



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline: Engineering (Track & Civil)

Category:

Standard

# Turnout Equipment

## ETF-03-01

### Applicability

New South Wales	✓	CRIA (NSW CRN)	
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### Primary Source

ARTC Engineering Instructions ETI-02-01, ETI-02-02 and ETI-03-02

### Document Status

Version	Date Reviewed	Prepared by	Reviewed by	Endorsed	Approved
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 Engineering Instructions ETI-02-01 v1.0, ETI-02-02 v1.0 and ETI-03-02 v1.0
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 Use of Screwspikes with Helical Spring Washers

## 1.1 Background

Where chair plates in turnout are fastened to bearers with screw spikes it is critical that the correct clamping force be applied to the screw spike/double helical washer combination to prevent lateral movement between bearer and plates (for normal track loading).

Each chair plate is to be fastened with four screw spikes each having a clamping force of 40kN.

*Note: Use of torque wrenches to measure clamping force is not appropriate as the measurement is of variable friction between spike and plastic insert or timber bearer rather than the clamping force between the helical spring washer and plate.*

## 1.2 Application

The required clamping force is achieved by compressing the installed Fe6 Double Helical Spring Washer to a stand height of 13.1mm. The stand height is achieved by a guiding sleeve on the 41mm high-impact hexagon socket (or alternatively the 12 x 28mm rectangular, 1"drive GETA high-impact socket).

See drawing number CV0166867 and CV0166868 (attached) for details.

Sockets are available through Delkor Pty Ltd and should be independently certified with a marking on the socket sleeve.

On the turnout plated, the bearing area of the double helical spring washer must be clean and free of burns and risers so that the correct torque setting can be achieved and wear to the socket sleeve is minimized.

## 1.3 Replacement of Earlier Installations

Early installations of screw spikes used on insulation washer and insulation sleeves through the fastening holes of the turnout bearer plates, but did not use helical washers. To change to screw spike and helical spring washer installation, remove washers and insulation sleeves from bearer plates and replace with insulation sleeves with steel brushes (I.D.26mm). The height of the steel bushes is not to be designed so that, when installed, the top of the bush does not protrude above the top of the turnout bearer plate.

## 1.4 Re-use of Double Helical Spring Washers

Double helical spring washers Fe6 or Fe15 should be rejected for re-use when the stand height (unloaded height) is reduced to 17mm or less. To determine the rejection limit of the washers a gauge has been developed. The gauge (see drawing number CV0166869 and CV0166870 attached for details) is available from Delkor. Sockets with sleeve are also available from Delkor.

The double helical spring washer is to be placed over the gauge shaft and the test block is to be placed over the washer onto the shaft. If the red line on the shaft of the washer acceptance gauge is visible, the washer is to be rejected.

## 2 Use of Nyloc and Other Self Locking Nuts

Although mainline points equipment is inspected and maintained by Signals discipline staff, there are many sets of manually operated points in sidings and yards that are the responsibility of Civil staff.

There have been cases in the past where failures have occurred due to various item of points equipment (extension pieces, point rod brackets, etc) becoming loose due to the self-locking nut on the securing bolt having become slack due to vibration.

Investigation revealed that in some cases the securing nuts had been removed and re-used.

Whenever a self-locking nut has been removed from the securing bolt on point's equipment, it must be replaced by a new unused nut.

In all cases the thread of the bolt and its straightness are to be examined and the bolt replaced if damaged. This is particularly the case where Glenlock self-locking nuts have been used.

### 3 Alternative Rail Brace Bolts

It has been identified that the poor forging surface quality of the bolt under-head has resulted in only partial contact of the bolt head with the brace surface when installed, thus causing high, localized stress concentration and subsequent fatigue failures.

The alternatives listed below are approved for use and should eliminate the above problem.

#### **Attachment 1 and 2 Alternative 1 – Use hexagon head bolts**

Three M24, Grade 8.8, hexagonal head bolts (2@ 120mm long and one @ 125mm long) have been catalogued. These bolts replace Rail Brace bolts shown in Way & Works Drawing No 91-170C, Stock Code No 1339837 (MI No 33506056) which have been withdrawn from service. The 125mm long bolt is the preferred option as the additional length allows the use of a 10mm thick spring washer. The shorter bolt can, however, be used with a flat washer.

The Stock Code Numbers, appropriate description and reference to relevant technical standards are provided in Attachment 2 of this section.

