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All anchor bolts shall receive a double nut and shall be tightened to given values to ensure they remain tight over the life of the structure. The elimination of the grout pad, while allowing the free drainage of the posts, creates a free-standing base plate. This requires special attention to the placement of the base plate. It is imperative that the gap between the base plate and the top of pedestal not exceed the dimensions given in the contract documents.

Pole markings are for the purpose of giving each OSS a unique Sign Identification Number (SIN), and to facilitate identifying each structure in the field. Stamping the name of the fabricator and date of fabrication will allow the State to trace any unexpected problems back to the original fabricator.

Serialized pay items by span length and sign area will easily allow cost comparisons in the future. Before, items were just serialized sequentially within a specific contract, even if the structures were very similar. Every structure had a unique item number because the serialized item number also acted as an identifying number for the structure. Under this old system costs could not easily be compared from contract to contract. Now that each structure will be assigned a SIN, the pay item no longer needs to be used as the identifying number. There can now be multiple structures in the same contract with the same pay item. This change should also help designers prepare the engineer's estimate.

EB 03-032 issues a design manual and BD sheets for use in designing, assembling plans for, and constructing span and cantilever OSS.

EB 03-033 issues Blue Pages to the "AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 4TH Edition, 2001."

TRANSMITTED MATERIALS: Attached to this EI are revisions to Section 644 Sign Structures, Section 645 Signs, Section 715-01 Structural Steel, and Section 730-27 Permanent Variable Message Signs.

BACKGROUND: The Department has been designing and building span type overhead sign structures using aluminum since the early 1960's. Research and field inspections have determined that fatigue is an important issue in sign structure design and that aluminum is considerably more susceptible to fatigue damage than steel. Beginning in the Spring of 2000 a statewide inspection program was begun for all OSS. By far the largest problem was cracked aluminum welded connections. The Department addressed this problem in October 2000 by calling an aluminum moratorium and by issuing interim steel designs for span type OSS with the issuance of EI 00-035 and EB 00-063. EB 03-032 updates these designs, and adds standard tables for both span and cantilever OSS.

COST IMPACT: It is anticipated that these new structures will be 20-30% less expensive than the interim steel designs issued by EI 00-035. There are three factors controlling these savings. First, the interim designs were designed very conservatively, in order to fast track replacement designs for the aluminum tri-chords. The designs contained herein have been refined without this extra degree of conservatism. The second factor is the switch from mandating conventional footings to allowing drilled shafts. It is anticipated that this change will decrease construction time and cause fewer disruptions to traffic. The third factor is the increasing familiarity of the fabricators with the new details required.

CONTACT: Please direct any questions regarding this Engineering Instruction to Harry White of the Standards Unit at (518) 485-1148 or by email at hwhite@dot.state.ny.us

Make the following changes to the Standard Specifications dated January 2, 2002.

Volume 2 of 3, page 6-140, **DELETE** Section 644 - Sign Structures in its entirety, and replace with the following:

SECTION 644 - OVERHEAD SIGN STRUCTURES

644-1 DESCRIPTION

644-1.01 General. Under this work the Contractor shall fabricate, furnish and erect sign structures for overhead signs in accordance with the contract documents.

Within seven (7) days of contract award, the Contractor shall notify the Deputy Chief Engineer, Structures (D.C.E.S.) of the name and address of the fabricator of all overhead sign structures, as outlined in §106-01, *Source of Supply and Quality Requirements*. This notification shall list the shop or shops in which the sign structures will be fabricated.

644-1.02 Definitions. Overhead Sign Structures (OSS) are structures with vertical supports and horizontal arms or chords used to support signs over any portion of the roadway, including the shoulders. Span Wire Assemblies supporting overhead signs, and structures supporting both traffic signal equipment and overhead signs are covered under Section 680, *Traffic Signals*. Bridge fascia mounted signs, where the signage is intended for the under roadway, are also not covered in this Section.

OSS are classified into the following three standard types (See Figure 644-1).

A. Single Arm Cantilever. Single (horizontal) arm supported by a single (vertical) post.

B. Trussed Arm Cantilever. Two trussed arms supported by a single post. (If the arms are not trussed, the structure shall be classified as Non-Standard).

