Engineering Practices Manual

Civil Engineering

Inspection of Track Clearances - Procedure

RAP 5135

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1. General

This instruction details the procedure for inspection of track clearances to structures and other tracks for all areas.

2. Reason and nature of change

Document reissued as ARTC Engineering Practice Manual.

3. Inspection Procedure

When performing this type of inspection, the examiner is to have the following equipment available.

- a 5m tape measure,
- a combination clearance/cross-level gauge,
- list of applicable clearances, track centres and superelevation for the Length,

The Delivery Manager or nomianted representative is to provide the Length Inspector/Examiner with details of:

- those structures known to be within the limits for recording on Form 1 as shown in ARTC Standard TEP 10 Section 3,
- the design clearance for each of those structures.

At locations where there is an approved infringement of the structure gauge, written advice will be provided by the Delivery Manager or nominated representative detailing the required clearances, examination frequency, special actions, etc.

4. Inspection of Clearance to Structures

The examiner is to check clearances at listed structures. This list will indicate:

- The kilometrage of the Sydney and country ends of each structure.
- The clearance to the gauge face of the nearest rail at both ends of the structure and at 5m intervals.
- The designed superelevation at each clearance measurement point and whether the structure is convex or concave.

Clearance at each indicated point is to be measured using a combination board. The board is to be referenced to the wall or plaque and the horizontal clearance to the gauge face of the rail is to be read off using the cursor (see Figures 1 and 2).

The board must be held level (as indicated by spirit level) when clearances are being measured.

The specified clearance for any structure takes any overhang such as platform copings, opening doors, etc into consideration. Only measurements at rail level need to be made.

In addition to checking the clearance, the examiner is to measure the cross-level or superelevation at each measurement point.

Track clearance and superelevation variations are to be recorded on the inspection form as +/- mm from design.

5. Inspection of Track Centres

Designed track centres and superelevations are listed for each Length.

Track centres are checked by measuring the distance from the gauge faces of the up or down rails of adjacent tracks.

Note: Track centres are NOT measured from adjacent rails of adjacent tracks.

A (non-conductive) tape measure is to be used for measuring track centres. Track centre variations are to be recorded on the inspection form as +/- mm from design (see Figure 3).

In addition to track centres, the superelevation/cross-level for both tracks is to be measured and recorded at each inspection point (see Figure 4).

Changes in clearances due to changes in track centres and superelevation are calculated in accordance with the examples shown in Appendix 1.

5.1 Clearance Points

Delivery Managers or nominated representatives are to confer with the Signals Engineer to ensure that approved design clearances are provided at clearance points and that relevant details are provided to track examination staff.

6. Inspection of Rail Level

Designed rail levels beneath all structures and under overhead wiring are listed for each Length.

Rail levels are checked by measuring the vertical distance from the reference mark on monuments or survey pegs to the running surface of the datum rail.

In the case of survey plaques or pipes set into the walls of platforms, tunnels or other structures, rail level is checked by measuring the vertical distance from the rail level (R.L.) inscription on the face of the plaque or from the upper face of the lower pipe to the running surface of the datum rail.

The datum rail may be either rail on straight track, but is always the inner or low rail on curves or transitions.

A combination clearance/cross-level gauge fitted with an accurate spirit level is to be used for measuring rail levels. In some cases, where survey pegs are significantly higher or lower than rail level, it may be necessary to use a tape measure in conjunction with the combination board.

Where survey pegs are located further than 1.5m from the track, a straight edge or string line fitted with an accurate spirit level may be used in conjunction with a tape measure.

