HIGHWAY CONSTRUCTION FACTORS GROUP
ATTACHMENT 19
STATE BRIDGE CONSTRUCTION LOADING RESTRICTIONS FOR OHIO, OREGON, TEXAS, WASHINGTON, W.VIRGINIA, AND PENNSYLVANIA

OHIO SPECIFICATIONS FOR BRIDGE LOADING

State Bridge Engineer
Ohio Department of Transportation
Telephone No. (614) 466-2463
Fax No. (614) 752-4824
e-mail: Tim.Keller@dot.state.oh.us

"Walsh Daniel" <daniel.walsh@ntsb.gov>

10/29/2007 04:40 PM

To <tim.keller@dot.state.oh.us>

cc

Subject Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Tim,

As we discussed on the telephone, can you please provide me Ohio DOT's policy on restriction of overweight loads and equipment (including stockpiling of raw material) on structures. Please call me at (817) 652-7844 if you have any questions. Thank you.

Dan Walsh, P.E.
National Transportation Safety Board

From: Tim.Keller@dot.state.oh.us

Sent: Thursday, November 01, 2007 2:36 PM

To: Walsh Daniel

Subject: Re: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Dan:
Attached are the Ohio DOT specifications that deal with construction loads on bridges.

105.12 Load Restrictions. Comply with all legal load restrictions when hauling materials on public roads.

Operate equipment of a weight or so loaded as to not cause damage to structures, to the roadway, or to other types of construction. Comply with subsection 501.05 B.6 for allowed loads on bridges.

Do not use off road vehicles on bases or pavements unless permitted by the DCE in writing.

Do not haul on concrete pavement, base, or structures before the expiration of the curing period.

Do not exceed the legal load limits in this section unless permitted by the Director in writing.

and the following:

501.05 Submittal of Construction Plans and Calculations. Do not begin work until after complying with the acceptance criteria and work limitations specified below.
Design and perform all procedures as directed by the following specifications except as modified herein: AASHTO Guide Design Specifications for Bridge Temporary Works, AASHTO Construction Handbook for Bridge

Temporary Works and AASHTO Standard Specifications for Highway Bridges.

A. Prepare and provide plans listed in this section as follows:

Have an Ohio Registered Engineer prepare, sign, seal and date each plan. Submit plans that will be accepted to all involved railway companies at least 50 days before construction begins. Obtain acceptance from all involved railroad company(s). Furnish the Engineer with copies of all correspondence with the railroad, documentation of railroad acceptance and the plans accepted by the railroad. Department acceptance is not required.

This section applies to construction plans for the following:

1. Sheeting and bracing of excavations adjacent to the railroad tracks.
2. Demolition of structures over or within 14 feet of railroad tracks.
3. Erection of structural members over or within 14 feet of railroad tracks or that carry railroad traffic.

B. Prepare and provide plans listed in this section as follows:

Have an Ohio Registered Engineer prepare, sign, seal and date each plan. Have a second Ohio Registered Engineer check, sign, seal and date each plan. The preparer and checker are two different Engineers. Include the following statement on the plans:

"This plan was prepared in compliance with contract documents."

Submit the plan to the Engineer at least 7 days before construction begins. Department acceptance is not required.

This section applies to construction plans for the following:

1. Sheeting and bracing adjacent to active traffic when required by contract.

Perform all work as specified below:

a. Locate sheeting and bracing per contract.
b. Maintain temporary horizontal and vertical clearances per contract.
c. Design sheeting or bracing to support the roadbed including the effects of AASHTO live and dead load surcharges.

2. Demolition of structures over or adjacent to active traffic. Perform all work as specified below:

a. Provide temporary devices or structures necessary to protect traffic during all demolition activities. Provide traffic protection when demolition is located less than 12' horizontally from active traffic on structures of less than 25' vertical clearance. Increase the 12' minimum horizontal distance 1 foot for each 2 feet of additional height greater than 25'.

b. Never lift the portions of structure being removed over active traffic. Before releasing traffic make the remaining structure stable.

c. Design traffic protection devices or structures for a minimum load of 50 pounds per square foot plus the weight of equipment, debris and any other load to be carried. Include any portion of the deck that cantilevers beyond the fascia beams or girders.

d. In lieu of temporary devices or structures required in "a" above, provide a vertical barrier. Design the vertical barrier with rigid or flexible materials specifically designed for demolition containment. Extend the enclosure up to the bottom of the deck and down to the ground. Maintain all materials free of tears, cuts and holes.

e. Maintain temporary horizontal and vertical clearances per contract.

f. Locate structural members to be reused before performing any removal operations.

g. Do not damage structural members being reused during any removal operation.

h. Perform work so that all members are stable during all operation and loading conditions.

i. Perform work per 501.05.B.6.

3. Falsework for cast-in-place concrete bridges over 20 feet (6.1 m) in span. Perform all work per 508 and as specified below:

a. Provide a camber table to account for the deflection of the falsework loaded with its self weight and the weight of wet concrete. Also include in the table, the specified camber to compensate for slab deflection after the falsework is released.

b. Maintain temporary horizontal and vertical clearances per contract.

c. As a minimum design falsework over waterways for a five year flood or with 75% of the effective waterway opening of the proposed structure. The Contractor is responsible for any damages caused by upstream flooding due to insufficient temporary structure size or the accumulation of debris or sediment in the channel.

d. Support falsework foundations located within the ten year flood limits on rock, shale or piles driven to a minimum depth of 15 feet, and to sufficient penetration to carry superimposed loads or until refusal on rock.

4. Erection of steel or precast concrete structural members as specified below:

a. Never lift structural members over active traffic. Before releasing traffic make structural members stable.

b. Supply any temporary supports or braces necessary to maintain structural stability and prevent lateral movement until completion of all construction activities.

c. Perform work per 501.05.B.6, 513 or 515.

d. Do not field weld temporary members to permanent steel members.

e. Maintain temporary horizontal and vertical clearances per contract.

5. Jacking and support of existing structures as specified below:

a. Support the structure on temporary supports and brace as necessary to maintain structural stability and prevent lateral movement until completion of the permanent supports. Do not use jacks alone to support the structure except during the actual jacking operation. Remove all temporary supports upon completion of the jacking procedure.

b. Maintain a maximum differential jacking height of 1/4 inch between any adjacent beam lines.

c. Maintain a maximum differential jacking height of 1 inch between any adjacent abutments or piers.

d. Place jacks and any load plates at least 2 inches from the edges of any

concrete substructure seats.

e. Do not field weld temporary members to permanent steel members.

f. Maintain temporary horizontal and vertical clearances per contract.

6. Placing or moving equipment having a gross weight in excess of 60,000 pounds (27,000 kg) on or across a structure as follows:

a. Do not allow equipment having a gross weight in excess of the posted limit to be placed on or driven across a structure.

b. Do not allow erection and construction methods, or use or move erection or construction equipment on or across the uncompleted or completed structure, to subject any part of the structure to unit stresses that exceed by more than one-third the allowable unit stresses, as given in *AASHTO Standard Specifications for Highway Bridges.*

7. Structures for maintaining traffic in accordance with Item 502.

a. For structures located over or within 14 feet of railroad tracks, submit plans in accordance with 501.05.A.

b. Perform work per 501.05.B.6.

C. Welded Attachments. Prepare and provide a detailed request showing weld size, length, type and location for welding permanent or temporary attachments to main structural members not shown or permitted by contract. Submit request to the Office of Structural Engineering for acceptance at least 20 days before construction begins. Perform work per 501.05.B.6 and 513.

The following link gets you to the entire Ohio DOT spec book:

http://www.dot.state.oh.us/construction/OCA/Specs/2005CMS/2005_ODOT_C&MS.htm

Thank You

Tim Keller

OREGON SPECIFICATIONS FOR BRIDGE LOADING

From: JOHNSON Bruce V [Bruce.V.JOHNSON@odot.state.or.us]
Sent: Friday, November 02, 2007 9:52 AM
To: Walsh Daniel
Cc: NELSON Catherine M * Cathy; GOWER Jeffrey L; SERADJ Hormoz; BOWLING Gary L
Subject: RE: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Dan,

Attached is a letter response to your inquiry. Please let me know if you need additional information.

Bruce
503-986-3344

-----Original Message-----
From: Walsh Daniel [mailto:daniel.walsh@ntsb.gov]
Sent: Friday, October 26, 2007 9:45 AM
To: JOHNSON Bruce V
Subject: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Bruce,

As we discussed on the telephone, can you please provide me Oregon DOT's policy on restriction of overweight loads and equipment (including stockpiling of raw material) on structures. Please call me at (817) 652-7844 if you have any questions. Thank you.

Dan Walsh, P.E.
National Transportation Safety Board

Oregon
Theodore R. Kulongoski, Governor

Department of Transportation
Transportation Building
355 Capitol St. NE, Rm. 301
Salem, OR 97301-3871

FILE CODE:

November 2, 2007

Daniel Walsh
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594

Dear Daniel,

In response to your October 26, 2007 inquiry, we have reviewed Oregon Department of Transportation procedures for monitoring and limiting overloads on bridges under construction or repair.

Construction Loads

Oregon DOT does not have a comprehensive written policy for limiting maximum allowable construction load on bridges for bridge reconstruction. However, in practice the contractor is responsible for all aspects of the construction site including loading a bridge in a manner that does not result in damage to the bridge. Oregon does provide some control of construction loading to structures by making the contractor responsible for limiting construction vehicle loads to the legal limit on bridges under their jurisdiction at a construction site (see attachment 1, Oregon DOT Supplemental Construction Specifications Section 00150.62) also, Oregon DOT does limit the placement of subsequent loading on newly placed concrete members (see attachment 2, Oregon DOT Construction Specifications Section 00540.52.)

In special cases the engineer may provide maximum permissible load on structure in the contract documents, if the bridge has any existing load restrictions established prior to beginning work on the bridge. Based on information provided in the contract documents in these special cases, the contractor will consult with their engineer to determine the safe construction loading for a bridge within the construction site.

Vehicle Overloads

There are two types of overload permits that are issues in Oregon. The first type is called a Continuous Trip Permit (CTP). The CTP is valid for one year, and is issued to two groups of vehicles that exceed 80,000 pounds. The first group is the "Extended Weight" vehicles that have legal axle loads but have a gross weight of up to 105,500 pounds. The second group is the "Heavy Hauls" that have heavier tandems (43,000 pounds) and a gross weight of up to 98,000 pounds. Vehicles that exceed the limits for a CTP (for heavy haul non-divisible loads) can apply for the second type of permit, the Single Trip Permit (STP). As long as individual axles, and all possible groups of axles, do not

exceed limits of the published weight tables, a STP can be issued to the carrier. These permits are issued by the Motor Carrier Transportation Division, Over-Dimension Permit Unit.

The Bridge Program Unit maintains the list of Restricted State Bridges. If the restrictions affect vehicles with legal axle loads and gross weights that do not require a permit, there is a sign at the bridge location that specifies the level of restrictions. For restrictions that only apply to vehicles operating with a permit, no sign is necessary since complying with unsigned bridge restrictions is a condition of the permit. Permit holders can refer to "Route Map 8 –Weight Restricted Bridges". The front of Route Map 8 is a map that shows the location of weight restricted bridges, the back details the load restriction description for each bridge. Any new load restrictions are coordinated with the freight industry, with adequate notice so that individual carriers can be notified through newsletters. If the bridge conditions require an immediate closure or restriction, the necessary action is taken and the freight industry is notified. If the new restriction will affect CTP loads, a sign is placed at the bridge. Placing these signs is a way to alert carriers operating with a CTP who are operating with a now outdated copy of Route Map 8.

All of the CTP permits and the vast majority of the STP permits are issued by the Motor Carrier Transportation Division with no additional input needed from the Bridge Program Unit. The Bridge Program Unit only becomes involved when there is a STP request that exceeds the published weight tables. In these cases, the Motor Carrier Transportation Division provides the Bridge Program Unit with the following information:

- Permit Analyst
- Carrier
- Desired Route
- Axle Configuration and Weights
- Comparison with the heaviest Weight Tables (Tables 4 and 5)

The load rating engineers take this information and make a list of every bridge on the route. The truck is entered into the BRASS load rating software, so that it can be run on every bridge that has a load rating. Of the 2678 State bridges, there are approximately 1200 that do not have load ratings. There is a six year agreement in-place between FHWA and ODOT to get the remaining bridges load rated, and there active contracts with four consulting firms to accomplish this task. While many states rate only the superstructure, ODOT includes crossbeams in the load rating evaluation.

For bridges that have ratings where the rating factor for the permit vehicle is greater than 1.0, there are no restrictions. In cases where the rating factor is less than 1.0, the critical elements are identified and loading options are considered. For example, the distribution factors for a two girder bridge can be reduced to be close to 1.0 if the permit vehicle is centered between the girders and there are no other vehicles on the bridge. Also, if a crossbeam has rating factors less than 1.0, the permit vehicle can be positioned so that the critical section of the crossbeam is not loaded. In other cases the loading of the

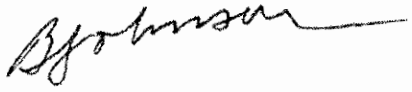
crossbeam can be reduced by positioning the permit vehicle so that one wheel line will be directly over a column. Every effort is made to allow the permit load to be safely moved on the desired route.

For those bridges that are not rated, the load rating engineer takes a close look at the truck configuration, and the comparison that was provided between the permit load and those loads that are allowed in Weight Tables 4 and 5. For bridges that are in good condition and the load is marginally outside of the weight tables, the vehicle is allowed to use the bridge. The rater can also modify an existing file to match the span configuration and compare the shear forces, moments, and reactions between the permit vehicle and the representative vehicles that are used for load rating. Depending on this result, the permit vehicle may be directed to slow down to reduce impact loading, maintain a specific path across the bridge to improve distribution and minimize loading to critical members, or be the only truck allowed on the bridge.

There are occasional permits where the weight exceeds the weight tables by a significant amount. In those cases, full load ratings are done on all bridges on the route before the permit is issued. There will also be specific directions given to minimize the loading of critical members. The Bridge Program Unit has three days to review an overweight permit request, unless there is coordination with the Motor Carrier Transportation Division. If there are load ratings that need to be accomplished, the Bridge Program Unit will coordinate early in the process and estimate when the analysis will be complete. There are times when a carrier will give several weeks notice of intent to move a large load so that there is plenty of time for analysis, coordination, and the consideration of detour routes.

Permit reviews are accomplished under the direction of the Senior Load Rating Engineer. Only experienced load raters are used for permit evaluation. There is open communication between all of the load raters and decisions on how to best model the vehicle and recommendations to minimize loading to critical members is discussed. The load rating results are communicated directly to the permit analyst and any questions answered before the permit is issued.

Sincerely,



Bruce V. Johnson
State Bridge Engineer

BVJ/mp

Attachments

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ATTACHMENT 1: Oregon DOT Construction Specifications Section 00150.60

00150.60 Construction Equipment Restrictions:
(a) Load and Speed Restrictions for Construction Vehicles and Equipment - The Contractor shall comply with legal mass (weight) and speed restrictions when moving Materials or Equipment beyond the limits of the Project Site.

The Contractor shall control vehicle and Equipment loads and speeds within the Project Site according to the following restrictions, unless the Special Provisions provide otherwise:

• The Contractor shall restrict loads and speeds as necessary to avoid displacement or loss of Materials on Subgrades and Aggregate Bases.

• The Contractor shall restrict masses (weights) to legal loads, and shall travel at speeds of no more than 70 km/h (45 mph) or the posted construction speed, whichever is less, on treated Bases, Pavement, or wearing Courses.

• The Contractor shall not cross Bridges or other Structures with Equipment or vehicles exceeding the legal load limit without prior written permission of the Engineer. The Contractor shall make any such request in writing, describing the loading details and the arrangement, movement, and position of the Equipment on the Structure. The Contractor shall comply with any restrictions or conditions included in the Engineer's written permission.

(b) Protection of Buried Items - The Contractor shall use temporary fill or other methods to avoid overload of pipes, box culverts, and other items that are covered, or to be covered, by fill or backfill.

(c) Responsibility for Damages - The Contractor shall assume responsibility for damages caused by excessive Equipment speed or loads while performing the Work, both inside and outside the Project Site. The Engineer's permission to cross Bridges and other Structures, according to 00150.60(a) will not relieve the Contractor from responsibility for load-caused damages.

ATTACHMENT 2: Oregon DOT Construction Specifications Section 00540.52

00540.52 Removal of Forms and Falsework, and Subsequent Loading - Do not remove forms and falsework or place subsequent loads without approval.

In determining when to remove forms and falsework, and when to place subsequent loads, the Engineer will consider the Contractor's proposed schedule, the location and character of the structure, the weather, and other conditions influencing the setting of the concrete. If appropriate, these operations will be controlled by compressive strength tests of cylinders cast by the Contractor and witnessed by the Engineer. The cylinders will be

tested at the Contractor's expense at a recognized testing laboratory. Cure cylinders under conditions which are equivalent to the most unfavorable field conditions for the portions of the concrete which the cylinders represent.

The Contractor may remove forms and falsework or place subsequent loads when both conditions of Table 00540-1 are met.

Table 00540-1

Part 1:

Form and Falsework Removal for:	**Percent of Specified Strength**	**Counting Days [1]**
Side form for footings, walls, abutments, caps, traffic and pedestrian barriers, and any other side forms not supporting the concrete weight	-	1
Columns	-	3
Cantilevered bridge deck sidewalks	80	7
Bridge decks supported on steel beams or precast, prestressed concrete members; top slabs of concrete box culverts	80	7
Crossbeams, caps, box girders, T-beam girders, and flat slab superstructures [2]	80	7
Arches [2]	80	7

Part 2:

Subsequent Loading [3] of:	**Percent of Specified Strength**	**Counting Days [1]**
Footings for signal, luminaire and sign supports	100	7
Footings [4]	-	3
Walls, wall-type abutments, columns, vertical girder stems, and box culvert stems over 4 feet in height [4]	100	3
Bottom slabs of box girders	66	5
Members and falsework designed integrally to	100	7

carry the additional loads		
Pile caps, bents, and other members designed as moment-carrying members	100	7
All other members	100	7

[1] From the time of the last placement in the forms or falsework supports and excluding days when the surrounding temperature is below 40 °F for a total of four hours or more.

[2] Where continuous spans are involved, the time for all spans will be determined by the last concrete placed affecting any span.

[3] Except loads from forms and reinforcing steel of further concrete placements.

[4] Mass type or other type members where subsequent loading will not induce flexural bending and flexural stresses.

TEXAS SPECIFICATIONS FOR BRIDGE LOADING

From: Brian Merrill [BMERRILL@dot.state.tx.us]
Sent: Tuesday, September 04, 2007 1:15 PM
To: Walsh Daniel
Cc: Bill Riley; Alfredo Valles; Kelly Hoffman; Keith Ramsey; Shiraz Dhanani; Randy Cox
Subject: Bridge Questions

Dan - per our phone conversation this morning I have collected the answers to your following questions:

1) Does TxDOT have requirements for construction loading?
2) Does TxDOT use the PONTIS system for bridge inspections?
3) What is the design loading currently used?

Our answers are as follows:

1) TxDOT does have requirements for construction loads both for equipment, vehicles and material storage. I have attached portions of our specifications that address these issues. Item 5 (s005.pdf), "Control of the Work", outlines the authority of the Engineer (TxDOT) for all construction matters. Item 6 (s006.pdf), "Control of Materials" covers in article 6.6 the requirements for storage of materials on the Right of Way. Finally, Item 7 (s007.pdf) "Legal Relations and Responsibilities", in article 7.8 covers the requirements to be met for hauling or placing loads on structures including the requirements for structural analyses as specified. The engineers who perform these calculations are hired by the Contractor and then we review their calculations for approval. ASD (allowable stress design) or LFD (Load factor design) methods are typically used for these calculations as LRFD is not well suited for this type of analysis.

