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Fixed Stretcher Bars

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Issue record

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1	March 2015	First Issue

Compliance

This Network Rail standard is mandatory and shall be complied with by Network Rail and its contractors if applicable from 07 March 2015.

When this standard is implemented, it is permissible for all projects that have formally completed GRIP Stage 3 (Option Selection) to continue to comply with the issue of any relevant Network Rail standards current when GRIP Stage 3 was completed and not to comply with requirements contained herein, unless stipulated otherwise in the scope of this standard.

Reference documentation

NR/SMS/PF01

TEF3099

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1 Purpose

This module contains information to support the installation and maintenance of fixed stretcher bars.

2 Scope

This Network Rail module applies to fixed stretcher bar assemblies and their associated fastenings and defects, which are fitted to the following configurations:

- full depth vertical AV to HV switches and full depth inclined A to G switches, of BR 109, BS110A, BS113A or CEN56 rail section, including plain leads, slips and switch diamonds in running lines with fixed stretcher bar assemblies.
- deep brackets
- stretcher bars on bull head rail
- stretcher bars on non-running lines

This document does not apply to:

- shallow depth S&C
- Installation of adjustable stretcher bars (see NR/L2/TRK/6100/mod06)
- Installation of tubular stretcher bars (see NR/L2/TRK/6100/mod04)
- Installation of Lock stretcher bars (see NR/L2/TRK/6100/mod07)
- train operated points
- spring points
- trapping direction of trap points

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3 Introduction to Fixed Stretcher Bars

There are two different designs of fixed stretcher bars available. The older design is black and incorporates imperial-sized fastenings.



Figure 1 – Fixed black stretcher bar example

In 2008 an enhanced fixed, yellow, stretcher bar assembly conforming to RE/PW/721, incorporating hard lock fastenings was introduced. It is designed to be fitted to full-depth, flat bottom S&C in running lines.



Figure 2 – Fixed yellow stretcher bar example

It is permitted to install Yellow fixed stretcher bar assemblies to the following full-depth, flat bottom S&C layouts in running lines:

- a) CEN56 Plain Leads
- b) 109/110A Plain Leads
- c) 109/110A Switch Diamonds
- d) 109/110A Slip Switches

It is permissible to use the older, black, stretcher bar assemblies for fixed stretcher bars attached to:

- a) bull head switches,
- b) S&C in non-running lines and
- c) stretcher bars requiring the use of deep brackets,

Black fixed stretcher bar installations need to conform to the appropriate RE/PW drawings and use non-hard lock fastenings, detailed in clause 4.4 of this module. These stretcher bar assemblies are installed as specified in Section 7.

	Bull Head	Full Depth Flat Bottom S&C in non-running lines	Deep brackets	S&C in non-running lines
Black Stretcher	✓	✓	✓	✓
Yellow Stretcher		✓		

Table 1 – Layouts and permitted Fixed Stretcher Bar types

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3.1 Fixed yellow stretcher bar assembly

The fixed stretcher bar assembly consists of a sprung steel stretcher bar, the stretcher bar brackets, insulations and all fastenings, including those to the switch rails.

Fixed yellow stretcher bar assemblies are used for plain leads with BR109 and BS110A rail, and all full depth, flat bottom slip switches. They are supplied in the following sizes:

- The No. 1 type (1.65 m long), is fitted in the first bay nearest to the toe. It has a kicking strap to prevent the switch toe rising.
- The No. 2 type, is a shorter version (1.18 m long). It is fitted to all subsequent positions.

In existing switch diamond installations where the soleplate insulation position matches that of stretcher bar with an off-centre insulation, No.1 and No.2 type stretcher bars are installed in combination with two further stretcher bar types:

- The No. 3 type, which contains the insulation (goose neck) in the centre of the bar, and is fitted in the first bay nearest the toe on switch diamonds with RCPL. It has a kicking strap to prevent the switch toe rising.
- The No. 4 type, which contains the insulation (goose neck) in the centre of the bar, and is fitted to all subsequent positions on switch diamonds with RCPL. Stretcher bars with central insulation are used on switch diamonds with RCPL and those which form part of a slip switch diamond.

