BACKGROUND ON E2-T1 AND SAS A354BD ANCHOR RODS

Draft 5/11/13

DOCUMENT(S)	DISCUSSION
SAS Design Criteria	Specifically ties design to Caltrans Bridge Design Specifications dated 1995. Use of A354BD rods is noted in design criteria. Per TY Lin/Moffatt & Nichol, design calculations required use of high strength steel anchor rods and bolts at certain locations. Due to involvement of federal funding, Buy America and sole source restrictions precluded use of proprietary rods unless it could be established that there was no alternative. This led to decision to specify A354BD rods, which were generally available and could be competitively bid.
Bridge Design Specifications ASTM Specifications	1995 Caltrans Bridge Design Specifications (BDS) do not restrict use of or galvanization of A354BD. Restriction on standard use of galvanized A354BD rods first appears in 2000 BDS. ASTM specifications for A354BD from 2002-2004 period do not restrict galvanization. The specifications do caution that hydrogen stress cracking "may occur" on hot dip galvanized A354BD rods. The 2002-2004 specifications refer to A153 for galvanization process (current specification refers to A2329). Other than the reference to A153, ASTM specifications for A354BD from 2002-2004 period are generally consistent with current ASTM specifications
E2-T1 Special Provisions	E2-T1 first advertised with specifications dated January 21, 2003 (this contract was advertised twice). Specifications call for use of A354BD rods with mechanical galvanization. Information at this point regarding use of A354BDs with galvanization is verbal and still being researched. Desire for long life span led to decision for corrosion protection. The fact that mechanical galvanization was specified indicates that potential for hydrogen embrittlement was being considered, but documentation of such analysis has not been identified.
SAS Special Provisions	SAS first advertised with specifications dated February 3, 2003 (this contract was also advertised twice). Similar to E2-T1, specifications call for use of A354BD rods with mechanical galvanization.
E2-T1 Bidder Inquiries	Bidder inquiry number 7 was submitted between 1/21/03 and 4/3/03, stating that the required A354BD rods were too large to mechanically galvanize and asked how galvanization could be applied.

Misc Correspondence	Several e-mails and memos dated between March 2003 and April 2003 discuss bolting specifications for SAS and bidder inquiry on E2-T1. Correspondence regarding E2-T1 indicates awareness of use of hot-dip galvanization of A354BD rods for the Richmond-San Rafael Bridge (RSRB) retrofit project. The RSRB retrofit was designed by a consultant, Ben Gerwick (the named principal of the firm was a member of the East Span Seismic Retrofit Peer Review Panel in the late 1990s, early 2000s). RSRB was originally specified with mechanical galvanization of A354BD rods, similar to E2-T1 and SAS, but this was modified during construction of the RSRB retrofit to hot dip galvanization by contract change order. The correspondence indicates that the RSRB did specifically consider and address hydrogen embrittlement in the change order by requiring blasting instead of pickling, followed by a standard tensile test. This approach was adopted for use in E2-T1.
E2-T1 Addendum 3	Addendum 3 to the first advertisement of the E2-T1 contract was Issued on April 4, 2003. The addendum called for hot dip galvanization of A354BD rods with blasting instead of pickling and testing per ASTM A143 (note: ASTM A143 states that testing is subject to “dimensional limitations”).
SAS Addendum 8	An analogous addendum was issued on June 6, 2003, for the first advertisement of the SAS contract.
E2-T1 Special Provisions	E2-T1 was not awarded when first advertised, and was re-advertised a second time on October 17, 2003. The readvertised contract called for hot dip galvanization of A354BD rods with blasting instead of pickling and testing per ASTM A143 (note: ASTM A143 states that testing is subject to “dimensional limitations”).
SAS Special Provisions	SAS was not awarded when first advertised, and was re-advertised a second time on August 1, 2005. The readvertised contract called for hot dip galvanization of A354BD rods with blasting instead of pickling and testing per ASTM A143 (note: ASTM A143 states that testing is subject to “dimensional limitations”).

DRAFT

SAS Design Criteria, Dated 7/15/02

San Francisco-Oakland Bay Bridge
East Span Seismic Safety Project

Contract 59A0040

SELF-ANCHORED SUSPENSION BRIDGE

DESIGN CRITERIA

07/15/02

100% Submittal

NOTE: THIS INCLUDES W2, E2 AND T1

Reference: Criter20r22

Prepared by T.Y.Lin International/Moffatt & Nichol Engineers, a Joint Venture

1. GENERAL

The bridge shall be designed in accordance with "Caltrans Bridge Design Specifications Manual (1995) (BDS)," modified or augmented as detailed in this design criteria.
In addition to bridge and site specific criteria, pertinent sections of the following standards or codes have been employed for such modifications or augmentations.

• "AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges", 1999 Edition, with Addenda through 1998	"AASHTO Seg."
• "Proposed LRFD Guide Specifications for Design of Segmental Concrete Bridges", S. I. Units, March 1997	"LRFD Seg."
• "AASHTO Standard Specifications for Highway Bridges", 16th Edition, 1992	"AASHTO"
• "AASHTO LRFD Specifications for Highway Bridge Design" 2nd Edition, 1998, AASHTO, Washington, DC, 1994	"AASHTO LRFD"
• "Sacramento Regional Transit District Light Rail Design Criteria", May 1993	"Sac. LRT"
• "San Francisco-Oakland Bay Bridge East Span Seismic Safety Project Light Rail Transit Design Criteria", 1999	"SFOBB LRT"
• "Improved Seismic Design Criteria for California Bridges: Provisional Recommendations" ATC-32 Report, June 30, 1996	"ATC-32" Report
• "Proposed Design Specifications for Steel Box Girder Bridges", FHWA-TS-80-205, FHWA, Washington, DC, 1980	
• "Guide Specifications and Commentary for Vessel Collision Design of Highway Bridges" Volume I: Final Report, February, 1991	
• "Recommended Practice for Planning, Designing, and Constructing Fixed Offshore Platforms – Working Stress Design", API RP2A-WSD 20th Ed. 1993	
• "Recommended Practice for Planning, Designing, and Constructing Fixed Offshore Platforms – Load and Resistance Factor Design" – API RP2A-LRFD 1st Ed. 1993	
• "AISC Manual of Steel Construction Load & Resistance Factor Design" (LRFD) , 1999 Edition	"AISC LRFD"
• "AISC Manual of Steel Construction", 9th Edition, 1989	"AISC"
• "ANSI/ASCE", 7-95 Standard	"ANSI / ASCE"
• Stability Design Criteria, 5th Edition, SSRC	
• West Wind Laboratory Report, Monterey, California, May, 2001	"WWL Report"

• Transportation and Traffic Engineering Handbook, Institute of Transportation Engineers, 1976	"THAT"
• Technical Specifications for Suspension Structures	"Suspension Contract" Document
• Hydraulic Modeling and Scour Analysis, T.Y. Lin / Moffatt & Nichol, JV Report , October 31, 1999	"Scour" Report
• Seismic Ground Motion for SFOBB, East Span Seismic Safety Project, Furgo, Earth Mechanics, JV Report, February 2001	"Seismic Ground Motion" Report
• AASHTO Guide Specifications and Commentary for Vessel Collision Design of Highway Bridge, 1991	"AASHTO Vessel Collision"
• Bridge Welding Code, AWS D1.5M, 1996	"AWS D1.5"
• Structural Welding Code – Steel AWS D1.1, 1998	"AWS D1.1"
• AISC – Seismic Provisions for Structural Steel Buildings, April 1997	"AISC – Seismic Provisions"
• "The strength and ductility of steel bridge piers based on loading tests" by K. Kawashima, G. MacCrae, and K. Hasegawa, Public Works Record Institute, Journal of Research Vol. 29, March 1992	"Kawashima et al" Report
• Technical Specifications for Skyway Sidewalks	
• "Recommended Design Loads for Bridges" by the Committee on Loads and Forces on Bridges of the Committee on Bridges of the Structural Division, July 1981	"Design Loads for Bridge" Report
• "East Bay Bridge Vessel Collision Analysis", Moffatt & Nichol	"Vessel Collision Analysis" Report
• "Frictional Resistance Between Cable and Saddle Equipped with Frictional Plates" by K. Hasegawa, H. Kojima, M. Sasaki, and K. Takena, Journal of Structural Engineering, Vol. 121, No. 1, January 1995, Paper No. 4042	"Hasegawa et al" Paper
• "Slip Behavior of Cable Against Saddle Suspension Bridges" by K. Takena, M. Sasaki, K. Hata, and K. Hasegawa. Journal of Structural Engineering, Vol. 118, No. 2, February 1992, Paper No. 1309	"Takena et al" Paper
• SFOBB East Span; Seismic Design Criteria Basis, SDCB, June 27, 2000	"SDCB"
• Axial Pile and Drivability Main Span-East Pier and Skyway Structures, Fugro and Earth Mechanics Report, March 2001	"Axial Pile and Drivability" Report
• Lateral Pile Design for Main Span Pier E2 and Skyway, Fugro and Earth Mechanics Report, February 2001	"Lateral Pile Design" Report
• San Francisco Oakland Bay Bridge –New Self Anchored Suspension Span Wind Studies Final Report, January 2002	

6. STRUCTURAL STEEL

6.1 MATERIALS

Unless modified herein, or specified in the BDS, structural steel shall comply with the AASHTO and ASTM Materials Specifications.

6.1.1 Structural Steel

The following steels shall be used:
ASTM A709M Gr. 345, ASTM A709M HPS 485W, ASTM A514M Gr. 690, and Shear Link Gr. 345

Shear Link Gr. 345

Yield Strength, min.	345 MPa (50 ksi)
Yield Strength, max.	380 MPa (55 ksi)

6.1.2 Structural Steel Connection

High Strength Bolts	ASTM A325-X, ASTM A490-X
Main Cable Strand Anchor Rod, Suspender Socket Anchor Rod, East Saddle Tie Rod, East Saddle Anchor Rods, Tower Anchor Bolts, Tower Saddle Tie Rods, and Pier E2 Bearing and Shear Key Anchor Bolts	ASTM A354 Gr. BD
Cable Band Bolts, West Deviation Saddle Anchor Rods, West Deviation Saddle Bolts, and West Jacking Saddle Bolts	ASTM A354 Gr. BC
Dowels	ASTM A633 Gr. E
Cap Screws	ASTM A240 Type 316

6.1.3 Main Cable

Parallel zinc coated carbon steel wire, diameter 5.40 mm (including coating)

Tensile Strength, min.	1,760 MPa	(254 ksi)
Yield Point, min.	1,350 MPa	(195 ksi)
Proportional Limit, min.	900 MPa	(131 ksi)
Design elastic modulus	200,000 MPa	(29,000 ksi)
Zinc coating	Class A	

6.1.3.1 Suspenders

Wire Rope	ASTM A603 – Class A zinc coating	
Wire Strength, min.	1,350 MPa	(195 ksi)
Design elastic modulus	138,000 MPa	(20,000 ksi)

6.1.3.2 Wrapping Wire

ASTM A510 Gr. 1010

Tensile Strength, min.	450 MPa	(65 ksi)

Caltrans Bridge Design Specifications

ASTM Specifications

(1) Along edges of material less than ¼ inch thick, the maximum size may be equal to the thickness of the material.
(2) Along edges of material ¼ inch or more in thickness, the maximum size shall be 1/16 inch less than the thickness of the material, unless the weld is especially designated on the drawings to be built out to obtain full throat thickness.

10.23.2.2 Minimum Size of Fillet Welds

The minimum fillet weld size shall be as shown in the following table. *Weld size is determined by the thicker of the two parts jointed unless a larger size is required by design. The weld size need not exceed the thickness of the thinner part joined.*

Material Thickness of the Thicker Part Joined		Minimum Size of Fillet Weld	
Inches	mm	Inches	mm
To ½ inclusive	12.7	3/16	4.8
Over ½ to ¾	12.7 to 19.1	¼	6.4
Over ¾ to 1½	19.1 to 38.2	5/16	7.9
Over 1½ to 2¼	38.2 to 57.2	⅜	9.5
Over 2¼ to 6	57.2 to 152.4	½	12.7
Over 6	152.4	⅝	15.9

The minimum size seal weld shall be 3/16" (4.8 mm) fillet weld.

10.23.3 Minimum Effective Length of Fillet Welds

The minimum effective length of a fillet weld shall be four times its size and in no case less than 1½ inches.

10.23.4 Fillet Weld End Returns

Fillet welds which support a tensile force that is not parallel to the axis of the weld, or which are proportioned to withstand repeated stress, shall not terminate at corners of parts or members but shall be returned continuously, full size, around the corner for a length equal to twice the weld size where such return can be made in the same plane. End returns shall be indicated on design and detail drawings.

10.23.5 Seal Welds

Seal welding shall preferably be accomplished by a continuous weld combining the functions of sealing and strength, changing section only as the required strength or the requirements of minimum size fillet weld, based on material thickness, may necessitate.

10.24 FASTENERS (Rivets and Bolts)

10.24.1 General

10.24.1.1 In proportioning fasteners, for shear and tension the cross-sectional area based upon the nominal diameter shall be used.

10.24.1.2 High-strength bolts may be substituted for Grade 1 rivets (ASTM A 502) or ASTM A307 bolts. When AASHTO M 164 (ASTM A325) high-strength bolts are substituted for ASTM A307 bolts they ~~need not be installed to the requirements of Article 11.5.6.4, Division II, nor inspected to the requirements of Article 11.5.6.4.9, Division II, but~~ shall be tightened to the full effort of a man using an ordinary spud wrench.

10.24.1.3 All bolts, except high-strength bolts ~~tensioned to the requirements of Table 11.5A or Table 11.5B, Division II~~, shall have single self-locking nut, ~~or~~ double nuts, *or a nut with a thread locking system.*

10.24.1.4 Joints required to resist shear between their connected parts are designated as either slip-critical or bearing-type connections. Slip-critical joints are defined as joints subject to stress reversal, heavy impact loads, severe vibration or where stress and strain due to joint slippage would be detrimental to the serviceability of the structure. They include:

(1) Joints subject to fatigue loading.
(2) Joints with bolts installed in oversized holes.
(3) Except where the Engineer intends otherwise and so indicates in the contract documents, joints with bolts installed in slotted holes where the force on the joint is in a direction other than normal (between approximately 80 and 100 degrees) to the axis of the slot.
(4) Joints subject to significant load reversal.
(5) Joints in which welds and bolts share in transmitting load at a common faying surface.

10.23.2 Effective Size of Fillet Welds

10.23.2.1 Maximum Size of Fillet Welds

The maximum size of a fillet weld that may be assumed in the design of a connection shall be such that the stresses in the adjacent base material do not exceed the values allowed in Article 10.32. The maximum size that may be used along edges of connected parts shall be:

(1) Along edges of material less than $^1/_4$ inch thick, the maximum size may be equal to the thickness of the material.
(2) Along edges of material $^1/_4$ inch or more in thickness, the maximum size shall be $^1/_{16}$ inch less than the thickness of the material, unless the weld is especially designated on the drawings to be built out to obtain full throat thickness.

10.23.2.2 Minimum Size of Fillet Welds

The minimum fillet weld size shall be as shown in the following table.**

Material Thickness of the Thicker Part Joined (in.)	Minimum Size of Fillet Weld* (in.)
To $^1/_2$ inclusive	$^3/_{16}$
Over $^1/_2$ to $^3/_4$	$^1/_4$
Over $^3/_4$ to $1^1/_2$	$^5/_{16}$
Over $1^1/_2$ to $2^1/_4$	$^3/_8$
Over $2^1/_4$ to 6	$^1/_2$
Over 6	$^5/_8$

The minimum size seal weld shall be $^3/_{16}$" fillet weld.

* Except that the weld size need not exceed the thickness of the thinner part jointed. For this exception, particular care should be taken to provide sufficient preheat to ensure weld soundness.

** Smaller fillet welds may be approved by the Engineer based upon applied stress and the use of appropriate preheat.

10.23.3 Minimum Effective Length of Fillet Welds

The minimum effective length of a fillet weld shall be four times its size and in no case less than $1^1/_2$ inches.

10.23.4 Fillet Weld End Returns

Fillet welds which support a tensile force that is not parallel to the axis of the weld, or which are proportioned to withstand repeated stress, shall not terminate at corners of parts or members but shall be returned continuously, full size, around the corner for a length equal to twice the weld size where such return can be made in the same plane. End returns shall be indicated on design and detail drawings.

10.23.5 Seal Welds

Seal welding shall preferably be accomplished by a continuous weld combining the functions of sealing and strength, changing section only as the required strength or the requirements of minimum size fillet weld, based on material thickness, may necessitate.

10.24 FASTENERS

10.24.1 General

10.24.1.1 In proportioning fasteners, for shear and tension the cross-sectional area based upon the nominal diameter shall be used. Galvanization of AASHTO M253 (ASTM A490) and A354 Grade BD high strength bolts is not permitted due to hydrogen embrittlement problems. These fasteners must be carefully evaluated before being utilized. Requirements for bolts in these specifications shall be used for threaded rods, threaded studs and anchor rods, where applicable.

10.24.1.2 High-strength bolts may be substituted for Grade 1 rivets (ASTM A 502) or ASTM A307 bolts. When AASHTO M 164 (ASTM A325) high-strength bolts are substituted for ASTM A307 bolts they shall be tightened to the full effort of a man using an ordinary spud wrench.

10.24.1.3 All bolts, except high-strength bolts tensioned to the requirements of the Standard Specifications of the California Department of Transportation, shall have single self-locking nut, double nuts, or a nut with a thread locking system (anaerobic adhesive) to prevent nut loosening. The thread locking system is the preferred method for bolt diameters of one inch or less. The thread locking system shall not be used on bolt diameters greater than one inch. When using the double nut method a torque value for the jam nut, relative to the main nut, shall be shown on the plans to assure that a

E2-T1 Special Provisions

First Advertisement

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

AND

SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN

THE CITY AND COUNTY OF SAN FRANCISCO

AT YERBA BUENA ISLAND

DISTRICT 04, ROUTE 80

For Use in Connection with Standard Specifications Dated JULY 1999, Standard Plans Dated JULY 1999, and Labor Surcharge and Equipment Rental Rates.

CONTRACT NO. 04-0120E4

04-SF-80-13.4,13.8

Bids Open: April 15, 2003
Dated: January 21, 2003

OSD

Material conforming to ASTM Designation: A 709M, Grade 345W shall not be substituted for ASTM Designation: A 709M, non-weathering steel grades.

Ducts for prestressing high-strength ASTM Designation: A 354 bolts shall be galvanized steel pipe conforming to the requirements in ASTM Designation: A 53 or galvanized rigid steel conduit conforming to UL Publication 6 for Rigid Metallic Conduit.

Galvanizing for rigid steel conduit or steel pipe shall be tested in conformance with the requirements in ASTM Designation: A 239. Adjacent sections of steel conduit or pipe shall be connected with galvanized standard couplings.

Grouting of high strength A354 bolts shall conform to the provisions in Section 50-1.09 "Bonding and Grouting," of the Standard Specifications. Grout injection pipes shall be furnished by the Contractor as shown on the plans.

Elastomeric pads used for pile centralizers shall conform to the requirements for plain elastomeric bearing pads in Section 51-1.12H(1), "Plain and Fabric Reinforced Elastomeric Bearing Pads," of the Standard Specifications.

Pile centralizers shall be bonded to pile sleeves with adhesive conforming to Federal Specification MMM-A-121, as shown on the plans.

Ducts, fasteners, and grout caps for prestressing ASTM Designation: A354 bolts shall be considered structural steel (bridge).

High-strength fastener assemblies, and other bolts attached to structural steel with nuts and washers shall be zinc-coated, except as noted. When direct tension indicators are used in these assemblies, the direct tension indicator and all components of the fastener assembly shall be zinc-coated by the mechanical deposition process.

THROUGH-THICKNESS QUALITY

Where through-thickness quality steel is shown on the plans, the steel shall meet the low sulfur and reduction of area requirements of AWS D1.5, Section 12.4.4.1. Additionally, each plate shall be ultrasonically examined and shall meet the acceptance criteria in conformance with the requirements in ASTM Designation: A578, Level C. The Contractor may specify these requirements at any additional location at no additional cost to the State.

FABRICATION

Quality of Workmanship

The Engineer may inspect fabrications for dimensional accuracy, fabrication practices, welding, and for compliance with these special provisions.

Fabrication/Erection Procedure and Mock-Ups

The Contractor shall submit to the Engineer for approval in accordance with the requirement in "Working Drawings," of these special provisions, written, detailed procedures for the fabrication and erection of the complex assemblies listed below. Procedures shall include the assembly and welding sequence and shall be of sufficient detail to demonstrate the proposed fabrication procedure and verify the inspectability of welds.

