

E.10/2 – LAYING OF SLEEPERS

RAILWAY ENGINEERING SPECIFICATION

E.10/2 – LAYING OF SLEEPERS

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1. SCOPE

This specification covers the work necessary for the laying, replacement and respacing of sleepers.

2. INTERPRETATIONS

2.1 SUPPORTING SPECIFICATION

2.1.1 Where this specification is required for a project, the following specification shall, inter alia, form part of the contract document:

- a) The E.10 Gen - General
- b) The E.10/1 - Laying of rails
- c) The E.10/4 - Ballasting and tamping
- d) The E.10/11 - Survey and setting out of track alignment and referencing

2.1.2 In addition the following specifications, inter alia, may be required:

- a) The E.10/3 - Ballast cleaning
- b) The E.10/9 - Slewing and alignment

2.2 DEFINITIONS

Void.

3. MATERIALS

3.1 SUPPLY OF MATERIAL

Wood sleepers will be supplied undrilled.

4. PLANT

Void.

5. CONSTRUCTION

5.1 GENERAL

Void.

5.2 SAFETY

Void.

5.3 PROGRAMME AND METHOD STATEMENT

Void.

5.4 METHODS AND PROCEDURES

5.4.1 GENERAL

- 5.4.1.1 Sleepers shall be laid at right angles to the track centre line on straight track and radially on curves.
- 5.4.1.2 Sleeper spacing shall be in accordance with Annexure E of specification E.10 Gen. for the nominal spacing specified in the Project Specification. When resleepering is to be done prior to rerailing, the position of the rail joints in jointed track shall be established beforehand.
- 5.4.1.3 Special attention shall be given to the spacing of the joint and adjacent sleepers to ensure that it is as specified.
- 5.4.1.4 The contact areas of clips and rail flanges shall be cleaned of lubricant and foreign matter, before installation.
- 5.4.1.5 Proprietary fastenings and those using multi-coil spring washers shall be tightened in accordance with the manufacturer's instructions or as directed by the Engineer.
- 5.4.1.6 Instructions which are issued in connection with the installation of insulating pads shall be followed implicitly. Care shall be taken not to damage these pads.

5.4.2 WOOD SLEEPERS AND FASTENINGS

- 5.4.2.1 Wood sleepers shall be laid with the heart down. Laminated wood sleepers may be laid either side down.
- 5.4.2.2 Holes for coach screws in wood sleepers shall be drilled right through the sleeper and square to its upper surface, 15 mm diameter in softwood and 17 mm diameter in hardwood.
- 5.4.2.3 Dowels 25 mm long shall be inserted and driven to the bottom of the holes whereafter the holes shall be filled with creosote before the coach screws are screwed home tightly by means of a manual or power-operated box spanner. Coach screws may not be hammered in.
- 5.4.2.4 Tapered or spring keys in chairs shall be driven in the direction of traffic on unidirectional lines and as the Engineer directs on bidirectional lines.
- 5.4.2.5 The Contractor shall ensure that when new wood sleepers are laid under second-hand rails, the holes are drilled such that the gauge will be correct if new rails were to be used.

5.4.2.6 Should the Contractor drills holes in wood sleepers incorrectly, he shall, at his own cost, plug the faulty holes with dowels of the correct diameter and length, dipped in creosote. If more than four holes are drilled incorrectly in any sleeper, the sleeper will be condemned and replaced at the contractor's cost.

5.4.2.7 Old holes must be plugged with dowels of the correct length, dipped in oil or creosote.

5.4.2.8 Chairs and sole plates shall be secured to sleepers as follows:

- a) On straights, with two coach screws per rail seat placed diagonally.
- b) Between shift points on curves with transitions, with four coach screws per rail seat.
- c) Between the beginning and end of the circular curve on curves without transitions, with four screws per rail seat.

5.4.2.9 Sleepers must be handled with care so that the wood is not damaged.

5.4.3 CONCRETE SLEEPERS AND FASTENINGS

5.4.3.1 Various makes of concrete sleepers and different types of fastenings shall not be mixed in the track.

5.4.3.2 The Contractor shall obtain sleeper clip combinations and details of sleeper fastenings from the Engineer and he shall check that the combinations and fastenings do, in fact, give the required gauge before he proceeds to use the material.

5.4.3.3 Concrete sleepers with Fist A type fastenings shall not be used as joint sleepers at fishplated joints.

5.4.3.4 Drilling of holes and driving of nails and bolts into concrete sleepers is not permitted.

5.4.3.5 Before traffic is permitted over track laid on newly inserted concrete sleepers, the sleepers shall be packed.

5.4.4 STEEL SLEEPERS AND FASTENINGS

5.4.4.1 Clip bolts shall be lubricated before they are tightened.

5.4.4.2 Clip bolts shall be fitted with washers and nuts.

5.4.5 SLEEPERS ON UNBALLASTED BRIDGES

5.4.5.1 Special sleepers will be supplied for use on unballasted bridges.

- 5.4.5.2 Bridge sleepers shall not be adzed to make the running top even. Steel packing plates will be supplied for this purpose for insertion between the sleeper and the rail chair.
- 5.4.5.3 If protective plates, walkways or safety rails are fixed to the sleepers, the Contractor shall, when resleepering, remove them and replace them on the new sleepers.
- 5.4.5.4 Sleepers shall not rest on the ballast walls but shall be laid on either side of the walls as close as possible to 700 mm spacing.
- 5.4.5.5 The Contractor shall drill the wood sleepers to suit the fixing arrangements on the steelwork and shall insert the fixing bolts with the special washers and nuts on the top of the sleepers.

