SECTION 760 - ERECTION OF SIGN GANTRIES AND

 HIGH‑MAST LIGHT STRUCTURES

##This section cross-references Sections 610, 611, 630 and 631.

If any of the above sections are relevant, they should be included in the specification.

If any of the above sections are not included in the specification, all references to those sections should be struck out, ensuring that the remaining text is still coherent:

760.01 DESCRIPTION

This section covers the requirements for the assembly and erection of sign gantries and high‑mast light structures, which have been designed in accordance with Bridge Technical Note BTN 014 Sign gantries and lighting masts.

760.02 GENERAL

The term anchor shall be used to describe bolts, threaded rods and bars.

The term column shall be used to describe all vertical or near-vertical members.

Reinforced concrete foundations and pile-caps shall be constructed in accordance with the drawings and Sections 610 and 611.

Structural steelwork shall be fabricated in accordance with the drawings and Section 630 and coated in accordance with the drawings and Section 631.

760.03 INSTALLATION OF ANCHORS AND ERECTION OF COLUMNS

(a) Anchors

 Bolts shall have a maximum grade of 4.6 or equivalent if other types of anchor are used.

 A minimum of eight anchors shall be used in each column base-plate.

 Anchors for gantry and light mast structures shall be cast into the foundation pile cap. Retro-fitted expanding or bonded anchors in drilled or cored holes shall not be used.

 A cast-in double anchor cradle shall be used to achieve correct relative positioning and alignment of cast-in anchors and holes in base-plates. Anchor cradles shall connect all of the anchors into a rigid arrangement and shall be made of weldable steel plates with a minimum width of 3 x anchor diameter and a minimum thickness of 5 mm, fabricated in accordance with Section 630. Double anchor cradles shall comprise two identical frames, one at the lower end of the anchors, and another removable frame at the upper end, which is to be removed when the foundation or pile-cap has gained sufficient strength and prior to erection of the column.

 On completion of casting of the foundation, all projecting anchors shall be vertical or as shown on the drawings, be mutually parallel, and it shall be possible to place the base-plate into its final position on the projecting anchors without any adjustment of the anchors.

 The projecting length of the anchors shall be sufficient to achieve the requirements of Bridge Technical Note BTN 014 in respect of the depth of the void under the base-plate and the limits on the projecting length of the anchor.

 Anchors that are misaligned, in the wrong position, of insufficient projecting length, or have damaged threads, shall be rejected.

**HP If cast-in anchors do not comply, the Contractor must submit proposals for rectification to the Superintendent. The use of force to correct errors in alignment or position of cast‑in anchors is not permitted.**

(b) Erection of Columns

 Columns shall be erected in accordance with the vertical alignment requirements of and tolerances stated in AS/NZS 5131 – Structural steelwork – Fabrication and erection.

 Columns shall be supported during erection using appropriate temporary structures until all permanent connections have been made, grout has achieved its design strength and the structure is stable and capable of resisting all working loads.

(c) Levelling Nuts

 Levelling nuts shall be placed on the projecting cast-in anchors and, following erection of the column or pole to the required alignment, nuts above and the levelling nuts below the base-plate shall be tensioned to snug-tight against the base-plate.

 Top-nuts shall then be tensioned by the part-turn method as follows:

Anchor-bolt diameter ≤ 37.5 mm 1/6 turn beyond snug tight

Anchor-bolt diameter > 37.5 mm 1/12 turn beyond snug tight

(d) Grouting of Voids Under Base-plates

 If the drawings require the use of grout to fill the void under the base-plate, it shall be a high early strength (minimum nominal strength of 50 MPa), free-flowing, non-shrink proprietary material. The use of sand:cement mortar or cement grout to fill the void is not permitted. The void under the base-plate must be filled to a level 10 mm above the underside of the base-plate.

 Grout must be mixed in accordance with the manufacturer’s recommendations using a mechanical mixer which has sufficient volume to mix the grout required for one base-plate in a single mix.

 Grout must be placed in its final position within the maximum time limit recommended by the manufacturer.

(e) Formwork

 Formwork for grout must be sealed to prevent leakage.

 Formwork must be provided on all sides or around the full perimeter of the base-plate.

(f) Grouting

 Grout must be poured in a single continuous operation to the required level.

 Neither the formwork, base-plate or fluid grout shall be vibrated or tapped.

 Grout must then be cured in accordance with the manufacturer’s instructions.

(g) Grout-testing

 Cube tests shall be taken at a minimum rate of one set of four per day. The set of cubes shall represent the whole of the day’s production of grout. Two cubes shall be tested at 7 and 28 days respectively. The results of the cube tests shall be reported to the Superintendent within 7 days of testing.

 **If the grout does not achieve the required 28‑day strength, the Contractor shall submit proposals for rectification to the Superintendent.**

760.04 ADDITIONAL REQUIREMENTS FOR CANTILEVER SIGN STRUCTURES WITH CANTILEVER ARMS OF HORIZONTAL LENGTH GREATER THAN 9 M

In the case of design and construct contracts, if the design requires a cantilever arm more than 9 m in length, the Contractor shall provide and install vibration monitoring equipment and monitor vibrations in the structure for a period of 12 months immediately following completion of the structure.

Vibration monitoring shall be achieved by measuring variations in strain at the base-plate weld to establish that the strain range is less than the relevant constant-amplitude fatigue limit.

The Contractor shall collect and interpret the vibration data and prepare a report on the performance of the structure which shall include an assessment of its fatigue life. The Contractor shall employ suitably experienced professionals to provide advice on vibration monitoring and to prepare the assessment of fatigue life.

Proposals for vibration monitoring together with the collection and interpretation of data shall be subjected to proof-engineering by a prequalified consultant.

**HP The Contractor shall submit its finalised proposals for vibration monitoring and reporting to the Superintendent for review not later than four weeks prior to the commencement of vibration monitoring.**

**The Contractor shall submit the final report on vibration monitoring including the assessment of fatigue life to the Superintendent within eight weeks of the completion of vibration monitoring.**