Fabrication and erection procedures are required for the following locations:

A. E2 Footing Girder Assemblies
B. Tower Footing Assembly (girder system for pile sleeves to tower)
C. Pile to footing connection

In addition, the Contractor shall prepare a mock-up of the pile to footing connection in accordance with "Field Welding of Pile/Sleeve Connector Plates" of this section to demonstrate the proposed fabrication procedure and verify the inspectability of each weld.

The mock-up shall comprise a complete fabrication of the specified detail as shown on the plans, but with member lengths that need not extend beyond the joint more than 0.5 m.

The Contractor shall prepare a written fabrication and welding sequence and a preliminary mock-up made of wood, plastic, dense Styrofoam or other material approved by the Engineer. The preliminary mock-up shall be one quarter to one half scale and shall demonstrate the assembly sequence. These shall be submitted for review by the Engineer, and approval shall be given before the mock-up is fabricated in steel. The Engineer shall witness all fit-up and welding for each steel mock-up.

The completed steel mock-up shall be examined visually and by Magnetic Particle (MT) and, in addition, by either UT or RT in accordance with the nondestructive examination table listed under "Shop Welding" of this section. Nondestructive examination shall be completed using the nondestructive examination procedures that are proposed for production. Mock-up assemblies shall then be sectioned as directed by the Engineer to produce three macroetch samples per weld that shall be evaluated per AWS D1.5. Approval of the fabrication and erection procedure and the nondestructive examination procedures shall be contingent on satisfactory results from the mock-up examination and destructive tests.

Mechanical Cutting

Mechanical shearing of material of thickness greater than 8 mm is prohibited. Mechanically sheared edges shall be ground smooth. All cracks emanating from these edges shall be removed.

Flame, Plasma And Arc Cutting

All cut edges shall be ground to remove dross, slag and hardened material.

Bent Plate

Cold-bent rolled steel plates shall conform to the following:

A. The axis of bending shall be perpendicular to the direction of plate rolling. The entire length of bend shall be formed simultaneously.
B. The radius of bend shall be as shown on the plans.
C. Before bending, the plate corners that are perpendicular to the axis of the bend shall be rounded to a radius of 2 mm.

Match-Marking

Match markings shall be made with low stress die stamps or other method that will not notch the steel.

Punching

The first paragraph of Section 55-3.14A(1) "Punching," of the Standard Specifications shall not apply.

Punching or sub-punching of Grade 250 structural steel where the material is thicker than 16 mm will not be permitted. Punching or sub-punching of high-strength structural steel where the material is thicker than 12 mm will not be permitted.

Tower Anchor Bolts

Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354, Grade BC and Grade BD, respectively. Steel fastener components for steel fasteners designated as A 354, Grade BC and Grade BD shall include a bolt, nut and hardened washer. Nuts for steel fasteners shall conform to Section 55-2.01, "Description," of the Standard Specifications. Bolts, nuts, and washers shall be zinc-coated by the mechanical deposition process and shall be furnished with a dry lubricant conforming to Supplementary Requirement S1 and S2 in ASTM Designation: A 563.

The Contractor shall deliver the zinc-coated nuts and hardened washers to the Engineer at a location to be determined by the Engineer. Said location will be within 25 km of the San Francisco-Oakland Bay Bridge Toll Plaza. Zinc-coated nuts and hardened washers shall be delivered to the Engineer within three months prior to completion of the work. The Contractor shall notify the Engineer at least two months prior to delivery of the material.

Zinc-coated nuts and hardened washers shall be packaged for the protection of the steel against physical damage and corrosion during shipping and storage. The shipping package shall be clearly marked with a statement that the package contains nuts and hardened washers for the San Francisco-Oakland Bay Bridge, the bolt type, grade, and the date packaged.

The Contractor shall furnish and install corrosion protective coverings on tower anchor bolts as shown on the plans. Corrosion protective covers shall be on the Department's current prequalified list prior to use.

The Department maintains a list of prequalified corrosion protective covers. The prequalified list can be obtained by contacting the Transportation Laboratory and is available at the Department's internet site at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

Tower Drainage System

Drain pipe, fittings, liners, and grates shall conform to the details shown on the plans, manufactured from high-density polyethylene (HDPE), and suitable for the transmission of non-potable water. Joints in HDPE pipe shall be butt-fused. Pipe wall thickness shall be adequate to withstand loads from construction installation and concrete placement operations.

SURFACE PREPARATION

For all bolted connections, the contact surfaces and inside surfaces of bolt holes shall be cleaned and coated before assembly in conformance with the provisions for cleaning and painting structural steel of these special provisions.

WELDING OF STEEL STRUCTURES

Table 2.2 of ANSI/ AASHTO/AWS D1.5 is superseded by the following table:

SAS Special Provisions

First Advertisement

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

AND

SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN

SAN FRANCISCO COUNTY IN SAN FRANCISCO FROM 0.6 KM TO 1.3 KM EAST OF THE YERBA BUENA TUNNEL EAST PORTAL

DISTRICT 04, ROUTE 80

For Use in Connection with Standard Specifications Dated JULY 1999, Standard Plans Dated JULY 1999, and Labor Surcharge and Equipment Rental Rates.

CONTRACT NO. 04-0120F4

04-SF-80-13.2/13.9

Bids Open: June 3, 2003
Dated: February 3, 2003

OSD

6. Procedures and sequences for bearing replacement including locations of temporary support, estimate of jacking load for each temporary support location, sequences and methods of detensioning anchor bolts, method of debonding between concrete and base plates and anchor bolts, method of removing and replacing bearings, a list of equipment to be used for bearing replacement, and traffic, safety, and environmental impact.

Each working drawing and calculation sheet shall be signed by an engineer who is registered as a Civil Engineer or Mechanical Engineer in the United States of America. This registered Civil Engineer or Mechanical Engineer shall be a full-time employee of the spherical bushing bearing manufacturer.

Complete working drawings and supplement shall be submitted to the Engineer within 80 working days after the contract is awarded. After complete working drawings and supplement are received by the Engineer, the Contractor shall allow the Engineer 40 working days to review the submittal. No fabrication of test specimen and test fixtures of the spherical bushing bearing shall begin until complete working drawings and supplement are reviewed and a preliminary approval is given, in writing, by the Engineer.

After the Engineer issues a preliminary approval in writing to the Contractor for the submitted working drawings and supplement, the Contractor shall begin conducting the prototype tests for the spherical bushing bearings.

Within 10 working days after the prototype tests have been successfully completed, the Contractor shall submit to the Engineer 4 copies of the following documents for review and final approval:

A. Test records, results, certified test reports, and all other relevant test information.
B. Revised working drawings and supplement including plans, procedures, or any other modifications.

The Contractor shall allow the Engineer 30 working days to review each of the certified test reports for the prototype tests and any Contractor proposed modifications to previously submitted working drawings and supplement. If the Engineer requests additional information or calculations, the Contractor shall allow the Engineer additional 10 working days for review. Fabrication of bearings shall be subject to successful completion of the relevant prototype tests as specified in "Testing" of these special provisions.

Upon completion of installation, the Contractor shall submit to the Engineer certification stating that each spherical bushing bearing has been installed in accordance with the approved working drawings and supplements installation procedure.

MATERIALS

The materials specifications of spherical bushing bearing components shall conform to the following table:

Component	ASTM Specifications
Anchor Bolts	A354, Grade BD
Assembly Bolts	A240, Type 316
Bearing Plate	B22-C86300
Spherical Housing	A744, Grade CF-8M
Spherical Ball	B271-C86300
Solid Shaft	Structural Casting, Grade 550
Bearing Bottom Housing	Structural Casting, Grade 550
Bearing Top Housing	Structural Casting, Grade 345
Bearing Hold Down Assembly	Structural Casting, Grade 345

Attention is directed to "Welding" and "Audits" in these special provisions.

Prestressing operation of anchor bolts shall conform to the requirements in Section, "Prestressing Concrete," elsewhere in these special provisions.

High strength nonshrinnk grout shall conform to the requirements in Section, "High Strength Nonshrink Grout," elsewhere in these special provisions.

Steel components including plates and anchor bolts shall conform to the details shown on the plans, the provisions in "Steel Structures," of the Standard Specifications, and these special provisions.

Clean and paint spherical bushing bearing shall conform to the requirements in Section, "Clean and Paint Structural Steel (Modular Joint Seal Assembly, Spherical Bushing Bearing, and Shear Key)," elsewhere in these special provisions.

The Contractor shall bend and trim ribs and shell plating to ensure that the geometric tolerances shown on the plans are met.

Match-Marking

Match markings shall be made with low stress die stamps or other method that will not notch the steel.

Bolted Connections

Bolted connections in structural steel joints, unless otherwise shown on the plans or specified in the special provisions, shall be made with high-strength steel fastener assemblies. Fastener assemblies shall consist of a high-strength steel bolt, nut and hardened washer.

Tightening of bolted connections shall be completed in a set pattern with a minimum of two cycles: snug tight and full tension.

The method for determining bolt tension shall include calibration using a calibrated bolt tension calibrator. The tightening pattern and the calibration and tightening procedure shall be included in the fabrication/erection procedure and submitted to the Engineer for approval.

For the tower shaft bolted splice, all plies of the bolted connections for all faces shall be brought into alignment and full contact before tightening commences. The tower lift ends shall be milled to bear and shall be in full contact before bolting together. The Contractor shall prepare a work plan that shall describe the procedure for meeting these requirements and that shall be approved by the Engineer before use. The work plan shall be demonstrated on the mock-up required above. The mating segments of each lift shall be mated at the fabrication site, and the required fit demonstrated, before moving each lift to the final assembly site.

Bolted connections shall conform to the requirements in the Research Council on Structural Connections, "Specification for Structural Joints Using ASTM A325 or A490 Bolts," 2000 (RCSC Specification). Where the DTI method is used, the DTI shall be collapsed to 0.075mm (3 mils), and the gap in the DTI shall be caulked after acceptance by the Engineer. The method of bolt tightening shall be as specified below:

LOCATION	BOLT TYPE	COATING	TIGHTENING METHOD
Tower	A325	Hot Dip Galvanized or mechanical galvanizing	Turn of Nut or Direct Tension Indicator (DTI) collapsed to 3mils (0.075mm) on inside of Tower
	A490	Inorganic zinc coating or mechanical galvanizing	Turn of Nut
Box Girder	A325	Hot Dip Galvanized or mechanical galvanizing	Turn of Nut, TC or DTI collapsed to 3mils (0.075mm) on inside of box
Tower Skirt	A307	Hot Dip Galvanized	Snug-Tight

High-strength fastener assemblies, and other bolts attached to structural steel with nuts and washers shall be zinc-coated as shown. When direct tension indicators are used in these assemblies, the direct tension indicator and all components of the fastener assembly shall be zinc-coated by the mechanical deposition process. Stripping and re-dipping of galvanized high strength fasteners is prohibited.

Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354. Steel fastener components for steel fasteners designated as A 354 shall include a bolt, nut and hardened washer. Nuts for steel fasteners designated as A 354 shall conform to Section 55-2.01, "Description," of the Standard Specifications. Nuts shall be zinc coated and be furnished with a dry lubricant conforming to Supplementary Requirement S1 and S2 in ASTM Designation: A 563.

Steel fasteners designated on the plans as A 354, Grade BD shall be tensioned not less than the value shown on the plans. Prior to installation, the Contractor shall submit to the Engineer for approval the methods and equipment to be used to tension steel fasteners designated as A354, Grade BD in accordance with Section 55-1.02, "Drawings," of the Standard Specifications. Working drawings shall include methods and equipment to be used to evaluate: 1) the presence of a lubricant, 2) the efficiency of the lubricant, and 3) the compatibility of the high strength steel bolt, nut and hardened washer.

Except where sub-punching is permitted, bolt holes shall be drilled or reamed, unless otherwise shown on the plans.

Anchor rods

Anchor rods shall conform to the requirements of ASTM Designation: A 354, Grade BC or BD and as specified in these special provisions. Nuts shall conform to the requirements of ASTM Designation: A 563, Grade C, heavy hex. Washers shall conform to the requirements of ASTM Designation: F 436. The pitch of the threads shall be as shown on the plans.

Anchor rods for PWS shall conform to grade BD and shall be mechanically galvanized.

Anchor rods for suspenders shall conform to grade BC and shall be hot-dip galvanized

Prior to shipment, all rods shall be fully threaded into their assigned mating component, including nuts, to ensure that the thread pitch has been fabricated without error and the process of turning does not strip any of the threads.

Elastomeric Collars

This work consists of the fabrication and installation of pre-molded split collars for the protection of suspender ropes inside steel collars.

Split collars shall be glued at the split surfaces and secured within the steel collar in a snug tight condition.

The gap between the upper end of the steel collar and suspender shall be caulked.

The Contractor is alerted to the fact that all suspenders shall meet with any of the planes where a collar is attached, in a perpendicular direction. There are no intended angles between the suspender and the flanges of the brackets at dead load.

Molds shall be manufactured from plaster molds taken on ropes subjected to dead load tension, and from molds of the steel collars. The molds used in casting shall be designed to compensate for shrinkage of the elastomer during cooling, such that the elastomer fits snugly between the steel rope and the steel collars.

Polymer – The polymer shall be a Thermoset Elastomer produced from Polytetramethylene Ether Glycol Toluene Diidocyanate (PT MEG TDI). The collar manufacturer shall be Steinmetz, Inc. Spencer Road, Moscow PA ; Tel (570) 842-6161 or approved equal.

Glue – The glue shall be as recommended by the manufacturer of the elastomeric collar and shall be demonstrated to bond to the elastomer.

Caulk material shall be SILPRUF as manufactured by General Electric Company, Silicon Products Division, Waterford, New York, or an approved equal.

Debonding films or backer materials shall be as recommended by the caulk manufacturer.

All materials in contact with the zinc coating shall not react with zinc. This shall be demonstrated by laboratory test or from literature describing previously conducted tests.

Caulking materials shall be tested to prove their ability to adhere to the substrates. Tests made by the manufacturer as part of product development are acceptable. The caulk seal shall not bond to the elastomeric collar or shall otherwise be installed with a de-bonding film over the elastomer.

The elastomer material shall be black and insensitive to ultraviolet rays.

The physical properties of the thermoset elastomer shall be as described in the following table:

Physical Property		Test Method	Capacity
Hardness		D2240	80 Shore A
Tensile strength		D412	31 MPa
Elongation at break		D412	580 %
!00 % tensile modulus		D412	4.8 MPa
300 % tensile modulus		D412	8.3 MPa
Bayshore Resilience		D2632	50%
Split tear		D470	1.52 kg/mm
Abrasion Resistance, NBS Index		D1630	200 %
Compression Set		D 395 (B)	35 %
Compression Modulus	5 %	D 575	1.45 MPa
	10 %		2.59 MPa
	15 %		3.65 MPa
	20 %		5.10 MPa
	25 %		6.89 MPa
Brittleness Temperature		D748	- 34°C

E2-T1 Bidder Inquiries

First Advertisement

THIS IS THE DATE OF THE FINAL LIST OF BIDDER INQUIRIES. INQUIRY # 7 WAS RECEIVED BETWEEN 1/21/03 AND 4/3/03 (THE DATE OF THE ORIGINAL ADVERTISEMENT AND THE ISSUANCE OF ADDENDUM 3 TO THE ORIGINAL ADVERTISEMENT

CONTRACTOR'S INQUIRY RESPONSES

September 17, 2003

CONTRACT NO. 04-0120E4
CONSTRUCT SAS T1 & E2 FOUNDATIONS
County Route: SF-80-8.3/8.5

The responses to contractors' inquiries, unless incorporated into a formal addenda to the contract, are not a part of the contract and are provided for the contractor's convenience only. In some instances, the question and answer may represent a summary of the matters discussed rather than a word-for-word recitation. The responses may be considered along with all other information furnished to prospective bidders for the purpose of bidding on the project. The availability or use of information provided in the responses to contractors' inquiries is not to be construed in any way as a waiver of the provisions of section 2-1.03 of the Standard Specifications or any other provision of the contract, the plans, Standard Specifications or Special Provisions, nor to excuse the contractor from full compliance with those contract requirements. Bidders are cautioned that subsequent responses or contract addenda may affect or vary a response previously given, and any such subsequent response or addenda should be taken into consideration when submitting a bid for the project. Inquiries submitted within seventy-two (72) hours of the bid opening date might not be addressed.

The Caltrans District 4 Office is located at 111 Grand Avenue, Oakland, CA 94612. Send Contractor Inquiries via email to the Duty Senior at Duty_Senior_District04@dot.ca.gov. The mailing address is P.O. Box 23660, Oakland, CA 94623-0660. The Duty Senior's telephone number is (510) 286-5209 and the fax number is (510) 622-1805. **All inquiries must include the contract number.**

Total Number of Inquiries: **76**

Inquiry Index
20 | 40 | 60

Inquiry No.	Inquiry	Response
1.0	We would like to view the rock samples and cores for this contract (04-0120E4). Where can they be viewed and at what time?	A tour is scheduled for March 7 and March 27, 2003 for contractors to view core samples at the Caltrans Transpotation Laboratory at 5900 Folsom Blvd in Sacramento, CA. ClicK Here for details
2.0	The pile details for the 2.5 M CIDH concrete piles with permanent steel casing do not provide details for the isolation material which is shown on drawings (sheets 32 and 52 of 115). Special Provisions Section 10-1.23 Piling, is also silent on the isolation material with respect to material and installation. Please provide the required details and specifications.	Specifications addressing the isolation material are contained in Section 10-1.21 "Earthwork", subsection "Isolation Material" of the special provisions. The Contractor shall select the isolation material that meets the requirements of the special provisions and shall submit working drawings of the proposed isolation material as stated in the special provisions.
3.0	On plan sheet 75/155, at the upper left of the page, aren't the "E" and "W" line callouts reversed? It seems that they are, and IF they are, that line should match up with the line drawn on the lower left of sheet 74/155. Please review.	Sheets 74 and 75 have been revised. See Addendum #2.
4.0	Note 2 on sheet 39 of the plans requires a minimum grout thickness of 75mm. Is this measured at the pile sleeve itself? Must it be measured at the more restrictive pile sleeve joint can? At the centralizers? Where is the thickness to be measured?	Note 2 on Sheet 39 has been revised. See Addendum #2.

