

NORTH EASTERN RAILWAY

CE'S P.WAY CIRCULAR NO.53 OF 1968.

LONG WELDED RAILS

In P.Way Circular No.46 of 1965 instructions were issued in connection with laying and maintenance of long welded rails. Since then a lot of development has taken place in the field of long welded rail. The Railway Board had appointed a Committee for studying the later development on the long welded rails and make recommendation. The Committee have submitted their report in the month of January 1967. The Railway Board have approved in principle the policy of laying of long welded rails on trunk routes and main lines and forwarded their comments under their letter No.67/W6/WII/6 dated 15.7.67 the copy of which was circulated under this office letter No.W/235/14/Pt.A-1/62-63 dated 7.7.1967.

The main gist of the recommendation of the Committee on the welded rails which has the approval of the Railway Board is indicated in this circular. These may please be followed in future and to this extent instructions contained in Circular No.46 should be treated as superceeded.

1. The Section for laying of the long welded rail should be selected keeping the following aspects in consideration.

- (i) Formation should trouble from in all weather. It should not have previous history of bad running in Rainy season.
- (ii) The vurvature should not be more than 3°.
- (iii) The gradient should not be steeper than 1 in 150.

- (iv) Area should not have severe climatic condition so that maintenance period is adequate.

It will be good practice to select section where the traction is predominantly either diesel or electric so that the problem of ashes getting mixed up with ballast is avoided.

2. Track structure:

(a) Type of sleeper & its density:

The sleeper density should be $(N+6)$. The steel sleepers with conventional loose jaw and key type fastenings are preferable for long welded rails till concrete sleeper with suitable elastic fittings is developed. Hard wood sleepers with anti-creep bearing plate with two steel keys can also be permitted. Soft wood and CST-9 sleeper has not been considered suitable for IWR.

The present practice is to provide sleepers at uniform spacing at welded joints in rails of 52 kg. on BG and 75R on MG whether fish bolt holes exist or not. Uniform spacing of sleepers should be adopted for other rail sections also where fish bolt holes do not exist in case of welded joints.

2. (b) Section of the Rails:

90R and 52 kg. rails on BG and 75 R on MG should only be used for long welded rails. 60 lbs. rails is not considered adequately strong as far as lateral resistance is concerned. Rails should have minimum fish bolt holes in the long welded rails. For this it has been suggested that the rails should be welded in 5 rail panels by flash butt welding process and transported to the site. The pre-welded panels which have no fish bolt holes should be temporarily linked by means of clamp and the traffic allowed at about 20 KMPH. In situ weld should then be taken up after adjusting the gaps between Short Welded Panels.

(10)

It is desirable to provide additional rail anchors temporarily on the pre-welded rails so as to prevent the undue movement of the rails due to braking. Another method suggested and which is invogue in the foreign countries is the 'Double Substitution Method', in which temporary service rails are first laid on the new sleepers and the track is allowed to consolidate for some time before long welded rails are laid in position. The present practice of doing welding on the cess is not considered desirable since this results in bad alignment of track. As far as possible welding should be done either in shop or in situ in track.

2. (c) Ballast Section:

The depth of the ballast should be 25 cm minimum supplemented by a sub-ballast layer of 25cm. on poor formation. The shoulder width in standard ballast section should be kept 40 cm. beyond the end of the sleepers on straight and 55 cm. on outside of the curves. The shoulder should also be bumped on both sides by 10 cm. height. Softer variety of ballast should not be used for L.W.R.

2. (d) Joints:

L.W.Rails should not have fish plated joint at their end until such time as the behaviour of the breathing lengths of long welded rails under Indian condition is known more precisely. The rail joint between the expansion Switch and the Long Welded Rails should be 'In Situ' weld and not machined 2 Rails with 3 ordinary fish plated joints should be interposed between 3 rail panels and insulated joints, crossings or stock rails.

3. L.W.R. on bridges & level crossings:

Long Welded Rail can be continued through the level crossings provided they do not lie within the breathing length of the long welded rails which should be reckoned, as 100 metres at each end. Long Welded Rails should not be continued through girder bridges which have span of 13 metres or more or with overall length of more than 18 metres each. Such bridges should be isolated with 3 rail-short welded panel of 100 metre length on either side. Suitable expansion joints should be provided between long welded rails and 3 rail panel. The 3 rail panel should have sufficient rail anchors in atleast 100 sleepers on each approach.

4. Maintenance of Long Welded Rails:

4.1 De-stressing annually may not be necessary under Indian condition as the temperature ranges are of lower order than in Europe, where annual de-stressing is not the practice inspite of greater temperature range. However, de-stressing is a must after laying Long Welded Rails and whenever a rail is to be replaced due to a fracture or other reasons. It would also be required in case of any realignment of curve or distortion of track.

4.2 There should be no need to carry out half year systematic through packing and periodical ballast screening operation. All work on track maintenance involving removal of sleepers or slight lifting or realignment of track should be done within 10° of the de-stressing temperature. For this it is essential to supply a table showing a temperature at which de-stressing was done for each panel to the maintenance gang. Thermometer should also be provided to them which should periodically be checked by P.W.I.

4.3 There must be very careful inspection specially as regards proper profile of the ballast as local defects in profile can be the beginning of deformation. Periodical making up of the ballast section is of great importance. Sufficient ballast should be trained out and kept in stock in every half KM to meet this requirement. Repairs to earth work particularly in the cess should be carried out promptly.

4.4 Specially attention should be given to the expansion switch. These should be checked once a fortnight and packed. Lubrication of the sliding surface should also be regularly done.

4.5 Casual Renewal of sleepers will have to be carried out such a way that not more than one sleeper in 10 metres length of track is dealt with at a time. Tightness of all fittings should be carefully checked by the Keyman and in case of obvious slack liftings immediate rectification would be necessary. During summer months special partolling should be done when rail temperature which could be conveniently carried out by the maintenance gang as the gang will not be carrying out any maintenance work at this temp. A special watch should be kept during such patrolling for any vertical or lateral buckling of the rails. The Patrolmen should tap the sleepers to detect any hollowness which will indicate a floating condition of the track.

4.6 After the long welded rails laid after ensuring clean ballast and a through packing and providing good drainage by suitable side drains and slope of the formation, there may not be any need of any subsequent through packing for atleast 2 to 3 years. It should

normally be necessary to maintain the track only by 'picking up of slacks' and replacement of ballast on the shoulder.

5. Action to be taken when buckling is noticed:

The first action should be for the protection of traffic as per the rules. The track portion should be carefully slewed into smooth curve of as bigger a radius as possible as per the local condition, the means and terms available. Any attempt to slew the curve to a 'S' curve should be done with great caution as there is a possibility of buffers of vehicles interlocking if the radius of the 'S' curve is too small.

6. Action to be taken in case of fracture:

For the immediate passage of trains clamps and boltless fish plate (in the case of thermite welded joint Joggled fishplates are required) should be fastened at the fracture. The first train must be passed under stop dead with 10 KMPH restriction and subsequent trains at 30 KMPH until the fractured portion is replaced. This is to be done only when the gap at the fracture and does not exceed more than 20 mm.

As soon as block becomes available cuts are to be made about 3 metres apart on each side of the fracture and a rail piece of about 6 metres is interposed. One end of the rail is welded by providing suitable gap while the other end is welded after destressing is carried out at a suitable temperature on 100 meters of each side. If necessary this rail may be slightly cut to provide proper gap.