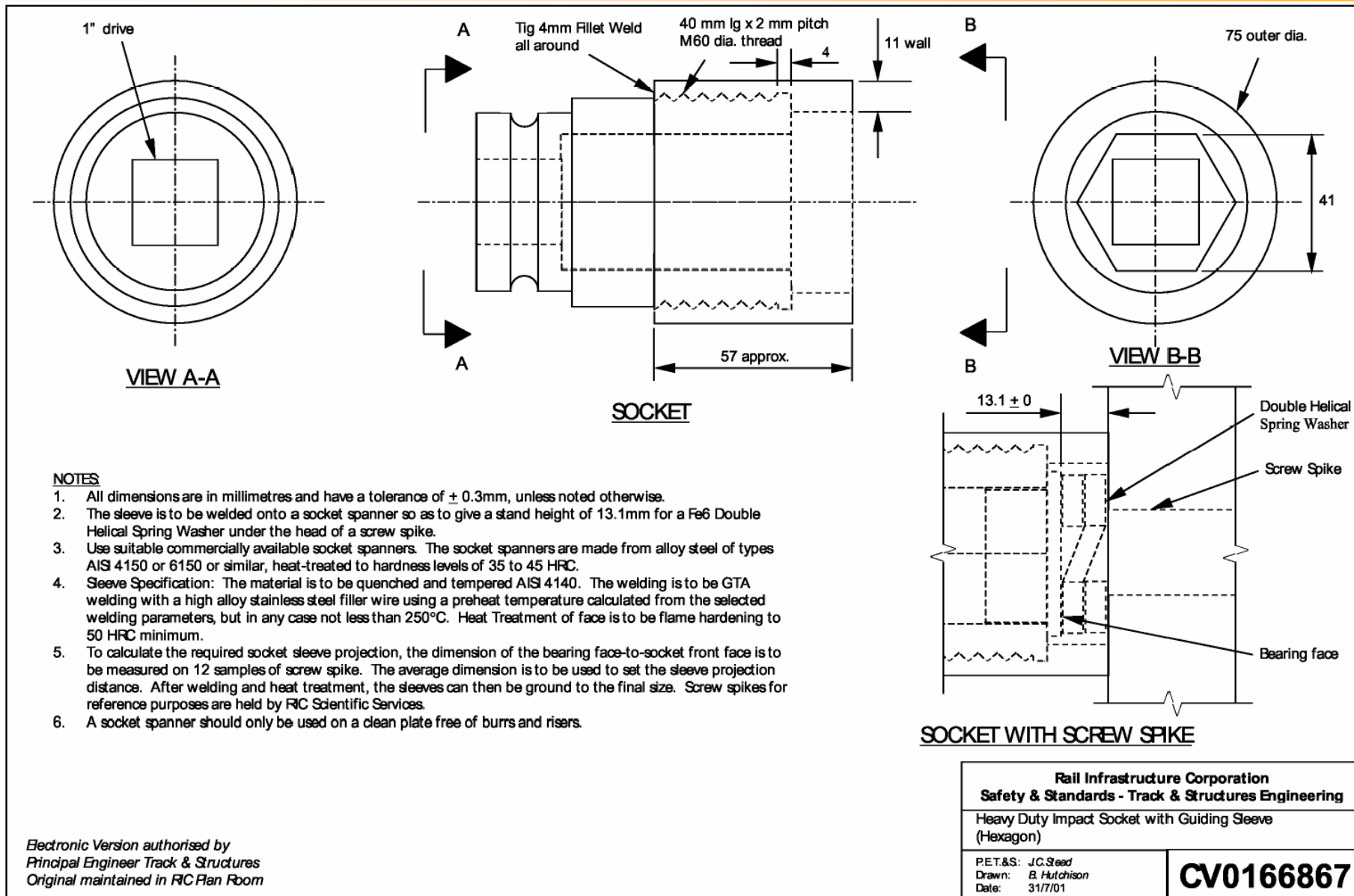
#### **Attachment 1 and 2 Alternative 2 – Use swage fasteners**