5.0 • **back to top**	Plan sheet 20/115 shows a section to be taken for the demonstration pour in the column. Is there also to be a demo pour for the footing? If so, from where is it to be taken? How big?	Sheet 20 has been revised. See Addendum #2.
6.0	Plan sheet 20/115, note 4, offers up a spot to look if one wants the definition of a "1 m strip". Where is this "1 m strip" referred to?	Sheet 20 has been revised. See Addendum #2..
7.0	Per Special Provisions 10-1.30, Steel Structures : Page 190 , Tower Anchor Bolts . Special Provisions indicate that the Tower Anchor Bolts shall conform to ASTM A354 Grade BC / BD , and include bolts nuts and washers , and shall be zinc coated by mechanical deposition process . The Tower Anchor Bolts do not appear to have a fixed head at either end . Without a fixed head at one end , are these still considered a bolt or are they considered a Rod with hex nuts and washers at both ends ? Our Bolt suppliers indicate that these Tower Anchor Bolts can not be zinc coated by mechanical deposition process , how should the zinc coating be applied ?	See Addendum #3.
8.0	Per Special Provisions 10-1.30, Steel Structures: Page 190 , Surface Preparation . Special Provisions indicate that the Tower Anchor Bolts are bolts (see Inquiry #7) . Special Provisions indicate that all bolted connections , contact surfaces and inside surfaces of bolt holes shall be cleaned and coated before assembly in conformance with the provisions for cleaning and painting structural steel of special provisions . Is the interface between the Anchor Bolts (Anchor Rods) the end plate and welded keeper washer / restrainer plates considered a contact surface that will require sandblasting , cleaning and painting per structural steel special provisions ? If the answer is " Yes " , With the weep holes and other obstruction that are in close proximity of the contact surface paint region , will over spray be allowable and if so please define ?	The 75 and 100 mm tower anchor bolts will be hot dip galvanized per revised zinc-coating procedure included in Addendum No.3. The end plates (Anchor Bolt Elevation View, Sheet 61 of 115) do not require undercoating. The components that are required to be cleaned and painted are shown on the Plan Sheet 62 of 115. These are the Dowels and the Dowel Stiffener plates.
9.0	Per Special Provisions 10-1.30, Steel Structures, Materials : Page 188 Tower Anchor Bolts . Contract Drawing 62 of 115 Special Provisions indicate that the Dowels shall conform to ASTM Designation: A633M, Grade E with supplemental Requirements S1 at frequency P, 34 J at - 7C . Sheet 62 of 115 indicates that the dowel will be welded to the Pile cap "top plate" and the dowel stiffener (55mm) plates welded to the top plate and to the dowels . Our reference material indicate that ASTM A633/A633M is the standard Specification for Normalized High-Strength Low-alloy Steel Plate . This means that these dowels will all need to be machined from 150mm plate (6") material and welded as indicated . Please confirm that this is the intent of the design ?	The design requires that the dowels conform to the specified ASTM Designation. Machining the dowels from the specified A633 plate is acceptable.
10.0 • **back to top**	We assume that the Tower Pier (T1) or Pier E2 will not require any painting other than that addressed in inquiry # 8.	The components that are required to be cleaned and painted are shown on Plan Sheet 62 of 115. They consist of the dowels and the dowel stiffener plates.
11.0	What is the general prevailing wage rate for tugboat operators who provide services for construction work? What classification of craft they fall under?	The correct craft is the Operating Engineer (Heavy and Highway Work) under the Group 2 Classification: "Licensed Construction Work Boat Operator, On Site." The applicable wage rates are

Misc Correspondence

Re: SAS and E2-T1

TY LIN INTERNATIONAL
MOFFATT & NICHOL
a joint venture

To: Gary Pursell, Steve Margaris

From: Marwan Nader

Date: March 18, 2003

Subject: **SFOBB-SAS – Metric Bolts**

Copy: Steve Gilbert, Reza Valizadeh, Wenyi Long, Nhan Vo, Tracy Abbott, James Duxbury, Jim Rucker, Chuck Seim

MEMORANDUM

Greetings:

Based on our meeting on 2/25/03, the following items were identified in regards to the metric bolts:

Item	Item Description	Engineer Responsible	Action Taken	Attachment
1	Metric bolt availability in US?	JV	JV identified three domestic metric bolt manufacturers.	1
2	RCSC testing applied to metric bolts?	JV	JV is proposing modification to RCSC to make it applicable to metric bolts. Additional background information: • Paper by Karl Frank, "Tightening of High-Strength Metric Bolts" • Phone conversation record with Ken Hearst of Kansas DOT • Bolting procedures & specs from the Kansas DOT • Structural Bolting Handbook, "Pre-Installation Testing, Turn-of-the-Nut Method" • Canadian metric bolt specifications	2 2A 2B 2C 2D 2E
3	Hole size standards for metric bolts.	JV	The standard metric hole size will be included in the specification.	3

4	Conformance with US Fastener Act.	CT	Status update to be discussed in 3/27/03 meeting.	-
5	Bolts substitution table in Section 8.	JV	JV reviewed Section 8 and agrees to leave the table in this section. The Structural Steel Specs (Section 10) will be modified to not allow substituting for metric bolt sizes.	-
6	Define "TC" in Table on Page 256.	JV	TC bolts removed (no TC metric bolts available).	6
7	Corrosion protection for A490 bolts.	JV	Mechanical galvanizing will not be allowed for the A490 bolts. The JV encourages Caltrans to review the use of dacromet instead.	6
8	Corrosion protection for A354BD bolts.	JV	Recommendations for corrosion protection of A354BD.	8

Tracy Abbott

Subject: FW: E2 & T1 Contract 04-0120E4 Bidder Inquiry #7 - Galvanization of A354 Bolts

Dyson_CCO_Richmond.pdf

-----Original Message-----
From: Jim Rucker [SMTP:jrucker@tylin.com]
Sent: Tuesday, March 18, 2003 4:41 PM
To: Steve Margaris (E-mail); Rob Reis (E-mail)
Cc: Kang Chen (E-mail); 'Nader, Marwan'; 'Duxbury, James'
Subject: E2 & T1 Contract 04-0120E4 Bidder Inquiry #7 - Galvanization of A354 Bolts

Steve & Rob,

The J.V. has been looking into the issue of mechanically galvanizing the ASTM A354 bolts for the E2/T1 Contract (Tower Anchor Bolts). The following items were determined:

1. The A354 Grade BD bolts cannot be galvanized using the mechanical deposition process (mechanical galvanizing), as called for in the special provisions, because the bars are too long and too heavy. A revised galvanization procedure is required.

2. Caltrans approved a procedure for galvanizing ASTM Grade BD bars for the Richmond/San Rafael Bridge. Dyson Corporation has followed this procedure for thousands of bars that are 65 to 90 mm in diameter and 2.58 to 105 m in length (we have 75 to 100 mm in diameter and 7.75 m in length). This is some of the language that was used in the CCO:

"In lieu of cleaning the high strength rod assemblies in a pickling solution prior to galvanizing, all surfaces of the assemblies shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the Steel Structures Painting Council. The assemblies shall be coated with the galvanizing within 4 hours of being dry blast cleaned."

3. Attached please find a PDF with Dyson's MFQA approval letter from Caltrans along with copies of the CCO issued by Caltrans.

Is this acceptable for SFOBB? Can we discuss this after tomorrow's weekly conference call tomorrow (2-3PM)? Please advise.

Regards,
Jim Rucker, P.E.
T.Y. Lin International
619.692.1920 voice
619.692.0634 fax

DYSON 53 Freedom Road • Painesville, Ohio 44077
PH: 440-946-3500 / FAX: 440-352-2700

Fax Transmission To:
James Duxbury
T Y Lin International
415/433-0807

From: **Kristin Wolf** *Regarding:*
March 13, 2003
(4 pages total)

Dear James,

Attached is the Caltrans letter approving hot dip galvanizing of high strength rods with near white metal cleaning in lieu of pickling.

Also attached is Dyson's MFQA approval letter from Caltrans.

Please advise if you need any additional information.

Best Regards,

Kristin Wolf
Sales Manager

cc: Arnie Dasaro

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING
DEPARTMENT OF TRANSPORTATION, DISTRICT 04
Toll Bridge Program
Richmond-San Rafael Field Office
995 Western Drive, Richmond CA 94801
Telephone Number (510) 231-7830
Facsimile Number (510) 231-7831

GRAY DAVIS, Governor

TS/K/T, JV
JOB 523

December 3, 2001

Tutor-Saliba/Koch/Tidewater JV
Attn: Stephen V. Buschmeyer
999 Western Drive
Richmond, CA 94801

Contract: 04-0438U4
04-CC, Mm-580-8.1/7.8,0.0/2.6
Richmond-San Rafael Seismic Retrofit Project

Letter No.: 5.20-01298

Subject: **MFQA of The Dyson Corporation – APPROVED**
Reference: **JV Submittal 0064.1a** (dated 11/08/01, received 11/08/01), **CT Letter 5.20-00452** (dated 06/27/01), **JV Submittal 0064.1** (dated 5/23/01, received 5/24/01), **CT Letter 5.20-00276** (dated 05/04/01), **CT Letter 5.20-00247** (dated 04/23/01), **JV Submittal 0064.0** (dated 3/20/01, received 3/21/01)

Gentlemen,

The State has completed a review of the Contractors Submittal 0064.1a, Response to Conditional MFQA Approval, for the Dyson Corporation (Dyson), as per Special Provisions Section 8-1.03 **"MANUFACTURING AND FABRICATION QUALIFICATION AUDIT FOR MATERIALS"**, for general compliance with the MFQA and for actions taken to mitigate the deficiencies found in the first and second audits of the facility and documented in Caltrans Review Letters 5.20-00276 (dated 5/04/01) and 5.20-00452 (dated 6/27/01).

Your submittal, which includes the response letter from Dyson (dated 10/30/01), adequately addresses the deficiencies previously noted. However, please note that, as per Standard Specifications Section 6-3.01, the ASTM Specifications to be used for this project shall be those which were in effect on the day the Notice to Contractors for the work is dated.

As such, the Dyson Corporation has met the Audit requirements and is approved for fabrication. You are reminded that the actions taken by the State, with respect to the audit process, do not relieve the Contractor from full compliance with all contract documents.

If you have any questions or concerns, please call Rich Melko at (510) 231-7845 or Bob Powell at (510) 231-7827.

Sincerely,

For **ROBERT POWELL, P.E.**
Structure Representative
for
PAUL M. WARD, P.E
Resident Engineer

TH:rwm
cc: File 5.20, 8.08, 58.64.1a, Mwimmer, FDiba
File:T:\Project Files\05.00 Correspondence\5.20 To Contractor\Letters 1251 to 1300\01298LTR-MFQA for Dyson 64.1a - Approved.doc

RECEIVED
AUG 2 7 2001
TS/K/T, JV
JOB 523

Caltrans

DEPARTMENT OF TRANSPORTATION - District 4

Division of Toll Bridge Program
Richmond -San Rafael Seismic Retrofit Project
995 Western Drive . Richmond CA 94801
Telephone (510) 231-7830 Facsimile (510) 231-7831

LETTER OF TRANSMITTAL

TO: Tutor - Saliba/Koch /Tidewater, JV 999 Western Drive Richmond, CA 94801 ATTN: STEPHEN V. BUSCHMEYER Project Manager	DATE: August 24, 2001 EA #: 04-043804 04-CC,Mrn-580-6.1/7.8,0.0/2.6 R-SR Seismic Retrofit Project

Enclosed please find the following items:

- [X] CONTRACT CHANGE ORDER *CCO 53 - Hot Dip Galvanize*
- [ ] COPY OF LETTER
- [ ] WEEKLY STATEMENT OF WORKING DAYS WEEK ENDING:
- [ ] PROGRESS PAYMENT No.
- [ ] SPECIFICATIONS
- [ ] PLANS
- [ ] CERTIFIED PAYROLL
- [ ] DAILY EXTRA WORK REPORT(S) CCO #: ____ REPORT #: ____
- [ ] SHOP DRAWINGS
- [ ] SUBMITTALS
- [ ] OTHER
- [ ]

COPIES	DATE	NO.	DESCRIPTION

These are transmitted as checked below:

- [X] FOR APPROVAL OR ACTION
- [ ] SIGN & RETURN BOTH COPIES
- [ ] RETURNED FOR CORRECTIONS
- [ ] FOR YOUR FILES
- [ ] SIGN & RETURN ORIG. COPY
- [ ] APPROVED AS NOTED
- [ ] FOR REVIEW & COMMENT
- [X] PLS. RETURN ORIG. SIGNED COPY
- [ ] SEE REMARKS BELOW

REMARKS:

Please received and date stamped at the back of the document. Return original signed copy within 2 weeks from date of receipt.

FROM:
- [ ] PAUL WARD (510) 231-7826
- [ ] BOB POWELL (510) 231-7827
- [ ] TODD HOEKSTRA (510) 231-7821
- [X] MERCY B. PACHECO (510) 231-7836

COPY TO: FILE 6.21
49.53

SIGNED:
TITLE: OFFICE ENGINEER

ALIFORNIA
ENT OF TRANSPORTATION

CONTRACT CHANGE ORDER NO. 53 SUPPL. 0

AD CC,Mrn-580-6.1/7.8,0.0/2.6 SHEET 1 OF 1 SHEETS

FEDERAL NO.(S) ACIM-580-2(041)3N CONTRACT NO. 04-0438U4

To Tutor Saliba/Koch/Tidewater JV Contractor

You are hereby directed to make the herein described changes from the plans and specifications or do the following described work not included in the plans and specifications on this contract.

NOTE: This change order is not effective until approved by the Chief Engineer.

Description of work to be done, estimate of quantities, and prices to be paid. Segregate between additional work at contract price, agreed price and force account. Unless otherwise stated, rates for rental equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This Change is requested by the ENGINEER.

The last percentage shown is the net accumulated increase or decrease from the original in the Engineer's Estimate.

ADJUSTMENT OF COMPENSATION AT AGREED LUMP SUM:

1. The sixth paragraph of the Special Provisions, Section 10-1A.27, "**Steel Casings,**" shall be replaced as follows:

> "High strength rod assemblies shall be galvanized in accordance with Section 75-1.05, "**Galvanizing**" of the Standard Specifications and shall conform to the specifications of ASTM Designation: A 123 for HS rods and ASTM Designation: A 153 for nuts and hardware."

2. In lieu of cleaning the high strength rod assemblies in a pickling solution prior to galvanizing, all surfaces of the assemblies shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the Steel Structures Painting Council. The assemblies shall be coated with the galvanizing within 4 hours of being dry blast cleaned.

There shall be no cost or credit to the State by reason of this change order.

There shall be no adjustment of contract time by reason of this change.

Estimated Cost Decrease $0.00 or Increase $0.00

By reason of this order the time of completion will be adjusted as follows: NO TIME ADJUSTMENT

Submitted by: _____ Date: 8-24-01
Paul Ward, Resident Engineer

Approval Recommended: _____ Date: _____
Paul Ward, Construction Engineer

Approved: Chief Engineer by _____ Date: _____

We, the undersigned contractor, have given careful consideration to the change proposed and hereby agree, if this proposal is approved, that we will provide all equipment, furnish all materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

Accepted; Date _____ Contractor Tutor Saliba/Koch/Tidewater JV

By _____ Title _____

If the contractor does not sign acceptance of this order, his attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

HC-5 Word(Rev.6/94)

3/27/03 mtg minutes from Alan Chow / Metric bolts
Pier 7

Allan Chow
03/27/2003 02:44 PM

To: Jess Avila/HQ/Caltrans/CAGov@DOT
cc: Rob Reis/HQ/Caltrans/CAGov@DOT, Steve Margaris/HQ/Caltrans/CAGov@DOT
Subject: Re: A354 & A490 bolt corrosion protection (SFOBB)

Jess:

There had been serveral bolts issues discussed during the meeting:

(1) T.Y.Lin found three manufacturers (including BBC, Nucor) in U.S. for metric bolts.

(2) Proposed metric bolt test specifications (**Steel Committee need to review the specifications by 4/4/03, Steve Margaris will bring you the package**)
The concept is to use Skidmore to determine snug tight condition (which dependent on the splice plates thickness) and specify the amount of turn of nuts beyond snug tight.
Some states & AASHTO allow turn of the nut method. Some research was done in University of Taxes. Canadian are using the method. RCSC adaptation of this method is in the work. All these info should be in the package. Any question regarding this package, please contact Marwan Nader @ T.Y.Lin directly @ 415-291-3700.

(3) TC bolts will not be used due to addition paint application – Not manufactured in metric

(4) A490 corrosion protection - Construction concerns about the inorganic zinc may peel off inside the nut and cause jamming. Jim prsent Dacromet product which requires Degreasing, Blast to white metal, Spray on application of Zinc coat, then bake at 615 degree F for 15 min. Akashi Bridge in Japan use this product. Construction concerns the time required to approve the new product. (The process seems to be IC fastener process which is recommended by FHWA.) The other option is use organic zinc, but California's high standard of VOC requirement prohibit application of this coating. If the bolts are manufactured out of state which has lower VOC std., that is O.K. Orgainc Zinc performs better, no need to blast clean, thinner film, less nut jamming problem. At this point, Construction suggest to specify black A490 bolt and will consider a change order later on.

(5) A354 BD grade bolt corrosion protection - Due to the size of these bolts, the cleaning process will be blasting to SP10 condition, then hot dip. Rob has concerns with strain age embrittlement and suggested to test the final product with ASTM A143 "Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement". T.Y.Lin & Construction agree. Also, Construction will investigate the change order in Richmond-San Rafael to determine the applicability of this method.

(6) Bolt sampling & testing - METS distributed the suggested sampling & testing spec. The decision is QC report need to be furnish before release. Release tag is required before shipment.
bolt

Allan

Jess Avila

Robert
Kobal/HQ/Caltrans/CAGov
04/01/2003 03:47 PM

To "jduxbury@tylin.com" <jduxbury@tylin.com>
cc Rob Reis/HQ/Caltrans/CAGov@DOT, sgilbertlaw@worldnet.att.net, Gary Pursell/D02/Caltrans/CAGov@DOT
bcc
Subject Re: Richmond/San Rafael CCO for Galvanizing

just got a fax from the richmond project, which matches the last page of the copy below, but the executed change order was re-signed dated somewhat later. My contact, Chis Havel, says they have had no problems that he knows of, but was uncertain about any strain aging possibilities. Our Materials folks say that ASTM A123 does not reference ASTM 143, so lets incorporate that reference and ask the contractor to submit test results as part of his certificates of compliance. How about the added phrase "The contractor shall also provide certified test reports showing that the rods nuts and hardware conform to the specifications of ASTM Designation A143."

"James Duxbury" <jduxbury@tylin.com>

"James Duxbury"
<jduxbury@tylin.com>
03/27/2003 03:13 PM
Please respond to
"jduxbury@tylin.com"

To: "'robert_kobal@dot.ca.gov'" <robert_kobal@dot.ca.gov>
cc:
Subject: Richmond/San Rafael CCO for Galvanizing

Rob,

As per our conversation, attached please find a copy of the CCO used for the Richmond/San Rafael Bridge.

Thanks,

James P. Duxbury, P.E.
T.Y. Lin International

- Richmond_SanR_CCO.pdf

Tracking #: 13BA68B1F41F0043A76BA519B525783A05D0C3DA

DYSON 53 Freedom Road • Painesville, Ohio 44077
PH: 440-946-3500 / FAX: 440-352-2700

Fax Transmission To:
James Duxbury
T Y Lin International
415/433-0807

From: **Kristin Wolf** *Regarding:*
March 13, 2003
(4 pages total)

Dear James,

Attached is the Caltrans letter approving hot dip galvanizing of high strength rods with near white metal cleaning in lieu of pickling.

Also attached is Dyson's MFQA approval letter from Caltrans.

Please advise if you need any additional information.

Best Regards,

Kristin Wolf
Sales Manager

cc: Arnie Dasaro

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING
DEPARTMENT OF TRANSPORTATION, DISTRICT 04
Toll Bridge Program
Richmond-San Rafael Field Office
995 Western Drive, Richmond CA 94801
Telephone Number (510) 231-7830
Facsimile Number (510) 231-7831

GRAY DAVIS, Governor

December 3, 2001

Tutor-Saliba/Koch/Tidewater JV
Attn: Stephen V. Buschmeyer
999 Western Drive
Richmond, CA 94801

Contract: 04-0438U4
04-OC, Mm-580-8.1/7.8,0.0/2.6
Richmond-San Rafael Seismic Retrofit Project

Letter No.: 5.20-01298

Subject: **MFQA of The Dyson Corporation – APPROVED**
Reference: **JV Submittal 0064.1a** (dated 11/08/01, received 11/08/01), **CT Letter 5.20-00452** (dated 06/27/01), **JV Submittal 0064.1** (dated 5/23/01, received 5/24/01), **CT Letter 5.20-00276** (dated 05/04/01), **CT Letter 5.20-00247** (dated 04/23/01), **JV Submittal 0064.0** (dated 3/20/01, received 3/21/01)

Gentlemen,

The State has completed a review of the Contractors Submittal 0064.1a, Response to Conditional MFQA Approval, for the Dyson Corporation (Dyson), as per Special Provisions Section 8-1.03 **"MANUFACTURING AND FABRICATION QUALIFICATION AUDIT FOR MATERIALS"**, for general compliance with the MFQA and for actions taken to mitigate the deficiencies found in the first and second audits of the facility and documented in Caltrans Review Letters 5.20-00276 (dated 5/04/01) and 5.20-00452 (dated 6/27/01).

Your submittal, which includes the response letter from Dyson (dated 10/30/01), adequately addresses the deficiencies previously noted. However, please note that, as per Standard Specifications Section 6-3.01, the ASTM Specifications to be used for this project shall be those which were in effect on the day the Notice to Contractors for the work is dated.

As such, the Dyson Corporation has met the Audit requirements and is approved for fabrication. You are reminded that the actions taken by the State, with respect to the audit process, do not relieve the Contractor from full compliance with all contract documents.

If you have any questions or concerns, please call Rich Melko at (510) 231-7845 or Bob Powell at (510) 231-7827.