Further details of switch diamond installations see clause 5.4

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4 How to select the correct components

This section specifies the approved fastenings, drive lugs, rail web shims, torque settings and installation requirements for fixed stretcher bars used with:

- Plain leads in BR109 / BS110A rail (6.4)
- Slip switches and switch diamonds on CEN56 / BS113A (6.3)
- Slip switches and switch diamonds on BS110A and BR109lb rail (6.5)

4.1 Fastenings

4.1.1 Yellow stretcher bar approved fastenings

Table 2 specifies the approved fastenings and torque settings for fixed stretcher bars (RE/PW/721 "yellow" bars). These fastenings are used for all installations of fixed stretcher bars utilising metric fastenings.

Connection	Fastening details	Torque setting
Stretcher bar bracket to switch rail	<ul style="list-style-type: none"> • M20 X 80 Grade 8.8 bolt • head retaining plate type A* • plain washer • a pair of Hard Lock nuts <p><i>* Head retaining plate is not installed on the front stretcher bar or any stretcher bar where convex or tapered shims are fitted between the switch rail and stretcher bar bracket.</i></p>	<p>At installation: Lower male nut - 250Nm. Upper female nut - 250Nm.</p> <p>Each NR/SMS/PF01 Service A: Check tighten the upper female nut - 200Nm</p>
First stretcher bar bracket to switch rail with clamp lock (Plain Leads and single slips only)	<ul style="list-style-type: none"> • M20 X 110** Grade 8.8 bolt • plain washer • A pair of Hard Lock nuts. <p><i>** 120mm bolt to be used where packings are fitted.</i></p>	<p>At installation: Lower male nut - 250Nm. Upper female nut - 250Nm.</p> <p>Each NR/SMS/PF01 Service A: Check tighten the upper female nut - 200Nm</p>
Stretcher bar bracket to stretcher bar	<ul style="list-style-type: none"> • M20 X 100*** Grade 8.8 bolt, • head retaining plate type A, • plain washer with • a pair of hard lock nuts • 15mm spacer block <p><i>*** 90mm bolt when used with lug specified on BRSSM522.</i></p> <p><i>Where drive/detector lugs are incorporated in this arrangement, see clause 4.3</i></p>	<p>At installation: Lower male nut - 250Nm. Upper female nut - 250Nm.</p> <p>Each NR/SMS/PF01 Service A: Check tighten the upper female nut - 200Nm</p>
Stretcher bar insulation (Goose neck). <i>For new assemblies this connection is shop-fabricated.</i>	<ul style="list-style-type: none"> • M20 X 100 Grade 8.8 bolt, • head retaining plate type B, • plain washer with a pair of hard lock nuts • 15mm nut washer plate. 	<p>At installation: Lower male nut - 250Nm. Upper female nut - 250Nm.</p> <p>Each NR/SMS/PF01 Service A: Check tighten the upper female nut - 200Nm</p>

Table 2 – Approved fastenings for Yellow Stretcher Bars

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4.1.2 Hard Lock Fastenings

Only the approved fastenings specified in Table 2 are to be used to replace a fastening. They shall be checked before use and discarded if there are any signs of damage, rust or dirt.

Hard lock fastenings may be re-used provided that:

- when they are finger-tightened to engage the interlocking cones, there is a clear gap between the surfaces of the nuts
- The female nut rotates at least half a turn between finger tightness and being tightened to 250Nm.

NOTE Due to manufacturing tolerances on the bolts, there may be a gap of 0 - 2 mm visible between the hard lock nuts when tightened to the correct torque.

Hard lock nuts are used in pairs consisting of a “lower male” nut and an “upper female flanged” nut.

Hard lock nuts are not used in a single nut assembly.

All bolts for use with Hard Lock fastenings in fixed stretcher bar assemblies shall be 20 mm diameter, with metric thread and Grade 8.8 (as marked on the bolt head).

NOTE The 80mm bolt has a reduced thickness head (12mm reduced to 10mm) to provide clearance between switch and stock rail webs at No. 1 stretcher bar position.

