

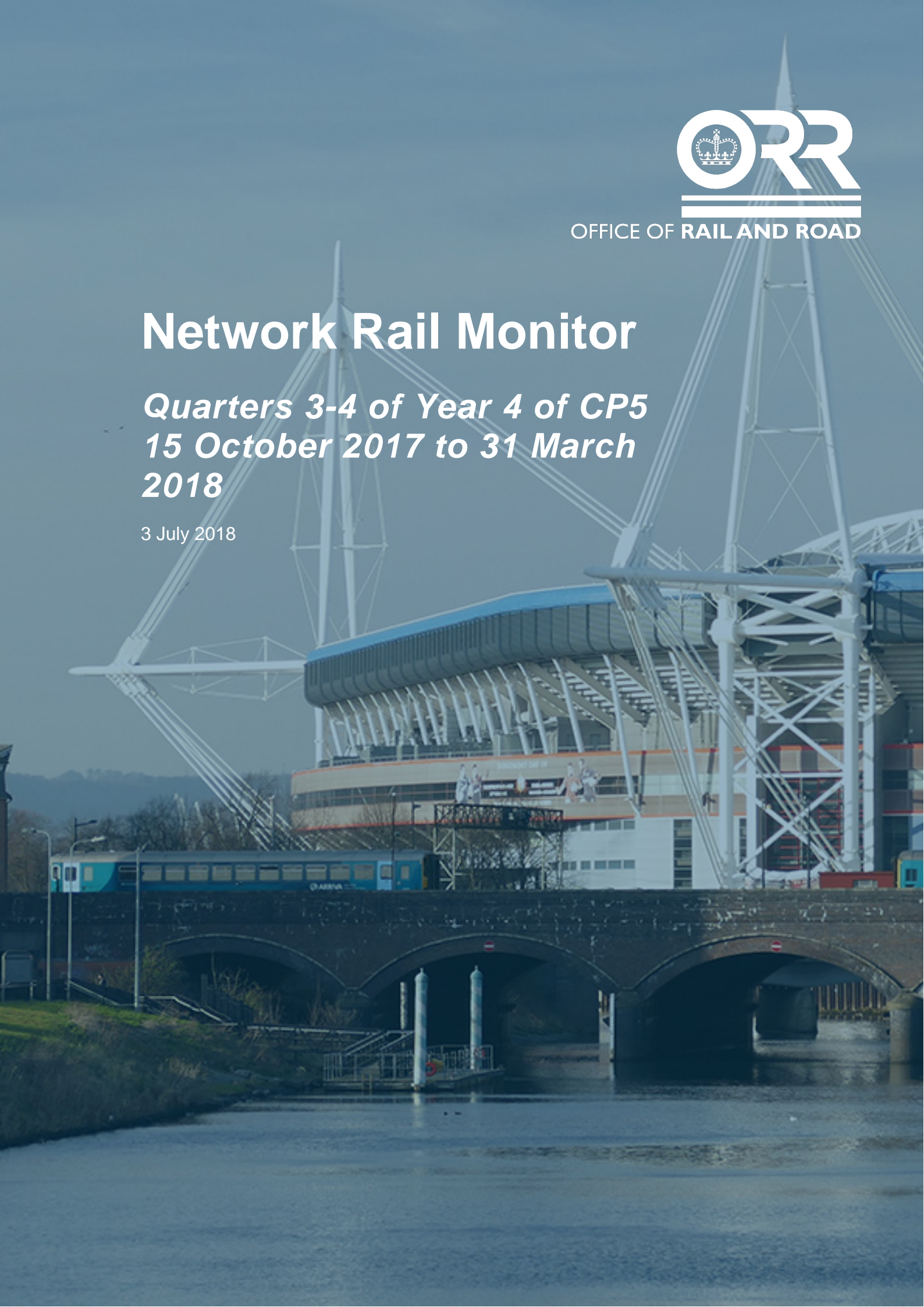


OFFICE OF RAIL AND ROAD

Network Rail Monitor

*Quarters 3-4 of Year 4 of CP5
15 October 2017 to 31 March
2018*

3 July 2018



Contents



1. Overview	4
Health and safety	4
Train service performance	4
Asset management	5
Developing the network	5
Expenditure and finance	6
Preparing for control period 6	7
Route level analysis	7
2. Health and Safety	8
Performance against key indicators	8
Inspection and investigation findings	9
Occupational health	15
Route level analysis	15
3. Train service performance	17
England and Wales performance	17
Delivery of performance at TOC level	20
Other performance interventions and measures	23
Freight performance	25
Route level analysis	28
4. Asset management	31
Asset performance	31
Asset sustainability	33
Asset data quality	34
Route level analysis	35
5. Developing the network	39
Delivery progress	39
Projects at risk	40
Enhancements capability	41
Route level analysis	41
6. Expenditure and finance	44
Efficiency continues to decline and renewals have been deferred	44

Wider financial performance	46
Significant enhancements have been delivered on budget	47
Debt and borrowing – no headroom in 2018-19	48
Asset disposals	48
Getting ready for CP6	48
Route level performance	51
7. The railway in Wales	54
Health and safety	54
Train performance	56
Asset management	57
Expenditure and financial performance	59
8. Y Rheilffyrdd yng Nghymru	62
Iechyd a diogelwch	62
Perfformiad trenau	64
Rheoli asedau	66
Gwariant a pherfformiad ariannol	67
9. Annex 1 – Route level analysis – methodology	70
Calculating composite metrics	70
Customer measures used to calculate the train performance composite metric	71
10. Glossary	73

1. Overview

Health and safety

- 1.1 Network Rail continued to deliver good health and safety management in 2017-18. There were no passenger or workforce fatalities on Network Rail-managed infrastructure and the workforce Lost Time Injury Frequency Rate (LTIFR) continued to reduce. Numbers of RIDDOR specified injuries were broadly static.
- 1.2 Network Rail's control of worker health and safety is consistent with a targeted national strategy. However, health and safety management systems within the routes and engineering disciplines are inconsistent and we continue to find varying levels of risk management and control. In other aspects of health and safety management, giving flexibility to the routes makes it easier to find innovative solutions to fit local circumstances and as such offers great potential for improvement. However, both nationally and locally, Network Rail needs to maintain strong safety leadership, effective risk assessment processes, and good assurance.
- 1.3 Favourable trends on asset safety indicators have continued, particularly in respect of track geometry. Management of civils assets, especially earthworks and drainage continues to present challenges particularly in respect of asset knowledge and inspection/examination. These challenges become more critical where the age and condition of assets, if not renewed, makes it all the more important that they are subject to effective and targeted maintenance regimes.
- 1.4 Level crossing risk continues to decline steadily although sadly six people died in accidents at level crossings in 2017-18. Faced with increasing difficulty in closing level crossings, Network Rail has taken the sensible decision to target improving safety at higher risk crossings through new technology. This refocused strategy has the potential to see continuing risk reductions.

Train service performance

Passenger

- 1.5 At the end of the year, national level punctuality as measured by the Public Performance Measure (PPM) moving annual average (MAA) was 87.6%, 4.8 percentage points (pp) worse than the regulated target. Similarly, Cancellations and Significant Lateness (CaSL) was 3.9%, 1.7pp above (i.e. worse than) the national level regulated target.
- 1.6 All 20 franchised train operating companies (TOCs) missed both PPM and CaSL targets.

- 1.7 Given South Western Railway's poor performance this year, we undertook a detailed review of Network Rail's delivery to this operator. We examined Network Rail's understanding of the issues affecting performance, the suitability of its short term recovery plans and the sustainability of those plans in the medium to longer term. We will publish the findings of our review shortly.

Informed Traveller and May 2018 timetable

- 1.8 In the last few months of 2017-18 it became apparent that the industry processes for setting timetables and providing passengers with information about planned services were not working as they should. Network Rail was unable to cope with a surge in urgent timetabling work, in particular its re-planning of the May 2018 base timetable to reflect delays to electrification around Bolton. We are currently investigating, focusing on Network Rail's recovery plan and monitoring, TOC information for passengers and root causes/lessons learnt.
- 1.9 The introduction of the May 2018 timetable has negatively impacted many passengers through cancellations, delay, overcrowding and uncertainty. On 4 June, the Secretary of State for Transport, Chris Grayling asked ORR, as the independent rail regulator, to set up an inquiry headed by ORR Chair Professor Stephen Glaister CBE into the failed introduction of the new timetable. The inquiry will focus on what actually took place when the timetable was introduced, compared to what should have happened. It will concentrate on the evidence of where there were differences, and the underlying causes. The inquiry will have three phases: evidence gathering, analysis, and the development of recommendations. An interim report will be published in September 2018.

Freight

- 1.10 Network Rail's performance for the freight sector was strong. The Freight Delivery Metric (FDM) MAA at the end of the year stood at 93.5%, well ahead of the national regulatory target of 92.5% although just behind Network Rail's internal target of 94%.

Asset management

- 1.11 During 2017-18, Network Rail achieved a 1.7% reduction in the number of infrastructure-related service affecting failures compared to 2016-17. The Composite Reliability Index (CRI), ended the year 2.5pp up at 18.3%. This is well ahead of the improvement trajectory Network Rail originally planned for CP5.

Developing the network

- 1.12 Network Rail's delivery of the enhancements portfolio remains mixed. There have been some major successes, notably the opening of the new concourse at London

Bridge Station, and electrification of Maidenhead to Didcot on the Great Western main line. There have also been some significant failures on electrification projects contributing to increased disruptive works across the network and delays to the introduction of new timetables. Network Rail still has much to do in the final months of CP5 to meet its obligations to passengers and funders.

- 1.13 We are working with the company to identify the material factors which have affected enhancements performance in CP5 and put in place a framework aimed at preventing the repeat of these failures in CP6 and beyond.

Expenditure and finance

- 1.14 The efficiency of Network Rail's operations, support, maintenance and renewals activities declined by £4m (0.4%) in 2017-18, compounding the £218m (4.4%) decline across the first three years of CP5. Network Rail's declining efficiency across the first four years of CP5 has been largely due to a £322m decline in renewals efficiency. Network Rail did not undertake £441m of renewals work planned in its budget for 2017-18 and has built up a substantial backlog of work across CP5 that will now need to be caught up in CP6 and beyond. We report on the problems with renewals delivery and efficiency in this Monitor.
- 1.15 Network Rail underperformed against its internal budget by £0.1bn in 2017-18 largely because of higher than budgeted Schedule 8 payments for poor train performance and rates for renewals. The level of underperformance has improved compared to the first three years of CP5 (average £0.6bn annual underperformance against budget).
- 1.16 Significant enhancements have been delivered on budget. Network Rail spent £4.1bn on enhancements in 2017-18, the largest annual investment in rail infrastructure in recent years. This work was delivered for slightly lower (£4m) than budget. Network Rail's difficulties with its enhancements programme earlier in CP5 resulted in increased budgets and deferred milestones for delivery of schemes. Problems with delivering these enhancements have contributed to problems with delivering planned renewals in CP5.
- 1.17 Network Rail's debt increased by £5.5bn to £50.3bn in 2017-18. It has fixed borrowing facilities with the Department for Transport (DfT) for CP5 for its activities in England and Wales, and in Scotland. For England and Wales, Network Rail expects to use all its remaining available borrowing for its planned activities in 2018-19. The lack of headroom means that the company will have no contingency in the event that income or expenditure outturn worse than planned. In view of Network Rail's underperformance against its own budget in each year of CP5 to date, we consider that this lack of contingency is risky. In practice, we expect that the company would need either to request additional funds from DfT, or defer further

renewals work into CP6, which would exacerbate the declining efficiency of its renewals activities.

Preparing for control period 6

1.18 Because poor planning for CP5 caused a number of the problems with Network Rail's renewals delivery and efficiency, we challenged the company to demonstrate that it is better prepared to deliver efficiently from the start of CP6. Network Rail has undertaken an analysis of some of the key leading indicators of efficient delivery for each of its routes for 2019-20, the first year of CP6. Given that it is around nine months before the start of CP6, we would not expect routes to have fully developed workbanks, contractual arrangements and resources. However, Network Rail's analysis shows that most routes still have a substantial amount of work to do to get ready for the start of CP6. Network Rail needs to do more to demonstrate that it will be ready for CP6. We report on this in this Monitor.

Route level analysis

1.19 ORR wishes to encourage comparisons and healthy competition between Network Rail route management teams as part of our route based regulatory approach. We believe this will provide routes with an incentive to excel and will facilitate the sharing of best practice.

1.20 In this edition of the Network Rail Monitor, we have built upon route level comparisons in previous Monitors and for the first time presented simple comparative charts comprised of composite measures of performance, based on Network Rail scorecards and supplementary measures by route. Appearing at the end of each chapter, these charts demonstrate the relative performance of each of the eight geographic routes against a series of performance metrics. We welcome feedback on how we can improve both the transparency and usefulness of this data. Please send your comments to us at routelevelcomparisons@orr.gsi.gov.uk.

2. Health and Safety

- 2.1 Network Rail continued to deliver good health and safety management in 2017-18. There were no passenger or workforce fatalities on Network Rail managed infrastructure and the workforce Lost Time Injury Frequency Rate (LTIFR) continued to improve.
- 2.2 Some of the issues we report on here are linked to other chapters, particularly chapter 4, Asset Management.

Performance against key indicators

- 2.3 Network Rail measures its health and safety performance against a range of targets. A key one for workforce safety is the LTIFR. By the end of 2017-18, this stood at 0.364, better than the target of 0.402. There were 85 RIDDOR specified injuries in 2017-18, compared to 89 in the previous year, and 580 lost time injuries in 2017-18 compared to 693 in 2016-17. This was despite 2.5 million extra hours worked in 2017-18 compared to 2016-17.
- 2.4 Compared to 2016-17, the LTIFR at the end of 2017-18 had reduced by 16%, continuing the trend seen over CP5. Within the reduction there are significant variations across Network Rail's businesses. Reduction in the routes was 14%, compared to Infrastructure Projects' reduction of 27%.
- 2.5 The fatalities and weighted injuries (FWI) measure, normalised for hours worked, is an indication of the severity of injuries and helps to explain the severity of accidents better than simple numbers of RIDDOR reportable injuries. At the end of 2017-18, the FWI was 0.076, a decrease of 14% compared to 2016-17. This suggests that injury severity has reduced over the year.
- 2.6 Overall, the picture is a positive one, with improving accident and injury trends. It suggests that Network Rail, through its workforce health and safety plans, is effectively targeting its efforts in the right areas.
- 2.7 According to the Train Accident Precursor Indicator Model (PIM), train accident risks have reduced over the past 12 months and the overall level of risk continues to be at historically low levels. The PIM is very susceptible to adverse weather events affecting earthworks, track, and signalling wrong side failures and is perhaps best seen as a historical indicator of risk rather than a predictor of levels of safety in the future. The PIM tracks higher risk (20+) wrong side failures (events/failures with the potential to cause higher risk accidents) in key areas. Track system risk, as expressed by FWI per year, has reduced over CP5. However, reducing overall numbers of 20+ wrong side failures and variable FWI/year suggests that although numbers of incidents have reduced, their potential seriousness has not. Network

Rail's own analysis is that the reduction in incidents reflects management focus on reducing numbers of temporary speed restrictions, rail defects, and cyclic top sites. Track twist and geometry faults remain above target and continue to make a substantial contribution to overall track risk. Following a slight reduction in 2016-17, the numbers of incidents in 2017-18 remained steady.

- 2.8 There were fewer higher risk (20+) structures wrong side failures in 2017-18 (36) than in 2016-17 (51), continuing the reduction seen throughout CP5. There were approximately 18% fewer earthworks higher risk (20+) wrong side failures in 2017-18 than in 2016-17. In both asset categories, although the reduction in numbers of events is positive, our inspections found areas of weakness in the control of risks from these assets.
- 2.9 Network Rail has a *Train Accident Risk Reduction* programme based on contributory workstreams and monitored by completion of milestones. At the end of 2017-18, the company had met 36 out of 38 milestones. The two uncompleted milestones, delivery of *Civils Strategic Asset Management Solution (CSAMS)* and *Remote Condition Monitoring* are initiatives intended to deliver improved asset management and timely maintenance and are therefore critical to Network Rail's plans in CP6. Network Rail will need to continue to focus on these projects.

Inspection and investigation findings

- 2.10 We have seen evidence of increasingly effective safety leadership at the centre of Network Rail. Network Rail's central health and safety organisation has a clear idea of priorities and attempts to focus on actions to improve risk control, particularly through continued focus on the *Home Safe Plan*. This plan represents a sensible and risk-based view of where the occupational health and safety priorities lie. Although with less consistent success as outlined below, centrally Network Rail has developed a programme of actions addressing key catastrophic risks. The improvement in management of derailment risks is a significant consequence of this focus.
- 2.11 Network Rail's management of significant risks is inconsistent both across and within the routes and disciplines. Our assessments of management maturity, using the *Railway Management Maturity Model (RM3)* show a wide range of attainment in some particularly safety critical areas such as interface safety, asset management, and risk assessment and control. Management of system safety interfaces was assessed overall as 'standardised', but within that there are some routes assessed at the lower levels of 'ad-hoc' and 'managed'. We assessed the critical area of asset management as 'managed', with wide variations found, between 'predictable' and 'ad hoc'. Similarly, whilst centrally Network Rail is focused on managing priority risks, our national assessment of attainment in risk assessment and management is only 'managed', and within this there are examples of 'ad-hoc' and the higher level

of 'predictable' within the routes. The conclusion is that Network Rail cannot be certain that risks are managed consistently and effectively across the country. This inconsistency is preventing Network Rail from progressing further in terms of its overall management predictability and capability.

- 2.12 Nationally we have seen improved RM3 results in some key areas: competence management, workload planning, change management, proactive monitoring and management review have all improved. Despite variable performance within the routes, we have seen overall improvement in Network Rail's management capability. Of 27 assessed elements, we assessed 19 at 'standardised', compared to 11 in 2016-17. This is a positive development that we hope will be sustained in future years. Across the routes inspectors report improved recognition and commitment by senior leaders to the importance of good safety leadership. Network Rail's adoption of the RM3 model is an encouraging sign of this, as is the engagement between routes and the centre on agreeing priorities. Adopting RM3 will help the routes assess health and safety performance and identify improvements.
- 2.13 This mixed picture - improved but inconsistent safety management capability - is reflected in isolated failures that could have resulted in serious consequences. Near misses between track workers and trains at Egmonton in LNE route in October 2017, and Primrose Hill in LNW route in March 2018 demonstrate the continuing need for improved risk management in this area. A landslip from third party land caused a derailment at Loch Eilt in January 2018, and in February 2018, there was the potential for a derailment when a train struck a rail left on the track at Cradlehall. In March 2018 passengers on busy trains opened the doors and stepped onto the tracks near Lewisham due to train delays caused by heavy snow and exacerbated by poor management. All these incidents show that Network Rail needs to continue to improve.

Track

- 2.14 Overall, Network Rail has continued to make good progress with managing track geometry performance. Track KPI's are at, or close to, 'best ever' levels, and we have seen a focus on understanding asset condition and associated risk. Consequently, our investigations of derailments found an increasing willingness to learn from incidents and failures within Network Rail. Our inspection work in the routes found a number of route initiatives that were improving the effectiveness of risk controls. In particular, LNE, LNW, SE and Wessex routes showed increased understanding of maintenance needs, and had improved repair plans. Importantly, these routes also showed improved assurance of maintenance activities. We found evidence of improved management capability, compared to earlier years, in several key areas, such as competence management.

2.15 Track risk management across the routes, although generally improving, remains inconsistent, with increasingly mature maintenance understanding more evident in LNW, LNE, South East and Wessex routes, with Anglia and Scotland showing similar signs of improvement although less pronounced. Improvements were less clear in Wales and Western routes. Broken rails and serious rail defects trends are improving in most, but not all routes, and not all routes are managing key switches & crossing (S&C) inspections. We found wide variation across and within routes in track performance. For example, levels of good track geometry were better than the network average in LNW (South) and Western (West), and worse in South East. There was less poor track geometry than the average in LNW, Wales and Scotland than in South East and Anglia. Geometry faults per 100km were higher than average in South East and Western (West) and lower in East Midlands and LNW. Breaks and serious defects per 100km were higher than average in Sussex, Anglia and LNW and lower in Scotland, Western and Wales. Some of this is attributable to route-specific factors, but equally there are significant elements of route-level track maintenance strategies, resourcing and management that contribute to this picture. Influential route-specific factors include:

- the age and condition of track and track formation (type of rail, condition of ballast, rail fixings, sleepers, drainage) related to historic levels of investment;
- climate and underlying geology affecting track stability and drainage;
- the amount and type of traffic carried on lines (frequency of services, frequency of heavier freight traffic); and
- the availability of maintenance access to the tracks (related to the frequency of services).

2.16 The numbers of maintainers and their training, competence and leadership make a significant difference to route track performance, as does the extent to which a route bases its maintenance strategies on a sound knowledge of its track assets. We found inconsistency in the robustness and maturity of risk controls following maintenance work and hand back by Works Delivery organisations. There is scope for improvement in how Network Rail assures itself of the availability of enough competent persons to ensure safe hand back and how it monitors correct implementation of risk controls.

2.17 Evidence suggests that both Network Rail STE and the routes are increasing their focus on assurance. Their quality strategy and *Integrated Management System* (IMS) approaches are capable of driving improved compliance and risk management. The *Business Critical Rules (BCR)* programme has been discontinued in favour of this new approach. The revised assurance framework setting out the 'what' was published in December 2017. Each route now needs to develop credible 'how' strategies. Central and route assurance remains important

as a means of driving greater control of track risk and greater consistency across the network.

Off track

2.18 We continued to focus on vegetation management. Inspections found that most routes were non-compliant with Network Rail's standards but that overall risk appeared to be managed through risk-based prioritisation. The long-term trend in the number of trains striking fallen trees is reducing.

Civils and Drainage

2.19 As mentioned in our Draft Determination summary of conclusions [document](#) published in June 2018, an extra c.£1bn of expenditure on civils assets is required in CP6, with particular priorities including earthworks, drainage and structures.

2.20 Our inspections and investigations confirmed the themes identified at the half-year stage. Asset knowledge, the first component in delivering an effective asset management regime, remains a challenge in several areas. Drainage asset records are incomplete in most routes and a programme to identify hidden tunnel shafts has not been completed. Network Rail accepts that it needs to do more to manage its assets effectively and has committed to a target date to identify 95% of drainage assets. It has made good progress in identifying tunnel shafts.

2.21 Related to asset knowledge, delivery of compliant examination regimes remains a problem for Network Rail across the civils discipline. For structures, there is an increased emphasis on robust planning to enable more reliable delivery of scheduled examinations, and Network Rail needs to improve its evaluation of defects so that they take the correct remedial action.

2.22 Continuing delays in the implementation of the Civils Strategic Asset Management Solution (CSAMS) have hampered the delivery of improvements in several areas, including asset knowledge, evaluation and system risk management. As a result of these delays, we have required Network Rail to put in place interim arrangements in several areas: ancillary structures, retaining walls risk prioritisation and evaluation of examination reports.

2.23 Third party elements were a factor in a number of significant incidents during the year. In January 2018 there were landslips at Loch Eilt (started on third party land) and Trealaw (blocked third party drain), as well as the discovery of significant corrosion on an OLE gantry (3rd party raft) at Liverpool Lime Street. This continues a line of previous incidents related to, or coincidental to, the activities of third parties. Network Rail needs to manage and mitigate these risks.

