

Table 1		
Section	Type of crossing	Conditions for suitability
		There is no limit to the amount of road traffic, but the road layout, profile and traffic conditions should be such that road vehicles are not likely to become grounded or block back obstructing the railway.
7	Automatic barrier crossings, locally monitored (ABCL)	<p>The speed of the trains over the crossings should not exceed 90 km/h.</p> <p>There should not be more than two running lines.</p> <p>The carriageway on the approaches to the crossing should be sufficiently wide to enable vehicles to pass safely.</p> <p>There is no limit to the amount of road traffic, but the road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.</p>
8	Automatic open crossings, locally monitored (AOCL)	<p>The speed of trains over the crossing should not exceed 90 km/h.</p> <p>Normally there should not be more than one running line.</p> <p>The limits on the road and rail traffic are defined in Appendix A.</p> <p>The carriageway on the approaches to the crossing should be sufficiently wide to enable vehicles to pass safely.</p> <p>The road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.</p>
9	Open crossings	<p>The speed of trains over the crossing should not exceed 15 km/h.</p> <p>There should not be more than <u>one</u> line over the crossing. <i>than</i></p> <p>The maximum daily traffic moment not normally to exceed 2000 or the peak hour traffic moment 30 or the maximum actual daily road vehicle user 200.</p> <p>The 85%ile road speed at the crossing to be less than 35 mile/h (60 km/h).</p> <p>The road layout, profile and traffic conditions should be such that road vehicles are not likely to ground or regularly to block back obstructing the railway.</p>
10	User-worked crossings (UWC) with gates or lifting barriers on private roads	<p>The speed of the trains over the crossing should not exceed 160 km/h unless additional protection is provided.</p> <p>There are no limitations upon the frequency of rail traffic.</p> <p>These crossings should only be used on private roads.</p> <p>There should not normally be more than two lines over the crossing.</p> <p>Where no additional protection is provided, the warning period should be greater than the time required by likely users to traverse the crossing length by not less than 5 seconds.</p>

Note: Road traffic light signals may only be omitted where the barriers are normally in the lowered position and are clearly visible from an appropriate distance to approaching road traffic. As a guide, the number of road vehicles during the peak hour should not exceed 20 and the line speed of the railway should not exceed 160 km/h.

43. Telephones for use by the public are not normally provided. Telephones will be required at where barriers can be lowered automatically by an approaching train.

Method of operation

44. This type of crossing may be operated:

- (a) by assigned railway staff who are permanently stationed at a control point adjacent to the crossing when the line is open to rail traffic;
- (b) by assigned railway staff who are permanently stationed at a control point remote from the crossing, with the use of closed-circuit television (CCTV), whenever the line is open to rail traffic;
- (c) automatically, by the approach of a train; and
- (d) by a member of the crew of an approaching train at a control point adjacent to the crossing after the train has been stopped short of the crossing.

45. For all methods of operation the person operating the crossing equipment should have a clear and full view of the crossing, including the barriers, from the control point, either directly or via the closed-circuit television.

46. Where the barriers are normally in the raised position, the sequence of events to close the crossing to road traffic, once the lowering cycle has been initiated, either manually or automatically, should be as follows:

- (a) the amber lights of the road traffic light signals immediately show and the audible warning begins. The amber lights should show for approximately 3 seconds (5 seconds for higher speed roads);
- (b) immediately the amber lights are extinguished, the intermittent red lights should show;

50. Once barriers have started to descend, the lowering cycle should be completed in the normal sequence even if all the red road traffic light signals facing in one direction fail. The barriers may then be raised when it is safe to do so. Where, in these circumstances, the barriers have not started to descend, they should remain in the raised position.

Railway signalling and control

51. Railway signals, which provide full protection to the crossing, are required on both railway approaches. These signals ~~are~~ must be interlocked with the lifting barriers so that it is not possible to clear the signals unless the road is fully closed by the barriers, nor should it be possible to raise the barriers unless the signals are set at danger and free of approach locking, or the train has passed the signal and traversed the crossings.

52. Where the barriers are power operated, there should be discrete function controls at the operating position to command the barriers to be raised, stopped or lowered. It should not be possible to clear any protecting signals until a further function control to confirm 'crossing clear' has been operated with the barriers down.

53. If a train passes a protecting signal at danger, the road traffic light signals should immediately show an intermittent red light, omitting the steady amber phase, if not already initiated, and the audible warning should start. The barriers should not be lowered.

54. If the crossing is operated by a member of the train crew, interlocking between the signalling and barriers is not required. Instead, a warning board is to be provided at full service braking distance from a stop board placed at a suitable point, not normally less than 50 m, before the crossing to remind the train driver to stop short of the crossing. The control point should be placed adjacent to the crossing.

55. The status of the crossing equipment should be indicated at the control point to ensure it operates safely when the railway line is open to traffic.

5A Barrier crossings operated by obstacle detector

General description

56. This type of crossing is protected by road traffic light signals and two lifting barriers on each side of the railway. An audible warning to pedestrians is

not be achieved. In this situation the barriers remain lowered and the intermittent red lights continue to flash but the sound emitted by the audible warning device changes in character as soon as the first of the trains arrives at the crossing.

72. Telephones for use by the public, including those who are required to phone for permission to cross, are normally provided near each road traffic light signal on the right-hand side of the road. The telephones are connected to a supervising point, which must always be open when the railway line is open.

