

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Expires: 04/12/2019  
Page 1 of 12



## NETWORK RAIL - SIGNAL ENGINEERING Defining LX Minimum Warning Time

### **Purpose**

This Notice Board (NB) is to clarify the procedure to define level crossing minimum warning times.

### **Scope**

This notice board applies to all Network Rail managed level crossing infrastructure.

### **Background**

There have been a number of challenges to the warning times documented for level crossing during project processes which have highlighted inconsistent practices applied for passive and active level crossing types.

### **Current practice**

The guidance provided in ORR document, Level Crossings: A guide for managers, designers and operators, Railway Safety Publication 7, December 2011 is reflected in Network Rail company standard NR/L2/SIG/11201 (X modules).

These documents describe methods to calculate level crossing minimum warning times from generic data to cater for the safe use by most level crossing users.

However further guidance has been provided to Level Crossing Managers under the Network Rail company standard NR/L3/OCS/041/5-16 which has been provided to inform staff when undertaking census reports to facilitate suitable and sufficient risk assessment of level crossing sites.

### **Guidance**

This notice board is an interim step to inform those defining level crossing minimum warning times when establishing the: -

- The decision point for users of the crossing for the protection system proposed for each user approach to the level crossing.
- The traverse time of each category of user from the decision point to a position of safety.
- The safety margin time for the user to be in a position of safety before a train arrives at the level crossing.

Originator's Details:-  
Colin Gibbons  
Network Rail  
[colin.gibbons@networkrail.co.uk](mailto:colin.gibbons@networkrail.co.uk)

**PUBLISHED UNDER NR/L2/SIG/11120**

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 2 of 12

## **Action Required**

Where change proposals are subject to design processes, the designer is required to liaise with route representatives responsible for management of level crossings (RLCM or LCM) to agree the minimum warning time to be applied, and record in design details and the level crossing risk assessment consistently.

When assessing the risk at level crossings, the level crossing minimum warning time is to be determined to fulfil the requirements of signalling design handbook (NR/L2/SIG/11201) X modules.

The warning time to be applied is subject to the mitigations included in the level crossing risk assessment and guidance that has been provided to level crossing managers by the Head of Level Crossings (Appendix A) of the warning time provision to reach tolerable risk levels, hence designs are required to include any additional warning time upon which the risk assessment is based.

Where level crossings are subjected to schedule review or review following allegation or incident, the with route representatives responsible for management of level crossings (RLCM or LCM) is to review the minimum warning time recorded in design details and the level crossing risk assessment is sufficient for the users of the level crossing. Where a discrepancy is identified, remedial actions for both suitable risk mitigation and update of design details and the level crossing risk assessment is to be progressed.

A maintenance copy of the current level crossing ground plan is required to be provided at each level crossing for signalling maintenance purposes, but is not always available to other staff. The STME is to provide access to level crossing ground plan information when requested by route representatives responsible for management of level crossings (RLCM or LCM).

RLCM or LCM should access level crossing ground plan information from National Records Group and can approach STME if a current record is not available from NRG.

## **Staff to be Briefed**

<b>Role</b>	<b>Responsible for Briefing</b>
Route Asset Managers (Signalling)	Head of Signalling
Signal & Telecoms Maintenance Engineer	Route Asset Managers (Signalling)
Head of Route Safety, Health & Environment	Head of Corporate Public and Passenger Safety
Route Level Crossing Managers	Head of Route Safety, Health & Environment
Level Crossing Managers	Route Level Crossing Manager
Head of Engineering (Infrastructure Projects – Signalling)	Head of Signalling
Signalling Delivery Engineers Designers and Project Engineers	Head of Engineering (Infrastructure Projects – Signalling)

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 3 of 12

## Appendix A

<b>LEVEL CROSSING GUIDANCE DOCUMENT</b>	Ref:	<b>LCG 01</b>
	Issue:	2
<b>COMPLETION OF SITE VISIT AND CENSUS FORMS</b>	Date:	February 2013
	Page:	1 of 9

## **COMPLETION OF SITE VISIT AND CENSUS FORMS**

### **CONTENTS**

1 Scope	2
2 Personal safety	2
3 Orientation of the crossing	2
4 Photographs	2
5 Census	3
6 Train and warning times (protected crossings)	3
7 Crossing approach (protected crossings)	4
8 Risks of crossing use (FP, bridleway, UWC, UWCT, UWCMWL, barrow)	5
9 Blocking back (AHB)	6
10 Records	6

<b>LEVEL CROSSING GUIDANCE DOCUMENT</b>	Ref:	<b>LCG 01</b>
	Issue:	2
<b>COMPLETION OF SITE VISIT AND CENSUS FORMS</b>	Date:	February 2013
	Page:	2 of 9

## 1 Scope

This document provides guidance on undertaking site visits and censuses at level crossings. It supports and should be used with NR/L3/OCS/041/5-16.