Level Crossings

2.24 Level crossing risk, measured by the *All Level Crossing Risk Model (ALCRM)*, showed a modest improvement in 2017-18, down from 11.78 FWI at the end of 2016-17 to 11.27 at the end of 2017-18. This is the lowest level of recorded level crossing risk, continuing the long-term trend of gradual, steady improvement.

2.25 At the end of 2017-18, the CP5 level crossing risk reduction fund was forecasting a 15.6% FWI risk reduction by the end of CP5, down from approximately 18% forecast at the end of period 6 of 2017-18. The fund achieved a 7.6% FWI risk reduction by the end of 2017-18. The shortfall to the level crossing risk reduction fund target of 25% shows the difficulties of realising risk improvements such as crossing closures. Total level crossing risks have reduced by 20.1% since the end of CP4, through minor works, renewals and enhancements as well as those achieved by the level crossing risk reduction fund. Crossing closure is impeded by a number of factors including:

- the cost of providing further risk controls;
- the continuing development of reliable and flexible technological solutions to provide lower-cost warnings; and
- the need to consider costs and benefits of closure against a crossing's local amenity value and the strength of any public opposition.

2.26 Network Rail has also focused on targeted risk reduction measures at higher risk crossings including fitment of warnings at selected passive footpath crossings.

2.27 Network Rail's first draft *Long Term Strategy for Level Crossings* made a commitment to the fitment of automatic warning systems to all user worked crossings with telephones (UWC(T)'s) in long sections by 2025. These are crossings where the user needs to telephone a signaller to get permission to cross. Typically, the signaller cannot pinpoint a train's exact location in a long section. This can cause delays to giving permission to cross and there have been fatal accidents associated with users becoming frustrated or signallers becoming confused. The 2025 timescale will not be met. Network Rail now focuses on improving controls on a case-by-case basis, where reasonably practicable (i.e. where the expenditure is justified by the level of risk to users). In the meantime, Network Rail continues to rely on procedural controls that depend on local instructions providing the signaller with enough information to know whether a train is approaching a crossing, clear communication between signallers and users, and users following instructions. These controls, although adequate if available and correctly used, nevertheless rely on people correctly interpreting instructions and following safe systems of work. The controls are more susceptible to human error and therefore give a lower level of safety than would automatic information and warning.

2.28 As a result, we continued our inspections of Network Rail's management of risks at these crossings in LNW, Wales and Scotland routes. The latter two had plans to fit active warning (typically lights and/or audible warning sounds) at the highest risk crossings whilst LNW's plans are less developed. We found that the routes need to continue to assess risks at all crossings, and risk assessments need to take better account of signaller actions and their interactions with users. Risk assessments also need to further consider crossing times and give more precise information to signallers about when, and for how long, permission to cross should be granted. Network Rail also needs to improve the quality of voice communications between signallers and users to reduce the opportunity for misunderstandings. Although these actions will improve risk control, Network Rail needs to continue to provide active warning where reasonably practicable.

Workforce Safety

2.29 In July 2017, Network Rail introduced a revised track access safety standard, 019+. It put greater emphasis on planning and consideration of means of protection that do not rely solely on human vigilance. The new standard has been in use by track staff since September. Early indications are that this change has had a positive effect on track worker safety.

2.30 In many routes we have seen a renewed focus on initiatives designed to reduce the need for track workers to work on lines open to trains. One such initiative for example aims to improve planning and coordination between disciplines to maximise the use of planned track access. This is not yet embedded in all the routes but Network Rail acknowledges the importance of ensuring that increased services and maintaining the assets does not put track workers at greater risk.

2.31 Management of occupational road risk featured prominently in Network Rail's 2017-18 *Home Safe Plan*, and produced initiatives that have helped improve Network Rail's overall worker safety performance. Network Rail road traffic accidents reduced by 80% from 2,718 in 2016-17 to 532 in 2017-18, and the project has seen a 33% reduction in worker injuries from 128 to 86. The introduction of vehicle monitoring appears to have played a key part in promoting speed awareness and better driving habits. These improvements show the benefit of identifying a key risk and developing and implementing suitable risk controls in a concerted, consistent way.

Occupational health

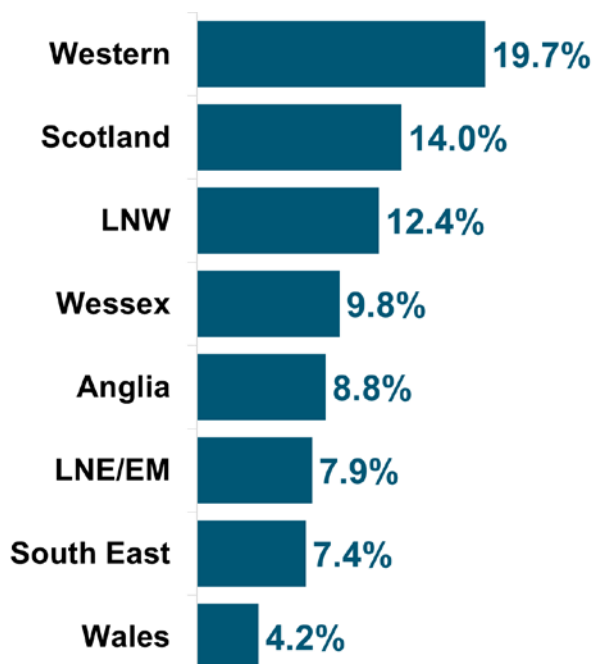
- 2.32 Network Rail's management of occupational health risks has been mixed and there have been some significant failures.
- 2.33 Health surveillance of workers for symptoms of hand arm vibration syndrome (HAVS) broke down in 2017-18, due to failures of a third party provider. Much to its credit, Network Rail promptly accepted responsibility and took ownership of this. It put in place an action plan and took decisive steps to provide exposed workers with health surveillance. As a result, the situation was largely recovered, with full or near-full compliance in most routes and only LNE with a substantial backlog.
- 2.34 Exposure to respirable crystalline silica (RCS) in ballast dust is an area where Network Rail is making improvements, including at aggregate handling plants and in the High Output fleet. In particular, we have seen moves away from simply relying on respiratory protective equipment (masks and respirators) to controlling dust in the first place by wetting down at handling plants and engineering controls on track laying and ballast renewal machinery. We also saw progress with the asbestos management programme, although surveys of 'high priority' assets, mostly buildings and lineside structures, were not all completed as planned.

Route level analysis

- 2.35 In this edition of the Network Rail Monitor, we have built upon route level comparisons in previous Monitors and for the first time presented simple comparative charts comprised of composite measures of performance, based on Network Rail scorecards and supplementary measures by route.
- 2.36 Further information on the methodology used for route level comparison, including how the composite metrics are calculated, is detailed in Annex 1.

Health & Safety Route Analysis

Composite scorecard items measured relative to target



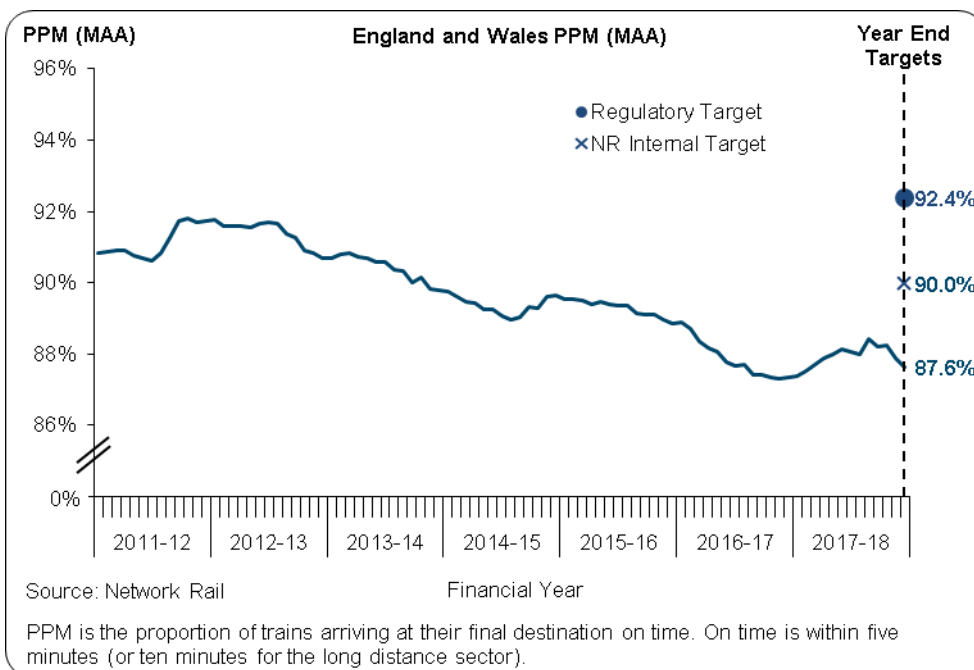
Summary of composite elements

	Lost Time injury Freq. rate (LTIFR)	Close calls raised	YTD close calls closed within 90 days	Train accident risk reduction	Level crossing risk reduction
Anglia	0.668	10,405	86%	100%	10
LNE/EM	0.653	22,002	79%	97%	10
LNW	0.536	21,277	75%	100%	10
Scotland	0.383	13,228	81%	100%	9
South East	0.517	10,199	87%	100%	8
Wales	0.377	8,595	90%	79%	9
Wessex	0.500	6,223	89%	100%	10
Western	0.413	10,734	90%	97%	10

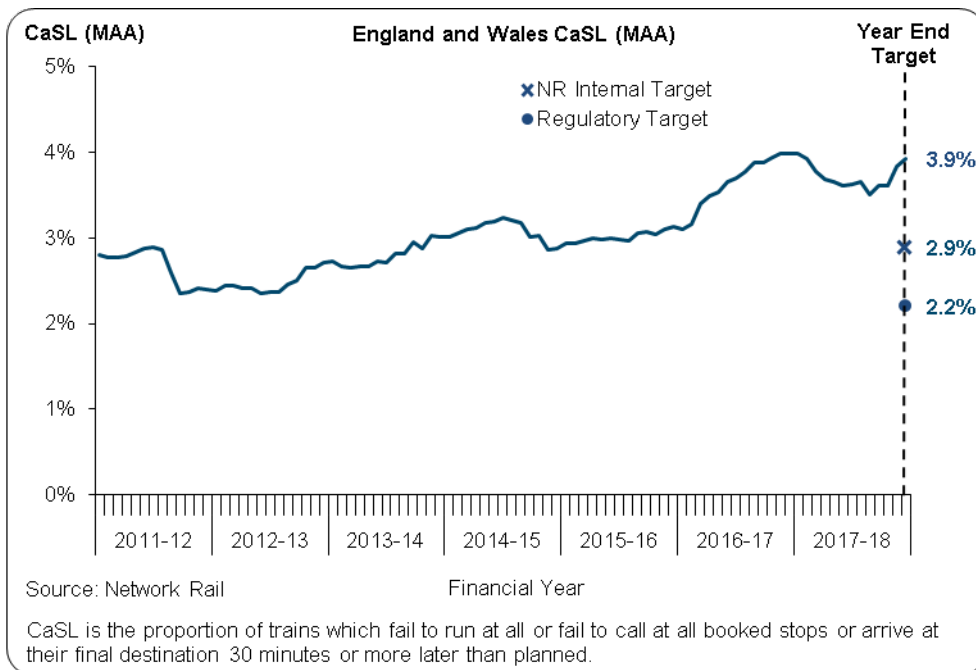
3. Train service performance

England and Wales performance

- 3.1 ORR regulates Network Rail’s delivery of performance to its customers, the train operators. We assess Network Rail’s performance by looking at the performance of the train service itself, primarily through the Public Performance Measure (PPM) and Cancellations and Significant Lateness (CaSL).
- 3.2 At a national level, train performance improved in the first half of 2017-18. However, in the second half of the year it declined. At the end of Period 13, punctuality as measured by PPM moving annual average (MAA) was 87.6%. This was 0.1 percentage points (pp) better than at the end of 2016-17. However, it was a deterioration of 0.5pp since the end of Period 7 2017-18. This was 2.4pp worse than Network Rail’s year-end internal target and 4.8pp worse than the year-end regulatory target.



- 3.3 CaSL MAA was also 0.1pp better at the end of 2017-18 than at the end of the previous year. However, over the second half of the year, CaSL MAA increased (worsened) by 0.3pp to 3.9%. It is now 1.0pp worse than Network Rail’s year-end internal target and 1.7pp above the year-end regulatory target.



Underlying performance factors

3.4 We work closely with Network Rail and train operating companies (TOCs) so we can fully understand performance trends. We have also undertaken regular site visits to see at first hand the challenges Network Rail faces and how it plans to tackle them. At this stage, our principal concerns are as set out below.

The performance of South Western Railway (SWR)

3.5 Network Rail's lead route for SWR is Wessex. SWR's punctuality has been disappointing this year. PPM MAA fell from 87.1% at the end of 2016-17 to 84.3% at the end of 2017-18, 5.0pp below the agreed Performance Strategy target. The proportion of Network Rail-caused delay minutes is also high at 68.3%.

3.6 The biggest challenge to performance during the year was the August 2017 Waterloo blockade that saw the delivery of capacity enhancements at this very busy station. While Network Rail achieved its project goal, there was a greater negative impact on train performance than expected. This was due to:

- late changes to the blockade that in turn entailed late changes to the train plan; and
- a derailment that closed part of the station for one day which also led to an overrun.

3.7 Since the blockade, there have been a number of disruptive incidents. Track circuit failures, cable fires and track defects have all led to severe disruption for SWR's customers. Notably, while the level of delay-causing infrastructure incidents has

remained broadly constant, delay per incident (DPI) for Non-Track Assets (NTA) increased significantly this year increasing from 168 to 208 (24%).

3.8 Given SWR's poor performance this year, we undertook a detailed review of Network Rail's delivery to this operator. We examined:

- Network Rail's understanding of the issues affecting performance;
- the suitability of its short term recovery plans; and
- the sustainability of those plans in the medium to longer term.

3.9 We will publish the findings of our review shortly.

The performance of Govia Thameslink Railway (GTR)

3.10 Network Rail's lead route for GTR is South East. At the end of 2017-18, GTR's PPM MAA had improved 7.1pp to 81.3% (albeit from a very low base last year). This was 2.1pp below the agreed Performance Strategy target.

3.11 In previous Monitors, we have reported on problems with Delay Attribution in the South East route which mean we cannot be totally confident in the delay data for GTR. Network Rail is undertaking a series of activities, such as increasing resources and improving processes to address the underlying issues. The data we do have suggests Network Rail's delivery is improving and its assets are becoming more reliable. There has been a 15% decline in all Network Rail-caused delay minutes to GTR with delay caused by Track and Non-Track Assets also declining.

The performance of Great Western Railway (GWR)

3.12 Network Rail's lead route for GWR is Western. Performance has declined over the last 18 months and at the end of 2017-18 PPM MAA was 85.5%, 4.5pp worse than the year-end Performance Strategy target.

3.13 While Network Rail and TOC-on-TOC delay minutes are the same as last year, TOC-on-Self delay minutes have increased by 50%. In 2017-18 PPM failures attributed to GWR, such as those caused by fleet and traincrew, increased by 78% compared to the previous year, from 16,115 to 28,830. We recognise that problems with the Great Western Electrification Programme (GWEP) may be an underlying factor here, but this is difficult to confirm and quantify using available data.

Performance Strategy targets

3.14 We have held Network Rail to account for the delivery of Performance Strategy targets, outputs that are locally agreed between the company and its customers (the TOCs). When these are aggregated at a national level, this becomes Network Rail's internal target. But, for clarity, the internal target is not a regulatory target.

- 3.15 We set a 'regulatory threshold', outside which we will consider further action. For PPM, this is 2.0pp below (worse than) Performance Strategy target and for CaSL, this is 0.2pp above (worse than) the Performance Strategy target.
- 3.16 At the end of 2016-17, we considered regulatory intervention in respect of Network Rail's delivery to four TOCs (GTR, South West Trains (now SWR), Southeastern and Virgin Trains East Coast (VTEC)) all of which finished the year outside the regulatory threshold, even after TOC-caused delays had been removed from the calculation. We decided to monitor Network Rail's delivery for these TOCs in 2017-18 more closely. Of the four, GTR and Southeastern have seen performance improve this year, while VTEC and SWR saw their performance get worse.

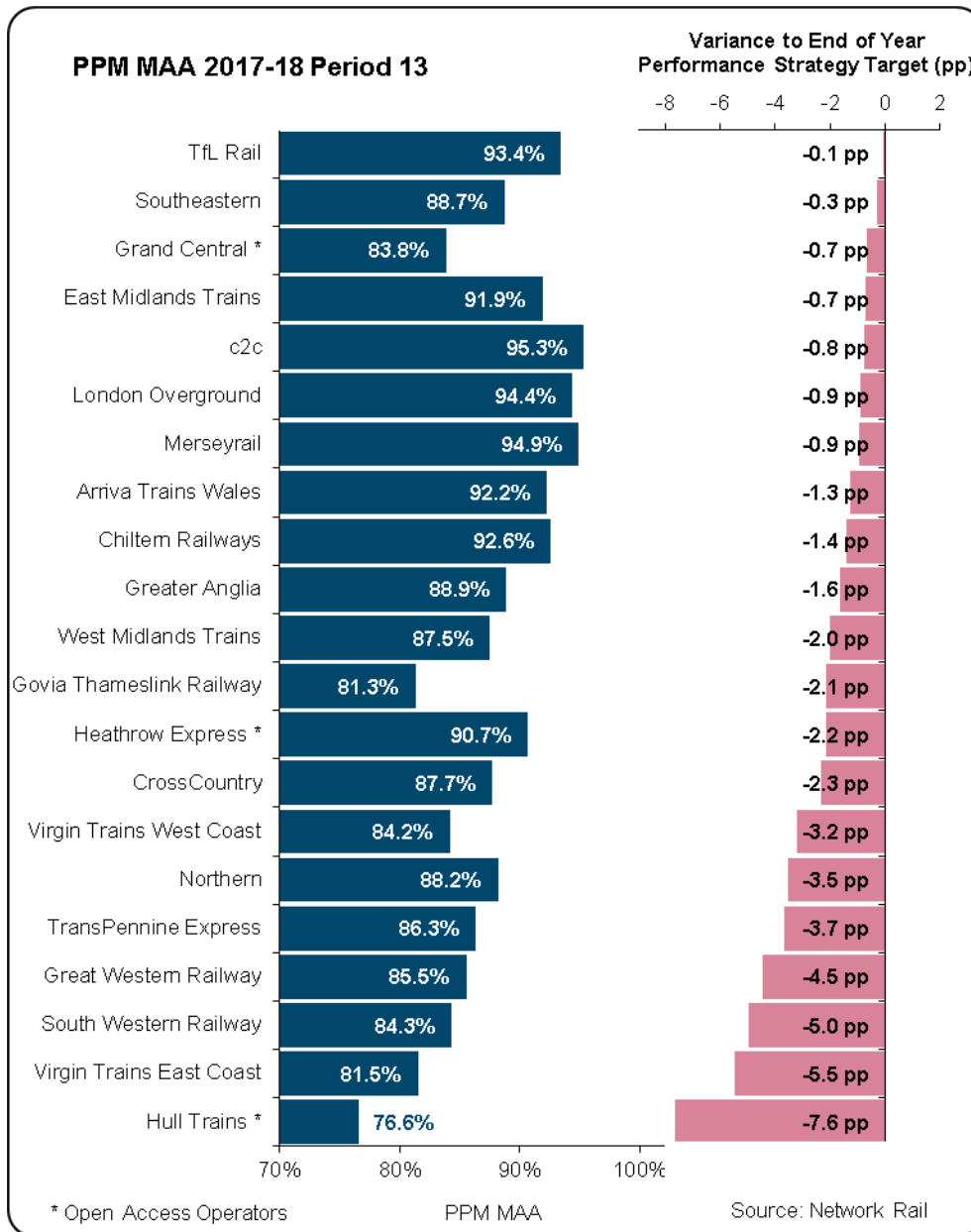
Delivery of performance at TOC level

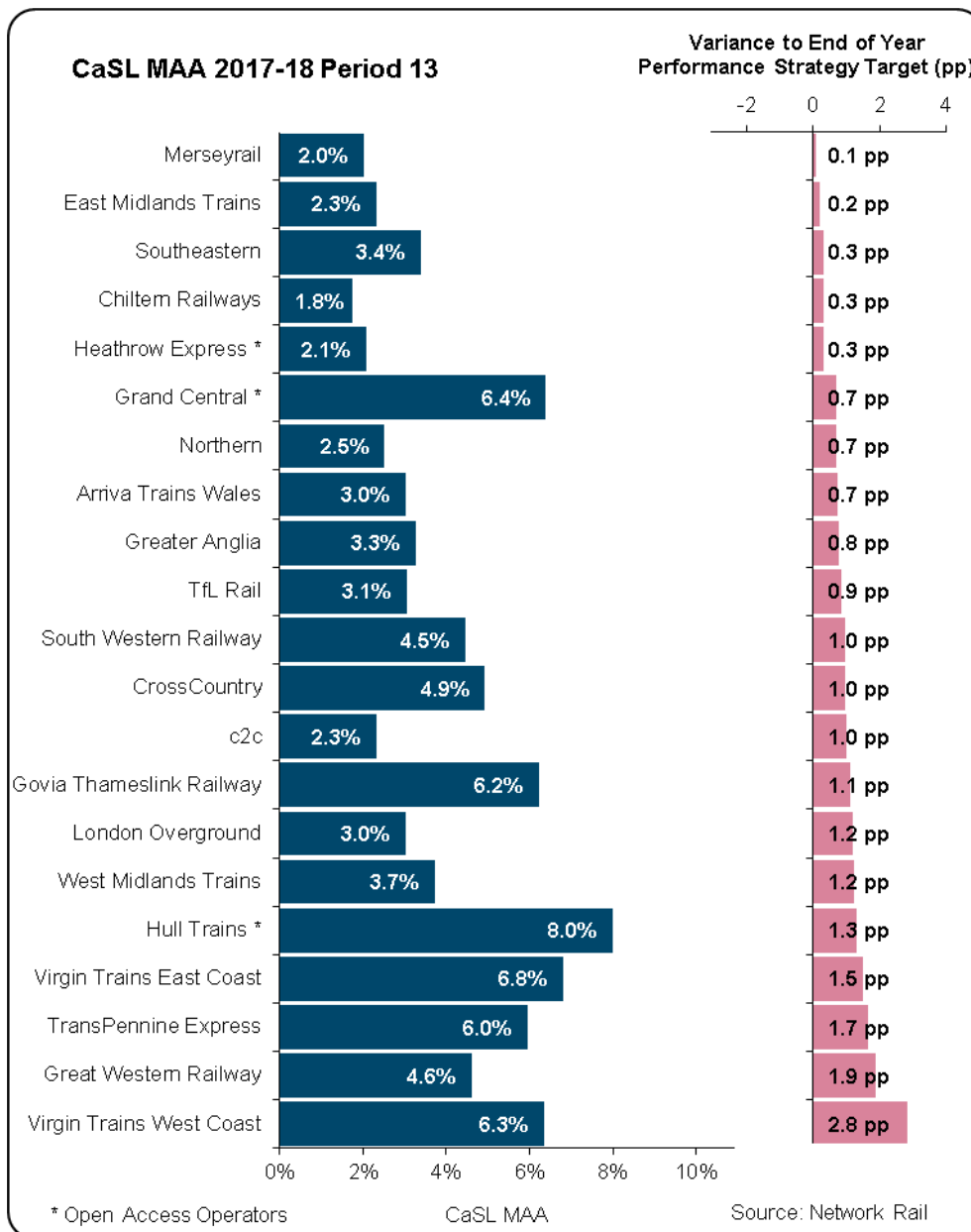
PPM

- 3.17 At the end of 2017-18, no operator had a PPM MAA that was ahead of its Performance Strategy target. c2c recorded the highest absolute PPM MAA score (95.3%).
- 3.18 Relative to the Performance Strategy targets, Hull Trains was the worst performer with a PPM MAA of 76.6%, 7.6pp below target. Caledonian Sleeper was the next worst with a PPM MAA of 85.7%, 6.3pp below its 2017-18 Performance Strategy target.
- 3.19 We continue to monitor closely Network Rail's delivery of performance to each of these TOCs. We attend liaison meetings with routes and TOCs, performance / alliance boards and quarterly reviews as appropriate.