73. The supervising point should have appropriate means to stop any train approaching the crossing, and means of communicating with railway staff operating the crossing equipment locally at the crossing in an emergency or abnormal situation.

Method of operation

74. The crossing equipment is activated automatically by a train as it approaches the crossing.

75. Arrangements for initiating the operation of the crossing should be such that the time elapsed between the amber lights of the road traffic light signals starting to show and the train arriving at the crossing should be at least 27 seconds. The train should pass as soon after 27 seconds as possible. At least 95% of trains should arrive within 75 seconds and 50% within 50 seconds, once the closing sequence has begun. Where the crossing length is longer than 15 m, the 27 seconds should be increased by 1 second for every additional 3 m of crossing length.

Note: In certain circumstances at 'predictor' crossings, in abnormal circumstances an accelerating train could arrive at the crossing slightly sooner than 27 seconds after initiation of the amber road traffic lights. This may be acceptable at crossings where it can be shown that the likelihood of an 'early arrival' is very low. No trains should arrive at a crossing in less than 22 seconds after initiation of the road traffic lights. If 'early arrival' is in any way a foreseeable event, e.g. for trains accelerating from a station, arrangements should be modified accordingly.

76. The sequence for closing the crossing to road traffic is as follows:

- (a) the amber lights of the road traffic light signals immediately show and an audible warning for pedestrians begins. The lights should show for approximately 3 seconds (5 seconds for higher speed roads);
- (b) immediately the amber lights are extinguished the intermittent red lights should show; and
- (c) approximately 4 to 6 seconds later the barriers should start to descend and take a further 6 to 10 seconds to reach the lowered position. ~~At skew crossings, where the crossing distance can be increased greatly, barrier timings may need to be lengthened accordingly.~~ ?

There is no exit barrier at an AHB so why lengthen barrier timings?

77. If the barriers remain down for another train, as soon as the first train arrives at the crossing the character or tone of the warning sound should change distinctively.

78. Both barriers should begin to rise simultaneously and should normally take 4 to 10 seconds to reach the raised position after a train has cleared the crossing. The intermittent red traffic light signals should continue to show, and the audible warning for pedestrians continue to sound, until the barriers begin to rise.

79. If both intermittent red lights in any of the road traffic light signals fail, the barrier should remain lowered. If there is a total power failure, the barriers should fall and remain lowered. If either barrier fails to reach the lowered position, neither barrier should rise until both have been fully lowered. If either barrier fails to rise from the lowered position, the intermittent red traffic light signals should continue to show.

Railway signalling and control

80. Appropriate means are required to stop any train approaching the crossing in an emergency situation. If there is a railway signal on each approach, in the normal direction of working, it should preferably be located at a distance from the crossing not less than the longest service braking distance for any train. On a double-track line, bi-directional control to initiate the crossing equipment is required.

81. If a train passes a signal at danger located between a strike-in point and the crossing, the road traffic light signals should immediately show an

should be sufficiently long to enable road vehicles and pedestrians to clear the crossing.

86. The crossing equipment is normally initiated automatically by an approaching train. The operation of the crossing equipment, and the absence of obstruction on the crossing are monitored by the driver of an approaching train.

87. Train drivers are required to stop their trains short of the crossing unless they have received an indication that the crossing equipment is functioning correctly and have observed that the crossing is clear.

88. The barriers rise immediately a train has passed unless another approaching train is so close that a minimum of 10 seconds road open time can *not* be achieved. In this situation the barriers remain lowered and the intermittent red lights continue to flash, but the sound emitted by the audible warning device changes in character as soon as the first of the trains arrives at the crossing.

89. Consideration should be given to providing telephones for use by the public. Where provided these should be connected to a supervising point which is always open when the railway line is open. Where no telephones are provided, signs giving the name of the crossing and the public telephone number of a supervising point, which is always open when the railway line is open, should be provided on each side of the crossing.

90. Staff at a supervising point should have:

- (a) direct control of all train movements over the crossing;
- (b) a means to communicate with railway staff operating the crossing equipment locally at the crossing:
 - (i) in an emergency; or
 - (ii) in an abnormal situation; and
- (c) a means of communicating with the train driver approaching the crossing.

Method of operation

91. The crossing equipment is activated automatically by a train as it approaches the crossing.

Table 3 pedestrian provisions						
Pedestrian category	Width of footway (metres)	Road markings	Audible warnings*	Pedestrian signals**	Tactile threshold*	Guard rails
A	2 or more	YES	YES	YES	YES	‡
B	1.8 or more	YES	YES	‡	YES	‡
C	1.5 or more †	YES	YES	‡	‡	‡

* Not required at gated crossings operated by railway staff
 ** Only at automatic crossings
 † A reduced width of 1 m or lack of approach funnel is normally restricted to those crossings with a daily pedestrian user of less than about 25
 ‡ Yes if necessary *? with*

Note: At any crossing where the number of pedestrians or the size of the vulnerable group is exceptionally large, automatic crossings may not be suitable and a barrier crossing operated by railway staff may have to be provided.

13 ~~A~~ station barrow crossings

General Description

185. This type of crossing is found between platforms at stations. These crossings may be the only route between platforms or the only practicable route for the disabled.

186. This type of crossing should only be considered for lightly used stations where line speed does not exceed 160km/h and no alternative arrangements are available.

187. The surface should be maintained in a good and even condition at rail level with suitable non-slip properties.

Method of operation

188. Where passengers are always escorted by railway staff, an established form of protection is a white light, extinguished 40 seconds before the arrival of