C. Span. Single span, four-chord (quad-chord) superstructure supported by trussed end posts.

OSS that fall outside these categories are Non-Standard. This includes butterfly structures, multi-span structures, structures that are a combination of span and cantilevers, and all other overhead sign structures not included in §644-1.02.

644-2 MATERIALS

644-2.01 Steel for Sign Structures. Steel for component parts of sign structures shall meet the requirements of the *New York State Steel Construction Manual* and the following:

All material greater than 13 mm thick shall meet the Charpy V-Notch toughness requirements of §715-01, *Structural Steel*. Chords, cantilevered arms, end posts, base plates, end and face plates for cantilever arm to post connections, and flange splice plates shall be considered main members. Diagonals, struts and gusset or tab plates shall be considered secondary members. Upon receipt at the fabrication plant, all main member material shall be traceable to a mill test report and traceability shall be maintained throughout the duration of the fabrication.

All main member material thickness shall be a minimum of 6 mm.

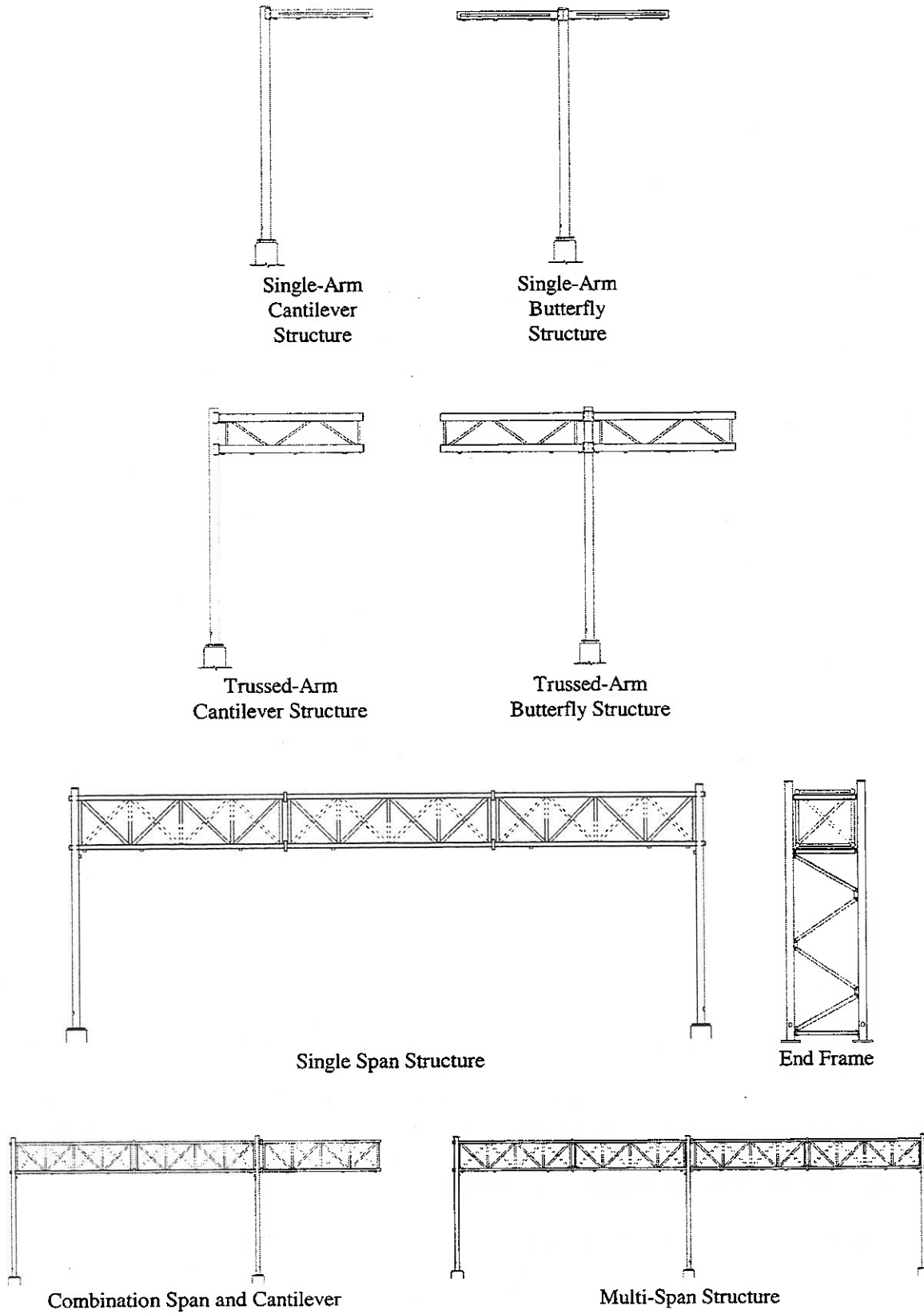


FIGURE 644-1

A. Pipe. Pipe shall meet the requirements of one of the following specifications:

- ASTM A 53, Welded and Seamless Steel Pipe, Grade B, Type E or S.
- ASTM A 500, Welded and Seamless Steel Pipe, Grade B (Rounds Only)
- ASTM A 252, Welded and Seamless Steel Pipe, Grade 2 or 3, provided that the chemical certifications meet the requirements for ASTM A 53, Grade B, Type E or S.
- API 5L American Petroleum Institute Specification 5L, Grade B

In addition to the above material requirements, all pipe used for welded applications shall have a maximum Carbon Equivalency (CE) of 0.40 using the following equation:

$$CE = \%C + \%Mn/6 + \%Cu/40 + \%Ni/20 + \%Cr/10 - \%Mo/50 - \%V/10$$

B. Structural Steel. Structural steel for structural shapes, plates, and bars shall meet the requirements of §715-01, *Structural Steel*, and the ASTM Specification noted on the contract documents. Cutting and drilling shall be done in such a manner that the resulting surfaces are free from any gouges or burrs.

C. Anchor Bolts, Nuts and Washers. Anchor bolts, nuts and washers shall meet the requirements of the following:

ASTM F 1554, Grade 55 with Supplementary Requirement S4, Charpy Impact Requirement

