

SRI LANKA RAILWAY STORES - SPECIFICATION

FOR STEEL FISH PLATES FOR 80 LBS. 88 LBS. & 90(A) LBS. RAILS
AND JUNCTION FISH PLATES FOR 88/90A, 80/90A & 60E1/90A LBS. RAILS**1 Scope**

This Part of BS 47 specifies the chemical composition and tensile property requirements for the steel used, and the dimensions and tolerances of rolled steel fishplates intended for use with railway rails of linear mass equal to or greater than 24.8 kg/m (50 lb/yd).

The provisions of this specification are not restricted to fishplates for use with rails that comply with BS 11 and may be applied to fishplates for any rail section of 24.8 kg/m (50 lb/yd) or greater linear mass.

NOTE 1. Whilst this standard does not specify requirements for forged or cast fishplates some of its provisions may be applied to such products where appropriate.

NOTE 2. Recommended batch inspection procedures are described in appendix A. The section properties are given for information in appendix B. Information to be supplied by the purchaser is given in appendix C.

NOTE 3. The titles of the publications referred to in this standard are listed on the inside back cover.

2 Manufacture**2.1 Manufacture of steel**

The source of the steel and the steelmaking process shall be the responsibility of the manufacturer of the fishplates. If requested by the purchaser at the time of enquiry the manufacturer shall describe the source of steel supply and the steelmaking and casting processes employed. The manufacturer shall not alter these without the agreement of the purchaser.

2.2 Manufacture of fishplates

The fishplates shall be manufactured from a hot rolled section, cut to length and holed in accordance with clause 9.

Sufficient crop shall be taken to ensure that end defects are removed.

The rolling and fishplate finishing processes shall be the responsibility of the manufacturer. If requested by the purchaser at the time of enquiry or order the manufacturer shall describe the rolling and fishplate finishing processes employed. The manufacturer shall not alter these without the agreement of the purchaser.

3 Chemical composition

When tested in accordance with clause 11 the chemical composition of the steel shall comply with the limits given in table 1.

In the event of dispute, analyses shall be carried out by the appropriate methods described in BS 6200 and BSI Handbook No. 19.

NOTE. The chemical composition and mechanical property requirements of grade 080M40 or grade 080M36 of BS 970 : Part 1 : 1983 may be specified by the purchaser.

4 Dimensions and properties

Dimensions and properties for all fishplates shall be in accordance with table 2 (see also figures 1 and 2). In addition, dimensions and properties for all fishplates ordered for use with a BS rail section number shall be in accordance with the values in

SLR DRG Nos. 23424, 19774 A, 19774 B, 22822 A & 22822 B (see also figure 3)

NOTE 1. With the exception of the fishplate for the 113A rail, all fishplates were designed in imperial units. The drawings for these fishplates are therefore shown in imperial units. For the convenience of users some data are also shown in metric units.

NOTE 2. The section properties are given for information in appendix B.

5 Marking

Brand marks shall be rolled in relief in such a position, clear of the bearing of the fishbolt head and nut, that the following information can be seen when the fishplate is fixed in position:

- (a) the identity of the rail section to which the fishplate belongs;
- (b) the identification mark of the manufacturer;
- (c) the last two figures of the year of manufacture.

Each element of the brand mark shall be separated by a hyphen of minimum length 0.7 times the height of the brand letters and numbers.

Example

BS 95 R - X & Co - 90

Table 1. Chemical composition

	Carbon	Silicon	Manganese	Phosphorous	Sulphur
	% by mass	% by mass	% by mass	% by mass	% by mass
Ladle analysis	0.30 min. 0.45 max.	0.35 max.	0.90 max.	0.05 max.	0.05 max.
Product analysis	0.27 min. 0.48 max.	0.38 max.	0.94 max.	0.058 max.	0.058 max.

6 Tensile properties

When tested in accordance with clause 12 the tensile strength and elongation of the steel shall comply with the following.

Tensile strength	Minimum elongation (Gauge length $5.65 \sqrt{S_0}$)
N/mm ²	%
600 $\pm$ 50	18

where

S_0 is the cross-sectional area of the test piece (in mm²).

NOTE. Where the purchaser specifies the use of a grade of steel complying with BS 970 : Part 1 then the associated tensile property requirements of this grade are applicable (see clause 3).

7 Templates and working gauges

The manufacturer shall make available to the purchaser a set of clearly identified master templates, internal and external, for the section of fishplate ordered and shall obtain the purchaser's approval of them before rolling of the fishplate section begins. The master templates shall be made available on request for the checking of working gauges.

In addition to the master templates, the manufacturer shall make available go and no-go working gauges incorporating the dimensional tolerances given in table 2.

NOTE. The same master templates may be used by several purchasers (see item (b) of appendix C).

8 Freedom from defects

Fishplates shall be free from manufacturing defects adversely affecting their performance in service.

No manufacturing operations shall be carried out with the object of concealing defects.

NOTE. Minor surface defects may be removed using a method approved by the purchaser.

9 Finishing

9.1 Straightness

The straightening operation shall be carried out with gradual pressure and without impact.

9.2 Fishplate length

The significantly rolled bars used shall be cut to length by any suitable method which does not deform the section or change the properties of the steel. Each cut shall be clean and free from burrs.

9.3 Bolt holes

One or more of the following methods shall be used for producing the holes:

- drilling;
- hot punching;
- machining.

All necessary precautions shall be taken to ensure that the fishing surfaces are not significantly deformed or the steel impaired. The dimensions of the hole shall remain within the tolerances given in table 2.

Burrs resulting from these operations shall be removed.

10 Tolerances

The tolerances of rolled bar and finished fishplate shall comply with table 2.

11 Chemical analysis

11.1 Ladle analysis

The chemical composition of each cast of steel shall be determined by representative ladle analysis and shall comply with the requirements of clause 3. If the result of the ladle analysis does not comply, all fishplates from that cast or part cast shall be deemed not to comply with this standard, subject to the provisions of 11.2.

NOTE. Determination may be made chemically, spectrographically or by other accepted modern instrumental methods.

11.2 Product analysis

Should the result of the ladle analysis fail to comply with the requirements of clause 3, or should the purchaser require it (see item (d) of appendix C) the manufacturer shall make tests on two separate product samples from the cast or part cast.

If the results of these tests comply with the product analysis requirements in clause 3 the cast or part cast shall be accepted. If one or both of the test pieces fail, the cast or part cast shall be rejected.

12 Tensile tests

12.1 Method of test

The manufacturer shall determine the tensile properties of the steel in accordance with BS 18 using a standard circular cross section tensile test piece.

12.2 Number of tests

One tensile test shall be carried out on each type of fishplate per cast for casts of 50 tonnes or less. For larger casts, one test shall be carried out for each additional 50 tonnes or part thereof.

12.3 Test pieces

The test pieces shall be cut with longitudinal axes in the rolling direction and taken in the area adjacent to one of the fishing surfaces without, however, touching it. Cutting and finishing shall be carried out entirely in the cold state, by means of machine tools and without any hammering, cold deformation, hardening or annealing (see BS 18).

12.4 Retests

If the sample part selected for the test, from the batch corresponding to a cast or part cast, does not satisfy the conditions laid down, two retests from the same batch shall be carried out. If one or both of the retests is not satisfactory the corresponding batch does not comply with this standard.

NOTE. Non-complying batches may be subjected to rectification operations and further testing only after receipt of the purchaser's approval.

13 Manufacturer's tests and certificate

The manufacturer shall be responsible for the supply, preparation and testing of test pieces.

The manufacturer shall supply the purchaser with certificates showing the source and method of steelmaking/casting used and the results of the mechanical and chemical tests.

14 Inspection

The manufacturer shall inspect all batches of fishplates and ensure that they comply with this Part of BS 47. All non-conforming batches shall be clearly marked.

NOTE 1. Recommended inspection procedures are described in appendix A.

The inspection or quality assurance system to be applied shall be defined at the time of enquiry or order (see item (c) of appendix C) and shall be based on one of the following.

(a) The purchaser shall require the manufacturer to take responsibility for quality assurance based on a procedure in compliance with BS 5750.

(b) Alternatively, the purchaser shall be advised in advance by the manufacturer of the dates of rolling, of sample selection and of mechanical testing of the test pieces to enable the purchaser to witness these procedures. The purchaser shall also be advised by the manufacturer of the availability of the finished product for inspection.

The purchaser shall have access during working hours to observe the manufacturing process and to inspect the finished product.

NOTE 2. Any batches which do not comply should be sorted before submission for the purchaser's inspection.

Appendices

Appendix A. Batch inspection procedure

A.1 General

The fishplates should be grouped into batches of the same kind.

Inspection should be carried out by random sampling from the batches.

The selected samples should be marked and these marks should be kept intact until the end of inspection.

One of the sampling procedures described in A.2, A.3 and A.4 should be used to define the acceptable levels of quality and risks and the size of the batch and of the sample.

A.2 BS 6001

The relevant tables of BS 6001 should be stated by the purchaser.

A.3 A sampling programme according to the Wald method

This design is shown in figure 24 with the resubmitted batch sampling diagram in figure 25.

The risks with this method are as follows:

- (a) a 5 % maximum probability of the rejection of a batch containing no more than 5 % of faulty parts;
- (b) a 5 % maximum probability of the acceptance of a batch containing not less than 15 % of faulty parts.

The test shall be terminated as soon as the point representing the progress of the check enters the acceptance or rejection area.

A.4 A sampling programme designed and detailed by the purchaser

This programme should state:

- (a) the batch size;
- (b) the sample size;
- (c) the maximum percentage of rejected plates in the sample which will permit the batch to be accepted;
- (d) the percentage of rejected plates in the sample which will cause the batch to be inspected on an individual plate basis;
- (e) the retest programme for batches where the percentage of rejected plates in the sample falls between the reject/accept percentage (where applicable).