Sincerely,

For **ROBERT POWELL, P.E.**
Structure Representative
for
PAUL M. WARD, P.E
Resident Engineer

TH:rwm
cc: File 5.20, 9.08, 88.64.1a, Mwimmer, FDiba
File:T:\Project Files\05.00 Correspondence\5.20 To Contractor\Letters 1251 to 1300\01298LTR-MFQA for Dyson 64.1a - Approved.doc

DEPARTMENT OF TRANSPORTATION - District 4
Division of Toll Bridge Program
Richmond -San Rafael Seismic Retrofit Project
995 Western Drive . Richmond CA 94801
Telephone (510) 231-7830 Facsimile (510) 231-7831

RECEIVED
AUG 2 7 2001
TS / K / T, JV
JOB 523

LETTER OF TRANSMITTAL

TO: Tutor - Saliba/Koch /Tidewater, JV 999 Western Drive Richmond, CA 94801 ATTN: STEPHEN V. BUSCHMEYER Project Manager	DATE: August 24, 2001 EA #: 04-0438U4 04-CC,Mrn-580-8.1/7.8,0.0/2.6 R-SR Seismic Retrofit Project

Enclosed please find the following items:

- [X] CONTRACT CHANGE ORDER — *CCO 53 - Hot Dip Galvenize*
- [ ] COPY OF LETTER
- [ ] WEEKLY STATEMENT OF WORKING DAYS — WEEK ENDING:
- [ ] PROGRESS PAYMENT No.
- [ ] SPECIFICATIONS
- [ ] PLANS
- [ ] CERTIFIED PAYROLL
- [ ] DAILY EXTRA WORK REPORT(S) — CCO #: ..... REPORT #: .....
- [ ] SHOP DRAWINGS
- [ ] SUBMITTALS
- [ ] OTHER
- [ ]

COPIES	DATE	NO.	DESCRIPTION

These are transmitted as checked below:

- [X] FOR APPROVAL OR ACTION
- [ ] SIGN & RETURN BOTH COPIES
- [ ] RETURNED FOR CORRECTIONS
- [ ] FOR YOUR FILES
- [ ] SIGN & RETURN ORIG. COPY
- [ ] APPROVED AS NOTED
- [ ] FOR REVIEW & COMMENT
- [X] PLS. RETURN ORIG. SIGNED COPY
- [ ] SEE REMARKS BELOW

REMARKS:

Please received and date stamped at the back of the document. Return original signed copy within 2 weeks from date of receipt.

FROM:
- [ ] PAUL WARD (510) 231-7826
- [ ] BOB POWELL (510) 231-7827
- [ ] TODD HOEKSTRA (510) 231-7821
- [X] MERCY B. PACHECO (510) 231-7836

COPY TO: FILE 6.21
49.53

SIGNED:
TITLE: OFFICE ENGINEER

ALIFORNIA
ENT OF TRANSPORTATION

CONTRACT CHANGE ORDER NO. 53 SUPPL. 0

AD CC,Mrn-580-6.1/7.8,0.0/2.6 SHEET 1 OF 1 SHEETS

FEDERAL NO. (S) ACIM-580-2(041)3N CONTRACT NO. 04-0438U4

To Tutor Saliba/Koch/Tidewater JV Contractor

You are hereby directed to make the herein described changes from the plans and specifications or do the following described work not included in the plans and specifications on this contract.

NOTE: This change order is not effective until approved by the Chief Engineer.

Description of work to be done, estimate of quantities, and prices to be paid. Segregate between additional work at contract price, agreed price and force account. Unless otherwise stated, rates for rental equipment cover only such time as equipment is actually used and no allowance will be made for idle time. This Change is requested by the ENGINEER.

The last percentage shown is the net accumulated increase or decrease from the original in the Engineer's Estimate.

ADJUSTMENT OF COMPENSATION AT AGREED LUMP SUM:

1. The sixth paragraph of the Special Provisions, Section 10-1A.27, **"Steel Casings,"** shall be replaced as follows:

> "High strength rod assemblies shall be galvanized in accordance with Section 75-1.05, **"Galvanizing"** of the Standard Specifications and shall conform to the specifications of ASTM Designation: A 123 for HS rods and ASTM Designation: A 153 for nuts and hardware."

2. In lieu of cleaning the high strength rod assemblies in a pickling solution prior to galvanizing, all surfaces of the assemblies shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the Steel Structures Painting Council. The assemblies shall be coated with the galvanizing within 4 hours of being dry blast cleaned.

There shall be no cost or credit to the State by reason of this change order.

There shall be no adjustment of contract time by reason of this change.

Estimated Cost Decrease $0.00 or Increase $0.00

By reason of this order the time of completion will be adjusted as follows: NO TIME ADJUSTMENT

Submitted by: _____ Date: 8-24-01
Paul Ward, Resident Engineer

Approval Recommended: _____ Date: _____
Paul Ward, Construction Engineer

Approved: Chief Engineer by _____ Date: _____

We, the undersigned contractor, have given careful consideration to the change proposed and hereby agree, if this proposal is approved, that we will provide all equipment, furnish all materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefor the prices shown above.

Accepted, Date _____ Contractor Tutor Saliba/Koch/Tidewater JV

By _____ Title _____

If the contractor does not sign acceptance of this order, his attention is directed to the requirements of the specifications as to proceeding with the ordered work and filing a written protest within the time therein specified.

HC-5 Word(Rev.8/94)

A 354 bolt
galvanizing

Robert Kobal
04/03/2003 06:47 AM

To: Steve Margaris/HQ/Caltrans/CAGov@DOT, Rob Reis/HQ/Caltrans/CAGov@DOT, sgilbertlaw@worldnet.att.net
cc: jrucker@tylin.com, jduxbury@tylin.com, Gary Pursell/D02/Caltrans/CAGov@DOT
Subject: DRAFT E2/T1 Addendum No. 3 Request

looks like this change does the trick for galvanizing the HS rods. See information from METS below explaining what they are doing for QA for the Richmond San Rafael project- it fits with this spec too. Golden Gate retrofit project also checked in with me yesterday and they have similar specs.
----- Forwarded by Robert Kobal/HQ/Caltrans/CAGov on 04/03/2003 06:35 AM -----

"Jim Rucker" <jrucker@tylin.com>
04/02/2003 04:56 PM
Please respond to jrucker

To: "'Duxbury, James'" <jduxbury@tylin.com>
cc: "Steve Margaris \(E-mail\)" <steve_margaris@dot.ca.gov>, "Rob Reis \(E-mail\)" <rob_reis@dot.ca.gov>, <Robert_Kobal@dot.ca.gov>
Subject: DRAFT E2/T1 Addendum No. 3 Request

James,
Please review.

Steve, Rob, and Robert,
FYI/Comment as necessary. I took the 4 hour window between blast cleaning and hot-dip galvanizing from the Richmond-San Rafael example.

Thanks,
Jim Rucker, P.E.
T.Y. Lin International
619.692.1920 voice
619.692.0634 fax

Tracking #: 0E9A76444D99DB42B5192E255721D0DD2B6A0DEA

- E2-T1 Add 3 Request(V2).doc
----- Forwarded by Robert Kobal/HQ/Caltrans/CAGov on 04/03/2003 06:35 AM -----

Andrew Gower
04/02/2003 05:28 PM

To: Robert Kobal/HQ/Caltrans/CAGov@DOT
cc: ehobsonlaw@worldnet.att.net, mwahbeh@att.net, sgilbertlaw@worlnet.att.net
Subject: Testing of Hot Dipped Galvanized High Strenght Rods

Rob,

I looked into the testing and fabrication requirements that have been stipulated on the Richmond-San Rafael Retrofit and in summary the following is being done to avoid and/or detect hydrogen embrittlement effects:

- the rods are sand blasted vice being "pickled" in an effort to reduce/avoid hydrogen embrittlement. (per CCO 53)

- tensile tests are performed after galvanizing to ensure the minimum strength required has been maintained. Tensile specimens are verifed for strength achieved and for required elongation per ASTM A722. This ensures adequate ductility. (per Special Provisions)

All rod lots are tested prior to being released, and results are verified by the METS QA inspectors.

If you have any questions, please do not hesitate to call,

Andrew Gower
Structural Materials Representative-Districts 1 and 4 North
Division of Engineering Services
Materials, Engineering and Testing Services
Office of Structural Materials
Cell: (858) 699-2380

Add. #3
A 354 bolt galvanizing

Rob Reis
04/03/2003 07:31 AM

To: <jrucker@tylin.com>
cc: "'Duxbury, James'" <jduxbury@tylin.com>, Robert_Kobal@dot.ca.gov, "Rob Reis \(E-mail\)" <rob_reis@dot.ca.gov>, "Steve Margaris \(E-mail\)" <steve_margaris@dot.ca.gov>
Subject: Re: DRAFT E2/T1 Addendum No. 3 Request

Jim,

This looks good.

Rob.
"Jim Rucker" <jrucker@tylin.com>

"Jim Rucker" <jrucker@tylin.com>
04/02/2003 04:56 PM
Please respond to jrucker

To: "'Duxbury, James'" <jduxbury@tylin.com>
cc: "Steve Margaris \(E-mail\)" <steve_margaris@dot.ca.gov>, "Rob Reis \(E-mail\)" <rob_reis@dot.ca.gov>, <Robert_Kobal@dot.ca.gov>
Subject: DRAFT E2/T1 Addendum No. 3 Request

James,
Please review.

Steve, Rob, and Robert,
FYI/Comment as necessary. I took the 4 hour window between blast cleaning and hot-dip galvanizing from the Richmond-San Rafael example.

Thanks,
Jim Rucker, P.E.
T.Y. Lin International
619.692.1920 voice
619.692.0634 fax

Tracking #: 0E9A76444D99DB42B5192E255721D0DD2B6A0DEA

- E2-T1 Add 3 Request(V2).doc

If you have any questions, please do not hesitate to call,

Andrew Gower
Structural Materials Representative-Districts 1 and 4 North
Division of Engineering Services
Materials, Engineering and Testing Services
Office of Structural Materials
Cell: (858) 699-2380

E2-T1 Addendum 3

First Advertisement

(Response to Bidder Inquiry #7)

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: Heng Tay
Office Engineer, District 4

Date: April 3, 2003

File: 04-0120E4
04-SF-80-13.2

From: Mike Whiteside
Office Chief
Specifications and Estimates
SFOBB East Span Seismic Safety Project

Subject: Addendum Request

It is requested that an addendum be issued to incorporate the following changes:

PLANS:

1. The following plan sheets have been revised and were submitted electronically (red marked plans and addendum notations to be revised at DES-OE).

Plan Sheet 52 of 115
Plan Sheet 72 of 115

2. On Plan Sheet 17 of 115, replace Note 4 with the following:

"Fender for tower foundation is part of the Self-Anchored Suspension Bridge (Superstructure and Tower) contract (by others)."

3. On Plan Sheet 61 of 115, detail "ANCHOR BOLT ELEVATION VIEW", detail, "AT TOP PLATE OF PILE CAP", change callout to read:

"Anchor bolt with tightly wrapped 2 layers of 7 kg building paper to debond from concrete, typ (see Note 4)".

4. Plan Sheet 50 of 115, Type 1 and Type 2 of Detail F, replace the "CJP" weld symbol with "80% PJP."

5. Plan Sheet 50 of 115, replace Note 1 with the following:

"All reinforcing bars shown shall be epoxy-coated reinforcement, except as noted."

6. Plan Sheet 50 of 115, replace Note 4 with the following:

"All #29 bars ending at pile sleeves shall be welded to pile sleeves as shown in Detail F, Type 1 or Type 2. #29 bars welded to pile sleeves shall not be epoxy-coated."

SPECIAL PROVISIONS:

1. In the Special Provisions, Section 10-1.23, "PILING," subsection "MATERIALS," subsection "Acceptance Testing and Mitigation," replace the fourth paragraph with the following:

"Inspection pipes shall be placed as shown on the plans 75 mm clear of the vertical reinforcement. The inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the clear spacing required herein. The pipes shall be installed in straight alignment, parallel to the main reinforcement, and securely fastened in place to prevent misalignment during installation of the reinforcement and placing of concrete in the hole."

2. In the Special Provisions, Section 10-1.30, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Tower Anchor Bolts," replace the first paragraph with the following.

"Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354, Grade BC and Grade BD, respectively. Steel fastener components for steel fasteners designated as A 354, Grade BC and Grade BD shall include a bolt, nut and hardened washer. Nuts for steel fasteners shall conform to Section 55-2.01, "Description," of the Standard Specifications."

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings".

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354 fasteners conform to the provisions in ASTM Designation: A 143.

This request incorporates revisions to the plans and special provisions.

If you have any questions regarding this addendum request, contact Steve Margaris, Specifications Engineer at (916) 227-8589 or Calnet 498-8589.

c: B Maroney
A Akinsanya
Y Liu
F Osumah, DES-OE
JDefevere DES-OE
Bid Book
RE Pending File
File

DEPARTMENT OF TRANSPORTATION
DES-OE MS #43
1727 30TH Street, 2ND Floor
Sacramento, CA 95816

April 4, 2003

04-SF-80-13.4,13.8
04-0120E4
ACBRIM-080-1(094)N

Addendum No. 3

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in THE CITY AND COUNTY OF SAN FRANCISCO AT YERBA BUENA ISLAND.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on April 15, 2003.

This addendum is being issued to revise the Project Plans, the Notice to Contractors and Special Provisions, and the Federal Minimum Wages with Modification Number 28 dated 3-7-03.

Project Plan Sheet 8A is added. A half-sized copy of the added sheet is attached for addition to the project plans.

Project Plan Sheets 52 and 72 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

On Project Plan Sheet 17, under Notes, the fourth note is revised as follows:

"Fender for tower foundation is part of the Self-Anchored Suspension Bridge (Superstructure and Tower) contract (by others)."

On Project Plan Sheet 50, Detail F, the callout "CJP" is revised to read "80%PJP."

On Project Plan Sheet 50, the notes number "1" and "4" are revised as follows:

"1. All reinforcing bars shown shall be epoxy-coated reinforcement, except as noted."
"4. All #29 bars ending at pile sleeves shall be welded to pile sleeves as shown in Detail F, Type 1 or Type 2. #29 bars welded to pile sleeves shall not be epoxy-coated."

On Project Plan Sheet 61, detail "ANCHOR BOLT ELEVATION VIEW," "AT TOP PLATE OF PILE," the callout "Anchor bolt with tightly wrapped 56kg/m building paper to debond from concrete, typ (see Note 4)." is revised to read "Anchor bolt with tightly wrapped 2 layers of 7 kg building paper to debond from concrete, typ (see Note 4)."

In the Special Provisions, Section 2-1.02C, "SMALL BUSINESS AND DISABLED VETERAN BUSINESS ENTERPRISE UTILIZATION AND REPORTING," is added as attached.

04-SF-80-13.4,13.8
04-0120E4
ACBRIM-080-1(094)N

In the Special Provisions, Section 3, "AWARD AND EXECUTION OF CONTRACT," the third paragraph is revised as follows:

"Bids in which the number of working days bid for completion of the work exceed 450 will be considered non-responsive and will be rejected."

In the Special Provisions, Section 4, "BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES," the fourth paragraph is revised as follows:

"The Contractor shall pay to the State of California the sum of $100,000 per day, for each and every calendar day's delay in finishing the work after expiration of the number of working days bid."

In the Special Provisions, Section 5-1.12, "PROJECT INFORMATION," subsection "INFORMATION HANDOUT," Item "D." of subsection "District Materials Information" is revised as follows:

"D. SFOBB East Span Survey Info (revised 12/31/2002)"

In the Special Provisions, Section 5-1.12, "PROJECT INFORMATION," subsection "INFORMATION HANDOUT," Item "H." of subsection "District Materials Information" is added as follows:

"H. United States Coast Guard Licenses "

In the Special Provisions, Section 5-1.19, "AREAS FOR CONTRACTOR'S USE," is revised as attached.

In the Special Provisions, Section 10-1.06, "COOPERATION," Item "5" of the third paragraph is revised as follows:

"5. Contract No. 04-0120P4 reconstructing YBI structures and providing demolition of Building No. 75, in the City and County of San Francisco, on Route 80, at Yerba Buena Island, between KP 12.6 (PM 7.8) and KP 13.2 (PM 8.2)"

In the Special Provisions, Section 10-1.06, "COOPERATION," Items "15" and "16" are added to the third paragraph as follows:

"15. Contract No. 04-0120Q4 constructing United States Coast Guard Road Relocation, Building No. 75 Demolition, Utility Relocation and Archaeological Recovery in the City and County of San Francisco, on Route 80, at Yerba Buena Island, between KP 12.7 (PM 7.9) and KP 13.0 (PM 8.1).
16. Contract No. 04-0120R4 constructing the YBI South-South Detour in the City and County of San Francisco, on Route 80, at Yerba Buena Island, between KP 12.6 (PM 7.8) and KP 13.2 (PM 8.2)"

In the Special Provisions, Section 10-1.08, "PROGRESS SCHEDULE (CRITICAL PATH METHOD)," is revised as attached.

In the Special Provisions, Section 10-1.23, "PILING," subsection "MATERIALS," subsection "Acceptance Testing and Mitigation," the fourth paragraph is revised as follows:

"Inspection pipes shall be placed as shown on the plans 75 mm clear of the vertical reinforcement. The inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the clear spacing required herein. The pipes shall be installed in straight alignment, parallel to the main reinforcement, and securely fastened in place to prevent misalignment during installation of the reinforcement and placing of concrete in the hole."

04-SF-80-13.4,13.8
04-0120E4
ACBRIM-080-1(094)N

In the Special Provisions, Section 10-1.30, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Tower Anchor Bolts," the first paragraph is replaced with the following paragraphs:

"Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354, Grade BC and Grade BD, respectively. Steel fastener components for steel fasteners designated as A 354, Grade BC and Grade BD shall include a bolt, nut and hardened washer. Nuts for steel fasteners shall conform to Section 55-2.01, "Description," of the Standard Specifications.

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings".

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354 fasteners conform to the provisions in ASTM Designation: A 143."

In the Proposal and Contract, the Engineer's Estimate Item is revised.

To Proposal and Contract book holders:

Attached are the following CD-ROMs: "Contract No. 04-0120E4 Addendum CD and Contract No. 04-0120E4 CD 8"

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

This office is sending this addendum by UPS overnight mail to Proposal and Contract book holders to ensure that each receives it. A copy of this addendum and the modified wage rates are available for the contractor's use on the Internet Site:

http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

Rebecca D. Harnagel

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Office Engineer

Attachments

SAS Addendum 8

First Advertisement

T.Y. LIN INTERNATIONAL
MOFFATT & NICHOL
a joint venture

Memorandum

To: Steve Margaris

Date: 5/22/03
File: 04-0120F4
04-SF,Ala-80
SFOBB East Spans
SAS

Subject: Addendum No. 8 Request

It is requested that an addendum be issued to incorporate the following changes:

PLANS:

The following plan sheets have been revised and are submitted electronically (addendum notations to be revised at DES-OE):

Plan Sheet 436 of 1161
Plan Sheet 458 of 1161
Plan Sheet 459 of 1161
Plan Sheet 460 of 1161
Plan Sheet 461 of 1161
Plan Sheet 462 of 1161
Plan Sheet 463 of 1161
Plan Sheet 464 of 1161
Plan Sheet 465 of 1161
Plan Sheet 466 of 1161
Plan Sheet 467 of 1161
Plan Sheet 468 of 1161
Plan Sheet 469 of 1161
Plan Sheet 470 of 1161
Plan Sheet 471 of 1161
Plan Sheet 474 of 1161
Plan Sheet 477 of 1161
Plan Sheet 494 of 1161
Plan Sheet 495 of 1161
Plan Sheet 496 of 1161
Plan Sheet 498 of 1161
Plan Sheet 502 of 1161
Plan Sheet 669 of 1161
Plan Sheet 673 of 1161
Plan Sheet 693 of 1161

Plan Sheet 752 of 1161
Plan Sheet 753 of 1161

The following plan sheets have been revised (red marked plans and addendum notations to be revised at DES-OE):

Plan Sheet 405 of 1161
Plan Sheet 414 of 1161
Plan Sheet 418 of 1161
Plan Sheet 419 of 1161
Plan Sheet 420 of 1161
Plan Sheet 421 of 1161
Plan Sheet 422 of 1161
Plan Sheet 671 of 1161
Plan Sheet 675 of 1161
Plan Sheet 754 of 1161
Plan Sheet 758 of 1161
Plan Sheet 853 of 1161
Plan Sheet 856 of 1161
Plan Sheet 857 of 1161
Plan Sheet 936 of 1161

SPECIAL PROVISIONS:

1. In the Special Provisions, Section 5-1.27, "PAYMENTS," add new item O to the fourth paragraph as follows:

   "O. S-Wire wrapping"

2. In the Special Provisions, Section 10-1.35, "EPOXY ASPHALT CONCRETE SURFACING," is revised as attached.

3. In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "GENERAL," replace the fourth paragraph with the following:

   "Attention is directed to "Welding" and "Audits" in Section 8, "Materials," of these special provisions."

2a. Subsection "GENERAL," replace the fifth paragraph with the following:

"Members shown on the plans with Seismic Performance Critical Member (SPCM) designations, including welds connecting SPCMs to other members shall conform to the requirements in ANSI/AASHTO/AWS D1.5, Section 12, "AASHTO/AWS Fracture Control Plan (FCP) for Non-Redundant Members" as modified herein."

