



<b>CODE OF PRACTICE - VOLUME TWO - TRAIN SYSTEM [CP2] TRANSADELAIDE INFRASTRUCTURE SERVICES</b>		
<b>PART 12: GUARD/CHECK RAILS, BUFFER STOPS &amp; DERAILS</b>	<b>DOC. NO. CP-TS-962</b>	
<b>Issue: 1</b>	<b>Date: 04/09/07</b>	<b>Page: 1 of 11</b>

**TRACK AND CIVIL INFRASTRUCTURE**

**CODE OF PRACTICE**

**VOLUME TWO - TRAIN SYSTEM [CP2]**

**GUARD/CHECK RAILS, BUFFER STOPS AND  
DERAILS**

Under Review



<b>CODE OF PRACTICE - VOLUME TWO - TRAIN SYSTEM [CP2] TRANSADELAIDE INFRASTRUCTURE SERVICES</b>		
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## 1.0 PURPOSE AND SCOPE

### 1.1 PURPOSE

The purpose of this part is to set standards to ensure that guard rails, check rails, buffer stops and derails are safe and fit for purpose.

### 1.2 PRINCIPLES

This part complies with the principles set out in the "Code of Practice for the Defined Interstate Rail Network", volume 4, part 2, section 1.

### 1.3 SCOPE

This part specifies general procedures for the design/rating, maintenance and monitoring of guard rails, check rails, buffer stops and derails.

### 1.4 DEFINITIONS

#### 1.4.1 Guard rail

Guard rails are defined in the "Code of Practice for the Defined Interstate Rail Network, Glossary, Volume 2, sub-section 4.1 (Track and Civil Infrastructure Terminology) General.

#### 1.4.2 Check rail

Check rails are defined in the "Code of Practice for the Defined Interstate Rail Network, Glossary, Volume 2, sub-section 4.1 (Track and Civil Infrastructure Terminology) General. In this Code of Practice, when used in conjunction with rerailers and laid on the track in close contact with the running rails, check rails shall also be used:

- a) to prevent a vehicle from derailing or to re-rail a derailed vehicle where it would be in danger of striking a structure with consequential personal injury or property damage; or
- b) to prevent a vehicle from derailing or to re-rail a derailed vehicle where it was in danger of toppling over the side of an overbridge.

Note that in this part of the Code of Practice, the usage of the term shall distinguish them from check rails used in points and crossings.

#### 1.4.3 Derail

In this Code of Practice, the term "derail" is defined as follows. Where a siding track meets a running line in a turnout, compound or diamond, a derailing device shall be provided to prevent unauthorised movements on the siding track fouling the running line or colliding with train movements. The derailing device shall include "derails," "catch points," and "catch sidings."

### 1.5 REFERENCES

#### 1.5.1 Industry codes of practice

- a) Code of Practice for the Defined Interstate Rail Network, Glossary, Volume 2, section 4.0 Track and Civil Infrastructure Terminology, sub-section 4.1 General.
- b) Code of Practice for the Defined Interstate Rail Network, volume 4 (Track, Civil and Electrical Infrastructure), part 2 (Infrastructure Principles), section 1: Rail.

#### 1.5.2 TransAdelaide documents

TransAdelaide Common and General Operating Rules



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**1.5.3 TransAdelaide documents**

a) **CP2**

CP-TS-955: Part 5, Structural clearances

CP-TS-961: Part 11, Rails and rail joints

b) **TransAdelaide/Infrastructure Services Procedures**

QP-IS-501: Document and Data Control

CPRD/PRC/046 Records Management

**1.5.4 TransAdelaide drawings**

318-A1-84-1793: Overway bridges - Check rail details

338-A3-85-444: Standard dead end buffer stop

xxx-xx-xx-xxx: Adelaide Railway Station, sand resistance type buffer stop

xxx-xx-xx-xxx: Adelaide Railway Station, sand resistance type buffer stop

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## 2.0 DESIGN AND RATING OF GUARD RAILS

### 2.1 APPLICATION OF GUARD RAILS

Guard rails shall be installed:

- a) where the nearer running rail is closer than 3.5m from the unprotected support of an overhead or adjacent structure;
- b) on all open deck bridges (i.e. unballasted) with a span in excess of 6m; and
- c) at any other location, where, in the event of a derailment, it is necessary to restrain derailed vehicles from deviating from the general track alignment.

