07	Network Rail HQ, Melton St, London	M3 M5	<ul style="list-style-type: none"> Tim Fuller, Acting National Track Geometry & Gauging Engineer John Turner, National Track Geometry Analyst 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
16/05/07	Network Rail HQ, Melton St, London	M8	<ul style="list-style-type: none"> Steve Fawcett, Civil Examinations Engineer Nigel Fisher, Head of Monitoring (ORR) 	<ul style="list-style-type: none"> Megan Gittins Ian Ratcliffe
16/05/07	Carolyn House, Croydon	M1 M2	<ul style="list-style-type: none"> Dave Gilbert, SE Territory Rail Management Engineer (Wessex & Anglia) Len Willie, Area Track Engineer (Sussex) Chris Levett, Area Rail Management Engineer (Sussex) 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
16/05/07	Network Rail HQ, Melton St, London	M1 M2	<ul style="list-style-type: none"> Brian Whitney, National Rail Management Engineer Mary Jordan, National Engineering Reporting Manager 	<ul style="list-style-type: none"> Rebecca Harold Phil Edwards
16/05/07	Network Rail HQ, Melton St, London	Signalling FEI	<ul style="list-style-type: none"> Andy Tappern, Financial Controller Renewals 	<ul style="list-style-type: none"> Duncan Mills
23/05/07	Network Rail HQ, Melton St, London	M17 M19	<ul style="list-style-type: none"> Tim Stringer, Asset Info Engineer – Operational Property 	<ul style="list-style-type: none"> Megan Gittins Steve Beaumont
24/05/07	125 House, Swindon	M23 M26 M27 M28 M29	<ul style="list-style-type: none"> Robert Oswald, Programme Efficiency Analyst, Civils 	<ul style="list-style-type: none"> Vidhi Mohan Ian Ratcliffe
24/05/07	Friars Bridge Court, London	Operational Performance, JPIPs	<ul style="list-style-type: none"> Mark Southron, Delay Resolution Co-ordinator 	<ul style="list-style-type: none"> Nicola Forsdike
25/05/07	Network Rail HQ, Melton St, London	M11 M12 M13 M14 M15 M16	<ul style="list-style-type: none"> Nick Snell, Strategy Engineer E&P Charles Hervey, Business Planning Engineer (E&P) David McQuillan, Systems Acceptance Engineer (E&P) Glen Wiles, Contact Systems Engineer (E&P) Mary Jordan, National Engineering Reporting Manager 	<ul style="list-style-type: none"> Megan Gittins Rob Williams Peter Woodruff Ian Scrowston
29/05/07	Eversholt Street, London	M18	<ul style="list-style-type: none"> Alan Garnell, Franchise Lease & Freight Manager Mark Rose, Lease Specialist Tim Casterton, Lease Specialist 	<ul style="list-style-type: none"> Megan Gittins Cliff Buckton
29/05/07	George Stevenson House, York	Operational Performance, JPIPs	<ul style="list-style-type: none"> Chris Carson, Route Performance Manager 	<ul style="list-style-type: none"> Nicola Forsdike
30/05/07	George Stevenson House, York	M20 M21 M22 M25	<ul style="list-style-type: none"> Andrew Allen, Financial Analyst, Track (MP&I) 	<ul style="list-style-type: none"> Vidhi Mohan
30/05/07	George Stevenson House, York	RUS & Congested Infrastructure	<ul style="list-style-type: none"> Richard Thompson, Principal Route Planner 	<ul style="list-style-type: none"> Nicola Forsdike
31/05/07	Network Rail HQ, Melton St, London	Operational Performance, JPIPs	<ul style="list-style-type: none"> Lee Amass, Delay Attribution Specialist 	<ul style="list-style-type: none"> Nicola Forsdike
01/06/07	Network Rail HQ, Melton St, London	Debt/RAB Ratio	<ul style="list-style-type: none"> Ian Ramshaw, Group Financial Accountant 	<ul style="list-style-type: none"> Duncan Mills
04/06/07	Carolyn House, Croydon	M3 M5	<ul style="list-style-type: none"> Ian Whatmore, Geometry & Components Engineer 	<ul style="list-style-type: none"> Phil Edwards