## 2 Personal safety

When undertaking site visits and censuses at level crossings there are two key safety risks that present themselves to the person undertaking the activity. These are personal track safety and road safety. These are the first consideration of the individual undertaking the activity.

## 3 Orientation of the crossing

### 3.1

Use a compass to measure the orientation of:

- a) the road / footpath over the railway at the intersection, with the bearing taken on the North side of the crossing. Record the result as a compass bearing from 0 to 360 degrees; and
- b) the railway over the road at the intersection, with the bearing taken on the North side of the crossing to the Up line in the up direction. Record the result as a compass bearing from 0 to 360 degrees.

### 3.2

If the orientation of the road or railway is East – West, depending on the lie of the horizon and the sun, there could be a problem with low sunlight. If possible, during the site visit and census, establish if:

- a) at protected crossings, low sun might make it difficult to see the lights / signs / barriers when approaching. This can cause dazzling if behind the crossing, or a phantom aspect if behind the user approaching the crossing; or
- b) at passive crossings, low sun might be a problem when looking for approaching trains.

## 4 Photographs

### 4.1

Take a set of photographs as specified in the site visit form that record the physical appearance of the crossing on the day it was visited. Take the photographs with a digital camera set to a low resolution, 640 by 480 is sufficient. Take the photographs in the order shown on the site visit form. Rename them using the filename protocol included on the Site Visit forms.

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 5 of 12

LEVEL CROSSING GUIDANCE DOCUMENT	Ref:	LCG 01
	Issue:	2
COMPLETION OF SITE VISIT AND CENSUS FORMS	Date:	February 2013
	Page:	3 of 9

## 4.2

The following guidance is given for taking the photographs:

- a) **Crossing Approach** – Take this photograph a few metres back from the crossing on both approaches to record the view a user would have when approaching. Include crossing signs / lights etc;
- b) **Looking Across** – Take this photograph from the decision point on both sides of the crossing looking across to the other side;
- c) **Looking Up / Down** – Take these photographs from both decision points looking up and down the line, if possible when a train is approaching. Record any features that limit the sighting; and
- d) **Signs / Lights / Crossing Equipment** – Take photographs of the crossings signs and equipments in both up and down directions.

Photographs taken looking up and down, see c), should be taken from the decision point, see 6.3.1.

## 4.3

Note any additional photographs taken of users or particular problems with the crossing for reference e.g. missing or confusing signs.

## 4.4

Record if guidance on crossing safely e.g. Stop, Look, Listen signage, is set back from the decision point.

## 5 Census

### 5.1 General

See LCG 02 for guidance on undertaking censuses.

### 5.2 Estimate

For passive crossings where usage is light, an approximate usage can be entered by selecting the appropriate category e.g. "Once or twice daily", "Weekly", "Few times a year only", "No evidence of use".

### 5.3 Train moment

Always enter the duration of time which trains run during the day. For example, a value might be 17 hours. This can be reduced e.g. for branch lines or extended e.g. for extended periods of freight activity.

## 6 Train and warning times (protected crossings)

### 6.1 Strike in Times for Automatic Crossings

Measure the strike-in time for each train type for both up and down direction trains. The strike-in time is the time from the first warning activation (lights / alarms) to the train arriving at the level crossing.

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 6 of 12

LEVEL CROSSING GUIDANCE DOCUMENT	Ref:	LCG 01
	Issue:	2
COMPLETION OF SITE VISIT AND CENSUS FORMS	Date:	February 2013
	Page:	4 of 9

Be particularly careful to record differences for stopping / through trains. The ALCRM can consider up to three different types of train. Typically the distinctions are through passenger, stopping passenger, and freight.

## 6.2 Train and Warning Time Manually Operated Crossings

Measure the time to close the gates/barriers to road traffic. Measure the time for each train type to arrive at the crossing for both up and down directions.