CaSL

- 3.20 At the end of 2017-18, no operator met or was ahead of the CaSL targets in its Performance Strategy. Chiltern recorded the lowest (i.e. best) absolute CaSL MAA score (1.8%).
- 3.21 The worst performer in absolute terms was Hull Trains. The CaSL MAA for this operator was 8.0% at the end of 2017-18. This was 1.3pp worse than the 2017-18 Performance Strategy target. The worst performer relative to its Performance Strategy target was Virgin Trains West Coast, with a CaSL MAA 2.8pp worse than target.
- 3.22 The charts below show all operators' performance ranked by difference to their Performance Strategy targets at the end of period 13 of 2017-18.





Route scorecards

3.23 Network Rail introduced route scorecards in 2016-17 to monitor its key performance indicators and to align its train performance targets more closely with TOC requirements. Most TOCs have agreed a PPM and CaSL target, while some, e.g. GTR and Southeastern have set out a Right Time metric. Train performance accounts for 20% of a route's overall score. We use the data in the scorecards as part of the evidence to determine whether Network Rail is doing everything reasonably practicable to achieve its regulated performance outputs.

3.24 Scorecards are developing as Network Rail prepares for CP6, and they are now a key part of the dialogue on performance. In the last Monitor, we highlighted some areas of risk around the scorecards. For example, where it becomes apparent that a scorecard target has become unachievable, this might lead to a tendency to divert effort and resource away from the area in question to focus on those targets which are still “in play”. That said, ORR’s view is that scorecards are a positive step towards a new environment where targets and outcomes are more locally-driven through closer engagement between a route and train operators rather than centrally determined.

Other performance interventions and measures

Delay minutes

3.25 We monitor Network Rail delay minutes as a key indicator of train performance. As the table on page 27 shows, at the end of 2017-18, 60% of delay minutes in England and Wales were attributable to Network Rail. Of the rest, 29% were “TOC on Self” (delays to a passenger train operating company's services caused by that company) and 11% were “TOC on TOC” (delays to a passenger train operator’s services caused by another train company). The position is broadly consistent with previous years.

Network capability

3.26 ‘Network capability’ describes the capability of the network in terms of track mileage and layout, line speed, gauge, route availability and the amount of electrified track. Network Rail’s network licence requires the company to accurately describe and maintain (subject to network change) the baseline capability for which it is funded for the benefit of its stakeholders. For CP5, we said that the baseline capability of the network would be that in place as at 1 April 2014.

3.27 The industry’s *Network Capability Steering Group* is the forum for engagement between Network Rail and a range of industry stakeholders. Whilst we have not received any formal complaints, a number of operators have raised concerns and we have asked Network Rail to improve its processes, so the information the company holds and that stakeholders rely on adequately reflects the physical state of the network enabling those stakeholders to plan their businesses with a reasonable degree of assurance. Network Rail has carried out a review of its processes and developed improvement plans. We will scrutinise this area of performance more closely over the coming months, with a particular focus on the network change process.

3.28 We continue to have concerns about how well Network Rail is delivering in this area. We are in the process of commissioning an Independent Reporter to review the current situation on network capability in England and Wales and Scotland,

including whether Network Rail is on track to deliver the end of CP5 regulated output target. This work will inform our monitoring position and assessment of network capability in England and Wales and Scotland in CP6. The findings from this work will be published in autumn 2018.

Network availability

- 3.29 Measures of network availability are intended to provide an indication of the impact of planned engineering work on passengers and freight customers. Network availability is currently measured using the Possession Disruption Index (PDI) for Passengers (PDI-P) and Freight (PDI-F).
- 3.30 As reported in the previous Monitor, a number of inaccuracies have been identified in the calculation, for PDI-P in particular. As a result, the outturn does not necessarily reflect the impact on passengers during possessions.
- 3.31 We required that Network Rail continue to report PDI, with some modifications, until it is possible to present appropriate and industry-agreed measures of network availability. The measures proposed by Network Rail were included in our consultation on route requirements and scorecards. The responses to this can be found [here](#).
- 3.32 Network Rail also notified us that the CP5 exit target for PDI-P, and possibly PDI-F, was likely to be missed largely as a result of the identified issues. The company has since set out how it has upheld the spirit of PDI and what steps it has taken to fulfil its obligations in this area. In late 2017, we undertook an industry-wide engagement exercise to gather further evidence of Network Rail's behaviour in respect to upholding the spirit of PDI, obtaining views from passenger and freight operators. The findings from this work will be published in summer 2018.
- 3.33 We will be engaging more closely with Network Rail, in particular the System Operator, to understand how it is working to optimise the balance between the level of disruption to passengers and freight customers and the level of planned engineering work necessary to maintain, renew and enhance the network. This is particularly important in the context of Network Rail's statement that CP5 targets for PDI may not be met.
- 3.34 Network availability is an important passenger and freight end-user outcome. Network Rail should balance the level of disruption to passengers and freight customers, and the level of planned engineering work necessary to maintain, renew and enhance the network.

Informed Traveller

3.35 In the last few months of 2017-18, it became apparent that the industry processes for setting timetables and providing passengers with information on advance tickets were not working. Network Rail was unable to cope with a surge in urgent timetabling work, in particular its re-planning of the May 2018 base timetable to reflect delays to electrification around Bolton. We are currently investigating whether Network Rail and TOCs comply with their licences ([see link](#)). Our focus has been on:

- Network Rail's recovery plan and monitoring;
- TOC information for passengers and monitoring; and
- root causes/lessons learnt.

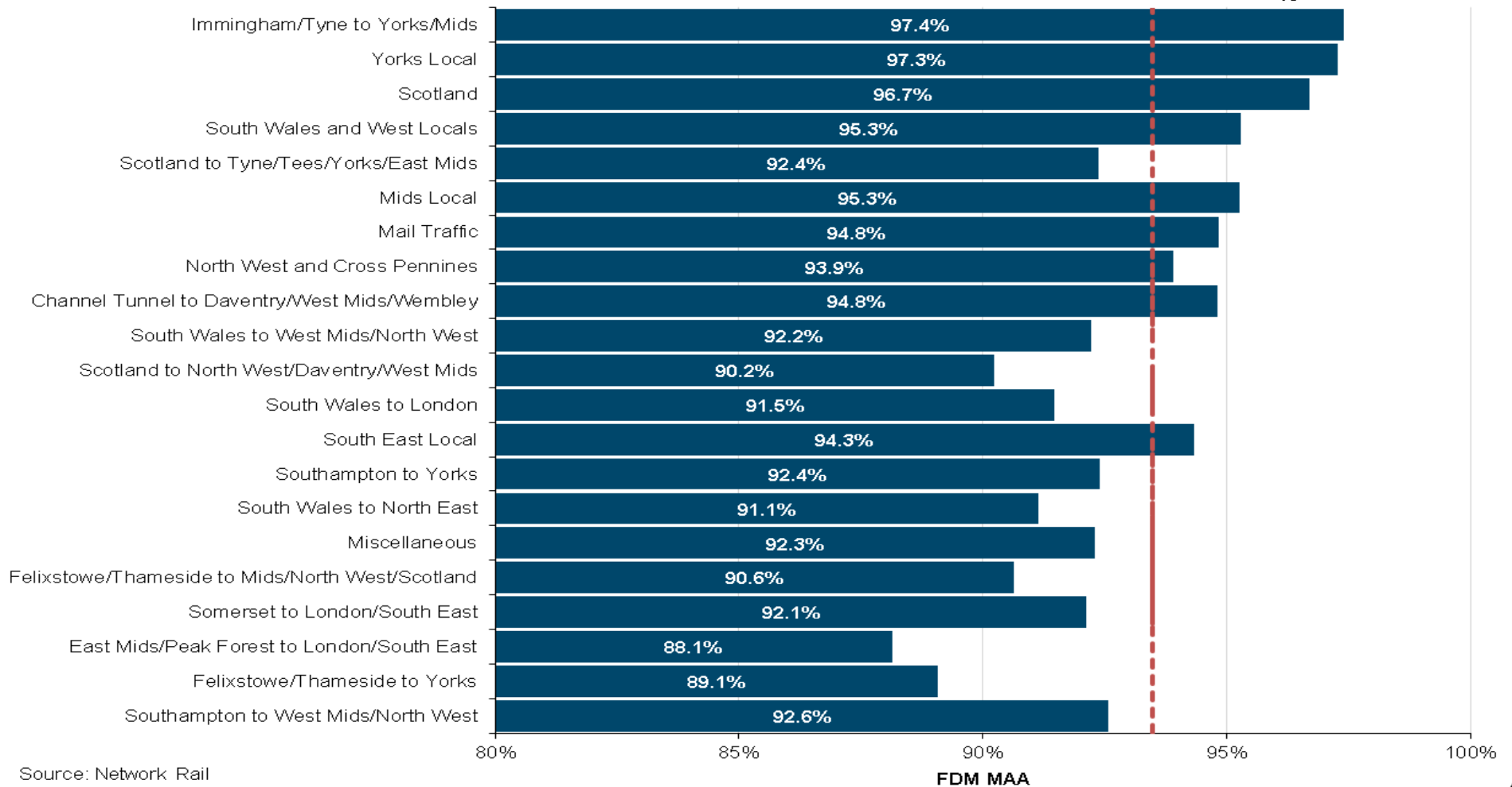
Freight performance

3.36 The regulatory performance measure for freight is the Freight Delivery Metric (FDM). This measures the percentage of freight trains arriving at their destination within 15 minutes of scheduled time. FDM covers delays for which Network Rail is responsible - i.e. not those caused by freight operators. The FDM MAA at the end of 2017-18 was 93.5% 1.0pp ahead of the annual target of 92.5%.

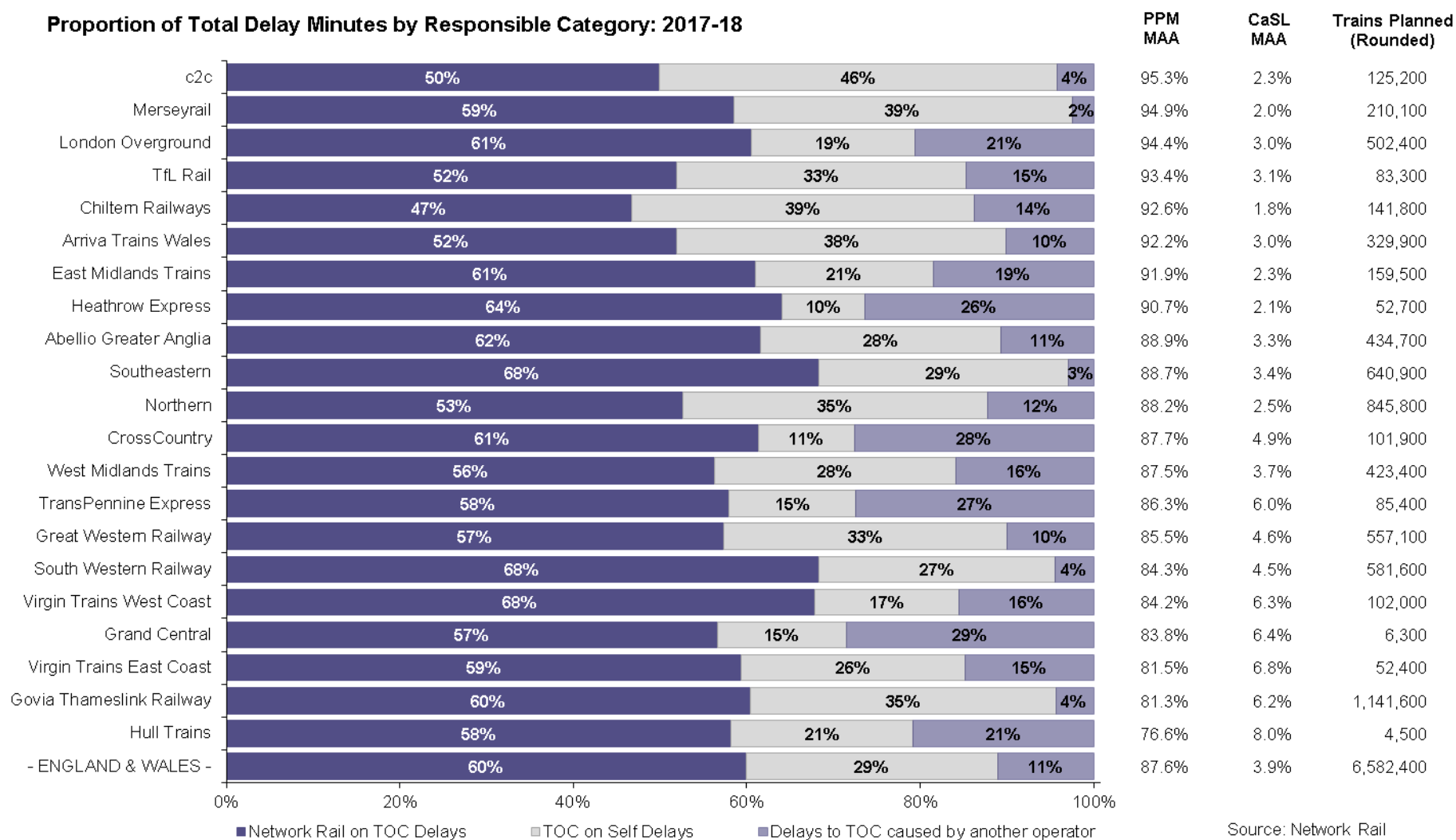
3.37 We are continuing to liaise with the Freight and National Passenger Operators (FNPO) route to gain assurance that this level of performance is sustained and that the FNPO route will continue to deliver for freight and national passenger operators whose operations cross the geographic routes.

FDM MAA by Strategic Freight Corridor - 2017-18 Period 13

National: 93.5%



Proportion of Total Delay Minutes by Responsible Category: 2017-18



Route level analysis

3.38 In this edition of the Network Rail Monitor we are including for the first time some information providing a simple comparison of the relative performance of Network Rail's eight geographical routes in respect of train performance.

Train Performance Route Analysis

Composite scorecard items measured relative to target

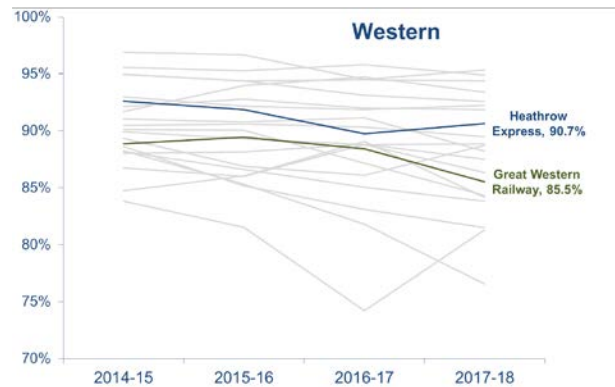
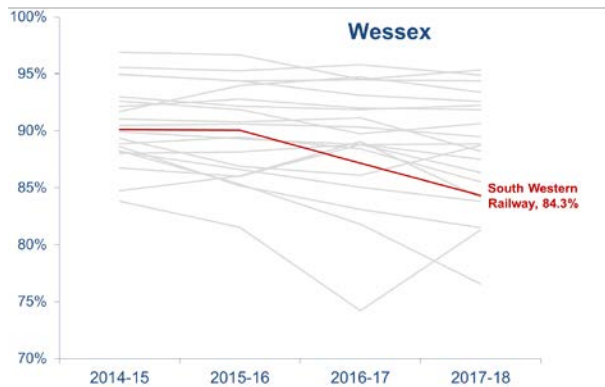
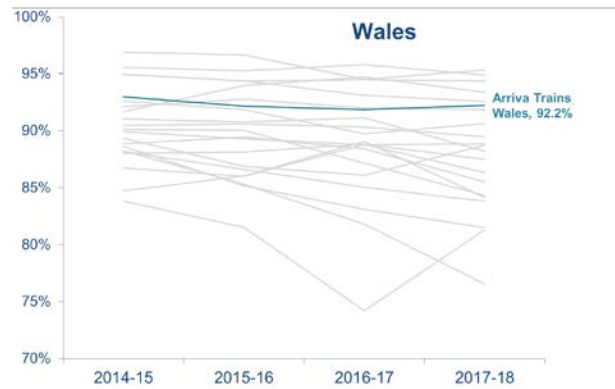
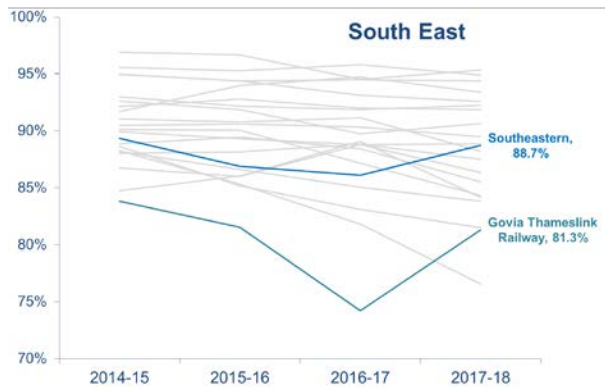
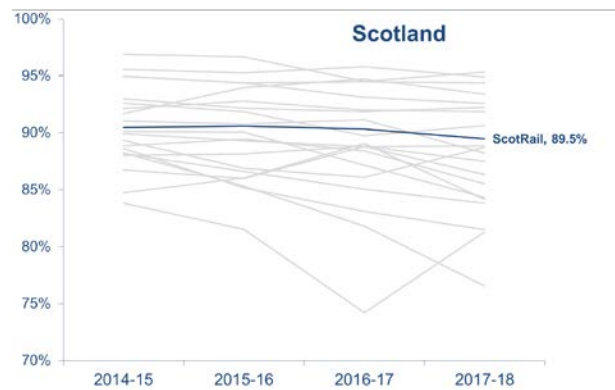
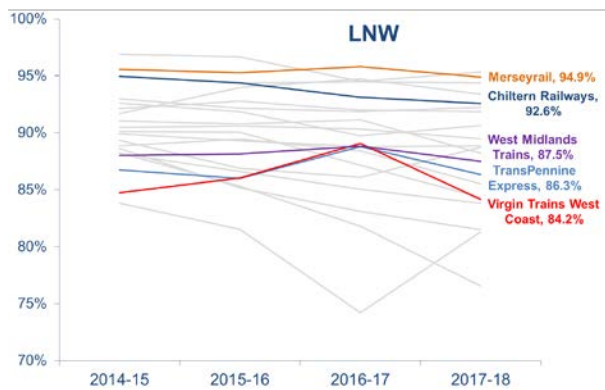
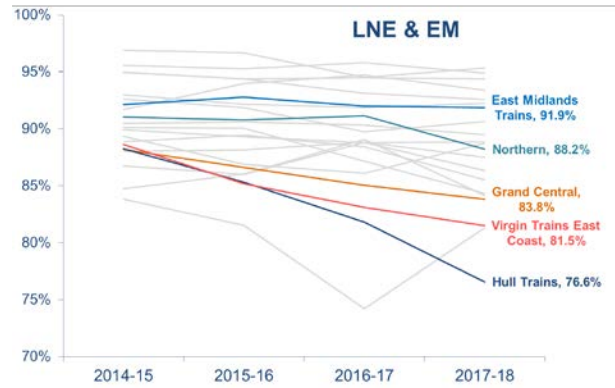
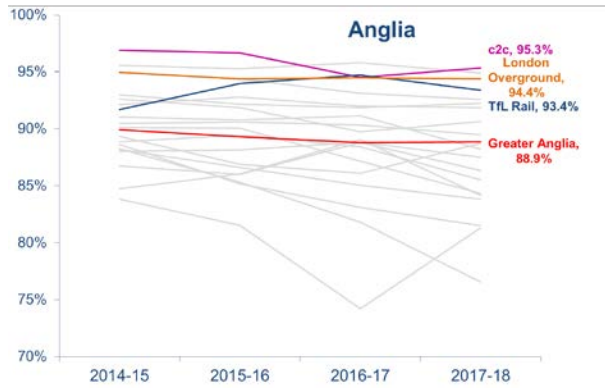


Owing to the lack of direct comparability between the bundle of measures Network Rail have agreed in their customer scorecard, we have used only selected measures to ensure comparability within the composite measure on a like-for-like basis. The composite measure for train performance has been calculated using route scorecard PPM and CaSL where present. Where CaSL is not listed, Right Time or On Time has been accepted as a substitute.

Where Train Performance or Locally Driven Measures were listed as customer scorecard 'roll ups', the PPM or CaSL element of this listed on the relevant TOC scorecard has been substituted. Weights were calculated using the product of the weights from the relevant Customer Scorecard line on the Route Scorecard and the performance measure on the TOC Scorecard. A full list of the measures used to calculate the composite performance measure and an explanation of how these were combined may be found in Annex 1.