5.4.6 RESLEEPERING

- 5.4.6.1 Resleepering under long-welded rails may be done at any temperature below the maximum of the A range on track laid with steel sleepers, B range on track laid with wood sleepers and C range on track laid with concrete sleepers, which ranges are specified in Annexure H of specification E.10 Gen. At least eight sleepers on both sides of any sleeper being removed shall be properly boxed in and tamped.
- 5.4.6.2 When resleepering under rails of 36 m length or shorter, at least four sleepers on both sides of any sleeper being removed shall be properly boxed in and tamped. Resleepering shall not be done when the rail temperature exceeds the upper limit of temperature range C shown in Annexure H of specification E.10 Gen.
- 5.4.6.3 In tunnels, sleepers may be replaced consecutively to within 20 m inside the tunnel portal irrespective of the rail temperature outside the tunnel.
- 5.4.6.4 Sleepers under lock bars and safety bars, and sleepers to which any bond or signalling apparatus is attached, shall not be disturbed unless the Engineer is present and has given his consent.

5.4.7 RESPACING OF SLEEPERS

- 5.4.7.1 Where the sleeper spacing is not in accordance with that specified in Annexure E of specification E.10 Gen. for the nominal spacing specified in the Project Specification, the Contractor shall respace the sleepers.
- 5.4.7.2 Respacing of sleepers shall only be done within the same temperature limits and while the same number of sleepers on both sides are properly boxed in and tamped as specified in 5.4.6 hereof for resleepering.
- 5.4.7.3 The Contractor shall open up the track to move a sleeper to be respaced to the correct position, loosen the sleeper fastenings, move the sleeper to the correct spacing, fasten the sleeper fastenings and pack the sleeper. Additional sleepers shall be inserted where necessary to ensure that the distance between packed sleepers does not exceed three times the nominal sleeper spacing.

5.5 STANDARDS

Void.

5.6 COMPLETION

Void.

6. TOLERANCES

Void.

7. TESTING

Void.

8. MEASUREMENT AND PAYMENT**8.1 SCHEDULED ITEMS****8.1.1 Offload and distribute sleepers Unit: Each**

Each sleeper offloaded and distributed will be counted.

8.1.1.1 Separate items will be scheduled for the following:

- a) Wood Sleepers.
- b) Concrete sleepers.
- c) Steel sleepers.
- d) Sleepers in tunnels and on bridges.
- e) Offloading from wagons and lorries.

8.1.1.2 The rates tendered shall include for the following:

Offloading and distributing the sleepers.

8.1.2 Offload and stack sleepers..... Unit: Each

Each sleeper offloaded and stacked will be counted.

8.1.2.1 Separate items will be scheduled for the following:

- a) Wood Sleepers.
- b) Concrete sleepers.
- c) Steel sleepers.
- d) Released sleepers.
- e) Sleepers in tunnels and on bridges.
- f) Offloading from wagons and lorries at stacking points.
- g) Offloading from lorries into wagons.

8.1.2.2 The rates tendered shall include for the following:

- a) Clearing site of all rubbish and vegetation.
- b) Offloading and stacking of sleepers on the ground or dunnage.
- c) Providing dunnage.

8.1.3 Load from stack, transport and distribute sleepersUnit: Each. km

Each sleeper loaded, transported and distributed will be counted.

8.1.3.1 Separate items will be scheduled for the following:

- a) Wood Sleepers.
- b) Concrete sleepers.
- c) Steel sleepers.
- d) Sleepers in tunnels and on bridges.
- e) Transport with wagons and lorries.

8.1.3.2 The rates tendered shall include for the following:

- a) Loading the sleepers.
- b) Transport over free haul distance.
- c) Offloading and distributing the sleepers.

8.1.4 Offload and distribute sleeper fasteningsUnit: Sleeper

Sleeper fastenings offloaded and distributed for each sleeper will be counted.

8.1.4.1 Separate items will be scheduled for the following:

- a) Wood sleepers fastenings.
- b) Concrete sleeper fastenings.
- c) Steel sleeper fastenings.
- d) Sleeper fastenings in tunnels and on bridges.
- e) Offloading from wagons and lorries.

8.1.4.2 The rates tendered shall include for the following:

Offloading and distributing the sleeper fastenings.

8.1.5 Offload and stack sleepers fastenings.....Unit: Sleeper

Sleeper fastenings offloaded and stacked for each sleeper will be counted.