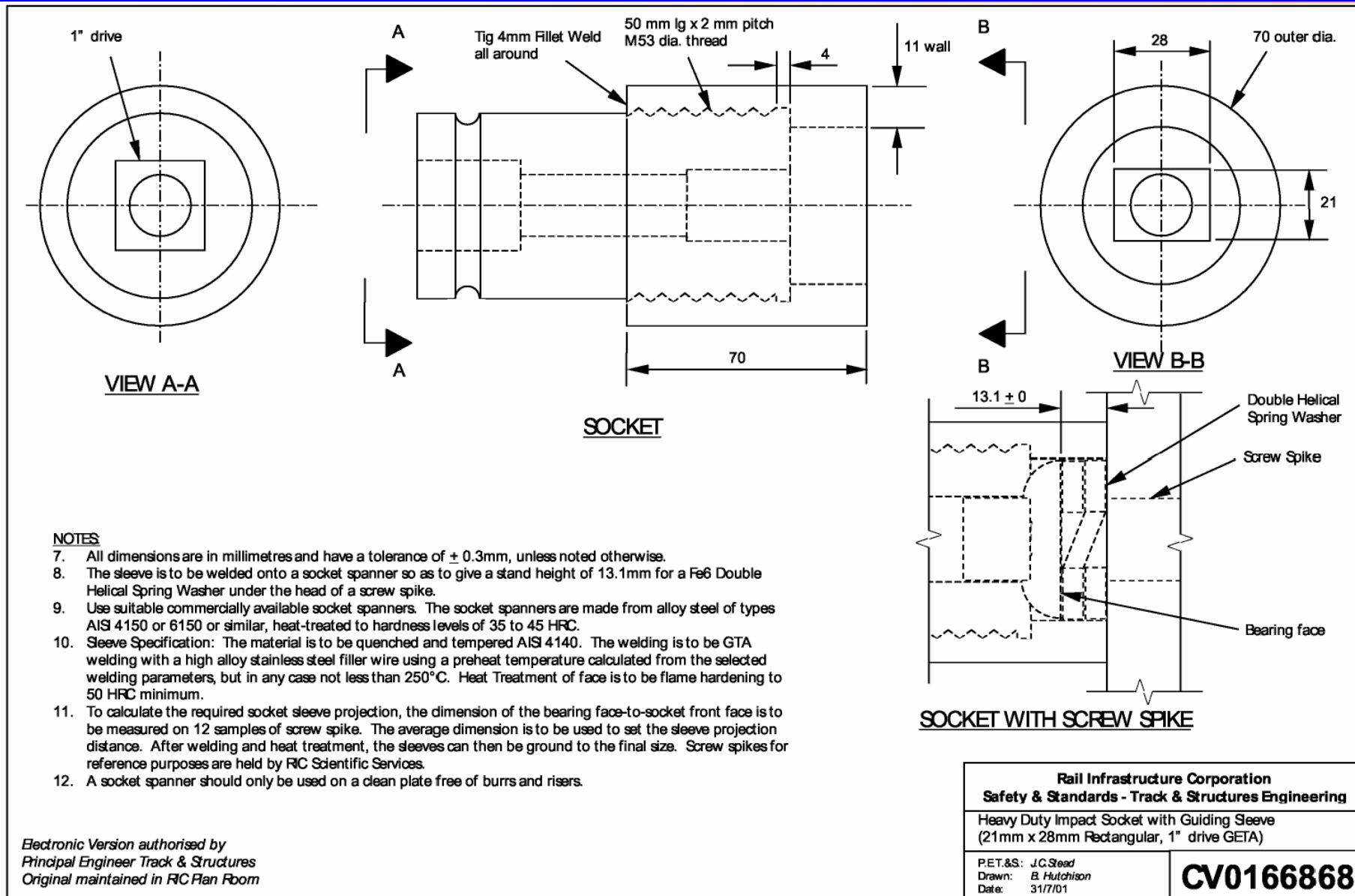
Rail Brace Plates and slide Chairs are “Huck Bolted” to the Stock Rail as shown in the Attachment.

Components and their Stock Code Numbers, appropriate description and reference to relevant technical standards are provided in Attachment 2 of this document.