Anchor bolts, nuts, and washers shall be galvanized in accordance with the requirements of Materials Detail 719-01 Type II, Galvanized Coatings and Repair Methods - Zinc Coating (Hot Dip) on Iron and Steel Hardware. Anchor bolts shall be the Unified Course Thread Series with Class 2A threads, and shall be galvanized full length. Nuts shall be Grade A, Heavy Hex.

D. High Strength Steel Bolts, Nuts and Washers. Bolted steel connections shall be made with bolts, nuts and washers meeting the material requirements of §715-14, *High Strength Bolts, Nuts and Washers*, and the galvanizing requirements of §719-01, *Galvanized Coatings and Repair Methods*. Additionally, the Contractor shall provide documentation that the zinc coated fastener assemblies have satisfied the requirements of ASTM A 325M Section 6.2, R.C. testing.

Fasteners in main members shall be sampled and tested in accordance with Section 1001.5 of the *New York State Steel Construction Manual*, with the exception that the waiver for lot sizes less than 20 bolts shall not apply.

E. U-Bolts. U-Bolts shall conform to material specification ASTM F 1554, Grade 36, and shall be galvanized in accordance with the requirements of Type II of §719-01, *Galvanized Coatings and Repair Methods*.

F. Galvanizing. All steel shall be galvanized in accordance with §719-01 Type I, except as noted above in §644-2.01 C, D & E. Galvanizing shall provide a minimum coating of 127 μ m. All welding, cutting and drilling shall be done prior to galvanization, and all bolting shall be done after galvanization, except as approved by the Engineer.

G. Acceptance. All steel furnished shall be documented in accordance with the requirements of §715-01 Basis of Acceptance.

644-2.02 Concrete. All overhead sign structure foundations shall meet the requirements of Class A concrete in Section 501, *Portland Cement Concrete - General*. The Contractor may submit, for approval by Director, Materials Bureau, a mix at least equivalent to the specified Class A Concrete.

All precast concrete overhead sign structure foundations shall meet the requirements of §704-03, *Precast Concrete - General*.

644-3 CONSTRUCTION DETAILS

644-3.01 Drawings. Shop drawings shall be required for all OSS in the contract documents. The Contractor must submit shop drawings in accordance with the requirements of Section 2 in the *New York State Steel Construction Manual*.