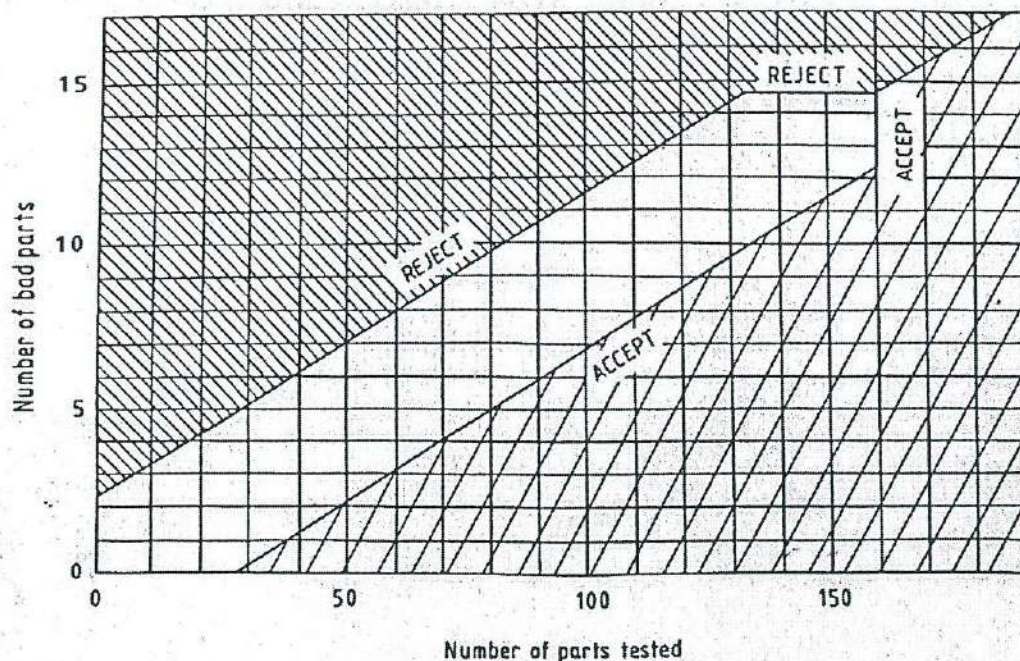


Figure 24. Progressive sampling plan — Wald method (see appendix A)

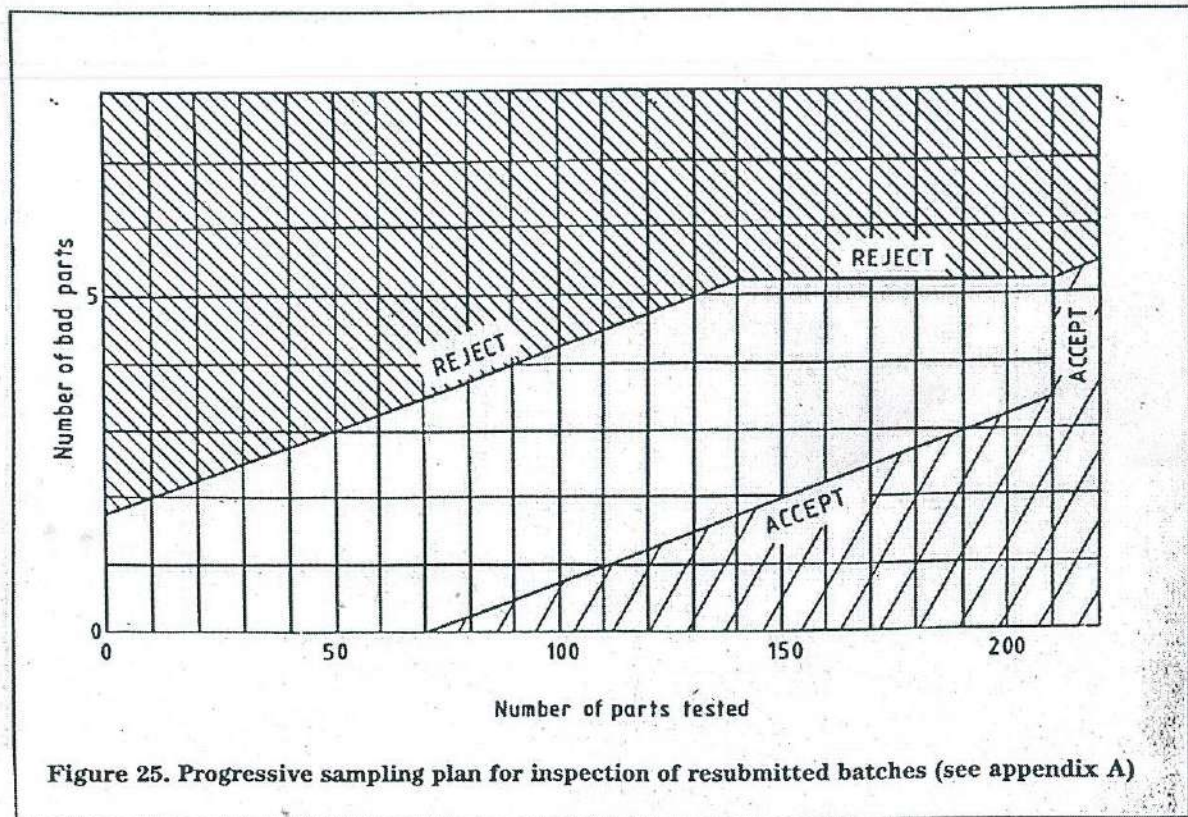


Figure 25. Progressive sampling plan for inspection of resubmitted batches (see appendix A)

Appendix B. Holing of rails to BS 11; dimensions of fishbolts and nuts to BS 64 and section properties of fishplates

B.1 For details of the holing of rails see BS 11 and for the dimensions of fishbolts and nuts see BS 64.

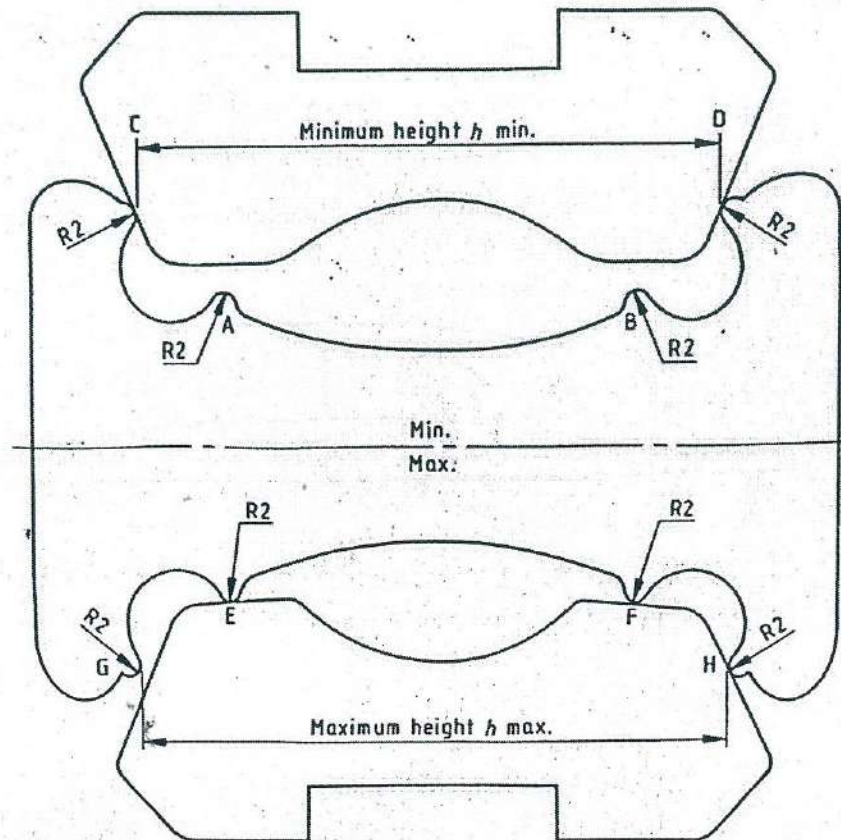
B.2 The areas, calculated masses and properties for rolled steel fishplate bar and finished fishplates are shown in imperial units in table 5 and in metric units in table 6 for information.

NOTE. The section masses quoted in this standard have been determined by multiplying the section area in mm^2 by 0.007 85 to give the mass in kg/m or by multiplying the section area in in^2 by 10.209 to give the mass in lb/yd.

Appendix C. Information to be supplied by the purchaser of the fishplates

When placing an order for fishplates complying with this standard the purchaser should state:

- (a) details of fishplate section and holing (see clause 4);
- (b) whether or not new templates and working gauges are required (see clause 7);
- (c) the method to be used for producing the bolt holes (see 9.3);
- (d) whether product analysis is required (see 11.2);
- (e) the procedure to be used for inspection (see clause 14).



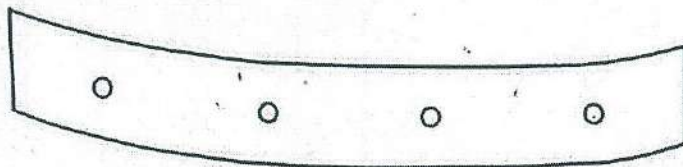
The height of the fishplate is to be checked along a vertical line which passes through the centre point of the upper fishing surface of the fishplate.

For checking height h :

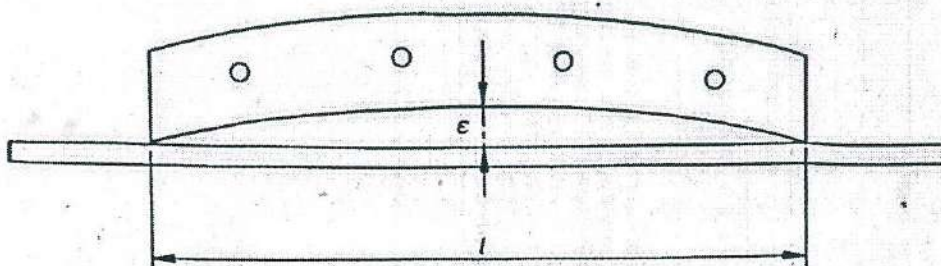
Minimum: if both stops A and B touch the vertical part of the fishplate and the gap between C or D and the fishplate is greater than 0.05 mm (0.002 in) the fishplate is deemed to be under the minimum height of h min.

Maximum: if both stops G and H touch the fishplate and the gap between E or F and the vertical part of the fishplate is greater than 0.05 mm (0.002 in) the fishplate is deemed to be in excess of the maximum height h max.