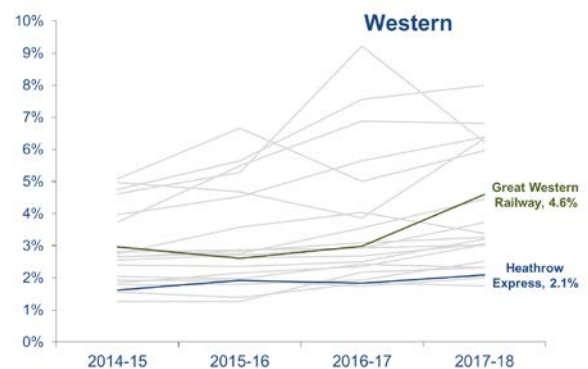
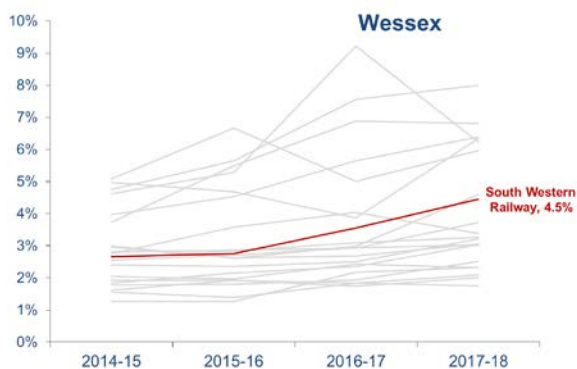
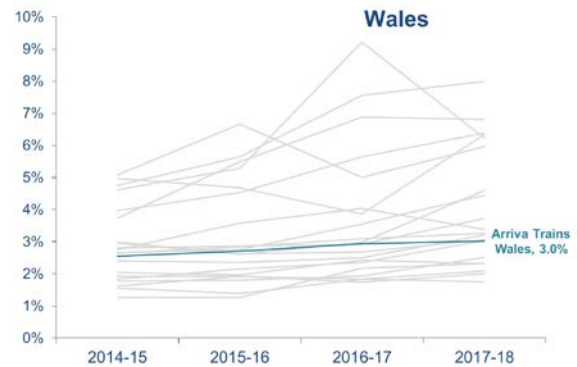
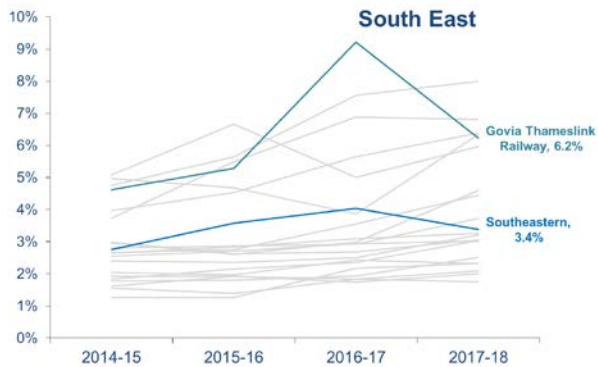
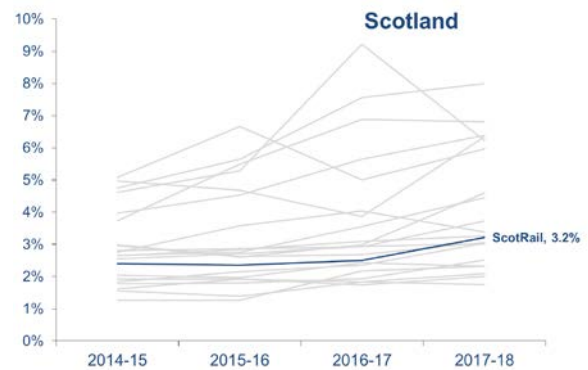
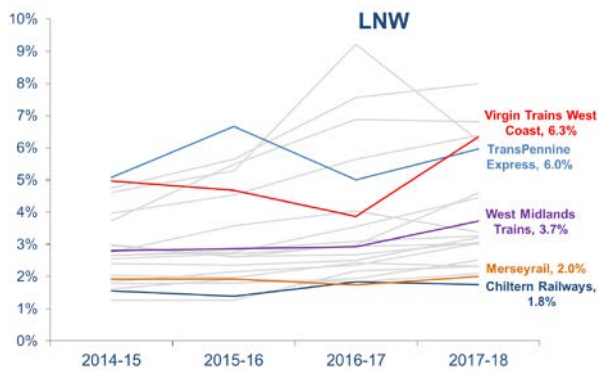
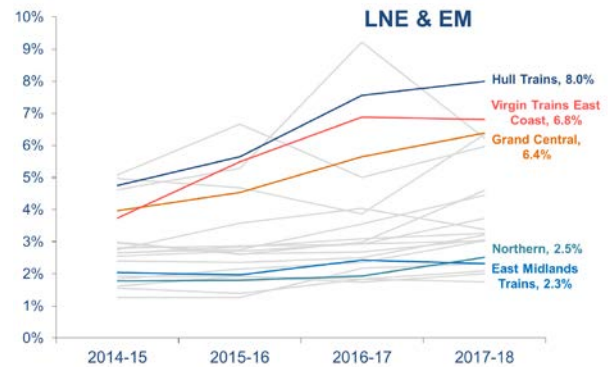
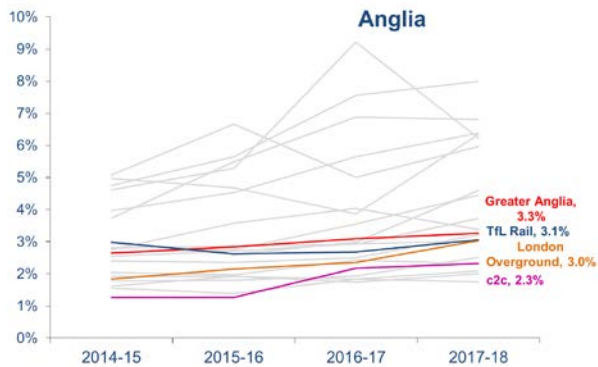
Public Performance Measure (PPM)

PPM measures the proportion of trains which arrive at their terminating station within 5 minutes of their planned time (10 minutes for long distance services)



Cancellations and Significant Lateness (CaSL)

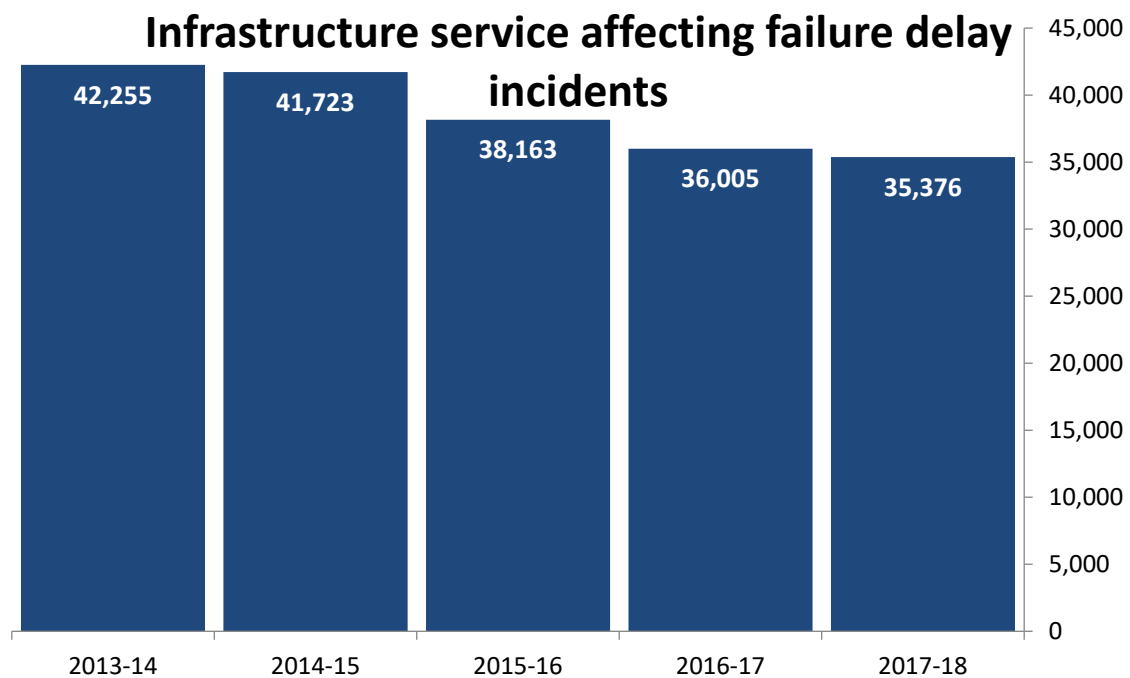
CaSL measures the proportion of trains that are cancelled or significantly late



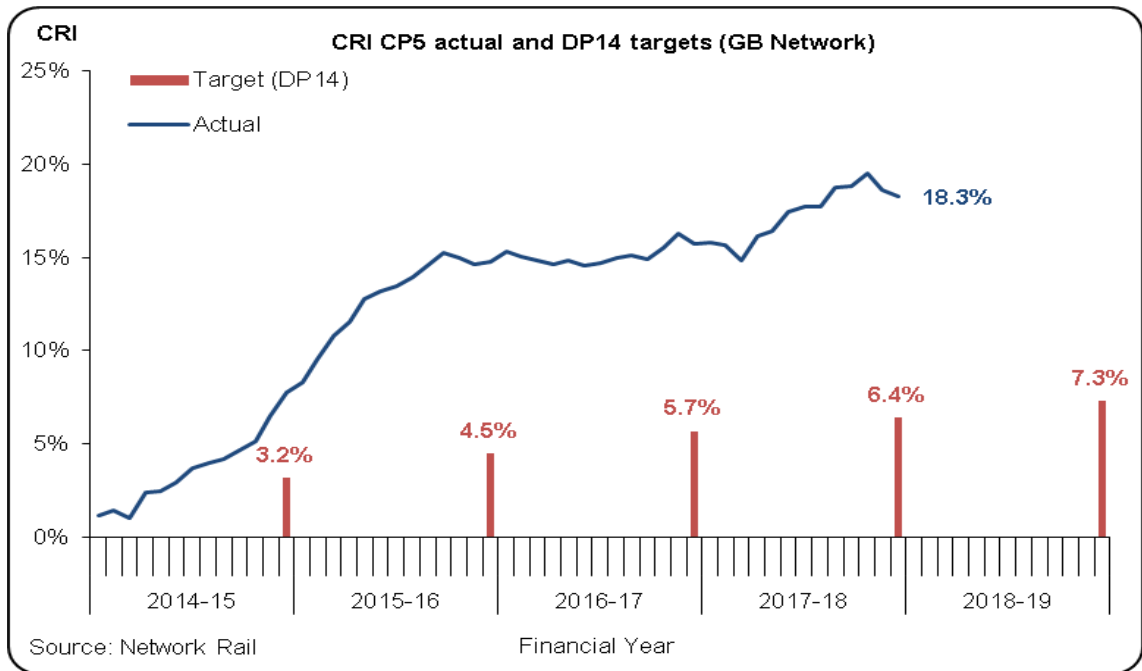
4. Asset management

Asset performance

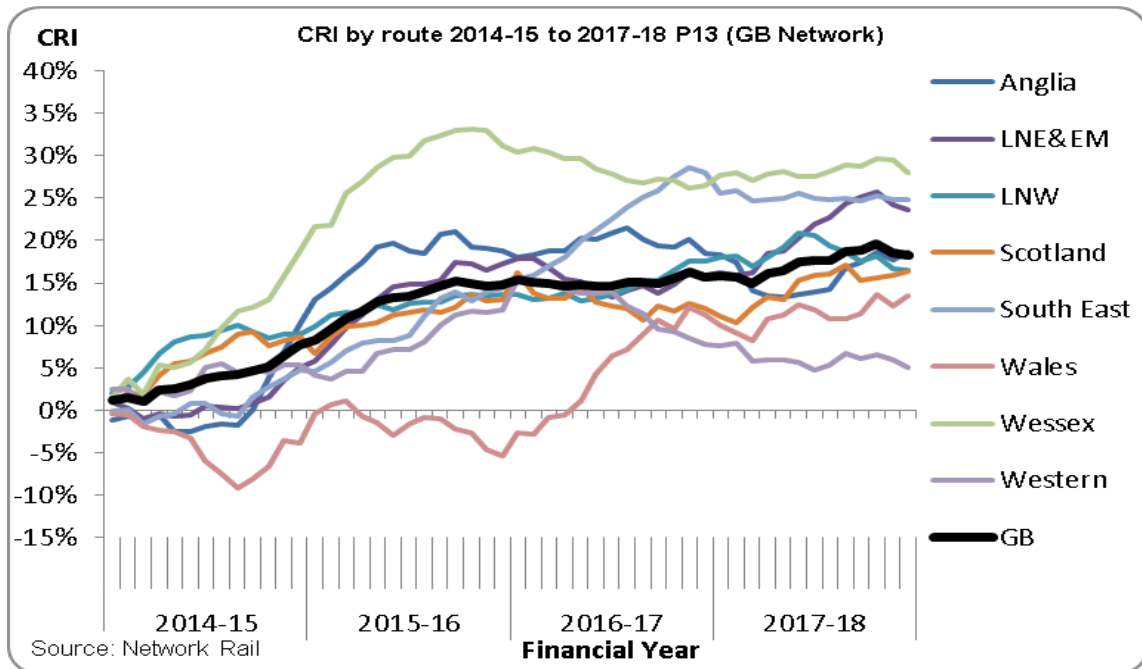
4.1 During 2017-18, Network Rail achieved a 1.7% reduction in the number of infrastructure-related service affecting failures compared to 2016-17. This is a reduction of over 16% compared to the last year of CP4. However the delay minutes attributable to infrastructure incidents has only reduced by 1.5% over the same period.



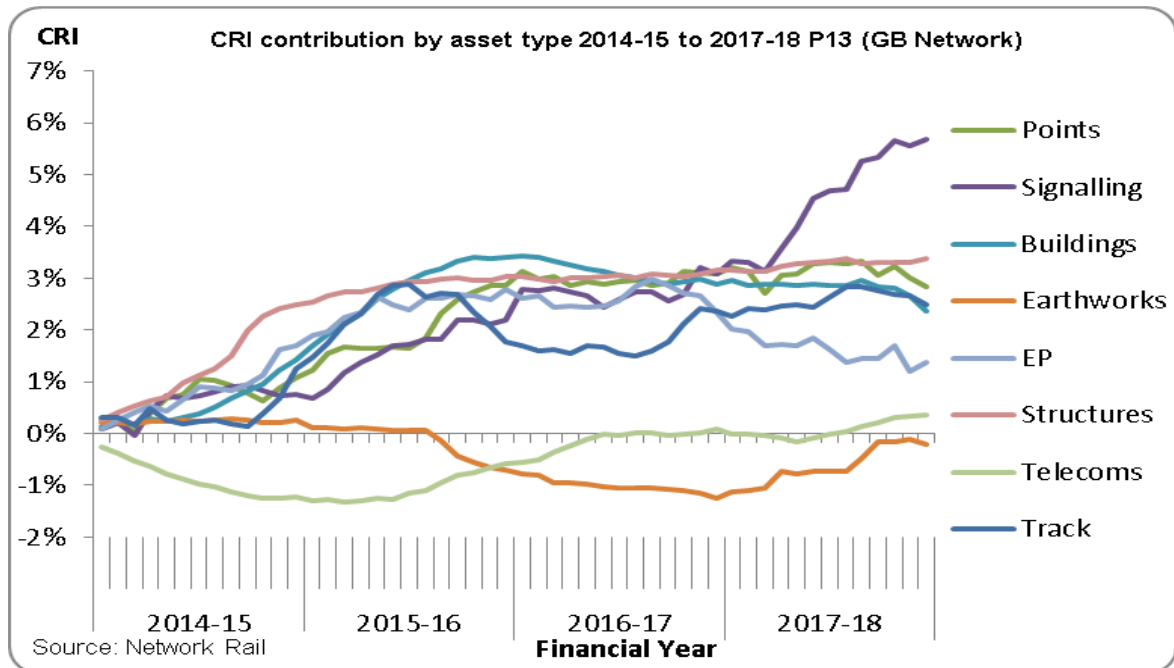
4.2 Network Rail also continued to improve its Composite Reliability Index (CRI) performance, ending the year 2.5pp up at 18.3%. This is and well ahead of the trajectory originally projected for CP5.



4.3 Wessex, South East and LNE/EM (which gained over 7.0pp during 2017-18) have all achieved a CRI gain of over 20% so far during CP5. Scotland gained 4.4pp during 2017-18 and Wales continued to make gains after a big improvement in 2016-17. Western's downward trend last year has continued and it is showing the lowest gain, at 5%, against the start of the control period. However, Western's performance was better than its target which reflected expected initial reliability issues following the electrification programme.



4.4 All asset groups except earthworks have made a positive contribution to the overall network CRI since the beginning of CP5. The recovery in telecoms performance has picked up again after a plateau at the CP4 exit level. Signalling has made the biggest gain this year, with its contribution to overall CRI increasing from 3.1% to 5.7%, partially offset by a fall in electrical power from 2.3% to 1.4%. The earthworks contribution has improved from -1.2% to -0.2%. The earthworks contribution has improved from -1.2% to -0.2%.



Asset sustainability

4.5 Maintaining and renewing the network is fundamental to Network Rail's responsibilities. Regular maintenance counters the incremental effects of wear and aging to keep the assets safe and performing as intended, but eventually it becomes uneconomic or impractical to maintain them any longer and they have to be renewed.

4.6 The company's asset policies set out the renewal work required to sustain the condition of the network assets at least whole life cost. The planned volume of renewals required during CP5 was set out in Network Rail's 2014 delivery plan (DP14). However, the actual cost of delivering renewals during CP5 has consistently exceeded what we assumed in the PR13 settlement, so to remain within the borrowing limit agreed with government, Network Rail has reduced the volume of renewals it plans to complete in the control period and changed the work activity mix, undertaking more smaller scale condition-driven activities. A particular example of this has been the greater reduction in the high output track renewals programme, compared to other track renewal activities due to a combination of factors including reducing track access, and the works generally being more driven by strategy and sustainability concerns.

4.7 We monitor the actual volume of work completed by Network Rail, to hold the company to account for achieving its current plan, and to understand the volume of work deferred from the original DP14 plan, which will increase the cost of future control periods. In this chapter we look at renewals volume delivery for seven key asset types, namely:

- plain line track;
- switches and crossings (S&C);
- signalling (SEUs);
- underbridges;
- earthworks (embankments, soil and rock cuttings);
- OLE wire runs; and
- conductor rails.

This covers around half of the overall renewals portfolio, but captures work on assets which, should they fail are most likely to impact passengers and freight customers. By contrast, in Chapter 6 we consider the whole asset renewals portfolio. Chapter 6 addresses the *spend* on renewals rather than (as here) physical work commissioned.

4.8 During the first year of CP5 (2014-15), the volume of renewals completed by Network Rail was significantly less than it had planned. The situation recovered during years 2 and 3, although the planned volume of work had been reduced due to affordability concerns.

4.9 For year 4, Network Rail has delivered more volume than anticipated in its 2017 delivery plan. The volume of work completed on underbridges was 19% ahead of plan. Earthworks was 13% ahead of plan and signalling, 8% above plan. The plain line track renewal volume increase of 12% has been accompanied by a change in work mix, with increases in re-railing (both rails) and medium refurbishment. Overhead line renewal was significantly above plan, due to reprioritisation in Anglia and omission from DP18 of planned activity in Anglia and LNE/EM.

Asset data quality

4.10 Both the development and application of asset policy, and the use of advanced decision support tools, are heavily reliant on Network Rail maintaining a comprehensive and reliable dataset of information about all the network assets and their condition. During the last periodic review we assessed the quality of Network Rail's asset data and found it variable, so for CP5 we set Network Rail the objective of delivering an improved asset dataset, and we made it a regulated output to be achieved by April 2017, to support the PR18 planning process. We said Network

Rail should demonstrate A2 data quality for the core asset data used in asset management decision making, which means it should be maintained by an overarching information management system (A), and that the data itself should be appropriately accurate and reliable (2).

- 4.11 Network Rail has responded by developing an approach that sees asset information itself managed as an asset, to be maintained and renewed, with assurance arrangements analogous to the arrangements for physical network assets, including the appointment of a professional head. This is a best practice approach, and reflects the requirements of the international standard for data quality, ISO8000. Network Rail has rolled out these arrangements in the routes, including organising the resources necessary to manage asset data quality at route level, and developing risk registers to focus action on priority areas.
- 4.12 We have previously determined that Network Rail has achieved the requirement of ‘A’ grade for governance. For the data accuracy and reliability measure, we used a risk-based approach to assessing the achievement of the regulated output, and have determined that Network Rail’s internal assurance process is appropriate evidence for those asset types where data accuracy is believed to have been maintained at ‘2’ since the start of CP5. Similarly for asset types where Network Rail believes the data accuracy has not met the ‘2’ level requirement the internal assurance reports have been used as evidence, as it was not deemed efficient use of resource to assess a measure known to have failed the requirement. Indicative scores at an asset level are shown in the table below.

Asset	Indicative measure (April 2017)
Track	2
Signalling	2
Telecoms	3
Electrical Power	4
Buildings	2

- 4.13 The indicator reports for the remaining asset types, Structures and Earthworks, suggest that the data quality has improved to level ‘2’ since the start of the control period. This improvement is in the process of being independently assessed through ORR’s Independent Reporter programme. We expect to report on the full set of results in the next edition of the Network Rail Monitor

Route level analysis

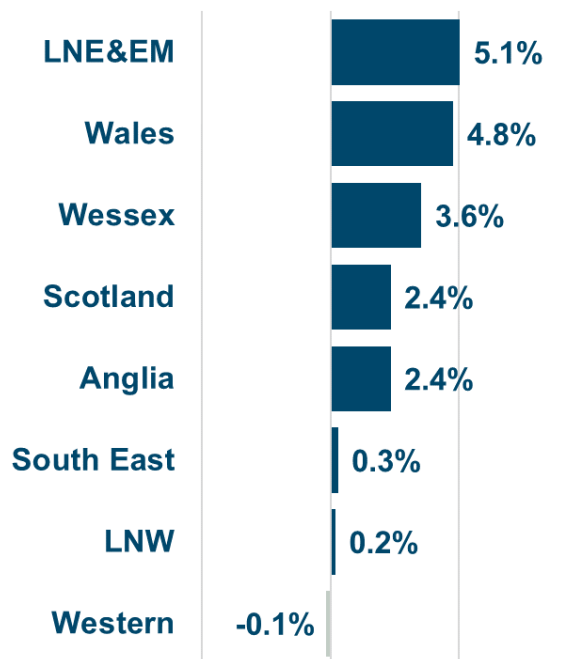
- 4.14 In this edition of the Network Rail Monitor, we have built upon route level comparisons in previous Monitors and for the first time presented simple

comparative charts comprised of composite measures of performance, based on Network Rail scorecards and supplementary measures by route.

4.15 Further information on the methodology used for route level comparison, including how the composite metrics are calculated, is detailed in Annex 1.

Asset Management Route Analysis

Composite scorecard items measured relative to target



Summary of composite elements

	Reduction in service affecting failures	7 key renewals volumes
Anglia	1.7%	98.5%
LNE&EM	7.1%	100.0%
LNW	-1.1%	97.5%
Scotland	4.7%	100.0%
South East	-0.4%	100.0%
Wales	4.6%	100.0%
Wessex	5.6%	100.0%
Western	-1.4%	99.6%

Composite Reliability Index (CRI)

The Composite Reliability Index (CRI) shows the percentage improvement of asset reliability compared to the baseline taken at the end of Control Period 4 by assessing a number of component measures relating to eight asset disciplines (track, points, signalling, buildings, earthworks, electrical power, structures & telecoms).



Source: ORR route level analysis of the Network Rail Composite Reliability Index (CRI) Report - 2017/18 P13

5. Developing the network

- 5.1 Network Rail is required to set out its commitments for developing the network in its Enhancements Delivery Plan (EDP). The purpose of the EDP is to allow stakeholders to plan their businesses with a reasonable degree of certainty taking into account what Network Rail will deliver. We monitor Network Rail against the EDP for England and Wales and for Scotland. Since the Hendy re-plan in 2015 for England and Wales, Network Rail has encountered significant challenges in delivering the plan. It has been working with its funders and stakeholders to address these challenges whilst remaining within its funding envelope.

Delivery progress

- 5.2 We monitor Network Rail against two major milestones:

- The end of GRIP Stage 3 – this is the end of the development process where a single option for design and delivery is selected; and
- Entry into Service (EIS) – when construction is substantively complete and services can begin.