644-3.02 Fabrication. All fabrication, inspection, transportation and erection shall be performed in accordance with the requirements of the *New York State Steel Construction Manual*. 5

A. Storage of Materials. Structural material shall be stored in a manner that will protect the materials from deformation, surface deterioration and accumulations of dirt, oil, or other foreign matter.

B. Straightening Materials. Prior to fabrication in the shop, all deformed structural materials shall be properly straightened by methods which are non-injurious. Sharp kinks and bends, and deep dents shall be cause for rejection. 10

C. Anchor Bolts. Where anchor bolts have been or are being set under a separate contract, the Contractor shall check the size, location, and spacing of anchor bolts before fabricating the structure. 15

D. Pole Markings. A Sign Structure Identification Number (SIN) shall be attached to the post using white numbers on a green background. The background shall be Green, Class A, Engineer Grade reflective sheeting as described in §730-05, *Reflective Sheeting*, and shall be 300 mm wide by 150 mm high, with the corners cut to a 40 mm radius. The numbers shall be cut out from White, Class A, Engineer Grade reflective sheeting and shall be 75 mm high. The sheeting and numbers shall be applied in accordance with the manufacturer's recommendations. The numbers shall be placed on the right near post, 45 degrees from the viewing direction of traffic, approximately 1.8 m above the base plate, so as to be visible to the traveling public. For structures spanning more than one direction of traffic, or structures that span non-contiguous travel lanes, two posts shall be marked to facilitate identification by inspectors. 20 25

The following information shall be stamped into the base plate in 12 mm letters to such a depth as to be clearly visible through subsequent galvanizing:

Required Information	Example	
Manufacturer's name or logo	ABC Fabricating	
Month and year of manufacture	06/2003	30
D Number	D123456	
SIN Number	SIN 12345	

For span type structures the marked base plate shall correspond to the marked posts, except that only one end of the span must be marked.

E. High Strength Bolts. Each bolt shall be furnished with a galvanized flat washer installed under the turned element. All connections shall be made by first tightening all nuts and bolts sufficiently to bring all components into full contact with each other. After full contact has been achieved, all connections shall be brought to a condition beyond snug tight as required by Table 1001.3b of the *New York State Steel Construction Manual*. 35

Fasteners shall be inspected after installation in accordance with Section 1001.4 of the *New York State Steel Construction Manual*. The inspection shall apply to a minimum of 10% of the connections randomly throughout the entire span of the structure. 40

All holes for high strength bolts in main members shall be made in accordance with Section 613 of the *New York State Steel Construction Manual*. This requirement also includes all secondary members that are welded to main members.

F. Quality. Fabricators shall be certified in accordance with the American Institute of Steel Construction's Quality Certification Program in the Simple Steel Bridge Structures Category, or an equivalent program acceptable to the D.C.E.S. 5

G. Inspection. Provisions for shop inspection shall be in accordance with the *New York State Steel Construction Manual*.

H. Assembly. All OSS shall be fully assembled in the fabrication shop to ensure proper fitup.

I. Acceptance For Shipping. Each section of a sign structure shall bear the QA inspector's mark of acceptance prior to shipping. 10

644-3.03 Transportation. Sign structures (including posts and post assemblies) shall be shipped by flat bed trailer or other similar means. Structures shall be shimmed, braced, blocked, and tied down to prevent distortion or other damage from occurring during transportation. The use of any device which does not support the member for its entire length, as described below, shall not be permitted. This prohibition includes, but is not limited to, dolly wheels and pole trailers. 15

Sections less than 15.0 m in length shall be, at a minimum, supported at the midspan and end points. Sections 15.0 m and longer shall be, at a minimum, supported at the ends and at the quarter points.

Adhering to these requirements does not relieve the Contractor of the responsibility for damage to the structure en route. 20

644-3.04 Excavation. All excavation shall conform to Section 206, *Trench, Culvert and Structure Excavation*.

Excavation shall not be performed until immediately before installation of the footings, or any other appurtenances. The excavated material shall be placed in a location or locations selected by the Contractor so as to cause the least inconvenience to vehicular and pedestrian traffic and to avoid interference with surface drainage. All surplus excavated material shall be removed and disposed of by the Contractor as specified in §203-3.08, *Disposal of Surplus Excavated Materials*. 25

Excavation shall be backfilled as specified in §203-3.15, *Fill and Backfill at Structures, Culverts, Pipes, Conduits and Direct Burial Cables*.

