



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil)

Category: Standard

Pedestrian Level Crossings – Design and Installation

ETD-16-03

Applicability

New South Wales	✓	CRIA (NSW CRN)	
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Primary Source

ARTC NSW Standard XDS 03

Document Status

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1.1	18 Jun 10	Standards	Manager Standards	Exec Manager SS&P 21/06/2010	CEO

Amendment Record

Version	Date Reviewed	Clause	Description of Amendment
1.0	01 Dec 09		Implementation draft. Supersedes NSW Standard XDS 03 v1.1
1.1	18 Jun 10		Banner added regarding mandatory requirements in other documents and alternative interpretations.

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Mandatory requirements also exist in other documents.

Where alternative interpretations occur, the Manager Standards shall be informed so the ambiguity can be removed. Pending removal of the ambiguity the interpretation with the safest outcome shall be adopted.

1 General Description

This Standard sets out the design and installation requirements for Pedestrian Level Crossings on railway lines owned by the Australian Rail Track Corporation.

It provides guidelines for determination of the most appropriate level of protection to be given to pedestrian crossings relative to the degree of safety risk involved, based on sight distances, train speeds, train frequencies and pedestrian usage.

2 Definitions and Abbreviations

Level Crossing	A crossing provided for road vehicles, pedestrians and/or stock traffic to cross rail tracks at grade.	
Passive Protection	A crossing provided for road vehicles, pedestrians and/or stock traffic to cross rail tracks at grade.	
Active Protection	Warning devices such as gates and/or lights at the crossing are activated by the approach of a train.	
Rail Traffic Volumes	Low	Up to 20 trains per day with intervals between trains usually exceeding 45 minutes.
	Moderate	20 to 50 trains per day with intervals between trains usually exceeding 30 minutes.
	High	More than 50 trains per day or regularly more than 4 trains per hour for the hours between 0600 and 2000.
Train Speeds	Low	Less than 80kph
	Medium	
	High	80kph or greater
Pedestrian Use	Occasional	Generally only one or two pedestrians at any one time, prolonged gaps between pedestrians, no noticeable peak usage.
	Low	Average peak usage 15 per hour or less.
	Moderate	Average peak usage 15 to 30 per hour.
	High	Average peak usage over 30 per hour or the crossing is subject to queuing at certain times of day such as after the arrival of a train.

Note: See relevant ARTC standards for definitions of other terms.

3 References

The principal references used in this document are:

- AS 1742 - Manual of Uniform Traffic Control Devices, Part 7: Railway Crossings
- AS 1743 – Road Signs - Specification
- Traffic Engineering Manual - Section 6: Railway Level Crossings, NSW Roads and Traffic Authority Draft 1994.

4 Design Requirements

4.1 General

The design shall be based on relevant Australian Standards and Codes of Practice, and performance requirements specified in this document.

4.2 Location

New pedestrian crossings must be located clear of:

- The length of track occupied by trains standing at railway signals.
- Turnouts and insulated joints.
- Existing installations which restrict sighting.

All Level Crossing location decisions are to give due consideration to the Level Crossing's effect on the sight distance requirements of trains on other tracks, including sidings and crossing loops.

4.3 Type of Protection

The type of protection to be applied at pedestrian crossings is to be established using the guidelines detailed in Section 5. The methodology is applicable to the installation of a new crossing, upgrading of a crossing or for on-going assessment of the suitability of the existing configuration.

The factors to be considered when determining the type of protection required; train speed and volume, sighting distance, usage rates, user profile and crossing environment are explained with application guidelines in Section 5 of this standard.

4.4 Signage

Sign content, size and layout are to be in accordance with the requirements of this standard (Appendix 2).

Sign location, height and orientation are to be in accordance with AS 1742.7.

Signs are to be manufactured in accordance with the requirements of AS 1743.

4.5 Pedestrian Maze

Where a pedestrian maze is installed, size and location requirements are to be in accordance with AS 1742.7.

4.6 Body of Level Crossing

4.6.1 General

Unless associated with road level crossings, pedestrian level crossings should not be designed as "fixed points." Designs are to include removable panels.