Date	Venue	Audit	For Network Rail (or Other)	For Reporter A
04/06/07	Pollockshields, Glasgow	M20 M21 M22 M25	<ul style="list-style-type: none"> Paul Reilly, Principal Programme Controls Manager, MP&I Craig Barclay, Project Manager (Plain Line Renewals) MP&I 	<ul style="list-style-type: none"> Phil Edwards
05/06/07	Sheffield Depot	M1 M2	<ul style="list-style-type: none"> Andrew Beeson, Territory Rail Management Engineer 	<ul style="list-style-type: none"> Phil Edwards
05/06/07	Network Rail HQ, Melton St, London	Mileage (Passenger)	<ul style="list-style-type: none"> Scott Provan, Performance Reporting Analyst 	<ul style="list-style-type: none"> Vidhi Mohan
06/06/07	The Mailbox, Birmingham	Operational Performance, JPIPs	<ul style="list-style-type: none"> Paul Kelly, Route Performance Manager Eliska James, Route Performance Measurement Manager 	<ul style="list-style-type: none"> Nicola Forsdike
06/06/07	Network Rail HQ, Melton St, London	M20 M21 M22 M25	<ul style="list-style-type: none"> Martin Zobel, Financial Controller, West Coast Paul Sadd, Performance Measurement Manager, West Coast 	<ul style="list-style-type: none"> Vidhi Mohan
07/06/07	George Stevenson House, York	M23 M26 M27 M28 M29	<ul style="list-style-type: none"> John Blenkey, Senior Commercial Manager Dave Edwards, Commercial Manager 	<ul style="list-style-type: none"> Ian Ratcliffe
08/06/07	Liverpool	Operational Performance, JPIPs	<ul style="list-style-type: none"> Pete Tyrell, Area Performance Manager 	<ul style="list-style-type: none"> Nicola Forsdike
08/06/07	Network Rail HQ, Melton St, London	Mileage (Freight)	<ul style="list-style-type: none"> Martin Hollands, Passenger and Freight Billing Manager Lorraine Pengelly, Financial Analyst, Track Access Billing 	<ul style="list-style-type: none"> Vidhi Mohan
11/06/07	Reading	M1 M2	<ul style="list-style-type: none"> John James, Territory Rail Management Engineer Peter Bridges, Acting Territory Engineer Track 	<ul style="list-style-type: none"> Phil Edwards
12/06/07	Network Rail HQ, Melton St, London	M20 M21 M22 M25	<ul style="list-style-type: none"> Gavin Smith, Programme Manager Maintenance Improvements Arun Pandya, Project Management Assistant 	<ul style="list-style-type: none"> Vidhi Mohan
12/06/07	Network Rail HQ, Melton St, London	RUS & Congested Infrastructure	<ul style="list-style-type: none"> Richard Eccles, Head of Route Planning 	<ul style="list-style-type: none"> Nicola Forsdike
12/06/07	Network Rail HQ, Melton St, London	Operational Performance, JPIPs	<ul style="list-style-type: none"> John Thompson, Performance Improvement Leader 	<ul style="list-style-type: none"> Nicola Forsdike
12/06/07	Network Rail HQ, Melton St, London	MUC	<ul style="list-style-type: none"> Erwin Klumpers, Senior Financial Analyst, Maintenance 	<ul style="list-style-type: none"> Duncan Mills
13/06/07	Network Rail HQ, Melton St, London	Satisfaction	<ul style="list-style-type: none"> Chris Rumfitt, Head of External Communications Pete Allen, Senior Market Research Specialist 	<ul style="list-style-type: none"> Nicola Forsdike
14/06/07	Sheffield LMD	M19	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Steve Beaumont
14/06/07	11 Albion Street, Leeds	M4	<ul style="list-style-type: none"> Chris Myers, TSR Planner 	<ul style="list-style-type: none"> Nicola Forsdike
15/06/07	Network Rail HQ, Melton St, London	CAF	<ul style="list-style-type: none"> Paul Wiseman, Head of Investment Efficiency 	<ul style="list-style-type: none"> Duncan Mills
19/06/07	Network Rail HQ, Melton St, London	RAB volume incentive	<ul style="list-style-type: none"> John Kennedy, Regulatory Economist 	<ul style="list-style-type: none"> Duncan Mills
27/06/07	Bletchley LMD	M19	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Steve Beaumont
28/06/07	Ramsgate LMD	M19	<ul style="list-style-type: none"> N/A 	<ul style="list-style-type: none"> Steve Beaumont
18/07/07	Temple Meads, Bristol	M20 M21 M22 M25	<ul style="list-style-type: none"> Brian Paynter, Principal Programme Controls Manager, MP&I 	<ul style="list-style-type: none"> Phil Edwards

15 Appendix D: Mandated confidence grading system

- 15.1.1 This Appendix presents the criteria used for assigning confidence grades under the mandated grading system.
- 15.1.2 The confidence grading system has been established to provide a reasoned basis for undertakers to qualify information in respect to reliability and accuracy. It is essential that proper care and a high level of application is given to the assignment of confidence grades to data requiring such annexation. A quality-assured approach should be employed in the methodology used to assign confidence grades, particularly if sampling techniques are in place.
- 15.1.3 The confidence grade combines elements of reliability and accuracy, for example:
- A2: Data based on sound records etc. (A, highly reliable) and estimated to be within +/- 5% (accuracy band 2);
 - C4: Data based on extrapolation from a limited sample (C, unreliable) and estimated to be within +/- 25% (accuracy band 4);
 - AX: Data based on sound records etc. (A, highly reliable) but value too small to calculate meaningful accuracy percentage.
- 15.1.4 Reliability and accuracy bands are shown in the tables below.

Reliability Band	Description
A	Sound textual records, procedures, investigations or analysis properly documented and recognised as the best method of assessment.
B	As A but with minor shortcomings. Examples include old assessment, some missing documentation, some reliance on unconfirmed reports, some use of extrapolation.
C	Extrapolation from limited sample for which Grade A or B data is available.
D	Unconfirmed verbal reports, cursory inspections or analysis.

Accuracy Band	Accuracy to or within +/-	but outside +/-
1	1%	-
2	5%	1%
3	10%	5%
4	25%	10%
5	50%	25%
6	100%	50%
X	accuracy outside +/- 100 %, small numbers or otherwise incompatible (see table below)	

- 15.1.5 Certain reliability and accuracy band combinations are considered to be incompatible and these are blocked out in the table below.

Compatible Confidence Grades				
Accuracy Band	Reliability Band			
	A	B	C	D
1	A1			
2	A2	B2	C2	
3	A3	B3	C3	D3
4	A4	B4	C4	D4
5			C5	D5
6				D6
X	AX	BX	CX	DX

- 15.1.6 Systems for the acquisition, collation and presentation of regulatory data are expected to have reached an advanced level of development. In most cases, a confidence grade of A2, A3, B2 or better should be expected. Where confidence grades are below these levels, Network Rail should report on their actions for improvement in the commentary for the table concerned.
- 15.1.7 Any deterioration in confidence grades from those reported in the previous Annual Return should be explained together with the action plan for improvement as appropriate.
- 15.1.8 Reports on action plans should include the projected confidence grades, but confidence grades entered in the tables should reflect the current status of the data and not the future status it is intended to achieve.
- 15.1.9 All confidence grades reported should be commented on by the Reporter (or, as appropriate, the Auditor). In each case, they are required to state whether they agree with the confidence grading and if not, provide their opinion. Reporters should also comment on any deterioration, the reason provided by the company, and either the action plan for improvement or justification for limited achievement as noted above. Where there is disagreement between the parties, the Director will normally use the Reporter's assessment of the confidence grade.

16 Appendix E: Historical Performance against Target

16.1 Summary of Targets

16.1.1 The ORR Access Charges Review 2003 set targets for Control Period 3 (2004/05-2008/09). Figure 16.1.1 shows Network Rail's performance against the regulatory targets reported in the Annual Return.

16.1.2 The colour coding in Figure 16.1.1 is based on the targets:

- Red: outside nominal target (target missed);
- Green: inside the nominal target (target achieved).
- Grey: no regulatory target set.