The outline of all areas to be removed in sidewalks, driveways, and pavement shall be saw cut to a depth of at least 75 mm prior to removal. Cuts shall be neat and true along score lines with no shatter outside the removal area. Damaged saw cut areas shall be recut. 30

Pavement, shoulder, sidewalks, curbs, driveways, lawns, plants and other such features shall be replaced in kind with material of equal quality or as shown in the contract documents. For transverse sidewalk, curb or gutter cuts in concrete the entire square or section shall be removed and replaced with the same kind and quality of material. For longitudinal cuts in concrete sidewalks only the area removed between sawcuts shall be replaced unless specified otherwise in the contract documents. 35

Whenever a part of a square or slab of existing concrete sidewalk, curb, gutter or driveway is broken or damaged by this work, the entire square, section or slab shall be removed and replaced with the same kind and quality of material, at no additional cost to the State. 40

644-3.05 Concrete Foundations. Foundations shall be constructed as shown in the contract documents. The Contractor shall establish the location and elevation of foundation, prior to the start of construction, based on the information shown in the contract documents and data derived from field surveys. Locations and elevations will be verified by the Engineer prior to the start of construction.

The Contractor has the option, unless specifically disallowed in the contract documents, to use either Drilled Shafts or Rectangular Footings for Overhead Sign Structures, if both types are detailed in the contract plans. When both foundation types are detailed and permitted, the Department has prepared the contract documents based on the presumed less expensive foundation type. If the Contractor elects to 45

change from one type of foundation to the other under this option, it shall be done at no additional cost to the State. The Contractor shall notify the Engineer of the decision to change foundation type.

Excavation for these items shall be as specified in §644-3.04. All concreting operations shall conform to Section 555, *Structural Concrete*. Reinforcing steel shall conform to Section 556, *Reinforcing Steel for Concrete Structures*.

The allowable tolerance from verticality for the drilled shaft or pedestal shall be 2.5%. The allowable tolerance for the top of shaft elevation or pedestal elevation shall be +6 mm, -0 mm.

Stripping of forms and subsequent loading of foundations shall be in accordance with §555-3, in Table 555-1, under "Pier Columns". Placing the sign panels on an overhead sign structure is assumed to be equivalent to placing superstructure loads on a bridge.

A. Drilled Shafts for Overhead Sign Structures. Work under this item shall consist of the layout and construction of Drilled Shaft foundations for Overhead Sign Structures. This work may require rock drilling, installing rock sockets, dewatering, the use of temporary casing, slurry, or other means necessary to keep the hole open. Formwork shall be required for the portion of the shaft above finished grade.

Holes for drilled shafts shall be pre-augered. Precaution shall be taken to protect the holes from collapse. Holes shall contain no free water, nor any loose material at the time of concrete placement. The holes shall be filled with Class A concrete placed in direct contact with the soil. Casing, if used, shall be removed prior to concrete placement. Precast shafts shall not be permitted.

B. Rectangular Footings for Overhead Sign Structures. Work under this item shall consist of the layout and construction of conventional rectangular spread footings, either cast-in-place or precast. This work may require the use of protective sheeting.

644-3.06 Erection of Sign Structures

A. Methods and Equipment. Before starting work, the Contractor shall submit details of the method of erection and types of equipment he proposes to use, to the Engineer for review and approval. Approval shall not relieve the Contractor of the responsibility for the safety of the methods or equipment, or for damage to the structures due to overloading.

B. Handling and Storage. Structural members shall be loaded, moved, and unloaded in a manner that prevents stresses in excess of those provided for by the structure design. Permanent distortion, or other damage attributable to the Contractor's operations, shall be cause for rejection.

Members stored either in the fabricator's storage area, or at the work site, or at other storage areas, shall be supported off the ground in a manner that will not allow distortion, or other damage to occur.