2b. Subsection "DEFINITIONS," replace the sixth paragraph with the following:

"The "Seismic Performance Critical Member" ("SPCM") designation identifies structural elements, including welds connecting SPCMs to other members, that are critical to the seismic performance of the bridge and that are fabricated and inspected to the requirements of AWS D1.5, Section 12, as modified by these special provisions."

2c. Subsection "ERECTION PLAN," fourth paragraph, replace Item H with the following:

H. Timing and methods for visual and nondestructive examination.

2d. Replace the subsection "CASTINGS," with the following:

CASTINGS

Castings shown on the plans as "Structural Casting Grade 345," "Structural Casting Grade 415," and "Structural Casting Grade 550" shall conform to the requirements of these special provisions. Castings for suspension, hangar and other cable system components shall conform to the requirements in "Cable System" of these special provisions.

At the option of the Contractor, the remaining portions of the casting components may be redesigned as castings in accordance with the requirements of this section. Any use of castings for other structural components shall follow the requirements of this section, and a detailed, written proposal shall be submitted to the Engineer for prior approval. The Contractor shall submit for the approval of the Engineer, working drawings for castings in accordance with the requirements of "Working Drawings," of these special provisions. Working drawings for castings shall include, at a minimum, detail drawings of the redesigned cast configuration showing equivalency to the details shown on the plans.

The Contractor shall perform finite element complex heat flow analysis for each pattern including all risers and gates that demonstrates that final solidification will occur outside of the final casting. This analysis shall also be used to confirm inspection procedures by identifying the locations of likely defects such as shrinkage, hot tears and porosity. The analytical solid model shall be sufficiently detailed and accurate to demonstrate complete coverage of ultrasonic examination by including the ability to superimpose ultrasonic beam paths on the model. Coverage may be demonstrated by drawing beam paths on printed sections of the solid model. The analytical model and supporting calculations shall be submitted to the Engineer for approval in accordance with the "Working Drawings" section above.

The Contractor shall submit a manufacturing procedure to the Engineer for approval that shall specify all chemical, heat treatment, testing, visual and nondestructive inspection and quality control requirements. Quality control requirements and manufacturing facilities shall be subject to a quality audit as

specified in Section 8-4 "Steel Audits" of these special provisions and include the additional requirements of this section.

Castings shall be manufactured to the requirements in ASTM Designation: A148 with the following Supplementary Requirements as modified herein: S1, S4, S5, S6, S7, S8 (Individually marked), S9, S12, S15 (S15.3.2, except one test coupon shall be 3T by 3T by T for all T as described below), and S16.

The manufacturing procedure shall define the specific chemistry, including tolerances for each element. The alloy shall conform to the general limits in the following table, except alternative alloys that meet the required mechanical properties and other requirements herein, that have similar or better weldability, and that have a documented history of successful application may be submitted for approval by the Engineer. The steel shall be fully killed and made to fine grain practice.

ELEMENT (Max. or range)	BASE GRADE	C	Si	Mn	P	S	Ni	Cr	Mo
Structural Casting Grade 345	A148M, Gr. 550-345	0.20	0.60	1.50	0.02	.010	1.2	0.50	0.25
Structural Casting Grade 415	A148M, Gr. 620-415	0.28	0.80	1.00	0.02	.010	1.40 - 2.00	0.55-0.90	0.20-0.40
Structural Casting Grade 550	A148M, Gr. 725-585	0.24	0.50	0.55 - 0.75	0.02	.010	2.50 - 3.50	1.35-1.85	0.30-0.60

ELEMENT (Max. or range)	BASE GRADE	Al	Cu	V	Cb	Ti	CE
Structural Casting Grade 345	A148M, Gr. 550-345	.010 – .060	0.30	0.03	0.03	0.05	0.51
Structural Casting Grade 415	A148M, Gr. 620-415	.010-.030	0.50*	0.03*	0.03	0.05	0.90
Structural Casting Grade 550	A148M, Gr. 725-585	.010-.030	0.20*	0.03*	0.03	0.05	-

Notes: * means not intentionally added.

$$CE = C + (Mn+Si)/6 + (Cr + Mo + V)/5 + (Cu + Ni)/15$$

Each casting shall be given a double normalized or a normalized plus quench and temper heat treatment at temperatures and times specified in the manufacturing procedure except the final tempering temperature shall not be less than 565 C. Specimens for mechanical testing shall be taken from a representative casting, a prolongation to the casting or a keel block. The test specimen block shall have a section size equivalent to 1/3T of that shown on the plans, be poured from the same ladle and heat treated along with the castings that it represents. The test specimens shall meet the requirements in the table below. In addition, a separate keel block with the equivalent maximum section size

shown on the plans shall be poured from the same heat, heat treated along with the casting and machined to provide two tensile test specimens. The tensile yield and ultimate strengths of these specimens shall not be less than 90% of the minimum strengths specified in the table below.

	STRUCTURAL CASTING GRADE 345	STRUCTURAL CASTING GRADE 415	STRUCTURAL CASTING GRADE 550
Tensile Strength:	550 MPa – 690 MPa	620 MPa – 795 MPa	680 MPa – 840 MPa
Yield Strength:	345 MPa, Minimum	415 MPa, Minimum	550 MPa, Minimum
Elongation:	22%, Minimum	20%, Minimum	18%, Minimum
Reduction of Area:	35%, Minimum	35%, Minimum	30%, Minimum
Charpy V-Notch:	42 J, Minimum at 0° C	42 J, Minimum at 0° C	90 J, Minimum at 0° C

Each casting shall be visually examined 100% on all surfaces and shall be free of adhering sand, scale, cracks, shrinkage, unfused chills and hot tears and meet the Manufacturing Standardization Society of the Valve and Fittings Industry Inc. Publications (MSS) specification MSS-SP-55, "Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components - Visual Method," otherwise. Machined surfaces shall be free of voids or other discontinuities that exceed the following: A maximum of one discontinuity within a radius of 150 mm that has a diameter not exceeding 3 mm within the saddle troughs or 5 mm elsewhere, a maximum depth of one half of the diameter, and a rounded shape with no sharp corners. Voids within the saddle troughs shall be filled during metallizing.

Each casting shall be examined 100% on all surfaces by visible contrast, wetmagnetic particle method to ASTM Designation: E709 on the final, as-finished surface. The prod method shall not be used on Grades 415 or 550 and shall be controlled to eliminate arcing. Linear indications, defined as having a ratio of maximum to minimum dimensions greater than 3, tears and cracks will not be permitted.

Each casting shall also be volumetrically examined 100% by ultrasonic (UT) methods in accordance with a written procedure submitted with the manufacturing procedure. The procedure shall define calibrations, equipment and materials and shall include part-specific shooting sketches that demonstrate complete coverage of the full volume from two perpendicular directions. Coverage shall be compatible with locations identified as possible locations for defects based on the finite element heat flow analysis and the foundry practice.

Ultrasonic procedures shall be based on ASTM Designation: A 609, "Standard Specification for Longitudinal Beam Ultrasonic Inspection of Carbon and Low-Alloy Steel Castings," using Procedure A, except supplementary angle beam examination to Supplementary Requirement S1 shall be performed on castings to ensure coverage from two perpendicular directions and on areas of castings where a back reflection cannot be maintained during straight beam examination, or where the angle between the front and back surfaces of the castings exceeds 15 degrees. The Distance Amplitude Curve (DAC) method shall be used for both straight and angle beam examinations. The DAC shall be constructed using a 3.0 mm diameter reference reflector hole for areas within

30 mm of the final surface unless noted otherwise on the plans, and areas designated as Level 1 on the plans, and a hole diameter as specified in ASTM Designation: A 609M shall be used elsewhere. At each facility producing castings, ultrasonic test calibration blocks shall be poured from the first casting heat produced for this contract. The calibration blocks shall be made available to the Engineer for use in QA testing of the castings and to any subcontractors that perform ultrasonic testing on the castings. All calibration details shall be defined in the procedure.

The ultrasonic examination acceptance criteria shall be as follows: Within 30 mm of any final surface, unless otherwise noted on the plans, and at locations designated as Level 1 on the plans, indications that provide a response equal to or greater than the DAC and that are planar or that exceed the area specified in ASTM Designation: A 609, Table 2 for ultrasonic testing quality Level 1 will not be permitted. At all other locations, indications that provide a response equal to or greater than the DAC and that are planar or that exceed the area specified in ASTM Designation: A 609, Table 2 for ultrasonic testing quality Level 3 will not be permitted. The method for determining whether a reflector is planar shall be defined in the written procedure and shall be based on the high directionality of amplitude response for planar reflectors or other established technique.

Each casting shall be stenciled with its heat number and serial number.

Before casting, the Contractor shall produce 1/10 scale model of the tower saddle in wood or other material approved by the Engineer. The model shall show all details of the saddle including the location of weld, cast and plate materials and cast component parting lines. The model and manufacturing procedure shall be approved by the Engineer before the start of foundry production.

All areas of steel castings that will be in contact with other elements by welding, bolting or direct contact pressure shall be machined.

Unless noted otherwise on the plans, the tolerance for linear dimensions of unmachined sections shall have a plus and minus tolerance (i.e., one half of the total tolerance range) in accordance with the following table:

Tolerance For Linear Dimensions (mm) Unaffected By Machined Surfaces

LINEAR DIMENSION, L	L < 60	60 ≤ L < 120	120 ≤ L < 250	250 ≤ L < 400	400 ≤ L < 630	630 ≤ L < 1000	1000 ≤ L < 1600	1600 ≤ L < 2500	2500 ≤ L < 4000	4000 ≤ L
TOLERANCE	4.5	5.5	7.0	9.0	11.0	13.0	16.0	19.0	31.0	47.0

Unless noted otherwise on the plans, the thickness tolerance of unmachined ribs shall have a minus tolerance of 3 mm and a plus tolerance in accordance with the following table:

Plus Tolerance For Thickness Of Ribs (mm) Where Both Faces Are Not Machined

THICKNESS RANGE	t < 18	18 ≤ t < 30	30 ≤ t < 50	50 ≤ t < 80	80 ≤ t < 120	120 ≤ t < 180	180 ≤ t < 250	250 ≤ t < 315	315 ≤ t < 400	400 ≤ t
PLUS TOLERANCE	6.0	9.0	10.0	11.0	12.0	13.0	15.0	19.0	27.0	35.0

No coating or oil preservative shall be applied to a casting until that casting has been inspected and approved by the Engineer.

Minor defects may be removed by grinding or chipping without welding repair, in accordance with the following requirements:

A. The removal of metal does not affect the strength, integrity or functionality of the casting, as determined by the Engineer.
B. The remaining wall thickness is equal to or greater than the required minimum wall thickness.
C. The surrounding metal is ground to a smooth contour with the elimination of apparent stress raisers.
D. Specified tolerances on machined surfaces are satisfied.

Weld repairs may be permitted if qualified welding procedures are used that demonstrate Charpy V-Notch toughness of 34J at –30 C in the weld metal and 34J for Structural Casting Grades 345 and 415, or 60J for Structural Casting Grade 550, at 0 C in the heat-affected zone in the final delivery condition. Weld procedure tests shall be qualified on 50 mm thick plates poured from the same heat as the final casting. Weld repairs shall be given a post weld stress relief heat treatment after all welding is complete. All proposed repair or upgrading welding procedure specifications (WPSs) shall conform to the requirements of ASME Boiler and Pressure Vessel Code, Section IX, as modified herein. Additional essential variables required for WPSs other than SMAW shall include welding travel speed (limited to ±10%), heat input (limited to +10%, -30%), and, for FCAW, the brand name of the electrode. Weld procedures with all supporting procedure qualification records (PQRs) shall be submitted in writing to the Engineer for each welding location, and shall include a description of the defect or other need for welding, the size and the shape of the excavation, the welding procedure specification, preheat and post weld heat treatment. If a second repair to base metal or heat affected zone is required at the same location, the Contractor shall include a metallurgical evaluation for the cause of the rejection in the submittal package to the Engineer for review and approval.

No welding or heat treatment will be permitted except with the specific written approval of the Engineer. In addition, the Contractor shall give the Engineer at least 12 hours notice prior to performing the work.

The exterior surfaces of the castings, after acceptance, shall be coated as specified in "Clean and Paint Structural Steel" and "Metallized Steel Surfaces" of these special provisions. The castings shall be carefully masked to avoid coating any high strength fastener contact surface, interior or other machine finished surface.

At the time of assembly, the contact surfaces of the castings shall meet the machine finish requirements shown on the plans.

2e. Subsection "FABRICATION," subsection "Fabrication/Erection Procedure and Mock-Ups," fourth paragraph, Item B, is replaced with the following:

"B. Tower Diaphragm Type 3B"

Add new Item F as follows:

"F. Tower Diaphragm Types 2 and 3B"

Replace the sixth paragraph with the following:

"For each mock-up, the Contractor shall prepare a written fabrication and welding sequence and a preliminary mock-up made of wood, plastic, dense Styrofoam or other material approved by the Engineer. The preliminary mock-up shall be sufficiently large to demonstrate the assembly sequence, but need not exceed one-half scale. These shall be submitted for review by the Engineer, and approval shall be given before the full-scale mock-up is fabricated in steel. The Engineer shall witness all fit-up and welding for each steel mock-up."

2f. Subsection "FABRICATION," subsection "Bikepath at Pier W2," replace the first paragraph with the following:

"A portion of the bikepath at Pier W2 will be furnished by the Contractor and installed by others, as shown on the plans. This portion of bikepath shall conform to the requirements of this section, including the requirements for cleaning and painting in the section "Clean and Paint Structural Steel," of these special provisions."

2g. Subsection "FABRICATION," subsection "Bolted Connections," add the following paragraph after the first paragraph:

"The provisions of Section 8-1.01 "SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS," will not be permitted for high-strength fastener assemblies."

2h. Subsection "FABRICATION," subsection "Bolted Connections," replace the fifth paragraph and the Table with the following:

"Bolted connections shall conform to the requirements in the Research Council on Structural Connections, "Specification for Structural Joints Using ASTM A325 or A490 Bolts," 2000 (RCSC Specification), with the following revisions:

A. Reference to A325 bolts shall mean A325M bolts.
B. Reference to A490 bolts shall mean A490M bolts.
C. Reference to A563 nuts shall mean A563M nuts.
D. Reference to F436 washers shall mean F436M washers.
E. Reference to F959 direct tension indicators shall mean F959M direct tension indicators.
F. Reference to F1852 twist-off type tension control bolts shall not apply.

G. Reference to ANSI B18.2.6 (for bolt dimensions) is replaced with B.18.2.3.7M.
H. Reference to ANSI B18.2.6 (for nut dimensions) is replaced with B.18.2.4.6M.
I. Replace Table 2.1 of the RCSC Specification with Table 8.1 of the AISC "Manual of Steel Construction, Load & Resistance Factor Design, Metric Conversion of the Second Edition" (AISC Specification).
J. Replace Table C-2.1, Figure C-2.2, and Table C-2.2 of the RCSC Specification with Table 8.2 of the AISC Specification.
K. Replace Table 3.1 of the RCSC Specification with Table J3.3 of the AISC Specification.
L. Section 6.2.3. of the RCSC is deleted.
M. Table 6.1 of the RCSC Specification is replaced with the following:

Table 6.1. Washer Requirements for Bolted Joints with Oversized and Slotted Holes in the Outer Ply

ASTM Designation	Nominal Bolt Diameter db, mm	Hole Type in Outer Ply		
		Oversized	Short-Slotted	Long-Slotted
A325	12-36	ASTM F436M		8 mm thick plate washer or continuous bar[a,b]
A490	≤ 25			
	>25	ASTM F436M with 8 mm thickness[a]		8 mm thick hardened plate washer or hardened continuous bar[a]

[a] Multiple washers with a combined thickness of 8 mm or larger do not satisfy this requirement.
[b] The plate washer or bar shall be of structural-grade steel material, but need not be hardened.

N. Replace Table 8.1 of the RCSC Specification with the following:

Minimum Bolt Tension, N*

Bolt Size, mm	A325M Bolts	A490M Bolts
M16	91 000	114 000
M20	142 000	179 000
M22	176 000	221 000
M24	205 000	257 000
M27	267 000	334 000
M30	326 000	408 000
M36	475 000	595 000

*Equal to 0.70 of minimum tensile strength of bolts, rounded off to nearest kN and converted to N, as specified in ASTM specifications for A325M and A490M bolts with UNC threads.

O. Table 8.2 of the RCSC Specification is replaced with the following:

Table 8.2. Nut Rotation from Snug-Tight Condition for Turn-of-Nut Pretensioning [a,b]

Bolt Length[c]	Disposition of Outer Face of Bolted Parts		
	Both faces normal to bolt axis	One face normal to bolt axis, other sloped not more than 1:20[d]	Both faces sloped not more than 1:20 from normal to bolt axis[d]
Not more than $4d_b$	1/2 turn	1/2 turn	2/3 turn
More than $4d_b$ but not more than $8d_b$	1/2 turn	2/3 turn	5/6 turn
More than $8d_b$ but not more than $12d_b$	2/3 turn	5/6 turn	1 turn

[a] Nut rotation is relative to bolt regardless of the element (nut or bolt) being turned. For required nut rotations of ½ turn, the tolerance is plus 30 degrees; for required nut rotations of 2/3 turn and more, the tolerance is plus 45 degrees.
[b] Applicable only to joints in which all material within the grip is steel.
[c] When the bolt length exceeds 12dh, the required nut rotation shall be determined by actual testing in a suitable tension calibrator that simulates the conditions of solidly fitting steel.
[d] Beveled washer not used.

P. Sections 8.2.2, 8.2.3, 9.2.2, and 9.2.3 of the RCSC Specification are deleted.

Where the DTI method is used, the DTI shall be collapsed to 0.075mm (3 mils), and the gap in the DTI shall be caulked after acceptance by the Engineer. The method of bolt tightening shall be as specified below:

LOCATION	BOLT TYPE	COATING	TIGHTENING METHOD
Tower	A325	Mechanical galvanizing	Turn-of-Nut or Direct Tension Indicator (DTI) collapsed to 3mils (0.075mm) on inside of Tower
	A490	Organic zinc coating	Turn-of-Nut or DTI collapsed to 3mils (0.075mm) on inside of Tower
Box Girder	A325	Mechanical galvanizing	Turn-of-Nut or DTI collapsed to 3mils (0.075mm) on inside of box
Tower Skirt	A307	Hot Dip Galvanized	Snug-Tight

2i. Subsection "FABRICATION," subsection "Bolted Connections," add the following paragraphs after the sixth paragraph:

"At least 60 working days prior to beginning turn-of-nut bolting operations, the Contractor shall perform the following tests to verify turn-of-nut installation procedures:

A. Minimum tension shall be verified using the "Pre-Installation Verification Turn-of-the-Nut Method," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated, except that the required rotation shall be as given in Table 8.2. of this section and the required tension shall be as shown in the following table:

Pre-Installation Verification
Required Tension, N*

Bolt Size, mm	A325M Bolts	A490M Bolts
M16	96 000	120 000
M20	149 000	188 000
M22	185 000	232 000
M24	215 000	270 000
M27	280 000	351 000
M30	342 000	428 000
M36	499 000	625 000
*The above values are 5% higher than the required pretension values used for design, actual installation and inspection, rounded to the nearest kN.		

B. Rotational-capacity tests in accordance with the requirements in Section 11.5.6.4.2 "Rotational-Capacity Tests," of the AASHTO LRFD Bridge Construction Specifications, except that Table 11.5.6.4.1-2 "Nut Rotation from the Snug Condition," is replaced by Table 8.2. of this section.

Test results shall confirm both the minimum bolt tension and the rotational capacity of the bolts. If either test fails, the Contractor shall modify the nut rotation in Table 8.2. of this section until the requirements of both tests are satisfied. No adjustment in compensation will be allowed for modifications to the nut rotations as necessary to satisfy test requirements. Revisions to Table 8.2. shall be approved by the Engineer prior to bolting operations.

The Engineer will randomly sample and perform quality assurance testing of high strength fasteners. Samples will be obtained at locations chosen by the Engineer. The Contractor shall provide the number of bolts specified below to the Engineer for quality assurance testing:

Bolt Sampling Size

Lot Size (No. of Bolts)	Sample Size (No. of Bolts)
2 to 15	3
16 to 25	4
26 to 50	5
51 to 90	7
91 to 150	8
151 to 280	9
281 to 10,000	12
10,001 to 500,000	16
500,001 and over	20

2j. Subsection "FABRICATION," subsection "Bolted Connections," replace the seventh paragraph with the following paragraphs:

"Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354. Steel fastener components for steel fasteners designated as A 354 shall include a bolt, nut and hardened washer. Nuts for steel fasteners designated as A 354 shall conform to Section 55-2.01, "Description," of the Standard Specifications."