## 4 Attachments

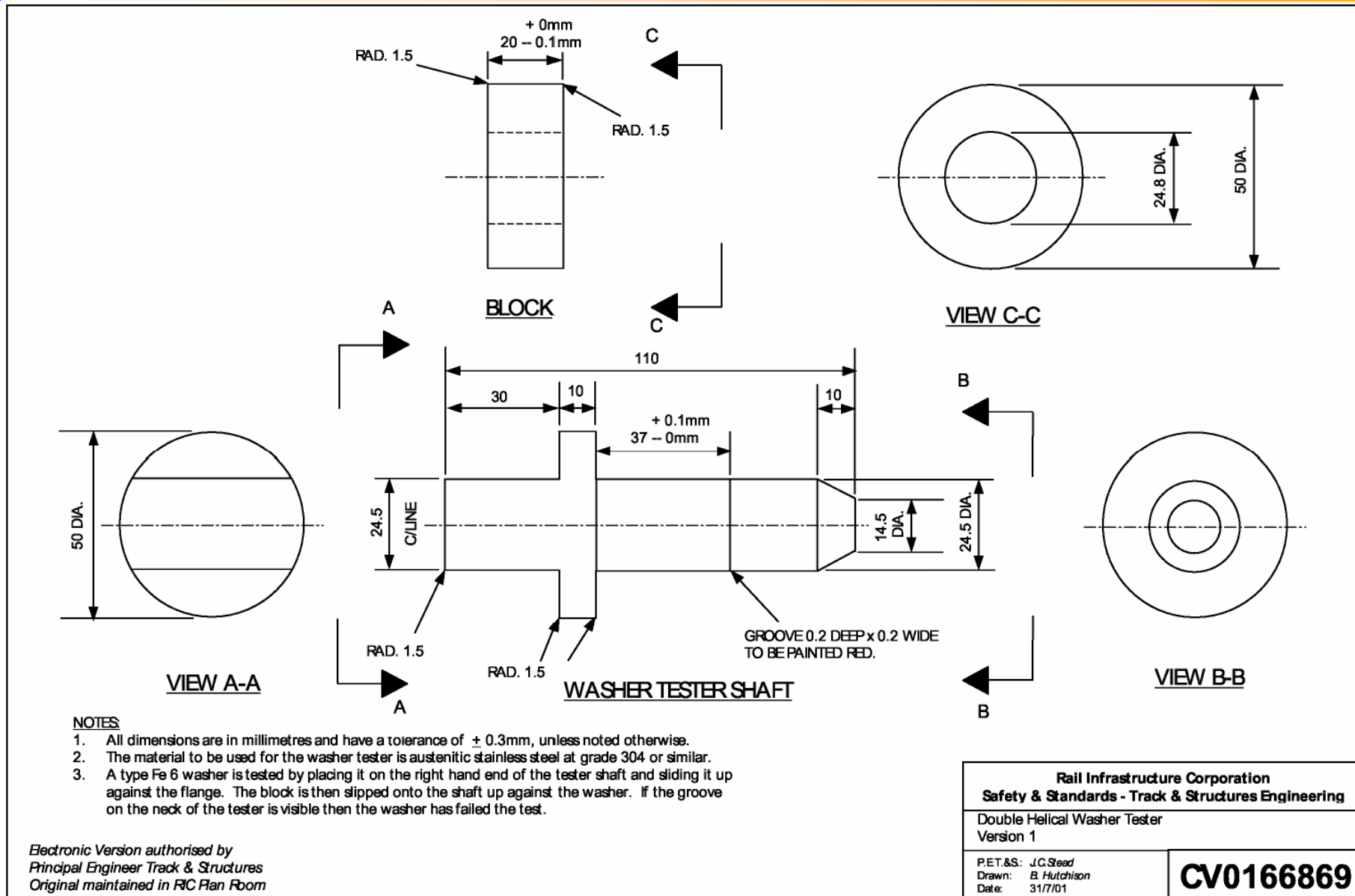
- CV0166867 Heavy Duty Impact Socket with Guiding Sleeve (Hexagon)
- CV0166868 Heavy Duty Impact Socket with Guiding Sleeve (21mm x 28mm Rectangular 1" Drive GETA)
- CV0166869 Double Helical Washer Tester (Version 1)
- CV0166870 Double Helical Washer Tester (Version 2)

