Bridge Construction Inspection Training

ANSWER KEY

Handouts and

Exercises 2025

Contents

Session 1
Special Provisions

HIGHWAY WORK PROPOSAL

Wisconsin Department of Transportation
DT1502 01/2020 s.66.0901(7) Wis. Stats

Proposal Number: 028

COUNTY	STATE PROJECT	FEDERAL	PROJECT DESCRIPTION	HIGHWAY
Fond Du Lac	1110-15-71	N/A	Rosendale-Oshkosh; Sth 23 - Cth Ff	STH 026

This proposal, submitted by the undersigned bidder to the Wisconsin Department of Transportation, is in accordance with the advertised request for proposals. The bidder is to furnish and deliver all materials, and to perform all work for the improvement of the designated project in the time specified, in accordance with the appended Proposal Requirements and Conditions.

Proposal Guaranty Required: $75,000.00 Payable to: Wisconsin Department of Transportation	Attach Proposal Guaranty on back of this PAGE.
Bid Submittal Date: February 14, 2023 Time (Local Time): 11:00 am	Firm Name, Address, City, State, Zip Code **SAMPLE** **NOT FOR BIDDING PURPOSES**
Contract Completion Time 50 Working Days	
Assigned Disadvantaged Business Enterprise Goal 0%	This contract is exempt from federal oversight.

This certifies that the undersigned bidder, duly sworn, is an authorized representative of the firm named above; that the bidder has examined and carefully prepared the bid from the plans, Highway Work Proposal, and all addenda, and has checked the same in detail before submitting this proposal or bid; and that the bidder or agents, officer, or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal bid.

Do not sign, notarize, or submit this Highway Work Proposal when submitting an electronic bid on the Internet.

Subscribed and sworn to before me this date _____

(Signature, Notary Public, State of Wisconsin)	(Bidder Signature)
(Print or Type Name, Notary Public, State Wisconsin)	(Print or Type Bidder Name)
(Date Commission Expires)	(Bidder Title)

Notary Seal

Type of Work: **For Department Use Only**

Grading, Base, Milling, Concrete Pavement, Asphalt Pavement, Curb and Gutter, Guardrail, Bridge Replacement, Culvert Pipe, Signs, Pavement Markings.

Notice of Award Dated	Date Guaranty Returned

Special Provisions

Table of Contents

SPECIAL PROVISIONS

1. General.

Perform the work under this construction contract for Project 1110-15-71, Rosendale – Oshkosh. STH 23 – CTH FF, STH 26, Fond du Lac County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2023 Edition, as published by the department, and these special provisions.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.

100-005 (20220628)

2. Scope of Work.

The work under this contract shall consist of grading, base aggregate, HMA pavement, guardrail, pavement marking, signing, culvert Structure C-20-0188, and bridge Structure B-20-239, and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

104-005 (20090901)

3. Prosecution and Progress.

Begin work within 10 calendar days after the engineer issues a written notice to do so.

Provide the time frame for construction of the project within the 2023 construction season to the engineer in writing within a month after executing the contract but at least 14 calendar days before the preconstruction conference. Assure that the time frame is consistent with the contract completion time. Upon approval, the engineer will issue the Notice to Proceed within 10 calendar days before the beginning of the approved time frame.

To revise the time frame, submit a written request to the engineer at least two weeks before the beginning of the intended time frame. The engineer will approve or deny that request based on the conditions cited in the request and its effect on the department's scheduled resources.

The Notice to Proceed will be issued such that the work shall start no earlier than August 1st, 2023, unless otherwise approved by the engineer.

Prior to beginning operations under this contract submit in writing a proposed schedule of operations and method of coordination and handling traffic to the engineer for approval.

Be advised that there may be multiple mobilizations and/or remobilizations to complete construction operations, for example such items as: HMA pavement, guardrail, traffic control, signing, pavement marking, finishing items and other incidental items related to the staging. No additional payment will be made, by the department, for additional mobilizations.

Conform the schedule of operations to the construction staging as shown in the traffic control plans and as described herein unless modifications to the schedule are approved in writing by the engineer.

Contractor Coordination and Advance Notification

The prime contractor shall have a superintendent or designated representative on the job site during all controlling work operations, including periods limited to only subcontractor work operations, to serve as a primary contact person and to coordinate all work operations.

Hold progress meetings once a week. The contractor's superintendent or designated representative and subcontractor's representatives for ongoing subcontract work or subcontractor work to begin within the next two weeks are to attend and provide a written schedule of the next week(s) operations. Include begin and end dates of specific prime and subcontractor work operations. Invite utilities, Fond Du Lac County Sheriff Department, Fond Du Lac County, Fond Du Lac County Highway Department, Village of Rosendale, Town of Rosendale, Village of Rosendale Police and Fire Departments, Town of Eldorado

Fire Department, and Rosendale-Brandon School District representatives to attend the progress meetings. Agenda items at the meeting will include review of the contractor's schedule and subcontractors' schedule, utility conflicts and relocation schedule, evaluation of progress and pay items, and making revisions if necessary. Plans and specifications for upcoming work will be reviewed to prevent potential problems or conflicts between contractors.

Based on the progress meeting, if a new revised schedule is requested by the engineer, submit it within seven calendar days. Failure to submit a new schedule within seven days shall result in the engineer holding pay requests until received.

Notify Fond Du Lac County Sheriff Department, Fond Du Lac County, Village of Rosendale, Town of Rosendale, Village of Rosendale Police and Fire Departments, Town of Eldorado Fire Department, and Rosendale-Brandon School District at least three days in advance of all traffic switches and closures of existing streets.