Be particularly careful to record differences for stopping / through trains. The ALCRM can consider up to three different types of train. Typically the distinctions are through passenger, stopping passenger, and freight.

## 6.3 Passive crossing sighting times (FP, Bridleway, UWC, UWCT, UWC + MWL, Station Foot or Barrow)

### 6.3.1

Measure the sighting distance carefully, from the decision point for both 'Up' and 'Down' sides of the crossing, looking 'Up' and 'Down' the line. The decision point is site specific and depends on local characteristics. For footpath crossings it should be no nearer than:

- a) Two metres from the nearest running rail for line speeds up to 100 mph;
- b) Three metres from the nearest running rail for line speeds greater than 100 mph.

For user worked crossings or bridleway crossings it should be no nearer than:

- a) three metres from the nearest running rail.

### 6.3.2

Measure the distance at which the majority of the front of the train comes into sight (in both directions from both sides of the crossing). A VISUAL ESTIMATE IS NOT ACCEPTABLE. Use a range finder and record where you measured the distance to.

### 6.3.3

Where it is not possible to use a range finder, marker boards, mile posts, signal posts, bridges or other fixed structures can be used. Record your method on the form. This information might be available from previous inspections. Undertake and record a visual inspection on each site visit.

### 6.3.4

Record what limits the sighting time e.g. track curvature, buildings, etc. Your photographs should confirm this.

## 7 Crossing approach (protected crossings)

For all protected crossings the characteristics of the crossing approach from the road are important as they influence the chance that an approaching motorist might fail to see the crossing in time, be approaching too quickly, or be distracted – any of which could lead to an accident.

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 7 of 12

<b>LEVEL CROSSING GUIDANCE DOCUMENT</b>	Ref:	<b>LCG 01</b>
	Issue:	2
<b>COMPLETION OF SITE VISIT AND CENSUS FORMS</b>	Date:	February 2013
	Page:	5 of 9

Use your best judgement to answer each of the questions. If the crossing approach is different from either side use the worst case i.e. take the worst visibility.

## **8 Risks of crossing use (FP, bridleway, UWC, UWCT, UWCMWL, barrow) 8.1**

Record whether there is a known problem with gates being left open using information from the signaller, control logs etc.

### **8.2**

Record the type of crossing surface, this influences the crossing speed.

### **8.3 Determining traverse time**

#### **8.3.1**

Determine the traverse time for vehicles and pedestrians separately. This is the average time taken for a typical user to travel between the decision points and depends on the distance over the crossing, the type of user, the crossing surface, and the users' behaviour. If this is long in comparison to the sighting time, people might be at risk.

#### **8.3.2**

Measure the distance over the crossing between decision points – use a wheel or other measuring device. Use the table in Appendix A to read-off the traverse time for the type of user. E.g. a decked crossing spanning two tracks might be measured as 9 metres from a 2 metre decision point to 2 metres clear of the furthest rail. A typical able bodied user would be expected to traverse the crossing in 7.57 seconds.

#### **8.3.3**

If users are seen during the visit, record the time taken to traverse using a stop watch. Record this separately to the answer from 8.3.1 using the notes section of the form.

#### **8.3.4**

If the decision point is at the gate, the traverse time might increase.

#### **8.3.5**

Judge whether there is a risk of vehicles getting stuck on the crossing. Factors to consider are the crossing profile, condition, material and the type of vehicles that use the crossing.

### **8.4**

Calculate the sighting time using the sighting distance table given in Appendix B, e.g. a traverse time of 7.57 seconds on a two tracked decked crossing with a permitted speed of 65 mph gives a sighting distance of 225 metres.

### **8.5**

For UWC-T record the extent of telephone usage 'Rarely or never', 'Sometimes', 'Always'. Establish a typical number of daily calls to cross from the signaller

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 8 of 12

<b>LEVEL CROSSING GUIDANCE DOCUMENT</b>	Ref:	<b>LCG 01</b>
	Issue:	2
<b>COMPLETION OF SITE VISIT AND CENSUS FORMS</b>	Date:	February 2013
	Page:	6 of 9

controlling the crossing and compare this to the estimated usage. Bear in mind that the estimated usage is an approximation from the authorised user, or yourself. Apply the following criteria:

- a) Calls to cross > 70% of estimated usage = Always;
- b) Calls to cross between 30% and 70% of estimated usage = Sometimes;
- c) Calls to cross < 30% of estimated usage = Rarely or never.

