



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil)

Category: Standard

# Use of Resilient Fastenings

## ETF-02-01

### Applicability

New South Wales	✓	CRIA (NSW CRN)	
-----------------	---	----------------	--

### Primary Source

ARTC NSW Standard TCS 06, TCS 07, TCS 08
------------------------------------------

### Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
1.2	05 Apr 11	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 Standards TCS 06 v1.2, TCS 07 v1.2 and TCS 08 v1.2
1.1	18 Jun 10		Banner added regarding mandatory requirements in other documents and alternative interpretations.
1.2	05 Apr 11	3.1, 4 and 5	Track classification A,B,C and D amended to show "Heavy Haul Lines", "Interstate lines", "Intrastate Lines", and "Light Weight Lines". Deleted reference to Class E Lines

© Australian Rail Track Corporation Limited 2011

**Disclaimer:**

This document has been prepared by ARTC for internal use and may not be relied on by any other party without ARTC's prior written consent. Use of this document shall be subject to the terms of the relevant contract with ARTC.

ARTC and its employees shall have no liability to unauthorised users of the information for any loss, damage, cost or expense incurred or arising by reason of an unauthorised user using or relying upon the information in this document, whether caused by error, negligence, omission or misrepresentation in this document.

**This document is uncontrolled when printed.**

Authorised users of this document should visit ARTC's intranet or extranet ([www.artc.com.au](http://www.artc.com.au)) to access the latest version of this document.

# Contents

<b>1</b>	<b>Approved Fastenings .....</b>	<b>3</b>
1.1	Identification of Pandrol Fastenings .....	3
1.2	Pandrol Clip Insertion Procedures for other than Fastclip .....	3
1.3	Installation of Fastclip Fastenings .....	4
<b>2</b>	<b>Fastenings at Glued Insulated Joints .....</b>	<b>5</b>
2.1	Low Profile Fastenings .....	5
2.2	Usage.....	9
2.3	Installation in Turnouts.....	9
2.4	Plating, Lockspike and Rail Clip on Timber Sleepers.....	9
<b>3</b>	<b>Use of Reformed and New Cast/Rolled Sleeper Plates with Resilient Fastenings .....</b>	<b>9</b>
3.1	Approved Components – Reformed Plates.....	9
3.2	Approved Components – New Sleeper Plates.....	10
<b>4</b>	<b>Use of Resilient Hook-in Fasteners in Double Shouldered Sleeper Plates</b>	<b>11</b>
<b>5</b>	<b>Use of Lockspikes with Resilient Fastenings in Turnouts and on Transoms .....</b>	<b>11</b>

**Mandatory requirements also exist in other documents.**

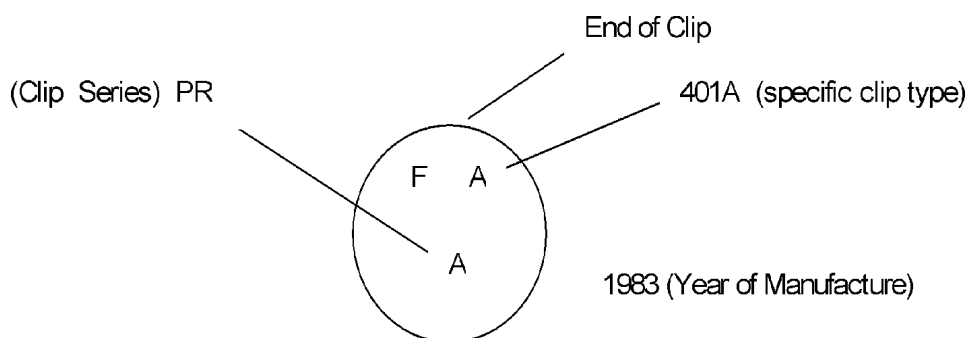
**Where alternative interpretations occur, the Manager Standards shall be informed so the ambiguity can be removed. Pending removal of the ambiguity the interpretation with the safest outcome shall be adopted.**

# 1 Approved Fastenings

Fastenings approved for use are shown in Table 3. Resilient fastenings shall be used with 60kg/m rail. For other rail sizes dog spikes or approved resilient fastenings shall be used.