2) The Elemental (PONTIS) data is collected and archived so that we can populate the tables when we get PONTIS up and running. We hope to have PONTIS running in FY09.

3) The current design loading for bridges is HL-93 in accordance with the AASHTO LRFD Bridge Design Specifications. While all of our bridge standards are compliant with the October 2007 FHWA mandate regarding new bridge designs, there are exceptions: many consultant-designed projects for which preliminary design has already begun and some widenings are both situations excepted by the mandate (att.). The noted exceptions use HS-20 loading in accordance with the AASHTO Standard Specifications for Highway Bridges.

Please feel free to contact Kelly Hoffmann (cc'd with this e-mail) at 512-416-2278 if you need additional information. She is the information coordinator for the Bridge Division.

Brian D. Merrill, P.E.
TxDOT - Bridge Division
Manager, Construction & Maintenance Branch
125 East 11th St
Austin, TX 78701
P:512-416-2232
F:512-416-2402

ITEM 7

LEGAL RELATIONS AND RESPONSIBILITIES

7.1. Laws to be Observed. Comply with all federal, state, and local laws, ordinances, and regulations that affect the performance of the work. The Contractor is not required to comply with city electrical ordinances not included in this Contract. Indemnify and save harmless the State and its representatives against any claim arising from violation by the Contractor of any law, ordinance, or regulation.

This Contract is between the Department and the Contractor only. No person or entity may claim third-party beneficiary status under this Contract or any of its provisions, nor may any non-party sue for personal injuries or property damage under this Contract.

7.2. Permits, Licenses, and Taxes. Procure all permits and licenses; pay all charges, fees, and taxes; and give all notices necessary and incidental to the due and lawful prosecution of work, except for permits provided by the Department and as specified in Article 7.19, "Preservation of Cultural and Natural Resources and the Environment."

7.3. Patented Devices, Material, and Processes. Indemnify and save harmless the State from any claims for infringement from the Contractor's use of any patented design, device, material, process, trademark, or copyright selected by the Contractor and used in connection with the work. Indemnify and save harmless the State against any costs, expenses, or damages that it may be obliged to pay, by reason of this infringement, at any time during the prosecution or after the completion of the work.

7.4. Insurance and Bonds. As specified in Article 3.4, "Execution of Contract," provide the Department with the Department's Certificate of Insurance verifying the types and amounts of coverage shown in Table 1.

Table 1
Insurance Requirements

Type of Insurance	Amount of Coverage
Commercial General Liability Insurance	$600,000 combined single limit
Business Automobile Policy: Bodily Injury Property Damage	 $250,000 each person $500,000 each occurrence $100,000 each occurrence
Workers' Compensation	Statutory

By signing the Contract, the Contractor certifies compliance with all applicable laws, rules, and regulations pertaining to workers' compensation insurance or legitimate alternates. This certification includes all subcontractors. Pay all deductibles stated in the policy. Subcontractors must meet the requirements of Table 1 either through their own coverage or through the Contractor's coverage.

The coverage listed in Table 1 must remain in force until final acceptance. If the insurance lapses for any reason, stop all work until the Department receives an acceptable certificate of insurance.

Commercial general liability and business automobile policies must include an endorsement naming the State as an additional named insured. Policies issued for coverage listed in Table 1 must include a waiver of subrogation endorsement in favor of the State.

Provide a substitute Surety on the Contract bonds in the original full Contract amount within 15 days of notification if the Surety is declared bankrupt or insolvent, the Surety's underwriting limitation drops below the Contract amount or the Surety's right to do business is terminated by the State. The substitute Surety must be authorized by the laws of the State and acceptable to the Department. Work will be suspended until a substitute Surety is provided. Working day charges will be suspended for 15 days or until an acceptable Surety is provided, whichever is sooner.

7.5. Restoring Surfaces Opened by Permission. Do not authorize anyone to make an opening in the highway for utilities, drainage, or any other reason without written permission from the Engineer. Repair all openings as directed. Payment for repair of surfaces opened by permission will be made in accordance with pertinent Items or Article 4.2, "Changes in the Work." Costs associated with openings made with Contractor authorization but without Department approval will not be paid.

7.6. Sanitary Provisions. Provide and maintain adequate, neat, and sanitary toilet accommodations for employees, including State employees, in compliance with the requirements and regulations of the Texas Department of Health or other authorities having jurisdiction.

7.7. Public Safety and Convenience. Manage construction to minimize disruption to traffic. Make every effort to ensure the safety and convenience of the public and property as provided in the Contract and as directed. Follow the safety provisions of all applicable rules, codes, and regulations. Keep all portions of the highway open to traffic, unless otherwise shown on the plans. Maintain the roadway in a good and passable condition. Provide for ingress and egress to adjacent property in accordance with the Contract and as directed. Provide suitable drainage of the roadway and erect temporary structures as required.

If at any time during construction, the approved plan of operation does not accomplish the intended purpose due to any condition affecting the safe handling of traffic, immediately make necessary changes, as directed, to correct the unsatisfactory conditions.

Store all equipment not in use in a manner and at locations that will not interfere with the safe passage of traffic.

Provide qualified flaggers in accordance with Section 502.2.B, "Flaggers," for the safety and convenience of the traveling public and workers, as directed.

If the Engineer determines that any of the requirements of this Article have not been met, the Engineer may take any necessary corrective action. However, this will not change the legal responsibilities set forth in the Contract. The cost for this work will be deducted from any money due or to become due to the Contractor.

7.8. Hauling and Loads on Roadways and Structures. Comply with federal and state laws concerning legal gross and axle weights. Except for the designated Interstate system,

vehicles with a valid yearly overweight tolerance permit may haul materials to the work locations at the permitted load. Provide copies of the yearly overweight tolerance permits to the Engineer upon request. Construction equipment is not exempt from oversize or overweight permitting requirements on roadways open to the traveling public.

Protect existing bridges and other structures that will remain in use by the traveling public during and after the completion of the Contract. Construction traffic on roadways, bridges, and culverts within the limits of the work, including any structures under construction that will remain in service during and after completion of the Contract is subject to legal size and weight limitations.

Additional temporary fill may be required by the Engineer for hauling purposes for the protection of certain structures. This additional fill will not be paid directly but will be subsidiary.

Replace or restore to original condition any structure damaged by the Contractor's operations.

The Engineer may allow equipment with oversize or non-divisible overweight loads to operate without a permit within the work locations on pavement structures not open to the traveling public. Submit Contractor-proposed changes to traffic control plans for approval, in accordance with Item 502, "Barricades, Signs, and Traffic Handling." The following sections further address overweight allowances. The Department will make available to the Contractor any available plans and material reports for existing structures.

A. Overweight Construction Traffic Crossing Structures. The Engineer may allow crossing of a structure not open to the public within the work locations, when divisible or non-divisible loads exceed legal weight limitations, including limits for load-posted bridges. Obtain written permission to make these crossings. Submit for approval a structural analysis by a licensed professional engineer indicating that the excessive loads should be allowed. Provide a manufacturer's certificate of equipment weight that includes the weight distribution on the various axles and any additional parts such as counterweights, the configuration of the axles, or other information necessary for the analysis. Submit the structural analysis and supporting documentation sufficiently in advance of the move to allow for review by the Engineer. Permission may be granted if the Engineer finds that no damage or overstresses in excess of those normally allowed for occasional overweight loads will result to structures that will remain in use after Contract completion. Provide temporary matting or other protective measures as directed.

Schedule loads so that only one vehicle is on any span or continuous unit at any time. Use barricades, fences, or other positive methods to prevent other vehicular access to structures at any time the overweight load is on any span or continuous unit.

B. Construction Equipment Operating on Structures. Cranes and other construction equipment used to perform construction operations that exceed legal weight limits may be allowed on structures. Before any operation that may require placement of equipment on a structure, submit for approval a detailed structural analysis prepared by a licensed professional engineer.

Submit the structural analysis and supporting documentation sufficiently in advance of the use to allow for review by the Engineer. Include all axle loads and

configurations, spacing of tracks or wheels, tire loads, outrigger placements, center of gravity, equipment weight, and predicted loads on tires and outriggers for all planned movements, swings, or boom reaches. The analysis must demonstrate that no overstresses will occur in excess of those normally allowed for occasional overweight loads.

C. **Hauling Divisible Overweight Loads on Pavement Within the Work Locations.** The Engineer may allow divisible overweight loads on pavement structures within the work locations not open to the traveling public. Obtain written approval before hauling the overweight loads. Include calculations to demonstrate that there will be no damage or overstress to the pavement structure.

7.9. Barricades, Warning and Detour Signs, and Traffic Handling. Provide, install, move, replace, maintain, clean, and remove all traffic control devices as shown on the plans and as directed. If details are not shown on the plans, provide devices and work in accordance with the TMUTCD and as directed. When authorized or directed, provide additional signs or traffic control devices not required by the plans.

If an unexpected situation arises that causes the Contractor to believe that the traffic control should be changed, make all reasonable efforts to promptly contact the Engineer. Take prudent actions until the Engineer can be contacted.

If the Engineer determines that any of the requirements of this Article have not been met, the Engineer may take any necessary corrective action. However, this will not change the legal responsibilities set forth in the Contract. The cost for this work will be deducted from any money due or to become due to the Contractor.

The Engineer may authorize or direct in writing the removal or relocation of project limit advance warning signs. When project limit advance warning signs are removed before final acceptance, traffic control in accordance with the TMUTCD may be used for minor operations as approved. Removal or relocation of project limit advance warning signs does not imply final acceptance.

7.10. Using Explosives. Do not endanger life or property. When required by the plans or requested, provide a written blasting plan. The Department retains the right to reject the blasting plan. Store all explosives securely and clearly mark all storage places with "DANGER – EXPLOSIVES." Store, handle, and use explosives and highly flammable material in compliance with federal, state, and local laws, ordinances, and regulations. Assume liability for property damage, injury, or death resulting from the use of explosives.

Give at least a 48-hr. advance notice to the appropriate Roadmaster before doing any blasting work involving the use of electric blasting caps within 200 ft. of any railroad track.

7.11. Protecting Adjacent Property. Protect adjacent property from damage. If any damage results from an act or omission on the part of or on behalf of the Contractor, take corrective action to restore the damaged property to a condition similar or equal to that existing before the damage was done.

7.12. Responsibility for Damage Claims. Indemnify and save harmless the State and its agents and employees from all suits, actions, or claims and from all liability and damages

for any injury or damage to any person or property due to the Contractor's negligence in the performance of the work and from any claims arising or amounts recovered under any laws, including workers' compensation and the Texas Tort Claims Act. Indemnify and save harmless the State and assume responsibility for all damages and injury to property of any character occurring during the prosecution of the work resulting from any act, omission, neglect, or misconduct on the Contractor's part in the manner or method of executing the work; from failure to properly execute the work; or from defective work or material.

Pipelines and other underground installations that may or may not be shown on the plans may be located within the right of way. Indemnify and save harmless the State from any suits or claims resulting from damage by the Contractor's operations to any pipeline or underground installation. At the pre-construction conference, submit the scheduled sequence of work to the respective utility owners so that they may coordinate and schedule adjustments of their utilities that conflict with the proposed work.

If the Contractor asserts any claim or brings any type of legal action (including an original action, third-party action, or cross-claim) against any Commissioner or individual employee of the Department for any cause of action or claim for alleged negligence arising from the Contract, the Contractor will be ineligible to bid on any proposed Contract with the Department during the pendency of the claim or legal action.

7.13. Responsibility for Hazardous Materials. Indemnify and save harmless the State and its agents and employees from all suits, actions, or claims and from all liability and damages for any injury or damage to any person or property arising from the generation or disposition of hazardous materials introduced by the Contractor on any work done by the Contractor on State owned or controlled sites. Indemnify and save harmless the State and its representatives from any liability or responsibility arising out of the Contractor's generation or disposition of any hazardous materials obtained, processed, stored, shipped, etc., on sites not owned or controlled by the State. Reimburse the State for all payments, fees, or restitution the State is required to make as a result of the Contractor's actions.

7.14. Contractor's Responsibility for Work. Until final acceptance of the Contract, take every precaution against injury or damage to any part of the work by the action of the elements or by any other cause, whether arising from the execution or from the nonexecution of the work. Protect all materials to be used in the work at all times, including periods of suspension.

When any roadway or portion of the roadway is in suitable condition for travel, it may be opened to traffic as directed. Opening of the roadway to traffic does not constitute final acceptance.

Repair damage to all work until final acceptance. Repair damage to existing facilities in accordance with the Contract or as directed by the Engineer. Repair damage to existing facilities or work caused by Contractor operations at the Contractor's expense. Repair work for damage that was not due to the Contractor's operations will not be paid for except as provided below.

A. **Reimbursable Repair.** Except for damage to appurtenances listed in Section 7.14.B.1, "Unreimbursed Repair," the Contractor will be reimbursed for repair of damage caused by:

- motor-vehicle, watercraft, aircraft, or railroad-train incident;
- vandalism; or
- Acts of God, such as earthquake, tidal wave, tornado, hurricane, or other cataclysmic phenomena of nature.

B. Appurtenances.

1. **Unreimbursed Repair.** Reimbursement will not be made for repair of damage to the following temporary appurtenances, regardless of cause:
   - signs,
   - barricades,
   - changeable message signs, and
   - other work zone traffic control devices.

   Crash cushion attenuators and guardrail end treatments are the exception to the above listing and are to be reimbursed in accordance with Section 7.14.B.2, "Reimbursed Repair."
2. **Reimbursed Repair.** Reimbursement will be made for repair of damage due to the causes listed in Section 7.14.A, "Reimbursable Repair," to appurtenances (including temporary and permanent crash cushion attenuators and guardrail end treatments) not listed in Section 7.14.B.1, "Unreimbursed Repair."

C. Roadways and Structures. Until final acceptance, the Contractor is responsible for all work constructed under the Contract. The Department will not reimburse the Contractor for repair work to new construction, unless the failure or damage is due to one of the causes listed in Section 7.14.A, "Reimbursable Repair."

The Department will be responsible for the cost for repair of damage to existing roadways and structures not caused by the Contractor's operations.

D. Detours. The Contractor will be responsible for the cost of maintenance of detours constructed under the Contract, unless the failure or damage is due to one of the causes listed in Section 7.14.A, "Reimbursable Repair." The Engineer may consider failures beyond the Contractor's control when determining reimbursement for repairs to detours constructed. The Department will be responsible for the cost of maintenance of existing streets and roadways used for detours or handling traffic.

E. Relief from Maintenance. The Engineer may relieve the Contractor from responsibility of maintenance as outlined in this Section. This relief does not release the Contractor from responsibility for defective materials or work or constitute final acceptance.

1. **Isolated Work Locations.** For isolated work locations, when all work is completed, including work for Article 4.6, "Final Cleanup," the Engineer may relieve the Contractor from responsibility for maintenance.
2. **Work Except for Vegetative Establishment and Test Periods.** When all work for all or isolated work locations has been completed, including work for Article 4.6, "Final Cleanup," with the exception of vegetative establishment and maintenance periods and test and performance periods, the Engineer may relieve the Contractor from responsibility for maintenance of completed portions of work.

3. **Work Suspension.** When all work is suspended for an extended period of time, the Engineer may relieve the Contractor from responsibility for maintenance of completed portions of work during the period of suspension.

F. Basis of Payment. When reimbursement for repair work is allowed and performed, payment will be made in accordance with pertinent Items or Article 4.2, "Changes in the Work."

7.15. Electrical Requirements.

A. Definitions.

1. **Electrical Work.** Electrical work is:

   a. work performed under:
   - Item 610, "Roadway Illumination Assemblies,"
   - Item 614, "High Mast Illumination Assemblies,"
   - Item 616, "Performance Testing of Lighting Systems,"
   - Item 617, "Temporary Roadway Illumination,"
   - Item 618, "Conduit,"
   - Item 620, "Electrical Conductors,"
   - Item 621, "Tray Cable,"
   - Item 622, "Duct Cable,"
   - Item 628, "Electrical Services,"
   - Item 652, "Highway Sign Lighting Fixtures,"
   - Item 680, "Installation of Highway Traffic Signals," or
   - Item 684, "Traffic Signal Cables";

   b. work performed under other Items that involves either the distribution of electrical power greater than 50 volts or the installation of conduit and duct banks;

   c. the installation of conduit and wiring associated with Item 624, "Ground Boxes," and Item 656, "Foundations for Traffic Control Devices"; and

   d. the installation of the conduit system for communication and fiber optic cable.

   Electrical work does not include the installation of the communications or fiber optic cable, or the connections for low voltage and inherently power limited circuits such as electronic or communications equipment. Assembly and placement of poles, structures, cabinets, enclosures, manholes, or other hardware will not be considered electrical work as long as no wiring, wiring connections, or conduit work is done at the time of assembly and placement.

2. **Specialized Electrical Work.** Specialized electrical work is work that includes the electrical service and feeders, sub-feeders, branch circuits, controls, raceways, and enclosures for the following:
   - pump stations,
   - moveable bridges,
   - ferry slips,
   - motor control centers,
   - facilities required under Item 504, "Field Office and Laboratory,"
   - rest area or other public buildings,

- weigh-in-motion stations,
- electrical services larger than 200 amps,
- electrical services with main or branch circuit breaker sizes not shown in the Contract, and
- any 3-phase electrical power.

3. **Certified Person.** A certified person is a person who has passed the test from the Texas Engineering Extension Service (TEEX) "TxDOT Electrical Systems" course. Submit a current and valid TEEX certification upon request.

4. **Licensed Electrician.** A licensed electrician is a person with a current and valid unrestricted master electrical license, or unrestricted journeyman electrical license that is supervised or directed by an unrestricted master electrician. An unrestricted master electrician need not be on the work locations at all times electrical work is being done, but the unrestricted master electrician must approve work performed by the unrestricted journeyman. Licensed electrician requirements by city ordinances do not apply to on state system work.

   The unrestricted journeyman and unrestricted master electrical licenses must be issued by a city in Texas with population of 50,000 or greater that issues licenses based on passing a written test and demonstrating experience.

   The Engineer may accept other states' electrical licenses. Submit documentation of the requirements for obtaining that license. Acceptance of the license will be based on sufficient evidence that the license was issued based on:
   - passing the NEC Block Test or the NEC Southern Building Code Test and
   - demonstrating sufficient electrical experience commensurate with general standards for an unrestricted master and unrestricted journeyman electrician.

B. Work Requirements. Table 2 sets forth the qualifications required to perform electrical work and specialized electrical work.

Table 2
Work Requirements

Type of Work	Qualifications to Perform Work
Electrical work with plans	Licensed electrician, certified person, or workers directly supervised by a licensed electrician or certified person
Electrical work without plans	Licensed electrician or workers directly supervised by a licensed electrician
Specialized electrical work	Licensed electrician or workers directly supervised by a licensed electrician
Replace lamps, starting aids, and changing fixtures	Licensed electrician, certified person, or workers directly supervised by a licensed electrician or certified person
Conduit in precast section with approved working drawings	Inspection by licensed electrician or certified person
Conduit in cast-in-place section	Inspection by licensed electrician or certified person
All other electrical work (troubleshooting, repairs, component replacement, etc.)	Licensed electrician or workers directly supervised by a licensed electrician

"Directly supervised by a licensed electrician" means that a licensed electrician is present during all electrical work. "Directly supervised by a licensed electrician or certified person" means that a licensed electrician or certified person is present during all electrical work.

A non-certified person may install conduit in cast-in-place concrete sections if the work is checked by a certified person before concrete placement.

If the plans specify IMSA certification or the completion of other electrical installation courses for traffic signal installation and maintenance, a licensed electrician or certified person will be required only for the installation of conduit, ground boxes, electrical services, pole grounding, and electrical conductors installed under Item 620, "Electrical Conductors."