Measure	01/02 result	02/03 result	03/04 result	04/05 result	05/06 result	06/07 result
Operational Performance						
Total Network Rail caused delay (million minutes)	13.8	14.7	13.7	11.4	10.5	10.5
Total delay minutes/100 train kms (franchised passenger operators)	2.75	2.92	2.66	1.96	1.93	1.92
Number of broken rails (M1)	535	444	334	322	317	192
Track geometry (M3)						
35mm Top 50%	62.4	61.9	62.4	66.0	67.9	70.0
35mm Top 90%	89.4	88.9	89.2	90.9	91.8	92.3
35mm Top 100%	97.1	97.0	97.0	97.7	98.0	98.1
35mm Alignment 50%	73.6	74.6	72.7	76.9	78.8	79.0
35mm Alignment 90%	93.1	93.6	92.9	94.1	94.8	95.0
35mm Alignment 100%	96.3	96.7	96.5	97.0	97.3	97.5
70mm Top 50%	61.9	62.2	63.6	67.7	70.5	72.2
70mm Top 90%	92.5	92.1	92.4	93.6	94.3	94.7
70mm Top 100%	95.6	95.2	95.3	96.2	96.5	96.7
70mm Alignment 50%	80.0	80.9	79.5	82.8	83.2	82.9
70mm Alignment 90%	96.0	96.2	95.8	96.9	97.1	97.3
70mm Alignment 100%	97.4	97.5	97.2	98.0	98.2	98.3
Track geometry – level 2 exceedences (M5)	1.35	1.17	1.11	0.91	0.82	0.72
Condition of asset TSRs (M4) (Number & Severity)	N/A	1,308	1,199	942	815	710
	N/A	6,169	6,089	4,624	4,285	3246
Earthworks Failures (M6)	N/A	N/A	47	54	41	90
Signalling failures (M9)	27,905	29,013	28,098	24,950	23,367	22,704
Signalling asset condition (M10)	2.4	2.4	2.5	2.5	2.4	2.39
Traction power incidents causing train delays (M11 & M12)	107	102	79	71	49	69
	30	32	33	13	6	11
Electrification condition – a.c. traction feeder stations & track sectioning points (M13)	2.1	1.9	1.9	1.87	1.85	1.88
Electrification condition – d.c. substations (M14)	2.3	2.1	1.9	1.82	1.78	1.64
Electrification condition – a.c. traction contact systems (M15)	1.9	1.8	1.7	1.7	1.7	1.7
Electrification condition – d.c. traction contact system (M16)	1.8	1.8	1.8	1.9	1.8	1.9
Station condition index (M17)	2.25	2.25	2.25	2.23	2.22	2.24
Light maintenance depot – condition index (M19)	3.07	3.04	2.63	2.63	2.58	2.56
Network Rail Asset Stewardship Incentive Index (ASII) <small>(Based on End of CP3 Target)</small>	N/A	1.20	1.09	0.90	0.80	0.72
Renewal Efficiency: Budget Variance Analysis	N/A	N/A	N/A	9%	18.1%	23%

Figure 16.1.1 Results by measure (2001/02-2006/07), and performance against CP3 Regulatory targets

17 Appendix F: Confidence grade trends

17.1 Summary of grades

17.1.1 This Appendix presents a summary of the confidence grades which have been assigned to the Annual Return measures over the last three years by:

- Independent Reporter A, Halcrow ('H');
- Independent Reporter B, Mouchel Parkman ('MP');
- Network Rail ('NR').

17.1.2 Figure 17.1.1 shows the confidence grades for the measures reported between 2004/05 and 2006/07. Where no grade was assigned by a particular party, 'NG' has been entered. Where the cells are greyed out for a measure for an entire year, that measure was not reported in that year. Where the cells are greyed out for only one Independent Reporter in a year, the measure was the responsibility of the other Independent Reporter.

Annual Return Measure	2004/05			2005/06		2006/07	
	NR	H	MP	NR	H	NR	H
	All Measures	Allocated Measures	Allocated Measures	All Measures	All Measures	All Measures	All Measures
Operational Performance	NG		NG	NG	B3	NG	B2
Customer & Supplier Satisfaction	NG		NG	NG	A2	NG	A2
Joint Performance Process (JPP)	NG		NG	NG	B3	NG	B2
Route Utilisation Strategies (RUSs)	NG		NG	NG	B1	NG	B2
Linespeed capability (C1)	B2		BX	B2	B2	B2	B2
Gauge capability (C2)	B3		B3	B1	B2	B2	B2
Route availability value (C3)	NG		NG	NG	B2	NG	B2
Electrified track capability (C4)	B2		BX	B2	B3	B2	B2
Mileage				NG	B3	NG	B3
Freight Gross Tonne Miles				NG	B3	NG	B2
Number of broken rails (M1)	A2	A1		A2	A1	A1	A1
Rail defects (M2)	B3	B4		B4	B4	B3	B3
Track geometry (M3 & M5)	A2	A1		A1	A1	A1	A1

Figure 17.1.1 Confidence Grades assigned to Annual Return Measures (2004/05-2006/07)

Annual Return Measure	2004/05			2005/06		2006/07	
	NR	H	MP	NR	H	NR	H
	All Measures	Allocated Measures	Allocated Measures	All Measures	All Measures	All Measures	All Measures
Condition of asset TSR sites (M4)	B2	B2		B2	B2	B2	B2
Earthworks Failures (M6)	A2		AX	A2	A2	A2	A2
Bridge condition (M8)	B3		B2	B3	B2	B3	B2
Signalling failures (M9)	B2	B3		B2	C4	B2	C4
Signalling asset condition (M10)	B3	B3		B3	B3	B3	B3
Traction power incidents causing train delays (M11)	B2	B2		B2	B3	B2	B2
Traction power incidents causing train delays (M12)	BX	BX		BX	BX	BX	BX
Electrification condition – a.c. FS & TSP (M13)	B2	B2		B2	B2	B2	B2
Electrification condition – d.c. substations (M14)	NG	B2		B2	B2	B2	B2
Electrification condition – a.c. contact systems (M15)	B3	B3		B3	C3	B3	C3
Electrification condition – d.c. contact system (M16)	B3	B3		B3	C4	B3	C4
Station condition index (M17)	B2		B3	B2	B3	B2	B3
Station facility score (M18)	B2		B3	B2	B2	B2	B2
Light maintenance depot – condition index (M19)	B3		BX	B2	B4	B2	B4
Asset Stewardship Incentive Index (ASII)	NG	B2		NG	BX	NG	BX
Track Renewal Volumes (M20, M21, M22, M25)	NG	B2		NG	B2	NG	B2
Signalling Renewed (M24)	B3	B2		NG	C4	NG	D3
Structures Volumes (M23)	NG		NG	NG	B2	NG	A3
Structures Volumes (M26-29)	NG		NG	NG	B2	NG	A1
Renewal Efficiency: Unit Costs	NG		NG	NG	B2	NG	B2
Renewal Efficiency: Budget Variance Analysis	NG		NG	NG	B3	NG	B2