## 1.1 Identification of Pandrol Fastenings

The following coding system is used to identify Pandrol fastenings, for use other than in insulated joints:



CLIP SERIES	CODE	SLEEPER
PR 401 A	F A	TIMBER, replaced by e2003
e1823	K K	STEEL with Hook In Shoulders (supplied in small numbers for Narrandera and Moree)
e1853	L A	TIMBER with reformed sleeper plates
e2003	S B	CONCRETE, TIMBER with all BHP plates
e2045	S W	CONCRETE, replaced by e2003

**Table 1**

Year of Manufacture Identification Code:

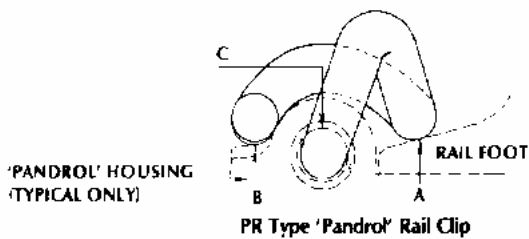
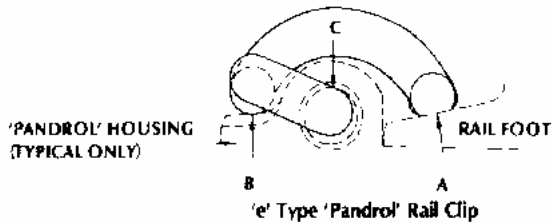
1983 - A	1991 - J	1999 - T
1984 - B	1992 - K	2000 - V
1985 - C	1993 - L	2001 - W
1986 - D	1994 - M	2002 - X
1987 - F	1995 - N	2003 - Y
1988 - G	1996 - O	2004 - Z
1989 - H	1997 - P	2005 - 5
1990 - I	1998 - S	2006 - 6

**Table 2**

## 1.2 Pandrol Clip Insertion Procedures for other than Fastclip

The correct installation procedure for these fastenings is shown below

**CRITICAL CONTACT FEATURES  
OF 'PANDROL' RAIL CLIPS**



A = Toe contact area  
B = Heel contact area  
C = Centre leg contact area

The relationship between the contact areas A, B & C is critical to ensure the correct working of any 'Pandrol' Rail fastening assembly.

**LOCATING THE 'PANDROL' CLIP CORRECTLY  
IN THE RAIL FASTENING ASSEMBLY**

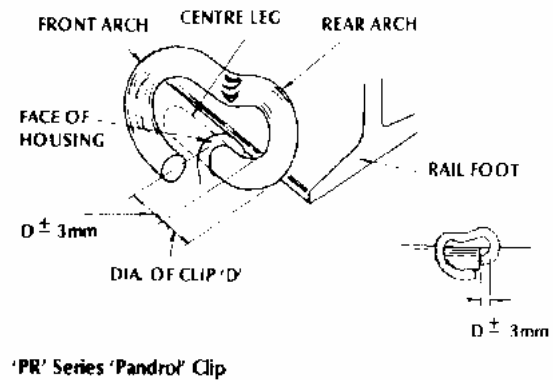
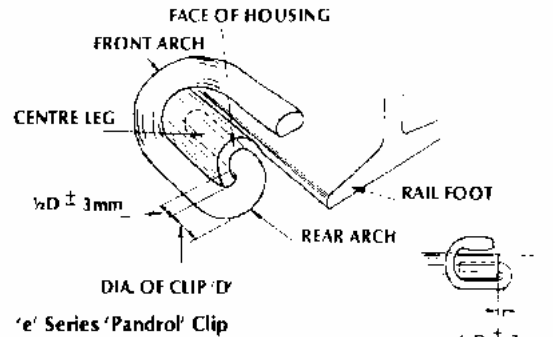


Figure 1

**1.3 Installation of Fastclip Fastenings**

Pandrol Fastclip is an approved product which may be used with concrete sleepers.

The installation procedures should be in accordance with the Pandrol Fastclip "Track Installation Guide" supplied by Pandrol Australia.

Some key points from the guide include:

- Special tools and equipment are needed for manual or mechanised installation.
- Sleepers should be installed on a good level ballast bed so that most sleepers directly support the rail.
- If there is a gap between the rail seat and the sleeper, the sleeper has to be lifted up against the rail seat before it can be clipped up (tools are available to facilitate this).
- There is a method available for repairing broken shoulders.
- Ballast regulator blades need to be checked to ensure that they will not hit the fastening assembly (the Fastclip assembly is wider than conventional Pandrol clips and shoulders).