7.16. Work Near Railroads.

A. General. If the work crosses or is in close proximity to a railroad, do not interfere with the use or operation of the railroad company's trains or other property. Assign responsible supervisory personnel to ensure that tracks and adjacent areas are clear of debris, road materials, and equipment. It is the Contractor's responsibility to contact the railroad to determine the railroad's requirements for work within the railroad right of way and to comply with the requirements. The Department will not reimburse the Contractor for any cost associated with these requirements.

If the work requires construction within 25 ft. horizontally of the near rail or if the tracks may be subject to obstruction due to construction operations, notify the Engineer and Roadmaster at least 3 days before performing work. The railroad company will provide flaggers during this work. If railroad flaggers will be needed longer than 2 consecutive days, request them at least 30 days before performing work within the railroad right of way.

Flaggers provided by the railroad company will be paid for by the Department.

Do not store material or equipment in the Railroad's right of way within 15 ft. of the centerline of any track. Do not place any forms or temporary falsework within 8.5 ft. horizontally from the centerline or 22 ft. vertically above the top of rails of any track, unless otherwise shown on the plans.

B. Temporary Crossings. If a temporary crossing is needed, obtain permission from the railroad company before crossing the tracks. Execute the "Agreement for Contractor's Temporary Crossing" if required by the Railroad Company. Ensure that the tracks are left clear of equipment and debris that would endanger the safe operation of railroad traffic. Provide a crossing guard on each side of the crossing to direct equipment when hauling across the tracks. Stop construction traffic a safe distance away from the crossing upon the approach of railroad traffic.

Work for temporary crossings will not be paid for directly, but is subsidiary to Items of the Contract. Work performed by the railroad company for the temporary crossing, except flaggers, will be at the Contractor's expense.

7.17. Personal Liability of Public Officials. Department employees are agents and representatives of the State and will incur no liability, personal or otherwise, in carrying

out the provisions of the Contract or in exercising any power or authority granted under the Contract.

7.18. Abatement and Mitigation of Excessive or Unnecessary Noise. Minimize noise throughout all phases of the Contract. Exercise particular and special efforts to avoid the creation of unnecessary noise impact on adjacent noise sensitive receptors in the placement of non-mobile equipment such as air compressors, generators, pumps, etc. Place mobile and stationary equipment to cause the least disruption of normal adjacent activities.

All equipment associated with the work must be equipped with components to suppress excessive noise and these components must be maintained in their original operating condition considering normal depreciation. Noise-attenuation devices installed by the manufacturer such as mufflers, engine covers, insulation, etc. must not be removed nor rendered ineffectual nor be permitted to remain off the equipment while the equipment is in use.

7.19. Preservation of Cultural and Natural Resources and the Environment. If the Contractor initiates changes to the Contract and the Department approves the changes, the Contractor is responsible for obtaining clearances and coordinating with the appropriate regulatory agencies.

A. Cultural Resources. Cease all work immediately if a site, building, or location of historical, archeological, educational, or scientific interest is discovered within the right of way. The site, building, or location will be investigated and evaluated by the Department.

B. Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3). The Department will file the Notice of Intent (NOI) and the Notice of Termination (NOT) for work shown on the plans in the right of way. Adhere to all requirements of the SWP3.

C. Work in Waters of the United States. For work in the right of way, the Department will obtain any required Section 404 permits from the U.S. Army Corps of Engineers before work begins. Adhere to all agreements, mitigation plans, and standard best management practices required by the permit. When Contractor-initiated changes in the construction method changes the impacts to waters of the U.S., obtain new or revised Section 404 permits.

D. Work in Navigable Waters of the United States. For work in the right of way, the Department will obtain any required Section 9 permits from the U.S. Coast Guard before work begins. Adhere to the stipulations of the permits and associated best management practices. When Contractor-initiated changes in the construction method changes the impacts to navigable waters of the U.S., obtain new or revised Section 9 permits.

E. Work Over the Recharge or Contributing Zone of Protected Aquifers. Make every reasonable effort to minimize the degradation of water quality resulting from impacts relating to work over the recharge or contributing zones of protected aquifers, as defined and delineated by the TCEQ. Use best management practices and perform work in accordance with Contract requirements.

F. **Project-Specific Locations.** For all project-specific locations (PSLs) on or off the right of way (material sources, waste sites, parking areas, storage areas, field offices, staging areas, haul roads, etc.), signing the Contract certifies compliance with all applicable laws, rules, and regulations pertaining to the preservation of cultural resources, natural resources, and the environment as issued by the following or other agencies:

- Occupational Safety and Health Administration,
- Texas Commission on Environmental Quality,
- Texas Department of Transportation,
- Texas Historical Commission,
- Texas Parks and Wildlife Department,
- Texas Railroad Commission,
- U.S. Army Corps of Engineers,
- U.S. Department of Energy
- U.S. Department of Transportation,
- U.S. Environmental Protection Agency,
- U.S. Federal Emergency Management Agency, and
- U.S. Fish and Wildlife Service.

All subcontractors must also comply with applicable environmental laws, rules, regulations, and requirements in the Contract. Maintain documentation of certification activities including environmental consultant reports, Contractor documentation on certification decisions and contacts, and correspondence with the resource agencies. Provide documentation upon request.

Obtain written approval from the Engineer for all PSLs in the right of way not specifically addressed in the plans. Prepare an SWP3 for all Contractor facilities, such as asphalt or concrete plants located within TxDOT right of way. Comply with all TCEQ permit requirements for portable facilities, such as concrete batch plants, rock crushers, asphalt plants, etc. Address all environmental issues, such as Section 404 permits, wetland delineation, endangered species consultation requirements, or archeological and historic site impacts. Obtain all permits and clearances in advance.

WASHINGTON SPECIFICATIONS FOR BRIDGE LOADING

From: Kapur, Jugesh [KapurJu@wsdot.wa.gov]
Sent: Thursday, October 25, 2007 12:59 PM
To: Walsh Daniel
Subject: RE: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Dan:

The following paragraphs are from our Standard Specification regarding Washington State DOT's policy on restricting weights during bridge construction. It has been in force for several years. WSDOT's legal load limit is 105,500 lbs that is referred to in this policy.

1-07.7(2) Load-Limit Restrictions
1. Structures Designed for Direct Bearing of Live Loads. The gross or maximum load on each vehicle axle shall not exceed the legal load limit by more than 35-percent. No more than one vehicle shall operate over any Structure at one time. The Contractor shall immediately remove any dirt, rock,
or debris that may gather on the Structure's Roadway surface.
If the Contractor desires to utilize work methods resulting in load that exceed
any of the restrictions described above, the Contractor shall submit calculations
and other supporting information (as specified in Section 6-01.6 for bridges
under construction) to the Engineer for approval in accordance with Sections
6-01.6 and 6-01.9. The Engineer will review the calculations and supporting
information to determine if the loading meets the criteria specified in Section
6-01.6. The Contractor shall not place or operate construction vehicles or
equipment on or over the Structure until receiving the Engineer's approval of
the submittal.

2. Underpasses and Reinforced Concrete Box Culverts Under Embankments. Loads shall not exceed 24,000-pounds on a single axle and 16,000-pounds each
on tandem axles spaced less than 10-feet apart. These limits are permitted only
if the embankment has: (a) been built to Specifications, and (b) reached at least
3-feet above the top of the underpass or culvert.
When the embankment has reached 5-feet above the top of the underpass or culvert, the Contractor may increase per-axle loads up to 100,000-pounds if
outside wheel spacing is at least 7-feet on axle centers.

3. Pipe Culverts and Sewer Pipes. Loads over pipe culverts and sewer pipes
shall not exceed 24,000-pounds on a single axle and 16,000-pounds each on
tandem axles spaced less than 10-feet apart. These limits are permitted only

if: (a) the culvert or pipe has been installed and backfilled to Specifications,
and (b) the embankment has reached at least 2-feet above the top limit of
pipe compaction.
2008 Standard Specifications M 41-10 Page 1-51
Legal Relations and Responsibilities to the Public 1-07
When the embankment has reached 5-feet above the top limit of pipe compaction, the Contractor may increase per-axle loads up to 100,000-pounds
if outside wheel spacing is at least 7-feet on axle centers, except that:
a. For Class III reinforced concrete pipes, the embankment shall have risen
above the top limit of compaction at least 6-feet.
b. For Class II reinforced concrete pipes, the maximum load for each axle
shall be 80,000-pounds if outside wheel spacing is at least 7-feet on axle
centers. In this case, the embankment shall have risen above the top limit
of compaction at least 6-feet.

The link to the entire WSDOT's Standard Specifications is:
http://www.wsdot.wa.gov/publications/manuals/fulltext/M41-10/SS2008.pdf.

Please let me know if there are any questions.

- Jugesh Kapur, PE, SE

-----Original Message-----
From: Walsh Daniel [mailto:daniel.walsh@ntsb.gov]
Sent: Thursday, October 25, 2007 11:28 AM
To: Kapur, Jugesh
Subject: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Jugesh,

As we discussed on the telephone, can you please provide me Washington DOT's policy on restriction of overweight loads and equipment (including stockpiling of raw material) on structures. Please call me at (817) 652-7844 if you have any questions. Thank you.

Dan Walsh, P.E.
National Transportation Safety Board

WEST VIRGINIA SPECIFICATIONS FOR BRIDGE LOADING

From: Lecia Atkins [LAtkins2@dot.state.wv.us] on behalf of Jim Sothen [jsothen2@dot.state.wv.us]
Sent: Thursday, November 29, 2007 9:21 AM
To: Walsh Daniel
Cc: Jim Sothen
Subject: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

The following items are related to the WVDOH policy concerning construction loading of bridge decks/superstructures.

1. Construction's policy is as follows:

The WVDOH does not allow the stockpiling of materials on the deck without calculations except for lightweight materials (epoxy rebar, burlap, forms, etc.). Any materials used for mixes (latex, shotcrete, etc.) are not allowed on the deck without calculations. Almost all contractors store those materials off deck rather than provide calculations.

In the past, the WVDOH has had requests from construction's project personnel to analyze superstructures due to requested construction loads. When visiting construction sites, we often see nominal stockpiling of materials on the bridge deck...usually the long ones. That is consistent with the stated policy above.

2. The WVDOH Bridge Design Manual (BDM) states:

3.1.4.1.8 Construction Loading

Construction loading shall be in accordance with the Governing Specifications. This loading shall include, but not be limited to, the erection and handling of girders and the effects of deck casting.

WVDOH does a pretty good job in adhering to the BDM requirements...in general we design the superstructure to handle the wet concrete, nominal wind loads, screed rail loads, and contractor's equipment loads for the pour sequence shown in the plans.

3. In addition to the BDM design requirements, a 11-9-05 memo on deck cracking requires the following:

1. Bridge decks shall have the following construction load limitations:

a. No construction equipment with an axle load greater than 20,000 lbs (20 kip) shall be permitted on the slab at any time.

b. No construction equipment or loads that are not required to complete the slab, parapets, railing, overlay, lighting, or other appurtenances shall be allowed on the bridge deck.

A random check of some recent construction plans shows that we have been somewhat erratic in complying with provisions in Item 3 above.

If you should require additional information, please contact my office at (304)558-0191.

Lecia Atkins
Administrative Secretary
Office of the Deputy State Highway Engineer - Development
Division of Highways
(304)558-0191

Good morning Dan. I do have the information. Both myself and my secretary have training early this morning for about an hour. She will type the information up and email it to you this morning. Thanks.

Jim S.

-----Original Message-----
From: Walsh Daniel [mailto:daniel.walsh@ntsb.gov]
Sent: Wednesday, November 28, 2007 10:19 AM
To: Jim Sothen
Subject: RE: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Jim,

I am sorry to inquire about the information from staff regarding the restriction of overweight loads and equipment for West Virginia. Has the information been compiled? It can be emailed (pdf format) or mailed to my business address. Let me know the option you prefer. Thank you.

Dan

-----Original Message-----
From: Jim Sothen [mailto:jsothen2@dot.state.wv.us]

Sent: Monday, November 19, 2007 10:22 AM
To: Walsh Daniel
Subject: RE: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Good morning Dan. I have received information from the staff. I have really been tied up over the last two weeks. I should be able to get it reviewed, and get it out to you by this Wednesday. I have to leave shortly and will be in the field the rest of the day. Tomorrow I have a bunch of meetings, one of which is a teleconference. Wednesday's schedule looks pretty open. Thanks.

Jim S.

-----Original Message-----
From: Walsh Daniel [mailto:daniel.walsh@ntsb.gov]
Sent: Friday, November 16, 2007 2:49 PM
To: Jim Sothen
Subject: FW: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures

Jim,

I have not received a reply to the below email. I was wondering if you would be able to reply in the next 2 weeks. Thank you.

Dan

> -----Original Message-----
> From: Walsh Daniel
> Sent: Thursday, October 25, 2007 1:59 PM
> To: 'jsothen2@dot.state.wv.us'
> Subject: Restriction of overweight loads and equipment (including stockpiling of raw material) on structures
>
> Jim,
>
> As we discussed on the telephone, can you please provide me West Virginia DOT's policy on restriction of overweight loads and equipment (including stockpiling of raw material) on structures. Please call me at (817) 652-7844 if you have any questions. I would like the information by Friday, November 2nd. Thank you.

>
> *Dan Walsh, P.E.*
> *National Transportation Safety Board*

PENNSYLVANIA SPECIFICATIONS FOR BRIDGE LOADING

From: Macioce, Thomas P [tmacioce@state.pa.us]
Sent: Monday, November 19, 2007 3:29 PM
To: Walsh Daniel
Cc: Rogers, Harold C
Subject: RE: Restriction of overweight loads and equipment (including stockpiling of raw materials) on structures

Sorry for the delay in responding. I have provided information on
Overweight Loads
Stock P{iling of Material
Bridge Erection and Demolition Analysis

Overweight Loads
PennDOT Publication 408 Specifications Section 107.23 addresses Hauling Restrictions, overweight vehicles. The section is attached for your use.

Stock Piling material on bridges is addressed by Publication 408 Section 105.02 regarding loads during erection.

Bridge Erection and Demolition Analysis
PennDOT's construction specifications require the erection plans and demolition plans be prepared and submitted by the contractor. A summary of requirements in Publication 408 regarding construction loads is as follows: * Submission of erection plans and demolition plans shall be in accordance with Publication 408, Section 105.02. * The contractor is required to submit the erection plans per Sections 1050.3 or 1080.3 and demolition plans per Section 1018.3 prepared by a registered Professional Engineer for review and acceptance by the Department, prior to any bridge construction operations. * Erection plans must address loads, stresses, and stability of the bridge considering traffic loads and construction operations and equipment. * All drawings for load-bearing falsework are to be signed and sealed by a Professional Engineer, registered in the state.

Also, the sections (105.02, 1050.3,1080.3 and 1018.3) of Publication 408 Construction Specifications are attached for your use.

Thomas P. Macioce, P.E.
Chief Bridge Engineer
Pennsylvania Department of Transportation

Tel. (717) 787-2881
Fax (717) 787-2882

tmacioce@state.pa.us

-----Original Message-----
From: Walsh Daniel [mailto:daniel.walsh@ntsb.gov]
Sent: Friday, November 16, 2007 2:47 PM
To: tmacioce@state.pa.us
Cc: hrogers@state.pa.us

Subject: FW: Restriction of overweight loads and equipment (including stockpiling of raw materials) on structures

Thomas,

I have not received a reply to the below email. I was wondering if you would be able to reply in the next 2 weeks. Thank you.

Dan

> -----Original Message-----
> From: Walsh Daniel
> Sent: Thursday, October 25, 2007 11:54 AM
> To: 'tmacioce@state.pa.us'
> Cc: 'hrogers@state.pa.us'
> Subject: FW: Restriction of overweight loads and equipment (including stockpiling of raw materials) on structures
>
> Thomas,
>
> Please provide the information mentioned below by Friday, November
> 2nd. Thank you.
>
> Dan
>
> -----Original Message-----
> From: Walsh Daniel
> Sent: Thursday, October 25, 2007 11:50 AM
> To: 'tmacioce@state.pa.us'
> Cc: 'hrogers@state.pa.us'
> Subject: Restriction of overweight loads and equipment (including stockpiling of raw materials) on structures
>
> Thomas,
>
> Can you please provide me Pennsylvania DOT's policy on restriction of
> overweight loads and equipment (including stockpiling of raw material)

> on structures. Please call me at (817) 652-7844 if you have any
> questions. Thank you.
>
> Dan Walsh, P.E.
> National Transportation Safety Board

SECTION 105—CONTROL OF WORK

105.01 AUTHORITY OF THE REPRESENTATIVE—

(a) General. The work will be subject at all times to the inspection of the Representative. Do not restrict or hinder this inspection.

To prevent disputes and litigation, the Representative will:

- determine the quantity of the kinds of work and the quality of material for which payment will be made under the contract;
- determine the answer to questions in relation to the project and its construction; and
- decide differences concerning the performance of the work covered by the contract.

All such determinations, decisions, directions, and explanations needed to complete, explain, or make definite any provisions of these Specifications and Plans will be given promptly, in writing, to the Contractor.

As a condition precedent to filing a claim for additional compensation because of any act or omission, of the Representative, or of any other person, submit notice of intent to claim to the Contracting Officer, in writing, within 10 days of the act or omission. This notice of intent will give the Department the opportunity to investigate the claim and to maintain and document information for future resolution or litigation of the claim.

File the claim in writing with the Contracting Officer within 6 months of the date it accrues and not thereafter. If the Contractor fails to file the claim or does not file the claim within the specified time period, the Contractor will be deemed to have waived its right to assert the claim in any forum. Claims not filed within the specified time period will be disregarded by the Contracting Officer. The claim, when filed, must state all grounds upon which the claim is based and must include a copy of the previously submitted notice of intent to claim.

The Contracting Officer will attempt to settle and resolve the claim with the Contractor. The Contracting Officer, at his or her discretion, may conduct a claim review meeting to attempt to settle and resolve the claim with the Contractor. If a claim review meeting is held, it will be attended by representatives of the Contractor and such Department representatives as the Contracting Officer considers appropriate.

If the claim is not resolved by agreement between the Contracting Officer and the Contractor, the Contracting Officer will issue a determination in writing, regarding the claim and will mail it to the Contractor by first class mail. The determination will be mailed within 120 days of the date on which the Contracting Officer received the claim, unless the 120 day period is extended by consent of the Contracting Officer and the Contractor. If the Contracting Officer fails to issue a final determination within the 120 days, unless extended by consent of the Contracting Officer and the Contractor, the claim will be deemed denied. The determination of the Contracting Officer will be conclusive and binding upon the Contractor unless the Contractor appeals the determination by filing a statement of claim with the Board of Claims within 15 days of the mailing date of the determination, or, if no extension is agreed to by the Contracting Officer and the Contractor, within 135 days of the receipt by the Contracting Officer of the claim, whichever occurs first.

(b) Authority to Suspend Work. The Representative may suspend the work, wholly or in part, for the following reasons:

- failure to carry out orders;
- failure to comply with any provisions of the contract; or
- unforeseen conditions not anticipated in estimating the contract time necessary for the completion of the work.

Written notification will be given of the suspension and the reason(s) for the suspension.

(c) Review and Acceptance. Review and acceptance by the Department as specified, stated, or indicated in the contract will be made on the basis of limited, general inspections.

It is understood that, because of such limited reviews, ultimate responsibility for the satisfactory completion of the project, including but not limited to:

- the quality of all materials;
- the quality of all workmanship;
- compliance with all terms of the contract;
- sufficiency, correctness, and accuracy of all working or shop drawings; and
- sufficiency of all QC Plans,

rests solely with the Contractor. Notwithstanding review and/or acceptance, save and hold harmless the Department from the consequences of all defective work as well as all defects, errors and omissions in the working or shop drawings, QC Plans, and plans of every other kind prepared by the Contractor.

