

Figure 5-397.158

Structural Tube Railing (Design T-2) For Concrete J or F Barrier

Approved, and signed, December 2, 2015.

Re-approved: 12-02-2015

The standard was updated to include the following changes; moved the railing spindles to the outside of the railing, added specific material requirements to the turnbuckle, stud socket, and other cable components, improved the welding details, improved rail expansion details at the posts, added a cover plate over the cable end connection, and added new anchorage requirements. The title was also updated.

At OUTSIDE ELEVATION OF RAILING:

- Moved the spindles to the outside of the railing
- Added a cover plate over the cable end connection.
- Added the guardrail connection plate.
- Updated the cable, turnbuckle and cable end connection notes and material requirements.
- Changed the rails from TS sections to HSS sections.
- Removed the deflection joints and added control joints.
- Added an additional expansion end and fixed end rail post of right side of elevation.
- Added an expansion joint in the barrier with circled notes.

At WELDS AT END PANEL:

- Updated the weld symbols and notes.

At CABLE ANCHOR PLATE DETAIL:

- Revised the anchorage note and circled notes.

Added COVER PLATE DETAIL

At DETAIL “A”

- Changed the rail from TS section to HSS section.

At DETAIL “B”

- Modified the note regarding the slotted hole.
- Added weld details.

Added DETAIL “C”

- Details the size of the bent plate and the weld of the bent plate to the rail post.

Added DETAIL “D”

- Details the connection of the spindles to the longitudinal rails.

Removed BENT PLATE DETAIL:

- Now included in DETAIL “C”.

At INTERMEDIATE RAILPOST DETAIL:

- Modified the bent plate dimensions and added circled notes 7 and 9 to allow more than ½” of movement for the panel at the end expansion joint.

At SECTION A-A:

- Updated the barrier to an F shape with an aesthetic coping.
- Changed the rails from TS sections to HSS sections.
- Updated the anchorage length and notes about the anchorage.

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At SECTION A-A (cont'd):

- Added a designer note regarding the anchorage length.
- Moved the spindles to the outside of the rail and updated the cable requirements.
- Modified the plate and weld details at the top of the post.
- Added reference to details "C" and "D".

Under GENERAL NOTES:

- The notes were completely rewritten in active voice and updated to conform to current requirements for ornamental metal railings, including updates to the adhesive anchor requirements. New notes were added for the anchorages including minimum embedment and torque requirements. A new note was added for continuous grounding of the railing and for bolts in slotted holes. New notes were added to specify specific material requirements for the cable turnbuckles and connection hardware.
- A new circled note 9 was added and circled notes 7 thru 13 were renumbered.

10-29-2004

Added note: RAIL MEETS TEST LEVEL 4 REQUIREMENTS OF NCHRP REPORT 350.

At OUTSIDE ELEVATION OF RAILING: changed LEFT-HAND TURNBUCKLE JAW ($\frac{1}{2}$ "-13 x 9") to LEFT-HAND TURNBUCKLE JAW ($\frac{1}{2}$ "-13 x 9"), HAND TIGHTEN FIRMLY

At END RAILPOST DETAIL and INTERMEDIATE RAILPOST DETAIL: changed $\frac{7}{8}$ " DIA. HOLE to $\frac{5}{8}$ " DIA. HOLE

At SECTION A-A:

- $\frac{5}{16}$ " dia. (7 x 19) cable shown and labeled
- Added note: SHIM AND CHALK AS NEEDED FOR PROPER GRADE AND ALIGNMENT. SEE SPECIAL PROVISION FOR REQUIREMENTS.

At DETAIL "B":

- Added centerline and dimensioning to vent hole
- Changed $1\frac{3}{8}$ " DIA. VENT HOLE to $1\frac{3}{8}$ " DIA. THROUGH HOLE and pointed to centerline

Under GENERAL NOTES:

- Changed note ©: $3\frac{1}{2}$ " (AT TYP. EXP. END) ... to $1\frac{1}{2}$ " (AT TYP. EXP. END) ...

Approved, and signed, October 29, 2004.