The blade needs to be cut out to give a clear area, 80mm above the rail seat and 135mm either side of the rail centre line.

An allowance needs to be added to the cut out to account for the throw of the regulator blade arising from curvature of the track. This will be different for different regulator designs.

*Note: There will also be a difference in the cut out required for different rail sizes. If the blade is setup for 60kg/m rail an additional 13mm will need to be cut out to allow for its use with 53kg/m rail.*

## 2 Fastenings at Glued Insulated Joints

### 2.1 Low Profile Fastenings

Purpose built, low profile fastenings are to be used for glued insulated joints in 53 and 60 kg/m rail. They are shown below.

- 1) For timber sleepers track Pandrol type e1627 fastenings are to be used. These fastenings have a round non flattened toe and are of a red/brown colour. They are suitable for normal application only. See figure 3 below.
- 2) For concrete sleepers track with the Pandrol System type e1629 fastenings are to be used. These fastenings have a flattened toe and are blue in colour. They are suitable for normal and reverse application with special insulator No IN55186. See figure 4 below.
- 3) For concrete sleepers with Pandrol Fastclip System FC1502 (Fastclip) fastenings are to be used.

For timber sleeper track, the plating concept as shown on Figure 3 is to be used except that the new low profile clips e1627 are to be used in lieu of the e1829 clips for new installations and as set out in clause 2.2 below.

For concrete sleepers with the Pandrol System, the same fastening is to be used as shown in Figure 4 except that the new low profile clips e1629 are to be used in lieu of the e1829 clips for new installations and as set out in clause 2.2 below.

The design with the new low profile clips does not require the removal of the second and fifth bolts.

The fastenings are designed to be clear of bolts and plates but have a lower toe load than normal clips.