Figure 1. Referee gauge for checking fishplate height (h)

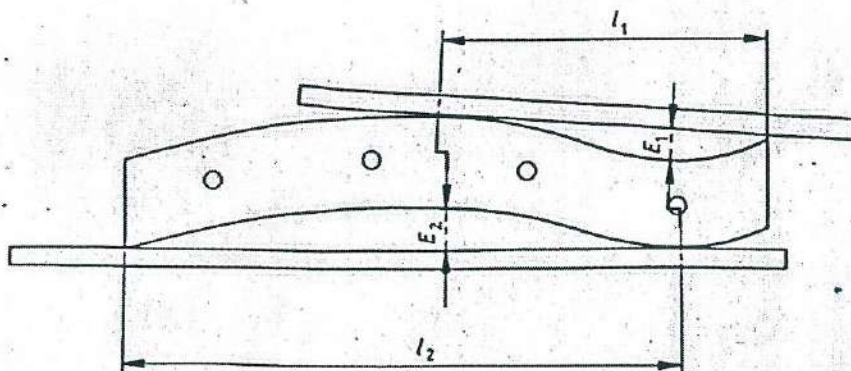


(a) Unacceptable deformation (centre lower than ends)



(b) Limiting deformation (centre higher than ends). The maximum deviation is 0.1 % of the fishplate length.

$$\epsilon \leq 0.1 \% \text{ of } l$$



(c) Limiting compound deformation. The maximum deviations permitted are 0.1 % of the chord lengths (l_1 and l_2).

$$\epsilon_1 \leq 0.1 \% \text{ of } l_1 \text{ and } \epsilon_2 \leq 0.1 \% \text{ of } l_2$$

Figure 2. Method for checking longitudinal straightness in a vertical direction

Table 2. Dimensional and finished tolerances

Dimensions		Tolerances	Method of checking
Height h of the fishplate (height at the check point selected)	mm	mm	Figure 1
	$H < 165$ $165 \leq H < 189$ $180 \leq H < 190$ $190 \leq H$ Where H is the height of the matching rail (defined as A in figure 4 of BS 11 : 1985).	± 0.5 ± 0.7 ± 0.8 ± 1.0	
Diameter of bolt holes (see note 1)	$\phi \leq 32$ $\phi > 32$	± 0.5 ± 1.0	
Position of bolt holes	The position of the holes shall enable the fishplate to be mounted on a gauge with cylindrical pins, consisting of a piece of rail to nominal section, and in the body of which are fixed a number of cylindrical pins corresponding to the holes in the fishplate. The vertical height and longitudinal spacing of the pin centres shall conform with the nominal bolt hole centres shown in figure 3 and tables 3 and 4 of this standard or the agreed purchaser's drawing. The pins shall have a diameter 1 mm less than the diameter of holes ≤ 32 mm and 2 mm less than the diameter of holes > 32 mm. When the rail and the fishplates are brought together, all the pins shall engage simultaneously in the holes.		
Straightness for fishplates supplied in rolled bars	On the flat: 1 mm/m The total deflection on the rolled bar length shall not exceed 0.4 % of the length		Checked by 1 m straightedge
Straightness for fishplates supplied as units	Vertical direction: 0.1 % of the chord length. Centre should not be lower than the ends Horizontal direction: 0.16 % of the length		Figure 2 Checked by 1 m straightedge
Length	As given in tables 3 and 4	+ 3 mm	
Inclination of the fishing surfaces	As given in figures 4 to 23	± 3.6 % of the specified inclination	
End squariness	—	+ 2 mm	
Tolerances on other dimensions defining the cross section	—	± 0.5 mm	

NOTE 1. For punched holes, the tolerances shown are increased by 0.05 times the thickness of the fishplate for the diameter on the side where the punch emerges.

Table 3. Length and holling of fishplates (imperial dimensions)

NOTE. All fishplates are designed to have a 1/4 in gap between rail ends

No. of BS section of rail	Fig. 3 ref.	50 'O'	60 A	60 R	70 A	75 A	75 R	80 A	80 R	80 R angled	80 'O'	90 A	90 R	95 A	95 R	95 RBH	95 RBH skirled	95 N	100 A	100 R	110 A	113 A thick ¹⁾
Length of 4-bolt fishplate	A	16	16	16	16	16	16	16	16	16	20	18	18	18	18	18	18	18	18	18	20	1)
Length of 6-bolt fishplate	B	24	24	24	24	24	24	24	24	24	30	27	27	27	27	N/A	N/A	27	27	27	36	1)
Centres of bolt holes in fishplates	C	2	2	2	2	2	2	2	2	2	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4	2	2	2 1/4	2 1/4	2 1/4	2 1/4	2 1/4
	D										6	4 1/4	4 1/4	4 1/4	4 1/4	N/A	N/A	4 1/4	4 1/4	4 1/4	8	1)
	E																				5	5
	F																				5	5
Diameter of bolt holes in fishplates	J	13/16	13/16	13/16	13/16	15/16	15/16	15/16	15/16	15/16	15/16	1 1/16	1 1/16	1 1/16	1 1/16	1	1	1 1/16	1 1/16	1 1/16	1 1/16	1 1/16

1) Designed in metric units.

NOTE. Fishbolts and nuts are described in BS 64.

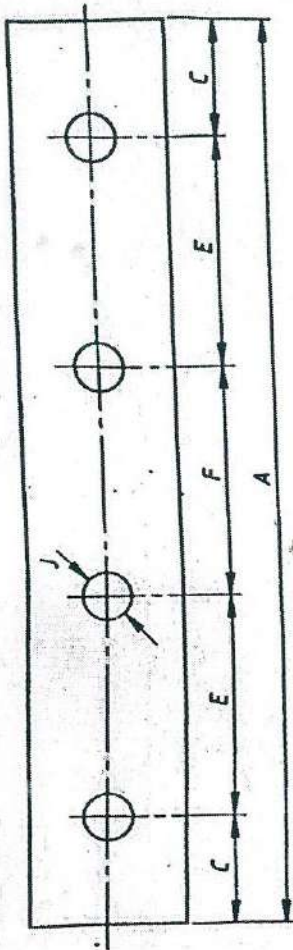
Table 4. Length and holling of fishplates (metric dimensions)

NOTE. All fishplates are designed to have a 6.35 mm gap between rail ends

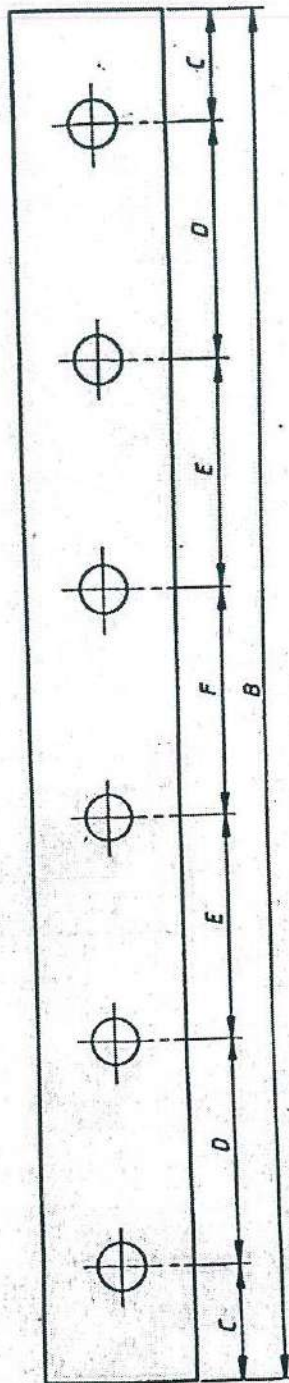
No. of BS section of rail	Fig. 3 ref.	50 'O'	60 A	60 R	70 A	75 A	75 R	80 A	80 R	80 R angled	80 'O'	90 A	90 R	95 A	95 R	95 RBH	95 RBH skirled	95 N	100 A	100 R	110 A	113 A thick ¹⁾
Length of 4-bolt fishplate	A	406.4	406.4	406.4	406.4	406.4	406.4	406.4	406.4	406.4	508	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	457.2	508	507
Length of 6-bolt fishplate	B	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6	609.6	767	685.8	685.8	685.8	685.8	N/A	N/A	685.8	685.8	685.8	914.4	914
Centres of bolt holes in fishplates	C	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	50.8	63.5	57.15	57.15	57.15	57.15	50.8	50.8	57.15	57.15	57.15	63.5	63.5
	D															N/A	N/A				203.2	203
	E										127	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	114.3	127	127
	F															127	127				127	127
Diameter of bolt holes in fishplates	J	20.64	20.64	20.64	20.64	23.81	23.81	23.81	23.81	23.81	23.81	26.99	26.99	26.99	26.99	25.4	25.4	26.99	26.99	26.99	26.99	27

1) Designed in metric units.

NOTE. Fishbolts and nuts are described in BS 64.