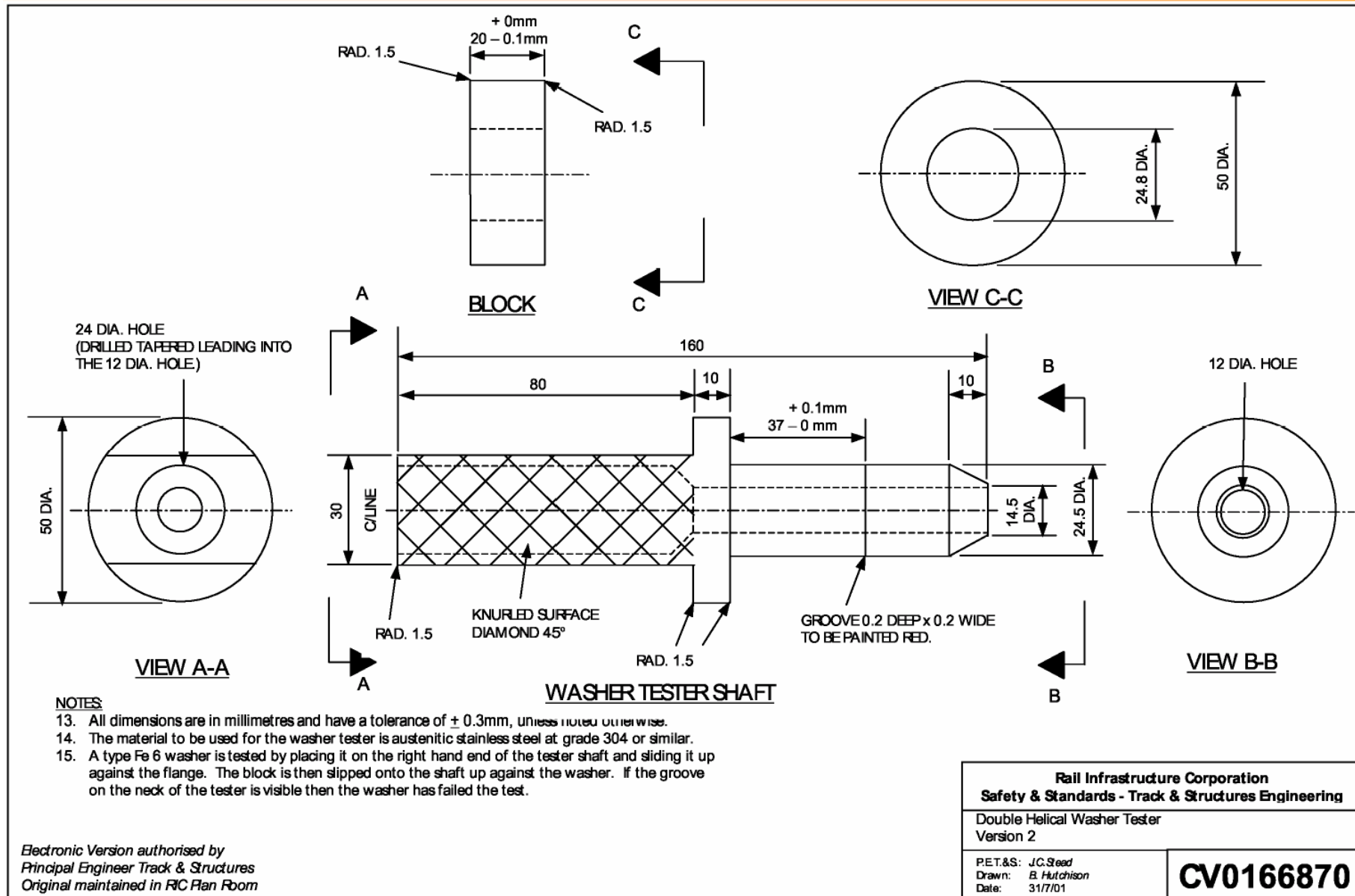




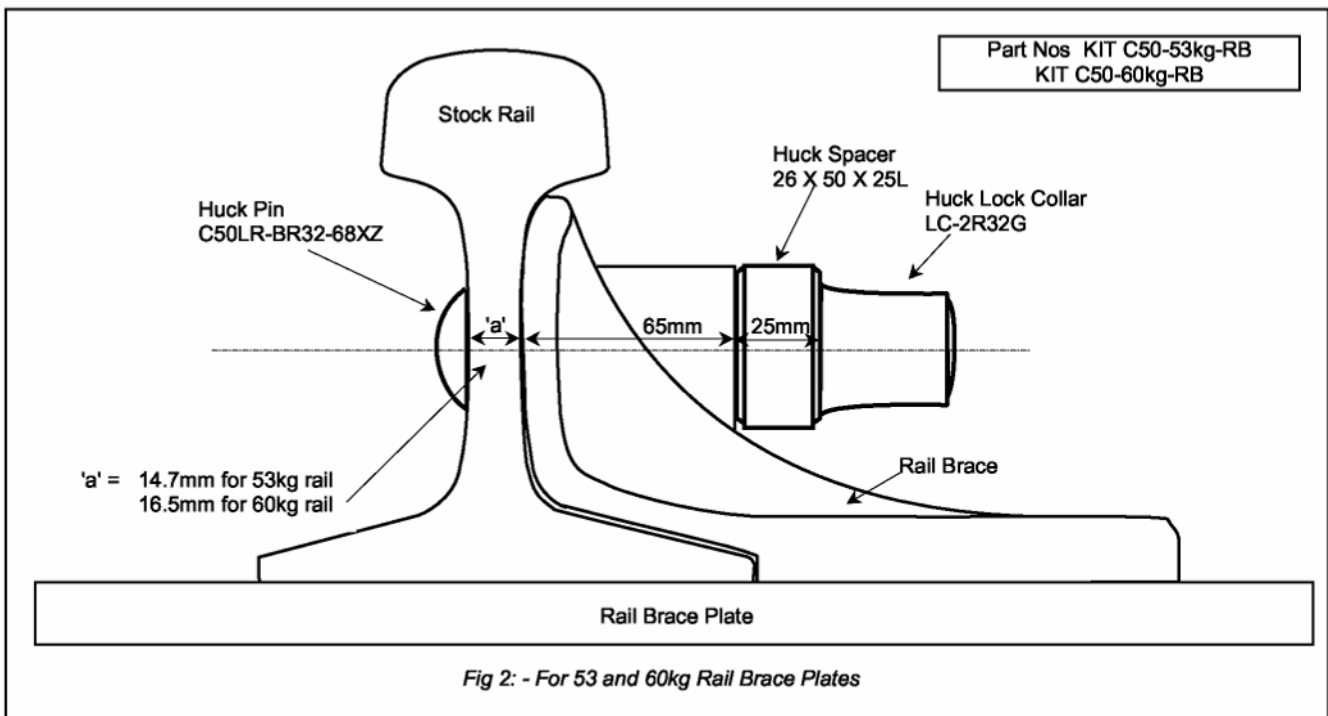
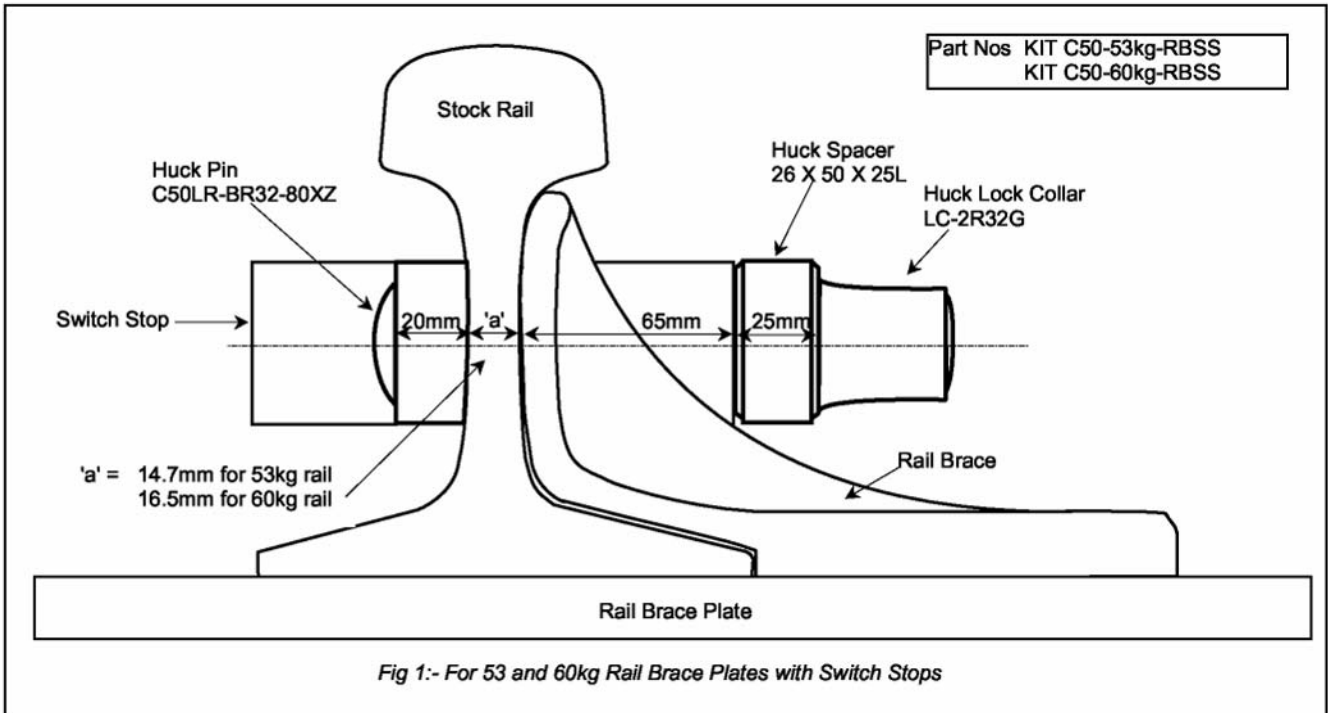
Electronic Version authorised by  
Principal Engineer Track & Structures  
Original maintained in RIC Plan Room