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings."

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354, Grade BD fasteners conform to the provisions in ASTM Designation: A 143.

2k. Subsection "WELDING OF HPS485W STEELS," replace Item E. with the following:

"E. Backing; AWS D1.5, Section 5.4.5 is modified to allow steel backing material for WPS test plates to be of grade 345W (Sulfur = 0.025 max.) or HPS485W material."

2l. Subsection "WELDING OF HPS485W STEELS," replace the fourth paragraph with the following:

WELDING OF GRADE 690 STEELS

Welds in Grade 690 steels shall conform to the requirements of AWS D1.5, as modified herein. All welding procedures shall be qualified by testing in accordance with the requirements in AWS D1.5 as modified herein and shall be used within the qualified limits of heat input. Previously qualified welding

procedures witnessed by the State may be submitted for review based on these specification requirements. Regardless of qualification range, the heat input, preheat temperature and maximum interpass temperature shall conform to the requirements of this section.

2m. Subsection "SHOP WELDING," subsection "General Provisions," replace Item A. with the following:

"A. Steel fabrication shall conform to the requirements of AWS D1.5, except members designated on the plans as SPCMs, including welds connecting SPCM's to other members, shall be fabricated according to Chapter 12 of the AWS D1.5, "AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members", except as modified in these special provisions."

2n. Subsection "SHOP WELDING," subsection "Design Details," replace Item F. with the following:

"F. Weld repairs – In addition to the provisions in AWS D1.5, Section 3.7.4, re-repair of welds or base metal requires prior approval of the Engineer. Repairs to SPCMs, including welds connecting SPCM's to other members, shall be as specified in AWS D1.5, "AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Member," Section 12.17, as modified herein."

2o. Subsection "SHOP WELDING," subsection "Welding of Closed Ribs to Box Shell Plate," Item B, the third paragraph is revised as follows:

"At completion of welding, the welded panels shall be checked for straightness and other production tolerances. The welded, unstraightened panel shall be flat within 10 mm. If the unstraightened panel is not flat within 10 mm, new measures such as different prebending or fixturing, shall be proposed, and new trial panels welded."

Item C, the first paragraph is replaced as follows:

"C. Monitoring of Production Welds – During fabrication, weld monitoring tests shall be conducted for each operator on each welding machine at the start of each work shift. Test specimens shall consist of a separate piece of deck plate and rib. The rib shall be tack welded to the test piece the same as on the panel. Run-on and run-off tabs may be used if used in the production plates. If the equipment is used in production to simultaneously weld multiple ribs, then at least two ribs shall be welded during the test. The specimen shall be at least 500 mm long, and shall be examined 100% by UT. The specimen shall be macroetched 25 mm from each end, at a tack weld, and at two intermediate locations, as determined by the Engineer, immediately after welding."

Item D, the first paragraph is replaced as follows:

"D. Panel Production – The dimensions of production panels of box shell plating shall be checked after welding. The welded panel, after straightening, if any, shall be flat within 5 mm in each 5 m length of box panels. Panels may be straightened in accordance with a written procedure that is in conformance to AWS D1.5 and is approved by the Engineer."

2p. Subsection "INSPECTION AND TESTING," replace the Notes following the Table with the following:

"Notes:

1) Vertical butt joints marked ** in the table shall be tested as follows:
   (a) 1/6 of the web depth beginning at each end of weld, unless otherwise noted, shall be tested 100 %.
   (b) 25 % of the remainder shall be tested.
2) If unacceptable discontinuities are found in a joint with 100% NDT, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50 mm at each end of the weld repair, for a minimum total additional length of 100 mm.
3) If unacceptable discontinuities are found in a joint with a specified percentage of NDT less than 100 %, including RT examination of butt weld repairs, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50mm at each end of the weld repair, for a minimum total additional length of 100mm for the repair re-examination. Two additional previously untested segments, each at least 10% of the total weld length, on each side of the repair, for a total additional length of 20%, shall be tested with the same NDT method. If additional unacceptable discontinuities are found as a result of this testing, then 100% of the remaining untested portion of the weld shall be tested with the same NDT method. All weld repairs shall be tested with the same NDT method that located the original defect.
4) Where the specified percentage of testing is greater than 25%, the specified length of each weld shall be tested.
5) Where the specified percentage of testing is 25 %, each weld that is 1.5 m long or more shall be examined over 25 % of the weld length. Welds under the same table category in the same component that are less than 1.5 m long may be lot examined by testing one weld 100 % for each lot of four welds.
6) Where the specified percentage of testing is 15 %, each weld that is 2.5 m long or more shall be tested over 15 % of the weld length. Welds under the same table category in the same component that are less than 2.5 m long may be lot examined by testing one weld 100 % for each lot of seven welds.
7) Where the specified percentage of testing is 10 %, each weld that is 4.0 m long or more shall be examined over 10 % of the weld length. Welds under the same table category in the same component that are

less than 4.0 m long may be lot examined by testing one weld 100 % for each lot of ten welds.

8) For lot examination, if unacceptable discontinuities are found in the weld tested, the remainder of that weld shall be tested, and a second weld in the lot will be chosen by the Engineer and shall be tested. If unacceptable discontinuities are found in the second weld, the entire lot shall be tested.
9) UT examination of PJP welds shall confirm the specified weld size and, for weld sizes greater than 15 mm, shall also evaluate the accessible weld volume to the requirements of AWS D1.5 for welds in compression.
10) Welds, and adjacent parent material within 10 mm of all accessible areas surrounding the weld, in grades with strength levels of 485 and above shall be tested 100% by MT in addition to other specified inspection. The timing of visual and any method of NDT for welds in these steels shall be in accordance with AWS D1.5, Section 12.16.4.
11) Welds made by either the electroslag or electrogas processes shall be examined 100% by both radiographic and ultrasonic testing.
12) Scanning for ultrasonic examination of corner, tee and cruciform welds in thicknesses greater than 50 mm shall include base metal behind and adjacent to the welds. Lamellar tearing discontinuities that exceed 3 mm or that lie within 10 mm of the surface shall be repaired.
13) SPCMs shall include welds connecting SPCM's to other members."

4. In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "MATERIALS," the first paragraph is replaced with the following:

"The cable painting system shall consist of a primer, a two intermediate coat Noxyde painting system, or equal, and a finish coat. The Noxyde cable painting system shall be manufactured by the following supplier:"

Subsection "MATERIALS," the third paragraph is replaced with the following:

"The intermediate and finish coats shall be a water-borne, single component semi-paste acrylic with highly elastic polymers. The coats shall be capable of 200 percent elongation, and shall be 100 percent waterproof and 100 percent resistant to ultraviolet radiation. The two intermediate coats shall be 100 percent Noxyde Plus."

Subsection "MATERIALS," the tenth paragraph is replaced with the following:

"The intermediate coats of the cable paint system shall conform to the following physical requirements:"

Subsection "PAINTING," the sixth and seventh paragraphs are replaced with the following:

"The intermediate coat shall be applied within 24 hours of the application of primer coat, weather permitting, except for the handrope stanchions, main cable shrouds, and the surfaces of cable band castings, tower saddle castings, and splay saddle castings. All undercoat surfaces showing evidence of contamination, as determined by the Engineer, shall be cleaned. The Engineer shall be the sole judge of the need for cleaning.

The intermediate coat shall be applied in accordance with the manufacturer's recommendations. The two intermediate coats shall be spray applied in a fine even spray so as to produce a uniform coating. The total dry film thickness of the two intermediate coats shall be between 200 µm and 350 µm."

Subsection "PAINTING," the twelfth paragraph is replaced with the following:

"The finish coat shall be applied in accordance with the manufacturer's recommendations. The finish coat shall be applied to produce a uniform coating. The dry film thickness of the finish coat shall be 35 µm."

It is recommended that an item for supplemental funds be identified for completion of the cable nonskid surfacing.

Any questions regarding this request should be directed to Jim Rucker at (619) 692-1920.

_____

JIM RUCKER, P.E.
Specification Engineer

Enclosure

cc: Marwan Nader, T.Y.Lin International
Nhan Vo, T.Y.Lin International
James Duxbury, T.Y.Lin International
Kang Chen, MGE Engineering

DEPARTMENT OF TRANSPORTATION
DES-OE MS #43
1727 30TH Street, 2ND Floor
Sacramento, CA 95816

June 6, 2003

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

Addendum No. 8

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in SAN FRANCISCO COUNTY IN SAN FRANCISCO FROM 0.6 KM TO 1.3 KM EAST OF THE YERBA BUENA TUNNEL EAST PORTAL.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on September 16, 2003, instead of the date of August 5, 2003.

This addendum is being issued to change the bid opening date as shown herein and revise the Project Plans; the Notice to Contractors and Special Provisions, and the Proposal and Contract.

Project Plan Sheets 405, 414, 418, 419, 420, 421, 422, 436, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 474, 477, 494, 495, 496, 498, 502, 669, 671, 673, 675, 693, 752, 753, 754, 758, 853, 856, 857, and 936 are revised. Half-sized copies of the revised sheets are attached for substitution for the like-numbered sheets.

Project Plan Sheet 24A is added. A half-sized copy of the added sheet is attached for addition to the project plans.

In the Special Provisions, Section 5-1.27, "PAYMENTS," in the sixth paragraph, Item O is added as follows:

"O. S-Wire wrapping"

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," subsection "DESIGNATED PORTIONS OF WORK" the first sentence of Item "A. Designated Portion "1" of the Work" of the first paragraph is revised as follows:

"The Designated Portion "1" of the Work shall be defined as the completion of all elements of work, as shown on the plans and special provisions, necessary to allow the completion of Hinge "K" by the YBI Structures contractor prosecuting Contract No. 04-0120P4 as provided for under "Cooperation," of these special provisions."

In the Special Provisions, Section 10-1.01, "ORDER OF WORK," subsection "DESIGNATED PORTIONS OF WORK" the last sentence of Item "A Designated Portion "1" of the Work" of the first paragraph is revised as follows:

"Once this Designated Portion "1" of Work is complete by the Contractor, the YBI contractor prosecuting Contract No. 04-0120P4 shall be provided full and unrestricted access to the Hinge "K" work area by the Contractor."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.08, "COOPERATION," Item 6 of the third paragraph is deleted.

In the Special Provisions, Section 10-1.17, "ELECTRONIC MOBILE DAILY DIARY SYSTEM DATA DELIVERY," subsection "DATA DELIVERY REQUIREMENTS," the last paragraph is deleted.

In the Special Provisions, Section 10-1.18, "MOBILIZATION," the first sentence of the second paragraph is revised as follows:

"Attention is directed to Section 5-1.27 "PAYMENTS" of these special provisions, and Sections 9-1.06, "Partial Payments," and 9-1.07, "Payment After Acceptance," of the Standard Specifications."

In the Special Provisions, Section 10-1.18, "MOBILIZATION," the second sentence of the third paragraph is revised as follows:

"The retention of funds provisions in Section 5-1.27, "PAYMENTS" and Section 9-1.06, "Partial Payments," shall apply to the contract lump sum item of mobilization."

In the Special Provisions, Section 10-1.35, "EPOXY ASPHALT CONCRETE SURFACING," is revised as attached.

In the Special Provisions, Section 10-1.44, "SHEAR KEY (PIER E2)," subsection "GENERAL" the sixth paragraph is revised as follows:

"WHEMCO Group of Companies has agreed to furnish the shear key housing, shear stub, and other services described in these special provisions at the guaranteed price of $263,450.00 per shear key stub and $276,830.00 per shear key housing. In addition to the above prices, there will be a one time charge of $21,430 for the shear key stub pattern and a one time charge of $22,150 for the shear key housing pattern."

In the Special Provisions, Section 10-1.44, "SHEAR KEY (PIER E2)," subsection "GENERAL" the ninth paragraph is revised as follows:

"The above prices will be guaranteed for orders placed with WHEMCO on or before December 31, 2003. The total price will be increased 3 percent for orders placed with WHEMCO after December 31, 2003 and on or before December 31, 2004. The FOB location is Midland, Pennsylvania."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "GENERAL" the fourth and fifth paragraphs are revised as follows:

"Attention is directed to "Welding" and "Audits" in Section 8, "Materials," of these special provisions.

Members shown on the plans with Seismic Performance Critical Member (SPCM) designations, including welds connecting SPCMs to other members shall conform to the requirements in ANSI/AASHTO/AWS D1.5, Section 12, "AASHTO/AWS Fracture Control Plan (FCP) for Non-Redundant Members" as modified herein."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "DEFINITIONS" the sixth paragraph is revised as follows:

"The "Seismic Performance Critical Member" ("SPCM") designation identifies structural elements, including welds connecting SPCMs to other members, that are critical to the seismic performance of the bridge and that are fabricated and inspected to the requirements of AWS D1.5, Section 12, as modified by these special provisions."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "ERECTION PLAN" Item H of the fourth paragraph is revised as follows:

"H. Timing and methods for visual and nondestructive examination."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "CASTINGS" is revised as follows:

"**CASTINGS**

Castings shown on the plans as "Structural Casting Grade 345," "Structural Casting Grade 415," and "Structural Casting Grade 550" shall conform to the requirements of these special provisions. Castings for suspension, hangar and other cable system components shall conform to the requirements in "Cable System" of these special provisions.

At the option of the Contractor, the remaining portions of the casting components may be redesigned as castings in accordance with the requirements of this section. Any use of castings for other structural components shall follow the requirements of this section, and a detailed, written proposal shall be submitted to the Engineer for prior approval. The Contractor shall submit for the approval of the Engineer, working drawings for castings in accordance with the requirements of "Working Drawings," of these special provisions. Working drawings for castings shall include, at a minimum, detail drawings of the redesigned cast configuration showing equivalency to the details shown on the plans.

The Contractor shall perform finite element complex heat flow analysis for each pattern including all risers and gates that demonstrates that final solidification will occur outside of the final casting. This analysis shall also be used to confirm inspection procedures by identifying the locations of likely defects such as shrinkage, hot tears and porosity. The analytical solid model shall be sufficiently detailed and accurate to demonstrate complete coverage of ultrasonic examination by including the ability to superimpose ultrasonic beam paths on the model. Coverage may be demonstrated by drawing beam paths on printed sections of the solid model. The analytical model and supporting calculations shall be submitted to the Engineer for approval in accordance with the "Working Drawings" section above.

The Contractor shall submit a manufacturing procedure to the Engineer for approval that shall specify all chemical, heat treatment, testing, visual and nondestructive inspection and quality control requirements. Quality control requirements and manufacturing facilities shall be subject to a quality audit as specified in Section 8-4 "Steel Audits" of these special provisions and include the additional requirements of this section.

Castings shall be manufactured to the requirements in ASTM Designation: A148 with the following Supplementary Requirements as modified herein: S1, S4, S5, S6, S7, S8 (Individually marked), S9, S12, S15 (S15.3.2, except one test coupon shall be 3T by 3T by T for all T as described below), and S16.

The manufacturing procedure shall define the specific chemistry, including tolerances for each element. The alloy shall conform to the general limits in the following table, except alternative alloys that meet the required mechanical properties and other requirements herein, that have similar or better weld ability, and that have a documented history of successful application may be submitted for approval by the Engineer. The steel shall be fully killed and made to fine grain practice.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

ELEMENT (Max. or range)	BASE GRADE	C	Si	Mn	P	S	Ni	Cr	Mo
Structural Casting Grade 345	A148M, Gr. 550-345	0.20	0.60	1.50	0.02	.010	1.2	0.50	0.25
Structural Casting Grade 415	A148M, Gr. 620-415	0.28	0.80	1.00	0.02	.010	1.40 - 2.00	0.55-0.90	0.20-0.40
Structural Casting Grade 550	A148M, Gr. 725-585	0.24	0.50	0.55 - 0.75	0.02	.010	2.50 - 3.50	1.35-1.85	0.30-0.60

ELEMENT (Max. or range)	BASE GRADE	Al	Cu	V	Cb	Ti	CE
Structural Casting Grade 345	A148M, Gr. 550-345	.010 – .060	0.30	0.03	0.03	0.05	0.51
Structural Casting Grade 415	A148M, Gr. 620-415	.010-.030	0.50*	0.03*	0.03	0.05	0.90
Structural Casting Grade 550	A148M, Gr. 725-585	.010-.030	0.20*	0.03*	0.03	0.05	-

Notes: * means not intentionally added.
$CE = C + (Mn+Si)/6 + (Cr + Mo + V)/5 + (Cu + Ni)/15$

Each casting shall be given a double normalized or a normalized plus quench and temper heat treatment at temperatures and times specified in the manufacturing procedure except the final tempering temperature shall not be less than 565 C. Specimens for mechanical testing shall be taken from a representative casting, a prolongation to the casting or a keel block. The test specimen block shall have a section size equivalent to 1/3T of that shown on the plans, be poured from the same ladle and heat treated along with the castings that it represents. The test specimens shall meet the requirements in the table below. In addition, a separate keel block with the equivalent maximum section size shown on the plans shall be poured from the same heat, heat treated along with the casting and machined to provide two tensile test specimens. The tensile yield and ultimate strengths of these specimens shall not be less than 90% of the minimum strengths specified in the table below.

	STRUCTURAL CASTING GRADE 345	STRUCTURAL CASTING GRADE 415	STRUCTURAL CASTING GRADE 550
Tensile Strength:	550 MPa – 690 MPa	620 MPa – 795 MPa	680 MPa – 840 MPa
Yield Strength:	345 MPa, Minimum	415 MPa, Minimum	550 MPa, Minimum
Elongation:	22%, Minimum	20%, Minimum	18%, Minimum
Reduction of Area:	35%, Minimum	35%, Minimum	30%, Minimum
Charpy V-Notch:	42 J, Minimum at 0° C	42 J, Minimum at 0° C	90 J, Minimum at 0° C

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

Each casting shall be visually examined 100% on all surfaces and shall be free of adhering sand, scale, cracks, shrinkage, unfused chills and hot tears and meet the Manufacturing Standardization Society of the Valve and Fittings Industry Inc. Publications (MSS) specification MSS-SP-55, "Quality Standard for Steel Castings for Valves, Flanges and Fittings and Other Piping Components - Visual Method". Machined surfaces shall be free of voids or other discontinuities that exceed the following: A maximum of one discontinuity within a radius of 150 mm that has a diameter not exceeding 3 mm within the saddle troughs or 5 mm elsewhere, a maximum depth of one half of the diameter, and a rounded shape with no sharp corners. Voids within the saddle troughs shall be filled during metallizing.

Each casting shall be examined 100% on all surfaces by visible contrast, wet magnetic particle method to ASTM Designation: E709 on the final, as-finished surface. The prod method shall not be used on Grades 415 or 550 and shall be controlled to eliminate arcing. Linear indications, defined as having a ratio of maximum to minimum dimensions greater than 3, tears and cracks will not be permitted.

Each casting shall also be volumetrically examined 100% by ultrasonic (UT) methods in accordance with a written procedure submitted with the manufacturing procedure. The procedure shall define calibrations, equipment and materials and shall include part-specific shooting sketches that demonstrate complete coverage of the full volume from two perpendicular directions. Coverage shall be compatible with locations identified as possible locations for defects based on the finite element heat flow analysis and the foundry practice.

Ultrasonic procedures shall be based on ASTM Designation: A 609, "Standard Specification for Longitudinal Beam Ultrasonic Inspection of Carbon and Low-Alloy Steel Castings," using Procedure A, except supplementary angle beam examination to Supplementary Requirement S1 shall be performed on castings to ensure coverage from two perpendicular directions and on areas of castings where a back reflection cannot be maintained during straight beam examination, or where the angle between the front and back surfaces of the castings exceeds 15 degrees. The Distance Amplitude Curve (DAC) method shall be used for both straight and angle beam examinations. The DAC shall be constructed using a 3.0 mm diameter reference reflector hole for areas within 30 mm of the final surface unless noted otherwise on the plans, and areas designated as Level 1 on the plans, and a hole diameter as specified in ASTM Designation: A 609M shall be used elsewhere. At each facility producing castings, ultrasonic test calibration blocks shall be poured from the first casting heat produced for this contract. The calibration blocks shall be made available to the Engineer for use in QA testing of the castings and to any subcontractors that perform ultrasonic testing on the castings. All calibration details shall be defined in the procedure.