C. Lifting. Erection of overhead sign structures shall be done in accordance with §107-05 (P), *Lifting*. Lift Plans shall be required, in accordance with §107-05 (P) 4. Nylon slings, or an equivalent approved by the Engineer, shall be used for all lift operations. Picking points for the superstructure portion of span type OSS shall be made at the panel points that are closest to the third points of the span, in order to ensure that no members are overstressed during lift operations. Two picking points, one at each end, shall be used for the superstructure portion of cantilever OSS. Picking shall be made by wrapping the entire cross section of the structure. When alternate pick points are used, supporting calculations shall be submitted in accordance with §107-05 (P) 5, *Lift Operations*. However, lifting by chains or by individual members shall not be permitted.

D. Field Inspection. All sign structures shall be visibly inspected, and components shall be clean prior to erection. Damage that is attributable to the Contractor's operations shall be cause for rejection. Damage includes, but is not limited to, bends, kinks, dents, cracks and pits. Rejected structures, or components, shall be removed from the work site and repaired, or replaced as required

by the D.C.E.S. All work relating to the repair or replacement, of defective structures, or components, shall be done at no additional cost to the State.

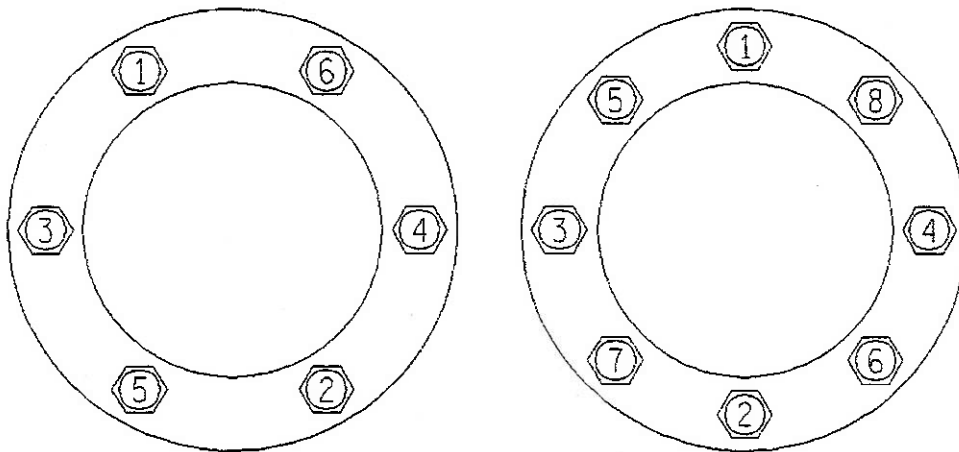
E. Anchor Bolts. The following procedure shall be used for placing and tightening anchor bolts:

1. Anchor bolts shall be carefully set to the proper location, alignment, and elevation by using templates. Templates shall be as detailed in the contract documents, and shall be used at both the top and bottom of the anchor bolt pattern. Bottom templates shall be cast into the footing. Top templates shall be placed near the top of the anchor bolts so as not to interfere with concrete operations, and shall be left in place for 24 hours after concrete placement. Undamaged top templates may be reused. 5
2. Anchor bolts shall be set vertical, within 2.5%, and shall not be realigned by bending to fit the base plate. Anchor bolts that do not fit the base plate, or anchor bolts that are more than 2.5% out of plumb, shall be rejected. The Contractor may propose a remediation method for rejected anchor bolts, subject to the approval of the Engineer. Rejected anchor bolts, and the concrete they are embedded in shall be replaced by new materials at no cost to the State. 10
3. The exposed portion of the anchor bolts shall be cleaned with a wire brush. The leveling nuts and washers under the base plate shall be threaded onto the anchor bolts, leaving a gap between the top of concrete and the bottom of the leveling nuts of no more than one anchor bolt diameter, and no less than 10 mm. 15
4. The post(s) alone, without the arms attached, shall be placed on the leveled anchor bolts and washers. Posts shall not be raked back to account for camber. The base plate shall bear directly and evenly on the washers and leveling nuts. 20
5. Beeswax, or the equivalent, shall be applied to the bearing face and the threads inside the top nut. The top anchor bolt nuts and washers shall then be placed and tightened by hand. All cleaning and lubricating shall be done immediately prior to nut placement and tightening. Top nuts and leveling nuts shall be checked for full bearing against the base plate, and any loose nuts shall be tightened by hand. The top nuts shall then be snug tightened using 20 - 30% of the torque values listed in Table 644-1. The snugging sequence shall be as shown in Figure 644-2. The leveling nuts shall then be similarly checked for snug tightness, using 20 - 30% of the values listed in Table 644-1. 25
6. Fully tighten all top nuts according to the torques listed in Table 644-1. The tightening sequence shall be as shown in Figure 644-2. There shall be no rotation of the leveling nut during this procedure. 30
7. An additional nut shall be installed and tightened against the top nut to lock the installation. This lock nut shall be prepared and tightened as defined in 5.) and 6.) above. There shall be no rotation of the lower top nut during this procedure. 35