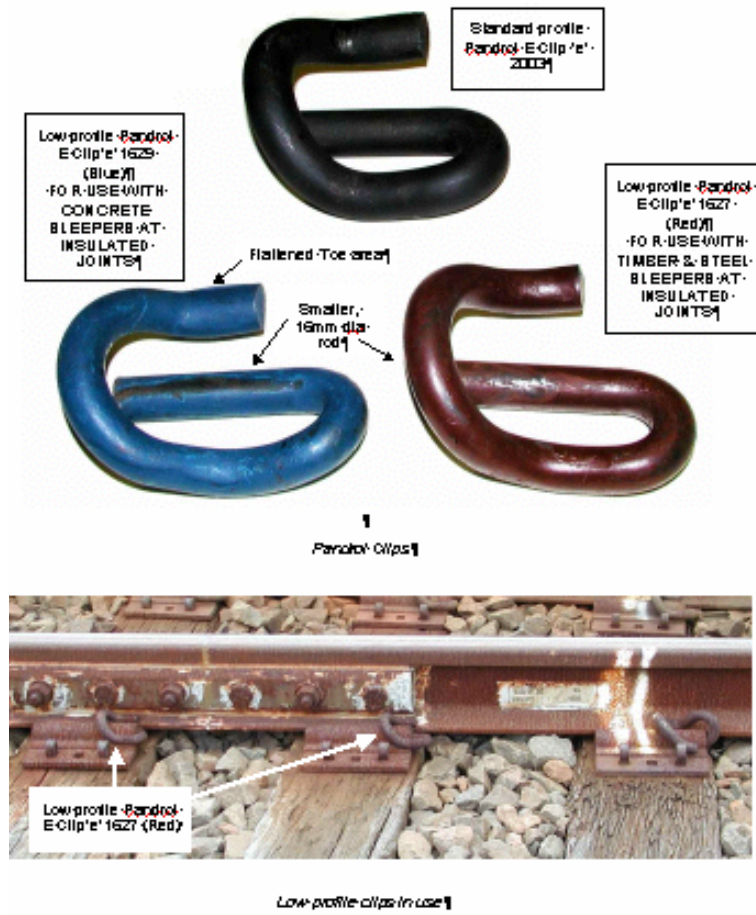
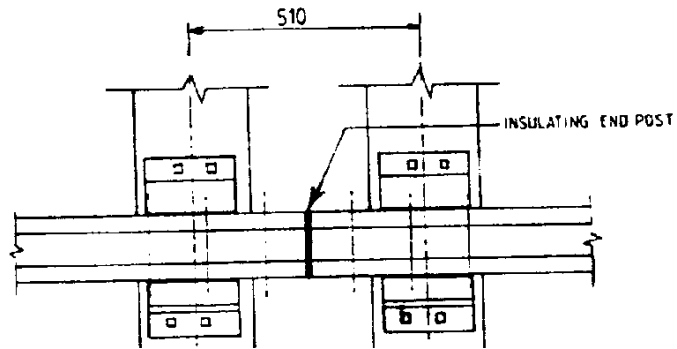
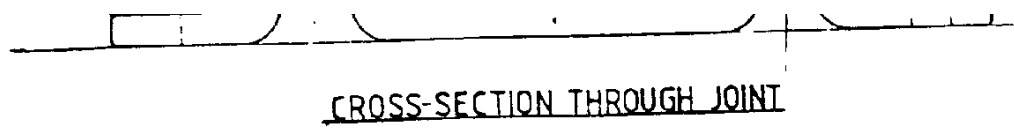
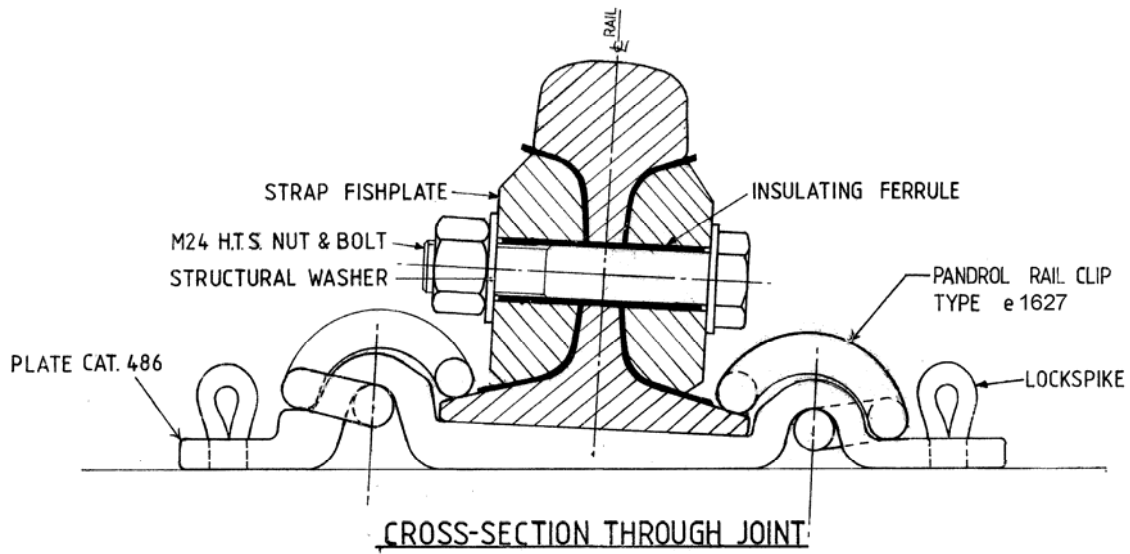


Figure 2



Plating arrangement at insulated joint

Figure 3

*Note: This arrangement is to be used in Plain Line and eliminates the need to remove the 2nd and 5th bolts from the insulated joint to clear the clips.*