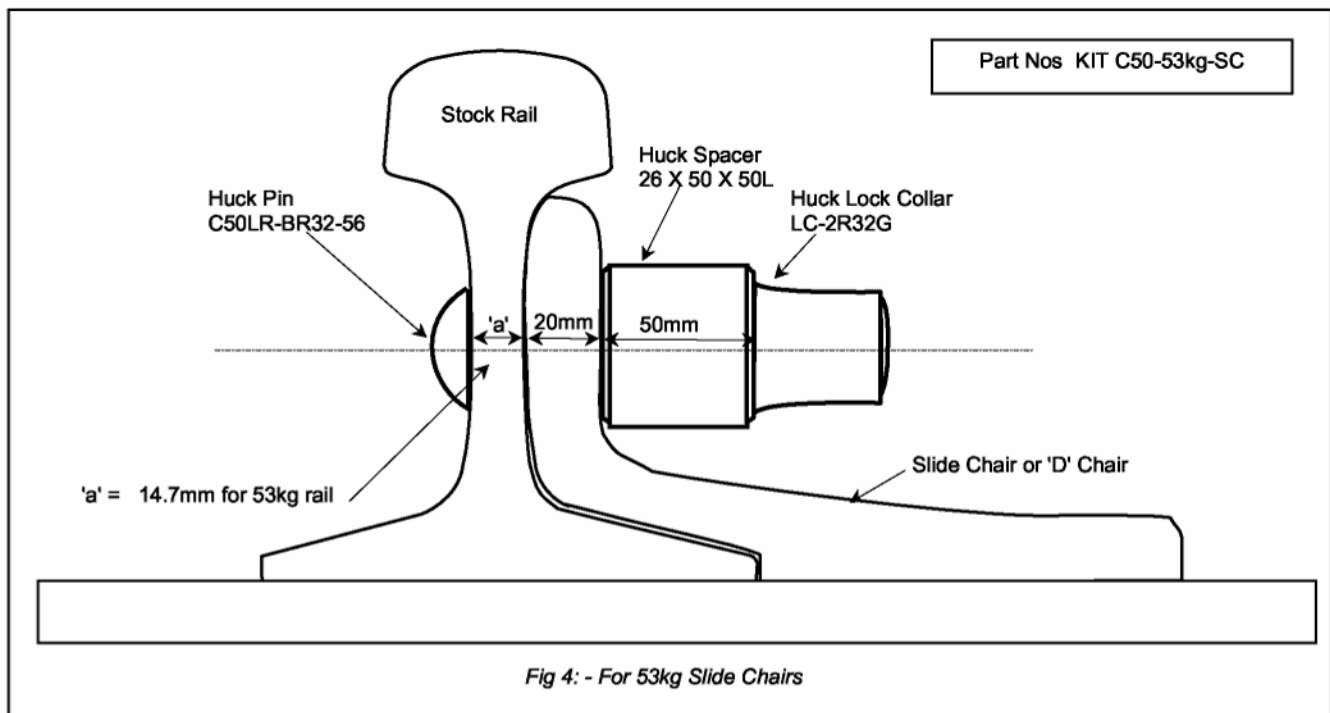
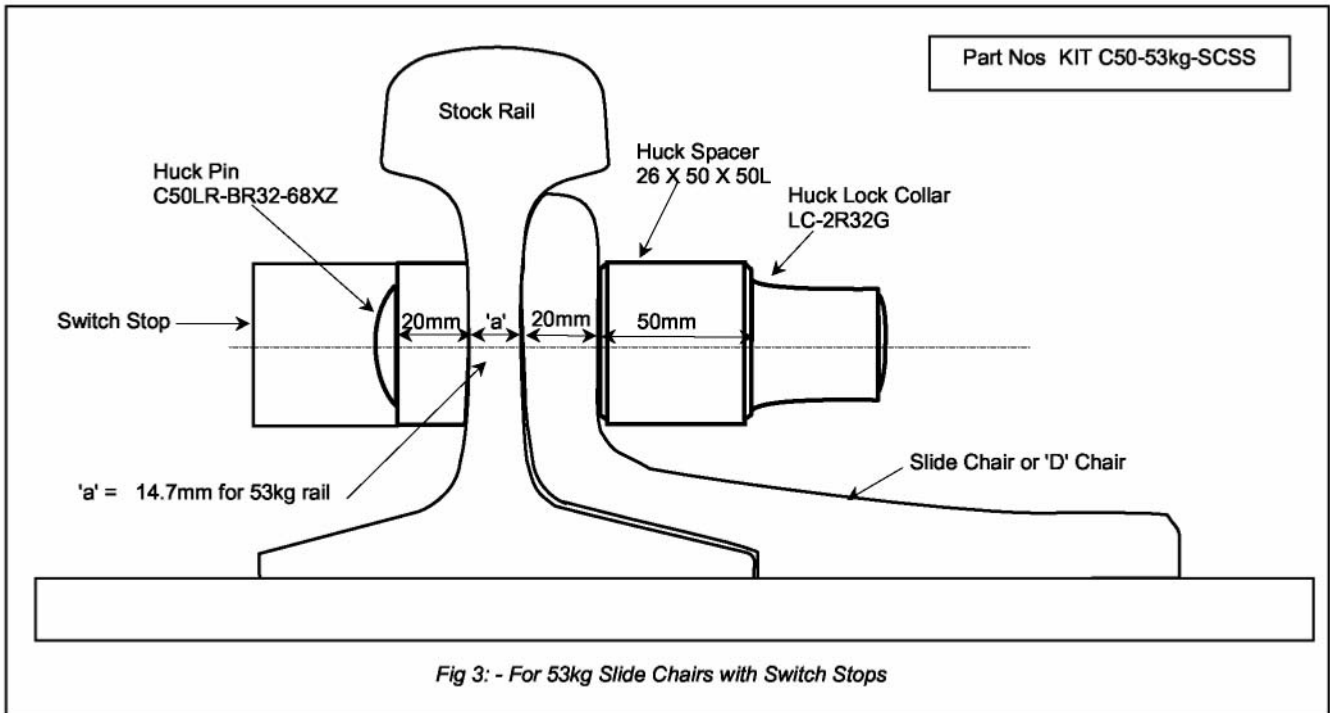