Designs are to include:

- insulated joints where required,
- provision of a suitable wheel flangeway,
- track drainage
- provision for surface water to run away from the level crossing

4.6.2 Flangeway clearance

Level Crossings are to have minimum flangeway clearance of 60mm.

Where guard rails are installed, the length of the guard rails shall be the nominal width of the walkway plus the nominal width of the two shoulders, plus 600mm for each tapered end (run-in) of the guard rail.

The top of the guard rail is to be level with the top of the running rail.

4.6.3 Surface

Level crossing surface type is to be based on a systems engineering approach taking account of:

- use of crossing
- surface grip under all conditions
- durability
- Resistance to UV and chemical attack
- Rail traffic volume, speed and axle load
- Track configuration
- Electrical resistance
- Track maintainability requirements including ease of removal for track maintenance
- Effect of level crossing components on track components in terms of wear and corrosion
- Life cycle cost

The walkway surface must not infringe above rail level by design or during the service life of the crossing.

5 Assessment of type of protection

5.1 Sighting Distance

In general for Type P1 or Type P2 protection to be acceptable, a pedestrian shall be able to sight any train from 2 metres outside the nearest rail running face at a time before the train arrives sufficient to traverse the crossing and be safely clear. Under most conditions this time will be approximately 9 seconds.

When assessing sighting distance, children eye levels, the possibility of rail or other vehicles standing on or adjacent to sidings, the affect of platforms and station buildings and other fixed structures such as overhead wiring structures shall be taken into account.

Local weather patterns, such as a high incidence of fog, shall also be considered.

Typical applications of the guidelines are shown in Appendix 1.

5.2 Usage Rate

The probability of pedestrians wishing to use the crossing when a train is approaching is to be assessed. The frequency of this train/pedestrian interaction will be a significant factor in the level of protection to be provided.

For rail traffic, use the highest speed board speed. In circumstances where all trains cannot achieve the normal speedboard speed, it may be reasonable to use the highest reduced speed for the assessment.

In some country areas there will be pedestrian crossings that have low pedestrian usage rates and infrequent, relatively low speed rail traffic. In these cases, passive protection would be appropriate unless sighting times are considerably below those recommended above.

5.3 Special User

Special consideration must be given to the class of protection to be provided at pedestrian crossings where, for example:

- The crossing provides the only access to a platform or platforms for which there are regularly scheduled rail services, particularly where the crossing is over double lines.
- The crossing provides access to a school, or for primary school children to reach a school bus or transport to school etc.
- The crossing is not at a platform but has moderate or higher rail traffic volumes.

5.4 Crossing Environment

The environment surrounding the crossing can sometimes affect the type of protection to be provided or the operating modes of the protection.

With passive protection, fencing and cribs should be provided where it is apparent that pedestrians (or children on bicycles etc.) are likely to move onto the track without pausing to look both ways.

Where there are houses in close proximity to the crossing, audible warning devices will almost certainly generate complaint if operating through the night at high volume levels.

For a pedestrian crossing, however, it is only necessary that the audible device be loud enough to draw the attention of pedestrians' on the crossing and within 15 metres of the approach to the crossing.

Where booms are provided the audible device can be further muted at night between say 2100 and 0600 hours.

5.5 Grade Separation

If rail traffic density is such that the crossing will be regularly closed to pedestrians and queueing of more than 25 people is a regular occurrence, or if the crossing is at an intermodal interchange, then grade separation shall be given serious consideration.

5.6 Road Level Crossings Used by Pedestrians

If a road level crossing is used by a significant number of pedestrians, the level of protection to be provided on the road should include assessment of the protection required as a result of the pedestrian usage.