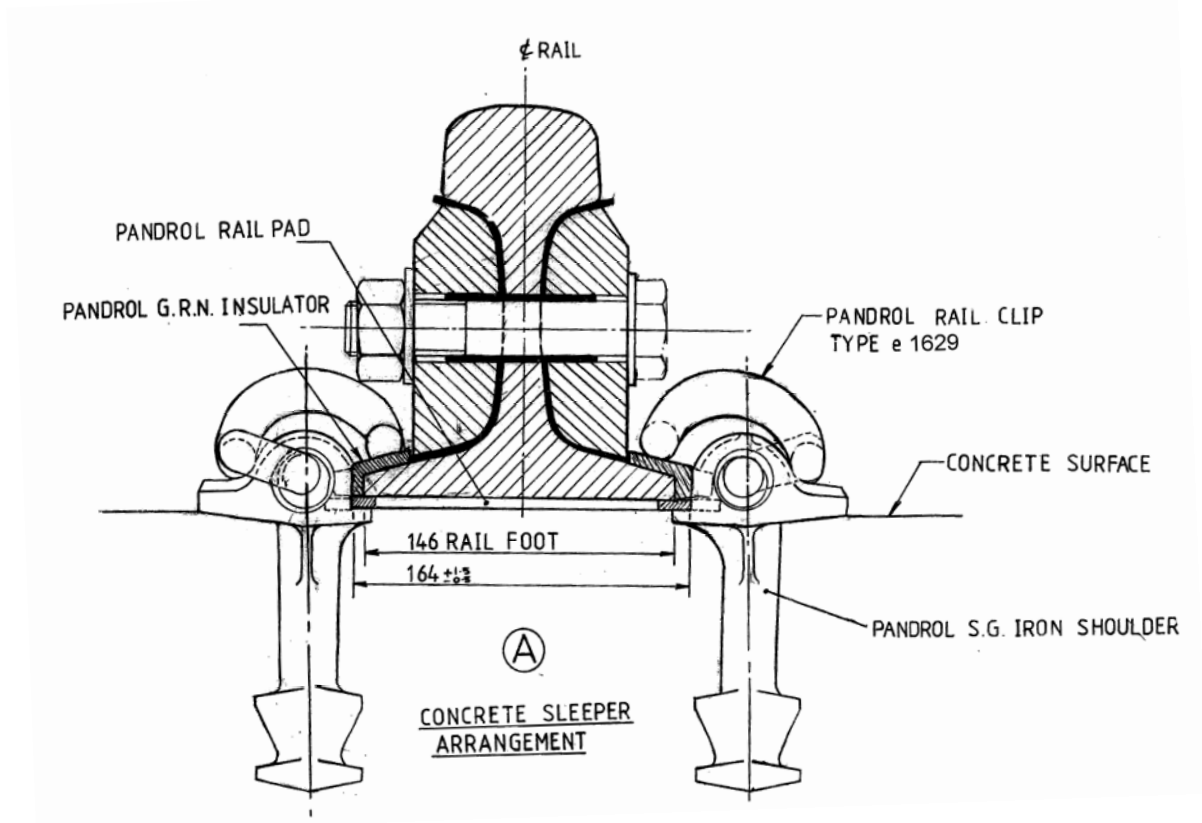


Figure 4



## 2.2 Usage

The low profile fastenings are to be used:

- on all new glued insulated joints;
- to replace fastenings previously removed because of clearance problems;
- to replace existing fastenings at glued insulated joints that have a history of signal failures;
- to replace existing e1829 fastenings during glued insulated joint maintenance.

Clearances are compromised with the low profile fastenings in timber bearers with baseplates type PZ 147. These have pressed steel lugs forming the fastening housing. Fastenings which may become foul of bolts or plates should be left off.

## 2.3 Installation in Turnouts

Fastening details at insulated joint in timber turnouts are shown on drawing No. 207-1096.

## 2.4 Plating, Lockspike and Rail Clip on Timber Sleepers

This plate is known as tapered Pandrol Plate with BHP catalogue No. 486 and dimensions are in accordance with Drawing No. 91-203A.

The lockspike type L1 is to be used in this plating arrangement. Refer to Drawing No. 91-189 for details.

# 3 Use of Reformed and New Cast/Rolled Sleeper Plates with Resilient Fastenings

## 3.1 Approved Components – Reformed Plates

Used Double Shoulder Plates reformed to suit nominated Pandrol or Traklok fastenings may be used as specified in Figure 3 and Figure 4 on Intrastate and Light Weight lines only.

Fastening requirements are shown in:

Reformed Plates Type RFT - 2 are shown on Drawing No. 480-1270.

Reformed Plates Type RFT - 3 are shown on Drawing No. 480-1271.