Table 644-1

Anchor Bolt Size (Metric)	Required Torque (±5%) (N•m)	Anchor Bolt Size (English)	Required Torque (±5%) (ft•lbs)
M36	850	1 ½	650
M42	1,300	1 ¾	1,000
M48	2,000	2	1,500
M56	2,900	2 ¼	2,200
M64	4,000	2 ½	3,000

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Anchor Bolt Star Pattern Tightening Sequence
 6 Bolt Pattern 8 Bolt Pattern

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FIGURE 644-2

F. Bolting. Bolted steel connections shall be made with bolts, nuts and washers meeting the material requirements of §715-14, *High Strength Bolts, Nuts and Washers*, and the galvanizing requirements of §719-01, *Galvanized Coatings and Repair Methods*. Each bolt shall be furnished with a galvanized flat washer installed under the turned element. All connections shall be made by first tightening all nuts and bolts sufficiently to bring all components into full contact with each other. Any gaps between the faying surfaces after snug tightening that exceed 1 mm shall not be considered in full contact and shall be cause for rejection. The Contractor may propose remediation measures subject to approval by the D.C.E.S. Rejected components shall be replaced or repaired at no cost to the State. Bolts shall not be fully tightened before said tolerances are checked. After full contact has been achieved, all connections shall be brought to a condition beyond snug tight as required by Table 1001.3b of the *New York State Steel Construction Manual*.

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Fasteners shall be inspected after installation in accordance with Section 1001.4 of the *New York State Steel Construction Manual*.

G. Welding. Field welding shall not be permitted on any part of the structure, except as approved by the D.C.E.S.

H. Galvanized Metal Repair. The Contractor shall repair any damage to galvanized surfaces in conformance with the field repair requirements specified in §719-01, *Galvanized Coatings and Repair Methods*, except that zinc paint applied by the spray method shall not be permitted.

644-4 METHOD OF MEASUREMENT

644-4.01 Sign Structure. The work will be measured as the number of sign structures installed without sign panels.

644-4.02 Drilled Shafts for Overhead Sign Structures. The payment quantity shall be the concrete volume shown for the shaft in the table in the contract documents, multiplied by the number of drilled shafts in the contract, unless the Engineer orders a modification to the details shown in the contract documents. If the Engineer orders a modification to the details shown in the contract documents, the payment quantity shall be the volume of concrete ordered by the Engineer. If the Engineer orders a change from a drilled shaft to a rectangular footing, an order-on-contract shall be negotiated. No adjustment shall be made for the Contractor's election to use a rectangular footing, unless the Engineer orders a change to the details shown in the contract documents.

644-4.03 Rectangular Footing for Overhead Sign Structures. The payment quantity shall be the concrete volume shown for the footing and pedestal in the table in the contract documents, multiplied by the number of footings in the contract, unless the Engineer orders a modification to the details shown in the contract documents. If the Engineer orders a modification to the details shown in the contract documents, the payment quantity shall be the volume of concrete ordered by the Engineer. If the Engineer orders a change from a rectangular footing to a drilled shaft, an order-on-contract shall be negotiated. No adjustment shall be made for the Contractor's election to use a drilled shaft, unless the Engineer orders a change to the details shown in the contract documents.

644-4.04 Anchor Bolts. The payment quantity shall be the mass shown in the anchor bolt table in the contract documents times the number of bolts installed.