6 Appendix 1 – Typical applications of protection types

Type P1	Warning Signs only	Single track, low volume, low to medium speed rail traffic, occasional pedestrian use, sighting meets minimum criteria, no special user criteria
Type P2	Warning Signs Fencing and Crib	Single track, high speed rail traffic, low to moderate volume rail traffic, low peak rates of pedestrian use with no queuing, sighting meets or exceeds minimum criteria, no special user criteria.
Type P3	Warning Signs Fencing Lights and Audible Warning	Single track, moderate to high volume rail traffic, moderate peak rates of pedestrian use without regular queuing, minimum sighting criteria not met and/or special user criteria apply.
Type P4	Warning Signs Fencing Lights Audible Warning Boom Barriers	Double track, moderate to high volume rail traffic, moderate peak rates of pedestrian use.
Grade Separation	Underpass or Overbridge	More than two running tracks, or Single or Double track, high volume rail traffic and high peak rates of pedestrian use and/or special user criteria apply.

7 Appendix 2 – Warning Signs

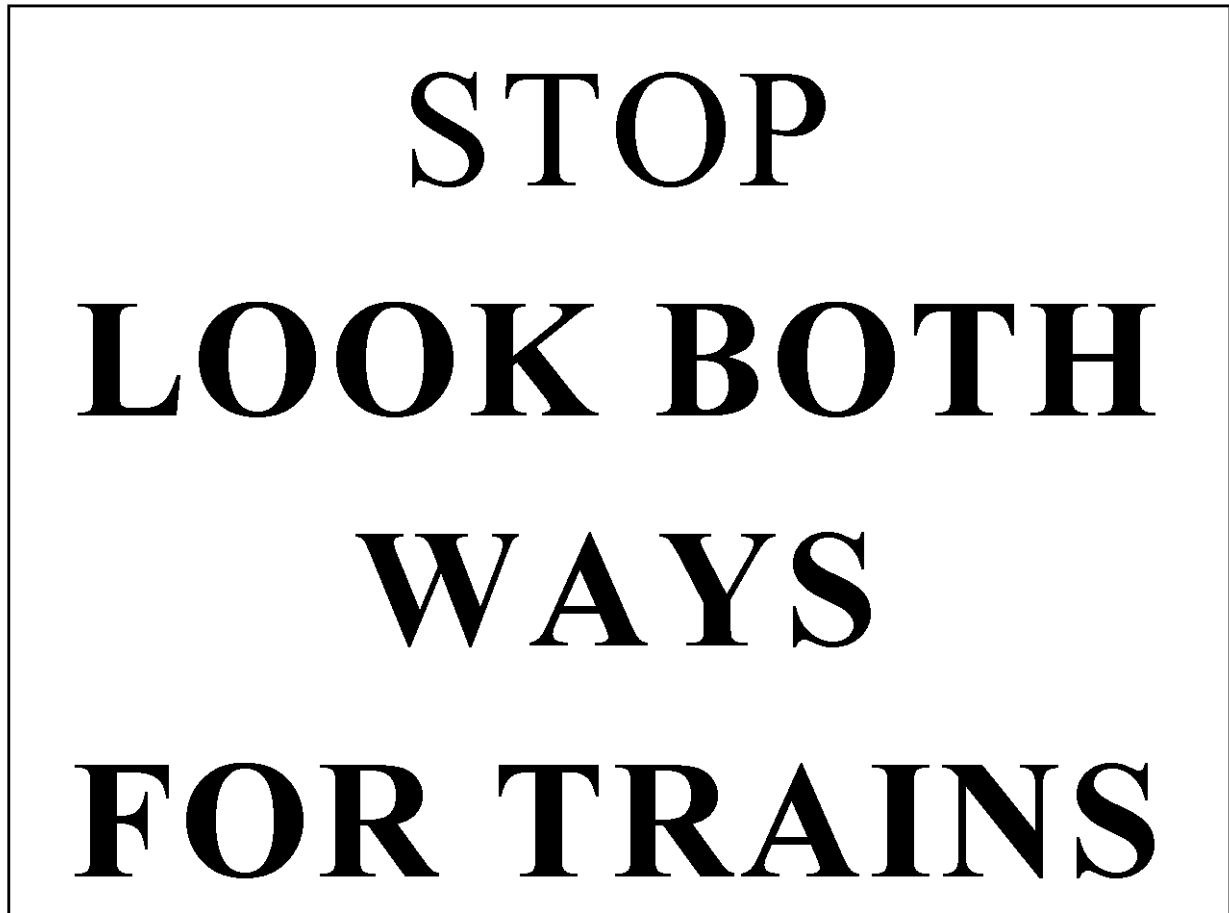


Figure A1: Notice Plate
Pedestrian Crossings
PLATE DIMENSIONS 600mm high x 800mm wide