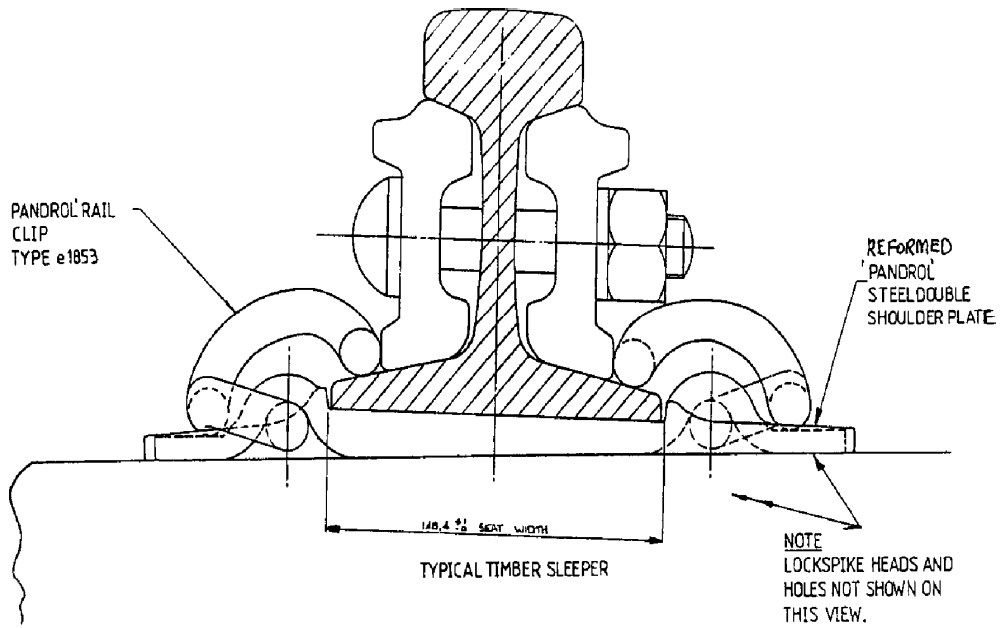


Figure 3

### 3.2 Approved Components – New Sleeper Plates

New sleeper plates are to conform to AS 1085.03 Railway permanent way materials – Sleeper Plates.

In general it is proposed to use Approved Hook-In Fastenings on existing double shouldered sleeper plates instead of new rolled or cast plates for new works, including the use of 60kg/m rail.

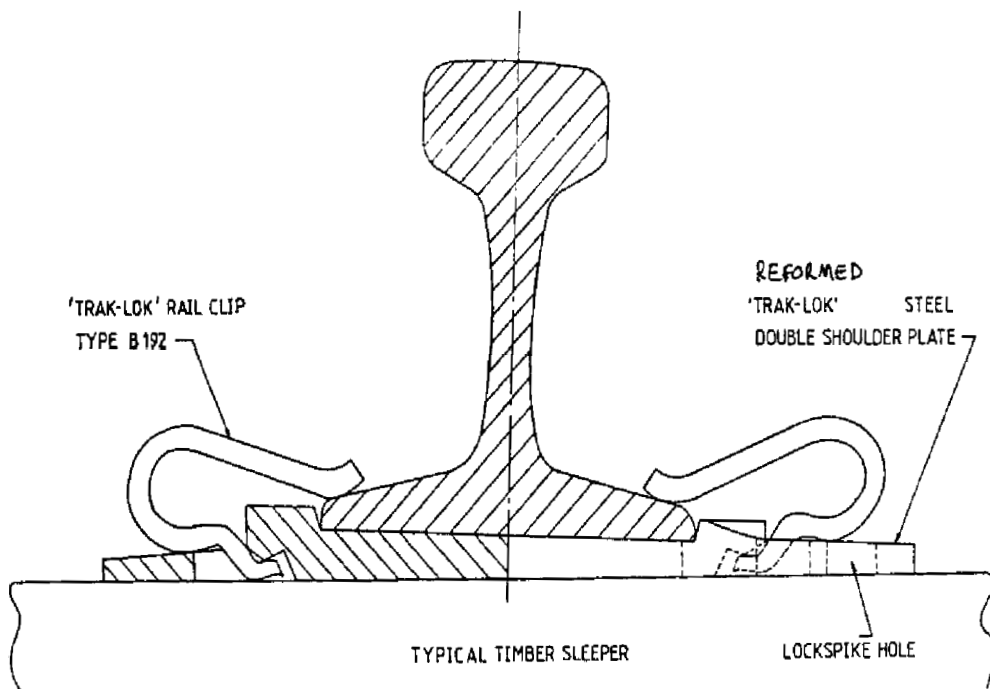


Figure 4

## 4 Use of Resilient Hook-in Fasteners in Double Shouldered Sleeper Plates

Resilient hook-in fastening systems are to conform to AS 1085.19. Approved fastening assemblies include:

- Pandrol resilient fastening assembly for timber sleeper conversion, utilising S.G. Iron shoulders PAN-75225 (Gauge Shoulder) and PAN-75226 (Field Shoulder) with e1829 clip;
- Rex-Lok / Trak-Lok resilient fastening assembly for timber sleeper conversion, utilising S.G Iron Inserts, with B296 clips.