Figure 17.1.1(cont) Confidence Grades assigned to Annual Return Measures (2004/05-2006/07)

- 17.1.3 Year-on-year changes in the confidence grades given to a measure may be due to:
- (a) Changes to the definition of a measure, agreed by ORR and Network Rail;
 - (b) Changes to the processes for the collection or reporting for a measure;
 - (c) Changes to the accuracy or reliability of a measure for a particular year;
 - (d) Changes to the Independent Reporter's investigation techniques leading to a more comprehensive understanding of the confidence that may be assigned;
 - (e) A maturing of the Independent Reporter's understanding of the collecting or reporting processes for a measure, leading to a more comprehensive application of the confidence grading system.
- 17.1.4 It should be noted that the Independent Reporters assigning grades over the period shown in Figure 17.1.1 may have used the confidence grading system differently; thus grades should be viewed in conjunction with the individual audit report and commentary for each measure to understand any variations in confidence year-on-year.

17.2 Commentary

- 17.2.1 Notable variations to confidence grades assigned by the Independent Reporters between 2005/06 and 2006/07 are shown in Figure 17.2.1 with a commentary.

Measure	2005/06	2006/07	Commentary
Route Utilisation Strategies (RUSs)	B1	BX	In 2005/06 this measure was mistakenly given a grade of B1, which is not a compatible grade under the grading system. An accuracy grade of X is awarded if the scores are incompatible.
Structures Volumes (M23)	B2	A3	The change to the process by reporting through the CAF system has improved the reliability and accuracy of the total renewal data. However, errors were found in the recorded square metres of bridge deck renewed, which has reduced the accuracy grade.
Structures Volumes (M26-29)	B2	A1	The change to the process by reporting through the CAF system has improved the reliability and accuracy of the total renewal data.

Figure 17.2.1 Notable variation for 2005/06-2006/07 Independent Reporter confidence grades

- 17.2.2 Notable variance between NR and Reporter grades in 2006/07 are shown in Figure 17.2.2 with a commentary.

Measure	NR	Halcrow	Commentary
Signalling failures (M9)	B2	C4	The Independent Reporter identified a misalignment between the information system used to supply the data for the measure and the data to support the commentary.
Electrification condition – d.c. contact system (M16)	B3	C4	The confidence grading system requires that measures subject to extrapolation are assigned a maximum reliability grade of C.
Light maintenance depot – condition index (M19)	B2	B4	The Independent Reporter identified discrepancies in depot inspection reports which impacted the results. Also shortcomings were noted in both report checking and HQ audits.

Figure 17.2.2 Notable variation for Network Rail/ Independent Reporter confidence grades

18 Appendix G: Material changes to measures

18.1 Summary of change

- 18.1.1 In order to assess the comparability of results reported in different years for the purposes of trend analysis, this Appendix presents a summary of:
- Changes to the definition of a measure, agreed by ORR and Network Rail;
 - Changes to the processes for the collection or reporting for a measure.
- 18.1.2 Where other changes are known these are also highlighted, e.g. changes to an underlying assessment methodology which (erroneously) does not form part of the Asset Reporting Manual documentation.
- 18.1.3 Currently, measures are formally documented in one of three locations:
- Network Rail: Asset Reporting Manual for asset management measures;
 - Network Rail: KPI Manual for Network Rail Key Performance Indicators;
 - Office of Rail Regulation: ORR KPI definitions for Network Rail Monitor (NRM).
- 18.1.4 As more measures are added to the Annual Return, a growing number of measures are not formally documented. Not only does this make the audit process less robust, it also makes it difficult to control or identify material change that impacts trend analysis.
- 18.1.5 Figure 18.1.1 shows the changes to documented definitions (DF), procedures (PR), sub-procedures (SP) and manuals (MN) from the Asset Reporting Manual and an assessment of the impact of the change on trend analysis. Changes within 2006/07 are highlighted in blue.
- 18.1.6 To our knowledge, there have been no changes to the definitions in the KPI Manual for NR KPIs or the NRM definitions for ORR KPIs.

Measure	Doc	Rev 1	Rev 2	Rev 3	Rev 4	Rev 5	Rev 6	Impact of change
Linespeed capability (C1)	DF	Nov-00	16/03/01	14/12/01	17/02/04	28/02/05	28/02/07	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Gauge capability (C2)	DF	Nov-00	16/03/01	14/12/01	17/02/04	28/02/05	-	Change of source database has not impacted use of trend
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Route availability value (C3)	DF	Nov-00	16/03/01	14/12/01	17/02/04	28/02/05	-	Change of source database has not impacted use of trend
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Electrified track capability (C4)	DF	Nov-00	16/03/01	14/12/01	17/02/04	28/02/05	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Number of broken rails (M1)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Change of source database has not impacted use of trend
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Rail defects (M2)	DF	Nov-00	16/03/01	14/12/01	17/02/04	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Track geometry (M3)	DF	Nov-00	16/03/01	14/12/01	17/02/04	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Condition of asset TSR (M4)	DF	Nov-00	01/12/00	01/01/01	16/03/01	17/02/04	-	Material change to calculation method from 2003/04 (incl.)
	PR	Nov-00	Jan-01	01/01/01	01/02/01	16/03/01	22/03/04	
Track geometry (M5)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	See M03	-	-	
Earthworks Failures (M6)	DF	Nov-00	16/03/01	17/02/04	28/02/05	09/02/07	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	22/03/04	28/02/05	-	-	
Bridge condition (M8)	DF	Nov-00	16/03/01	14/12/01	17/02/04	28/02/05	-	Material changes to SCMI methodology [date tbc]
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	-	
Signalling failures (M9)	DF	Nov-00	16/03/01	17/10/02	12/11/02	17/02/04	02/03/07	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	22/03/04	02/03/07	-	-	
Signalling asset condition (M10)	DF	Nov-00	16/03/01	14/12/01	17/02/04	23/02/07	-	Material changes to SICA methodology 2002/03, 2005/06
	PR	Nov-00	16/03/01	14/12/01	22/03/04	23/02/07	-	
Traction power incidents a.c. (M11)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	22/03/04	28/02/05	-	-	
Traction power incidents d.c. (M12)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	See M11	-	-	-	