Attachment 1



Attachment 1 (cont'd)



Attachment 2

<b>Alternative 1 – Hexagon head Rail Brace bolts</b>		
<b>S/CODE</b>	<b>ITEM NAME</b>	<b>DESCRIPTION</b>
1877232	BOLT, BRACE	M24 X 120MM LG; 54MM THREAD; GDE 8.8; HEX HD TO AS1252; C/W HEX NUT TO AS1252 (1996)
1877240	BOLT, BRACE	M24 X 120MM LG; 50MM THREAD; GDE 8.8; HEX HD TO AS1252; C/W HEX NUT TO AS1252 (1996)
1887231	BOLT, BRACE	M24 X 125MM LG; 59MM THREAD; GDE 8.8; HEX HD TO AS1252; C/W HEX NUT TO AS1252 (1996) & 10MM SPRING WASHER TO AS 1085.7

<b>Alternative 2 - Swage rail brace kits</b>				
<b>S/CODE</b>	<b>ITEM NAME</b>	<b>DESCRIPTION</b>	<b>HUCK PART No</b>	<b>APPLICATION</b>
1881283	BOLT KIT	SWAGE TYPE; RAIL BRACE KIT C/W 1" Pin C50LR-BR32-80XZ, 1" Lock Collar & 26x50x25L & Spacer (Huck Dwg MI 0045)	KITC53-60kg-RBSS	RB to 53kg & 60kg Stock Rail & Switch Stop (See Fig 1)
1881309	BOLT KIT	SWAGE TYPE; RAIL BRACE KIT C/W 1" Pin C50LR-BR32-68XZ, 1" Lock Collar & 26x50x25L & Spacer (Huck Dwg MI 0045)	KITC53-60kg-RB	RB to 53kg & 60kg Stock Rail Only (See Fig 2)
1881325	BOLT KIT	SWAGE TYPE; RAIL BRACE KIT C/W 1" Pin C50LR-BR32-56, 1" Lock Collar & 26x50x50L & Spacer (Huck Dwg MI 0044)	KITC50-53kg-SC	Slide Chair to 53kg Stock Rail Only (See Fig 4)
1881333	BOLT KIT	SWAGE TYPE; RAIL BRACE KIT C/W 1" Pin C50LR-BR32-68XZ, 1" Lock Collar & 26x50x50L & Spacer (Huck Dwg MI 0044)	KITC50-53kg-SCSS	Slide Chair to 53kg Stock Rail & Switch Stop (See Fig 3)