These fastening systems are suitable for use on Interstate, Intrastate and Light Weight Lines including those containing 60kg/m rail.

## 5 Use of Lockspikes with Resilient Fastenings in Turnouts and on Transoms

In turnouts there are to be four lockspikes per plate including split plates. Where plates have 6 holes the additional holes may be used to provide additional support where conditions warrant.

Where Pandrol plates are used on transom top bridges, type ISP95098 plates with round holes may be used with screw spikes. Four 19mm screw spikes are to be used, except in track circuited areas, where one of the spikes would cause shorting to the underframe. In such cases three screw spikes per plate may be used on curves  $\geq 300\text{m}$  radius, preferably with the two screw spikes on the gauge side of the rail.

Usage	Max Axle Load	Resilient Fastenings	R > 800m		500m < R ≤ 800m		300m < R ≤ 500m		R ≤ 300m		Track Type	Notes	
			Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate			
<b>Concrete</b>													
	Heavy Duty	30 t	Pandrol e2003	N/A	N/A							Heavy Haul and Interstate,	e2003 replaces e2045
	Medium Duty	25 t	Pandrol e2003; Pandrol FC1507	N/A	N/A							Interstate	
	Insulated Joints		Pandrol e1629; Pandrol FC1502	N/A	N/A							Interstate	Use Pandrol e1929 with IN55186
<b>Timber</b>													
	New cast or rolled plates	25 t	Pandrol e2003	4	-	4		4	-	N/A	N/A	Interstate	e2003 replaces PR401A
		23 t		2	-	3		4	-	4	-	Intrastate and Light Weight	
	Hook In	25 t	Pandrol e1829 OR Rex-Lok / Trak-Lok B296	2	1	2	2	2	2	N/A	N/A	Interstate	Includes 60kg/m rail
		23 t		2	-	2	1	2	2	2	2	2	Intrastate and Light Weight
	Reformed Double Shouldered Sleeper Plate		Pandrol e1853 OR Trak-Lok B192	2	-	2	1	2	2	2	2	Intrastate and Light Weight	Not on New Works; (Existing use accommodates 60kg/m rail)
	Double Shouldered Sleeper Plates - Non-resilient		N/A	2	2	2	2	2	2	2	2	Light Weight	Not on New Works (Not for 60kg/m rail)
			N/A	2	-	2	-	2	-	2	-	Light Weight	

Use of Lockspikes with Resilient Fastenings in Turnouts and on Transoms

Usage		Max Axle Load	Resilient Fastenings	R > 800m		500m < R ≤ 800m		300m < R ≤ 500m		R ≤ 300m		Track Type	Notes
				Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate	Lockspikes or Lockscrews/Plate	Dogspikes or Dogscrews/Plate		
	Re-punched Double Shouldered Sleeper Plates - Non-resilient		N/A	2	-	2	1	2	2	2	2	Intrastate Lines	Not on New Works
			N/A	2	-	2	-	2	-	2	-	Light Weight	
	Insulated Joints		Pandrol e1627									Intrastate, Interstate and Light Weight Lines	
<b>Steel</b>													
	Hook-in		Pandrol e1823, OR Rex-Lok / Trak-Lok B296 or B286									Light Weight Lines	Intrastate lines with ARTC Approval B296 - 9mm; B286 - 8mm section
	Insulated Joints		As for timber with hook-in clips										

Table 3

Notes:

- 1) Utilise fastenings for timber with relevant hook-in shoulders as supplied by manufacturers for use with NSW double shouldered sleeper plates on timber sleepers , e.g. Pandrol PAN-75225 (Gauge shoulder), PAN-75226 (Field shoulder);
- 2) AJAX dogscrews and lockscrews as supplied by Pandrol –
  - Dogscrews, with 19mm threaded shank and 22mm shoulder below the flange are approved alternative to round dogspikes. Dogscrews require a 17mm drilled hole. When used in double shouldered sleeper plates with hook-in resilient fastenings, to be tightened until the flange touches the rail.

**Use of Lockspikes with Resilient Fastenings in Turnouts and on Transoms**

- *Lockscrews, 16mm threaded shank with either small or large flange are approved alternative to L6, 16mm lockspikes. Lockscrews require a 14mm drilled hole. Tighten with torque between 150 and 300Nm.*