Figure 18.1.1 Changes to measures reported in the Asset Reporting Manual

Measure	Doc	Rev 1	Rev 2	Rev 3	Rev 4	Rev 5	Rev 6	Impact of change
Electri'n condition – a.c. FS & TSP (M13)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	23/11/06	
Electri'n condition – d.c. substations (M14)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	28/02/05	23/11/06	
Electri'n condition – a.c. contact systems (M15)	DF	Nov-00	16/03/01	17/02/04	21/11/06	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	21/11/06	-	
Electri'n condition – d.c. contact system (M16)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	-	-	
	SP	16/03/01	14/12/01	22/03/04	-	-	-	
Station condition index (M17)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	MN	16/03/01	14/12/01	22/03/04	-	-	-	
	PR	Nov-00	16/03/01	14/12/01	22/03/04	-	-	
Station facility score (M18)	DF	Nov-00	Dec-00	16/03/01	17/02/04	-	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	05/01/01	07/02/01	16/03/01	22/03/04	28/02/05	
Light maintenance depot – condition index (M19)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	MN	16/03/01	22/03/04	-	-	-	-	
	PR	Nov-00	16/03/01	14/12/01	22/03/04	-	-	
Track Renewal Volumes (M20)	DF	Nov-00	16/03/01	14/12/01	12/11/02	17/02/04	-	Non-material changes: trend analysis unaffected
	PR	Nov-00	16/03/01	14/12/01	22/03/04	-	-	
Track Renewal Volumes (M21)	DF	Nov-00	16/03/01	14/12/01	12/11/02	17/02/04	-	Non-material changes: trend analysis unaffected
	PR	See M20	-	-	-	-	-	
Track Renewal Volumes (M22)	DF	Nov-00	16/03/01	14/12/01	12/11/02	17/02/04	-	Non-material changes: trend analysis unaffected
	PR	See M20	-	-	-	-	-	
Structures Volumes (M23)	DF	Nov-00	16/03/01	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	22/03/04	-	-	-	-	-	
Signalling Renewed (M24)	DF	Nov-00	16/03/01	14/12/01	17/02/04	-	-	Non-material changes: trend analysis unaffected
	PR	22/03/04	-	-	-	-	-	
Track Renewal Volumes (M25)	DF	14/12/01	17/02/04	-	-	-	-	Non-material changes: trend analysis unaffected
	PR	See M20	-	-	-	-	-	
Structures Volumes (M26)	DF	12/11/02	17/02/04	-	-	-	-	Non-material changes: trend analysis unaffected
	PR	See M23	-	-	-	-	-	
Structures Volumes (M27)	DF	12/11/02	20/02/03	17/02/04	-	-	-	Non-material changes: trend analysis unaffected
	PR	See M23	-	-	-	-	-	
Structures Volumes (M28)	DF	17/02/04	-	-	-	-	-	Non-material changes: trend analysis unaffected
	PR	See M23	-	-	-	-	-	
Structures Volumes (M29)	DF	17/02/04	-	-	-	-	-	Non-material changes: trend analysis unaffected
	PR	See M23	-	-	-	-	-	

Figure 18.1.1(cont) Changes to measures reported in the Asset Reporting Manual

18.2 Commentary

18.2.1 The use of Annual Return data for the purposes of trend analysis should be undertaken with reference to the individual audit reports and commentaries for each measure to understand any variations in confidence year-on-year or to identify other pertinent issues.

18.2.2 There were no material changes which impacted trend analysis this year.

19 Appendix H: Network Rail Monitor (NRM)

19.1 Measures reported in both NRM and Annual Return

19.1.1 The quarterly Network Rail Monitor can be found on the website of the Office of Rail Regulation, www.rail-reg.gov.uk

19.1.2 Figure 19.1.1 identifies where the same measures are reported in both the Network Rail Monitor and the Annual Return. However, it should be noted:

- (a) The measures in the Annual Return pertain to the full year, whereas the measures in the NRM are collected on a quarterly basis.
- (b) The measures in the Annual Return are finalised full-year figures, whereas the measures in the NRM are “the latest available and may be subject to subsequent update” and “subject to year end verification”.

Measure in Network Rail Monitor	Measure in Annual Return Measure
KPI 1 – Safety risk; Railway Safety & Standards Board (RSSB) train accident precursor measure composite	No equivalent measure
KPI 2 – Train performance; Public Performance Measure (PPM)	Public Performance Measure (PPM); Table 13, Section 1 of Annual Return
KPI 3 – Network Rail delay minutes; Number of delay minutes attributed to Network Rail causes	National delay data by cause; Table 16, Section 1 of Annual Return
KPI 4 – Asset failures; Number of infrastructure incidents	Asset failure; Table 32, Section 1 of Annual Return
KPI 5 – Asset stewardship index (ASI) (GB only) Composite of eight asset condition measures at Network level	Asset Stewardship Incentive Index (ASII); Table 110/111, Section 3 of Annual Return
KPI 5 -Asset stewardship index -routes (ASI- R) (England and Wales, and Scotland) Composite of eight asset condition measures at route level	No equivalent measure
KPI 6 – Activity volumes (track renewals only); Percentage of activity compared with plan	Activity Volume KPI; Included within Table 132, Section 4 of Annual Return
KPI 7 – Unit cost efficiency gain; Unit cost compared with benchmark	Financial Efficiency Index; Text, Section 6 of Annual Return
KPI 8 – Expenditure variance; Variation to Network Rail annual budget from ORR determination	Overall Cost Control or Expenditure Variance; Table 181, Section 7 of Annual Return
KPI 9 – Financing; Debt to RAB (Regulatory Asset Base) ratio	Debt to RAB ratio; Table 179, Section 7 of Annual Return
KPI 10a – Customer satisfaction; Train operator customer satisfaction	Customer satisfaction – passenger operators; Table 41, Section 1 of Annual Return
KPI 10b – Customer satisfaction; Train operator customer satisfaction	Customer satisfaction – freight operators; Table 42, Section 1 of Annual Return
KPI 11 – Supplier satisfaction; Major supplier satisfaction	Supplier Satisfaction; Table 43, Section 1 of Annual Return