## 9 Blocking back (AHB)

### 9.1

Blocking back or queuing over a crossing poses a very high risk of collision between a train and motor vehicle. This is generally a rare occurrence. It can happen at crossings with very high vehicular flow, in particular where the flow off the crossing might be interrupted by right turns or other obstructions. Blocking back means that vehicles are held in a queue of stationary traffic on the crossing for greater than five seconds.

### 9.2

Use the best available information to establish how often blocking back occurs. The answer will usually be 'Never known to occur'. If in doubt, visit the crossing during peak hours to gain a better understanding.

### 9.3

Where blocking back is never known to have occurred, look for the road layout to see whether any features such as right turns may potentially create blocking back in heavy traffic. Note if the crossing is known to be used as a diversionary route meaning that traffic might on occasion be much higher.

## 10 Records

Keep site visit and census forms undertaken for the ALCRM within the relevant level crossing files.



# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 9 of 12

LEVEL CROSSING GUIDANCE DOCUMENT	Ref:	LCG 01
	Issue:	2
COMPLETION OF SITE VISIT AND CENSUS FORMS	Date:	February 2013
	Page:	7 of 9

## Appendix A

Use the crossing speeds shown in Table A.1 to calculate crossing times.

User	Crossing speed (metres per second)	Add the following time to calculated crossing time (seconds)
<b>Category A</b>	0.914	13
Animals on the hoof		
Farm Machinery		
Caravans		
Tractors with trailers		
HGVs		
<b>Category B</b>	1.006	0
Pedestrians (without decks)		
<b>Category C</b>	1.189	5
Single tractors		
Cars / vans		
Quad bikes		
Equestrians		
Cyclists		
Pedestrians (at crossings with decks)		

Table A.1 – Crossing speeds

# NOTICE BOARD

NB 166  
Issue 1  
05/12/2018  
Page 10 of 12

<b>LEVEL CROSSING GUIDANCE DOCUMENT</b>	Ref:	<b>LCG 01</b>
	Issue:	2
<b>COMPLETION OF SITE VISIT AND CENSUS FORMS</b>	Date:	February 2013
	Page:	8 of 9

Table A.2 shown some typical calculated distance and times. All times are rounded up to the nearest whole second.

	Length of crossing in metres	Pedestrian no deck	Pedestrian with deck	Quad bike	Car / tractor	Farm machinery / caravan	Tractor and trailer / HGV
<b>Minimum for 1 track</b>	5	5	5	7	10	19	26
	6	6	5	8	10	20	27
	7	7	6	9	11	21	28
	8	8	7	10	12	22	29
<b>Minimum for 2 tracks</b>	9	9	8	11	13	23	30
	10	10	9	11	14	24	31
	11	11	10	12	15	25	32
<b>Minimum for 3 tracks</b>	12	12	11	13	16	27	34
	13	13	11	14	16	28	35
	14	14	12	15	17	29	36
<b>Minimum for 4 tracks</b>	15	15	13	16	18	30	37
	16	16	14	16	19	30	38
	17	17	15	17	20	32	39
	18	18	16	18	21	33	40
	19	19	16	19	21	34	41
	20	20	17	20	22	35	42
	21	21	18	21	23	36	43
	22	22	19	21	24	38	45
	23	23	20	22	25	39	46
	24	24	21	23	26	40	47
	25	25	21	24	26	41	48

**Table A.2 – Typical calculated crossing times**



# NOTICE BOARD

**NB 166**  
**Issue 1**  
**05/12/2018**  
**Page 12 of 12**

<b>1450</b>	653.2	326.6	217.4	163.1	130.5	108.8	93.2	81.6	72.5	65.3	59.3	54.4	50.2	46.6	43.5	40.8	38.4	36.3	34.3	32.6	31.1	29.7	28.4	27.2	26.1
<b>1475</b>	664.4	332.2	221.1	165.9	132.8	110.7	94.8	83.0	73.8	66.4	60.4	55.3	51.1	47.4	44.3	41.5	39.0	36.9	34.9	33.2	31.6	30.2	28.9	27.7	26.5
<b>1500</b>	675.7	337.8	224.9	168.7	135.0	112.5	96.4	84.4	75.0	67.5	61.4	56.2	51.9	48.2	45.0	42.2	39.7	37.5	35.5	33.8	32.1	30.7	29.3	28.1	27.0

**End**