### 2.2 CONFIGURATION

#### 2.2.1 Single or double guard rails

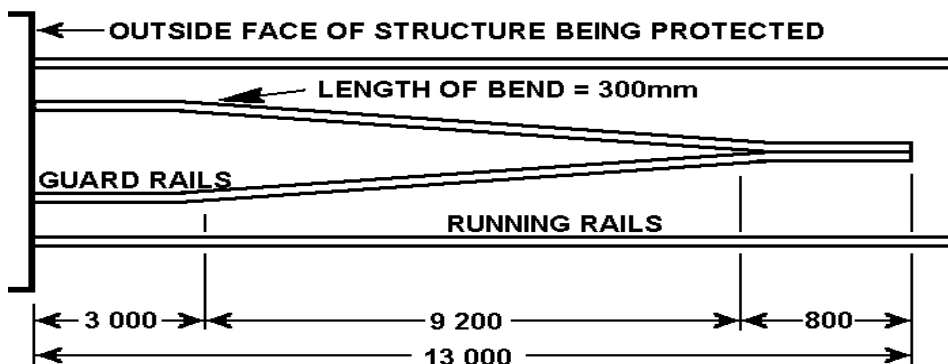
Guard rails shall be installed in accordance with drawing number 318-A1-84-1793 and shall consist of either of the following configurations:

- a) where there is a structure at risk on both sides of the line - two rails laid between the running rails, laid for the length required to protect the structure at risk, then angled to meet in the centre of the track; or
- b) where there is a structure at risk on one side of the line only - one rail laid on the opposite side of the track centreline to the structure at risk, laid for the length required, then angled across to the centre line of the track.

#### 2.2.2 Basic dimensions of guard rails

The basic dimensions of all guard rails are shown in figures 2.1 and 2.2.

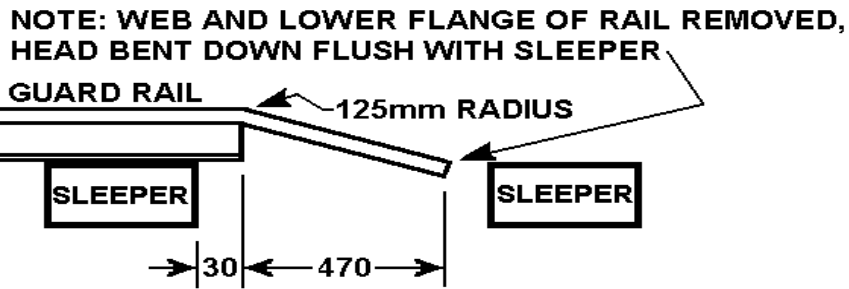
**Figure 2.1: Plan view of guard rails**



**Figure 2.2: Ends of guard rails**



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### 2.3 WEIGHT OF RAIL

Guard rails shall preferably be made with 90AS or AS 47kg rail but in all cases shall be of a weight not less than 40kg/metre.

### 2.4 INSTALLATION

- a) The distance between the gauge side of the nearest running rail and the near side of the guard rail (measured 16mm below the top of running rail) shall be a maximum of 300mm and a minimum of 130mm.
- b) If this is insufficient to ensure a clearance of 125mm between a derailed vehicle and the structure at risk, then check rails shall be fitted in accordance with section 3.
- c) Where guard rails are installed on an open deck bridge, the guard rails shall be installed at a distance from the running rail (or rails) so that on a derailed vehicle with derailed wheels bearing hard against the guard rail, the opposite wheels will still ride on the bridge timbers. If this requires guard rails to be installed closer to a running rail than 130mm., then check rails shall be fitted in accordance with section 3.
- d) The top of the guard rail shall be at the level of the adjacent running rail surface, or below it by no more than 50mm.
- e) Guard rails shall be fastened preferably every sleeper or every fastening interval on slab track, but shall be fastened at least every alternative sleeper or fastening interval.
- f) Joints in guard rails shall be made in accordance with the requirements for running rails in CP-TS-961 (Rails and rail joints).

### 2.5 PLAIN TRACK OR POINTS AND CROSSINGS

Guard rails as prescribed in this section shall be used on plain track. Where points and crossings are present, consideration shall be given to an alternative means of protection or to the susceptibility of risk.