The ultrasonic examination acceptance criteria shall be as follows: Within 30 mm of any final surface, unless otherwise noted on the plans, and at locations designated as Level 1 on the plans, indications that provide a response equal to or greater than the DAC and that are planar or that exceed the area specified in ASTM Designation: A 609, Table 2 for ultrasonic testing quality Level 1 will not be permitted. At all other locations, indications that provide a response equal to or greater than the DAC and that are planar or that exceed the area specified in ASTM Designation: A 609, Table 2 for ultrasonic testing quality Level 3 will not be permitted. The method for determining whether a reflector is planar shall be defined in the written procedure and shall be based on the high directionality of amplitude response for planar reflectors or other established technique.

Each casting shall be stenciled with its heat number and serial number.

Before casting, the Contractor shall produce 1/10 scale model of the tower saddle in wood or other material approved by the Engineer. The model shall show all details of the saddle including the location of weld, cast and plate materials and cast component parting lines. The model and manufacturing procedure shall be approved by the Engineer before the start of foundry production.

All areas of steel castings that will be in contact with other elements by welding, bolting or direct contact pressure shall be machined.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

Unless noted otherwise on the plans, the tolerance for linear dimensions of unmachined sections shall have a plus and minus tolerance (i.e., one half of the total tolerance range) in accordance with the following table:

Tolerance For Linear Dimensions (mm) Unaffected By Machined Surfaces

LINEAR DIMENSION, L	L < 60	60 ≤ L < 120	120 ≤ L < 250	250 ≤ L < 400	400 ≤ L < 630	630 ≤ L < 1000	1000 ≤ L < 1600	1600 ≤ L < 2500	2500 ≤ L < 4000	4000 ≤ L
TOLERANCE	4.5	5.5	7.0	9.0	11.0	13.0	16.0	19.0	31.0	47.0

Unless noted otherwise on the plans, the thickness tolerance of unmachined ribs shall have a minus tolerance of 3 mm and a plus tolerance in accordance with the following table:

Plus Tolerance For Thickness Of Ribs (mm) Where Both Faces Are Not Machined

THICKNESS RANGE	t < 18	18 ≤ t < 30	30 ≤ t < 50	50 ≤ t < 80	80 ≤ t < 120	120 ≤ t < 180	180 ≤ t < 250	250 ≤ t < 315	315 ≤ t < 400	400 ≤ t
PLUS TOLERANCE	6.0	9.0	10.0	11.0	12.0	13.0	15.0	19.0	27.0	35.0

No coating or oil preservative shall be applied to a casting until that casting has been inspected and approved by the Engineer.

Minor defects may be removed by grinding or chipping without welding repair, in accordance with the following requirements:

A. The removal of metal does not affect the strength, integrity or functionality of the casting, as determined by the Engineer.

B. The remaining wall thickness is equal to or greater than the required minimum wall thickness.

C. The surrounding metal is ground to a smooth contour with the elimination of apparent stress raisers.

D. Specified tolerances on machined surfaces are satisfied.

Weld repairs may be permitted if qualified welding procedures are used that demonstrate Charpy V-Notch toughness of 34J at –30 C in the weld metal and 34J for Structural Casting Grades 345 and 415, or 60J for Structural Casting Grade 550, at 0 C in the heat-affected zone in the final delivery condition. Weld procedure tests shall be qualified on 50 mm thick plates poured from the same heat as the final casting. Weld repairs shall be given a post weld stress relief heat treatment after all welding is complete. All proposed repair or upgrading welding procedure specifications (WPSs) shall conform to the requirements of ASME Boiler and Pressure Vessel Code, Section IX, as modified herein. Additional essential variables required for WPSs other than SMAW shall include welding travel speed (limited to ±10%), heat input (limited to +10%, -30%), and, for FCAW, the brand name of the electrode. Weld procedures with all supporting procedure qualification records (PQRs) shall be submitted in writing to the Engineer for each welding location, and shall include a description of the defect or other need for welding, the size and the shape of the excavation, the welding procedure specification, preheat and post weld heat treatment. If a second repair to base metal or heat affected zone is required at the same location, the Contractor shall include a metallurgical evaluation for the cause of the rejection in the submittal package to the Engineer for review and approval.

No welding or heat treatment will be permitted except with the specific written approval of the Engineer. In addition, the Contractor shall give the Engineer at least 12 hours notice prior to performing the work.

The exterior surfaces of the castings, after acceptance, shall be coated as specified in "Clean and Paint Structural Steel" and "Metallized Steel Surfaces" of these special provisions. The castings shall be carefully masked to avoid coating any high strength fastener contact surface, interior or other machine finished surface.

At the time of assembly, the contact surfaces of the castings shall meet the machine finish requirements shown on the plans."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Fabrication/Erection Procedure and Mock-Ups," Item KL of the third paragraph is revised as follows:

"K. Tower Strut Assembly including connection to Tower Diaphragm"

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Fabrication/Erection Procedure and Mock-Ups," Item B of the fourth paragraph is revised as follows:

"B. Tower Diaphragm Type 3B"

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Fabrication/Erection Procedure and Mock-Ups," Item F is added to the fourth paragraph as follows:

"F. Tower section"

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Fabrication/Erection Procedure and Mock-Ups," the sixth paragraph is revised as follows:

"For each mock-up, the Contractor shall prepare a written fabrication and welding sequence and a preliminary mock-up made of wood, plastic, dense Styrofoam or other material approved by the Engineer. The preliminary mock-up shall be sufficiently large to demonstrate the assembly sequence, but need not exceed one-half scale. These shall be submitted for review by the Engineer, and approval shall be given before the full-scale mock-up is fabricated in steel. The Engineer shall witness all fit-up and welding for each steel mock-up."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Bikepath at Pier W2," the first paragraph is revised as follows:

"A portion of the bikepath at Pier W2 will be furnished by the Contractor and installed by others, as shown on the plans. This portion of bikepath shall conform to the requirements of this section, including the requirements for cleaning and painting in section "Clean and Paint Structural Steel," of these special provisions."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Bolted Connections," the following paragraph is added after the first paragraph:

"The provisions of Section 8-1.01 "SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS," will not be permitted for high-strength fastener assemblies."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Bolted Connections," the fifth paragraph is revised as follows:

"Bolted connections shall conform to the requirements in the Research Council on Structural Connections, "Specification for Structural Joints Using ASTM A325 or A490 Bolts," 2000 (RCSC Specification), with the following revisions:

A. Reference to A325 bolts shall mean A325M bolts.
B. Reference to A490 bolts shall mean A490M bolts.
C. Reference to A563 nuts shall mean A563M nuts.
D. Reference to F436 washers shall mean F436M washers.
E. Reference to F959 direct tension indicators shall mean F959M direct tension indicators.
F. Reference to F1852 twist-off type tension control bolts shall not apply.
G. Reference to ANSI B18.2.6 (for bolt dimensions) is replaced with B.18.2.3.7M.
H. Reference to ANSI B18.2.6 (for nut dimensions) is replaced with B.18.2.4.6M.
I. Replace Table 2.1 of the RCSC Specification with Table 8.1 of the AISC "Manual of Steel Construction, Load & Resistance Factor Design, Metric Conversion of the Second Edition" (AISC Specification).
J. Replace Table C-2.1, Figure C-2.2, and Table C-2.2 of the RCSC Specification with Table 8.2 of the AISC Specification.
K. Replace Table 3.1 of the RCSC Specification with Table J3.3 of the AISC Specification.
L. Section 6.2.3. of the RCSC is deleted.
M. Table 6.1 of the RCSC Specification is replaced with the following:

Table 6.1. Washer Requirements for Bolted Joints with Oversized and Slotted Holes in the Outer Ply

<table>
<tr><th rowspan="2">ASTM Designation</th><th rowspan="2">Nominal Bolt Diameter db, mm</th><th colspan="3">Hole Type in Outer Ply</th></tr>
<tr><th>Oversized</th><th>Short-Slotted</th><th>Long-Slotted</th></tr>
<tr><td>A325</td><td>12-36</td><td colspan="2" rowspan="2">ASTM F436M</td><td rowspan="2">8 mm thick plate washer or continuous bar[a,b]</td></tr>
<tr><td rowspan="2">A490</td><td>≤ 25</td></tr>
<tr><td>>25</td><td colspan="2">ASTM F436M with 8 mm thickness[a]</td><td>8 mm thick hardened plate washer or hardened continuous bar[a]</td></tr>
<tr><td colspan="5">[a] Multiple washers with a combined thickness of 8 mm or larger do not satisfy this requirement.
[b] The plate washer or bar shall be of structural-grade steel material, but need not be hardened.</td></tr>
</table>

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

N. Replace Table 8.1 of the RCSC Specification with the following:

Minimum Bolt Tension, N*

Bolt Size, mm	A325M Bolts	A490M Bolts
M16	91 000	114 000
M20	142 000	179 000
M22	176 000	221 000
M24	205 000	257 000
M27	267 000	334 000
M30	326 000	408 000
M36	475 000	595 000

*Equal to 0.70 of minimum tensile strength of bolts, rounded off to nearest kN and converted to N, as specified in ASTM specifications for A325M and A490M bolts with UNC threads.

O. Table 8.2 of the RCSC Specification is replaced with the following:

Table 8.2. Nut Rotation from Snug-Tight Condition for Turn-of-Nut Pretensioning [a,b]

Bolt Length[c]	Disposition of Outer Face of Bolted Parts		
	Both faces normal to bolt axis	One face normal to bolt axis, other sloped not more than 1:20[d]	Both faces sloped not more than 1:20 from normal to bolt axis[d]
Not more than $4d_b$	1/2 turn	1/2 turn	2/3 turn
More than $4d_b$ but not more than $8d_b$	1/2 turn	2/3 turn	5/6 turn
More than $8d_b$ but not more than $12d_b$	2/3 turn	5/6 turn	1 turn

[a] Nut rotation is relative to bolt regardless of the element (nut or bolt) being turned. For required nut rotations of ½ turn, the tolerance is plus 30 degrees; for required nut rotations of 2/3 turn and more, the tolerance is plus 45 degrees.
[b] Applicable only to joints in which all material within the grip is steel.
[c] When the bolt length exceeds 12dh, the required nut rotation shall be determined by actual testing in a suitable tension calibrator that simulates the conditions of solidly fitting steel.
[d] Beveled washer not used.

P. Sections 8.2.2, 8.2.3, 9.2.2, and 9.2.3 of the RCSC Specification are deleted.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

Where the DTI method is used, the DTI shall be collapsed to 0.075mm (3 mils), and the gap in the DTI shall be caulked after acceptance by the Engineer. The method of bolt tightening shall be as specified below:

LOCATION	BOLT TYPE	COATING	TIGHTENING METHOD
Tower	A325	Mechanical galvanizing	Turn-of-Nut or Direct Tension Indicator (DTI) collapsed to 3mils (0.075mm) on inside of Tower
	A490	Organic zinc coating	Turn-of-Nut or DTI collapsed to 3mils (0.075mm) on inside of Tower
Box Girder	A325	Mechanical galvanizing	Turn-of-Nut or DTI collapsed to 3mils (0.075mm) on inside of box
Tower Skirt	A307	Hot Dip Galvanized	Snug-Tight

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Bolted Connections," the following paragraphs are added after the sixth paragraph:

"At least 60 working days prior to beginning turn-of-nut bolting operations, the Contractor shall perform the following tests to verify turn-of-nut installation procedures:

A. Minimum tension shall be verified using the "Pre-Installation Verification Turn-of-the-Nut Method," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated, except that the required rotation shall be as given in Table 8.2. of this section and the required tension shall be as shown in the following table:

Pre-Installation Verification
Required Tension, N*

Bolt Size, mm	A325M Bolts	A490M Bolts
M16	96 000	120 000
M20	149 000	188 000
M22	185 000	232 000
M24	215 000	270 000
M27	280 000	351 000
M30	342 000	428 000
M36	499 000	625 000
*The above values are 5% higher than the required pretension values used for design, actual installation and inspection, rounded to the nearest kN.		

B. Rotational-capacity tests in accordance with the requirements in Section 11.5.6.4.2 "Rotational-Capacity Tests," of the AASHTO LRFD Bridge Construction Specifications, except that Table 11.5.6.4.1-2 "Nut Rotation from the Snug Condition," is replaced by Table 8.2. of this section.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

Test results shall confirm both the minimum bolt tension and the rotational capacity of the bolts. If either test fails, the Contractor shall modify the nut rotation in Table 8.2. of this section until the requirements of both tests are satisfied. No adjustment in compensation will be allowed for modifications to the nut rotations as necessary to satisfy test requirements. Revisions to Table 8.2. shall be approved by the Engineer prior to bolting operations.

The Engineer will randomly sample and perform quality assurance testing of high strength fasteners. Samples will be obtained at locations chosen by the Engineer. The Contractor shall provide the number of bolts specified below to the Engineer for quality assurance testing:

Bolt Sampling Size

Lot Size (No. of Bolts)	Sample Size (No. of Bolts)
2 to 15	3
16 to 25	4
26 to 50	5
51 to 90	7
91 to 150	8
151 to 280	9
281 to 10,000	12
10,001 to 500,000	16
500,001 and over	20

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "FABRICATION," subsection "Bolted Connections," the seventh paragraph is replaced with the following paragraphs:

"Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354. Steel fastener components for steel fasteners designated as A 354 shall include a bolt, nut and hardened washer. Nuts for steel fasteners designated as A 354 shall conform to Section 55-2.01, "Description," of the Standard Specifications.

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings.

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354, Grade BD fasteners conform to the provisions in ASTM Designation: A 143."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "WELDING OF HPS485W STEELS" in the third paragraph Item E is revised as follows:

"E. Backing; AWS D1.5, Section 5.4.5 is modified to allow steel backing material for WPS test plates to be of grade 345W (Sulfur = 0.025 max.) or HPS485W material."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "WELDING OF HPS485W STEELS" the fourth paragraph which starts with "shall be qualified by testing ..." is revised as follows:

"**WELDING OF GRADE 690 STEELS**

Welds in Grade 690 steels shall conform to the requirements of AWS D1.5, as modified herein. All welding procedures shall be qualified by testing in accordance with the requirements in AWS D1.5 as modified herein and shall be used within the qualified limits of heat input. Previously qualified welding procedures witnessed by the State may be submitted for review based on these specification requirements. Regardless of qualification range, the heat input, preheat temperature and maximum interpass temperature shall conform to the requirements of this section."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "SHOP WELDING," subsection "General Provisions," Item A is revised as follows:

"A. Steel fabrication shall conform to the requirements of AWS D1.5, except members designated on the plans as SPCMs, including welds connecting SPCM's to other members, shall be fabricated according to Chapter 12 of the AWS D1.5, "AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Members", except as modified in these special provisions.

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "SHOP WELDING," subsection "Design Details," Item F is revised as follows:

"F. Weld repairs – In addition to the provisions in AWS D1.5, Section 3.7.4, re-repair of welds or base metal requires prior approval of the Engineer. Repairs to SPCMs, including welds connecting SPCM's to other members, shall be as specified in AWS D1.5, "AASHTO/AWS Fracture Control Plan (FCP) for Nonredundant Member," Section 12.17, as modified herein."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "SHOP WELDING," subsection "Welding of Closed Ribs to Box Shell Plate," Item B, the fourth paragraph beginning with "At the completion of welding ..." is revised as follows:

"At completion of welding, the welded panels shall be checked for straightness and other production tolerances. The welded, unstraightened panel shall be flat within 10 mm. If the unstraightened panel is not flat within 10 mm, new measures such as different prebending or fixturing, shall be proposed, and new trial panels welded."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "SHOP WELDING," subsection "Welding of Closed Ribs to Box Shell Plate," Item C, the first paragraph is revised as follows:

"C. Monitoring of Production Welds – During fabrication, weld monitoring tests shall be conducted for each operator on each welding machine at the start of each work shift. Test specimens shall consist of a separate piece of deck plate and rib. The rib shall be tack welded to the test piece the same as on the panel. Run-on and run-off tabs may be used if used in the production plates. If the equipment is used in production to simultaneously weld multiple ribs, then at least two ribs shall be welded during the test. The specimen shall be at least 500 mm long, and shall be examined 100% by UT. The specimen shall be macroetched 25 mm from each end, at a tack weld, and at two intermediate locations, as determined by the Engineer, immediately after welding."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "SHOP WELDING," subsection "Welding of Closed Ribs to Box Shell Plate," Item D, the first paragraph is revised as follows:

"D. Panel Production – The dimensions of production panels of box shell plating shall be checked after welding. The welded panel, after straightening, if any, shall be flat within 5 mm in each 5 m length of box panels. Panels may be straightened in accordance with a written procedure that is in conformance to AWS D1.5 and is approved by the Engineer."

In the Special Provisions, Section 10-1.51, "STEEL STRUCTURES," subsection "INSPECTION AND TESTING" the Notes following the table are revised as follows:

"Notes:
1) Vertical butt joints marked ** in the table shall be tested as follows:

(a) 1/6 of the web depth beginning at each end of weld, unless otherwise noted, shall be tested 100 %.
(b) 25 % of the remainder shall be tested.

2) If unacceptable discontinuities are found in a joint with 100% NDT, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50 mm at each end of the weld repair, for a minimum total additional length of 100 mm.

3) If unacceptable discontinuities are found in a joint with a specified percentage of NDT less than 100 %, including RT examination of butt weld repairs, the repairs shall be completed and then re-examined by the same NDT method along with an additional 50mm at each end of the weld repair, for a minimum total additional length of 100mm for the repair re-examination. Two additional previously untested segments, each at least 10% of the total weld length, on each side of the repair, for a total additional length of 20%, shall be tested with the same NDT method. If additional unacceptable discontinuities are found as a result of this testing, then 100% of the remaining untested portion of the weld shall be tested with the same NDT method. All weld repairs shall be tested with the same NDT method that located the original defect.

4) Where the specified percentage of testing is greater than 25 %, the specified length of each weld shall be tested.

5) Where the specified percentage of testing is 25 %, each weld that is 1.5 m long or more shall be examined over 25 % of the weld length. Welds under the same table category in the same component that are less than 1.5 m long may be lot examined by testing one weld 100 % for each lot of four welds.

6) Where the specified percentage of testing is 15 %, each weld that is 2.5 m long or more shall be tested over 15 % of the weld length. Welds under the same table category in the same component that are less than 2.5 m long may be lot examined by testing one weld 100 % for each lot of seven welds

7) Where the specified percentage of testing is 10 %, each weld that is 4.0 m long or more shall be examined over 10 % of the weld length. Welds under the same table category in the same component that are less than 4.0 m long may be lot examined by testing one weld 100 % for each lot of ten welds.

8) For lot examination, if unacceptable discontinuities are found in the weld tested, the remainder of that weld shall be tested, and a second weld in the lot will be chosen by the Engineer and shall be tested. If unacceptable discontinuities are found in the second weld, the entire lot shall be tested.

9) UT examination of PJP welds shall confirm the specified weld size and, for weld sizes greater than 15 mm, shall also evaluate the accessible weld volume to the requirements of AWS D1.5 for welds in compression.

10) Welds, and adjacent parent material within 10 mm of all accessible areas surrounding the weld, in grades with strength levels of 485 and above shall be tested 100% by MT in addition to other specified inspection. The timing of visual and any method of NDT for welds in these steels shall be in accordance with AWS D1.5, Section 12.16.4.

11) Welds made by either the electroslag or electrogas processes shall be examined 100% by both radiographic and ultrasonic testing.

12) Scanning for ultrasonic examination of corner, tee and cruciform welds in thicknesses greater than 50 mm shall include base metal behind and adjacent to the welds. Lamellar tearing discontinuities that exceed 3 mm or that lie within 10 mm of the surface shall be repaired.

13) SPCMs shall include welds connecting SPCM's to other members."

In the Special Provisions, Section 10-1.52, "CABLE SYSTEM," subsection "MATERIALS AND FABRICATION," subsection "Cable Wrapping Wire," the first sentence of the second paragraph is revised as follows:

"The S-shaped cable wrapping wire shall be manufactured by the following supplier:"

In the Special Provisions, Section 10-1.52, "CABLE SYSTEM," subsection "MATERIALS AND FABRICATION," subsection "Cable Wrapping Wire," the seventh paragraph is revised as follows:

"The price quoted by the manufacturer for S-shaped cable wrapping wire is $5.50 per kilogram. The manufacturer's charge for a technical supervisor is $1,400 per person per day, and $25,000 per person per month (20 working days per month). These charges apply from the day of departure from Japan to the day of return back to Japan. The daily allowance for a technical supervisor shall be $125 per person per day. The charge for round trip airfare between Japan and San Francisco, California, United States, shall be $4,200 per person. The FOB location is Yokohama, Japan. Quoted prices are in United States dollars."