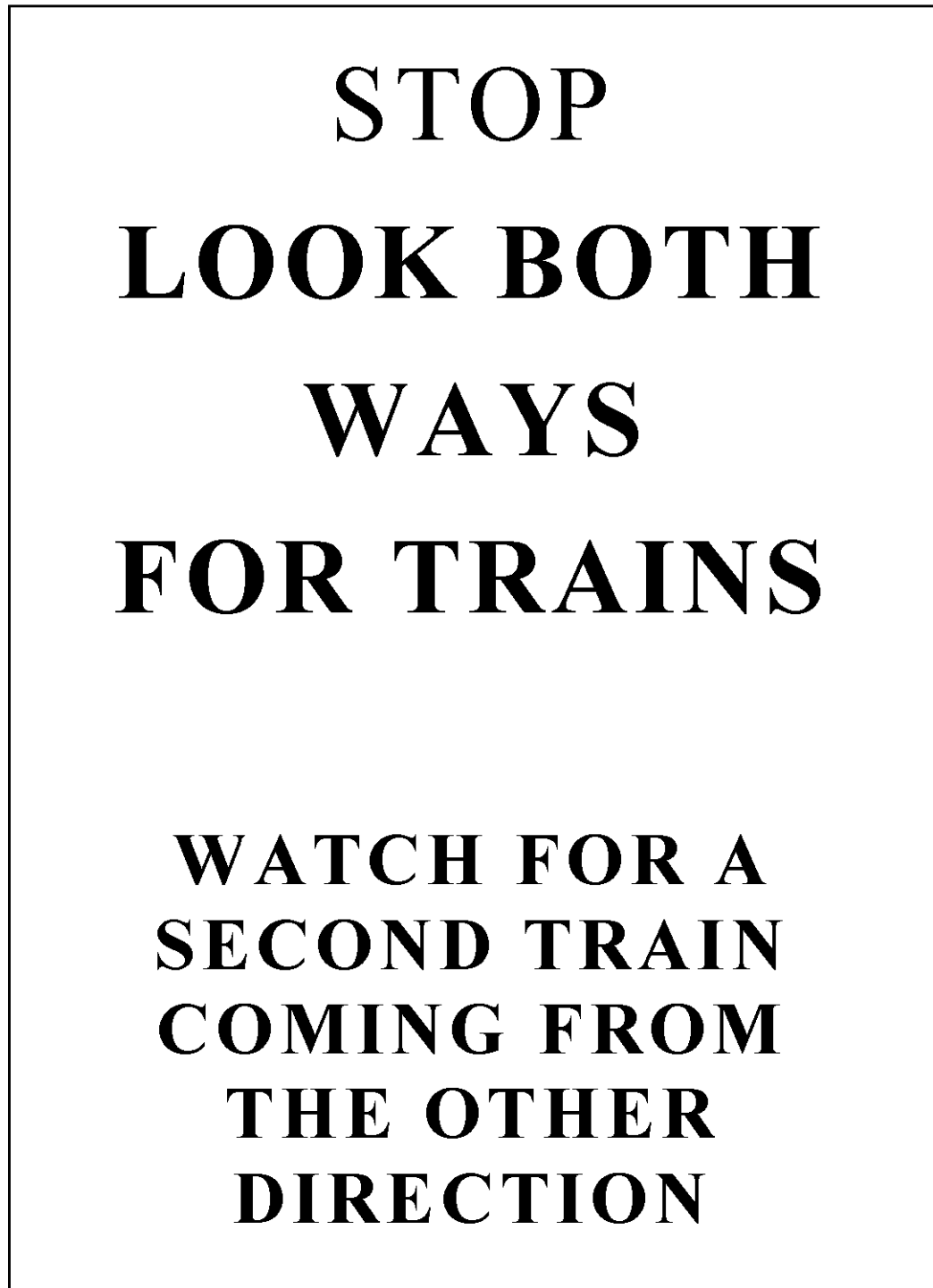


Figure A2: Notice Plate
Pedestrian Crossings
Double Track - Passive Protection