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### 3.0 DESIGN AND RATING OF CHECK RAILS

#### 3.1 APPLICATION OF CHECK RAILS

Check rails shall be used where, because of proximity of adjacent structures, guard rails do not provide adequate protection to structures e.g. through girder bridges, truss bridges, etc.

#### 3.2 CONFIGURATION

Check rails shall have the following characteristics:

- a) Check rails used to protect structures shall
  - 1) always be laid in pairs with the ends of the check rails square across the track.
  - 2) be fitted with permanent rerailers at the leading end on unidirectional track or both ends on bidirectional track and derailed wheels shall be led into the rerailers with rails or steel angles laid on the approach.
- b) The flangeway of the check rails shall be not less than 45mm or greater than 65mm wide.
- c) Where checkblocks are used, the flangeway shall be preferably 45mm deep measured below the surface of the running rail but not less than 35mm under all wear conditions.
- d) Checkblocks shall be spaced a maximum distance apart of 1.5m.
- e) Check rails shall be fitted with the top of the check rails level with a plane across the top of the running rails ( $\pm 5$ mm).
- f) Check rails shall be fastened preferably every sleeper or every fastening interval on slab track, but shall be fastened at least every alternative sleeper or fastening interval.
- g) Joints in check rails shall be made in accordance with the requirements for running rails in CP-TS-961 (Rails and rail joints).

#### 3.3 WEIGHT OF RAIL

Check rails shall preferably be made with the same weight of rail as the running rail but in all cases shall be of a weight not less than 40kg/metre.

#### 3.4 PLAIN TRACK OR POINTS AND CROSSINGS

Check rails as prescribed in this section shall be used on plain track. Where points and crossings are present, consideration shall be given to an alternative means of protection or to the susceptibility of risk.



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#### 4.0 MONITORING AND MAINTENANCE OF GUARD/CHECK RAILS

##### 4.1 INSPECTION, ASSESSMENT AND MAINTENANCE ACTIONS

Inspection, assessment and maintenance actions of guard rails and check rails shall comply with the requirements of CP-TS-961 (Rails and rail joints) and include the specific conditions shown in table 4.1:

**Table 4.1: Guard rail and check rail inspection, assessment and maintenance actions**

Type of inspection	Specific conditions or actions to observe
<b>Scheduled inspections</b>	
Walking inspections	a) Identify visually, and report, visible guard rail and check rail defects and conditions (i.e. indicators of a defect) that may affect the integrity or function of the guard rail including the following: 1) missing or ineffective rail/sleeper continuity; 2) lack of guard rail continuity; 3) obvious damage to components. b) Intervals between walking inspections shall not exceed 31 days.
<b>Unscheduled inspections</b>	To be undertaken following the report of defective guard rails and check rails.
<b>Assessment and method of assessment</b>	The integrity of guard rails and check rails shall be assessed to verify their capacity to safely perform their required function.
<b>Maintenance actions and response</b>	a) Damaged components including ineffective rail joints, which may render the guard rail or check rail ineffective in the event of a derailment shall be replaced or restored within 30 days or less. b) Missing or ineffective sleeper fastenings shall be dealt with as follows: 1) If less than 25% sleeper fastenings are missing or ineffective; no action. 2) If 25% or greater are missing or ineffective; replace or restore to specification within 30 days. 3) If a guard rail is missing or ineffective, a 25km/hr maximum speed limit shall be applied until the guard rail is replaced or made effective. 4) For splay rails or the ends of guard rails, three or more are missing or ineffective on consecutive sleepers, replace or restore to specification within 30 days. c) Where check rails are fitted the responses shall be as shown in table 4.2.

**Table 4.2: Response criteria to check rail flangeways**

<b>Flangeway</b>		
Width, variation from design width	< ±6mm	No action
	±6 to ±10mm	Impose 20km/hr speed limit or repair
	> ±10mm	Pilot or repair
Depth, variation from design depth	≤ ±10mm	No action
	> ±10mm	Impose 20km/hr speed limit or repair



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## 5.0 BUFFER STOPS

### 5.1 APPLICATION OF BUFFER STOPS

Buffer stops shall be used to prevent vehicle movements taking place beyond the end of dead end main line tracks.

### 5.2 BUFFER STOPS SHALL BE EITHER:

- a) steady resistance type – designed to decelerate the movement of vehicles over a prescribed length of track to minimise damage to rolling stock; or
- b) sudden impact type – designed to stop vehicles in a very short distance to protect infrastructure behind the buffer stop.