- 5.3 Network Rail delivered 11 of 20 (55%) EIS milestones it planned to deliver during the current reporting period. This included electrification of the line between Maidenhead and Didcot, the completion of the capacity improvements between Kettering and Corby and platform extensions at Waterloo to allow 10-car services on suburban lines.

- 5.4 Six EIS milestones (30%) were missed in the reporting period. These were:

- Edinburgh Glasgow Improvement Programme (EGIP) Key Output 1 – in October 2017 (missed for a second time)
- Bromsgrove Electrification – in November 2017
- North West Electrification, Phase 4 and Huyton & Roby Phase 2 – both in December 2017
- Thames Valley EMU capability from Paddington to Didcot – in December 2017
- Gospel Oak to Barking Electrification – in March 2018 (missed for a second time)

- 5.5 Network Rail completed three (50%) GRIP 3 development milestones on schedule and missed one (17%) against a total of six. The remaining milestones were revised to later dates following the change control process agreed between Network Rail, its funders, stakeholders, and ORR.

5.6 More information on Network Rail's performance against its milestones can be found [here](#).

Projects at risk

5.7 Network Rail is undertaking a number of complex projects and programmes which will support the delivery of new train services.

5.8 The *Great Western Electrification Programme* has a number of milestones which it must meet in 2018. Obtaining the access needed to complete the work has been disruptive for passengers, particularly between Reading and Newbury.

5.9 ORR raised concerns with Network Rail in February 2018 having benchmarked previous electrification performance. An achievable plan to deliver electrification to Cardiff in 2018 has not been produced. Network Rail is looking at options with its funders and customers for delivering electrification to Cardiff that would complete the works in 2019 taking into account the impact on passengers.

5.10 As previously reported the *Northwest Electrification Programme* faces significant challenges, notably the installation of OLE in some difficult and relatively inaccessible parts of the North Western network. Phases 4 (Manchester to Preston electrification) and 5 (Manchester to Stalybridge electrification) were impacted by problems over the Christmas period with ground conditions affecting delivery. As a result infrastructure was not available for the May 2018 timetable change. Delays were compounded by the collapse of Carillion in January.

5.11 *Bromsgrove Electrification* encountered problems due to bad weather at both Christmas and in February. The May 2018 milestone is being revised to August 2018 through the change control process.

5.12 In Scotland Key Output 1 (electrification of the line between *Edinburgh and Glasgow*) delivered in December 2017. While this is a significant milestone for this programme it was a year after the original date required by funders. A lessons learnt review is ongoing. We will publish the recommendations from this when it is complete.

5.13 The *Scotland portfolio* has generally performed well over this period, although some challenges remain, in particular around the delivery of Stirling Dunblane Alloa electrification.

5.14 As reported in previous Monitors, the *Gospel Oak to Barking* Project failed to reach a regulated milestone in June 2017. It failed again in March 2018 and the project is now over 18 months late. The EIS milestone is being revised to July 2018 through the change control process.

Enhancements capability

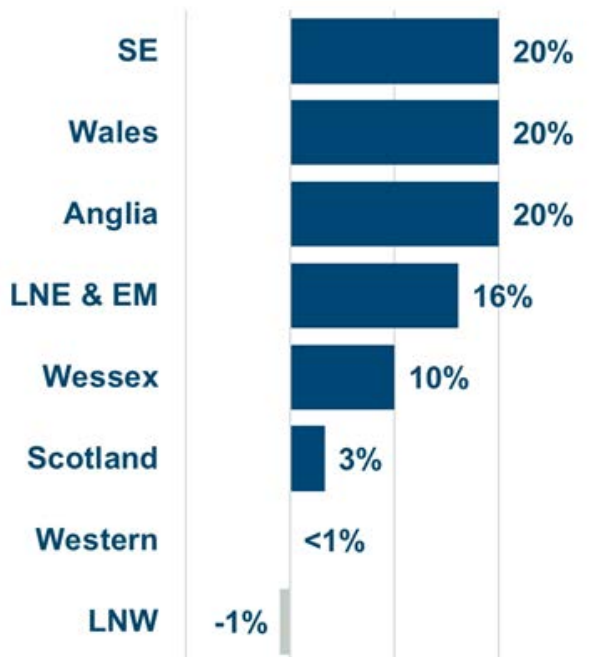
- 5.15 Network Rail has reported its Enhancements Improvement Programme (EIP) led to improvements in schedule and cost adherence. However, as the organisation did not forecast the expected benefits from the EIP at the start of the programme, we cannot conclude if these reported improvements are sufficient to indicate the programme was a success. Articulating the measurable benefits from the EIP was a requirement of our s.55 (5b) Notice under the Railways Act (1993) from November 2015. We are working with Network Rail to define a framework focused on the capabilities required for capital project and programme delivery.
- 5.16 We will set out later in the year our approach to monitoring enhancements capability in the next Control Period.

Route level analysis

- 5.17 In this edition of the Network Rail Monitor, we have built upon route level comparisons in previous Monitors and for the first time presented simple comparative charts comprised of composite measures of performance, based on Network Rail scorecards and supplementary measures by route.
- 5.18 Further information on the methodology used for route level comparison, including how the composite metrics are calculated, is detailed in Annex 1.

Enhancements route analysis

Top Investment Milestones measured relative to target



The chart above measures each route's performance against its target. For example, Anglia's target was to complete 80% of their Top Investment Milestones in 2017-18 and they completed 100%, placing them 20 percentage points above their target.

Wales route had no regulated milestones during 2017-18. However, Network Rail's route comparison scorecard uses a proxy measure which is reflected in the chart above.

Completion status of all regulated milestones by route (2017-18)

These charts illustrate what proportion of all regulated milestones for each route in 2017-18 have been completed, revised or missed.

Anglia



4 milestones

EM & LNE



15 milestones

LNW



13 milestones

Scotland



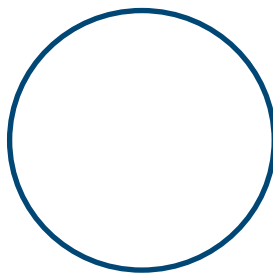
1 milestone

South East



2 milestones

Wales



No milestones

Wessex



10 milestones

Western



9 milestones

Source: ORR analysis of Network Rail data

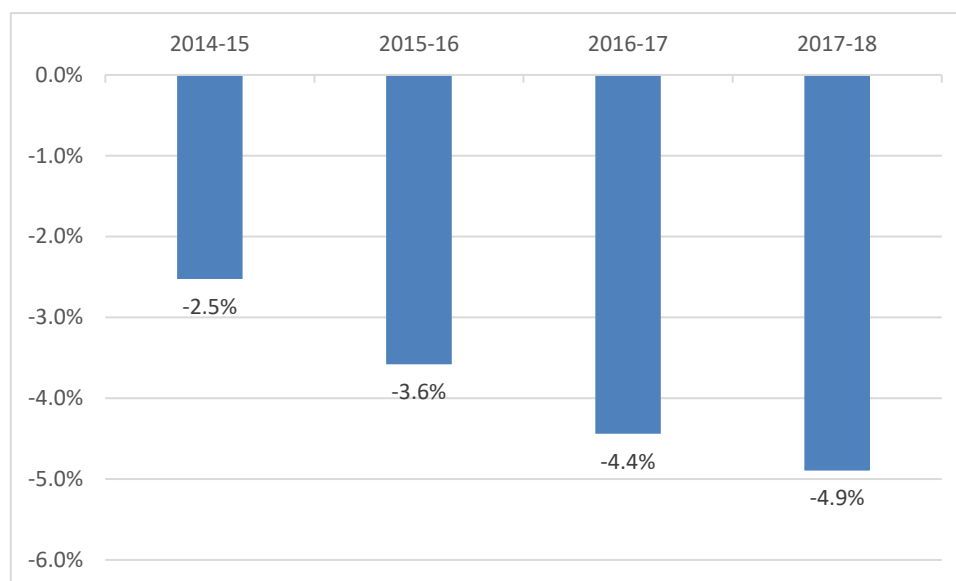
6. Expenditure and finance

- 6.1 This section examines Network Rail's efficiency and wider financial performance, including for each of the company's routes, debt and borrowing in 2017-18.
- 6.2 This analysis is based on draft financial information provided by Network Rail. We will report more fully on Network Rail's financial performance in our annual efficiency and finance assessment¹.

Efficiency continues to decline and renewals have been deferred

- 6.3 We monitor the efficiency of Network Rail's core business activities. These are operations, support, maintenance and renewals. Efficiency declined by £4m (0.4%) in 2017-18, compounding the £218m (4.4%) decline across the first three years of CP5.

Network Rail's efficiency compared to the start of CP5



- 6.4 Network Rail's declining efficiency across the first four years of CP5 has been largely due to a £322m (15.6%) decline in renewals efficiency. This has been partially offset by a £100m (4.0%) increase in efficiency across operations, support and maintenance activities. Using the CP5 efficiency measure, Network Rail is forecasting that its efficiency will be 10.7% lower in 2018-19 compared to the start

¹ See <http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/monitoring-performance/efficiency-and-finance-assessment>.

of CP5². Caution needs to be applied in interpreting the effect of the forecast for 2018-19 on the cumulative number for CP5 because Network Rail is planning on spending additional operating expenditure in the last year of CP5 to prepare for CP6. This shows as inefficiency in CP5 but may overall generate efficiency savings when looked at over both control periods.

6.5 Network Rail did not undertake £441m of renewals work planned in its budget for 2017-18³. It has built up a substantial backlog of work across CP5 that will now need to be caught up in CP6 and beyond⁴.

6.6 Earlier this year we consulted on the problems with Network Rail's renewals in CP5⁵. In our view Network Rail:

- was poorly prepared to deliver renewals at the start of CP5 and consequently its efficiency improvement plans were not well founded. Volumes of renewals delivered have been considerably lower than set out in Network Rail's CP5 delivery plan. This has reduced productivity within Network Rail and through its impact on the supply chain;
- reacted slowly to the problems on efficiency reflecting the fact that Network Rail has been focused for much of CP5 on the related challenges of delivering its enhancements programme;
- has experienced increased pressure on access to the railway to carry out work. Network Rail assumed that network access would increase by 25% in CP5, but it has actually fallen. The relationship between access duration and productivity is not straightforward. However, reduced access will tend to reduce productivity. Network Rail has also become more risk averse so that it plans to do less work in the access that is available to prevent overruns;
- was affected by its reclassification into the public sector with the introduction of fixed borrowing limits. Inefficiency at the start of CP5 led to cost pressures and repeated re-planning of renewals projects, reducing the volume of work to keep

² Network Rail has said that the decline in 2018-19 is partly due to cost increases (£65m), reversal of beneficial one-offs (£40m) and also because Network Rail has decided that to best prepare for CP6, it has chosen to spend more money on operations, support and maintenance activities (£179m). The effect of this decision will worsen reported efficiency because increases to operations, support and maintenance expenditure count as inefficiency.

³ Chapter four includes an analysis of some of the main renewals volumes. There are two important differences between that analysis and here. Firstly, this section includes all renewals expenditure, whereas chapter four covers around only half of all renewals. Secondly, for financial purposes, work is recorded as a project progresses, whereas for asset management purposes it is only recorded when the asset is brought into operation.

⁴ Network Rail has undertaken £3.0bn less renewals work over the first four years of CP5 than assumed in our PR13 determination.

⁵ See <http://orr.gov.uk/rail/consultations/pr18-consultations/consultation-on-improving-network-rails-renewals-efficiency>.

spending within the borrowing limits. This re-planning created further cost pressures, leading to a downward spiral of deferred work and higher costs for the work done; and

- devolution to Network Rail's routes initially led to unaffordable increases in the scope of work in some areas. Route managers made use of local opportunities to increase the scope of some renewals work to secure additional local benefits. The additional costs of doing so have increased headline costs and put pressure on available funding.

6.7 Because poor planning for CP5 caused a number of the problems with Network Rail's renewals efficiency, we appointed an independent reporter, Nichols to assess whether Network Rail was developing robust expenditure plans as part of its route-based strategic business plans for Control Period 6 (CP6). Nichols concluded that Network Rail is following a progressive planning process that should lead to robust efficiency plans for operations, maintenance and renewals expenditure in CP6. We are currently reviewing these plans to inform our 2018 periodic review of outputs and funding for CP6⁶.

Wider financial performance

6.8 The regulatory financial performance measure (FPM) provides a better understanding of Network Rail's financial performance than simple income and expenditure variances. FPM compares actual income and expenditure to Network Rail's annual budget, and then to the financial assumptions in our PR13 determination (which underpin the company's level of funding)⁷. It ensures that Network Rail does not benefit from delaying work to a later date if that work still needs to be done and adjusts for the value of any outputs that Network Rail was funded to, but has not delivered such as reliability of train performance.

⁶ See <http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/price-controls/periodic-review-2018>.

⁷ It excludes some income and expenditure that are not as controllable by Network Rail. These include network grant, fixed track access charges, traction electricity income and costs, and business rates.

Network Rail's financial performance in 2017-18

£m	Budget	Actual	Variance b/(w)	Of which out / (under) performance
Turnover	1,741	1,760	19	(4)
Schedule 4	(235)	(220)	15	5
Schedule 8	(121)	(219)	(98)	(98)
Operations	(601)	(604)	(3)	(19)
Support	(520)	(452)	68	57
Maintenance	(1,389)	(1,412)	(23)	(17)
Capex – Renewals	(2,804)	(2,413)	391	(50)
Capex – Enhancements	(4,366)	(4,055)	311	4
Financial performance against budget)⁸				(123)
Budget vs. PR13				(1,749)
Adjustments for missed regulatory outputs				(203)
Financial performance (regulatory)				(2,075)

6.9 Network Rail underperformed against its internal measure by £0.1bn in 2017-18. This was largely because of higher than budgeted Schedule 8 payments for poor train performance and rates for renewals. The level of underperformance has improved compared to the first three years of CP5 (average £0.6bn annual underperformance against budget).

6.10 Network Rail underperformed the regulatory financial performance measure by £2.1bn largely because its internal budget was £1.7bn higher than our PR13 financial assumptions for the year. It underperformed against its own budget by £0.1bn and the regulatory measure includes a £0.2bn downward adjustment for train performance lower than the regulatory target.

Significant enhancements have been delivered on budget

6.11 Network Rail spent £4.1bn on enhancements in 2017-18, the largest annual investment in rail infrastructure in recent years⁹. This work was delivered for slightly lower (£4m) than budget. Network Rail's difficulties with its enhancements programme earlier in CP5 resulted in increased budgets and deferred milestones

⁸ Neutral timing differences including deferral of work represent the £803m difference between £680m of cumulative income and expenditure variances and the £123m of financial underperformance against budget.

⁹ This is 35% higher than the average annual enhancements spend over the previous five years and 68% higher than the average over the previous ten years.

for delivery of schemes. Problems with delivering these enhancements have contributed to problems with delivering planned renewals in CP5¹⁰.

Debt and borrowing – no headroom in 2018-19

- 6.12 Network Rail's debt increased by £5.6bn to £50.4bn in 2017-18. This was £0.5bn lower than budget largely due to underspend on renewals and enhancements projects.
- 6.13 Network Rail has fixed borrowing facilities with the Department for Transport for CP5¹¹ for its activities in England and Wales, and in Scotland. For England and Wales, Network Rail expects to use all of its available borrowing for its planned activities in 2018-19. The lack of headroom means that the company will have no contingency in the event that income or expenditure outturn worse than planned. In light of Network Rail's underperformance against its own budget in each year of CP5 to date, we consider that this lack of contingency is risky. In practice, we expect that the company would need either to request additional funds from the Department, or defer further renewals work into CP6, which would exacerbate the declining efficiency of its renewals activities.

Asset disposals

- 6.14 Following the Hendy Review, Network Rail continues to proceed with its plans to dispose of land assets where appropriate. Network Rail currently expects to achieve over £1bn of asset sales in CP5 including its commercial estate portfolio.

Getting ready for CP6

Leading indicators of performance

- 6.15 Because poor planning for CP5 caused a number of the problems with Network Rail's renewals delivery and efficiency, we requested Network Rail to demonstrate that it is better prepared to deliver efficiently from the start of CP6.
- 6.16 Network Rail has undertaken an analysis of some of the key leading indicators of efficient delivery for each of its routes for 2019-20, the first year of CP6. We recognise that this is new management information (based on existing data sources). As such, there may be some inaccuracies and that this analysis is likely to evolve. However, in our view, the currently available information is a good start for

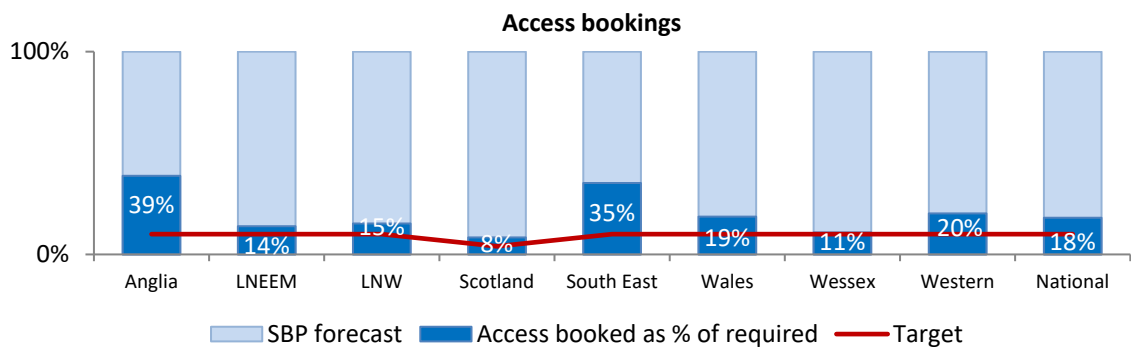
¹⁰ For example, network access has been re-prioritised towards the Great Western electrification programme in the Western route.

¹¹ There are separate limits for England and Wales, and for Scotland.

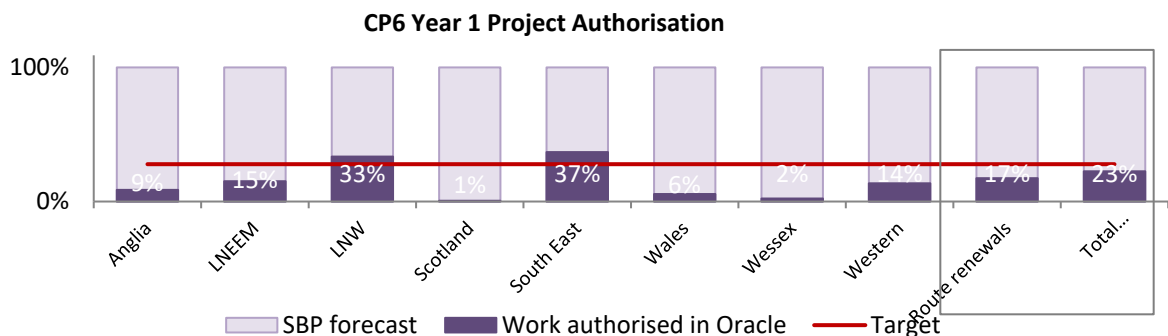
assessing how well prepared routes are for the start of CP6, which starts in April 2019. We expect the analysis to evolve over time, for example, around target levels.

6.17 Given that it is approximately nine months before the start of CP6, we would not expect routes to have fully developed workbanks, contractual arrangements and resources. We also recognise that it requires judgment to compare routes who face different challenges, for example depending on the type of work being carried out or the network they operate. However, Network Rail's analysis shows that most routes still have a substantial amount of work to do to get ready for the start of CP6:

- **Network access:** Most routes have booked less than 20% of the network access that they forecast they will need to undertake planned engineering work in 2019-20. Network Rail considers that routes are ahead of where they were last year with regional variations largely a result of the different levels of disruptive possessions¹².



- **Workbank planning:** Few CP6 projects have been booked in Oracle Projects (Network Rail's project management system) and received internal authorisation. There are significant regional variations.



- **Efficiency plans:** Network Rail has shared information on the progress of routes' efficiency plans. Most routes have not yet developed mature plans for how they will deliver efficiency improvements in CP6. This is concerning and we are

¹² Disruptive possessions have a significantly greater impact on train services. These need to be agreed with train operators much longer in advance. Anglia and South East have higher levels of planned engineering works, requiring more disruptive possessions and earlier booking than other routes.

discussing with Network Rail. We would have expected routes' efficiency plans to be further progressed at this stage. We are expecting substantial progress over the next few months.

- *Renewals delivery contracts*: Network Rail has around 20 framework contracts for its renewals activities and it is currently in the process of renewing some and extending some of these contracts. This is important to avoid disruption to the supply chain. It appears on target to implement the new contracts on time.
- *Maintenance capacity*: Network Rail intends to recruit nearly 500 additional staff in 2018-19 to ensure that it has adequate resources to deliver its planned maintenance activities for 2019-20. It has recruited less than 10 percent of these additional roles so far.

6.18 We agree with Network Rail that it is difficult to draw firm conclusions from the current information on leading indicators. In our view, the current information does not clearly demonstrate that routes are better prepared to deliver efficiently from the start of CP6. Network Rail needs to do more to demonstrate that it will be ready for CP6. It needs to be clearer about its targets, and to improve its comparative analysis of the regional variations across its leading indicators. We will check Network Rail's progress at our regular director-level meetings and report on progress in our next Monitor publication.

Changes to our monitoring approach for CP6

6.19 We recently consulted on changes that we intend to make to the way that we assess Network Rail's efficiency and financial performance¹³. In CP6, we will provide more rounded assessments that draw out key messages about the drivers of performance, recognising that different audiences want different levels of technical detail. We will also make more informed forward-looking assessments of the efficiencies that Network Rail will likely deliver across the control period.

6.20 To support these changes, Network Rail will need to make changes to the information that it provides to us. Network Rail has largely supported our intended changes and is working with us to agree how these should work in practice. Network Rail has committed to:

- improve its communication of the reasons for cost changes due to changes to routes' efficiencies, mix of work and external factors;
- provide a sharper focus on performance compared to delivery plans; and

¹³ See <http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/price-controls/periodic-review-2018/pr18-consultations/our-approach-for-assessing-network-rails-efficiency-and-wider-financial-performance-in-control-period-6>.

- identify the most appropriate measures of routes' productivity and leading indicators of performance.

6.21 We will publish our finalised approach in regulatory accounting guidelines before the start of the control period.

Route level performance

6.22 Network Rail's routes are the geographic sub-divisions that have devolved responsibility for managing the rail network. The following table summarises their financial performance in 2017-18 compared to budget.

