

North Eastern Railway
(Engineering Department)

CE Circular No.97

Sub: Replacement of corroded steel channel sleepers.

1. Divisions have been executing works of replacement of corroded steel channel sleepers. The corrosion has been caused in most cases due to droppings from toilets, humidity and other local conditions and the fact that Galvanized or metallised steel channel sleepers were not used. RDSO has made Galvanization of new steel channel sleepers mandatory as per guidelines issued by RDSO on Fabrication of Steel Channel Sleepers (Report No. BS-45).

2. **Fabrication of Steel Channel Sleepers:**

Fabrication is to be done as per Guidelines contained in RDSO's Report No. BS-45, a copy of which is enclosed. Important items for fabrication mentioned in BS-45 are included in the following:-

- 2.1 Steel as per IS:2062 Grade 'B' fully killed shall be used. Test Certificate shall be insisted for every lot of steel purchased by contractor. Independent testing of steel by recognized and reputed Test Houses may also be done by Railways.
- 2.2 Steel jigs and fixtures used in fabrication of channel sleepers are as RDSO Drawing. Steel Jigs and fixtures shall be approved by Railways before permitting general fabrication.
- 2.3 Welding procedure specification record and welding procedure qualification records shall be maintained by fabricator as per proforma given in BS-45. Besides, Jig register, Rivet checking register, Offering & Inspection register, Material test certificate register, record for inspection and testing on galvanizing shall be maintained by fabricator and these records shall be handed over to Railway for further scrutiny. Inspection stages shall be before fabrication, during fabrication and after fabrication.
- 2.4 Hot Dip Galvanizing will be done after surface preparation as per IS:2629. A minimum coating of 86 microns shall be ensured and checked for each sleeper by Elcometer and record maintained. Pivoted hammer test and knife test to determine adherence of zinc coating shall also be conducted on 10% of fabricated sleepers and record for the same maintained.

3. If road approach to both the ends of the bridge exists, about 50% sleepers should be taken at either end especially in case of important bridges. One set of dip lorry should be stationed at either end with loose rails. After the channel sleepers are brought to site, one coat of ready mixed paint red oxide zinc chromate conforming to IS:2074 followed by one coat of Aluminum paint conforming to IS:2339 shall be provided.

4. **Replacement of corroded channel sleepers:**

Various stages for replacement will be as under:

4.1 **Activities prior to replacement:**

- Recheck correctness of new channel sleepers and its fittings.
- Paste Elastomeric rubber pad to channel sleepers by appropriate adhesive such as Fevicol SR 998 or similar.

4.2 **Pre-replacement activities:**

Before replacing corroded channel sleepers, all new channel sleepers have to be interlaced in between existing corroded channel sleepers. This activity will have to be done in traffic blocks but without imposing any further speed restriction.

4.2.1 **Pre-block requirements for interlacing channel sleepers & replacing corroded channel sleepers:**

- Protection equipment – Gloves, Helmets for the workmen.
- Availability of 50 to 60 workmen.
- 2 nos. Gas cutting equipment.
- Availability of 2 sets of dip lorries and 4 nos. rail dollies.
- New channel sleepers have to be taken on dip lorries from bridge approach.
- Clearing of inter space between existing channel sleepers and removal of wooden blocks if any.

4.2.2 **Interlacing channel sleepers during traffic blocks of about 2 hrs:**

- Dip Lorries at either end are placed on track and two nos. rails provided on dip lorries.
- About 40 sleepers are loaded on each set and dip lorries moved from either end to bridge.
- Work of interlacing to be done from either end of bridge.
- Each unit will comprise of about 15 to 20 persons. In addition 8 to 10 persons in each unit should be stationed (at bottom boom of girder in case of open web girder) at locations where channel sleepers are to be interlaced. Sleepers are to be unloaded in turn and passed to persons on the bridges

who will insert the new channel sleepers in the space between existing corroded channel sleepers.

- Dip lorries after unloading of new channel sleepers are moved towards approaches and are reloaded with new channels sleepers and again brought towards bridge. The procedure is repeated till the availability of block.
- Around 10 – 15 sleepers on either side should be unloaded and kept at trolley refuges nearest to the work sites at either end on the bridge. These should be used for interlacing in next days block during the time loaded dip lorries arrive at the location where sleepers are to be interlaced.

With this it should be possible to interlace 100 to 120 sleepers in 2 hrs block.

4.3 Replacement of corroded channel sleepers:

4.3.1 Pre block activities:

- Mark exact proposed location of centre line of new sleepers on running rail. Sleeper interlaced need also to be numbered with paint.
- Rivet holes marked as per site condition and punched in 25mm thick elastomeric rubber pad. Sleeper no. and LH or RH to be marked with marker pen on the rubber pads (in case of plate girders).
- Tools & Plants i.e. Jacks, wooden blocks, wedges, spanners, gang tools, etc. to be arranged and brought to site. Effective working of Jacks to be checked and ensured.
- Inner/outer clips to be fitted to new channel sleepers and kept loose. Oiling and greasing of fittings is also done.
- Fittings of Guard rail, running rails, pathway to be oiled and loosened and then again made tight so that these can be easily removed during block period.
- Guard rails, Gang way and spacer angles removed for about 100 to 150 m length one day in advance of work of replacement and speed restriction of 20 Kmph imposed. Guard rails thus removed can be kept on cross-girders in case of open web girders.

4.3.2 Activities during traffic blocks of about 2 hrs:

- Dip lorries from either end are taken to work sites.
- In the meantime, the fittings on existing channel sleepers are removed and track is lifted by jacks.
- The corroded channel sleepers are taken out and placed on dip lorries. The already interlaced sleepers are brought in position, rubber pad inserted and track lowered. The fittings atleast on alternate sleepers are tightened.

- Released sleepers are taken to bridge approach on dip lorries and are unloaded. Dip lorries are again brought to the bridge. During the period when dip lorries are carting released sleepers, the sleepers being released are placed on track, to be loaded in to next trip of dip lorries.
- Track parameters checked and block cancelled.

4.3.3 Post-Block activities:

- (i) Tightening of fittings and fastenings along with ensuring squareness and correct spacing of sleepers.
- (ii) Guard rails are taken to site from bridge approach on rail dolly and Guard rails fixed.
- (iii) Spacer angles are fixed at the end of channel sleepers.
- (iv) Speed restriction stretch is shifted.
- (v) Preparatory arrangements for next day's work are done as detailed above.

With the above arrangement, replacement of 100 to 120 channel sleepers would be possible within 2 hrs block.

DA – Copy of 'RDSO's Report No. BS-45'.

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d/c

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