644-5 BASIS OF PAYMENT

644-5.01 Sign Structure. The unit price bid for each structure for supporting sign panels shall be compensation in full for fabricating, furnishing and erecting the structure complete as specified including upright support(s), span and/or cantilever arm or truss assemblies, diagonal bracing, all necessary hardware, nuts, bolts, and washers, and all other material, equipment and labor necessary to properly complete the work as shown in the contract documents and called for in the specifications. Footings and anchor bolts shall be paid for under separate items or will be furnished by others.

The cost of all shop drawings, prints and reproducible prints required by the *New York State Steel Construction Manual* shall be included in the unit price bid for this item.

644-5.02 Foundations for Overhead Sign Structures. The unit price bid per cubic meter shall include the excavation, any protective system(s) required to ensure the safety of the workers and the public, dewatering, backfill (select granular backfill or concrete), formwork, concrete, bar reinforcement for concrete, excavation and backfilling of test holes, conduit and fittings, restoration of surfaces in kind, disposal of excess excavated material, and saw cutting.

644-5.03 Anchor Bolts. The unit price bid per kilogram shall include the furnishing and installing the anchor bolts and all necessary hardware, including galvanizing, as shown in the contract documents and called for in the specifications. This includes the anchor bolts, all templates used to ensure the proper alignment of the anchor bolt system, all nuts, and all washers necessary to complete the work as shown in the contract documents.

Payment will be made under:

Item No.	Item	Pay Unit	
644.11 M	Anchor Bolts	Kilogram	
644.20 M	Drilled Shaft for Overhead Sign Structures	Cubic Meter	
644.30 M	Rectangular Footing for Overhead Sign Structures	Cubic Meter	5
644.41xxyy M	Single Arm Cantilever Sign Structure	Each	
644.42xxyy M	Trussed Arm Cantilever Sign Structure	Each	
644.43xxyy M	Single Span Sign Structure	Each	
644.44nn M	Non-Standard Sign Structure	Each	

Note: xx, yy and nn denote serialized pay items. See §101-02, *Definition of Terms*, under "Specifications". 10

xx denotes span or arm length in meters. For Single Arm and Trussed Arm Cantilever Sign Structures, xx varies from 04 to 16 in whole number increments. For Single Span Sign Structures, xx varies from 15 to 65 in 5 meter increments.

yy denotes sign area in square meters. For Single Arm Cantilever Sign Structures, yy is 03, 05 or 08 square meters. For Trussed Arm Cantilever Sign Structures, yy varies from 05 to 30 in 5 square meter increments. For Single Span Sign Structures, yy varies from 30 to 90 in 30 square meter increments. 15

Make the following changes to the Standard Specifications dated January 2, 2002:

Page 6-148, **Add** the following after line 17

Rubber Impregnated Woven Cotton-Polyester Fabric	728-01
Rubber Impregnated Random Fiber Pad	728-02

Page 6-149, **Add** the following after line 39

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645-2.09 Sign Structure Bearing Pads. Pads shall conform to the material requirements of the following:

Type A. Pad-Rubber Impregnated Woven Cotton Fabric	728-01
Type B. Pad-Rubber Impregnated Random Fiber Pad	728-02

The specific pad types shall be specified in the contract documents or by the Engineer.

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645-2.10 U-Bolts. U-Bolts shall conform to material specification ASTM F 1554, Grade 36, and shall be galvanized in accordance with the requirements of Type II of §719-01, Galvanized Coatings and Repair Methods.

Page 6-150 line 16 **Delete** "Sign panels on overhead structures and".

Page 6-150, **Add** the following after line 23:

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C. Sign panels on overhead sign structures shall be constructed with sign and structure able to withstand wind loadings as given in the current version of the NYSDOT Design Specifications for Overhead Sign Structures.

Page 7-162, **Delete** lines 19 and 20.

Page 7-163 line 8, **Delete** "12 mm" and **Replace** with "13 mm".

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Page 7-283, **Add** the following heading after line 23:

Non-Overhead Permanent Variable Message Signs

Page 7-284, **Delete** lines 18 through 23 and **Replace** with the following:

Overhead Permanent Variable Message Signs. Variable message signs to be mounted over a traveled way, or over what the contract documents indicate will become a traveled way, shall be designed for the fatigue loads and using the allowable stresses given in the current version of the NYSDOT Standard Specifications for Overhead Sign Structures.

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