In the Special Provisions, Section 10-1.52, "CABLE SYSTEM," subsection "MATERIALS AND FABRICATION," subsection "Cable Wrapping Wire," the ninth paragraph is revised as follows:

"The S-wire wrapping price includes all materials, technical advice and inspection by a qualified representative of the manufacturer during installation and final inspection of the installed S-wire wrapping."

In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "MATERIALS," the first paragraph is revised as follows:

"The cable painting system shall consist of a primer, a two intermediate coat Noxyde painting system, or equal, and a finish coat. The Noxyde cable painting system shall be manufactured by the following supplier:"

In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "MATERIALS," the third paragraph is revised as follows:

"The intermediate and finish coats shall be a water-borne, single component semi-paste acrylic with highly elastic polymers. The coats shall be capable of 200 percent elongation, and shall be 100 percent waterproof and 100 percent resistant to ultraviolet radiation. The two intermediate coats shall be 100 percent Noxyde Plus."

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "MATERIALS," the tenth paragraph is revised as follows:

"The intermediate coats of the cable paint system shall conform to the following physical requirements:"

In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "PAINTING," the sixth and seventh paragraphs are revised as follows:

"The intermediate coat shall be applied within 24 hours of the application of primer coat, weather permitting, except for the handrope stanchions, main cable shrouds, and the surfaces of cable band castings, tower saddle castings, and splay saddle castings. All undercoat surfaces showing evidence of contamination, as determined by the Engineer, shall be cleaned. The Engineer shall be the sole judge of the need for cleaning.

The intermediate coat shall be applied in accordance with the manufacturer's recommendations. The two intermediate coats shall be spray applied in a fine even spray so as to produce a uniform coating. The total dry film thickness of the two intermediate coats shall be between 200 µm and 350 µm."

In the Special Provisions, Section 10-1.64, "CLEAN AND PAINT CABLE SYSTEM," subsection "PAINTING," the twelfth paragraph is revised as follows:

"The finish coat shall be applied in accordance with the manufacturer's recommendations. The finish coat shall be applied to produce a uniform coating. The dry film thickness of the finish coat shall be 35 µm."

In the Special Provisions, Section 10-3.08, "SUPPORT HARDWARE FOR CONDUITS, CABLE TRAYS AND WIREWAYS," subsection "CABLE TRAY LADDER TYPE," the following subsection is added after subsection "Cable Tray Sections and Components":

"Cable Tray Solid Trough Type

The solid trough type tray shall be the same as ladder type cable tray specified elsewhere in these special provisions except for the following. It shall be a solid bottom trough type tray with two longitudinal members (side rails) with a corrugated bottom welded to the side rails. The peaks of the corrugated bottom shall have a minimum flat cable-bearing surface of 70 mm and shall be spaced on 152-mm centers. The cable trays may be manufactured by B-Line Systems, Chalfant, or other approved manufacturer. Solid bottom trays with covers shall be used for communications and signal wire trays. Tray fittings shall include all reducers, and vertical and horizontal bends. Cable tray shall be supported at intervals of not more than 4.74 m. All conduit terminating at trays shall provide a continuous cable route by using bushings specifically suited for attaching conduit to the tray rail and for providing ground continuity."

In the Special Provisions, Section 10-3.10, "CONDUCTORS, CABLES AND WIRING," the following subsection is added after subsection "600 VOLT MULTI-CONDUCTOR CABLE":

"600 VOLT ARMORED MULTI-CONDUCTOR CABLE

The 600-volt armored cable shall be used for call box power supply and bike path lighting as shown on the roadway eastbound plan sheet.

The individual conductor of the armored cable shall conform to the 600-volt cable requirements as specified above in the special provisions.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

The armor sheath shall exceed the grounding conductor requirements of Table 250-95 of the National Electrical Code and UL 1569. The armor sheath shall be impervious, continuous, welded, corrugated aluminum that will provide complete protection against moisture, liquid, and gases, and has excellent mechanical strength. The armor sheath shall be covered with low temperature black polyvinyl chloride to protect the cable against chemical attack.

The cable shall have stranded copper grounding conductor, located in the outer interstices. The cable shall be UL Listed as type MC cable per Article 334 of the NEC."

In the Special Provisions, Section 10-3.10, "CONDUCTORS, CABLES AND WIRING," the following subsection is added after subsection "SHIELDED TWISTED PAIR CABLE":

"600 Volt Shielded-Twisted Pair Armored Cable

The 600 V instrumentation armored cables shall be used for call box communication as shown on the roadway eastbound plan sheet.

The individual conductor of the armored cable shall conform to the shielded-twisted pair cable requirements as specified above in the special provisions.

The armor sheath shall be impervious, continuous, welded, corrugated aluminum that will provide complete protection against moisture, liquid, and gases, and shall have excellent mechanical strength and provide equipment grounding through the sheath. The armor sheath shall be covered with low temperature black polyvinyl chloride to protect cable against chemical attack.

The cable shall be UL Listed as ITC/PLTC in accordance with Article 727 and Article 725 of the NEC. Cables shall comply with UL 2250 and UL 13 for PLTC, CL2, and CL3."

In the Special Provisions, Section 10-4.02, "PIPE, FITTING AND VALVES," subsection "PART 2.-PRODUCTS," subsection "MATERIALS, PIPE AND FITTINGS," the following subsection is added after subsection "Hinged Flex Joint":

" Manufactured Expansion Loop for Compressed Air and Water

Provide flexible expansion loops of size noted on drawings. The loop shall consist of flexible sections series 300 SS hose and braid, and two steel end nipples with cut grooves for groove-couplings and gaskets. Loops shall be installed in a neutral condition unless noted otherwise.

Install loop within four pipe diameters, both upstream and downstream, from a pipe guide or anchor. Loop shall be Metaflex, Metraloop or equal."

In the Proposal and Contract, the Engineer's Estimate for both Alternatives 1 and 2, Items 161 and 162 are added and Items 152 and 160 are deleted as attached.

To Proposal and Contract book holders:

Replace pages 35 and 43 and add pages 35A and 43A of the Engineer's Estimate in the Proposal with the attached revised and added pages 35, 35A, 43, and 43A of the Engineer's Estimate. The revised Engineer's Estimate is to be used in the bid.

Attached are the following: A copy of additional Materials Information and a readable CD ROM.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

04-SF-80-13.2/13.9
04-0120F4
ACBRIM-080-1(095)N

This office is sending this addendum by UPS overnight mail to Proposal and Contract book holders to ensure that each receives it. A copy of this addendum and the modified wage rates are available for the contractor's use on the Internet Site:

http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY:

REBECCA D. HARNAGEL, Chief
Office of Plans, Specifications & Estimates
Office Engineer

Attachments

E2-T1 Special Provisions

Second Advertisement

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

AND

SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN

THE CITY AND COUNTY OF SAN FRANCISCO

AT YERBA BUENA ISLAND

DISTRICT 04, ROUTE 80

For Use in Connection with Standard Specifications Dated JULY 1999, Standard Plans Dated JULY 1999, and Labor Surcharge and Equipment Rental Rates.

(INFORMAL BIDS CONTRACT)

CONTRACT NO. 04-0120E4

04-SF-80-13.4,13.8

ACBRIM-080-(094)N

Bids Open: December 16, 2003
Dated: October 17, 2003

OSD

Procedures shall include the assembly and welding sequence and shall be of sufficient detail to demonstrate the proposed fabrication procedure and verify the inspectability of welds.

Fabrication and erection procedures are required for the following locations:

A. E2 Footing Girder Assemblies
B. Tower Footing Assembly (girder system for pile sleeves to tower)
C. Pile to footing connection

In addition, the Contractor shall prepare a mock-up of the pile to footing connection in accordance with "Field Welding of Pile/Sleeve Connector Plates" of this section to demonstrate the proposed fabrication procedure and verify the inspectability of each weld.

The mock-up shall comprise a complete fabrication of the specified detail as shown on the plans, but with member lengths that need not extend beyond the joint more than 0.5 m.

The Contractor shall prepare a written fabrication and welding sequence and a preliminary mock-up made of wood, plastic, dense Styrofoam or other material approved by the Engineer. The preliminary mock-up shall be one quarter to one half scale and shall demonstrate the assembly sequence. These shall be submitted for review by the Engineer, and approval shall be given before the mock-up is fabricated in steel. The Engineer shall witness all fit-up and welding for each steel mock-up.

The completed steel mock-up shall be examined visually and by Magnetic Particle (MT) and, in addition, by either UT or RT in accordance with the nondestructive examination table listed under "Shop Welding" of this section. Nondestructive examination shall be completed using the nondestructive examination procedures that are proposed for production. Mock-up assemblies shall then be sectioned as directed by the Engineer to produce three macroetch samples per weld that shall be evaluated per AWS D1.5. Approval of the fabrication and erection procedure and the nondestructive examination procedures shall be contingent on satisfactory results from the mock-up examination and destructive tests.

Mechanical Cutting

Mechanical shearing of material of thickness greater than 8 mm is prohibited. Mechanically sheared edges shall be ground smooth. All cracks emanating from these edges shall be removed.

Flame, Plasma And Arc Cutting

All cut edges shall be ground to remove dross, slag and hardened material.

Bent Plate

Cold-bent rolled steel plates shall conform to the following:

A. The axis of bending shall be perpendicular to the direction of plate rolling. The entire length of bend shall be formed simultaneously.
B. The radius of bend shall be as shown on the plans.
C. Before bending, the plate corners that are perpendicular to the axis of the bend shall be rounded to a radius of 2 mm.

Match-Marking

Match markings shall be made with low stress die stamps or other method that will not notch the steel.

Punching

The first paragraph of Section 55-3.14A(1) "Punching," of the Standard Specifications shall not apply.

Punching or sub-punching of Grade 250 structural steel where the material is thicker than 16 mm will not be permitted. Punching or sub-punching of high-strength structural steel where the material is thicker than 12 mm will not be permitted.

Tower Anchor Bolts

Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354, Grade BC and Grade BD, respectively. Steel fastener components for steel fasteners designated as A 354, Grade BC and Grade BD shall include a bolt, nut and hardened washer. Nuts for steel fasteners shall conform to Section 55-2.01, "Description," of the Standard Specifications.

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings".

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354 fasteners conform to the provisions in ASTM Designation: A 143.

The Contractor shall deliver the zinc-coated nuts and hardened washers to the Engineer at a location to be determined by the Engineer. Said location will be within 25 km of the San Francisco-Oakland Bay Bridge Toll Plaza. Zinc-coated nuts and hardened washers shall be delivered to the Engineer within three months prior to completion of the work. The Contractor shall notify the Engineer at least two months prior to delivery of the material.

Zinc-coated nuts and hardened washers shall be packaged for the protection of the steel against physical damage and corrosion during shipping and storage. The shipping package shall be clearly marked with a statement that the package contains nuts and hardened washers for the San Francisco-Oakland Bay Bridge, the bolt type, grade, and the date packaged.

The Contractor shall furnish and install corrosion protective coverings on tower anchor bolts as shown on the plans. Prior to installing the corrosion protective coverings, the Contractor shall prevent water and other deleterious material from entering the pipe sleeves. Corrosion protective covers shall be on the Department's current prequalified list prior to use.

The Department maintains a list of prequalified corrosion protective covers. The prequalified list can be obtained by contacting the Transportation Laboratory and is available at the Department's internet site at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

Tower Drainage System

Drain pipe, fittings, liners, and grates shall conform to the details shown on the plans, manufactured from high-density polyethylene (HDPE), and suitable for the transmission of non-potable water. Joints in HDPE pipe shall be butt-fused. Pipe wall thickness shall be adequate to withstand loads from construction installation and concrete placement operations.

SURFACE PREPARATION

For all bolted connections, the contact surfaces and inside surfaces of bolt holes shall be cleaned and coated before assembly in conformance with the provisions for cleaning and painting structural steel of these special provisions.

WELDING OF STEEL STRUCTURES

Table 2.2 of ANSI/ AASHTO/AWS D1.5 is superseded by the following table:

Base Metal Thickness of the Thicker Part Joined, mm	Minimum Effective Partial Joint Penetration Groove Weld Size, * mm
Over 13 to 19 inclusive	6
Over 19 to 38 inclusive	8
Over 38 to 57 inclusive	10
Over 57 to 150 inclusive	13
Over 150	16

* Except the weld size need not exceed the thickness of the thinner part

All corner and T-joint groove welds shall be reinforced with fillet welds with a size of 1/4 times the thickness of the abutting member, or 10 mm, which ever is less.

Dimensional details and workmanship for welded joints in tubular and pipe connections shall conform to the provisions in Part A, "Common Requirements of Nontubular and Tubular Connections," and Part D, "Specific Requirements for Tubular Connections," in Section 2 of AWS D1.1.

Backing for welds that are subject to computed stress which are left in place in the completed structure as shown on the plans or approved by the Engineer shall be a single length. Backing shall be of the same material as the structural steel being welded. Single lengths of backing shall be obtained by using a continuous strip, or may consist of lengths of backing joined by complete joint penetration butt welds. Butt welds in the backing material shall be tested in conformance with the requirements in AWS D1.5, Section 3.13.1. Butt welds in backing material shall be ground flush as necessary to obtain proper inspection and for proper fit-up in the weld joint with which the backing is to be used.

SAS Special Provisions

Second Advertisement

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

AND

SPECIAL PROVISIONS

FOR CONSTRUCTION ON STATE HIGHWAY IN

SAN FRANCISCO COUNTY IN SAN FRANCISCO

FROM 0.6 KM TO 1.3 KM EAST OF THE YERBA BUENA TUNNEL EAST PORTAL

DISTRICT 04, ROUTE 80

For Use in Connection with Standard Specifications Dated JULY 1999, Standard Plans Dated JULY 1999, and Labor Surcharge and Equipment Rental Rates.

CONTRACT NO. 04-0120F4

04-SF-80-13.2/13.9

Bids Open: February 1, 2006
Dated: August 1, 2005

OSD

A. Minimum tension shall be verified using the "Pre-Installation Verification Turn-of-the-Nut Method," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated, except that the required rotation shall be as given in Table 8.2. of this section and the required tension shall be as shown in the following table:

Pre-Installation Verification
Required Tension, N*

Bolt Size, mm	A325M Bolts	A490M Bolts
M16	96 000	120 000
M20	149 000	188 000
M22	185 000	232 000
M24	215 000	270 000
M27	280 000	351 000
M30	342 000	428 000
M36	499 000	625 000
*The above values are 5% higher than the required pretension values used for design, actual installation and inspection, rounded to the nearest kN.		

B. Rotational-capacity tests in accordance with the requirements in Section 11.5.6.4.2 "Rotational-Capacity Tests," of the AASHTO LRFD Bridge Construction Specifications, except that Table 11.5.6.4.1-2 "Nut Rotation from the Snug Condition," is replaced by Table 8.2. of this section.

Test results shall confirm both the minimum bolt tension and the rotational capacity of the bolts. If either test fails, the Contractor shall modify the nut rotation in Table 8.2. of this section until the requirements of both tests are satisfied. No adjustment in compensation will be allowed for modifications to the nut rotations as necessary to satisfy test requirements. Revisions to Table 8.2. shall be approved by the Engineer prior to bolting operations.

The Engineer will randomly sample and perform quality assurance testing of high strength fasteners. Samples will be obtained at locations chosen by the Engineer. The Contractor shall provide the number of bolts specified below to the Engineer for quality assurance testing:

Bolt Sampling Size

Lot Size (No. of Bolts)	Sample Size (No. of Bolts)
2 to 15	3
16 to 25	4
26 to 50	5
51 to 90	7
91 to 150	8
151 to 280	9
281 to 10,000	12
10,001 to 500,000	16
500,001 and over	20

Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354. Steel fastener components for steel fasteners designated as A 354 shall include a bolt, nut and hardened washer. Nuts for steel fasteners designated as A 354 shall conform to Section 55-2.01, "Description," of the Standard Specifications.

Steel fasteners designated on the plans as A 354, Grade BD shall be dry blast cleaned in accordance with the provisions of Surface Preparation Specification No. 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings.

Steel fasteners designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall be galvanized in accordance with the requirements in Section 75-1.05, "Galvanizing," of the Standard Specifications and shall conform to the requirements in ASTM Designation: A123 for bolts and ASTM Designation: A153 for nuts and hardware. Steel fastener assemblies designated as A354, Grade BD, shall be galvanized within 4 hours of being dry blast cleaned.

The Contractor shall submit certified test reports showing that the A 354, Grade BD fasteners conform to the provisions in ASTM Designation: A 143.

Steel fasteners, designated on the plans as A 354, Grade BC, and A 354, Grade BD, shall conform to the requirements of ASTM Designation: A 354. Steel fastener components for steel fasteners designated as A 354 shall include a bolt, nut and hardened washer. Nuts for steel fasteners designated as A 354 shall conform to Section 55-2.01, "Description," of the Standard Specifications. Nuts shall be zinc coated and be furnished with a dry lubricant conforming to Supplementary Requirement S1 and S2 in ASTM Designation: A 563.

Steel fasteners designated on the plans as A 354, Grade BD shall be tensioned not less than the value shown on the plans. Prior to installation, the Contractor shall submit to the Engineer for approval the methods and equipment to be used to tension steel fasteners designated as A354, Grade BD in accordance with Section 55-1.02, "Drawings," of the Standard Specifications. Working drawings shall include methods and equipment to be used to evaluate: 1) the presence of a lubricant, 2) the efficiency of the lubricant, and 3) the compatibility of the high strength steel bolt, nut and hardened washer.

Except where sub-punching is permitted, bolt holes shall be drilled or reamed, unless otherwise shown on the plans.

Punching

The first paragraph of Section 55-3.14A(1) "Punching," of the Standard Specifications shall not apply.

Punching or sub-punching of Grade 250 structural steel where the material is thicker than 16 mm will not be permitted. Punching or sub-punching of high-strength structural steel where the material is thicker than 12 mm will not be permitted.

Prestressing High-Strength Bolts

High-strength A354 bolts shall be tensioned by means of hydraulic jacks so that the force in the bolts shall not be less than the value shown on the plans.

The maximum temporary tensile stress (jacking stress) in high-strength bolts shall not exceed 75 percent of the specified minimum ultimate tensile strength of the material. Prestressing forces in high-strength bolts shall consider all losses, including creep of steel, losses due to sequence of stressing, and other losses specific to the method or system of prestressing used by the Contractor.

Hydraulic jacks used for prestressing high-strength bolts shall be calibrated in accordance with the requirements in Section 50-1.08, "Prestressing," of the Standard Specifications.

Final prestressing high strength A354 bolts at the tower anchorage shall be performed after the full dead load is transferred to the cable system.

ASSEMBLY

The method of erection of the suspended structure and tower shall be determined by the Contractor to meet the seismic design load criteria and ensure control of box girder and tower deflections due to wind induced oscillations.

The Contractor shall carry out the necessary structural analyses for the erection procedure to demonstrate the adequacy of the procedure. Details of these analyses and of any supplementary damping or other measures shall be submitted to the Engineer for review and approval.

Wind pressure effects during erection shall be calculated using a gust wind appropriate to a return period of not less than 25 years and shall allow for variation of speed with height per ANSI ASCE 7-95. The 25-year wind corresponds to a 77 mph one-hour average wind speed (and a corresponding 3-second gust wind speed of 100 mph) at deck elevation of 50 meters, as well as a critical flutter wind speed threshold of 112 mph based on a 1000-year return period. The Contractor shall provide temporary connections between adjacent lift sections in order to ensure sufficient torsional stiffness of the suspended structure. The Contractor shall also provide the proper support of the suspended structure during all stages of erection. The Contractor shall similarly ensure control of tower deflections due to wind-induced oscillations at all stages of erection and shall provide holdback stays or other damping devices as necessary. All such temporary measures shall be approved by the Engineer.

Wind design loads may be reduced during lifting operations.

Seismic loading during erection shall conform to the seismic loading requirements specified in "TEMPORARY TOWERS," subsection "TEMPORARY TOWER DESIGN," subsection "Seismic Design Loads," of these special provisions.

The erection procedure shall be such that the maximum stresses in any part of the permanent structure do not cause any permanent deformation or damage. Appropriate values of loads and safety factors for erection loading conditions shall be submitted by the Contractor to the Engineer for review and approval.

The details of any fastenings which the Contractor may require in any part of the permanent works for erection, and the procedure for their removal, shall be submitted to the Engineer for approval.

Tower

Tower lifts shall be in lengths as indicated on the plans. Exterior plates of the tower shafts shall be fabricated with direction of rolling aligned along the vertical direction of the tower. Within each lift, the number of transverse splices of the