Routes' financial performance compared to budget

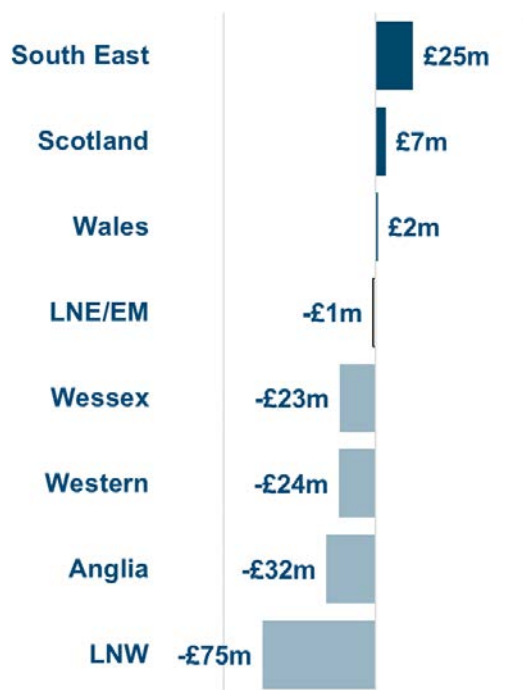
£m	Financial performance better/(worse)	Percentage of budget
Anglia	(79)	-10%
LNE & East Midlands	4	0%
LNW	(153)	-7%
South East	56	4%
Western	(55)	-3%
Wessex	(51)	-7%
England	(278)	
Scotland	31	3%
Wales	1	0%
Central services	105	
Great Britain	(123)	

6.23 In this edition of the Network Rail Monitor, we have built upon route level comparisons in previous Monitors and for the first time presented simple comparative charts comprised of composite measures of performance, based on Network Rail scorecards and individual measures by route.

6.24 Further information on the methodology used for route level comparison, including how the composite metrics are calculated, is detailed in Annex 1.

Finance Route Analysis

Composite scorecard items measured relative to target



An assessment of cash compliance is included in this composite measure to reflect Network Rail's scorecard and management incentive plan (MIP). In our annual efficiency assessment and other financial monitoring publications, we assess the financial performance measure only. This composite measure is based on information in Network Rail's Period 13 composite scorecard. Analysis earlier in this chapter is based on updated financial information.

Summary of composite elements (£ million)

	Gross FPM excluding enhancements	Gross FPM enhancements	Cash compliance
Anglia	-37.5	-38.7	-14.7
LNE/EM	-23.1	27.2	13.2
LNW	-73.4	-78.6	-72.7
Scotland	-3.3	36.8	-2.3
South East	15.5	43.1	26.2
Wales	2.4	0	2.7
Wessex	-43.5	-6.4	0
Western	-40.3	-14.7	0

Financial performance compared to budget



Source: ORR analysis of *Network Rail Financial Report, Period 13 2017/2018*, Financial Performance Measure by business unit – summary. Route level performance analysis included earlier in this chapter is based on updated financial information.

7. The railway in Wales

Health and safety

- 7.1 Whilst most performance indicators for the Wales route show no significant variation compared to the Great Britain picture, LTIFR at the end of 2017-18 was 0.377, significantly lower (i.e. better) than the GB figure of 0.529¹⁴. The FWI associated with accidents reduced over the year, indicating that accident severity has reduced. FWI was 0.933 at the start of 2017-18 and reduced to 0.837 at the end of the year (although this is a positive development, it should be noted that this figure is still higher than it was at the start of CP5). The level crossing risk indicator model shows that, after several years of rising risk, Wales achieved reductions.
- 7.2 Set against this positive background we saw isolated shortfalls in health and safety risk management, such as HAVS health surveillance (see below) and a landslip in January 2018 caused by a blocked third party storm drain at Trealaw.
- 7.3 Our inspections and investigations found some signs of increasing management capability. The route accepted full responsibility and ownership for a major failure to provide HAVS health surveillance. An action plan was put in place and decisive steps taken to provide exposed workers with health surveillance and to significantly improve compliance. Joint inspections with the route, and union safety representatives, produced solutions for preventing falls from height in signal boxes. Similarly, regular liaison meetings with Infrastructure Projects have helped drive up health and safety standards on sites.

Assets

- 7.4 Wales route met or exceeded most *Train Accident Risk Reduction* volumes. These are target amounts of key maintenance work set by Network Rail at GB level. Wales did not achieve the target for fencing maintenance, but achieved, or bettered the target in nearly all other areas. Working within resource constraints, the route took the risk-based decision to prioritise vegetation clearance work and fencing renewals over fencing maintenance. Targets for vegetation clearance, drainage, and scour sites were all exceeded.
- 7.5 The route explored an innovative approach to tunnels examinations to optimise limited resource and track access, with the intention of combining planned maintenance work with examinations and scoping of repairs in a single possession. Similarly, the route has been training maintainers to carry out visual structures inspections, something that will help increase asset knowledge. Other examples of

¹⁴ This figure is the national LTIFR for route businesses (as opposed to all functions) as it provides a comparative score to the Wales LTIFR for route businesses.

innovative approaches to structures include using single contractors for coastal defences and metal bridges maintenance. These approaches all have the potential to yield considerable benefits. They could also contribute to a more robust, safer asset management system.

- 7.6 Track renewal volumes were largely on target, and the route has plans to improve the targeting of asset condition-led renewals in CP6. The availability of on-track machinery (OTM), essential for carrying out heavy maintenance and track refurbishment work efficiently, appears to have improved. The use of risk-based maintenance (RBM) on continuously welded rail, and discontinuance of visual inspections of low risk track should drive further efficiencies. On the other hand, inspectors noted challenges regarding staffing levels in track maintenance teams. Unfilled vacancies combine with increased workloads to create pressures, particularly in the planning and management of safety-critical maintenance work. The route will need to ensure that these pressures do not result in reduced quality of essential maintenance, or reduced levels of track worker safety.
- 7.7 Much of Network Rail's management of asset safety depends on the correct performance of safety-critical maintenance tasks by local delivery unit (DU) maintainers. Network Rail needs to assure itself that these tasks are done correctly. In Wales we carried out inspections of front-line assurance, the process by which Network Rail obtains this confirmation. We found that assurance was carried out in line with Network Rail's expectations, but concluded that more direct observation of the work would give greater confidence. We also found apparent failures to follow switches and crossings (S&C) inspection standards at one visit. This is the sort of failure that Network Rail's own front-line assurance process is designed to identify.

Level crossings

- 7.8 The second half of 2017-18 saw the delayed commissioning of active warning systems at 10 whistle board crossings, the deferred closure of a crossing due to difficulties extinguishing access rights, and the delayed installation of 'standing red men' pedestrian signals at two crossings. These items show the practical difficulties of reducing level crossing risks where (relatively) new technology and users' access rights are involved.
- 7.9 As in other routes, we inspected arrangements for granting permission to cross at user worked crossings with telephones (UWC(T)) in long signal sections. Our findings were similar to those found elsewhere; crossing risk assessments did not take adequate account of the interface between user and signaller. The assessment did not inform the signaller's decision-making, so that they did not know as a matter of course any unique circumstances at particular crossings that might affect the safety of the user seeking to cross. Wales route continues to experience incidents

at these crossings, such as a near-miss at Bagillt UWC(T) in October 2017, making this a risk that the route needs to continue to work hard to control.

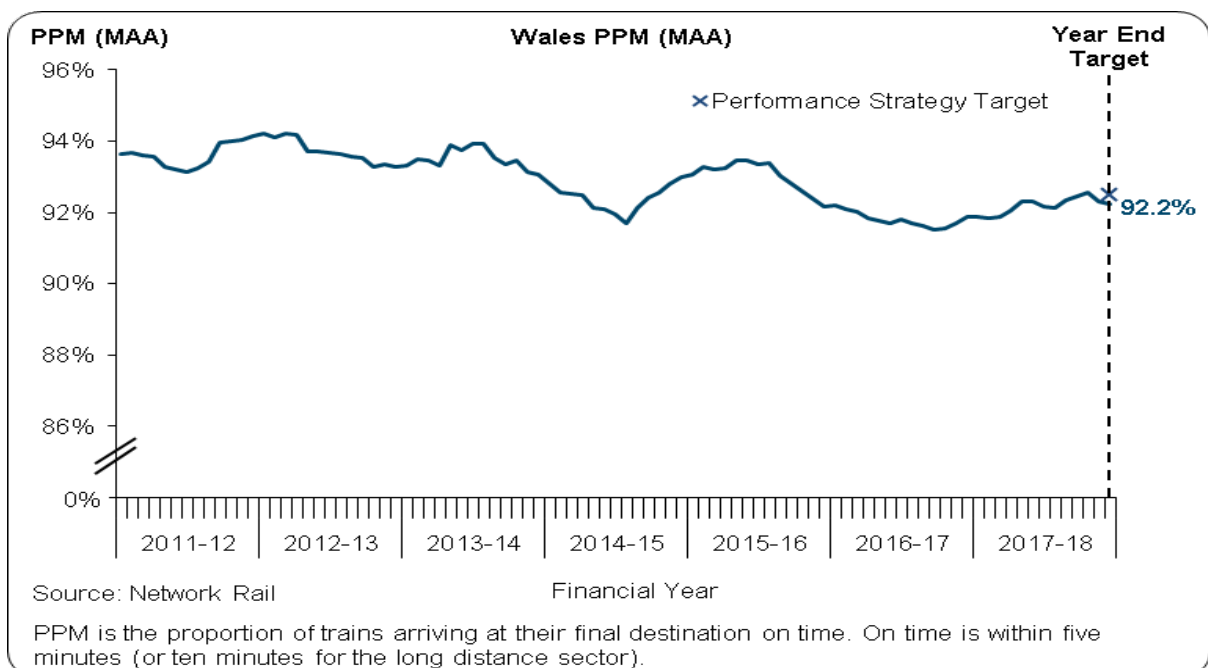
Track worker safety

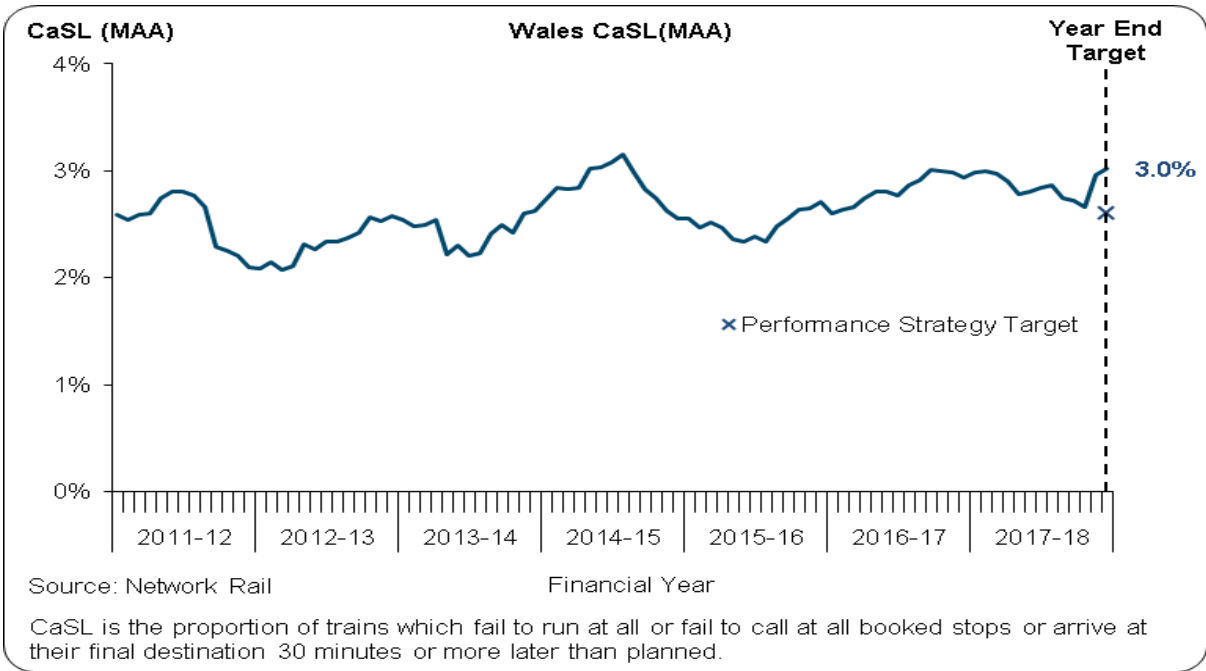
7.10 In comparison to other routes, Wales had the fewest track worker injuries. In common with the other routes, the introduction of Network Rail’s revised track access safety standard (known as 019+) has had a positive impact on numbers of injuries.

7.11 Major projects, particularly electrification, can mean it is difficult to obtain the access needed to maintain the network. Network Rail’s 019+ standard requires greater consideration of planning safe access and carrying out works when trains are not running. Major projects make it important that the route maximises track availability in quiet hours through making best use of available possessions. Initiatives in other parts of GB have shown that it is possible to assess periodic track/trackside maintenance needs and organise these disparate tasks, undertaken by different teams, into blocks of work carried out at the same time in planned possessions. Wales route should explore the possibility of optimising possessions in this way, both to ensure safety-critical maintenance continues to be done, and to improve the safety of workers.

Train performance

7.12 At the end of 2017-18, Arriva Trains Wales’ (ATW’s) PPM MAA was 92.2%, 1.3pp worse than the Performance Strategy target. CaSL MAA was 3.0%, 0.7pp above (i.e. worse than) the Performance Strategy target.

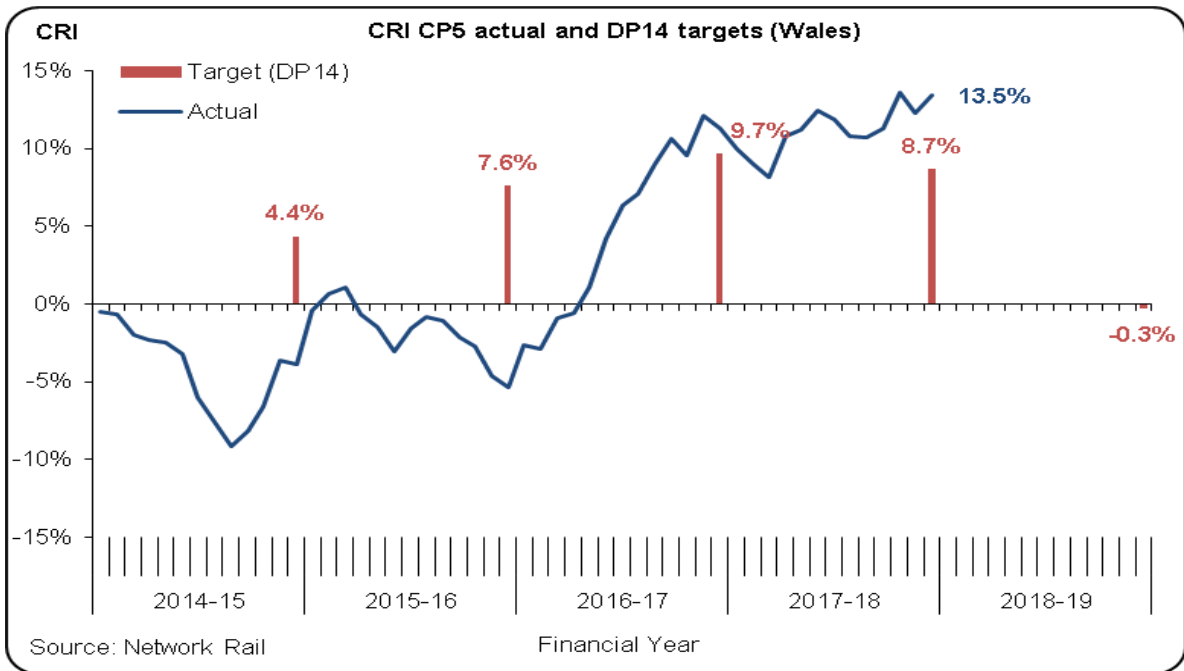




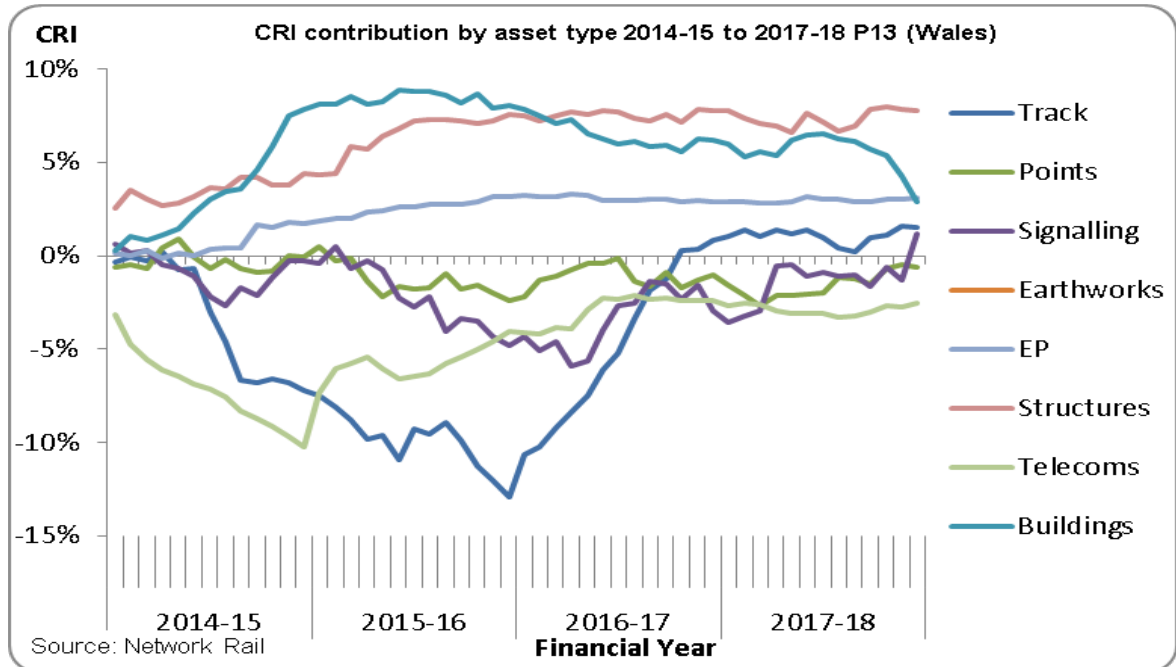
7.13 For England and Wales, we monitor Network Rail’s delivery of the PPM and CaSL targets agreed with the operator in the local Performance Strategies. One of the ways we do this is by using the Network Rail Scorecards, which provide route level information based on targets agreed with the operators. Although behind target for PPM and CaSL at the end of Period 13, PPM performance for Arriva Trains Wales (ATW) was within the threshold specified in the Final Determination. However, for CaSL it was outside the threshold.

Asset management

7.14 The improving trend in asset performance in Wales continued in 2017-18 with CRI reaching 13.5% at the end of the year.



7.15 The main contributor to the continuing improvement was with signalling, where the CRI contribution rose 4.1 pp, from -2.9% last year to 1.2%. There were also slight gains in the track and points contributions, offset by a drop seen in buildings over the last two periods of the year. Now only points and telecoms are below the CP4 exit value.



7.16 Core Valley Lines infrastructure is due to transfer from Network Rail to Keolis Amey in September 2019. Construction and civil engineering on these routes will then become the responsibility of the franchisee. The Central Metro proposal will integrate services on the lines that remain the responsibility of Network Rail (City Line, Penarth, Barry Island and Bridgend) with those on the Valley Lines that transfer from Network Rail.

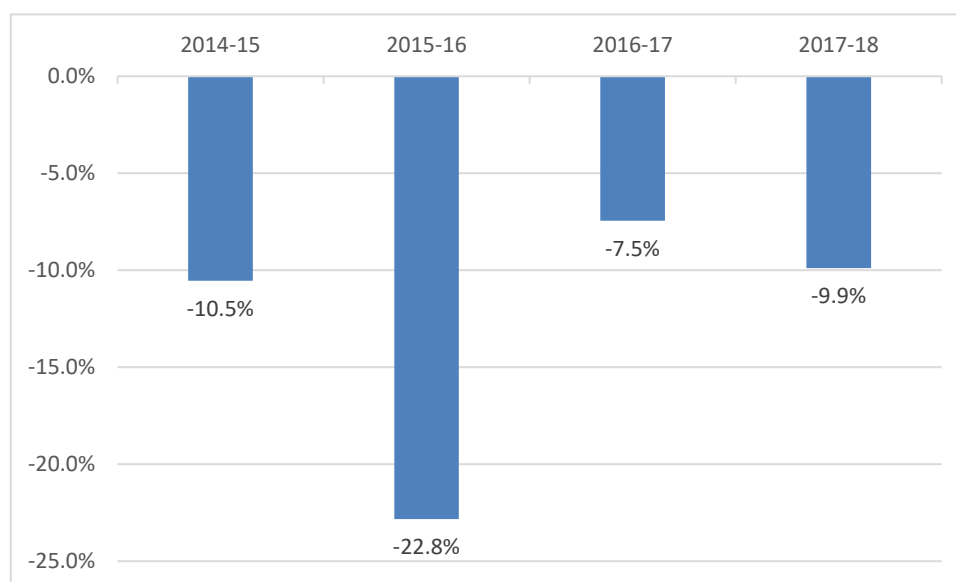
Expenditure and financial performance

7.17 This section examines the efficiency and wider financial performance of Network Rail in Wales in 2017-18. This analysis is based on draft financial information provided by Network Rail. We will report more fully on these matters in our annual efficiency and finance assessment¹⁵.

Efficiency

7.18 We monitor the efficiency of Network Rail's core business activities. These are operations, support, maintenance and renewals. Efficiency declined by £5m (2.3%) in 2017-18, compounding the £23m (7.5%) decline across the first three years of CP5.

Network Rail's efficiency in Wales compared to the start of CP5



7.19 Network Rail's declining efficiency across the first four years of CP5 has been largely due to a £40m (27.4%) decline in renewals efficiency. This has been partially offset by a £12m (9.1%) increase in efficiency across operations, support and maintenance activities. Using the CP5 efficiency measure, Network Rail is forecasting that its efficiency will be 7.4% percent lower in 2018-19 compared to the start of CP5.

¹⁵ See <http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/monitoring-performance/efficiency-and-finance-assessment>.

7.20 Network Rail has deferred renewals work to stay in CP5. In 2017-18, Network Rail Wales deferred £16m (8%) of planned renewals¹⁶. It has built up a substantial backlog (£0.2bn) of work across CP5 that will now need to be caught up in CP6 and beyond.

Wider financial performance

7.21 The regulatory financial performance measure (FPM) provides a better understanding of Network Rail's financial performance than simple income and expenditure variances. FPM compares actual income and expenditure to Network Rail's annual budget, and then to the financial assumptions in our PR13 determination (which underpin the company's level of funding)¹⁷. It ensures that Network Rail does not benefit from delaying work to a later date if that work will still need to be done and adjusts for the value of any outputs that Network Rail was funded to, but has not delivered such as reliability of train performance.

Network Rail Wales financial performance in 2017-18

£m	Budget	Actual	Variance better/(worse)	Of which out / (under) performance
Turnover	47	29	-7	1
Schedule 4	-12	-8	4	3
Schedule 8	-3	-4	-1	-1
Operations	-32	-34	-2	-2
Support	-27	-23	4	3
Maintenance	-70	-70	0	0
Capex – Renewals	-198	-186	12	-4
Capex – Enhancements	-207	-197	10	-3
Financial performance (internal)				-3
Budget vs. PR13				-97
Adjustments for missed regulatory outputs				-4
Financial performance (regulatory)				-104

7.22 Network Rail underperformed against its internal measure by £3m in 2017-18¹⁸. This was largely because of worse than budgeted renewals, enhancements and Schedule 8 payments.

¹⁶ Chapter four includes an analysis of some of the main renewals volumes. There are two important differences between that analysis and here. Firstly, this section includes all renewals expenditure, whereas chapter four covers around only half of all renewals. Secondly, for financial purposes, work is recorded as a project progresses, whereas for asset management purposes it is only recorded when the asset is brought into operation.