Figure 19.1.1 Measures reported in both Network Rail Monitor and Annual Return

20 Appendix I: Recommendations

Reference code	Recommendation
2006/07-001	Operational Performance recommendation 1. We have no doubt that the performance initiatives in hand arise in part from the high level of resource (especially people) being dedicated to this area. We recommend that the current resource base continue to be maintained with funding made available for systems improvements (subject to appropriate business cases being made).
2006/07-002	Satisfaction recommendation 1. The measure reported is a single element in a much wider survey. We believe there may be benefit in the development of a second score, potentially a composite measure based on a number of attitudinal questions. However, we believe the true value of this survey lies not in the scores themselves, but in the changes and improvements that Network Rail make based on this and other KPIs.
2006/07-003	JPIP recommendation 1. We recommend the continued development of the challenge process for standard and stretch targets. We also recommend the continuing development of reporting such that forecasting accuracy can be monitored enabling Routes that may require support in this area to be identified.
2006/07-004	JPIP recommendation 2. We recommend that the links between the JPIP process and infrastructure maintenance and renewal plans be formally strengthened. The JPIP has the potential to become a powerful tool for driving performance improvement, but is at risk of being seen as a bolt-on, rather than a process that could be influential in business planning.
2006/07-005	RUS recommendation 1. We recommend that processes be developed to ensure the on-going maintenance of RUS including clear documentation of the types of triggers and circumstances that would cause a RUS to be re-visited.
2006/07-006	RUS recommendation 2. The Technical Guide should be updated. Areas for update include a revision of the demand forecasting text, in light of experience and lessons learned; documentation of process for maintenance of a RUS; reference to Network Rail's organisation and structure for the development and maintenance of a RUS, including the new roles of HQ Project Manager; reference to project management processes.
2006/07-007	RUS recommendation 3. We recommend that Network Rail sets out how the RUS process will be internalised into the route development and business planning processes to ensure it does not become a stand-alone exercise. The Business Planning Criteria might be an appropriate vehicle for this. However, the process should also be documented within the Technical Guide.
2006/07-008	C1 recommendation 1. We recommend that the data tables in the Annual Return be presented in consistent units, rather than in a confusing mix of Imperial and SI units. This recommendation was also made in our 2006 report, but has yet to be implemented.
2006/07-009	C2 recommendation 1. We recommend that Network Rail undertakes a thorough data cleaning exercise of the Capabilities Database to ensure that the gauge given for all sections of the network reflect those that are in the National Gauging Database and all Certificates of Gauging Authority issued.
2006/07-010	Mileage recommendation 1. We recommend that Chiltern Railways running on LUL infrastructure be excluded from the figure reported.
2006/07-011	Mileage recommendation 2. We recommend that Network Rail rationalises the significant differences between data extracted from BIFS by the Performance Reporting Analyst and the Freight Billing Team.
2006/07-012	Mileage recommendation 3. We recommend Network Rail rationalises the significant differences between the BIFS and PALADIN train mileages.
2006/07-013	Mileage recommendation 4. We recommend that a Network Rail adopt a formal procedure for reporting this measure.
2006/07-014	M1 recommendation 1. We recognise that there has been some good practice in some of the Territories to carry out an analysis of rail break classifications to compare with previous years. We recommend that a retrospective network-wide analysis of the individual classifications of rail breaks is carried out. This will add significant value if year-on-year trends, geographical trends, or other trends which may be established. In our opinion, this is an essential part of Network Rail's rail asset management process which is currently not being managed on a consistent network-wide basis.