105.02 DRAWINGS—The following drawings, when applicable, are required to perform the work:

(a) Contract Drawings. These drawings will be furnished. They show roadway lines, grades, and typical cross sections; location and design of structures; related construction features and details; and construction quantities. Keep one set of the drawings available on the project.

(b) Standard Drawings. Section 101.03

(c) Working Drawings. Prepare these drawings to supplement the plans. They include falsework drawings, field sketches, erection diagrams, erection stresses and loads, and other details, as necessary to construct the project. Submit two copies of the drawings to the Representative, for review and acceptance, before beginning work on the item involved. All drawings for load-bearing falsework submissions are to be signed and sealed by a Professional Engineer, registered in the State.

(d) Bridge Shop Drawings. Prepare these drawings in accordance with the requirements of design drawings, Department Standards, Design Manual Part 4 Structures, and the contract special provisions unless otherwise specified. Prepare original drawings using pencil or ink, or prepare drawings electronically (CAD), using standard ANSI D size, 559 mm x 864 mm (22 inch by 34 inch) sheets with 38 mm (1 1/2 inch) margin on the left side and 13 mm (1/2 inch) margins on remaining three sides. All lines on the drawing are to be of sufficient density and width so as to have residual density when reduced by 50% or microfilmed. Use a minimum metric LeRoy size of 30 (U.S. Customary LeRoy size of 120) for lettering, symbols, and characters. Make details clear and uncluttered. Show complete details, dimensions, materials, notes, camber diagrams, welding details and sequences, and any other information required to fabricate the item.

Provide a title block in the lower right-hand corner of each drawing that indicates the county, route, section number, segment and offset, station, contract number, (ECMS No.), name of Contractor, name of Fabricator, title of drawing, drawing number, structure number (S-Number), initials of the drawer, initials of the checker, and date of the drawing. Include a revision block to the left of the title block and an empty block, approximately 100 mm x 75 mm (4 inch by 3 inch) above the title block to be used by the shop drawing reviewer for the shop drawing stamp.

Either electronic or paper shop drawings may be submitted. The following requirements are to be followed by those choosing to submit electronic shop drawings:

Scan original drawings or convert electronic drawings, to produce a portable document format (PDF) file for each drawing. Include structure number (S-Number) and drawing number in the file name. It is required that the PDF files be created with the "end user commenting" and "digital signature" features enabled. These features allow electronic comments to be added directly to the PDF using only reader software and create a log of comments that cannot be changed once the digital signature is added. Submit PDF files to the District Executive or to an agent designated by the District Executive, for review and acceptance. Provide files on compact disc or supply an FTP website for use by the reviewer to download the files. As an alternate, files

may be sent by e-mail provided attachments total to no more than 2.0 MB per e-mail message. Provide electronic transmittal forms regardless of submittal method. PDF files will be returned with corrections noted. Modify original or electronic drawings as required, scan or convert into new PDF files, and resubmit. Continue until PDF files are accepted.

After acceptance, submit eight sets of full-size final prints or six sets of 1/2–size prints plus two sets of full-size prints (or more if directed). If the quality of the 1/2-size prints is unacceptable, furnish full-size prints upon request and without delay, at no additional cost to the Department. After erection is complete, but before project completion, submit final drawings on acceptable drafting medium showing as-built conditions and two copies of microfilm to the District Executive. If electronic shop drawings were used, also submit final matching PDF files.

105.03 CONFORMITY WITH DRAWINGS AND SPECIFICATIONS—

(a) General. Perform work within reasonably close conformity to the lines, grades, dimensions, and indicated details, and/or as specified.

(b) Determination by the Representative.

1. Restricted Performance Specifications. The Representative will determine acceptability of material or construction. When material or construction is not within specification limits, acceptance will be as specified within the individual specification sections, except where test result variations are so great that the material or construction is unacceptable.

2. Other Than Restricted Performance Specifications. For each individual case, the Representative will determine the limits of reasonably close conformity; the judgment given will be final and conclusive.

If it is determined that material or the finished product in which the material was used is not within reasonably close conformity, but that reasonably acceptable work has been produced, the Representative will then determine if the work will be accepted and remain in place. In this event, written documentation will be provided for acceptance by required contract modification, and/or to provide for an appropriate adjustment in the contract price for such work or material.

If it is determined that material or the finished product is not within reasonably close conformity and has resulted in an inferior or unsatisfactory product, remove or replace it.

(c) Certification of Falsework Adequacy. Have a Professional Engineer, registered in the State, certify that the falsework system has been assembled as shown on the Professional Engineer's signed and sealed falsework drawings prepared as specified in Section 105.02(c). Submit the certification to the Representative before placing loads on the falsework.

105.04 COORDINATION OF PLANS AND SPECIFICATIONS—Perform the work according to the intent of the Plans and Specifications. Do not take advantage of any error on/or omission in the Plans or discrepancy between the Plans and Specifications. In the event such an error, omission, or discrepancy is discovered, immediately notify the Department. Failure to notify the Department will constitute a waiver of all claims for misunderstandings, ambiguities, or any other reasons resulting from the errors, omissions, or discrepancies. If requested, corrections and interpretations necessary for the fulfillment of the Plans and Specifications will be made. Do not use scaled measurements where dimensions on the drawings are given or can be computed.

In case of a discrepancy among the contract documents, the following order of precedence will apply:

(1) Special Provisions
(2) Plans (excluding cited Standard Drawings)
(3) Specifications (other than Special Provisions)
(4) Standard Drawings

If any Special Provisions or information on the Plans conflict with these Specifications, the Special Provisions or information on the Plans will govern. If a conflict exists between any portion of the Plans designed specifically for this project and any portion of the Standard Drawings, the former will govern.

If necessary, the District Executive will determine and order, in writing, any modifications or changes in the Plans, Standard Drawings, or Specifications to update, adjust, accept, or complete the work contemplated by the

contract as specified in Section 104.02. Wherever reference specifications or publications are specified, comply with the issue or edition (including interim AASHTO specifications and ASTM tentative designations) in effect on the date bids are opened, unless the date or year of the reference specification or publication is indicated or specified. If there is a conflict between a cited title and a cited section number, the title will take precedence over the section number.

105.05 RESPONSIBILITY OF CONTRACTOR—

(a) General. Keep direct control of the contract and see that the work is properly supervised and is performed satisfactorily and efficiently. Supervise the work personally or appoint a competent superintendent or representative to be on the project at all times. Give this superintendent or representative the authority to receive orders and directions; to execute orders and directions without delay; and to make arrangements for all necessary material, equipment, and labor.

Keep on the project, at all times, a copy of the plans, a copy of the specifications, and a copy of the contract, and a copy of all subcontracts.

The Department is not responsible for the Contractor's satisfactory completion of the contract work as a consequence of the presence of Department representatives or inspectors and their inspection.

Notify the Assistant District Executive for Construction in the District having responsibility for the project 3 days before the actual start of work. Keep the Assistant District Executive for Construction informed as to any changes in the scheduled date for starting work.

(b) Work By Others. For work to be done without the supervision of the Department, investigate the work and anticipate its execution and completion. The Department will not be liable for failure to anticipate the time of performance and completion of such work, except in those cases where, upon timely request, the Department has agreed to cooperate.

(c) Gratuities and Penalties. Do not give or offer, or allow agents, employees, or representatives to give or offer, either directly or indirectly, money, property, entertainment, or other valuable things, to any employee or representative of the Department for any reason, purpose, or cause, or as an inducement, bribe, or reward for doing or omitting to do any act, or for showing any favor or disfavor in relation to any matter relating to the contract. Any such action will constitute a violation of the contract. Upon satisfactory proof to the Secretary of such violation, the Department may terminate performance of the work and take steps to complete the project, as specified in Section 108.08.

105.06 UTILITY INFRASTRUCTURE AND UTILITY ADJUSTMENTS –

(a) Utility Infrastructure and Utility Adjustments Interfering with Contract Operations. Before submitting a bid for the project, examine the project site and any waste or borrow sites designated in the proposal to determine the location of all Utility Infrastructure and the need for any Utility Adjustments. The Department has indicated in the contract documents such Utility Infrastructure and Utility Adjustments as have been brought to its attention. The Department is not responsible for waste and borrow areas not designated in the contract documents. Accept the responsibility and risk relating to the conditions to be encountered regarding Utility Infrastructure and Utility Adjustments that are indicated in the contract documents or that can be ascertained from a careful pre-bid examination of the project site for any waste or borrow sites designated in the proposal.

Upon execution of the contract, inform all public service companies, individuals, and others owning or controlling any facilities or structures within the limits of the project, which may have to be relocated, adjusted, or reconstructed, of the plan of construction operations. Give due notice to the responsible party in sufficient time for that party to organize and perform such work in conjunction with or in advance of construction operations.

Cooperate with the Utility Infrastructure owners and the owners of all waste and borrow areas not on the project site. Make arrangements for Utility Adjustments necessary to perform the work as indicated in the contract documents. Arrange and perform contract work in and around such Utility Infrastructure in accordance with recognized and accepted engineering and construction practices and in a manner that assists the Utility Infrastructure owners in their required Utility Adjustments.

Refer to the provisions of Act 287-1974, as amended by Act 187-1996, which specifies project responsibilities in regard to public health and safety during excavation and demolition operations in areas of underground utilities.

(b) Delays in the Performance of Work. No additional compensation will be paid because of an impact to the contract work from Utility Infrastructure and Utility Adjustments unless the Contractor establishes, to the satisfaction of the District Executive and the Chief Engineer, that the impact was unforeseen and unforeseeable by a reasonable contractor; that losses could not have been avoided by the judicious handling of forces, equipment and plants, or by reasonable revisions to the schedule of operations; and that the impact has resulted in a documented increase in the cost of performing the contract work, in which case only delay damages will be paid as specified in Section 111.

The following are conditions precedent to the right, if any, of the Contractor to an adjustment in compensation:

- Attend a coordination meeting(s) that will be scheduled and conducted by the Department before beginning construction. The meeting(s) will include all Utility Infrastructure owners. At this meeting(s), be prepared to discuss: the project schedule; all project milestones and required completion dates and all activities related to Utility Infrastructure and Utility Adjustments and; how the project schedule differs from the utility relocation schedule prepared by the Department during project design. Incorporate appropriate information from this meeting(s) into the project schedule as specified in Section 108.03(b) or the Scheduling Special Provision, if applicable. The Department will provide a record of the meeting(s).

- Furnish all schedule updates specified in Section 108.03(b) or the Scheduling Special Provision, if applicable, to all affected Utility Infrastructure owners.

- Comply with the requirements specified in Section 111.

(c) Utility Adjustments by Others. When required, owners or lessees are to bring railway tracks to the established line and grade. Utility Adjustments are to be performed by the owners of the Utility Infrastructure, unless otherwise indicated. Check the line and grade before base or pavement is placed adjacent to or around such Utility Infrastructure.

(d) Damage to Utility Infrastructure. Compensate the owner for all cost of repairing, replacing, or resetting any Utility Infrastructure damaged or disturbed by contract construction as specified in Section 107.12.

Coordinate with the railroad company to provide accepted measures for protection of railroad tracks and ballast from debris, silt, or other foreign matter.

Provide required means of protection, maintenance, cleaning, repair, and replacement of ballast. This work will be subject to the approval of the Railroad's Chief Engineer or authorized representative.

105.07 COOPERATION BETWEEN CONTRACTORS—The Department reserves the right to contract for and perform other work on or near the work covered by the contract.

If separate contracts are awarded within the limits of, or adjacent to, any one project, conduct the work to avoid interfering with or hindering the progress or completion of the work being performed by other contractors. As directed, cooperate with contractors working on the same project. Satisfactorily join work with and in proper sequence with the work of others.

Assume all liability in connection with the contract. Protect and save harmless the Department from all damages or claims that may arise because of inconvenience, delay, or loss experienced because of the presence and operations of other contractors working within or outside the same project limits.

105.08 CONSTRUCTION SURVEYING—

(a) Projects that Do Not Include a Construction Surveying Pay Item. If the project plans and specifications do not indicate a separate pay item for Construction Surveying, control stakes will be furnished and placed, offset from the proposed roadway base line, and a grade sheet will be furnished showing the horizontal and vertical measurements from the stakes to the base line and grade of the roadway as planned, including adjusted alignment and grades, as directed, to meet conditions. Where the highway is to be constructed on a grade of more than 4%, an offset stake will be set on each side of each designated grade point. The stakes will be on a direct line

through the grade point or base line, or otherwise, as may be required. Slope stakes will be placed adjacent to the top of cut and toe of embankment slopes where these points are more than 2 m (5 feet) vertically above or below the finished grade line. Applicable base line, abutment, pier, sidewall, and wingwall stakes, together with offset, reference, and grade stakes for bridges, arches, slab and box culverts, including metal plate and pipe culverts and other special structures, will also be placed, as required, to facilitate and control the work.

Employ a Professional Land Surveyor or Professional Engineer, registered in the State, qualified in the use of plans, cross sections, and specifications, to establish lines and grades, as may be required. Assume full responsibility for dimensions and elevations taken from the control stakes and the setting of lines and grades.

Furnish templates and other material and place additional stakes and markers necessary for control and guidance of construction operations. Also, furnish the Inspector with any assistance required for checking lines, grades, and measurements established (other than by the Department) and necessary for the performance of the work. The Department does not assume responsibility for the performance of the work as a consequence of this checking.

Preserve survey points and stakes, as placed. If any of these surveying controls are disturbed or destroyed by construction operations, the cost to the Department for replacement will be charged against and deducted from money due or to become due.

(b) Projects that Include a Construction Surveying Pay Item. If the project plans and specifications indicate a separate pay item for Construction Surveying, perform the work as specified in Section 686.

105.09 AUTHORITY AND DUTIES OF INSPECTOR-IN-CHARGE—The Inspector-in-Charge will have immediate responsibility for administering the performance of work on the project.
In case a dispute arises concerning material to be furnished or the manner of performing the work, the Inspector-in-Charge will have authority to reject material or suspend the work until the question at issue can be referred to and be decided by the Representative. A rejection of material or suspension of work will be confirmed by written notice from the Representative.

105.10 INSPECTION OF WORK—The work will be subject to the inspection of the Representative or authorized assistants. Provide them access to the work and furnish them with every reasonable facility for determining whether the work being performed or which has been completed is according to the requirements of the plans, specifications, and contract, except as otherwise provided. Provide all labor and equipment necessary for such examination.

Should the work thus exposed or examined prove satisfactory, the uncovering or removing and restoring of the uncovered or removed work will be paid for, as specified in Section 110.03, except the incidental work for testing the depth of base and surface courses and pavement will not be paid for separately. Should the work exposed or examined prove defective or unsatisfactory, promptly uncover or remove and satisfactorily restore the defective or unsatisfactory work, at no expense to the Department.

When any unit of government or political subdivision, or any public or private corporation, is to pay a portion of the cost of the work covered by the contract, the respective representatives will have the right to inspect the work. Such inspection will not make any unit of government or political subdivision, or any public or private corporation, a party to this contract and will in no way interfere with the rights of either party to this contract.

105.11 DUTIES OF THE INSPECTOR—Authorized inspectors, who perform their duties under the direction of the Representative, will be assigned to the project.

Execute work under the observation and subject to examination of an inspector(s); carry out such work during the normal working hours of the day, unless specifically directed otherwise. If work is performed during nighttime hours with permission, provide sufficient artificial lighting to assure proper inspection and workmanship.

The inspector is not authorized to do the following: revoke, alter, enlarge, relax, or release any requirements of the specifications; approve or accept any portion of the work; or issue instructions contrary to the plans and specifications.

The presence of the inspector during the performance of any work on the project will not relieve the Contractor of the responsibility for work that is later determined by the Representative to be defective.

105.12 DEFECTIVE WORK AND MATERIAL—If any work and/or material does not meet the requirements of the plans and specifications, or is not within reasonably close conformity, as determined by the Representative, such work and/or material will be declared defective.

Unless otherwise specified, repair, as directed, or remove and replace defective work and/or material at no expense to the Department.

105.13 MAINTENANCE OF PERFORMED WORK—

(a) Maintenance of Performed Work. Maintain performed work, making continuous and effective efforts, with adequate equipment and forces, to keep the roadway or structures in satisfactory condition at all times during construction. Provide such maintenance, at no additional cost to the Department, until relieved of responsibility for further physical work, maintenance, and third party liability as specified in Section 110.08(a).

If, at any time, performed work is not maintained, the Department reserves the right to perform such work as may be considered necessary for traffic accommodation and to deduct the cost thereof from money due or to become due the Contractor.

Provide removals, renewals, restorations, and repairs as required to remedy damage to performed work occurring before relief of Contractor responsibility as specified in Section 110.08(a). Perform such work, according to the terms and conditions of the contract, at no expense to the Department. If, as determined by the Representative, the damage is due to unforeseeable causes beyond the control of the Contractor and occurs despite satisfactory maintenance precautions taken, such work will be paid for, at the Department's expense, as specified in Section 110.03.

(b) Maintenance During Temporary Suspension of Work. If the work is temporarily suspended, wholly or in part, for a sustained or indefinite period, satisfactorily store all materials and take every precaution to prevent damage or deterioration of preformed work. Provide suitable drainage for the roadway by constructing temporary shoulders; by opening culverts, inlets, and parallel ditches; and by erecting temporary drainage structures where necessary.

During suspension, the entire project under contract, or any section, may be opened to traffic, as directed. If opened to traffic, maintain the roadway in satisfactory condition and maintain local traffic as specified in Section 902. Perform such work at no expense to the Department, except as specified in Section 902.4. During work suspension, remove all protective devices installed on the project. However, if directed, maintain protective devices in certain areas.

If work is suspended in part, the Representative will have the authority to direct that other parts or items of work be performed.

Satisfactorily protect the ends of any sections of rigid-type base course, pavement, or wearing surface opened to traffic during a temporary, partial suspension of work. Maintain this protection, remove it when no longer required, and satisfactorily dispose of protective material.

During any period of work suspension, properly and continuously maintain, in an acceptable growing condition, all living material in newly established plantings, seedings, and soddings furnished under the contract. Take adequate precautions to protect new tree growth and other desirable vegetative growth.

105.14 BORROW AREAS AND WASTE AREAS—

(a) Non-Designated Areas. Locate proposed areas for obtaining borrow material and/or areas for disposal of waste material, when required. Locate waste, borrow, or staging areas inside or outside of the right-of-way in upland areas not impacting Waters of the United States, including jurisdictional wetlands, unless already authorized by the U.S. Army Corps of Engineers and DEP. Situate areas so cross sections may be taken by the Department to measure the volume of material removed or deposited. Before cross sectioning borrow areas, remove topsoil and stockpile it for replacement when removal of borrow material has been completed.

Review proposed areas with the Representative for approval to negotiate a "Borrow and/or Waste Agreement." Waste and borrow areas that impact Waters of the United States are prohibited unless already permitted, as agreed to with the U.S. Army Corps of Engineers. Obtain waterway and/or other required permits as applicable. Prepare and submit an Erosion and Sediment Pollution Control Plan to the Conservation District for approval. Negotiate with the owner(s) of property to be obtained by using the Department's standard "Borrow and/or Waste Agreement," available from the District Executive. This standard agreement may be modified to cover unusual or special

conditions, provided such conditions are acceptable to the Department. Submit one copy of the executed agreement to the Representative for review and acceptance. Do not proceed with work in the area until such review and acceptance is completed and until written notification of the acceptance is received.

Also submit one copy of applicable permits and of the approved Erosion and Sedimentation Control Plan to the Representative before starting work.

Have the agreement provide for cleaning and leaving the premises and area in a well-drained and, if required, smoothly graded condition, blending into the existing topography. Scarify, lime, fertilize, seed, and mulch any disturbed areas with material, and formulae, at rates typical for the project. When directed, satisfactorily remove and dispose of surplus material.