¹⁷ It excludes some income and expenditure that are not as controllable by Network Rail. These include network grant, fixed track access charges, traction electricity income and costs, and business rates.

¹⁸ This analysis includes a portion of Network Rail's central costs. These are shown separately in the assessment of Wales' financial performance in the table on page 51.

7.23 Network Rail underperformed the regulatory financial performance measure by £104m largely because its internal budget was £97m higher than our PR13 financial assumptions for the year and a £4m adjustment for poor performance.

8. Y Rheilffyrdd yng Nghymru

Iechyd a diogelwch

- 8.1 Er nad yw'r mwyafrif o ddangosyddion perfformiad ar gyfer Llwybr Cymru yn dangos unrhyw amrywiad arwyddocaol o gymharu â'r darlun ar gyfer Prydain, roedd LTIFR ar ddiwedd 2017-18 yn 0.377, yn sylweddol is (sef gwell) na ffigur Prydain o 0.529¹⁹. Fe wnaeth y FWI sy'n gysylltiedig â damweiniau leihau dros y flwyddyn, gan ddangos bod difrifoldeb damweiniau wedi lleihau. Roedd yr FWI yn 0.933 ar gychwyn 2017-18 ac wedi lleihau i 0.837 ar ddiwedd y flwyddyn (er bod hyn yn ddatblygiad cadarnhaol, dylid nodi bod y ffigur hwn yn dal yn uwch nag yr oedd ar gychwyn CP5). Mae model dangosyddion risg croesfannau rheilffordd yn dangos bod Cymru, ar ôl sawl blwyddyn o risg yn codi, wedi cyflawni gostyngiadau.
- 8.2 Yn wahanol i'r cefndir cadarnhaol hwn gwelsom ddiffygion yma ac acw mewn rheoli risg iechyd a diogelwch, megis gwyliadwriaeth iechyd HAVS (gweler isod) a thirlithriad ym mis Ionawr 2018 a achoswyd gan dagfa mewn draen storm trydydd parti yn Nhrealaw.
- 8.3 Fe wnaeth ein harolygiadau a'n hymchwiliadau ganfod rhai arwyddion o gynnydd mewn gallu rheoli. Mae'r llwybr wedi derbyn cyfrifoldeb llawn am fethiant sylweddol i ddarparu gwyliadwriaeth iechyd HAVS. Rhoddwyd cynllun gweithredu ar waith a chymerwyd camau pendant i ddarparu gwyliadwriaeth iechyd i weithwyr sy'n agored i niwed a gwelliant sylweddol mewn cydymffurfiaeth. Fe wnaeth arolygiadau ar y cyd â'r llwybr, a chynrychiolwyr diogelwch undebau, gynhyrchu atebion ar gyfer rhwystro cwmpïadau o uchder mewn blychau signal. Yn yr un modd, mae cyfarfodydd cydgysylltu rheolaidd gyda Phrosiectau Seilwaith wedi helpu codi safonau iechyd a diogelwch ar safleoedd.

Asedau

- 8.4 Mae Llwybr Cymru wedi cyrraedd neu fynd ymhellach na lefelau Lleihau Risg Damweiniau Trên. Targedau gwaith cynnal a chadw yw'r rhain a osodir gan Network Rail ar lefel Brydeinig. Ni chyrrhaeddodd Cymru'r targed ar gyfer cynnal a chadw ffensys, ond cyrrhaeddodd y targed neu ragori arno ym mhob maes arall bron. Gan weithio o fewn cyfyngiadau adnoddau, cymerodd y llwybr y penderfyniad ar sail risg i roi blaenoriaeth i waith clirio llystyfiant a blaenoriaeth i adnewyddu ffensys ar gynnal a chadw ffensys. Rhagorwyd ar yr holl dargedau clirio llystyfiant, draenio a safleoedd sgwrio.

¹⁹ Y ffigur hwn yw'r LTIFR cenedlaethol ar gyfer busnesau llwybr (yn hytrach na'r holl swyddogaethau) gan ei fod yn darparu sgôr cymharol i LTIFR Cymru ar gyfer busnesau llwybr.

- 8.5 Fe wnaeth y llwybr arbrofi gyda dull arloesol o archwilio twneli i fanteisio i'r eithaf ar adnoddau cyfyngedig a mynediad i'r cledrau, gyda'r bwriad o gyfuno gwaith cynnal a chadw a gynlluniwyd ag archwiliadau a chwmpasu atgyweiriadau mewn un ymweliad. Yn yr un modd, mae'r llwybr wedi bod yn hyfforddi gweithwyr cynnal a chadw i gynnal archwiliadau gweledol o adeiladweithiau, rhywbeth a fydd yn helpu cynyddu gwybodaeth o asedau. Mae enghreifftiau eraill o ddulliau arloesol o ymdrin ag adeiladwaith yn cynnwys defnyddio'r un contractwyr ar gyfer amddiffynfeydd arfordirol a chynnal a chadw pontydd metel. Mae gan yr holl dulliau hyn y potensial i greu manteision sylweddol. Gallent hefyd gyfrannu at system rheoli asedau sy'n gadarnach a mwy diogel.
- 8.6 Roedd graddfeydd adnewyddu cledrau yn unol â'r targed i raddau helaeth, ac mae gan y llwybr gynlluniau i wella targedu adnewyddu asedau ar sail cyflwr yn CP6. Mae'n ymddangos bod gwelliant yn y graddau mae peirianwaith ar gael ar y cledrau (ORM), sy'n hanfodol ar gyfer cyflawni gwaith cynnal a chadw trwm ac adnewyddu cledrau yn effeithlon. Dylai'r defnydd o gynnal a chadw seiliedig ar risg ar gledrau wedi eu hasio'n ddi-dor, a rhoi'r gorau i arolygiadau gweledol o gledrau risg isel arwain at effeithlonrwydd pellach. Ar y llaw arall, fe wnaeth arolygwyr nodi heiriau o ran lefelau staffio mewn timau cynnal a chadw cledrau. Mae swyddi gwag heb eu llenwi ochr yn ochr â chynnydd mewn llwythi gwaith yn creu pwysau, yn enwedig wrth gynllunio a rheoli gwaith cynnal a chadw allweddol i ddiogelwch. Bydd angen i'r llwybr sicrhau nad yw'r pwysau hyn yn arwain at leihau ansawdd cynnal a chadw hanfodol, neu lefelau is o ddiogelwch gweithwyr cledrau.
- 8.7 Mae llawer o reolaeth Network Rail o ddiogelwch asedau yn dibynnu ar gyflawni tasgau cynnal a chadw allweddol i ddiogelwch yn gywir gan unedau cynnal a chadw lleol. Mae angen i Network Rail sicrhau ei hun bod y tasgau hyn yn cael eu gwneud yn gywir. Yng Nghymru rydym wedi cynnal arolygiadau o sicrwydd rheng flaen, y broses a ddefnyddir gan Network Rail i gael y cadarnhad hwn. Rydym wedi canfod bod y sicrwydd wedi ei gyflawni yn unol â disgwyliadau Network Rail, ond daethom i'r casgliad y byddai arsylwi mwy uniongyrchol o'r gwaith yn rhoi mwy o hyder. Rydym hefyd wedi canfod yr hyn sy'n ymddangos fel methiannau i ddilyn safonau arolygu switsys a chroesfannau mewn un ymweliad. Dyma'r math o fethiant y mae proses sicrwydd rheng flaen Network Rail ei hun wedi ei chynllunio i'w adnabod.

Croesfannau rheilffordd

- 8.8 Yn ail hanner 2017-18 gwelwyd comisiynu hwyr systemau rhybuddio byw mewn 10 o groesfannau bwrdd chwiban, cau croesfan wedi oedi yn sgil anawsterau wrth ddi-ddymu hawliau mynediad, a gosod arwyddion cerddwyr 'dynion coch yn sefyll' mewn dwy groesfan, a oedd unwaith eto'n hwyr. Dengys yr eitemau hyn yr anawsterau ymarferol wrth leihau risgiau croesfannau rheilffordd lle mae technoleg (cymharol) newydd a hawliau mynediad defnyddwyr yn y cwestiwn.

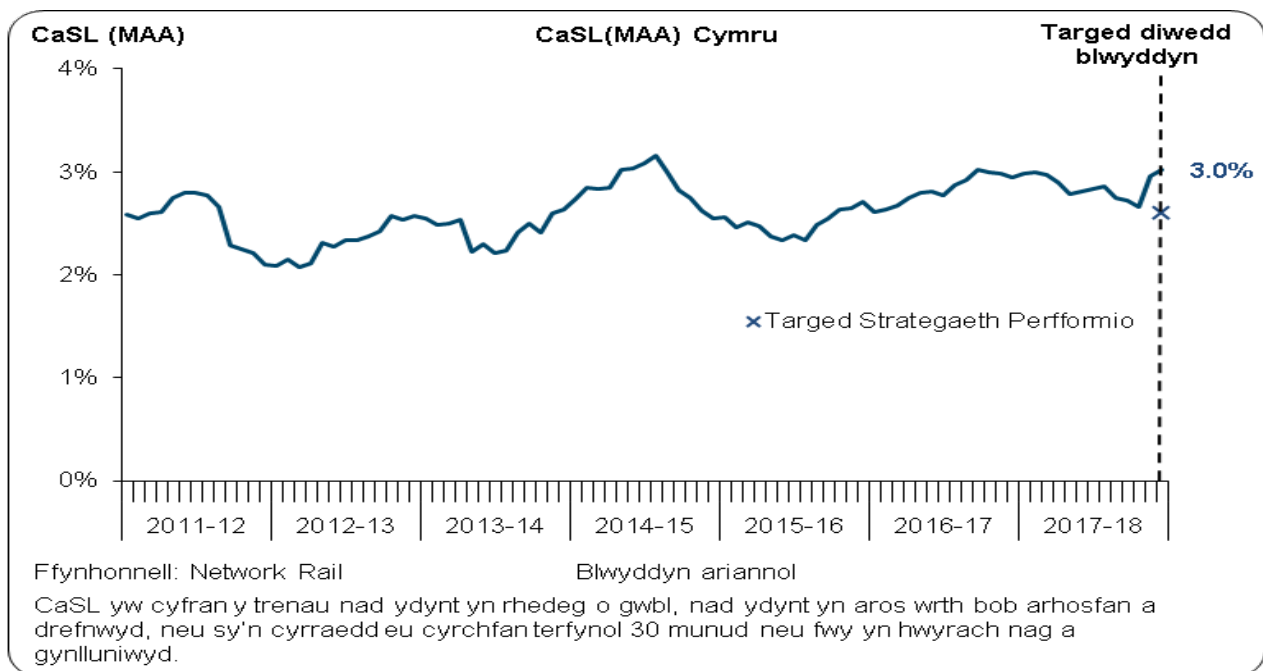
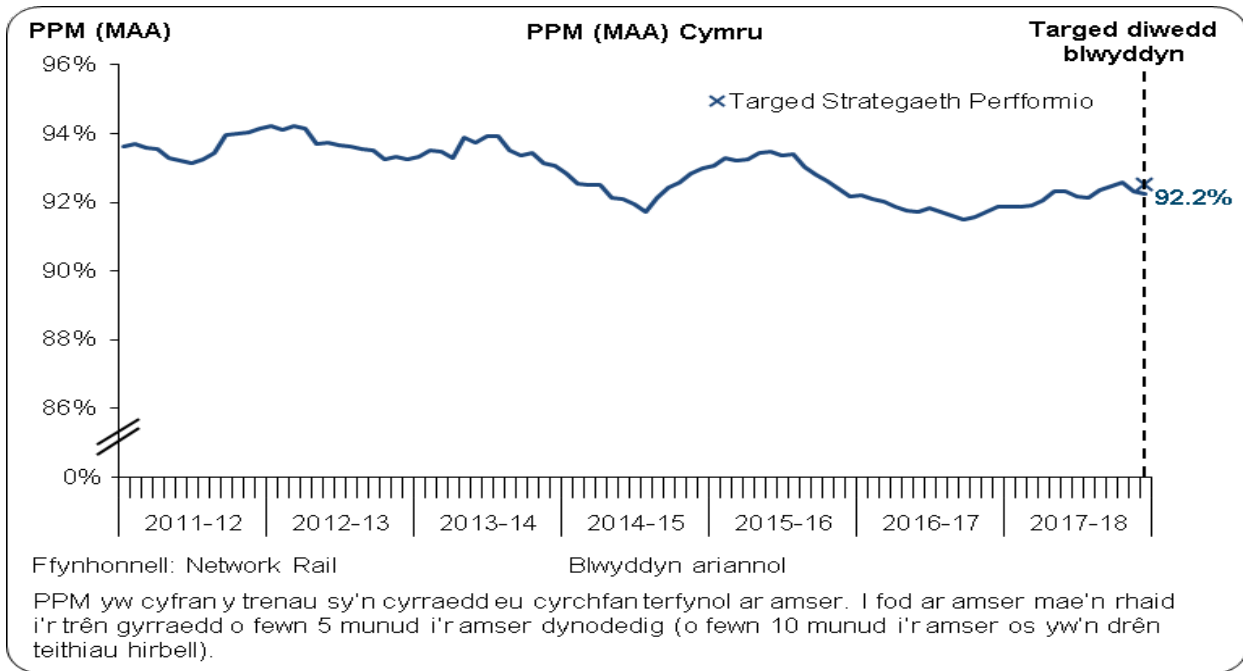
8.9 Fel mewn llwybrau eraill, arolygasom drefniadau ar gyfer rhoi caniatâd i groesi mewn croesfannau a weithredir gan ddefnyddwyr gyda ffonau (UWC(T)) mewn adrannau signal hir. Roedd ein canfyddiadau'n debyg i'r hyn a geir mewn lleoedd eraill; nid oedd asesiadau risg croesfannau yn rhoi digon o ystyriaeth i'r rhyngwyneb rhwng y defnyddiwr a'r signalydd. Nid oedd yr asesiad yn rhoi gwybodaeth ar gyfer penderfyniad y signalydd, fel nad oeddent yn gwybod ar unwaith unrhyw amgylchiadau unigryw mewn croesfannau a allai effeithio ar ddiogelwch y defnyddiwr yn ceisio croesi. Mae llwybr Cymru'n dal i brofi digwyddiadau yn y croesfannau hyn, fel damwain ond y dim yn UWC(T) Bagillt ym mis Hydref 2017, gan wneud hyn yn risg y mae angen i'r llwybr barhau i weithio'n galed i'w reoli.

Diogelwch gweithwyr cledrau

- 8.10 O gymharu â llwybrau eraill, gan Gymru mae'r nifer lleiaf o anafiadau gweithwyr cledrau. Fel gyda'r llwybrau eraill, mae cyflwyno safon ddiogelwch ddiwygiedig mynediad at gledrau Network Rail (a adnabyddir fel 019+) wedi cael effaith cadarnhaol ar y niferoedd o anafiadau.
- 8.11 Gall prosiectau mawr, yn enwedig trydaneiddio, olygu ei bod yn anodd cael y mynediad sydd ei angen i gynnal a chadw'r rhwydwaith. Mae safon 019+ Network Rail yn gofyn am roi mwy o ystyriaeth i gynllunio mynediad diogel a chyflawni gwaith pan nad yw trenau'n rhedeg. Mae prosiectau mawr yn ei gwneud yn bwysig bod y llwybr yn manteisio i'r eithaf ar pan fydd y cledrau ar gael mewn oriau tawel trwy wneud y defnydd gorau o'r meddiant sydd ar gael. Mae mentrau mewn rhannau eraill o Brydain wedi dangos ei bod yn bosibl asesu anghenion cynnal a chadw achlysurol cledrau a threfnu'r gwahanol dasgau hyn, a wneir gan dimau gwahaol, yn dalpiau o waith i'w gyflawni ar yr un adeg mewn meddiannau a gynllunir. Dylai llwybr Cymru archwilio'r posibilrwydd o fanteisio i'r eithaf ar feddiannau fel hyn, er mwyn sicrhau bod gwaith cynnal a chadw allweddol i ddiogelwch yn parhau i gael ei wneud, a gwella diogelwch gweithwyr.

Perfformiad trenau

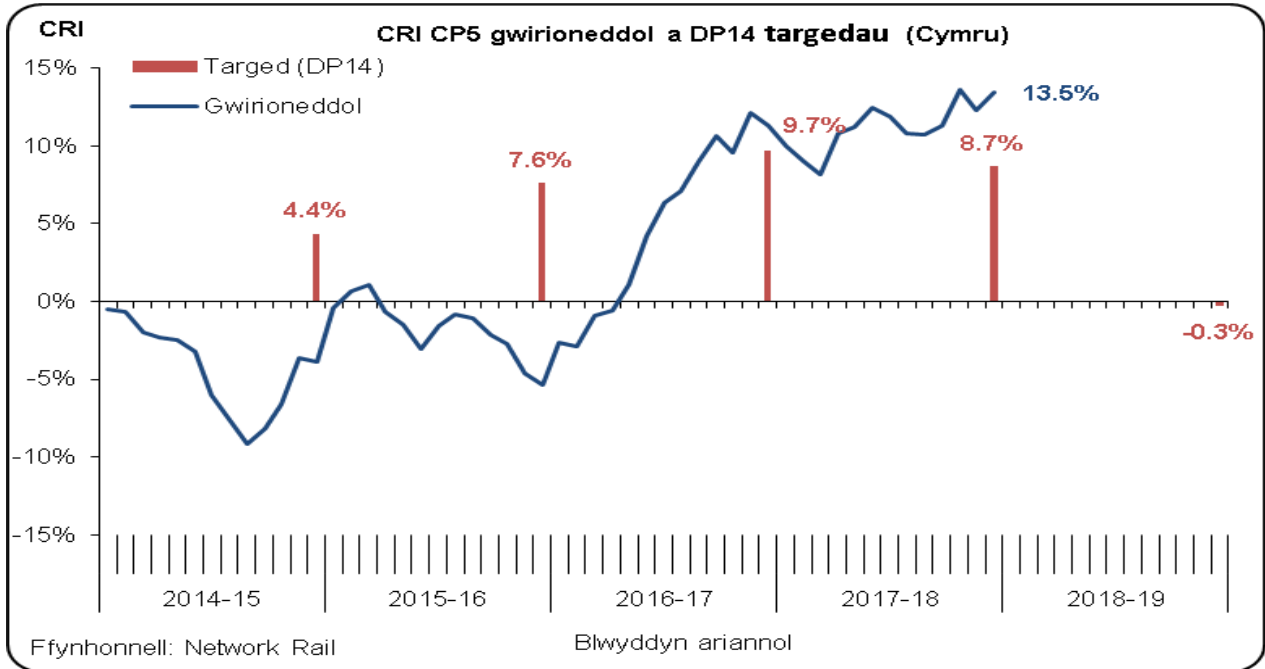
- 8.12 Ar ddiwedd 2017-18, roedd PPM MAA Trenau Arriva Cymru yn 92.2%, 1.3pp yn waeth na'r targed Strategaeth Perfformiad. Roedd CaSL MAA yn 3.0%, 0.7pp yn uwch (sef yn waeth) na'r targed Strategaeth Perfformiad.



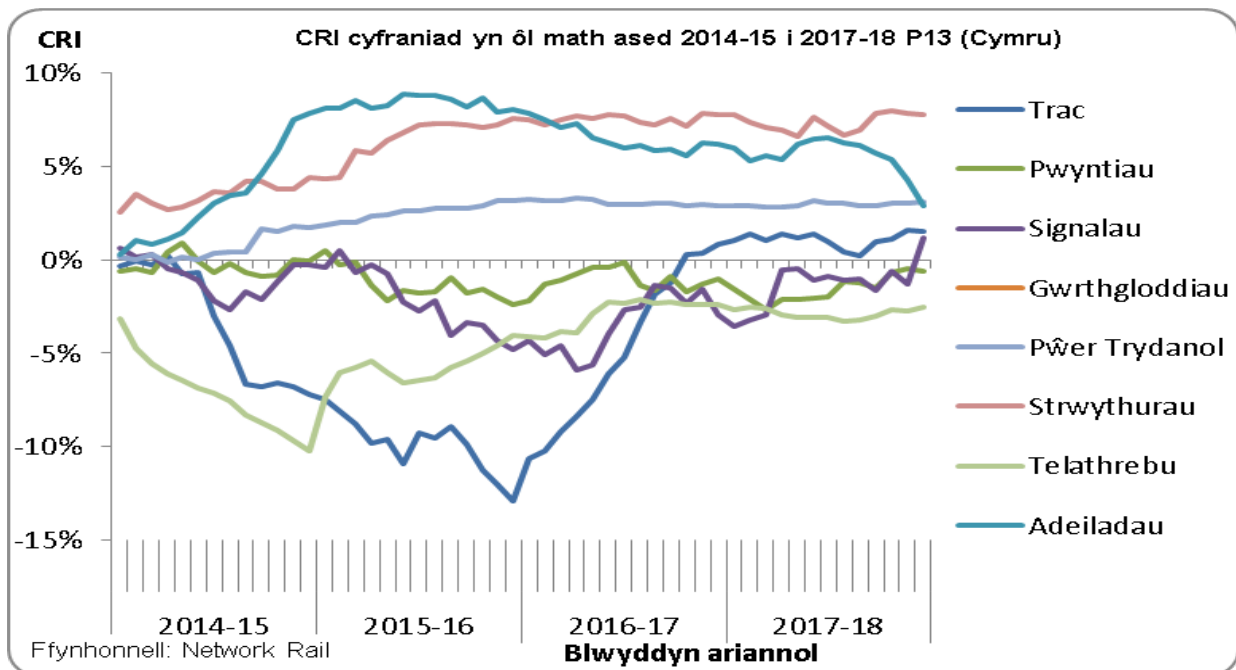
8.13 Ar gyfer Cymru a Lloegr, rydym yn monitro'r graddau y mae Network Rail yn cyrraedd targedau PPM a CaSL y cytunwyd arnynt gyda'r gweithredwr yn y Strategaethau Perfformiad lleol. Un o'r ffyrdd rydym yn gwneud hyn yw trwy ddefnyddio Cardiau Sgôr Network Rail, sy'n darparu gwybodaeth ar lefel llwybr sy'n seiliedig ar dargedau y cytunwyd arnynt gyda'r gweithredwyr. Er ei fod y tu ôl i'r targed ar gyfer PPM a CaSL ar ddiwedd Cyfnod 13, roedd perfformiad PPM Trenau Arriva Cymru o fewn y trothwy a bennwyd yn y Penderfyniad Terfynol. Er hynny, o ran CaSL roedd y tu allan i'r trothwy.

Rheoli asedau

8.14 Parhaodd y tueddiad o welliant mewn perfformiad asedau yng Nghymru yn 2017-18 gyda CRI yn cyrraedd 13.5% ar ddiwedd y flwyddyn.



8.15 Yr hyn a gyfrannodd fwyaf at y gwelliant parhaus oedd y gwaith signalau, lle cododd cyfraniad CRI 4.1 pp, o -2.9% y llynedd i 1.2%. Roedd hefyd enillion bach yng nghyfraniadau'r cledrau a'r pwyntiau, wedi eu gwrthbwysu gan ostyngiad a welwyd mewn adeiladau dros ddau gyfnod diwethaf y flwyddyn. Bellach dim ond pwyntiau a thelegyfathrebu sydd islaw pris gwerthu CP4 yn eu gwerth.



