

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS



सत्यमेव जयते

TECHNICAL INSTRUCTION NO. TI/IN/0039

Technical Instruction for making of non-scheduled holes in steel structures of
Traction Installation

January , 2019

ISSUED BY

TRACTION INSTALLATION DIRECTORATE
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- 1.0 Scope:** Instructions for non-schedule holes in steel structures of Traction Installation.
- 2.0 Background:** CPD/RE/SC informed RDSO regarding non-standard practice of making hole in the portal/TTC leg by drilling or gas cutting.
- 3.0 Objective:** To avoid weakening of the structures due to non-standard practices.
- 4.0 Instructions:** Instructions for provision of non-schedule holes in steel structures:
- (i) Schedule of holes in the steel structure's RDSO drawings comply the requirements of IS: 800. Non-schedule holes can be made in the steel structure subject to the compliance of this IS.
 - (ii) 'Over size holes' and 'short & long slots holes' as mentioned in IS: 800 are not permitted for making non-schedule hole in steel structures. Only "standard clearance hole" are permitted as per clause 10.2.1 table-19 of IS: 800-2007 specifying the clearances for fastener holes.
 - (iii) Making holes by hand flame cutting, gas cutting and punching are not permitted.
 - (iv) Portal upright legs are made of L-angles. Holes are not drilled in these L-angles. A plate having hole is welded for Bond connection. If Bond is to be connected at non-scheduled location, then similar plate (with predrilled hole) should be welded at appropriate place for making bond connection.
 - (v) Clause 7.3.2 of IS:800-2007, *Effective Sectional Area*: Except as modified in 3.7.2 (Class 4), the gross sectional area shall be taken as the effective sectional area for all compression members fabricated by welding, bolting and riveting so long as the section is semi-compact or better. Holes not fitted with rivets, bolts or pins shall be deducted from gross area to calculate effective sectional area.
 - (vi) *Clause 8.6.2 of IS:800-2007, Sectional Properties 8.6.2.1 The effective sectional area*: of compression flanges shall be the gross area with deductions for excessive width of plates as specified for compression members and for open holes occurring in a plane perpendicular to the direction of stress at the section being considered (see 8.2.1.4).
 - (ix) *Clause 10.2.4 of IS: 800-2007, Edge and End Distances 10.2.4.1*: The edge distance is the distance at right angles to the direction of stress from the centre of a hole to the adjacent edge. The end distance is the distance in the direction of stress from the centre of a hole to the end of the element.
 - (x) *Clause 13.3 of IS: 800-2007, Detail Category*: This clause not applicable.
 - (xi) *Clause 17.2.4.2 of IS: 800-2007, Punching*: Guideline of punching as per this clause is not applicable. Punching is not permitted.
 - (xii) 17.5mm Ø hole/holes shall be drilled in channel of TTC upright at a spacing of 200mm or a plate having pre-drilled hole of 17.5mm Ø shall be welded with angles of portal upright for bonding at height of 350mm (approx.) from the top of embedded length.