8.1.5.1 Separate items will be scheduled for the following:

- a) Wood sleeper fastenings.
- b) Concrete sleeper fastenings.
- c) Steel sleeper fastenings.
- d) Sleeper fastenings in tunnels and on bridges.
- e) Released sleeper fastenings.
- f) Offloading from wagons and lorries.
- g) Offloading from lorries into wagons.

8.1.5.2 The rates tendered shall include for the following:

- a) Clearing site of all rubbish and vegetation.
- b) Offloading and stacking of the sleeper fastenings.

8.1.6 Load from stack, transport and distribute sleeper fastenings:Unit: Each.km

Sleeper fastenings loaded, transported and distributed for each sleeper will be counted.

8.1.6.1 Separate items will be scheduled for the following:

- a) Wood sleeper fastenings.
- b) Concrete sleeper fastenings.
- c) Steel sleeper fastenings.
- d) Sleeper fastenings in tunnels and on bridges.
- e) Transport with wagons and lorries.

8.1.6.2 The rates tendered shall include for the following:

- a) Loading the sleeper fastenings from the stack.
- b) Transport over free haul distance.
- c) Offloading and distributing the sleeper fastenings.

8.1.7 Lay sleepers in new track..... Unit: Each

Each sleeper laid will be counted.

8.1.7.1 Separate items will be scheduled for the following:

- a) Wood sleepers on straights.
- b) Wood sleepers on curves.
- c) Concrete sleepers.
- d) Steel sleepers.
- e) Sleepers in tunnels and on bridges.

8.1.7.2 The rates tendered shall include for the following:

- a) Laying sleepers and fitting sleeper fastenings.
- b) Drilling holes and inserting dowels in wood sleepers.
- c) Plugging of old holes in wood sleepers.
- d) Inserting packing plates on sleepers on unballasted bridges.

8.1.8 Re-sleepering in existng track Unit: Each

Each sleeper put in existing track to replace an existing sleeper will be counted.

8.1.8.1 Separate items will be scheduled for the following:

- a) Wood sleepers on straights.
- b) Wood sleepers on curves.
- c) Concrete sleepers.
- d) Steel sleepers.
- e) Sleepers in tunnels and on bridges.

8.1.8.2 The rates tendered shall include for the following:

- a) Opening up the ballast.
- b) Removing the existing sleepers and sleeper fastenings from the track.
- c) Laying sleepers and fitting sleeper fastenings.
- d) Packing the sleepers and boxing in the ballast.
- e) Drilling holes and inserting dowels in wood sleepers.
- f) Plugging of old holes in wood sleepers.
- g) Removing and inserting packing plates on sleepers over unballasted bridges.
- h) Removing and replacing any bond or signaling apparatus attached to the sleepers.
- i) Removing and replacing protective plates.

8.1.9 Respacing of sleepers Unit: Each

Each sleeper respaced will be counted.

8.1.9.1 Separate items will be scheduled for the following :

- a) Wood sleepers.
- b) Wood sleepers on curves.
- c) Concrete sleepers.
- d) Steel sleepers.

8.1.9.2 The rates tendered shall include for the following:

- a) Opening up the track.
- b) Loosening and refitting the sleeper fastenings.
- c) Moving the sleeper to the correct position.
- d) Packing the sleepers and boxing in the ballast.

8.1.10 Loading released and surplus sleepers Unit: Each

Each sleeper loaded will be counted.

8.1.10.1 Separate items will be scheduled for the following:

- a) Wood sleepers.
- b) Concrete sleepers.
- c) Steel sleepers.
- d) Sleepers in tunnels and on bridges.
- e) Loading on wagons and lorries.

8.1.10.2 The rates tendered shall include for the following:

Loading the sleepers.

8.1.11 Loading released and surplus sleeper fastenings Unit: Sleeper

Sleeper fastenings loaded for each sleeper will be counted.

8.1.11.1 Separate items will be scheduled for the following:

- a) Wood sleeper fastenings.
- b) Concrete sleeper fastenings.
- c) Steel sleeper fastenings.
- d) Sleeper fastenings in tunnels and on bridges.
- e) Loading on wagons and lorries.

8.1.11.2 The rates tendered shall include for the following:

Loading the released and surplus sleeper fastenings.

8.1.12 Transport released and surplus sleepers with lorries Unit: Each.km

Each sleeper transported will be counted.

8.1.12.1 Separate items will be scheduled for the following:

- a) Wood sleepers.
- b) Concrete sleepers.
- c) Steel sleepers.
- d) Sleepers in tunnels and on bridges.

8.1.12.2 The rates tendered shall include for the following:

The transport over free haul distance.

8.1.13 Transport released and surplus sleeper fastenings with lorries.....Unit: Sleeper.km

Sleeper fastenings transported for each sleeper will be counted.

8.1.13.1 Separate items will be scheduled for the following:

- a) Wood sleeper fastenings.
- b) Concrete sleeper fastenings.
- c) Steel sleeper fastenings.
- d) Sleeper fastenings in tunnels and on bridges.

8.1.13.2 The rates tendered shall include for the following:

The transport over free haul distance.