Perform the clean fill determination for all borrow materials entering the construction right-of-way by completing and submitting the Environmental Due Diligence Form EDD-VI, and, if necessary, Form EDD-VII to the Department for acceptance.

(b) Designated Areas. If the Department has previously selected areas from which to obtain borrow or areas in which to deposit waste, the proposal will specify the location(s).

For such designated area(s), complete the standard agreement as specified above for Non-Designated Areas. The Department will provide all applicable permits and Erosion and Sediment Pollution Control Plans.

105.15 ARCHEOLOGICAL AND HISTORICAL FINDINGS—In areas where remains of prehistoric people's dwelling sites or where artifacts of historical or archeological significance are encountered, discontinue construction operations in the general area. Contact will be made with the State Historical and Museum Commission to determine how to proceed. When directed, satisfactorily excavate the site to preserve the artifacts encountered, then remove them for delivery to the custody of the Pennsylvania Historical and Museum Commission. In the event construction operations are halted or delayed because of archeological or historic findings, appropriate adjustments will be made in the contract time as specified in Section 108.06. Such site excavation will be considered extra work as specified in Section 104.03.

105.16 COAL OR VALUABLE MINERAL FINDINGS—If coal or other valuable minerals are uncovered, during prosecution of the work, that are not addressed by contract special provisions, store and handle the coal and other valuable minerals according to the directions of the Representative.

Do not claim or assume ownership rights.

If direction is given to handle and dispose of the material in a manner other than as unsuitable material, the contract time and contract price may be adjusted as specified in Section 110.02.

SECTION 107—LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

107.01 LAWS TO BE OBSERVED—At all times, observe and comply with the following, and post as required: all Federal, State, and local laws, ordinances, and regulations that have appropriate jurisdiction over the project and affect the conduct of the work or that apply to employees on the project; and all orders or decrees that have been or may be enacted by any legal bodies or tribunals having authority or jurisdiction over the work, material, employees, or contract. Protect and indemnify the State and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, including violations by Contractor employees.

107.02 PERMITS, LICENSES, AND TAX RESPONSIBILITY—

(a) Permits and Licenses. Purchase and submit copies of permits and licenses. At the job site, post notices necessary for the proper and lawful performance of the work according to such permits and licenses. Do not start work until signing and submitting all documentation required to become a transferee/co-permitee for all applicable permits required for the project.

(b) Tax Responsibility. Ascertain the possible existence, scope and coverage of any local subdivision tax, sometimes called an occupation tax, wage tax, income tax, franchise tax, or excise tax on the construction operations within the limit of the political subdivision imposing such tax. Also indemnify and save harmless the State and its agents from liability for the collection and payment of any taxes assessed and levied by the constituted authority, including upon Contractor agents, employees, and/or representatives in connection with the performance of work on the project.

(c) Vehicle Registration. Attention is directed to 75 P.S. 1302(a) and 1303(a), (b), which requires vehicles to be registered in Pennsylvania when used on a project which is being built under traffic or where the vehicles are operated on a public highway opened to traffic.

107.03 PATENTED DEVICES, MATERIAL, AND PROCESSES—If any design, device, material, or process covered by letters of patent or copyright is used, provide for use by suitable legal agreement with the patentee or owner. Indemnify and save harmless the State or political subdivision from any claims for infringement, by reason of the use of any patented design, device, material, process, or any trademark or copyright, and indemnify the State for any costs, expenses, and damages which it may be obliged to pay by reason of any infringement, at any time during the performance or after the completion of the work. These provisions also apply to the surety.

107.04 RESTORATION OF SURFACE OPENED BY PERMIT—Do not allow any opening to be made within the right of way unless a valid permit is presented authorizing the opening. For such an opening, made before the date upon which the work provided for in the contract is finally accepted, repair at the time and in the manner directed in writing by the District Executive.

107.05 FEDERAL-AID PROVISIONS—If the Federal Government pays any portion of the project costs, observe the Federal laws pertaining to the project, as well as the rules and regulations made according to such laws. Work will be subject to the inspection of the appropriate Federal agency.

Such inspection will not make the Federal Government a party to the contract and will not interfere with the rights of either party to the contract.

107.06 SANITARY PROVISIONS—Provide and maintain, in a neat and clean condition, sanitary facilities for the exclusive use of personnel on the project. Dispose of all wastes, both sewage and wastewater, in a manner approved by the DEP. As required, obtain permits from local municipalities to install temporary toilet facilities.

107.08 OCCUPATIONAL SAFETY AND HEALTH—Comply at all times with applicable Federal, State, and local laws, provisions, and policies governing safety and health, including the Federal Construction Safety Act (Public Law 91-54), Federal Register, Chapter XVII, Part 1926 of Title 29 CFR, Occupational Safety and Health Regulations for Construction, and subsequent publications updating these regulations.

Take any other needed action or proceed as directed, to protect the life, health, and general occupational welfare of personnel employed on the project.

If, in the Representative's opinion, employees are exposed to extraordinary conditions which could or do constitute a hazard, modify such equipment, devices, and job procedures to ensure protection against the hazard or to reduce the risk to the employees engaged in project work.

All areas of a project will be hard hat areas. Require all persons within the project limits to wear protective headgear, including persons in cement concrete and bituminous concrete plants operated exclusively for a project, even though the plant(s) may be remotely located.

At the preconstruction conference, submit a written project safety program and procedure to document lost time due to accident for Department review. Give special emphasis to providing safeguards for any specially or unusually hazardous operations and health hazards. Include initial indoctrination and continuing instructions for all employees to enable them to perform work in a safe manner. Include in the instruction project safety practices, manner of reporting accidents, availability of medical facilities, and explanation of individual responsibility for accident-free operations.

For multi-season projects with a contract amount $\geq$ $5,000,000, provide and maintain one scoreboard safety sign 1200 mm (4 feet) wide by 900 mm (3 feet) high to identify the number of days worked on the project without a lost time accident. Imprint on the sign, the name of the Contractor and an appropriate safety message. Prominently display the following on the sign in 100 mm (4-inch) letters:

a. Contractor's name and address.
b. "(***) Days Worked Since Last Lost-Time Injury"

NOTE: "(***)"—indicates space for three removable numbers. Number displayed to include subcontractors.

Place the sign in a prominent location at the project site. Update the sign at least bi-weekly.

Immediately take corrective action, upon notification by the Representative of any noncompliance with the provisions of this section. Upon receipt of this notice, failure or refusal to promptly comply will cause a written order to be issued, stopping all or part of the work until the corrective action has been taken. Claim for an extension of time, costs, or damages because of the time lost due to any such stop orders will not be considered.

Require all persons to wear orange or strong yellow-green (or fluorescent versions of these colors) vest, shirt, or jacket while in work zones adjacent to traffic.

107.09 RAILWAY-HIGHWAY PROVISIONS—Conform to regulations stipulated in the Pennsylvania Public Utility Commission's order when work is indicated to be performed within, or adjacent to, the right of way or trackage belonging to, or upon which a common carrier operates. Observe strict adherence to all requirements pertaining to the work, safety, and movement of trains; to public and personal liability insurance; and to any other related matters.

If it is necessary to use crossings other than those indicated, make arrangements for the use of the crossings.

107.10 BRIDGES OVER NAVIGABLE WATERS—Conduct work on navigable waters according to the requirements of permits issued by the U.S. Army Corps of Engineers or U.S. Coast Guard, whichever is applicable.

107.12 CARE OF PUBLIC AND PRIVATE PROPERTY—Do not damage overhead and underground facilities and structures or property within or adjacent to the project. Use special care in the performance of the work in order to avoid interference or damage to operating utilities or plants; however, where there is any possibility of interference or damage, make satisfactory arrangements with responsible corporate officers of the utilities or plant, covering the necessary precautions to be used during the performance of the work. Make these arrangements, subject to review, before work is started.

Protect all land monuments and property markers which are to be affected by the construction until they have been correctly referenced by the Department. Beyond the construction area, reset monuments and markers which are disturbed by contract operations, either during the construction of the project or otherwise, when and as directed.

Promptly make restitution for or satisfactorily repair or restore damaged public or private property. Protect trees to be left standing. If these existing trees to be left standing are damaged, satisfactorily repair or replace them, at no expense to the Department, or compensate the Department for the damage by an equitable monetary amount as determined by, or agreed with, the Department.

107.13 PUBLIC USE LANDS—In performing work within or adjacent to public use lands, namely National or State Forests, State Gamelands, Wildlife or Waterfowl Refuges, recreation areas, parklands, and historic sites, comply with all applicable rules and regulations of the authority having jurisdiction.

Cooperate with the National or State Forest Officer or Supervisor and authorized subordinates in observing sanitary laws and in exercising every reasonable precaution to prevent and suppress forest fires and vandalism.

Do everything reasonable to prevent and suppress forest fires. Notify a forest supervisor, as soon as possible, of the location and extent of any fire observed. Before starting indicated work affecting stream channels, verify that the Department has the approval of the DEP and/or the DCNR.

107.14 RESPONSIBILITY FOR DAMAGE CLAIMS—Furnish insurance certificate(s), as specified in Section 103.05, to indemnify and save harmless the State, the Department, and all of its officers and employees from all suits, actions, or claims of any character, name, and description, brought for or on account of any injuries or damages received or sustained by any person, persons, or property during the performance of work by the Contractor, whether the same is due to the use of defective material, defective workmanship, neglect in safeguarding the work or public interests, or by or on account of any act, omission, neglect, or misconduct of the Contractor, or any Subcontractors, Fabricators, Manufacturers, or Vendors.

Also indemnify and save harmless the State, the Department, and all of its officers and employees from cases arising as specified in Sections 105.05 and 107.16, or from any claims for amounts arising or recovered under the Workers' Compensation Law, or any other law, bylaw, ordinance, order, or decree.

107.15 OPENING SECTIONS OF PROJECT TO TRAFFIC—The Representative will have the authority to order, in writing, any substantially completed section of the project opened to traffic when seasonal, local, or other conditions relating to the project or public convenience justify such action; however, such opening will not be held to be an acceptance or a waiver of any provisions of the specifications or the contract.

Furnish, place, and maintain necessary traffic control devices, as directed, at the Department's expense, as specified in Section 110.03. Conduct the remainder of construction operations so as to cause the least obstruction to traffic.

Any section of the project opened before project completion will be subject to the applicable requirements specified in Section 110.08(a).

After opening a section of the project to traffic, any damage to satisfactorily completed work items within the section which occurs due to vehicles, other than construction vehicles and equipment engaged on the project, and not to defective materials and/or workmanship, and which occurs despite satisfactory precaution taken, will be replaced or repaired, as directed, at the Department's expense, as specified in Section 110.03.

107.16 CONTRACTOR'S RESPONSIBILITY FOR WORK—

(a) Responsibility for Performed Work. The terms and conditions of the Contract will be in effect until the work is completed and accepted by the Department, as evidenced by the dated acceptance certificate issued by the Department. However, the Contractor will be relieved of responsibility for further physical work, maintenance, and third-party liability as specified in Section 110.08(a). The issuance of the acceptance certificate does not relieve the Contractor and Surety from continuing liability for latent defects, as specified in Section 107.16(b).

(b) Responsibility for Latent Defects. The Representative will determine if a defect is a latent defect. The Contractor and the Surety continue to be liable for all latent defects; however, the Surety is liable only until the performance bond is released. Satisfactorily repair or correct latent defects at no expense to the Department. If defects cannot be satisfactorily repaired or corrected, provide reimbursement for any expenses or damages incurred by the State because of latent defects. Failure to satisfactorily correct latent defects, or to reimburse the State for expenses or damages incurred as a result of latent defects, will be considered sufficient cause to suspend or remove prequalification, according to 67 PA Code Chapter 457, regulations governing prequalification of prospective bidders, provided that any adjudication regarding such latent defects is final.

(c) Responsibility During Temporary Suspension of Work. Should the work be temporarily suspended, wholly or in part, according to the provisions specified in Section 105.01(b), written notification will be given of the suspension and the reason(s) for the suspension.

If the work is temporarily suspended, wholly or in part, due to the fault of the Contractor, the Required Completion Date and any specified Milestone Date(s) will not be changed, unless otherwise directed by the Chief Engineer, Highway Administration.

After a whole or partial suspension, upon receipt of written notice from the Representative, actively resume work according to the detailed schedule of operations.

107.17 CONTRACTOR'S RESPONSIBILITY FOR PUBLIC OR PRIVATE FACILITIES AND STRUCTURES—Cooperate with others in the performance of corrective project work, as specified in Section 105.06.

The Department will cooperate in the issue of notices and will participate in all essential field conferences relating to the facilities and structures.

107.18 FURNISHING OF RIGHT OF WAY—The Department will be responsible for securing all necessary rights of way in advance of construction. Any exceptions will be indicated in the proposal and contract.

107.19 PERSONAL LIABILITY OF PUBLIC OFFICIALS—In carrying out any of the provisions of these specifications or in exercising any power or authority granted to them by or within the scope of the contract, no liability may be placed upon the Secretary, Engineer, or their authorized representatives, either personally or as officials of the State. In such matters, they act solely as State agents and representatives.

107.20 NO WAIVER OF LEGAL RIGHTS—The Department, the Secretary, the Engineer, or the Representative will not be prevented by an erroneous

- measurement,
- computation,
- estimate, or
- certificate

made or given by them or any agent or employee of the Department, under any provision or provisions of the contract at any time, either before or after the completion and acceptance of, and payment for the roadway, from showing at any time that any

- measurement,
- computation,
- estimate, or

- certificate

is untrue or incorrectly made in any particular or that the work or material or any part does not conform to the specifications and contract.

The Department will have the right to reject the whole or any part of the work or material, should any

- measurement,
- computation,
- estimate,
- certificate, or
- payment

be discovered or be known to be inconsistent with the contract terms or otherwise improperly given. The Department will not be prevented, notwithstanding any

- measurement,
- computation,
- estimate,
- certificate, or
- payment

from demanding and recovering from the Contractor or surety, such damages as it may sustain by the failure to comply with the terms of the specifications and contract or on account of any overpayment(s) made on any estimate or certificate.

Neither the payment on any estimate or certificate signed by the Department nor any extension or remission of contract time nor any possession taken by the Department or its employees, will operate as a waiver of any portion of the Contractor of any power herein reserved by the Department or any right to damages herein provided, nor will any waiver of any breach of contract held to be a waiver of other or subsequent breach.

The terms of this contract will not be waived or modified by any verbal communication between the Contractor and Department personnel.

107.21 WORKERS' COMPENSATION INSURANCE—Carry Workers' Compensation Insurance or file a proper Certificate of Exemption as provided for by the Workers' Compensation Act and execute a valid affidavit in accepting provisions of the Workers' Compensation Act as supplied with the contract.

107.22 MINIMUM WAGE SPECIFICATIONS AND RATES—

(a) Requirements. According to the provisions of the Pennsylvania Prevailing Wage Act 43 P.S. 165-1, and the implementing Regulations of the Pennsylvania Department of Labor and Industry, comply with the prevailing minimum wage predetermination requirements, as specified in the proposal, specifications, and contract.

(b) Responsibility for Payment of Wages. Accept responsibility for all wages paid or due to any employees engaged upon the project under contract, as mandated by the Pennsylvania Prevailing Wage Act, various applicable Federal acts, and the contract. Do not attempt to pass such responsibility elsewhere. Do not require employees to refund, directly or indirectly, any part of such wage(s). Where classification, reclassification, or additional classifications of workers are made according to the Pennsylvania Prevailing Wage Act and its regulations, make no

claim against the Department for additional compensation for such classification, reclassification, or additional classification.

If after a contract has been awarded, it is decided, because of unforeseen construction development, to list an additional classification and wage rate, the Department, with or without application by the Contractor, will make written request for a wage determination by the Secretary of Labor and Industry.

No person may be employed on the project under contract, except according to the classification set forth in the decision of the Secretary of Labor and Industry.

(c) Certification and Payment of Rate of Wage. According to the provisions of the Pennsylvania Prevailing Wage Act and various applicable Federal acts, including their implementing regulations, file with the Department a weekly statement and a final statement at the conclusion of project work under contract, certifying that all employees have been paid wages in conformity with the provisions of the contract, as prescribed by the regulations of the Pennsylvania Department of Labor and Industry, implementing the Pennsylvania Prevailing Wage Act. If any wages remain unpaid, list on the statement the amount of wages due to each employee. Certify that, directly or indirectly, no refunds are received from any employee of any such minimum wage(s), other than deductions authorized by the Pennsylvania Wage Payment and Collection Law, 43 P.S. 260.1. Use forms furnished by the Department and submit the forms to the District Executive within 7 days after the regular payment date of the payroll period. Payment of the current and semifinal estimates and final settlement certificate will be withheld if such certification is not submitted, using the proper form, within the prescribed time limit.

(d) Posting. Post a notice(s) in the manner and form prescribed by the current regulations of the State Department of Labor and Industry. This notice is to be clearly legible and to be placed in a prominent and easily accessible place at the project site under contract, as well as at places where employees are paid their wages.

(e) Records and Inspection. Keep accurate records of employment and wage payments, including all the information required by the regulations of the State Department of Labor and Industry implementing the State Prevailing Wage Act, as amended. Keep time cards of employees, as required by the cited regulations and act. In addition, keep the original signed indentures for each apprentice and the approvals of the Pennsylvania Apprenticeship and Training Council. Preserve the records for 2 years from the date of payment and keep open at all reasonable hours, for inspection by the Department and by the State Secretary of Labor and Industry. Make these records easily accessible within the State within a period of 7 days from the date on which the State Secretary of Labor and Industry requests in writing that such records be made available. For the purpose of such inspection, furnish the authorized inspectors of the Department every assistance in determining the wages paid in compliance with the regulations.

(f) Penalties. Failure to comply with the Pennsylvania Prevailing Wage Act and its regulations will result in withholding money due or to become due on the project contract. It will also result in termination of the right to proceed with the project work under contract and/or other penalties prescribed by law.

(g) Federal-Aid Projects. All Federal-Aid Projects are subject to the implementing rules and regulations of the various Federal departments. Accordingly, the contract provisions and the penalties prescribed for their violations, both of which are required to be incorporated verbatim in all contracts for such Federal-Aid Projects, will be set forth in the proposal and the contract applicable to each project.

107.23 HAULING RESTRICTIONS—

(a) General. Accept responsibility for all hauling done on the project and on adjacent highways, in connection with the contract. Hauling restrictions on highways will be according to the applicable sections of the Pennsylvania Vehicle Code, Act of 1976, No. 81.

Before submission of the bid, if truck delivery of long bridge members (in excess of 21 m (70 feet)) is contemplated, obtain, in writing, a determination if a Department's hauling permit can be issued for the routing from the proposed source(s) of supply to the project.

Without written permission, do not move and/or operate heavy-duty construction grading and hauling equipment over existing or new pavements, subbase, base and surface courses, and structures which will remain in service.

No special permits will be required for the transfer of oversize or overweight equipment or vehicles from one work area to another work area within the project limits. However, correct any damage caused by the transfer of equipment or vehicles.

If, in special cases, further restrictions are necessary, such restrictions will be indicated and/or specified in the proposal.

(b) Mass (Weight) Limits and Weighing.

1. Do not operate on public highways any vehicles which are in excess of the registered, gross, and/or axle mass (weight) limits established in Chapter 49 of the Vehicle Code, 75 PA C.S. Chapter 49, or as posted by the Department.

2. Submit to weighing by Department weigh teams when requested. If, as a result of such a weighing, it is determined that a vehicle owned or leased by the Contractor or any Subcontractor has been operated on public highways carrying a mass (weight) in excess of the above registered, gross or axle mass (weight) limits, the sum of $50 for each 225 kg (500 pounds) or part thereof of such excess mass (weight) will be deducted as liquidated damages from money due or to become due. These liquidated damages are attributable to inherent damage to the highway which is not readily ascertainable and do not relieve the Contractor of responsibility to pay ascertainable damage as may be required in other sections of these Specifications.