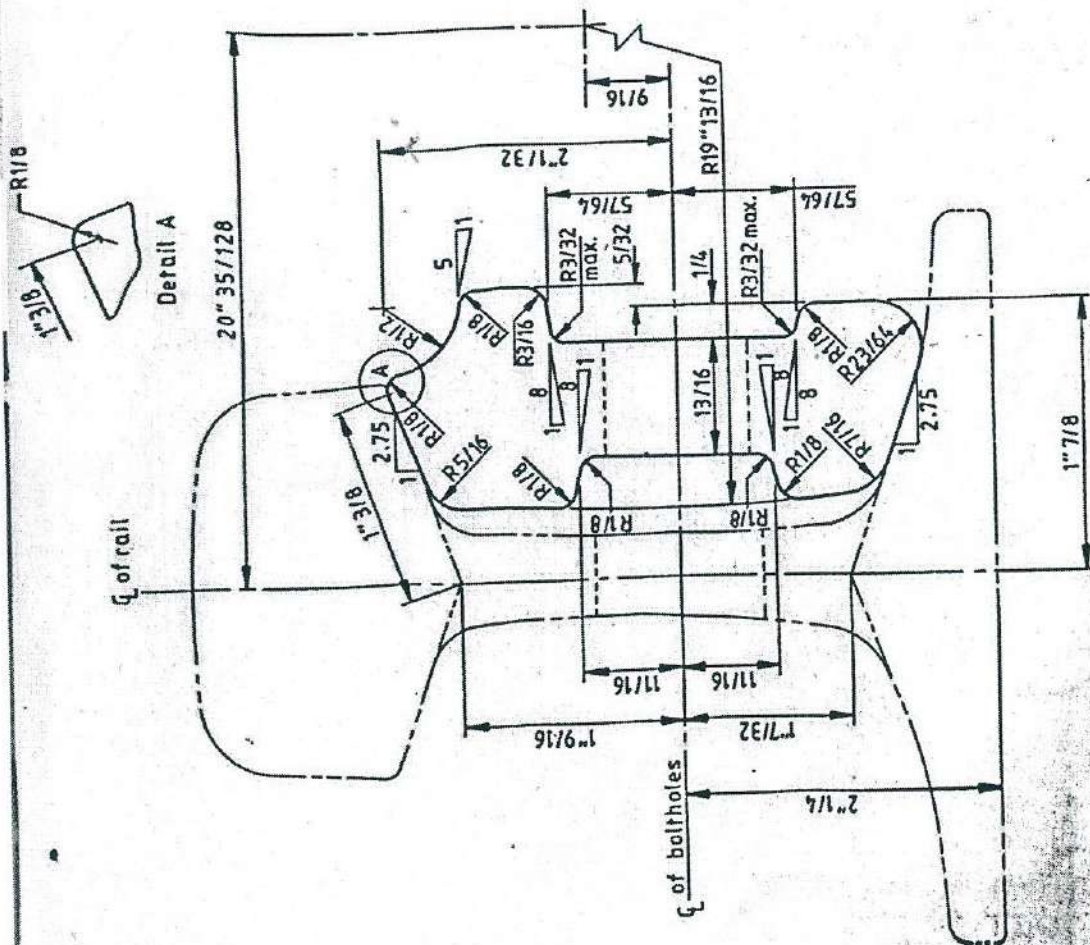
Position of bolt holes in 4-bolt fishplate



Position of bolt holes in 6-bolt fishplate

Figure 3. Key to tables 3 and 4

	Imperial units	Metric units
Rolled section		
Cross-sectional area	3.9180 in ²	2527.8 mm ²
Section weight	40.00 lb/yd	19.84 kg/m
Moment of inertia (I_{xx})	4.575 in ⁴	190.41 cm ⁴
Section modulus (J_{xx})		
— Top	2.461 in ³	40.32 cm ³
— Bottom	2.374 in ³	37.90 cm ³
Finished fishplate		
Height of neutral axis above bolt hole centres	0.181 in	4.59 mm
Calculated weight per pair		
(4 hole)	38.55 lbs	17.49 kg
(6 hole)	57.83 lbs	26.23 kg



GENERAL SPECIFICATIONS FOR STEEL BOLTS & NUTS**1. SCOPE**

This standard specifies the dimension and requirements for Bolts & Nuts to use with flat bottom rails.

2. MATERIALS

The steel shall conform to the requirements having property class 6.8 of table 3 (having tensile strength of 600N/mm^2) and having chemical composition limits as per table 2 indicated in BSEN 20898-1-1992.

3. MANUFACTURE

Bolts & Nuts shall be produced by hot forging. Nut shall be hot forged. Welding is not permitted. Fasteners shall be clearly finished full fit form and free from burrs and harmful defects.

4. HEAT TREATMENT

Fasteners may be supplied under full heat treated condition and details of the heat treatment shall be given in the manufacturer's certificate.

5. MECHANICAL PROPERTIES

After manufacture under heat treatment, a selected number of fasteners shall be tested to ascertain the mechanical properties of the batch. The sample or test pieces prepared there from shall not be subjected to additional heat treatment prior to testing. For acceptance purpose, all tests according to the table 5 of BSEN 20898-1-1992 test programme B shall be carried out.

5.1 BOLTS**5.1.1 Tensile test for full size Bolts.**

The above shall be carried out as per Clause 8.2 of BSEN 208-1-1992.

5.1.2 Hardness test.

The above test shall be carried out as per Clause 8.3 of BSEN 20898-1-1992.

5.1.3 Proofing Load Test for full size Bolts.

The above test shall be carried out as per Clause 8.4 of BSEN 20898-1-1992.

5.1.4 Test for strength under wedge loading of full size Bolts.

The above test shall be carried out as per Clause 8.5 of BSEN 20898-1-1992. The fracture shall occur in the shank of thread of the Bolt and not between the head and the shank.

5.2 NUTS

Nuts shall conform and tested with BSEN 20898-2-1994 having property class 6.

6. DIMENSIONS

As per Drawing Nos. 19669, 21800, 21871 and 20185/1 for Fish Bolts & Nuts 80 Lbs, Fang Bolts & Nuts 7 1/2", Fang Bolts & Nuts 8 1/2" and Switch Heel Bolts & Nuts 80/88 Lbs. respectively.

7. SCREW THREAD

The thread form shall, unless otherwise specified by the purchaser conform to the medium class tolerance in accordance with BS 84.

As an alternative to the spanner test the bolts and nuts may be ordered to comply with the "Tight fit" tolerance specified in Clause 12 below and should be BSW thread as required by the purchaser.

8. GAUGING

Gauges used to establish compliance with dimensions and tolerance shall be included in the manufacturer's calibration system for periodic checking to confirm their accuracy and traceable to national standards.

9. QUALITY CONTROL

Option 1:

If the bidder is not a manufacturer, offer should be supported with a certificate from the manufacturer acceptable to Sri Lanka Railways giving the mode of manufacture and the physical and chemical properties of the materials before and after heat treatment. Bids not complying with above would be considered as unacceptable.

The manufacture shall, as part of his quality control procedure, carry out sufficient inspections and tests to ensure that the specified requirement under BS 5750/ISO 9001:2008 are attained and maintained.

When sample plans are used in the selection of samples they shall be statistically viable.

The result of all inspections and tests shall be recorded and identified to the fasteners they represent and if required made available to the purchaser.

Option 2:

The inspection of all batches of bolts and nuts shall be undertaken by one of the following:-

- (a) The purchaser or their authorized inspectors shall inspect all batches of bolts and nuts ordered and witness any of the tests (see Clause 05), or
- (b) The application of quality assurance system (see the forward make reference to BS 5750/ISO 9001:2008 in the forward).

10. MARKINGS

Each bolt shall be marked on the head in embossed letter and with the trade (identification) marks of the manufacture, S/R and last two digit of the year of manufacture as per Clause 9 of BSEN 20898 - 1 - 1992. (Further on bridge hook bolts stem end side an arrow mark shall be impressed as shown in the drawing No. 18750 "ELEVATION FROM X" this arrow head shall indicate the direction of hook (elongated) portion of the bolt head.)

11. PROTECTIVE COATING

Before dispatch the finished fasteners shall be protected from atmospheric corrosion, under normal storage conditions by a protective medium. The head of all bolts shall be painted in red and a coat of linseed oil shall be applied for the items.

12. UNSCREWING TEST

At least one in every batch of 500 or part thereof bolts and nuts manufactured in accordance with Clause 11 (a) of BS 64: 1946 shall be tested for resistance to unscrewing. Should the test prove unsatisfactory the Engineer (or purchaser) or the Inspector may take further test at his discretion.

13. TOLERANCES

13.1. Tolerance on Nominal Length

Nominal Length		Tolerance on length
Over	Up to and including	mm
mm	mm	
30	50	±1.25
50	80	±1.50
80	120	±1.75
120	180	±2.00
180	250	±2.30
250	315	±2.60
315	400	±2.85
400	500	±3.15

13.2 Tolerance on unthreaded shank
Diameter

19mm to 24mm	$\pm 0.84\text{mm}$
24mm to 26mm	$\pm 0.84\text{mm}$

13.3 Tolerance for washers diameter (mm)

Diameter of the bolt (mm)	Interior diameter of the Washer (mm) Allowable tolerance	Quarter diameter of the Washer (mm) Allowable tolerance
19 mm	± 0.2	± 0.75
22 mm	± 0.2	± 0.75
24 mm	± 0.2	± 0.75
26 mm	± 0.2	± 0.75

13.4 Allowable tolerance for thickness of washers

Diameter of the bolt (mm)	Allowable tolerance
19 mm to 24 mm	± 0.2
22 mm to 26 mm	± 0.2

13.5 Tolerance of Hexagon Nuts
Dimensions in millimeter

Nominal size and thread diameter	Width Across Flats	Width across Corners	Thickness of Nut	Tolerance on squareness
19 mm	± 0.5	± 1.0	± 0.65	0.61
22 mm	± 0.5	± 1.0	± 0.65	0.61
24 mm	± 0.5	± 1.01	± 0.65	0.70
26 mm	± 0.5	± 1.3	± 0.65	0.78

13.6 Pitch of Thread (for metric thread)

Nominal size and thread diameter	Pitch of thread (coarse pitch series)
19 mm	2.5
22 mm	2.5
24 mm	3.0

14 TIGHTENING OF NUTS TO BOLTS

Nuts of all bolts shall be fixed (tighten) to full length of thread of the bolts before commencing packing for dispatch. Tightening of nuts should be done only with a prescribed spanner.

APPENDIX "D" III

SLR Specification No.: 564SPECIFICATION FOR STEEL DOG SPIKES 88 LBS. RAIL SECTION

The use of equivalent International Standards to those quoted is permissible, subject to submission of supporting document acceptable to the Purchaser.

1. Description:

Work included: This section covers the manufacturing and delivering of dog spikes to be provided for track laying as required at the location of the Sri Lanka Railways (hereafter referred as SLR) and cover the requirement for quality of steel manufacturing, tolerance on dimensions and related technical condition for the supply of the products as required.

The materials required shall be manufactured such that upon delivery they are essentially ready for the installation and do not require further cutting and fitting for the typical condition and use intended.

Installation of these materials is not a part of the requirements of this section.

2. Specifications & Drawings

The bidders shall submit following with the offer.

- i) Supplier's Specifications in detail.
- ii) Supplier's Drawings.

3. Material:

Material of dog spikes shall be rolled steel in accordance with JIS G 3101 or ASTM A 36.

4. Shape and Dimension:

Shape and dimensions of dog spikes shall be in accordance with the SLR Drawing No. 14812/A for 88 lbs. rail section.

5. Quality:

The dog spikes shall be manufactured from rolled steel bar and the surface of track spikes shall be smooth and free from defects such as harmful furrows, cracks and fins.