Reference code	Recommendation
2006/07-015	M2 recommendation 1. We still remain concerned as to the accuracy of data reported and the extent of 'data refreshes' at the start of each year for the M2 measure which has directly led to the confidence grade of B3. We recommend that Network Rail ensure that the data that is transferred to the new national system, RDMS, is from the most accurate source and is systematically checked by the Territories and Areas.
2006/07-016	M2 recommendation 2. We have recognised the concentrated effort to reduce RCF type defects with rail grinding and re-railing particularly. However, the visibility of the results of this work is not reflected in the continuous rail defect figures. Therefore, to make this more visible, we recommend again that an RCF Heavy & Severe category is reported separately in order to make visible the removal of Heavy & Severe RCF defects. This would enable the benefit of the rail grinding and rerailing work to be assessed.
2006/07-017	M4 recommendation 1. We recommend the additional process notes currently in development to document the manual manipulation and checking be incorporated within the RT/ARM/M4PR as further guidance to correct compilation of the measure.
2006/07-018	M4 recommendation 2. We recommend the PPS system is considered for further enhancement to further automate the generation of the measure.
2006/07-019	M4 recommendation 3. We recommend instructions be re-issued to all local teams regarding the correct procedure for inputting Emergency Speed Restrictions to PPS.
2006/07-020	M4 recommendation 4. We recommend the definition of the measure be amended to remove the qualifying time period of >4weeks.
2006/07-021	M6 recommendation 1. Reporting of multiple failures caused by a single event needs to be clearly defined. Currently all Territories are reporting failures such as this consistently but it would be useful for this to be defined within Network Rail's Asset Reporting Manual. Such a review should consider the process of reporting to ensure it is consistently applied across the Territories by all those involved. We have no recommendations for this measure.
2006/07-022	M8 recommendation 1. We recommend that the competency standard is revised to include SCMI examinations, and that Network Rail ensure that the training and assessment standards for both SCMI and Examiners Competence, that satisfy NR/SP/CTM/01, are agreed by the Industry.
2006/07-023	M9 recommendation 1. We recommend that the Fault Management System should be reviewed. This review should cover known deficiencies in respect of FMS verified assets, FMS data entry, FMS data coding, FMS data extraction/ analysis. We suggest that analysis of the data-entry process might usefully include a human factors study to assess how the non-technical Controllers interact with the data-entry tree. This will be particularly relevant to any system design for a replacement for FMS.
2006/07-024	M10 recommendation 1. We recommend that the current practice of applying adjustment factors to primary SICA scores should be documented to justify and provide evidence for the level of the adjustment factor. The procedure and definition should be updated to include an explanation of this practice.
2006/07-025	M10 recommendation 2. We recommend that a concerted management effort is undertaken to ensure that the SIS data is checked against the interlocking data cards. to ensure that the number of interlockings is correct for 2007/08 and that any differences can be detailed and attributed to new interlockings not yet due for assessment or to assessments not carried out when planned. We recommend that a documented process for making changes to SIS is produced.
2006/07-026	M13 recommendation 1. We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.
2006/07-027	M14 recommendation 1. We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.
2006/07-028	M15 recommendation 1. We recommend that the dataset of condition scores should be recalculated using natural rounding now that 100% of the population has been assessed.
2006/07-029	M17 recommendation 1. If the use of MP&I for management of the inspection contracts is continued, we recommend that this is applied consistently across the Territories and is documented in an updated procedure, which clearly outlines the responsibilities and ownership for this measure.
2006/07-030	M17 recommendation 2. To ensure consistency across the Network, we recommend that Network Rail check that inspection contractor's staff are suitably qualified and fully briefed on the procedure for this measure. This should also include keeping a register of the names of inspectors used to collect the data for this measure.
2006/07-031	M17 recommendation 3. We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay.

Reference code	Recommendation
2006/07-032	M18 recommendation 1. We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay. Issues to be considered should include: (a) review relevance and purpose of measure, (b) take account of split responsibility for providing facilities between Network Rail and train operators, (c) introduce weighting of the scores to reflect importance to public e.g. disabled access and security; (d) review scoring of facilities to reflect quality as well as/ rather than quantity; (e) review scoring for facilities which are not currently operational; (f) introduce benchmark for what facilities stations of various categories/footfalls should have; (g) consider combining collection of data with other surveys; (h) ensuring that the list of facilities included in the measure is flexible to ensure redundant technologies can be removed, and new technologies can be added.
2006/07-033	M18 recommendation 2. We suggest that it may be beneficial for Network Rail to redirect the resources planned for the collection of this measure in 2007/08, to the development of a better measure, and with the agreement of ORR, not report this measure in the Annual Return 2008.
2006/07-034	M19 recommendation 1. We strongly recommend that the long-standing matter of necessary change to this measure to make it more appropriate and reflective of true asset condition be concluded between Network Rail and ORR this year in order to allow it to be implemented without further delay.
2006/07-035	M19 recommendation 2. To ensure consistency across the Network, we recommend that Network Rail check that inspection contractor's staff are suitably qualified and fully briefed on the procedure for this measure. This should also include keeping a register of the names of inspectors used to collect the data for this measure.
2006/07-036	M20-M22, M25 recommendation 1. The PCS database should be modified to classify S&C renewals as 'full' and 'partial' renewals separately.
2006/07-037	M20-M22, M25 recommendation 2. Network Rail should investigate why for South East Territory, when volumes for individual depots (from P3e) were aggregated, they did not correspond accurately to the totals for South East Territory obtained from the MBR reports, and remedy the discrepancy
2006/07-038	M20-M22, M25 recommendation 3. We recommend that Scotland territory take steps to ensure that data is accurately entered into P3e.
2006/07-039	M24 recommendation 1. It was apparent from our meetings at Network Rail that the Champion identified for this measure did not deal with this matter directly. We recommend that Network Rail ensure that the Champion's for this and other measures do relate to the measure directly.
2006/07-040	M24 recommendation 2. We recommend the procedure for this measure is revised to reflect the new reporting process in use and update the assigned responsibilities for this measure.
2006/07-041	M23, M26-M29 recommendation 1. We recommend that Network Rail develops a revised definition and procedures for these measures. This to include a consistent policy of whether or not to include walkways while reporting bridge deck area renewed Also when square areas are entered into CAF, a record is made of which drawings these areas have been derived from.
2006/07-042	M23, M26-M29 recommendation 2. We recommend that CAF should indicate why any significant changes to volumes have taken place in relation to the business plan.
2006/07-043	MUC recommendation 1. We recommend that responsibilities and accountabilities for the quality of data in Ellipse is reviewed, allocated and documented. This review should include <i>inter alia</i> the roles of recording data, approving data, inputting data, checking data, authorising data, reporting data, auditing data, improving data quality at Work Gang, Delivery Unit, Area, Territory and National levels.
2006/07-044	MUC recommendation 2. We recommend that (i) the data quality levels required in Ellipse are identified (and set as targets) in order to optimise the usefulness of the data and the level of resources required to maintain a given level of data quality; (ii) Ellipse data quality reports monitor the level of achievement against these targets; and (iii) MBR packs report the level of achievement against these targets so that those responsible can be held to account by management.
2006/07-045	MUC recommendation 3. We recommend that the work activities (inputs and outputs) and reporting activities should be described in sufficient detail to reduce the opportunity for local interpretation; this would most likely take the form of formal documentation, communication materials and staff training.
2006/07-046	RAB Volume Incentives recommendation 1. We recommend the specifications of the input data and subsequent calculations are recorded and agreed with ORR.