3. When a weight slip shows that a vehicle delivering material to the project exceeds limits specified in Section 107.23(b), the Contractor will be assessed liquidated damages as specified in Section 107.23(b)2. Weighing by a Department Weigh Team will not be required.

107.24 ACCESSIBILITY OF FIRE HYDRANTS—Make necessary arrangements with the local authorities to provide fire protection at all times. Keep the fire hydrants adjacent to the work readily accessible to fire apparatus and do not place material or other obstructions within 5 m (15 feet) of any hydrant.

107.25 DISCRIMINATION ON ACCOUNT OF RACE, COLOR, RELIGIOUS CREED, ANCESTRY, SEX, AGE, OR NATIONAL ORIGIN PROHIBITED IN CONNECTION WITH EMPLOYMENT—

(a) General. Do not discriminate against any individual, who is qualified and available to perform the work to which the employment relates, by reason of race, color, religious creed, ancestry, sex, age, or national origin.

(b) Penalties. Failure to comply with the above provisions, prescribed in greater detail in 15 P.S. 7306, and modified by Pennsylvania Human Relations Act 43 P.S. 951, may result in the deduction of money due or to become due for each violation. A second or subsequent violation will result in cancellation or termination of the contract upon which the violation occurred, and forfeiture of all money due or to become due, and other penalties prescribed by law.

(c) Federal-Aid Projects. In addition to the above, the requirements specified in Section 107.22(g) also apply.

107.26 SELECTION OF LABORERS AND MECHANICS—This Section does not apply to projects which are partially or totally financed with Federal funds.

(a) Veteran Preference. In employment on public works, provisions of 51 P.S. 492.1 require a preferential rating, similar to that given to State employees, to any soldier making application for employment and on intended discharge for reduction in force. The word "soldier," as used in the cited act, means a person who served in the armed forces of the United States or in any official women's organization, during any war or armed conflict in which the United States was engaged, and who has an honorable discharge from such service.

107.27 WATERWAY REGULATIONS AND WATER POLLUTION CONTROL—

(a) Waterway Regulations. Conduct indicated work in waterways, flood plains or their hydrologically connected wetlands according to the requirements of permits or approvals issued by the U.S. Army Corps of Engineers, the U.S. Coast Guard, the DEP, the DCNR, and/or the Pennsylvania Fish and Boat Commission, whichever is applicable. Do not conduct work, including borrowing or wasting material other than indicated, in waterways, floodplains or their hydrologically connected wetlands before obtaining the required permits or approvals.

(b) Water Pollution Control. Comply with all applicable State and Federal laws and regulations preventing the pollution of surface water and ground water resources.

(c) Act 247. According to Act 247, enacted by the General Assembly of the Commonwealth of Pennsylvania and approved by the Governor on October 26, 1972, the statutes, rules, and regulations concerning anti-pollution measures have been enumerated in Appendix C, Designated Special Provision 9. Include in the bid price all costs of complying with the terms of the listed statutes, rules, and regulations. No separate or additional payment will be made for such compliance. In the event that the listed statutes, rules, and regulations are amended, or if new statutes, rules, or regulations become effective, perform all additional and/or extra work deemed necessary, as ordered in writing and directed by the Representative, as specified in Section 110.03.

Determine what local ordinances, if any, will affect the project work. Check for any county, city, borough, or township rules or regulations applicable to the area in which the project is being constructed, and, in addition, for any rules or regulations of other organizations having jurisdiction, such as chambers-of-commerce, planning commissions, industries, or utility companies who have jurisdiction over lands which the project occupies. Include any costs of compliance with local controls in the prices bid, even though documents of such local controlling agencies are not listed herein. No separate or additional payments will be made for complying with existing, amended or new local ordinances, directives, or controls.

107.28 EROSION AND SEDIMENT POLLUTION CONTROL PLANS AND PERMITS—Install and maintain erosion and sediment pollution control devices as indicated or submit an alternate plan for accomplishing equal or better temporary and permanent erosion and water pollution control. If an alternate plan is submitted, do not start work until the plan is approved by the County Conservation District and the Department. If a National Pollutant Discharge Elimination System Permit is involved, do not start work until the plan is approved by the DEP and/or the DCNR or their designee and the Department.

107.29 THIRD-PARTY LIABILITY—Contracts covered by these specifications are not to be construed for the benefit of any person or political subdivision not a party to this contract, nor will this contract be construed to authorize any person or political subdivision not a party to this contract to maintain a lawsuit on or under this contract.

107.30 SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES—This Section only applies to projects which are partially or totally financed with Federal funds.

(a) General.

1. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity, as required by Executive Order 11246 and Executive Order 11375, are set forth in Required Contract Provisions (Form FHWA-1273) and these requirements; imposed pursuant to 23 U.S.C. 140, as established by Section 22 of the Federal-Aid Highway Act of 1968. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-43 and the provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. The requirements set forth herein constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract Provisions.

2. Work with the Department and the Federal Government in carrying out equal employment opportunity obligations and in their review of contract activities.

3. Comply with and have subcontractors (not including material suppliers) comply with the following minimum specific requirement activities of equal employment opportunity. The Equal Employment Opportunity Requirements of Executive Order 11246, as set forth in 23 CFR 633, are applicable to material suppliers as well as contractors and subcontractors. Include these requirements in every subcontract of $10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

(b) Equal Employment Opportunity Policy. Accept as operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through positive continuing programs:

It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action includes: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training.

(c) Equal Employment Opportunity Officer. Designate and make known to the Department contracting officers an equal employment opportunity officer (hereinafter referred to as the EEO Officer) who has the responsibility for and is capable of effectively administering and promoting an active company program of equal employment opportunity and who has been assigned adequate authority and responsibility to do so.

(d) Dissemination of Policy.

1. Make all company staff members related to the project who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, fully cognizant of, and have them implement, the company's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement is met, take the following actions as a minimum:

1.a Conduct periodic meetings of supervisory and personnel office employees before the start of work and then not less often than once every 6 months, at which time the contract equal employment opportunity policy and its implementation will be reviewed and explained. Have the meetings conducted by the EEO Officer or another knowledgeable company official.

1.b Give all new company supervisory or personnel office employees a thorough indoctrination by the EEO Officer or other knowledgeable company official covering all major aspects of the company's equal employment opportunity obligations within 30 days following their reporting for duty on the project.

1.c Instruct all company personnel who are engaged in direct recruitment for the project by the EEO Officer or appropriate company official in the company procedures for locating and hiring minority group employees.

2. In order to make the equal employment opportunity policy known to all company employees, prospective employees, and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., take the following actions:

2.a Place notices and posters setting forth the equal employment opportunity policy in areas readily accessible to company employees, applicants for employment, and potential employees.

2.b Bring the equal employment opportunity policy and the procedures to implement such policy to the attention of company employees by means of meetings, employee handbooks, or other appropriate means.

(e) Recruitment.

1. When advertising for employees, include in all advertisements for employees the notation: "An Equal Opportunity Employer." Publish all such advertisements in newspapers or other publications having a large circulation among minority groups in areas from which the project work force would normally be derived.

2. Unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, through the company EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to for company employment consideration.

In the event a valid bargaining agreement exists providing for exclusive hiring hall referrals, observe the provisions of that agreement to the extent that the system permits compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended.)

3. Encourage present company employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, discuss information and procedures with regard to referring minority group applicants with employees.

(f) Personnel Actions. Establish and administer wages, working conditions, and employee benefits and take personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, without regard to race, color, religion, sex, or national origin. Follow the following procedures:

1. Conduct periodic inspections of the project site to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

2. Periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

3. Periodically review selected personnel actions in depth to determine where there is evidence of discrimination. Where evidence is found, promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, take corrective action to include all affected persons.

4. Promptly investigate all complaints of alleged discrimination made to the company in connection with obligations under this contract, attempt to resolve such complaints, and take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, include in such corrective action such other persons. Upon completion of each investigation, inform every complainant of all of his/her avenues of appeal.

(g) Training and Promotion.

1. Assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

2. Consistent with company work force requirements and as permissible under Federal and State regulations, make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, provide 25% of apprentices or trainees in each occupation in their first year of apprenticeship or training. In the event the Special Provision for Trainees is provided under this contract, this subparagraph will be superseded.

3. Advise employees and applicants for employment of available training programs and entrance requirements for each.

4. Periodically review the training and promotion potential of minority group and women employees and encourage eligible employees to apply for such training and promotion.

(h) Unions. If reliance is made in whole or in part upon unions as a source of employees, use maximum effort to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions either directly or through a contractor's association acting as agent will include the procedures set forth below:

1. Use maximum efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

2. Use maximum efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union is contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.

3. Obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information, so certify to the Department and set forth what efforts have been made to obtain such information.

4. In the event the union is unable to provide a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, or national origin, making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it is no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents meeting obligations pursuant to Executive Order 11246, as amended, and these requirements, immediately notify the Department.

(i) Subcontracting.

1. Use maximum efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Obtain lists of minority-owned construction firms from Department personnel.

2. Use maximum efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

(j) Records and Reports.

1. Keep such records as are necessary to determine compliance with the company's equal employment opportunity obligations. Design the records kept to indicate:

1.a The number of minority and non-minority group members and women employed in each work classification on the project.

1.b The progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractors who rely in whole or in part on unions as a source of their work force).

1.c The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees.

1.d The progress and efforts being made in securing the services of minority group subcontractors or subcontractors with meaningful minority and female representation among their employees.

2. Retain all such records for a period of 3 years following completion of the contract work and make them available at reasonable times and places for inspection by authorized representatives of the Department and the FHWA.

3. Submit to the Department a report each month after construction begins for the duration of the project, indicating the work hours, number of minority, women and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form EO-400, and according to the instructions included thereon. Form PR-1391 is to be submitted annually for the month of July, reflecting manpower figures for the project work force, for the last payroll period preceding the 31st of the month. If on-the-job training is being required by Special Provision for trainees, furnish Form EO-365 for each trainee employed, on a monthly basis, and Form FHWA-1409 semi-annually.

SECTION 1050—STEEL BRIDGE SUPERSTRUCTURE

1050.1 DESCRIPTION—This work is the construction of a steel bridge superstructure.

1050.2 MATERIAL—

(a) Deck and Barriers.

- Cement Concrete Structures—Section 1001.2
- Preformed Neoprene Compression Joint Seal—Section 1008.2
- Pedestrian Railing—Section 1012.2
- Aluminum Bridge Hand Railing—Section 1023.2
- Steel Bridge Hand Railing—Section 1022.2
- Protective Barrier—Section 1015.2
- Protective Fence—Section 1016.2
- Protective Coating for Reinforced Concrete Surfaces—Section 1019.2(a)
- Armored Preformed Neoprene Compression Dam—Section 1021.2
- Tooth Expansion Dam with Drain Trough—Section 1020.2
- Reinforcement Bars—Section 1002.2
- Neoprene Strip Seal Dam—Section 1026.2

(b) Fabricated Structural Steel. Section 1105

(c) Paint. Section 1060.2

(d) Neoprene Bearing Pads. Sections 1113.02 and 1113.03(g)

(e) High-Load Multi-Rotational Bearings. Section 1111

(f) Polymer Modified Mortar for Beam Seat Leveling. Section 1080.2(e)

1050.3 CONSTRUCTION—

(a) General. The superstructure consists of all indicated portions of the bridge above the bridge seat and includes bearings, bearings and anchors set in the substructure, abutment backwalls, cheekwalls, bridge drainage down to but not including the drain box, and portions of wings and appurtenances above the horizontal construction joint nearest the bridge seat.

(b) Superstructure. Construct the superstructure, as indicated, as shown on the Standard Drawings, and as follows:

- Fabricated Structural Steel—Section 1105
- Cement Concrete Structures—Section 1001.3
- Reinforcement Bars—Section 1002.3
- Preformed Neoprene Compression Joint Seal for Bridges—Section 1008.3
- Tooth Expansion Dam with Drain Trough—Section 1020.3
- Neoprene Strip Seal Dam—Section 1026.3
- Armored Preformed Neoprene Compression Dam—Section 1021.3
- Pedestrian Railing—Section 1012.3
- Aluminum Bridge Hand Railing—Section 1023.3
- Steel Bridge Hand Railing—Section 1022.3
- Protective Barrier—Section 1015.3
- Protective Fence—Section 1016.3
- Protective Coating for Reinforced Concrete Surfaces—Section 1019.3(a)

(c) Erection.

1. Handling and Storing Materials. Place material stored at the job site on skids. Keep it clean and properly drained. Place girders and beams upright and shore them. Support long members, such as columns and chords, on skids placed near enough together to prevent injury from deflection. If the contract is for erection only, check material turned over against the shipping lists and promptly report in writing any shortage or injury discovered. The Contractor is responsible for the loss of any material while in the Contractor's care, or for any damage caused to it after being received by the Contractor.

2. Falsework Design and Construction. Design and construct falsework according to AASHTO 11.2.2, 11.6.1, AASHTO Publications (Guide Design Specifications for Bridge Temporary Works and Construction Handbook for Bridge Temporary Works) and as specified in Section 105.03(c).

2.a General. Provide all tools, machinery, and equipment necessary to erect the falsework. Falsework is considered to be any temporary structure that supports structural elements of concrete, steel, masonry, or other materials during their construction or erection. Form travelers, as used in segmental cantilever construction, are considered to be a combination of falsework and forms. Have a Professional Engineer registered in the State sign and seal the working drawings for the falsework if the height of falsework exceeds 4.3 m (14 feet) or if traffic, other than workmen involved in constructing the bridge, will travel under the bridge. Furnish falsework of sufficient rigidity and strength to safely support all forces imposed, and to produce, in the finished structure, the lines and grades indicated.

2.b Design Loads. Ensure that the design load for falsework consists of the sum of dead and live vertical loads, and any horizontal loads. As a minimum, include in the dead loads the gravitational force of the falsework and all construction material to be supported. Assume the combined density of concrete, reinforcing and prestressing steel, and forms to be not less than 2570 kg/m^3 (160 pounds per cubic foot) of normal density concrete or 2090 kg/m^3 (130 pounds per cubic foot) of low-density concrete that is supported.

For live loads, include the actual force of any equipment to be supported, applied as concentrated forces at the points of contact and a uniform force of not less than 960 N/m^2 (20 pounds per square foot) applied over the area supported, plus 1100 N/m (75 pounds per linear foot) applied at the outside edge of deck overhangs.

For the design of the falsework bracing system, use the sum of the horizontal forces due to equipment, construction sequence, including unbalanced hydrostatic forces from fluid concrete, stream flow when applicable, and an allowance for wind. However, do not allow the horizontal force to be resisted in any direction to be less than 2% of the total dead load.

Do not exceed the load-carrying capacity of the structure, or portion of structure, as computed using AASHTO LRFD Specifications Article 3.4.2 by imposing forces on existing, new, or partially completed portions of structures due to construction operations. For the compressive strength of concrete, f'c, in computations of the load-carrying capacity, use the lesser of the actual compressive strength at the time of loading or the specified compressive strength of the concrete.

2.c Clearances. Unless otherwise provided for roadways that are to remain open to traffic, supply minimum dimensions for clear openings through falsework at least 1.5 m (5 feet) wider than the width of the approach traveled way, measured between barriers when used, and 4.3 m (14 feet) high, except over interstate routes and freeways use 4.4 m (14.4 feet) for the minimum vertical clearance.

2.d Erection Drawings. Submit drawings illustrating the proposed method of erection. Show details on the drawings of all falsework bents, bracing, guys, dead-men, lifting devices, and attachments to the bridge members. Show the sequence of erection, location of cranes and barges, crane capacities, location of lifting points on the bridge members, and masses (weights) of the members. Supply plans and drawings complete in detail for all anticipated phases and conditions during erection. If required, furnish calculations to demonstrate that allowable stresses are not exceeded and that member capacities and final geometry will be correct. Do not proceed with erection until the drawings have been accepted.

2.e Construction. Construct falsework and set it to grades that allow for its anticipated settlement and deflection, and for the vertical alignment and camber indicated or ordered by the Representative for the permanent structure. Use variable depth camber strips between falsework beams and soffit forms to accomplish this, if directed.

Use suitable screw jacks, pairs of wedges or other devices at each post to adjust falsework to grade, to allow minor adjustments during the placement of concrete or structural steel should observed settlements deviate from those anticipated, and to allow for the gradual release of the falsework. Provide tell-tales attached to the forms and extending to the ground, or other means, for accurate measurement of falsework settlement during the placing and curing of the concrete.

Support falsework or formwork for deck slabs on girder bridges directly on the girders so that there will be no appreciable differential settlement during placing of the concrete. Brace and tie girders to resist any forces that would cause rotation or torsion in the girders caused by the placing of concrete for diaphragms or deck. Do not weld falsework support brackets or braces to structural steel members or reinforcing steel unless specifically allowed.

2.f Removal. Section 1001.3(q)

3. Erection Procedure.

3.a Conformance to Drawings. Ensure that the erection procedure conforms to the erection drawings submitted as specified in Section 1050.3(c)2.d. Any modification to or deviations from this erection procedure will require revised drawings and verification of stresses and geometry.

3.b Erection Stresses. Account for any erection stresses that are induced in the structure as a result of the use of a method of erection or equipment which differs from that indicated or specified, and which will remain in the finished structure as locked-in stresses. Provide additional material, at no additional cost to the Department, to keep both temporary and final stresses within the allowable limits used in design.

Provide temporary bracing or stiffening devices to accommodate handling stresses in individual members or segments of the structure during erection.

3.c Maintaining Alignment and Camber. During erection, support segments of the structure in a manner that will produce the proper alignment and camber in the completed structure. Install cross frames and diagonal bracing, as necessary during the erection process, to provide stability and ensure correct geometry. Provide temporary bracing, if necessary, at any stage of erection.

4. Bearings and Anchorage.

4.a General. This work consists of furnishing and installing bridge bearings. Bearing types include, but are not limited to, elastomeric pad, rocker, roller, pot, spherical, disk, and sliding plate bearings. Included as components of bearings are masonry, sole and shim plates, bronze or copper-alloyed bearing and expansion plates, anchor bolts, PTFE sheets or surfacing, lubricants and adhesives. The furnishing and installation of bedding materials used under masonry plates is also included in this work.

Construct bearings according to the indicated details. If complete details are not provided, furnish bearings that conform to the limited, indicated details and provide the design capacities for loads and movements shown or specified and the performance characteristics specified.

4.a.1 Working Drawings. If complete details for bearings and their anchorages are not indicated, prepare and submit working drawings for the bearings. Show all details of the bearings and of the materials proposed for use on such drawings, and have the drawings approved before fabrication of the bearings is begun.

4.a.2 Packaging, Handling, and Storage. Before shipment from the point of manufacture, package bearings in such a manner to ensure that during shipment and storage the bearings will be protected against damage from handling, weather, or any normal hazard. Clearly identify each completed bearing's components; securely bolt, strap, or otherwise fasten its components to prevent any relative movement; and mark on its top its location and orientation in each structure in the project, in conformity with the plans. Do not dismantle bearings at the site unless absolutely necessary for inspection or installation.

Store all bearing devices and components at the work site in an area that provides protection from environmental and physical damage. Ensure that bearings are clean and free of all foreign substances when installed.

4.a.3 Manufacture or Fabrication. Unless otherwise specified or indicated, furnish the surface finish of bearing components that come into contact with each other or with concrete, but are not embedded in concrete, as specified in Section 1105.03(q).

4.a.4 Construction and Installation. Install bearings to the positions indicated. At the time of installation, set bearings to the dimensions prescribed by the manufacturer, the Representative, or as indicated. Adjust bearings as necessary to take into account the temperature and future movements of the bridge.

Set bridge bearings level, in exact position, and to have full and even bearing on all bearing planes.