Any bend or twist shall not exist in the shank, and the head point shall be correctly formed.

6. Finish:

The finished spikes shall be straight, with well formed heads, sharp points and be free from injurious defects and shall be finished in a workmanlike manner.

Underside of the head of the spike shall stand being bent backwards to an angle of 115 degrees without crack on the exterior of the bent portion.

7. Dimensional Tolerances:

The dimensional tolerances shall be as follows:

Item	Tolerance in (mm)
Cross Section	+ or - 0.5
Head	+ 2.5 or - 1.0
Length under head to point	+ or - 3.0
Length between top of head and under head	+ 2.0 or - 1.0
Angle, underside of head	+ or - 1 degree

8. Test Requirements:

The contractor (supplier) shall be responsible for determining and providing all necessary supervision, inspection, sampling, testing or otherwise controlling the manufacturer such that the materials or items supplied comply with the requirements of these specification.

Materials, or items; individually or in groups where so evaluated, not meeting the requirements or these specifications shall be rejected and not used for the work under this Contract.

9. Marking:

Manufacturer's traceability identification code, "SLR" and last two digits of the year of manufacture shall be pressed on the head of each spike while it is being formed.

10. Shipping Requirements:

Protection: The dog spikes shall be protected against rust during long period of storage, and by such methods and means as proposed and approved.

Irrespective of the method of protection adopted, the whole surface area especially the machine sections, shall be covered with a protective coating.

Packing: Packing used for dispatch shall not have been previously used for any purpose, which would result in damage to these materials.

The package shall be sealed as necessary and each package shall bear the following information as applicable, in clearly indelible characters on label firmly fixed to the package:

- name or the mark of the supplier
- order number
- Description of parts contained
- Number of total weight of the parts.

Maximum weight of packing for each shipment shall be limited to approximately 2 (two) Metric Tons.

11. Certification:

A certification of conformity shall be supplied with each consignment confirming that the products conform to the requirements of this SLR specifications and drawing.

SLR Specification No.: 565

RAILWAY STORES SPECIFICATIONS FOR SPRING WASHERS

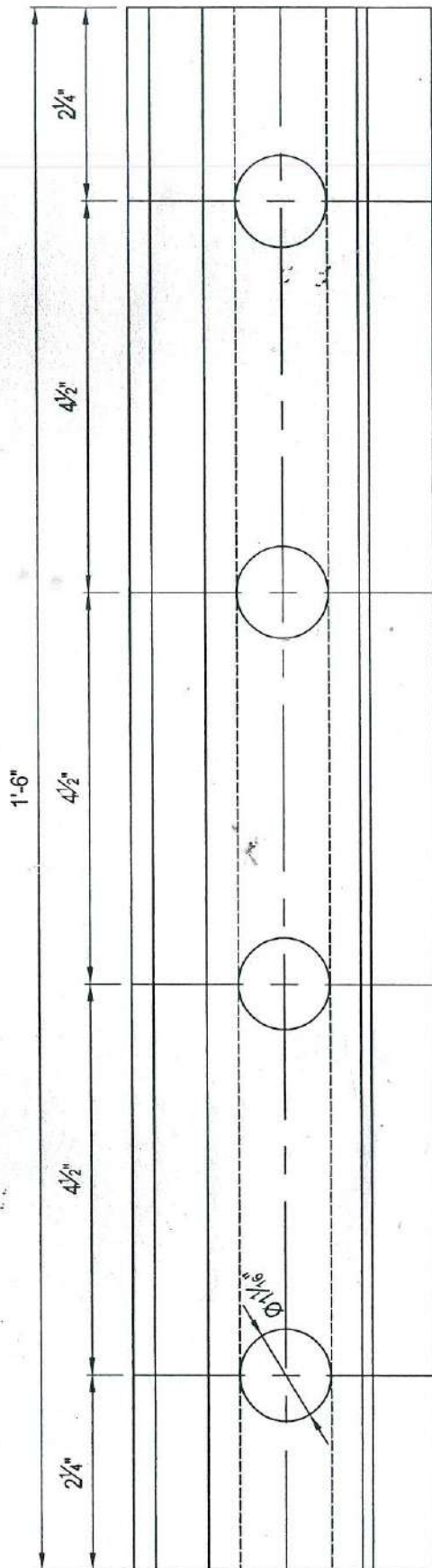
- | | | |
|-----|--|--|
| 01. | Scope | Single Coil Square, section steel spring washers |
| 02. | Dimension | As per Drawing No. 21360 |
| 03. | Materials | Shall be as per EN 10089:2002 (E) Type S63C-7 Steel No. 1.7106. |
| 04. | Manufacturing & Quality Control | Spring washers shall be of "Self Colour" finish. During use the washers shall remain circular and therein section shall be such as not to cause them to spread when set down by a nut under normal service conditions. |
| 05. | Surfacing / Coating | Spring Washers shall be supplied in a lightly oiled condition. |
| 06. | Chemical Composition of materials (percentage) | C 0.52 – 0.60, Si 1.6 – 2.0, Mn 0.70 – 1.0, P 0.025 Max, S 0.025 Max, Cr 0.2 – 0.45 |
| 07. | Hardness | Test report of hardness HRC at 80 & 90% martensite shall be submitted. The value shall comply to Table 5 of EN 10089:2002(E). |

Handwritten marks: a large checkmark and two small scribbles.

SLR TYPE PLAN

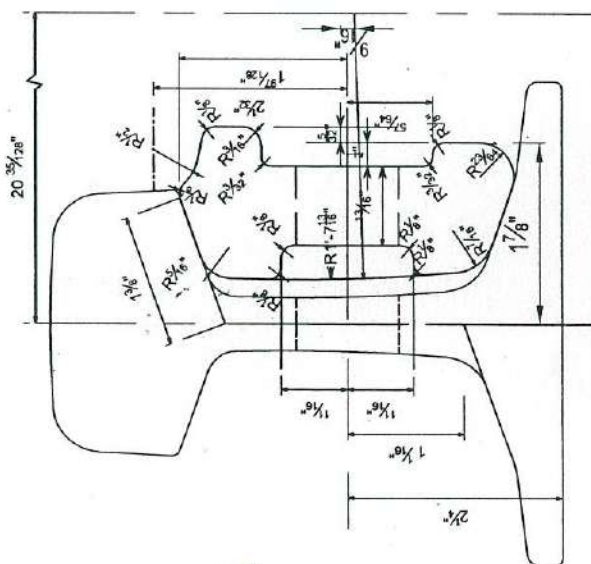
DRG. NO - Tr/Type/Drg/23424

FISH PLATE BS EN 45 (90A-lb) RAIL.



POSITION OF BOLT HOLES IN 4 BOLT FISH PLATE

SCALE - 1:2



CROSS SECTION

SCALE - 1:2

SLR - TYPE PLAN

FISH PLATE
BS EN 45 (90A-lb)
RAIL.

DRAWN BY

Muditha

CHECKED BY

Muditha

C.D.O

Muditha

APPROVED BY

Muditha

SRI LANKA RAILWAYS

WAY & WORKS DEPARTMENT

DRG. NO - Tr/Type/Drg/23424

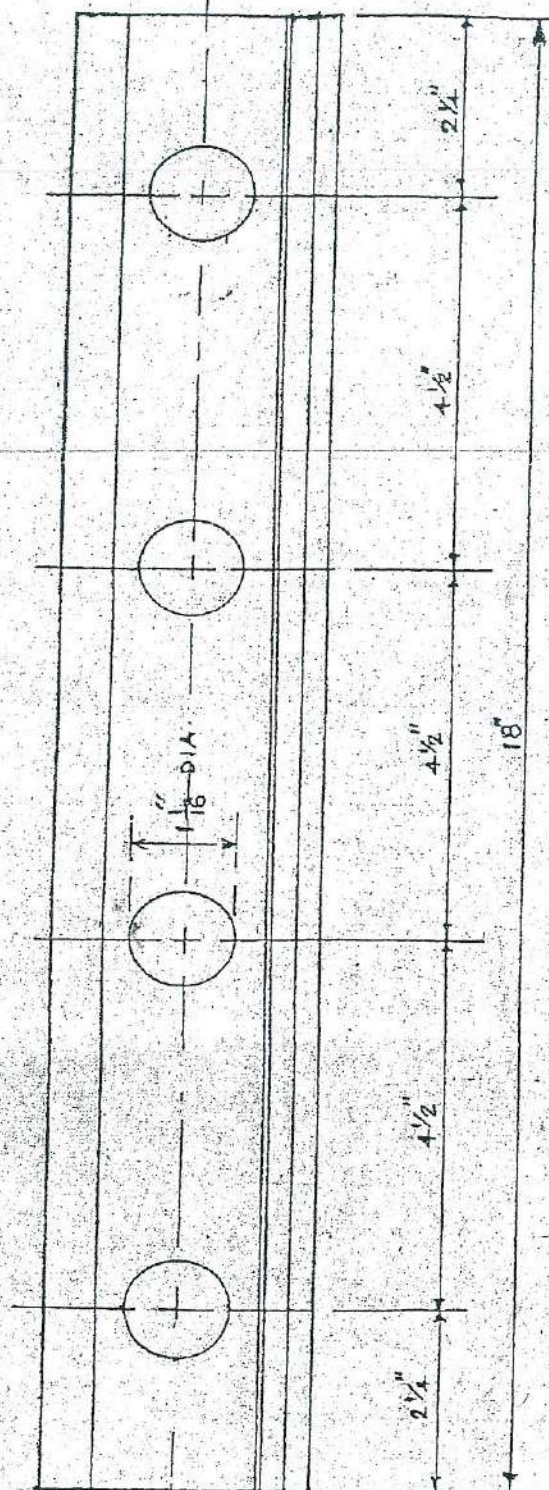
DATE - 2025 AUG

[Signature]

CHIEF ENGINEER

SCALE - AS SHOWN

PAGE - 01 OF 01



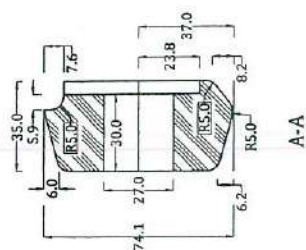
WEIGHT OF SECTION AS ROLLED 9.49 LBS/FT
(14.13 KG/M)

WEIGHT PER PAIR OF FISHPLATES 26.47 LBS
(12.00 KG)

NOTE: THIS DRAWING TO BE READ
IN CONJUNCTION WITH
DRG. No. 19774 'A'

DETAIL OF HOLING IN FISHPLATE
NOT TO SCALE

TRACED BY. <i>[Signature]</i>	SRI LANKA RAILWAY WAY & WORKS DEPT
CHECKED BY. <i>m.s.</i>	DRG. NO. 19774-B DATE 1-10-09
<i>[Signature]</i> D.O.A.	<i>[Signature]</i> CHIEF ENGINEER (I/B)
J. W. <i>[Signature]</i> APPROVED BY.	