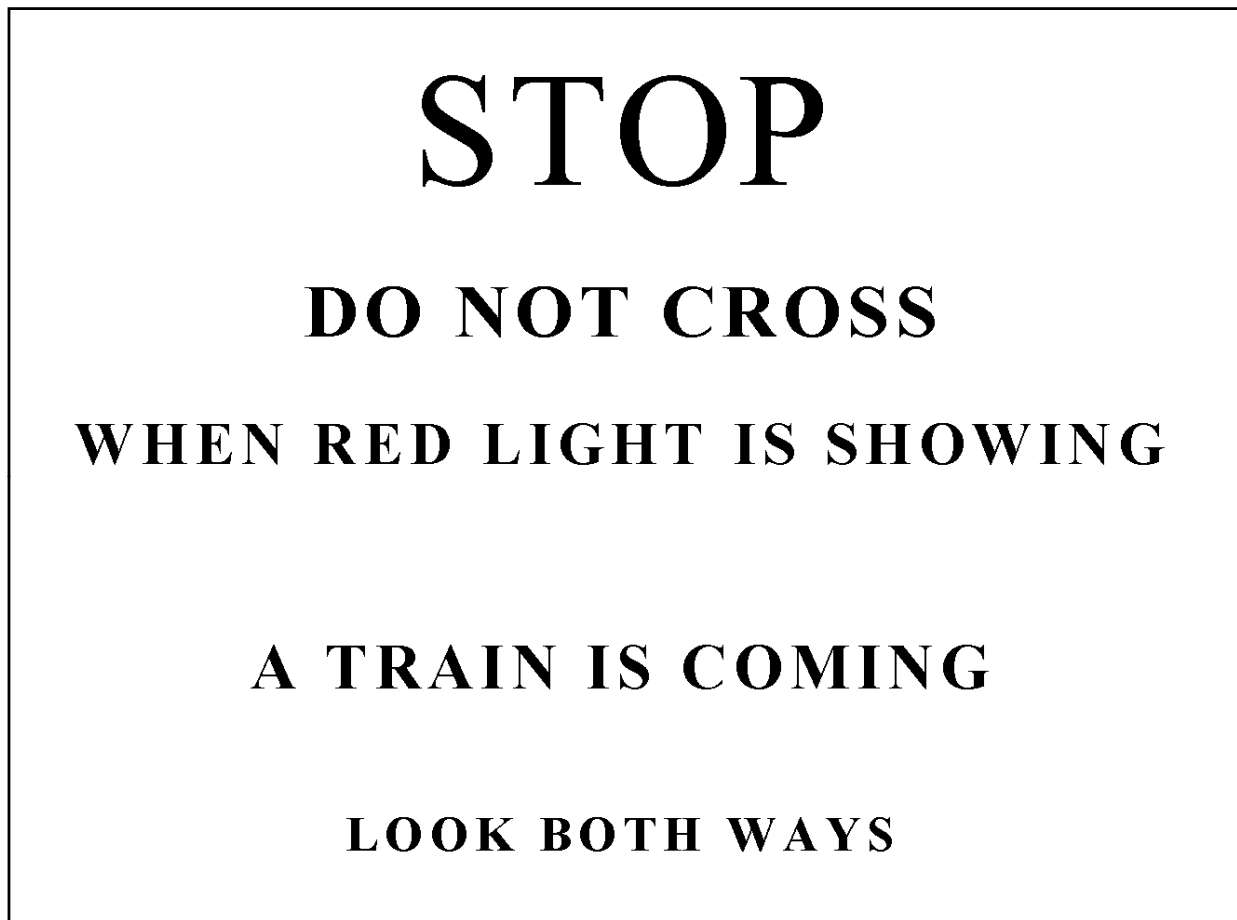


Figure A3: Notice Plate
Pedestrian Crossings
Double Track - Active Protection