### 5.3 STEADY RESISTANCE TYPE

- a) Sand resistance type  
In Adelaide Railway Station the platform at the ends of the tracks are protected by sand resistance type buffer stops. The following drawings show the construction of these buffer stops:

- i) xxx-xx-xx-xxx
- ii) xxx-xx-xx-xxx

- b) Friction type  
On the ends of main lines where there is sufficient length of track available, friction type buffer stops may be used.

### 5.4 SUDDEN IMPACT TYPE

- a) Standard dead end buffer stop – drawing number 338-A3-85-444  
On the ends of main lines where there is insufficient length of track available to install a steady resistance type buffer stop a standard dead end buffer stop shall be used.
- b) Mound of ballast or similar  
A mound of ballast or similar material may be placed on a dead end track to act as a buffer stop.

### 5.5 STOP SIGN

All permanent buffer stops shall be provided with a stop sign mounted on the face of the buffer stop in accordance with the requirements of the Common General Operating Rules.

### 5.6 EXISTING BUFFER STOPS

Existing buffer stops on main line dead ends are of the following types:

- a) Adelaide Station (9 tracks): sand resistance type;
- b) Tonsley: standard dead end buffer stop;
- c) Noarlunga Centre: sudden impact type (earth wall);
- d) Grange: standard dead end buffer stop;
- e) Outer Harbor: mound of ballast type.

### 5.7 MONITORING AND MAINTENANCE OF BUFFER STOPS

Buffer stops shall be inspected during:

- a) walking inspections for unreported damage;
- b) an unscheduled inspection following the report of a collision.



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Arrangements for repairs shall include pulling back steady resistance type to their original position and restoring the resistance devices.



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## 6.0 PROTECTION OF RUNNING LINES FROM UNAUTHORISED MOVEMENTS

### 6.1 DERAILS, INCLUDING CATCH POINTS AND CATCH SIDINGS

Derails are defined in clause 1.4.3

### 6.2 SELECTING THE APPROPRIATE DERAILING DEVICE

The type of derailing device and its location relative to the running line shall be designed to prevent unauthorised movements fouling running line movements, including while still moving in the derailed condition or in the final stationary condition. A vehicle shall be considered to be foul if it infringes the requirements of section 5.0.

### 6.3 REQUIREMENTS TO BE MET

The following requirements shall be taken into account when determining the type of derailing device and its position relative to the running line:

- a) All derailing devices shall derail vehicles away from the running line unless to do so creates a greater risk than derailing towards the running line;
- b) Where it is necessary to derail towards the running line, care shall be taken to ensure that a derailed vehicle meets the requirements of CP-TS-955 (Structural clearances).
- c) The ground where a vehicle is to travel after derailment shall be soft to present a high resistance to movement and shall be clear so as not cause the vehicle to be deflected towards the running line or topple on to it. In certain circumstances it may be necessary to construct a barrier between this area and the running line to ensure that the requirements of CP-TS-955 (Structural clearances) are met.
- d) Where the siding track is parallel with the running line at minimum track centres, the derailing device shall be placed at the end of the parallel section so that derailed vehicles will continue parallel with the running line until stopped.
- e) Where the siding track approaches the running line at an oblique angle, a catch point is the preferred derailing device, placed at a sufficient distance from the running line and supplemented with a deflector rail to ensure that the requirements of CP-TS-955 (Structural clearances) are met. Where the derailing device would need to be placed at a distance from the running line, which would shorten the standing room unduly, a catch siding may be used. Where catch sidings are used, vehicles that over-run the end of the siding shall be deflected away from the running line.
- f) Derails shall not be used:
  - 1) on new TransAdelaide sidings;
  - 2) where vehicles with six-wheeled bogies are likely to use the siding track.



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## 7.0 DOCUMENTATION

### 7.1 GUARD RAIL RECORD

A record shall be maintained of all guard rails in accordance with QP-IS-501 (Document and Data Control).

*RECORD TO BE PREPARED*

### 7.2 CHECK RAIL RECORD

A record shall be maintained of all check rails in accordance with QP-IS-501 (Document and Data Control).

*RECORD TO BE PREPARED*

### 7.3 INSPECTION REPORTS

All inspection reports shall be maintained in accordance with CPRD/PRC/046 Records Management .