STANDARD: BS 47-1-1991

C:0.27-0.48

 $Mn \leq 0.94$ ≤ 0.058

2.FINISHED: PLAIN

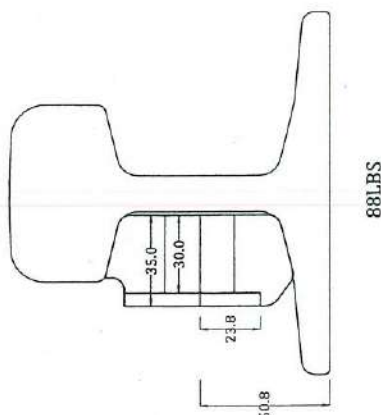
3.TENSILE STRENGTH: $600 \pm 50 \text{ N/mm}^2$

ELONGATION $\geq 18\%$

4. UNMARKED TOLERANCE ± 0.8

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. WEIGHT IS 7.86 Kg

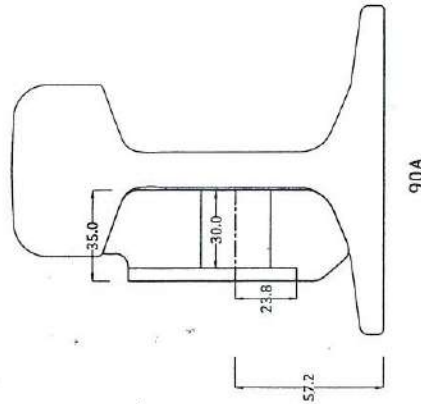
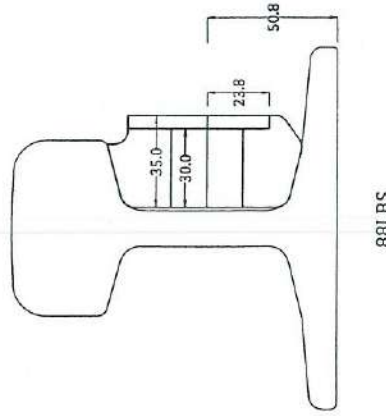
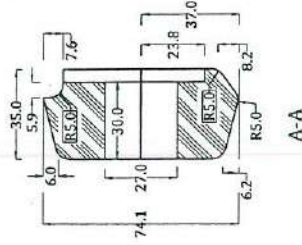
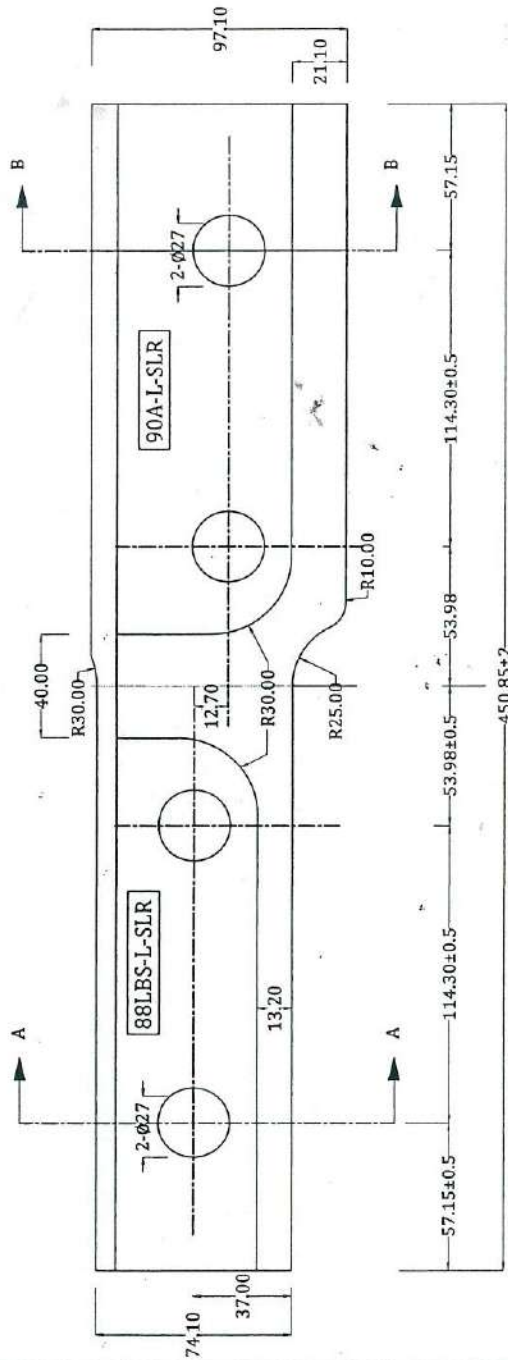


90A

SLR - TYPE PLAN JUNCTION FISH PLATE 88 LBS & 90A (RIGHT SIDE)	SCALE: AS SHOWN	PAGE: 01 OF 01
	DRAWN BY: <u> </u> CHECKED BY: <u> </u> DATE: <u> </u>	
SRI LANKA RAILWAYS WAY & WORKS DEPARTMENT	DRG NO: 24872-A DATE: FEB/2022	DESIGNED BY: <u> </u> ENGINEER: <u> </u> APPROVED BY: <u> </u> CHIEF ENGINEER

SRI LANKA RAILWAYS - JUNCTION FISH PLATE - 88 LBS & 90A (LEFT SIDE)

DRG NO: 22822-B



STANDARD : BS 47-1-1991

1. CHEMICAL COMPOSITION % :

C: 0.27-0.48
Si ≤ 0.38
Mn ≤ 0.94
P ≤ 0.058
S ≤ 0.058

2. FINISHED : PLAIN

3. TENSILE STRENGTH : 600 ± 50 N/mm²
ELONGATION ≥ 18%

4. UNMARKED TOLERANCE ± 0.8

NOTE :

- ALL DIMENSIONS ARE IN MILLIMETERS
- WEIGHT IS 7.86 Kg

SLR - TYPE PLAN

JUNCTION FISH PLATE
88 LBS & 90A
(LEFT SIDE)

SRI LANKA RAILWAYS

WAY & WORKS DEPARTMENT

DRG NO: 22822-B

DATE : FEB/2022

DRAWN BY:

RELATIN

CHECKED BY:

D.O.X

DESIGN

ENGINEER

APPROVED BY:

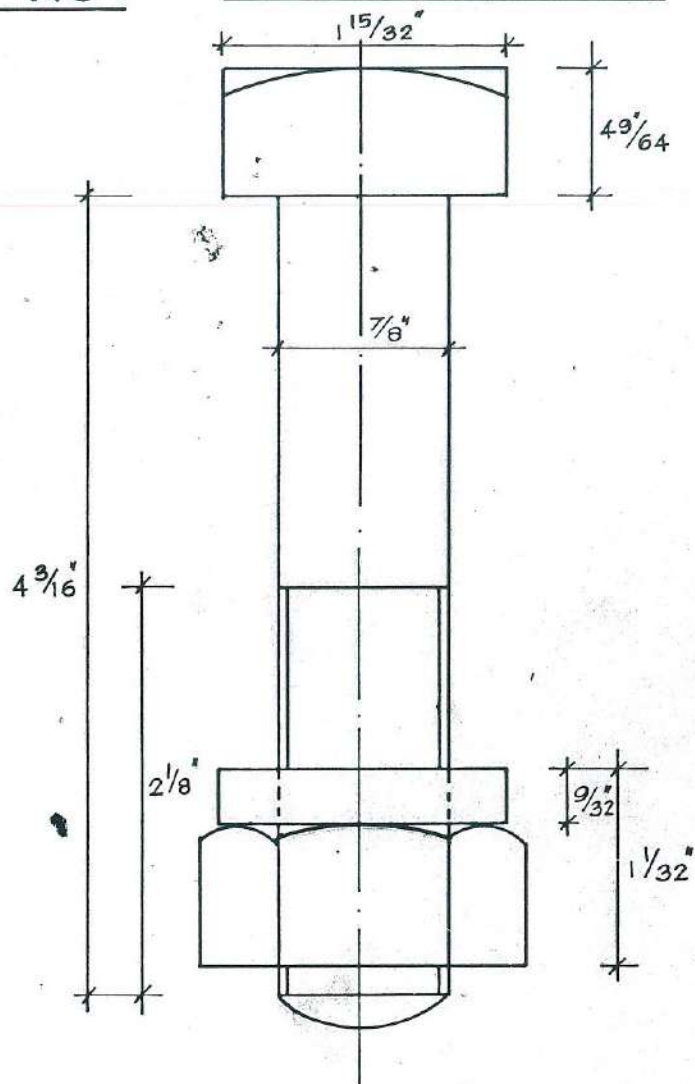
CHIEF ENGINEER

SCALE: AS SHOWN PAGE 01 OF 03

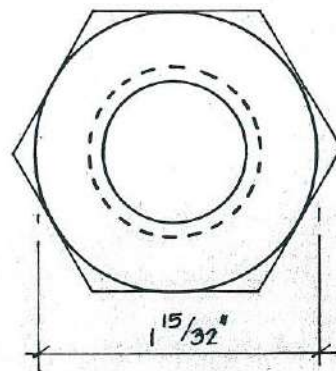
FISH BOLT & NUT

FOR 80 LB RAIL

DRG : NO . 19669



ELEVATION



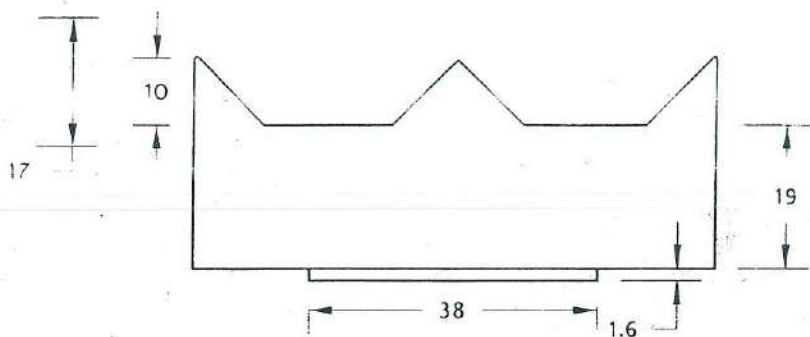
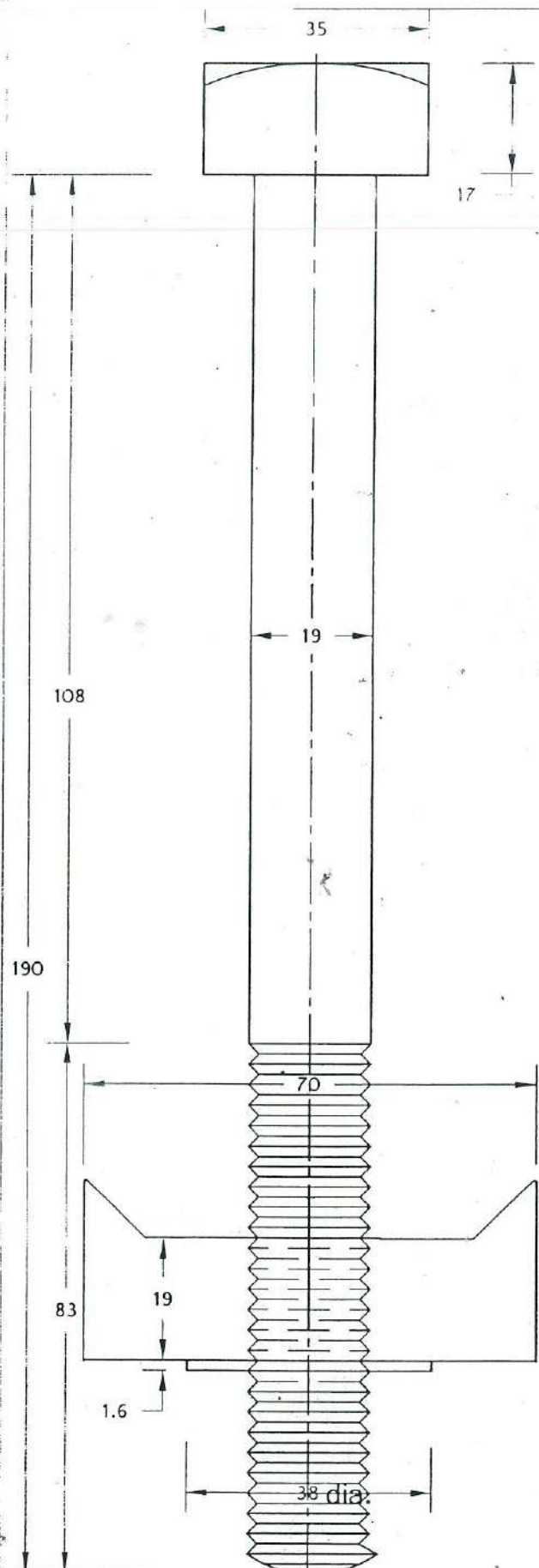
PLAN OF NUT

SCALE : FULL SIZE

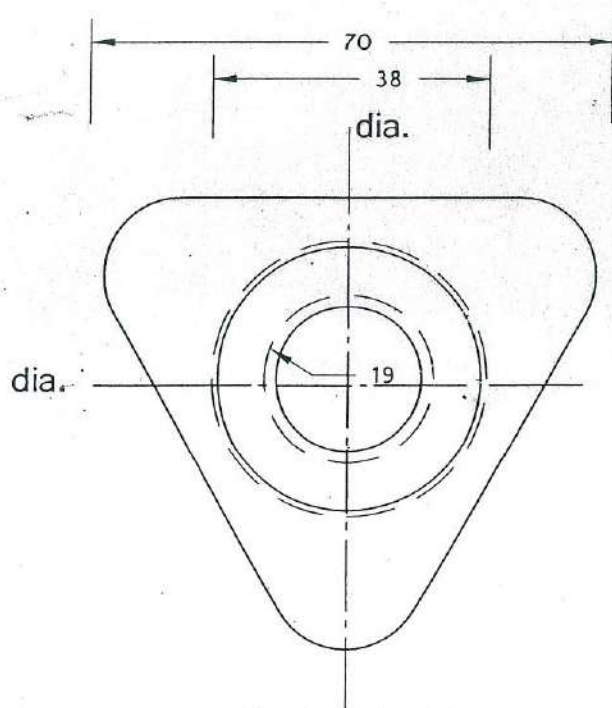
DRAWN BY: S. G. H.	SRI LANKA RAILWAYS	
	WAY & WORKS DEPT.	
CHECKED BY: <i>[Signature]</i>	DRG. NO. 19669	
	DATE : 10.07.91	
D. O. A.	CHIEF ENGINEER	
APPROVED BY:		

FANG BOLT & NUT (7 1/2") drg.no.21800

10



ELEVATION



PLAN

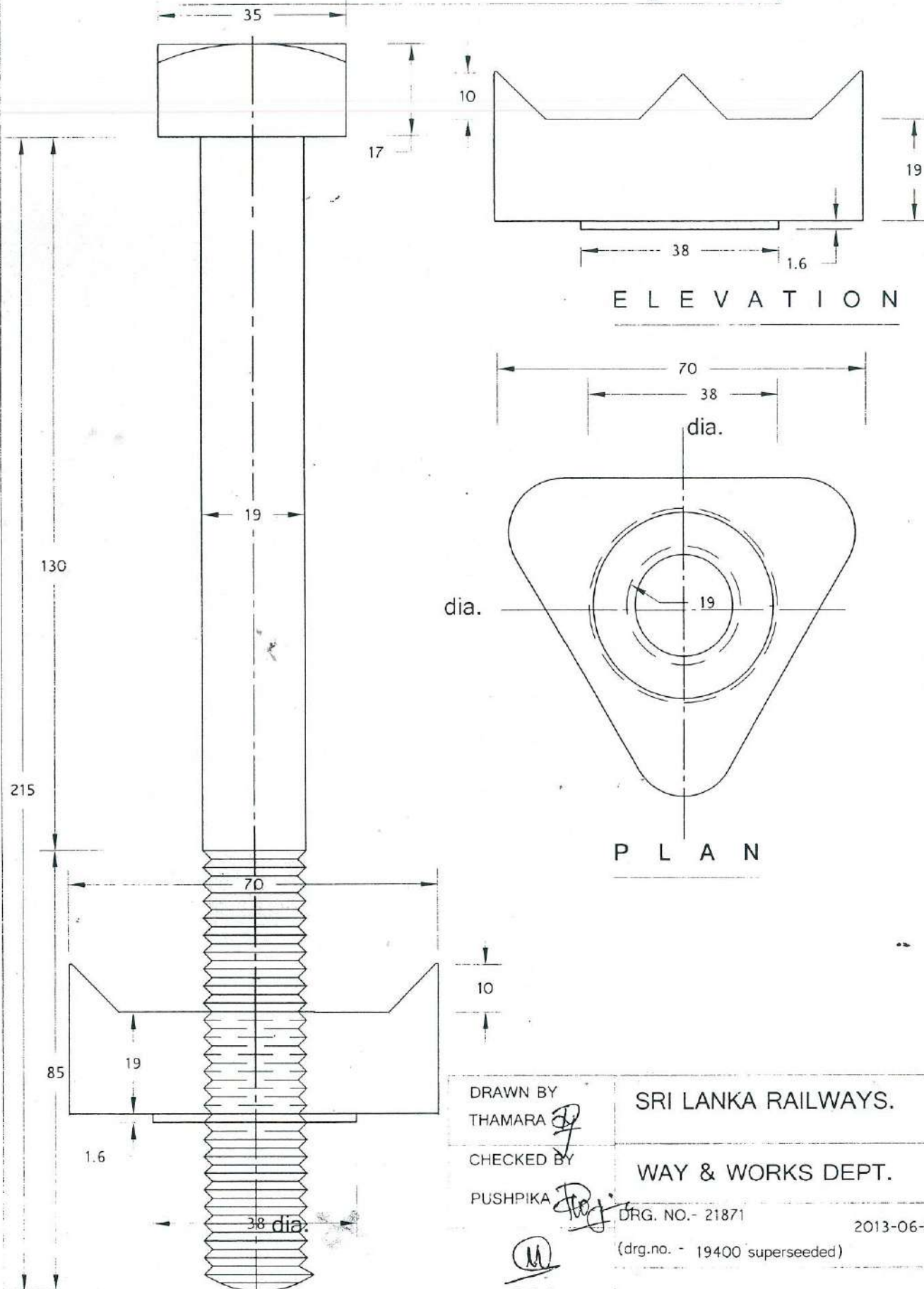
NOTE:-
PITCH 2.5

SCALE - FULL SIZE
(All dimensions are in mm.)

DRAWN BY THAMARA	SRI LANKA RAILWAYS.
CHECKED BY PUSHPIKA	WAY & WORKS DEPT.
D.O.A.	DRG. NO.- 21800 (drg.no. - 19400 superseeded)
APPROVED BY	2013-05-06 CHIEF ENGINEER

FANG BOLT & NUT (8 1/2")

Drg.no. 21871



NOTE:-
PITCH 2.5

SCALE - FULL SIZE
(All dimensions are in mm.)

DRAWN BY
THAMARA

CHECKED BY

PUSHPIKA

D.O.A.

APPROVED BY

SRI LANKA RAILWAYS.

WAY & WORKS DEPT.