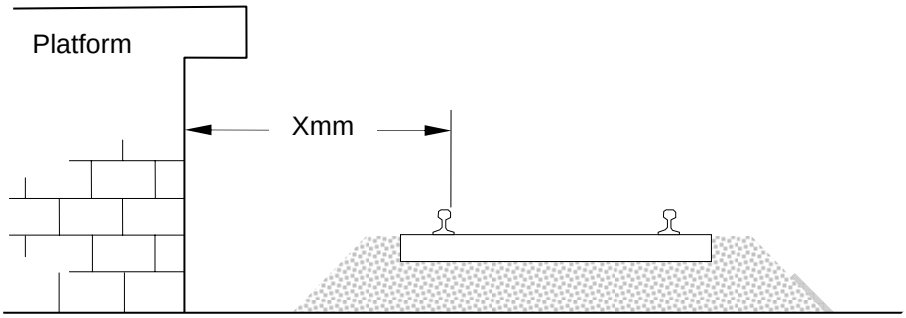


Figure 1 - Measuring Clearance to structures

Figure 2 – Measurement of Structure Clearances

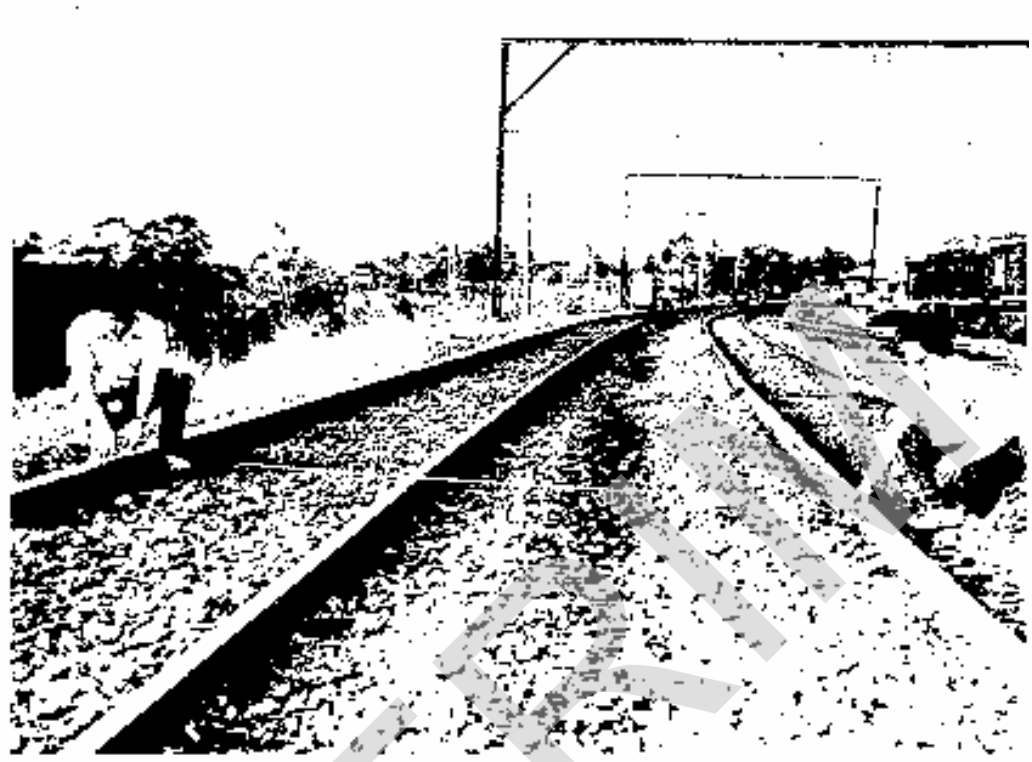


Figure 3 - Measuring Track Centres

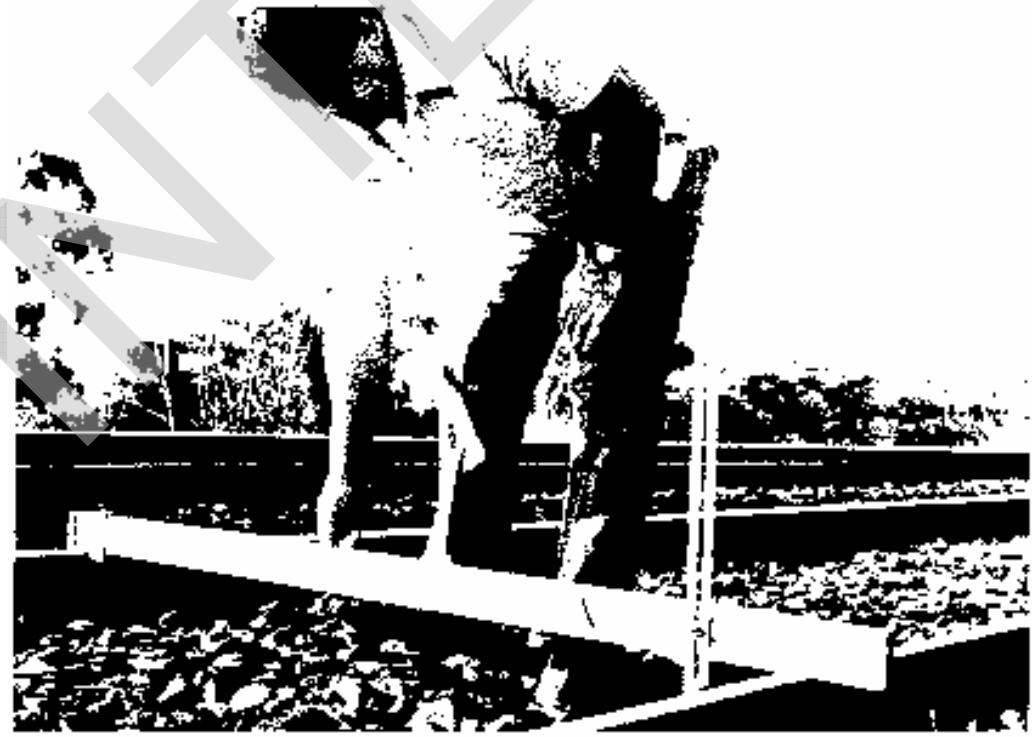
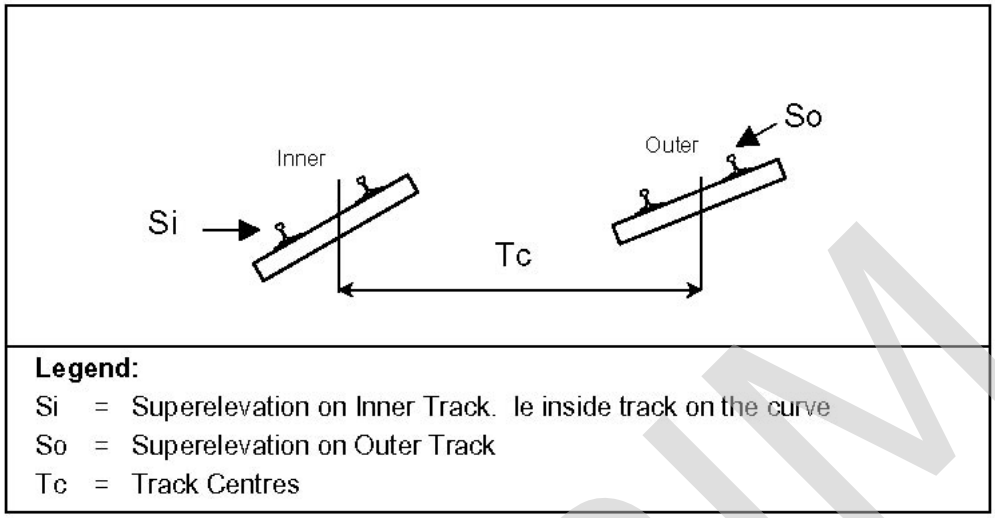


Figure 4 - Measuring Superelevation

Appendix 1

Example A: Calculation of Variation in Track Centres



Legend:
Si = Superelevation on Inner Track. Ie inside track on the curve
So = Superelevation on Outer Track
Tc = Track Centres

Example

Si = 50mm (Actual)

So = 70mm (Actual)

Tc (Actual) = 3950

Tc (Design) = 4000

Difference in Super = Si - So
= 50mm - 70mm
= - 20mm

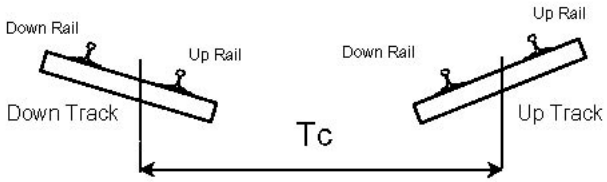
Difference in Track Centres due to Super = - 20mm x 3
= - 60mm

Difference in Track Centres = Tc (Actual) - Tc (Design)
= 3950mm - 4000mm
= - 50mm

Total Variation in Track Centres = Diff. (Super) + Diff. (Centres)
= (- 60mm) + (- 50mm)
= - 110mm (reduced by 110mm)

This exceeds 90mm and must be reported

Example B: For Straight Track



Convention:
Where the Down Rail is lower than the Up Rail, Superelevation is positive (+)

Example

S (Down Track) = - 10mm (Actual) Tc (Actual) = 4010

S (Up Track) = + 30mm (Actual) Tc (Design) = 4000

Difference in Super = S (Down Track) - S (Up Track)
= (- 10mm) - (+ 30mm)
= - 40mm (Note: Negative sign indicates reduction in vehicle clearance)

Difference in Track Centres due to Super = - 40mm x 3
= - 120mm

Difference in Track Centres = Tc (Actual) - Tc (Design)
= 4010mm - 4000mm
= + 10mm

Total Variation in Track Centres = Diff. (Super) + Diff. (Centres)
= (- 120mm) + (+ 10mm)
= - 110mm (reduced by 110mm)

This exceeds 90mm and must be reported