8.16 Mae seilwaith craidd Rheilffyrdd y Cymoedd am gael ei drosglwyddo o Network Rail i Keolis Amey ym mis Medi 2019. Cyfrifoldeb deilydd y rhyddfrait wedyn fydd adeiladu a pheirianeg sifil ar y teithiau hyn. Bydd cynnig y Metro Canolog yn integreiddio gwasanaethau ar y rheilffyrdd sy'n dal i fod yn gyfrifoldeb Network Rail (Rheilffordd y Ddinas, Penarth, Ynys y Barri a Phen-y-bont) gyda'r rheini ar Reilffyrdd y Cymoedd sy'n trosglwyddo o Network Rail.

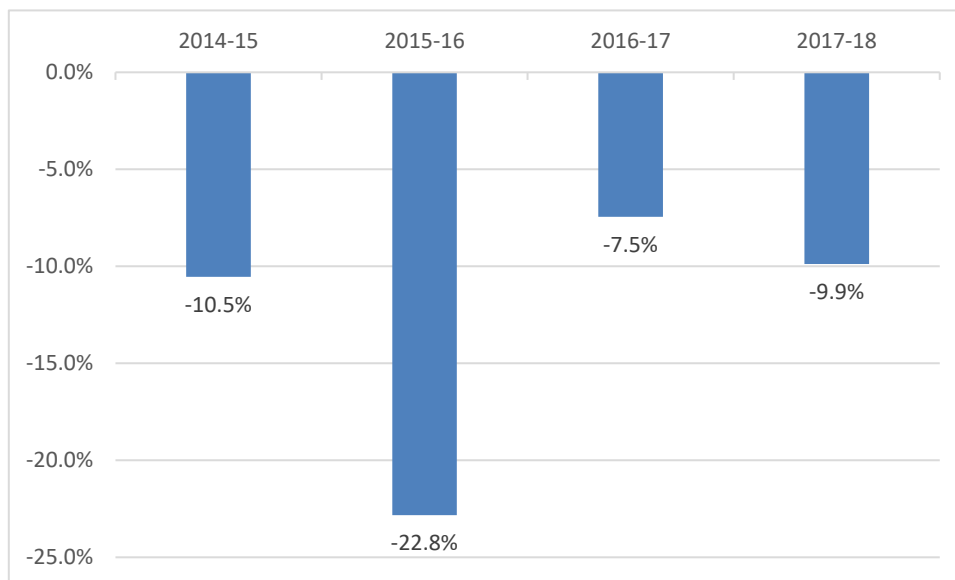
Gwariant a pherfformiad ariannol

8.17 Mae'r adran hon yn archwilio effeithlonrwydd a pherfformiad ariannol ehangach Network Rail yng Nghymru yn 2017-18. Mae'r dadansoddiad hwn yn seiliedig ar wybodaeth ariannol ddrafft a ddarparwyd gan Network Rail. Byddwn yn adrodd yn llawnach ar y materion hyn yn ein asesiad effeithlonrwydd ac ariannol blyneddol²⁰.

Effeithlonrwydd

8.18 Rydym yn monitro effeithlonrwydd gweithgareddau busnes craidd Network Rail. Y rhain yw gweithrediadau, cefnogaeth, cynnal a chadw ac adnewyddu. Gostyngodd effeithlonrwydd £5m (2.3%) yn 2017-18, gan ychwanegu at y gostyngiad o £23m (7.5%) dros dair blynedd gyntaf CP5.

Effeithlonrwydd Network Rail o gymharu â'r hyn oedd ar gychwyn CP5



8.19 Mae'r gostyngiad yn effeithlonrwydd Network Rail dros bedair blynedd gyntaf CP5 i'w briodoli i raddau helaeth o ostyngiad o £40m (27.4%) mewn effeithlonrwydd adnewyddiadau. Mae hyn wedi'i wrthbwysu'n rhannol gan gynydd o £12m (9.1%) mewn effeithlonrwydd ar draws gweithrediadau, cefnogaeth a gweithgareddau cynnal a chadw. Gan ddefnyddio mesur effeithlonrwydd CP5, mae Network Rail yn

²⁰ Gweler <http://orr.gov.uk/rail/economic-regulation/regulation-of-network-rail/monitoring-performance/efficiency-and-finance-assessment>.

rhagweld y bydd ei effeithlonrwydd 7.4% yn is yn 2018-19 o gymharu â'r hyn oedd ar gychwyn CP5.

8.20 Mae Network Rail wedi gohirio gwaith adnewyddu i aros yn CP5. Yn 2017-18, fe wnaeth Network Rail Cymru ohirio £16m (8%) o adnewyddiadau a gynlluniwyd²¹. Mae wedi adeiladu ôl-groniad sylweddol (£0.2bn) o waith ar draws CP5 y bydd angen dal i fyny at ef bellach yn CP6 a'r tu hwnt.

Perfformiad ariannol ehangach

8.21 Mae'r mesur rheoleiddio perfformiad ariannol (FPM) yn rhoi gwell dealltwriaeth o berfformiad ariannol Network Rail nag amrywiannau incwm a gwariant syml. Mae FPM yn cymharu incwm a gwariant gwirioneddol i gyllideb flynyddol Network Rail, ac wedyn â'r rhagdybiadau ariannol yn ein penderfyniad PR13 (sy'n cadarnhau lefel cyllid y cwmni)²². Mae'n sicrhau nad yw Network Rail yn elwa o ohirio gwaith tan ddyddiad hwyrach os bydd yn dal angen i'r gwaith hwnnw gael ei wneud ac mae'n addasu ar gyfer gwerthu unrhyw allbynnau yr ariannwyd Network Rail ar eu cyfer, ond nad yw wedi cyflawni o ran pethau fel dibynadwyedd perfformiad trenau.

Perfformiad ariannol Network Rail Cymru yn 2017-18

£m	Cyllideb	Gwirioneddol	Amrywiant b/(w)	All / (tan) berfformio
Trosiant	47	29	-7	1
Rhaglen 4	-12	-8	4	3
Rhaglen 8	-3	-4	-1	-1
Gweithrediadau	-32	-34	-2	-2
Cefnogaeth	-27	-23	4	3
Cynnal a chadw	-70	-70	0	0
Capex – Adnewyddu	-198	-186	12	-4
Capex – Gwelliannau	-207	-197	10	-3
Perfformiad ariannol (mewnol)				-3
Cyllideb vs. PR13				-97
Addasiadau ar gyfer allbynnau rheoleiddiol a gollwyd				-4
Perfformiad ariannol (rheoleiddiol)				-104

²¹ Mae pennod pedwar yn cynnwys dadansoddiad o rai o'r prif gyfrolau adnewyddiadau. Mae dau wahaniaeth pwysig rhwng y dadansoddiad hwnnw a'r hyn a geir yma. Yn gyntaf, mae'r adran hon yn cynnwys yr holl wariant adnewyddu tra nad yw pennod pedwar ond yn ymwneud â hanner yr holl adnewyddiadau. Yn ail, i ddibenion ariannol, caiff gwaith ei gofnodi wrth i brosiect fynd yn ei flaen, lle na chaiff ei gofnodi i ddibenion rheoli asedau ond lle cychwynnir gweithio'r ased.

²² Nid yw'n cynnwys rhai incwm a gwariant na ellir ei reoli gan Network Rail. Mae'r rhain yn cynnwys grant rhwydwaith, taliadau sefydlog mynediad i'r trac, incwm a chostau trydan tyniant, a threthi busnes.

- 8.22 Fe wnaeth Network Rail danberfformio £3m yn erbyn ei fesur mewnol yn 2017-18²³. Roedd hyn i raddau helaeth oherwydd gwariant is na'r hyn a gyllidebwyd ar adnewyddu a gwelliannau wedi ei wrthbwysio gan daliadau Rhaglen 8 uwch na'r hyn a gyllidebwyd ar gyfer perfformiad gwael trenau.
- 8.23 Fe wnaeth Network Rail danberfformio'r mesur ariannol rheoleiddiol o £104m i raddau helaeth oherwydd bod ei gyllideb mewnol yn £97m yn uwch na'n tybiaethau ariannol PR13 am y flwyddyn ac addasiad o £4 miliwn ar gyfer perfformiad gwael.

²³ Mae'r dadansoddiad hwn yn cynnwys cyfran o gostau canolog Network Rail. Caiff y rhain eu dangos ar wahân yn yr asesiad o berfformiad ariannol Cymru yn y tabl ar dudalen 51.

9. Annex 1 – Route level analysis – methodology

Calculating composite metrics

9.1 Route comparison scorecard items have been combined to create one single composite measure summarising performance against target for each route. These are created by:

- measuring the variance between the full year result for each scorecard item and the target value;
- multiplying these by the relative weight of the performance related pay factors (see 9.3) within each section of the scorecard, and
- summing these into a single composite route measure.

9.2 For example:

- in P13, the Year to Date Actual results listed in the Network Rail route scorecard for Anglia Asset Management were 1.7% for the reduction in service affecting failures and 98.5% for 7 key renewal volumes;
- these were 1.2 percentage points and 3.5 percentage points higher than their respective targets;
- there are two items that comprise the asset management section of the route comparison scorecard. These each account for 5% of the total 10% PRP weighting allocated to this section; and are thereby each allocated an ‘adjusted’ weighting factor of 50%;
- the product of the two variance measurements and their adjusted weighting factors are summed to create a composite measure for Anglia asset management relative to target of 2.4%.

9.3 Scorecard results are used to set annual performances related pay (PRP) awards for Network Rail employees. The PRP weight determines how the numerous elements of the scorecards influence these payments. We have used these weights to combine the elements into the composite measures in our route level analysis - rather than a simple unweighted average - as it more accurately reflects Network Rail’s views on the importance of each of these elements²⁴.

9.4 For illustrative purposes, below is an example route comparability scorecard outlining performance measures and weightings in the Safety discipline:

²⁴ More details are to be found in the Network Rail Annual Performance Related Pay Scheme 2017-18 at <https://cdn.networkrail.co.uk/wp-content/uploads/2017/12/Annual-Performance-Related-Pay-Scheme-2017-2018.pdf>.

ROUTE COMPARABILITY SCORECARD - EXAMPLE

AREA	PERFORMANCE MEASURE	PRP % Weighting	FULL YEAR FORECAST							
			Anglia	LNE & EM	LNW	Scotland	South East	Wales	Wessex	Western
Safety			Route Target	Route Target	Route Target	Route Target	Route Target	Route Target	Route Target	Route Target
Workforce Safety	Lost Time Injury Frequency Rate (LTIFR)	5.0%								
Workforce Safety	Workforce Close Calls Raised	2.0%								
Workforce Safety	YTD Close Calls Closed within 90 days (%)	3.0%								
Passenger Safety	Train accident risk reduction measures	5.0%								
Level Crossing Risk Reduction	Top 10 Milestones to reduce level crossing risk	5.0%								

Source: *Planning, Reporting and Regulatory Framework Strategic Business Plan* (Network Rail 2018).

Customer measures used to calculate the train performance composite metric

- 9.5 Owing to the lack of direct comparability between the bundle of measures Network Rail have agreed in their customer Scorecard, we have used only used selected measures to ensure comparability within the composite measure on a like-for-like basis. The composite measure for train performance has been calculated using route scorecard PPM and CaSL where present. Where CaSL is not listed, Right Time or On Time has been accepted as a substitute.
- 9.6 Where Train Performance or Locally Driven Measures were listed as customer scorecard 'roll ups', the PPM or CaSL element of this listed on the relevant TOC scorecard has been substituted. Weights were calculated using the product of the weights from the relevant customer scorecard line on the route scorecard and the performance measure on the TOC scorecard. A full list of the measures used to calculate the composite performance measure are included in the table below.

Summary of measures used to construct the composite performance measure

	<i>PPM</i>	<i>CaSL</i>	<i>Right Time</i>	<i>On Time</i>	<i>FDM</i>	<i>Other</i>
Anglia	c2c, GA, L. Overground, TfL Rail	c2c, Greater Anglia, London Overground, TfL Rail			✓	
LNE EM	EMT, Northern, FTPE	Hull Trains, FTPE	VTEC arr. at dest. & dep. Origin; CC dep @Newcastle SB, Leeds NB & Donc. NB, GTR G. Northern	Northern NE	✓	Hull Trains % of trains delivered each period against Train Plan
LNW	Chiltern, West Mid., Virgin WC, TPE, Merseyrail	Chiltern, West Mid., Virgin WC, TPE, Merseyrail	Cal. Sleeper & CC arrivals	Northern (West & Central)	✓	
Scotland	ScotRail	ScotRail	Cal. Sleeper Arrivals	-	✓	
SE	-	NR cont. to GTR & SE	GTR & SE		✓	
Wales	ATW	ATW	GWR Dep. Wales @Sev. TI Junc.		✓	
Wessex	South Western Railway, GWR - Amal.PPM on North Downs & Portsmouth-Cardiff	South Western Railway	CC arr. @Reading		✓	
Western	GWR, Hex	GWR, Hex	CC dep. Bristol Pkwy		✓	

10. Glossary

Term	Explanation
Alliances	The term 'alliances' is currently being used to describe a wide range of different relationships from project-based partnerships through to potentially long-term and comprehensive commercial arrangements covering a wide range of activities carried out by Network Rail routes and train operators. The common factor is that Network Rail and a train operator reach agreement to work together more closely and share the benefits of doing so, within the framework of their existing individual accountabilities and responsibilities. As currently being discussed, alliances do not involve the creation of new legal entities such as formal joint ventures
Business Critical Rules	Business Critical Rules provide an overall structure for determining what Network Rail must do and who needs to do it. They are being designed from risk-based principles - understanding the things that can go wrong and what must be done to prevent them
Cancellations and Significant Lateness (CaSL)	The proportion of trains which arrive at final destination greater than 30 minutes from planned arrival, or full/part cancelled or missed calls
CAPEX	Capital expenditure - refers to the funds used by Network Rail to acquire or upgrade physical assets on the railway and related infrastructure in order to maintain or increase the scope of their operations. Such expenditure is referred to as Renewals (of existing infrastructure e.g. works that will provide long term benefits such as replacing a section of track) or Enhancements (upgrading existing or building new infrastructure, e.g. electrification of a railway line).
Civils	A term describing only those responsible for structures such as bridges
Close Call	Any unsafe act or unsafe condition that in different circumstances could have led to an accident or

Term	Explanation
	personal injury, or could have resulted in damage to property or equipment, but would not introduce risk to the railway infrastructure.
Composite Reliability Index (CRI)	It provides an indication of the contribution of asset reliability to the safety and performance of the railway.
Continuous Welded Rail (CWR)	Lengths of rail welded together to form one uninterrupted rail.
Control Period	<p>A control period is the period to which an access charges review (e.g. a periodic review) applies. Control periods are typically five years in length, but maybe shorter or longer depending on what the regulator decides as part of the review.</p> <ul style="list-style-type: none"> • CP6 covers from 1 April 2019 to 31 March 2024 • CP5 covers from 1 April 2014 to 31 March 2019 • CP4 covers from 1 April 2009 to 31 March 2014 • CP3: 1 April 2004 to 31 March 2009 • CP2: 1 April 2001 to 31 March 2004 • CP1: from the privatisation of Railtrack to 31 March 2001
CSAMS	Civils Strategic Asset Management Solution
Cyclic Top	Cyclic top is a series of dips or vertical irregularities, in one or both rails. When trains pass over these dips wagons can experience a bouncing motion which in severe cases can cause the risk of train derailment.
Delay Attribution	The practice of accurately identifying the causes of delay.
DfT	Department for Transport
Earthworks	Natural earth slopes and earth-related structures such as cuttings and embankments
EDP	Enhancements Delivery Plan

Term	Explanation
EGIP	Edinburgh to Glasgow Improvements Programme
EIS	Entry into service
Enhancements	Schemes to change to network outputs, usually involving construction, that improves network capacity or capability (e.g. enabling higher speeds, allowing heavier loads) relative to the level of network outputs funded at the last relevant periodic review. Usually outputs are required at specific times (in contrast to most renewals).
Fatalities and Weighted Injuries (FWI)	An index measuring relative risk from fatalities, major and minor injuries.
Final Determination	Our final determination sets out our overall package of decisions for the periodic review 2013 (PR13).
Fixed Track Access Charges (FTAC)	The fixed track access charge (FTAC) recovers Network Rail's net revenue requirement. The net revenue requirement is the revenue that we determined in a periodic review is required by Network Rail to run its business, after accounting for the income received from short-run variable track access charges, regulated station charges, other single till income and the network grant. The FTAC is only paid by franchised passenger train operators.
FPM	Financial Performance Measure
Freight Delivery Metric (FDM)	This measure tracks the punctuality of freight services at destination as well as taking into account Network Rail caused delays.
Gauge	Distance between the inner running faces of two rails on the same track. Also used to describe the "envelope"

Term	Explanation
	through which train profiles must fit; this is the structure gauge.
GRIP	Guide to railway investment projects. A Network Rail formal procedure through which every investment project on Network Rail's network must pass. It consists of a number of stages; at the end of these a review is carried out and if the project cannot meet the pass criteria it is stopped or held until it does.
GWEP	Great Western Electrification Programme
HAVS	Hand Arm Vibration Syndrome
High Output Track renewal	A system for renewing track in part or as a whole far more quickly than has been possible in the past.
Independent Reporter	A consultant whose role is to provide ORR with independent, professional opinions and advice relating to Network Rail's (as the railway licence holder) provision or contemplated provision of railway services, with a view to ORR relying on those opinions or advice in the discharge by ORR of its functions.
Infrastructure Projects	Network Rail division in charge of overseeing the company's CP5 enhancements programme.
KPI	Key Performance Indicator
LNE/EM Route	London North Eastern / East Midlands Route
LNW Route	London North Western Route

Term	Explanation
LTIFR	Lost Time Injury Frequency Rate - a measure of the number of lost time injuries occurring in a workplace per 1 million man-hours worked.
Moving Annual Average (MAA)	Moving annual average - the average of the last 13 four-week time periods.
Network Grant	A proportion of Network Rail's income in the past has been paid directly by DfT and Transport Scotland in the form of network grants. Over CP5, more than 60% of Network Rail's income is forecast to come from network grants.
Network Licence	Network Rail operates under a network licence. This licence contains a set of conditions under which Network Rail must operate. As the operator and owner of the national rail infrastructure, it has a key role to play in railway safety and improving railway performance and efficiency. The network licence is a tool we have for holding Network Rail to account.
ONS	Office of National Statistics
OPEX	Operating expense: as distinct from CAPEX (capital expenditure), OPEX refers to ongoing costs incurred by Network Rail to maintain the railway infrastructure. Examples of OPEX include routine safety checks on the railway tracks or repairing signalling when it fails.
Overhead Line Equipment (OLE)	An assembly of metal conductor wires, insulating devices and support structures used to bring traction supply current to suitably equipped traction units. The conducting wires are normally strung between masts or poles in some form of catenary arrangement but simple systems may have a single trolley wire.

Term	Explanation
Performance Strategy	Jointly prepared plans agreed between Network Rail and a train operator to improve performance.
Plain Line Track	Track without switches and crossings
Planning and Delivering Safe Work (PDSW)	PDSW is a wholesale reform of how infrastructure projects are planned and delivered safely and, ultimately, it makes clear who is responsible.
Possession Disruption Index (PDI)	<p>'Possession disruption index – passenger' (PDI-P) and 'Possession disruption index – freight (PDI-F)': a graph indicating the level of disruption caused by possessions over a period of time.</p> <p>Network Rail needs to restrict access to the network to carry out many of its maintenance and renewals activities.</p> <p>These restrictions of access are referred to as possessions. Possessions are considered to be 'disruptive' if they impact on the running of passenger or freight operators' normal timetabled services.</p>
Possessions	Network Rail needs to restrict access to its network to carry out many of its maintenance and renewals activities. These restrictions of access are referred to as possessions.
Precursor Indicator Model (PIM)	A model which measures the underlying accident risk by tracking changes in accident precursors.
Public Performance Measure (PPM)	The Public Performance Measure (PPM) is the percentage of trains arriving at their final destination within 5 minutes of their scheduled arrival time (within 10 minutes for long distance services).
RBM	Risk Based Maintenance

Term	Explanation
Regulated Outputs	These are outputs that we determine as part of our periodic review that Network Rail is required to deliver over the relevant control period.
Renewals	Major capital works or replacement of the network in order to maintain its required capability. These may be required at specific times but are more often carried out according to Network Rail's own timetable
RIDDOR	Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013.
Right Time	Performance measure measuring train arrival within one minute of the scheduled time
RM3	Rail Management Maturity Model: the tool we use to assess an organisation's ability to achieve excellence in controlling health and safety risks.
Route availability	A code used to indicate which rolling stock can use which routes.
Safety Management System (SMS)	In essence, it is a formal arrangement for a safer working environment. All operators and duty holders are now required to have arrangements in place for managing safety risks. A safety management system defines roles and responsibilities, sets arrangements for safety mechanisms, involves workers in the process and ensures continuous improvement.
SEU	Signalling Equivalent Unit
Schedule 4	Schedule 4 (the possessions regime) is the part of passenger and freight operators' track access contract with Network Rail that sets out arrangements for

Term	Explanation
	compensation to the operator in the event of planned disruption to their services.
Schedule 8	Schedule 8 (the performance regime) is the part of passenger, freight and charter operators' track access contract with Network Rail that sets out arrangements for compensation in the event of unplanned disruption to services.
Scour	The removal of material from a bed or bank of a watercourse or material from a beach by current or wave action. This is a particular problem where the removed material was providing support or restraint to a structure such as a bridge pier or retaining wall, ultimately leading to its collapse.
Switches and Crossings (S&C)	Track consisting of switches (an assembly of two movable rails – the switch rails) and two fixed rails (the stock rails) and crossings (an assembly that permits the passage of wheel flanges across other rails where tracks intersect).
Temporary Speed Restriction (TSR)	Temporary speed restriction imposed for safety reasons. This can arise from the poor condition of track, structures, earthworks, hot weather effects, or following track relaying until the track bed is stabilised.
TOC	Train operating companies: run the passenger trains and services on the network.
Track Circuit Failure	A failure in the device used to detect the absence of a train on a defined section of track using the running rails in an electric circuit.
Track Geometry	The horizontal and vertical alignment of the track.

Term	Explanation
Train Accident Precursors Indicator Model (PIM)	RSSB's Precursor Indicator Model (PIM) provides a measure of the underlying risk from train accidents by tracking changes in the occurrence of accident precursors
Twist Faults	Where particular misalignments between the heights of rails which can cause the risk of train derailment.
Underbridge	Bridges that allow passage under the railway.
User- worked crossings	A level crossing where the barriers or gates are operated by the user.
Whistle Board	A white circular sign with a grey edge and black W in the centre indicating to a train driver that they must sound the horn or whistle. This is often used to provide warning to users of accommodation, footpath and occupation crossings.
Wrong-side failure	A failure that causes a piece of equipment to cease functioning in such a way as to cause danger to the safety of the line.



© Crown copyright 2018

This publication is licensed under the terms of the Open Government Licence v3.0 except where otherwise stated. To view this licence, visit nationalarchives.gov.uk/doc/open-government-licence/version/3.

Where we have identified any third party copyright information you will need to obtain permission from the copyright holders concerned.

This publication is available at orr.gov.uk

Any enquiries regarding this publication should be sent to us at orr.gov.uk.