DRG. NO.- 21871

2013-06-20

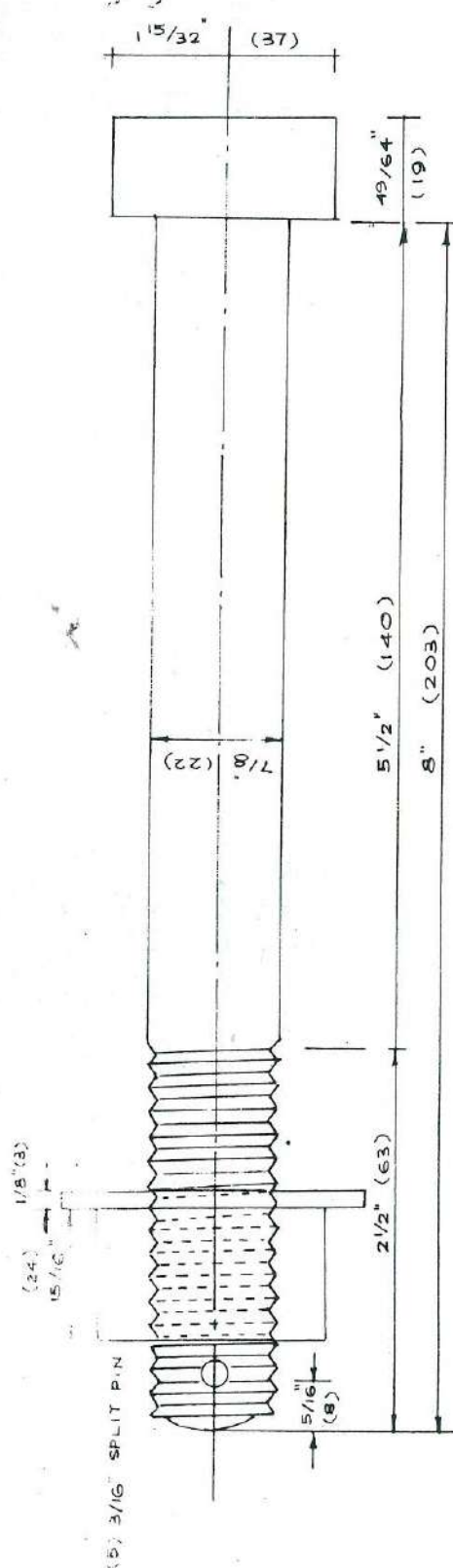
(drg.no. - 19400 superseded)

CHIEF ENGINEER

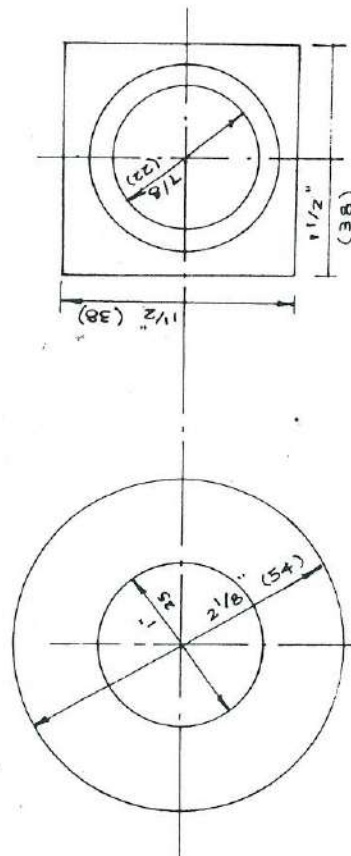
DRG. NO. 20185/1

SLR SWITCH HEEL BOLT FOR 88 & 80 LBS RAILS

SCALE: FULL SIZE



THREAD DETAILS:
MEDIUM TOLERANCE
CONFORMING TO BS 84



1/8" WASHER

NUT

DRAWN BY	SRI LANKA RAILWAYS
TRACED BY	WAY & WORKS DEPT
CHECKED BY	DATE: 28.02.94 No. 20185/1
D.O.A.	CHIEF ENGINEER

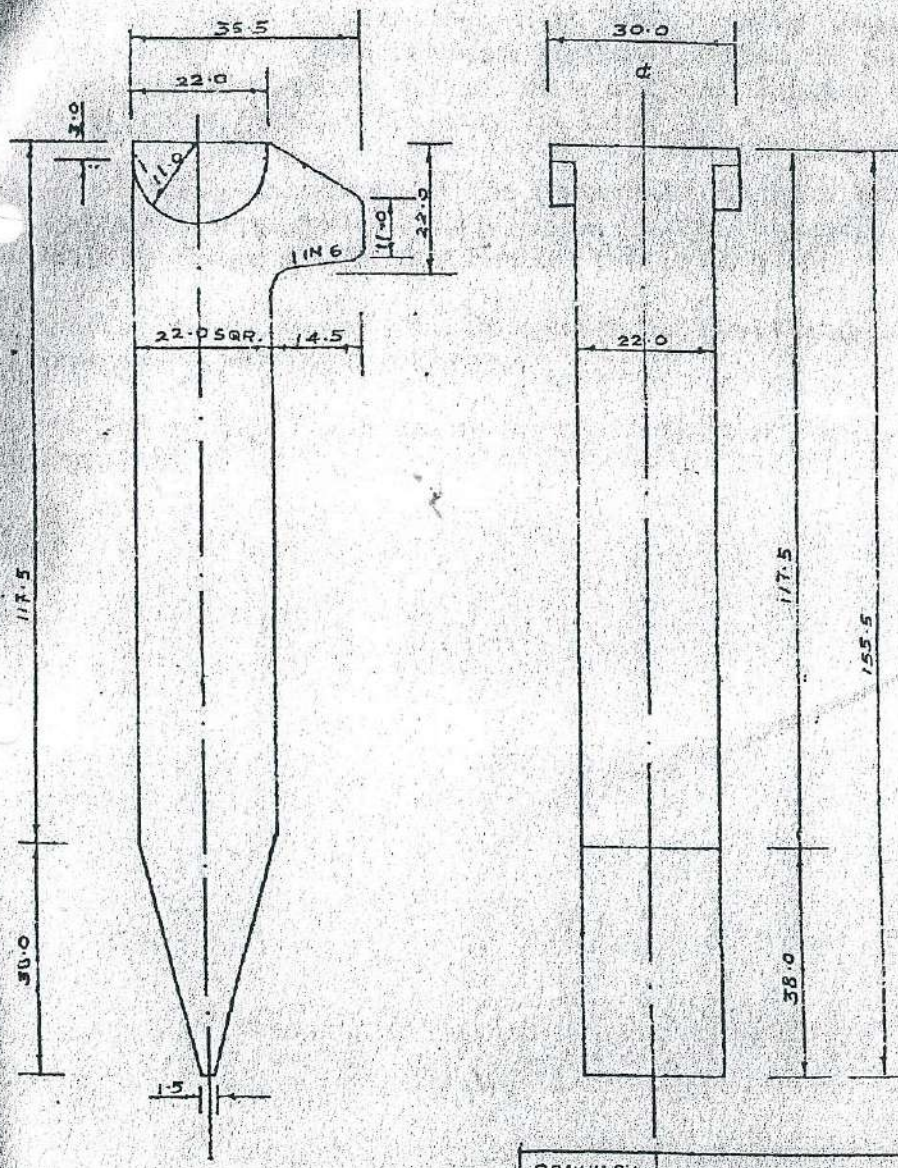
NOTE: MILLIMETRE DIMENSIONS SHOWN IN PARANTHESES

DRG NO 14812/A

Date: 2003-08-19

DOG SPIKE FOR 88 Lbs RAIL

Scale: Full Size in mm.

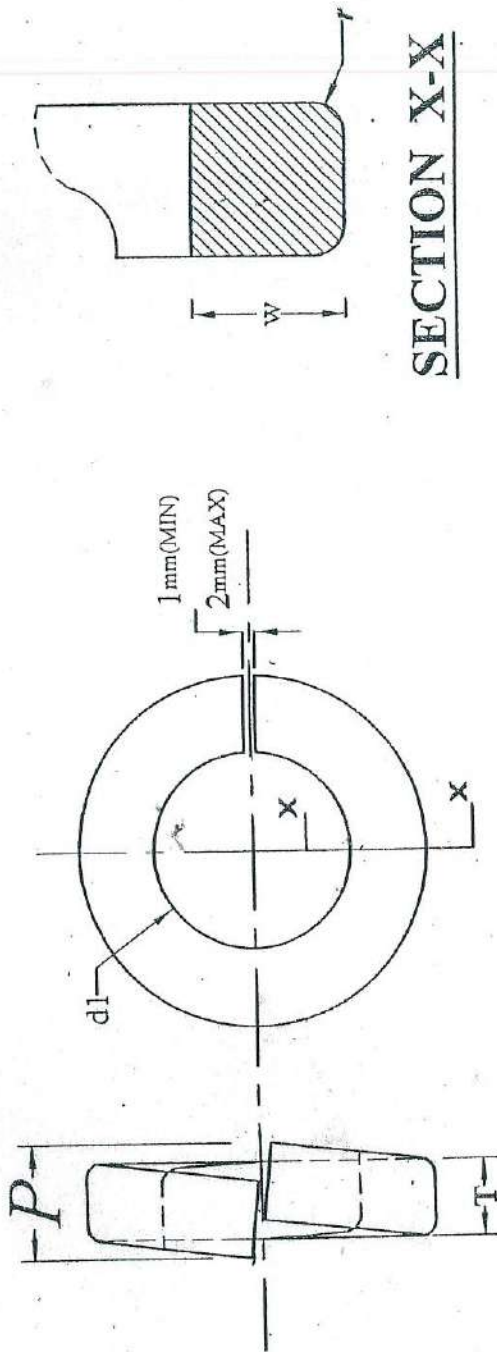


DRAWN BY.	SRI LANKA RAILWAYS.
CHECKED BY.	WAY & WORKS DEPARTMENT
D.O.A.	
APPR BY.	CHIEF ENGINEER

Drg. No:

21360

SPRING WASHER



SECTION X-X

NORMAL SIZE OF BOLT	THICKNESS (T)	WIDTH (W)	INSIDE DIAMETER (dl)		RADIUS (r) max	P	
			min	max		min	max
M23	10+/- 0.25	10+/- 0.25	25	26	2	15	16

DRAWN BY SUNIL PERERA		SRI LANKA RAILWAYS	
CHECKED BY Vinitha Kekulawala		WAY & WORKS DEPARTMENT	
D.O.A. [Signature]		Drg.No. ; 21360 Date; 08.06.2009	
APPROVED BY J. [Signature]		[Signature] CHIEF ENGINEER	

Scale - 1:1

ALL DIMENSIONS IN mm

MATERIAL-
EN 10089:2002(E)
TYPE 56 SiCr 7