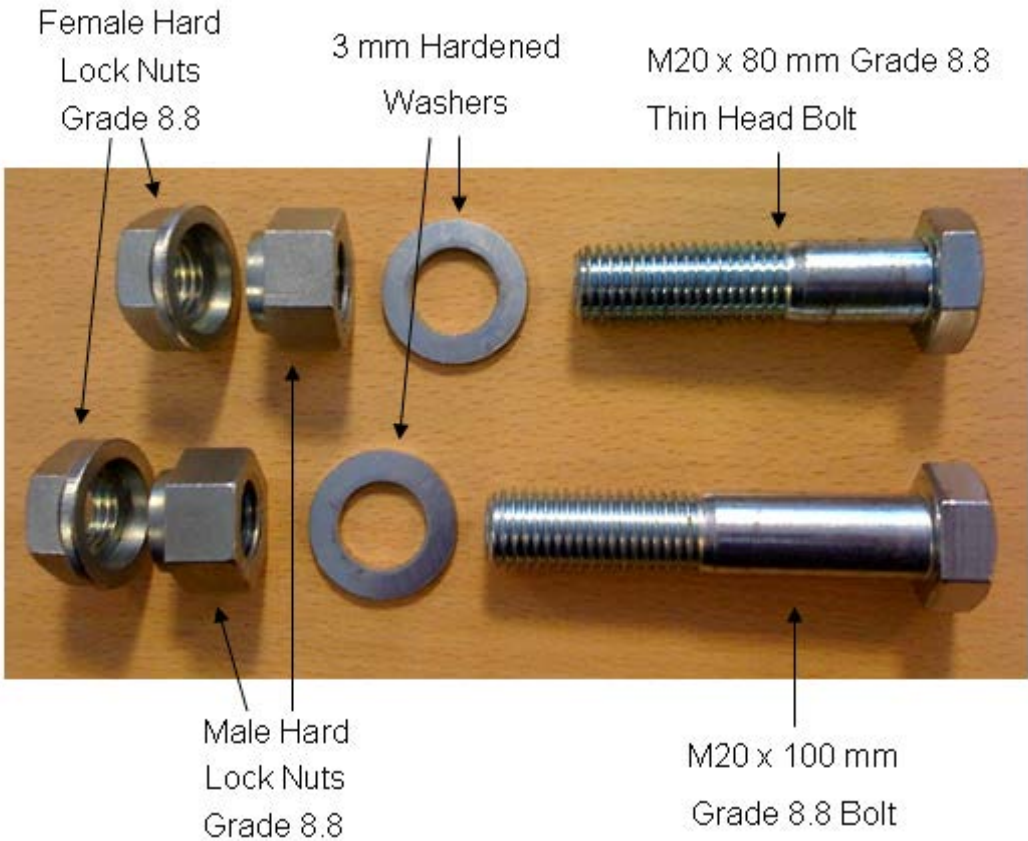


Figure 3 – M20 Grade 8.8 bolts and hard lock fastenings

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4.1.3 Imperial fastenings for use with black fixed stretcher bars

The following fastenings are used for:

- all installations of fixed stretcher bars using imperial fastenings (that is with black bars) attached to bull head or non-running line S&C
- Fixed stretcher bar assemblies incorporating deep brackets.

Switch rail to bracket connection:

- 2 $\frac{3}{4}$ " BSW diameter square headed bolts $2\frac{1}{2}$ " long, secure with square headed nuts and new spring washers as shown in Figure 10

Bracket to stretcher bar connection (without drive lug):

- 2 $\frac{13}{16}$ " BSW diameter square headed bolts $2\frac{1}{2}$ " long, secure with square headed nuts and new spring washers as shown in Figure 10;

Bracket to stretcher bar connection (with drive lug):

- 2 $\frac{13}{16}$ " diameter x $3\frac{1}{4}$ " square headed shoulder bolts, secure with square headed nuts and new spring washers.

Stretcher bar insulated joint (Goose neck):

- 2 $\frac{3}{4}$ " BSW diameter square headed bolts 3" long, secure with square headed nuts and new spring washers.



Figure 4 – $\frac{3}{4}$ " diameter square headed BSW

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4.2 Stretcher bar insulation (goose neck) fastenings

Pre-assembled yellow fixed stretcher bars are supplied with the goose neck insulated joint.

The fixings used are:

- 2 M20 X 100mm Grade 8.8
- Type B bolt head retaining plate
- spacer plate
- plain washer
- A pair of hard lock nuts.



Figure 5 – The assembled goose neck connection fitted with hard lock fasteners

4.3 Supplementary drive lugs

The interface between the stretcher bar and the points operating equipment (POE) is via drive connection lugs. A supplementary drive lug is fixed to one end of the stretcher bar assembly, typically the same side as the POE is mounted.

There are 3 different supplementary drive lugs which can be installed, depending on the type and location of the POE and supplementary back drive.

4.3.1 BRS SM336

The BRS-SM 336 drive lug is the most commonly used drive lug. It was modified in 2008 to include slots in the bracket and a head retention plate.