21 Appendix J: Observations

<p>Operational Performance observation 1. We found significant examples of good practice in the Routes sampled. Whilst some information exchange does occur through cross-route forums, we found no formal mechanisms for exchanging this Best Practice (for example, through staff placements, or best practice forums), with exchange tending to rely on proactive individuals. We consider that during 2007 Network Rail should identify and recognise specific areas of best practice, leading to the development and trial of mechanisms to deliver exchange.</p>
<p>Operational Performance observation 2. At present, there is no regular and on-going benchmarking between Routes although Network Rail route targets for 2007/8 have been based on benchmarked information. It is therefore difficult to judge where the best performance is occurring both in terms of ensuring data quality and in terms of performance management. We consider that Network Rail should examine the benefits of developing a periodic report benchmarking Route Performance (arguably the PPM measure already delivers this for TOCs, but not Routes).</p>
<p>Operational Performance observation 3. At present, analysis and reporting is based on all delays over three minutes. Whilst this has helped to ensure that causes of major delay have been identified and tackled, parallels from railway safety suggest that pre-cursors may be important in terms of identifying future issues (rather than events that have already happened). There may, therefore, be a case for evaluating the merit in extending analysis to all delay.</p>
<p>Operational Performance observation 4. Current targets are based on the assumption that infinite improvement in performance is achievable and desirable. In practice, this may not be the case. Operational performance is a complex issue and we are aware that there is no such thing as a "base case", that is, no one has been able to define what the optimal performance level is for the current network and mix of services. The fact that performance this year has been stable, despite valiant efforts by Network Rail to improve, suggests that equilibrium point may be being reached. If this is the case, then simply doing more of the same will not obtain improvements in future years.</p>
<p>JPIP observation 1. It is very hard to draw the link between Delay Minutes and PPM. Whilst recognising that the current contractual structure of the industry means the latter are of primary importance to TOCs we consider that Network Rail's focus should remain on the former. In several instances during the audits we were told of cases where focussing on delay minutes rather than PPM had led to above-expected returns in PPM improvement. We recognise that this is difficult for Network Rail given the current financial incentive structures but strongly recommend that delay minute focus is not lost in pursuit of PPM.</p>
<p>C1 observation 1. For the purpose of gap analysis, the National Engineering Information Analyst has developed a spreadsheet whereby all Territories can report their linespeed changes occurring during the year in a consistent manner. This has however not been adopted uniformly by all Territories, and we consider that this should be implemented across all Territories.</p>
<p>C2 observation 1. During our visit to the Gauging NST we were informed that historical Certificates of Gauging Authority issued are not stored centrally at York, but are at the individual Territories. We consider that efforts should be made to ensure that copies of all Certificates issued are stored centrally, even if only in electronic format.</p>
<p>M2 observation 1. We recognise the progress being made on the initiative to apply the Ultrasonic Test Unit (UTU) testing to lines which are Track Category 1A, 1, 2 and 3 and the aim to comply with the mandatory testing requirements using the UTU instead of pedestrian ultrasonic testing, where practicable. As part of this process Network Rail have a wish to separate reportable defects from non-reportable defects in order to manage the data. We recognise that the testing process, as it improves, will most likely increase the overall volume of defects found, particularly if more non-reportable defects are being discovered which were previously not picked up. Therefore we support and endorse the initiative to separate actionable defects from non-actionable defects so that in the future, trend analysis will be possible for both actionable defective rail volumes and non-actionable defective rail volumes. If the new RDMS is capable of being coded to make this split visible, then all rail defects (both UTU and pedestrian ultrasonic generated defects) can be analysed in this way.</p>
<p>M3&M5 observation 1. In the London North Western and South East Territories we have witnessed some good practice with sub dividing PTG information down to Track Section Manager level. We believe that this practice should be rolled out to the rest of the network.</p>
<p>M4 observation 1. The process for calculating the score is documented. It is also embedded into a spreadsheet. However, we saw no evidence that these instructions are communicated other than by verbal delivery. It may be helpful to codify these in writing, covering for any future personnel changes.</p>
<p>M8 observation 1. To establish the level of national comparability within the SCMI scores, Network Rail Headquarters should arrange a SCMI examiner's workshop involving a few examiners from each SEC assessing the same sample of bridges. The resulting SCMIs could then be compared to see if there were any underlying trends in the scores awarded by each SEC's examiners.</p>
<p>M10 observation 1. We consider that a simple check be introduced to ensure that the data produced by the assessment process is correctly entered into SIS.</p>

<p>M11 observation 1. As reported last year, London North Eastern have initiated a failure/ trends database system and have expended some energy in recovering data from historic systems to produce this useful monitoring tool. We believe that this approach should be standardised and introduced nationally.</p>
<p>M13 observation 1. If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect any change in the process for collection and reporting of the data and the new responsibilities for this process to ensure continued ownership.</p>
<p>M14 observation 1. If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect the new responsibilities and ensure continued ownership.</p>
<p>M15 observation 1. If as proposed, the accountability of this measure is moved to the maintenance organisation, we recommend that the definition is updated in a timely manner to reflect any change in the process for collection and reporting of the data and the new responsibilities for this process to ensure continued ownership.</p>
<p>M16 observation 1. We would suggest that, subject to route / gauge acceptance, the programming of the new SMT should include at least one pass of the southern section of conductor rail in London North Western Territory.</p>
<p>MUC observation 1. The method for processing the maintenance unit cost and efficiency data before reporting, including the decision criteria for replacing collected data with estimated data, should be reviewed and subsequently formalised in documentation.</p>
<p>MUC observation 2. The in-year reporting of data using the MBR process would be improved by using a 'rolling-year' rather than a 'year-to-date' calculation; this would encourage better data quality as comparable results (between Delivery Units and time trends) would be available 13 periods-a-year rather than once-a-year as at present.</p>
<p>MUC observation 3. A systematic approach is required to eliminate data entry errors, such as automated error-checking (such as input masks) in Ellipse to eliminate entry of zero value or very low 'dummy' values (e.g. 1 minute in an 'hours worked' data field).</p>
<p>Renewals Budget Variance Analysis observation 1. We observe that the process was well-managed this year but that some confusion remained regarding the definition of some of the variance categories, primarily arising from the differences in use of terminology between delivery teams and finance/ regulatory teams. Network Rail should (and undoubtedly are already planning to) take steps to improve this understanding, including production of documentation, communication materials and training.</p>