For bearing surfaces located at improper elevations or set not level and true to plane, either grind the surface, grout pack bearings, or modify the bearing such that intended bearing placement is as originally designed with the least amount of bearing modification.

Use a filler or fabric material as specified in Section 1113.03(h) to bed on the concrete metallic bearing assemblies not embedded in the concrete.

Set elastomeric bearing pads directly on properly prepared concrete surfaces without bedding material.

For bearings seated directly on steel work, machine the supporting surface so as to provide a level and planar surface to place the bearing.

4.b Preparation of Bearing Areas. Prepare bearing areas as specified in Section 1001.3(k)9 and furnish bedding material as specified in Section 1113.03(h).

4.c Elastomeric Bearings. Elastomeric bearings include unreinforced pads (consisting of neoprene only) and reinforced pads with steel or fabric laminates. Furnish bearings with the dimensions, material properties, neoprene grade and type of laminates indicated.

4.c.1 Setting Bearing Pads. Set bearing pads as specified in Section 1080.3(c)2 and as indicated. Where elastomeric bearings are used at piers of continuous bridges, provide full contact between the beam, the bearing pad, and the beam seat, unless the plans indicate that a lift-off condition is expected when the beam is initially set on the pad.

4.c.2 Resetting Bearing Pads. If indicated, reset expansion bearings after all dead loads have been placed. Submit a plan showing and describing the jacking procedure for review and acceptance at least 2 weeks before proceeding with the jacking operations. Provide calculations showing actual and allowable bearing stresses in the bearing plates and bearing areas at the jacking locations. Have the plans and calculations sealed and signed by a Professional Engineer registered in the State.

Before resetting, truck mixers and slip-forming equipment, necessary for placement of barriers and sidewalks, will be allowed on the structure. Do not allow other construction equipment or traffic on the structure until the bearings are reset. Coordinate the resetting operation with the installation of on-bridge hardware, including conduits, utilities, expansion dams, and drainage, to prevent damage to these components when the beams are jacked and lowered.

Furnish jacks with a working capacity at least equal to the jacking forces indicated. Jack beams at expansion bearings to achieve a 2 mm (1/16-inch) gap between the bottom of beam or sole plate and the top of the entire bearing pad. Place jacks at jacking points indicated. Unless indicated otherwise, jack all beams simultaneously. Limit the differential rise between all beams to 3 mm (1/8 inch) during jacking. After jacking, center the pad beneath the sole plate or beam bearing area as indicated. Lower the beams onto the bearings in the same manner as they were jacked.

Reset bearings when the ambient temperature is above -7 °C (20F) and below 30 °C (85F).

4.d Anchor Bolts.

4.d.1 Fabrication. Furnish swedged or threaded anchor bolts to secure a satisfactory grip upon the material used to embed them in the holes.

4.d.2 Setting Anchor Bolts. Set by template to the indicated elevation and alignment. As an alternate, set in preformed holes 50 mm (2 inches) larger than the bolt diameter. Clean the holes, set and fix the bolts, and fill the holes with nonshrink grout, as specified in Section 1001.2(e). Use drilled holes, as a substitute for preformed holes, in abutments and solid piers only. Protect the holes against water entry during freezing periods.

Limit the threaded projection above the nut to between 5 mm and 25 mm (3/16 inch and 1 inch).

4.e Setting Bearings. As shown on the Standard Drawings and as follows:

Align masonry plates and set them so they will be centered with the rockers, rollers, sole plates, and bearing plates, at 20 °C (68F) and under full dead load. Make adjustment for the difference in temperature, from 20 °C (68F), at time of erection. Compensate for the change in length of the bottom chord, or flange, due to the later addition of dead loads.

Maximum deviation of the top of rockers from a vertical position, and maximum eccentricity of the parts of sliding bearings, is 0.0001(X) + 5 mm, where X, in millimeters (0.0001(L) + 0.25 inch, where L, in inches), is the horizontal distance between the expansion bearing and the fixed bearing.

4.f Spherical Bearings. Fabricate, test, and install spherical bearings as indicated.

4.g Separate Contracts for Substructure and Superstructure. If the substructure and superstructure are built under separate contracts, proceed as follows:

4.g.1 Substructure Contractor. Accurately place the anchor bolts and grind the bearing areas to the correct plane and elevation.

At the completion of the substructure, make an as-built survey to accurately show the as-built versus the plan location of all substructure centerlines, girder centerlines, anchor bolt group centerlines, anchor bolts, bearing elevations, and any other elements or items that may affect the layout or placement of the work to be furnished by the superstructure contractor. Show all of the pertinent as-built survey information, including dimensions, elevations, and angles on suitable drawings, as specified for shop drawings, together with the corresponding design drawing information

for direct comparison. Submit the original drawings, or equal, to the Department as soon as practical after completion of the survey. Conduct the survey and have the survey drawings signed by a Surveyor or Professional Engineer registered in the State.

Provide documented evidence to show that the bearings can be set properly within the tolerances specified in Section 1050.3(c)4.d.

4.g.2 Superstructure Contractor. Use the as-built survey information, furnished by the substructure contractor, for the accurate layout of the connecting parts of the work.

Verify location, level, and elevation of all bearing seats and anchor bolts as soon as possible. Verify, before the fabrication of any metal work, in cases where the substructure is completed before award of the superstructure contract, or before erection of the metal work, in cases where fabrication has been started before completion of the substructure.

Furnish and install bedding, bearings, and nuts and washers for anchor bolts.

4.h High-Load Multi-Rotational Bearings. If required, construct as follows:

Provide complete erection and installation procedures for acceptance before installation.

Evenly support bearings over their upper and lower surfaces under all erection and service conditions.

Lift bearings by undersides only or by specially designed lifting lugs.

Take care to avoid damage to and contamination of bearing surfaces during installation.

Align the centerlines of the bearing assembly with those of the substructure and superstructure. On guided bearings take special care to properly align the guiding mechanism with the designated expansion direction of the structure.

Leave bearing straps or retaining clamps in place as long as possible to ensure parts of bearing are not inadvertently displaced relative to each other. Take care to remove straps or clamps before any normal structural movement takes place, such as post-tensioning.

Set offsets of upper and lower bearing parts as indicated. Under dead load, the distance between the upper and lower bearing plates is not to be out of parallel by more than 3 mm (1/8 inch) measured from edge to edge.

Make the mating surface of the superstructure level within a slope of 1:100 (100:1). Have no local irregularities exceeding 1.5 mm (1/16 inch).

During welding of sole plates to girders, limit the temperature of the metal adjacent to neoprene and PTFE to a maximum of 150 °C (300F). Use temperature indicating markers.

4.h.1 Bearing Seats. Provide bedding material for steel bearings as specified in Section 1113.03(h).

5. Straightening Material. If allowed, straighten plates, angles, other shapes, and built-up members. Use methods that will not produce fracture or other injury to the metal. Straighten distorted members by mechanical means or, if allowed, by carefully planned procedures and supervised application of a limited amount of localized heat. Heat-straighten Grades 485W, 690, and 690W (Grades 70W, 100, and 100W) steel members only under rigidly controlled procedures, each application subject to approval. Do not allow the maximum temperature to exceed the following values:

Steel Grade	Distance from Weld	Max. Temp.
485W (70W)	> 150 mm (6 inches)	580 °C (1,050F)
485W (70W)	< 150 mm (6 inches)	480 °C (900F)
690 (100) or 690W (100W)	> 150 mm (6 inches)	610 °C (1,100F)
690 (100) or 690W (100W)	< 150 mm (6 inches)	510 °C (950F)

In all other steels, do not allow the temperature of the heated area to exceed 650 °C (1,200F) as controlled by temperature indicating crayons, liquids, or bimetal thermometers.

Ensure that parts to be heat-straightened are substantially free of stress and from external forces, except stresses resulting from mechanical means used in conjunction with the application of heat.

Evidence of fracture following straightening of a bend or buckle will be cause for rejection of the damaged piece.

6. Field Assembly. Accurately assemble the parts as indicated or shown on the erection drawings, and follow any match-marks. Carefully handle the material so that no parts will be bent, broken, or otherwise damaged. Do not hammer members if it will injure or distort them. Clean bearing surfaces and surfaces to be in permanent contact before the members are assembled. Fill one-half of the holes of splices and field connections with bolts and cylindrical erection pins (half bolts and half pins) before installing and tightening the balance of high-strength bolts. Fill three-fourths of the holes of splices and connections carrying traffic during erection before installing and tightening the balance of high-strength bolts.

Fitting-up bolts may be the same high-strength bolts used in the installation. If other fitting-up bolts are used, supply fitting-up bolts of the same nominal diameter as the high-strength bolts, but supply cylindrical erection pins 1 mm (1/32 inch) larger.

7. Connections Using High-Strength Bolts. Make connections as specified in Section 1105.03(j) and as follows:

7.a General. Obtain the "snug tight" condition as defined in Section 1050.3(c)7.d for any method of final tightening except direct-tension-indicator (DTI) tightening.

Assemble fasteners of appropriately assigned lot numbers together when installed. Protect such fasteners from dirt and moisture at the job site. Take only as many fasteners as are anticipated to be installed and tightened during a work shift from protected storage. Return fasteners not used to protected storage at the end of the shift. Do not clean lubricant from fasteners that is required to be present in as-delivered condition. Before installation, clean and relubricate fasteners for slip-critical connections, which accumulate rust or dirt resulting from job site conditions. If relubrication is required, use a lubricant recommended by the fastener manufacturer.

Provide a Skidmore-Wilhelm Calibrator, or other equivalent bolt tension measuring device, at each job site, during erection. Perform periodic testing (at least once each working day if calibrated wrench method is used) to ensure compliance with the installation test procedures specified herein for turn-of-nut tightening, calibrated wrench tightening, installation of alternate design bolts, and direct tension indicator tightening. Bolts that are too short for the Skidmore-Wilhelm Calibrator may be tested using DTI devices. In that case, calibrate the DTI devices in the Skidmore-Wilhelm Calibrator using longer bolts.

Install fasteners together with washers of size and quality specified, located as required below, in properly aligned holes, and tighten by any of the methods specified in Sections 1050.3(c)7.d through 1050.3(c)7.g to at least the minimum tension specified in Table A, when all the fasteners are tight. When it is impractical to turn the nut, tighten the fastener by turning the bolt while the nut is prevented from rotating. If impact wrenches are used, provide adequate wrench capacity and sufficient air supply to perform the required tightening of each bolt in approximately 10 seconds.

Do not reuse galvanized AASHTO M 164 (ASTM A 325) fasteners. Reuse other AASHTO M 164 (ASTM A 325) bolts only if approved. Do not consider as reuse touching up or retightening previously tightened bolts that may have been loosened by the tightening of adjacent bolts provided the snugging up continues from the initial position and does not require greater rotation, including the tolerance, than that required by Table B.

7.b Rotational-Capacity Tests. Perform the rotational capacity test on each bolt/nut/washer assembly lot, as specified in Section 1105.02(d)7, immediately before the start of bolt installation in the fabrication shop or at the project site. Document test results according to PTM No. 427. If testing and installation is performed in the fabrication shop, submit test results to MTD. If testing and installation is performed at the project site, submit test results to the Representative. All job-site rotational capacity tests are to be performed by the Contractor and witnessed by the Inspector.

Hardened steel washers are required as part of the test, although they may not be required in the actual installation. Mark fastener containers for each assembly lot after testing to indicate their acceptance.

7.c Requirement for Washers. Where the outer face of the bolted parts has a slope greater than 1:20 (20:1) with respect to a plane normal to the bolt axis, use a hardened beveled washer to compensate for the lack of parallelism.

For American Standard Beams and Channels use hardened beveled washers that are square or rectangular, that conform to AASHTO M 293 (ASTM F 436M), and that taper in thickness.

Where necessary, clip washers on one side to a point not closer than 7/8 of the bolt diameter from the center of the washer.

Hardened washers are not required for connections using AASHTO M 164 (ASTM A 325) bolts except as follows:

- Use hardened washers under the element turned in tightening when the tightening is to be performed by calibrated wrench method.
- Hardened steel washers are required as part of rotational-capacity tests, even if they are not required in the actual installation.
- Where AASHTO M 164 (ASTM A 325) bolts are to be installed in a long slotted hole in an outer ply, provide a plate washer or continuous bar of at least 8 mm (5/16-inch) thickness with standard holes. Furnish washers or bars of sufficient size to completely cover the slot after installation. Use a single hardened washer conforming to ASTM F 436, but with a minimum thickness of 8 mm (5/16 inch), or use a washer or bar of structural grade material. Do not use multiple hardened washers to achieve a thickness of 8 mm (5/16 inch).
- As an alternate satisfying the requirements for washers, use alternate design fasteners conforming to the requirements specified in Section 1050.3(c)7.c.1, with a geometry that provides a bearing circle on the head or nut with a diameter equal to or greater than the diameter of hardened washers conforming to the requirements of ASTM F 436. Such fasteners may be used without washers.

7.c.1 Alternate Fasteners. If alternate fasteners are allowed, proceed as specified in Section 1050.3(c)7.h and as follows:

If allowed, use other fasteners or fastener assemblies that conform to the materials, manufacturing, and chemical composition requirements of AASHTO M 164 (ASTM A 325) and that conform to the mechanical property requirements of the same specification in full-size tests, and that have body diameter and bearing areas under the head and nut, or their equivalent, not less than those provided by a bolt and nut of the same nominal dimensions specified in Section 1105.02(d). Such alternate fasteners may differ in other dimensions from those of the specified bolts and nuts.

7.d Turn-of-Nut Tightening. If turn-of-nut tightening is used, hardened washers are not required except as specified in Section 1050.3(c)7.c.

Check a representative sample of not less than three bolt and nut assemblies of each diameter, length and grade to be used in the work at the start of work in a device capable of indicating bolt tension.

Using the test, demonstrate that the method for estimating the snug tight condition and controlling the turns from snug tight to be used by the bolting crew develops a tension not less than 5% greater than the tension required by Table A. Perform periodic retesting if ordered by the Representative.

Install bolts in all holes of the connection and bring them to a snug tight condition. Snug tight is defined as the tightness that exists when the plies of the joint are in firm contact. Use a few impacts of an impact wrench or the full effort of a man using an ordinary spud wrench to attain the snug tight condition.

Snug tighten the bolts of the connection by progressing systematically from the most rigid part of the connection to the free edges, and then retighten the bolts in a similar systematic manner as necessary until all bolts are simultaneously snug tight and the connection is fully compacted. Following this initial operation further tighten all bolts in the connection by the applicable amount of rotation specified in Table B. During the tightening operation, do not allow rotation of the part not turned by the wrench. Systematically tighten the bolts progressing from the most rigid part of the joint to its free edges.

7.e Calibrated-Wrench Tightening. Use calibrated wrench tightening only if installation procedures are calibrated on a daily basis and if a hardened washer is used under the element turned in tightening. Standard torques determined from tables or from formulas, which are assumed to relate torque to tension, are not acceptable.

When calibrated wrenches are used for installation, set them to provide a tension not less than 5% in excess of the minimum tension specified in Table A. Calibrate the installation procedures at least once each working day for each bolt diameter, length, and grade, using fastener assemblies that are being installed in the work. Perform calibration in a device capable of indicating actual bolt tension by tightening three typical bolts of each diameter, length, and grade, from the bolts being installed and with a hardened washer, from the washers being used in the work, under the element turned in tightening. Recalibrate wrenches if significant difference is noted in the surface condition of the bolts, threads, nuts, and washers. Verify during actual installation in the assembled steel work that the wrench adjustment selected by the calibration does not produce a nut or bolt head rotation from snug tight greater than that specified in Table B. If manual torque wrenches are used, turn nuts in the tightening direction when torque is measured.

When calibrated wrenches are used to install and tension bolts in a connection, install bolts with hardened washers under the element turned in tightening bolts in all holes of the connection and bring them to a snug tight condition. Following this initial tightening operation, tighten the connection using the calibrated wrench. Tighten the bolts by progressing systematically from the most rigid part of the joint to its free edges. Use the wrench to again tighten previously tightened bolts that may have been relaxed as a result of the subsequent tightening of adjacent bolts, until all bolts are tightened to the prescribed amount.

7.f Installation of Alternate Design Bolts. When fasteners that incorporate a design feature intended to indirectly indicate the bolt tension or to automatically provide the tension specified in Table A and that have been qualified under Section 1050.3(c)7.c.1 are to be installed, check a representative sample of not less than three bolts of each diameter, length, and grade, at the job site in a device capable of indicating bolt tension. Include flat, hardened washers in the test assembly, if required in the actual connection, arranged as those in the actual connections to be tensioned. Use the calibration test to demonstrate that each bolt develops a tension not less than 5% greater than the tension specified in Table A. Follow the manufacturer's installation procedure for installation of bolts in the calibration device and in all connections. Perform periodic retesting when ordered by the Representative.

When alternate design fasteners that are intended to control or indicate bolt tension of the fasteners are used, install bolts in all holes of the connection and initially tighten them sufficiently to bring all plies of the joint into firm contact but without yielding or fracturing the control or indicator element of the fasteners. Then further tighten all fasteners, progressing systematically from the most rigid part of the connection to the free edges in a manner that will minimize relaxation of previously tightened fasteners. In some cases, to properly tension the bolts, perform more than a single cycle of systematic partial tightening before final twist-off of the control or indicator element of individual fasteners. Replace any individual fastener assembly if twist off occurs before the final tensioning cycle.

7.g Direct Tension Indicator Tightening. When tightening of bolts using DTI devices is used, assemble a representative sample of not less than three devices, for each diameter and grade of fastener to be used in the work, in a calibration device capable of indicating bolt tension. Include flat-hardened washers in the test assembly, if required in the actual connection, arranged as those in the actual connections to be tensioned. Use the calibration test to demonstrate that the device indicates a tension not less than 5% greater than that specified in Table A.

After tightening in the calibrating device, use a torque wrench to verify the torque required for proper tightening. Tighten the nut of each assembly five degrees past the initial required tension, record the respective load reading on the torque wrench dial, and determine the average of the sample assemblies. This average torque will be the inspection torque used on completed connections and is to be determined each day that inspection of completed connections is performed.

Follow manufacturer's installation procedure for installation of bolts in the calibration device and in all connections. Give special attention to proper installation of flat-hardened washers when DTI devices are used with bolts installed in oversize or slotted holes and when the load indicating devices are used under the turned element.

When bolts are installed using DTIs conforming to the requirements of ASTM F 959, install bolts in all holes of the connection and bring them to snug tight conditions. Snug tight is indicated by partial compression of the direct tension indicator protrusions. Provide a maximum gap of 0.125 mm (0.005 inch) after installation. Then tighten all fasteners, progressing systematically from the most rigid part of the connection to the free edges, in a manner that will minimize relaxation of previously tightened fasteners.

TABLE A (Metric)
Required Fastener Tension
Minimum Bolt Tension in Kilonewtons*

Bolt Size mm	AASHTO M 164 (ASTM A 325)
12.7	53.4
15.9	84.5
19.1	124.5
22.2	173.5
25.4	226.8
28.6	249.1
31.8	315.8
34.9	378.1
38.1	458.1

* Equal to 70% of specified minimum tensile strength of bolts (according to ASTM Specifications for tests of full-size ASTM A 325 bolts with UNC profile threads loaded in axial tension) rounded to the nearest tenth of a kilonewton.

TABLE A (English)
Required Fastener Tension
Minimum Bolt Tension in Pounds*

Bolt Size inches	AASHTO M 164 (ASTM A 325)
1/2	12,000
5/8	19,000
3/4	28,000
7/8	39,000
1	51,000
1-1/8	56,000
1-1/4	71,000
1-3/8	85,000
1-1/2	103,000

* Equal to 70% of specified minimum tensile strength of bolts (according to ASTM Specifications for tests of full-size ASTM A 325 bolts with UNC profile threads loaded in axial tension) rounded to the nearest kip.

TABLE B
Nut Rotation from the Snug-Tight Condition[1],[2] Geometry of Outer Faces of Bolted Parts

Bolt length measured from underside of head to end of bolt	Both faces normal to bolt axis	One face normal to bolt axis and other face sloped not more than 1:20 (20:1). Bevel washer not used.	Both faces sloped not more than 1:20 (20:1) from normal to bolt axis. Bevel washers not used.
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 diameters	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 diameters[3]	2/3 turn	5/6 turn	1 turn

(1) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance should be ±30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

(2) Applicable only to connections in which all material within grip of the bolt is steel.

(3) No research work has been performed by the Research Council Riveted and Bolted Structural Joints to establish the turn-of-nut procedure if bolt lengths exceed 12 diameters. Therefore, the required rotation must be determined by actual tests, in a suitable tension device, simulating the actual conditions.

In some cases, proper tensioning of the bolts may require more than a single cycle of systematic partial tightening before final tightening to deform the protrusion to the specified gap.

7.h Lock-Pin and Collar Fasteners. Install lock-pin and collar fasteners using approved methods and procedures.

7.i Inspection. In the presence of the Inspector, inspect the tightened bolts using a calibrated torque wrench. At the Representative's option, this inspection can be performed either by the Inspector or the Contractor.

Individually place three bolts of the same grade, size, and condition as those under inspection in a device calibrated to measure bolt tension. Perform this calibration operation at least once each inspection day. Provide a washer under the part turned in tightening each bolt, if washers are used on the structure. If washers are not used on the structure, furnish the material used in the tension measuring device which abuts the part turned of the same specification as that used on the structure. In the calibrated device, tighten each bolt to the specified tension by any convenient means. Apply the calibrated torque wrench to the tightened bolt to determine the torque required to turn the nut or head five degrees (approximately 25 mm (1 inch) at a 300 mm (12-inch) radius) in the tightening direction. Take the average of the torque required for all three bolts as the job-inspection torque.

For final acceptance of connections installed using high-strength bolts, inspect 10% (2 minimum) of the bolts in the connection using a calibrated torque wrench. Select bolts to be inspected according to PTM No. 1. Then apply the job-inspection torque to each with the calibrated torque wrench turned in the tightening direction. If this torque turns no bolt head or nut, the bolts in the connection will be considered to be properly tightened. But if the torque turns one or more bolt heads or nuts, apply the job-inspection torque to all bolts in the connection. Tighten and reinspect any bolt whose head or nut turns at this stage, or retighten all the bolts in the connection and resubmit it for inspection.

8. Pin Connections. Use pilot and driving nuts in driving pins. Drive pins so that the members will take full bearing on them. Screw pin nuts up tight and burr the threads at the face of the nut with a pointed tool.

9. Misfits. The correction of minor misfits involving minor amounts of reaming, cutting, and chipping will be considered a legitimate part of the erection. However, errors in the shop fabrication or deformation resulting from handling and transporting will be cause for rejection.

The Contractor is responsible for all misfits, errors, and damage. Make the necessary corrections and replacements to correct misfits, errors, and damage.

(d) Painting. Apply intermediate and finish coats of paint, as specified in Section 1060.3.

1050.4 MEASUREMENT AND PAYMENT—Lump Sum. The price includes the following component items.

- **Fabricated Structural Steel.** Kilogram (Pound)
  The cost of welds in excess of those indicated and allowed by the Chief Bridge Engineer, due to the Contractor's request, is incidental to the other fabricated structural steel work. The cost of all nondestructive testing, including equipment, supplies, and technicians is also incidental to the other fabricated structural steel work.

- **Cement Concrete Structures.** Section 1001.4
- **Preformed Neoprene Compression Joint Seal.** Section 1008.4
- **Pedestrian Railing.** Section 1012.4
- **Aluminum Bridge Hand Railing.** Section 1023.4
- **Steel Bridge Hand Railing.** Section 1022.4
- **Protective Barrier.** Section 1015.4
- **Protective Fence.** Section 1016.4
- **Protective Coating for Reinforced Concrete Surfaces.** Section 1019.4
- **Armored Preformed Neoprene Compression Dam.** Section 1021.4
- **Tooth Expansion Dam with Drain Trough.** Section 1020.4
- **Reinforcement Bars.** Section 1002.4
- **Neoprene Strip Seal Dam.** Section 1026.4
- **High Load Multi-Rotational Bearings.** Each
  For the type indicated.
- **Neoprene Bearing Pads.** Each
  For the type indicated.
- **Reset Expansion Bearings, Steel Superstructure.** Each

SECTION 1080—PRESTRESSED CONCRETE BRIDGE SUPERSTRUCTURE

1080.1 DESCRIPTION—This work is the construction of a prestressed concrete bridge superstructure.

1080.2 MATERIAL—

(a) Deck and Barriers.

- Cement Concrete Structures—Section 1001.2
- Preformed Neoprene Compression Joint Seal for Bridges—Section 1008.2
- Pedestrian Railing—Section 1012.2
- Aluminum Bridge Hand Railing—Section 1023.2
- Steel Bridge Hand Railing—Section 1022.2
- Protective Barrier—Section 1015.2
- Protective Fence—Section 1016.2
- Protective Coating for Reinforced Concrete Surfaces—Section 1019.2(a)
- Armored Preformed Neoprene Compression Dam—Section 1021.2
- Tooth Expansion Dam With Drain Trough—Section 1020.2
- Reinforcement Bars—Section 709.1
- Neoprene Strip Seal Dam—Section 1026.2

(b) Beams and Bearings.

- Prestressed Concrete Bridge Beams—Section 1107.02
- Plain Steel Bars—Section 709.1(a)2
- Closed Cell Neoprene Sponge—Sections 1107.02(p)1 and 1107.03(e)3
- Neoprene Bearing Pads—Sections 1113.02 and 1113.03(g)
- Bedding Material for Bridge Shoes—Section 1113.03(h)
- Steel Bearings—Section 1107.02(j)
- Post Tensioning, when required—Section 1108.02

- Nonshrink Grout for Shear Keys—Section 1080.2(c)
- Nonshrink Grout for Studs, Dowels, and Anchor Bolts—Section 1001.2(e)
- Epoxy Resin Protective Coating—Section 1019.2(b)
- High Load Multi-Rotational Bearings—Section 1111

(c) Nonshrink Grout for Shear Keys in Adjacent Prestressed Concrete Box Beam Bridges. Use either a premixed, nonshrink grout, from a manufacturer listed in Bulletin 15 and certified as specified in Section 106.03(b)3, or mix as follows:

- One part Non-shrink Grout Admixture—Bulletin 15. Certify as specified in Section 106.03(b)3.
- Two parts Cement, Type IP, IS or II—Section 701
- Three parts Fine Aggregate, Type A—Section 703.1
- Water—Section 720.1

Required grout compressive strength:

- 7 MPa (1,000 pounds per square inch) at 24 hours
- 28 MPa (4,000 pounds per square inch) at 28 days

Combine dry materials in the mixer, then agitate to mix. Add water slowly and mix for 3 minutes or less, or according to the manufacturer's instructions.

Mix as closely as possible to the site of the work and use each batch within 20 minutes. Do not retemper. Mold daily test cylinders according to PTM No. 521. Test cylinders according to PTM No. 604.

(d) Fabricated Structural Steel. Section 1105. At least 2 weeks before the start of fabrication, furnish to the Inspector-in-Charge a complete list of the names and addresses of firms that are to fabricate or supply incidental, fabricated structural steel items to be used in conjunction with, or as a part of, the prestressed concrete members.

(e) Modified Mortar for Beam Seat Leveling. Use mortar from a manufacturer listed in the Miscellaneous Section – Polymer Modified and Special Cements, Mortars, and Concrete in Bulletin 15 conforming to the following specifications:

- Polymer modified
- Non-shrink
- Non-sag consistency
- Application thickness range 3 mm to 12 mm (1/8 inch to 1/2 inch)

- Properties

Initial set time (AASHTO T 131)	1/2 hour minimum
Compressive strength (AASHTO T 106)	17 MPa (2,500 pounds per square inch)—24 hours 24 MPa (3,500 pounds per square inch)—7 days 35 MPa (5,000 pounds per square inch)—28 days
Slant shear bond test (ASTM C 882, Modified)	-14 MPa (2,000 pounds per square inch)—7 days
Freeze-thaw resistance (PTM No. 633)	8%—maximum loss by mass (weight)

Certify as specified in Section 106.03(b)3.

(f) Post-Tensioning Strand. Section 1108.02(g)

1080.3 CONSTRUCTION—

(a) General. The superstructure consists of all indicated portions of the bridge above the bridge seat and includes bearings, bearings and anchors set in the substructure, abutment backwalls, cheekwalls, shear blocks, bridge drainage down to, but not including, the drain box, and portions of wings and appurtenances above the horizontal construction joint nearest the bridge seat.

(b) Superstructure. Construct the superstructure as indicated, as shown on the Standard Drawings, and as follows:

- Fabricated Structural Steel—Section 1105
- Cement Concrete Structures—Section 1001.3
- Preformed Neoprene Compression Joint Seal for Bridges—Section 1008.3
- Pedestrian Railing—Section 1012.3
- Aluminum Bridge Hand Railing—Section 1023.3
- Steel Bridge Hand Railing—Section 1022.3
- Protective Barrier—Section 1015.3
- Protective Fence—Section 1016.3
- Tooth Expansion Dam with Drain Trough—Section 1020.3
- Reinforcement Bars—Section 1002.3
- Neoprene Strip Seal Dam—Section 1026.3

- Armored Preformed Neoprene Compression Dam—Section 1021.3
- High Load Multi-Rotational Bearings—Section 1050.3(c)4.h

(c) Erection.

1. General. Erect prestressed concrete beams, as shown on submitted and accepted shop drawings. At the bridge site, beams will be inspected for possible damage, cracking, and twisting during shipment, and for camber, tolerances, and dimensions. Replace beams damaged by improper storing, handling, transporting, erecting, or any other reason.

2. Bearings. When elastomeric bearings are used under beams, determine if there is full contact between the bearing pad and bearing surfaces just after the beams are set in place. Temporarily remove or relocate waterproofing and other material as required to expose all sides of the pad. If a gap between the pad and bearing surfaces is present, proceed as follows unless the contract plans indicate that a lift-off condition is expected when the beam is initially set on the pad:

- **Gap Thickness > 10 mm (3/8 inch).** If a gap along any edge of the pad exceeds 10 mm (3/8 inch), grind the bearing surface of the substructure to eliminate the gap, except gaps along the front edge of the pad (edge toward the midspan of the beam) will be allowed as specified in Steps 1 and 2 below. Provide a rough textured bearing surface after grinding. Verify that the minimum required vertical clearance to the bottom of beams, as indicated, is maintained after grinding.

- **Gap Thickness ≤ 10 mm (3/8 inch).** If gaps along any edge of the pad are less than or equal to 10 mm (3/8 inch), proceed as follows:

  Gap Along Rear Edge of Pad Only. If a gap occurs anywhere along the rear edge of the pad (edge toward the end of the beam), eliminate the gap by placing a leveling bed of polymer-modified mortar beneath the pad as specified in Section 1080.3(c)2.a.

  Gap Along Side Edges of Pad. If a gap occurs along the side edges of the pad, and there is full contact at the front and rear edges, eliminate the gap by placing a leveling bed of polymer-modified mortar beneath the pad as specified in Section 1080.3(c)2.a.

  Gap Along Front Edge of Pad. If a gap occurs along the front edge (edge toward the midspan of the beam of the bearing pad), proceed as follows:

  Step 1: Determine the area of non-contact between the pad and beam. If the amount of non-contact is less than 20% of the pad area, proceed to Step 2; otherwise eliminate gap by placing a leveling bed of polymer-modified mortar beneath the pad as specified in Section 1080.3(c)2.a.

  Step 2: Measure the maximum gap thickness along the front edge and proceed as follows:

Spans < 30 000 mm (100 feet)	
Gap Thickness ≤ 2.5 mm (3/32 inch):	Leave gap in place.
2.5 mm (3/32 inch) < Gap Thickness ≤ 10 mm (3/8 inch):	Eliminate the gap by placing a leveling bed of polymer-modified mortar beneath the pad as specified in Section 1080.3(c)2.a.
Spans ≥ 30 000 mm (100 feet)	
Gap Thickness ≤ 3 mm (1/8 inch):	Leave gap in place.
3 mm (1/8 inch) < Gap Thickness ≤ 10 mm (3/8 inch):	Eliminate the gap by placing a leveling bed of polymer-modified mortar beneath the pad as specified in Section 1080.3(c)2.a.

2.a Leveling Bed of Polymer-Modified Mortar, Placement Procedure.

1. Immediately before lifting beam, prepare mortar according to the manufacturer's recommendations. Do not extend mortar by adding coarse aggregate.
2. Lift beam as necessary.
3. Remove pad.
4. Apply a bed of mortar to the beam seat, covering an area approximately 50 mm (2 inches) beyond the perimeter of the bearing pad. Apply the mortar in a thickness approximately 3 mm (1/8 inch) greater than the maximum actual gap thickness.
5. Place the pad on the mortar.
6. Reset the beam on the pad while the mortar remains plastic.
7. Cure the mortar, as applicable, according to the manufacturer's recommendation.

Place mortar according to temperature restrictions recommended by the manufacturer.
Do not place a leveling bed of mortar before the initial setting of beams.

(d) Shear Key Joints Between Adjacent Box Beams.

1. General. Check shear keys for widths. Maximum allowable gap between beams will be the tolerance for horizontal alignment plus 15 mm (1/2 inch), as specified in Section 1107.03(e)1.b.

2. Preparation of the Joints. Before shipping, sandblast the entire shear key area providing a rough texture, and completely remove all oil, grease, dirt, or material that would prevent bonding. Just before erection, clean the blasted surface with compressed air, clean stiff-bristle fiber brushes, or vacuum. Caulk joints below the keys with suitable backer rod and soak joints with water 1 hour before grouting.

3. Filling Joints. Fill the longitudinal joints between adjacent beams with nonshrink grout. Place grout quickly and continuously into the joints. Spade, but do not vibrate. Overfill the joints, let stand for 1/2 hour, then strike off, flush with the top of the beams. Follow the manufacturer's recommendations for filling in hot or cold weather.

Do not allow construction activity or other loadings on the bridge for at least 24 hours after the grout has been placed. For vehicular loading, Section 1080.3(d)5 applies.

4. Curing. Start curing immediately after the grout has been placed. Use a double thickness of water-saturated burlap. Keep the burlap wet during the curing period for at least 24 hours. During cold weather, prevent freezing of the grout. Provide curing temperatures of 10 °C (50F) or above.

5. Opening to Traffic. For non-composite adjacent box beam construction: after grouting shear keys, do not allow any traffic on a span until 5 days have elapsed and grout compressive strength is 22 MPa (3,200 pounds per square inch) minimum.

(e) Protective Coating for Prestressed Concrete Beams. Where indicated, apply an epoxy-resin protective coating, as specified in Section 1019.3(b), to the beam tops and to grouted shear keys before the construction of a bituminous surface course. Apply coating as specified in Section 1019.3(b). Cure the coating according to the manufacturer's recommendations.

(f) Waterproofing at Abutments. As indicated, place closed cell neoprene sponge on top of abutments, then erect the beams.

Use a wire brush and clean vertical end notches in beams of adjacent box beam bridges, then seal by caulking with a suitable backer rod. Wet the backer rod 1 hour before grouting. Fill the notches with nonshrinking grout. Cure with wet burlap for at least 24 hours.

(g) Resetting Expansion Bearings. Where indicated, reset expansion bearings as specified in Section 1050.3(c)4.c.2.

(h) Post-Tensioning Adjacent Box Beams. Post-tension adjacent box beams as indicated and as specified in Section 1108.03.

1080.4 MEASUREMENT AND PAYMENT—Lump Sum. The price includes the following component items.

- **Prestressed Concrete Bridge Beams.** Meter (Linear Foot)
- **Preformed Neoprene Compression Joint Seal for Bridges.** Section 1008.4
- **Pedestrian Railing.** Section 1012.4
- **Aluminum Bridge Hand Railing.** Section 1023.4
- **Steel Bridge Hand Railing.** Section 1022.4
- **Protective Barrier.** Section 1015.4
- **Protective Fence.** Section 1016.4
- **Protective Coating for Reinforced Concrete Surfaces.** Section 1019.4
- **Tooth Expansion Dam with Drain Trough.** Section 1020.4
- **Armored Preformed Neoprene Compression Dam.** Section 1021.4
- **Reinforcement Bars.** Section 1002.4

- **Neoprene Strip Seal Dam.** Section 1026.4
- **Cement Concrete Structures.** Section 1001.4
- **Fabricated Structural Steel.** Section 1050.4
- **High Load Multi-Rotational Bearings.** Section 1050.4
- **Reset Expansion Bearings, Prestressed Concrete Superstructure.** Each

SECTION 1018—REMOVAL OF EXISTING BRIDGES OR CULVERTS

1018.1 DESCRIPTION—This work is the removal and disposal of existing bridges, culverts, or superstructures.

1018.2 MATERIAL—

- Topsoil—Section 802.2
- Seeding and Soils Supplements—Section 804.2
- Mulching—Section 805.2

1018.3 CONSTRUCTION—

(a) General. Submit a plan to the District Executive showing or describing the demolition and removal methods to be used for the removal of an existing bridge or culvert, as indicated. Do not proceed with this demolition work until the plan has been reviewed and accepted. Within the plan, provide methods for the protection and safety of the general public and public utilities.

If the structure to be removed is over or under a railroad, submit the accepted demolition plan to the railroad company's Area Engineer. Do not proceed with the demolition work until written acceptance is received from the railroad company. Provide a copy of this written acceptance to the Department. Notify the railroad company 10 days before starting demolition work. Failure to obtain the railroad company's acceptance will require an alternate plan submittal to the Department and the railroad company for review and acceptance.

After removing the existing structure, backfill the area where the existing bridge or culvert was removed, as specified in Section 202.3(f). Grade into the existing topography. If directed, place topsoil. Seed and provide soil supplements, as specified in Section 804.3. Use a type and rate of seeding and soil supplements typical for project. Mulch with the type and rate of mulch typical for project, as specified in Section 805.3.

Where the removal area coincides with new construction, backfill voids below the elevation of the bottom of the proposed footings, using acceptable material, then compact, as specified in Section 202.3(f).

If indicated, leave in place portions of the existing substructure that do not interfere with new construction, landscaping, or other operations. Provide documentation (photographs, survey notes) for portions of the structure to remain in place if blasting is used as a method of removal.

(b) Structures Retained by the Department. If indicated, remove members or parts of the structure to be retained by the Department. Match-mark the members or parts, and place them within the right of way at an indicated or directed location, within 300 m (1,000 feet) of the existing structure. If indicated, load the members or parts, haul them to, and unload them at, the indicated location. If indicated, load the members or parts on railroad cars, ready for shipment.

(c) Structures Retained by the Contractor. If not otherwise indicated, the Department will not retain structures, or parts of structures. Remove and dispose of the structure, or parts of the structure, in a satisfactory manner.

1018.4 MEASUREMENT AND PAYMENT—

(a) Removal of Existing Bridge. Lump Sum

When removal area coincides with excavation area of new construction, the pay limit for removal extends 300 mm (1 foot) horizontally beyond the outer limits of the structure being removed.

The Department will pay for backfilling of voids below the indicated elevation of the bottom of proposed footings for new construction as specified in Section 1001.4(f).

(b) Removal of Existing Culvert. Lump Sum

When removal area coincides with excavation area of new construction, the pay limit for removal extends 300 mm (1 foot) horizontally beyond the outer limits of the structure being removed.

The Department will pay for backfilling of voids below the indicated elevation of the bottom of proposed footings for new construction as specified in Section 1001.4(f).

(c) Removal of Existing Bridge Superstructure. Lump Sum