Fish Spawning

There shall be no instream disturbance of West Branch of the Fond Du Lac River at Station 657+75 as a result of construction activity under or for this contract, from March 1 to June 15 both dates inclusive, in order to avoid adverse impacts upon the spawning and migration of fish and other aquatic organisms.

Any change to this limitation will require submitting a written request by the contractor to the engineer, subsequent review and concurrence by the Department of Natural Resources in the request, and final approval by the engineer. The approval will include all conditions to the request as mutually agreed upon by WisDOT and DNR.

Migratory Birds

Swallow or other migratory bird nests have been observed on or under the existing structure(s). All active nests (when eggs or young are present) of migratory birds are protected under the federal Migratory Bird Treaty Act. The nesting season for swallows and other birds is from May 1 to August 31.

See below for information on affected structure(s). As a last resort, apply for a depredation permit from the US Fish and Wildlife Service for work that may disturb or destroy active nests. The need for a permit may be avoided by removing the existing bridge structure prior to nest occupation by birds or clearing nests from all structures before the nests become active in early spring.

Either prevent active nests from becoming established or prevent birds from nesting by installing and/or maintaining one suitable deterrent device on the following structure(s) prior to nesting activity under the bid item Installing and Maintaining Bird Deterrent System:

- 657+75

Working days will not be assessed for placement of deterrent systems.

Northern Long-eared Bat *(Myotis septentrionalis)*

Northern long-eared bats (NLEB) have the potential to inhabit the project limits because they roost in trees, bridges and culverts. Roosts may not have been observed on this project, but conditions to support the species exist. The species and all active roosts are protected by the Federal Endangered Species Act. If an individual bat or active roost is encountered during construction operations, stop work and notify the engineer and the WisDOT Regional Environmental Coordinator (REC).

Ensure all operators, employees, and subcontractors working in areas of known or presumed bat habitat are aware of environmental commitments and avoidance and minimization measures (AMMs) to protect both bats and their habitat.

Direct temporary lighting, if used, away from wooded areas during the bat active season: April 1 to October 31, both dates inclusive. To avoid adverse impacts upon the NLEBs, no tree clearing is allowed between April 1 and October 31, both dates inclusive.

If the required tree clearing is not completed by March 31, the department will suspend all tree clearing and associated work directly impacted by clearing. The department will issue a notice to proceed with clearing and associated work directly impacted by clearing after consulting with the United States Fish and Wildlife Service (USFWS).

Tree clearing is limited to that which is specified in the plans. If additional trees with a 3-inch or greater diameter at breast height (dbh) need to be removed, no tree clearing shall occur without prior approval from the engineer, following coordination with the WisDOT REC. Additional tree removal beyond the area originally specified will require consultation with the USFWS and may require a bat presence/absence or visual emergency survey. Notify the engineer if additional clearing cannot be avoided to begin coordination with the WisDOT REC. The WisDOT REC will initiate consultation with the USFWS and determine if a survey is necessary. Submit a schedule and description of clearing operations with the ECIP 14 days prior to any clearing operations. The department will determine, based on schedule and scope of work, what additional erosion control measures shall be implemented prior to the start of clearing operations, and list those additional measures in the ECIP.

Working days will not be assessed for clearing operations required prior to April 1.

4. Traffic.

A General

STH 26 will be closed and detoured for the replacement of the bridge and culvert structures.

Do not deliver or store materials and equipment within open travel lanes or open side roads during any stage of construction.

Conduct operations in a manner that will cause the least interference to traffic and pedestrian movements. Maintain vehicle and pedestrian access at all times to buildings within the limits of construction. Access to residential parcels may be restricted for up to one calendar day in order to construct driveways in front of residential access points. Notify property owners at least two working days prior to closing their access point. Maintaining property access is incidental to the Traffic Control bid item.

Wisconsin Lane Closure System Advance Notification

Provide the following advance notification to the engineer for incorporation into the Wisconsin Lane Closure System (LCS).

TABLE 108-1 CLOSURE TYPE AND REQUIRED MINIMUM ADVANCE NOTIFICATION

Closure type with height, weight, or width restrictions (available width, all lanes in one direction < 16 feet)	**MINIMUM NOTIFICATION**
Lane and shoulder closures	7 calendar days
Full roadway closures	7 calendar days
Ramp closures	7 calendar days
Detours	7 calendar days
Closure type without height, weight, or width restrictions (available width, all lanes in one direction ≥ 16 feet)	**MINIMUM NOTIFICATION**
Lane and shoulder closures	3 business days
Ramp closures	3 business days
Modifying all closure types	3 business days

Discuss LCS completion dates and provide changes in the schedule to the engineer at weekly project meetings in order to manage closures nearing their completion date.

Portable Changeable Message Signs – Message Prior Approval

Coordinate the locations of portable changeable message signs with the engineer.

After coordinating with department construction field staff, notify Northeast Region Traffic Section at (920) 366-8033 (secondary contact number is (920) 360-3107) three business days before deploying or changing a message on a PCMS to obtain approval of the proposed message. The Northeast Region Traffic Unit will review the proposed message and either approve the message or make necessary changes.

B Notification of Emergency and Local Officials

Notify the following emergency and local officials forty-eight (48) hours in advance of the start of work and prior to traffic control changes. Notifications must be given by 4:00 PM on Thursday for any such work to be done on the following Monday.

- Wisconsin State Patrol
- Fond Du Lac County Sheriff's Department
- Fond Du Lac County Highway Department
- Village of Rosendale
- Town of Rosendale
- Village of Rosendale Fire Department
- Town of Eldorado Fire Department

Notify the Rosendale-Brandon School District two weeks prior to the start of construction and one week prior to traffic switches and lane closures. following emergency and local officials 48 hours in advance of the start of work and prior to traffic control changes.

5. Holiday and Special Event Work Restrictions.

Do not haul materials of any kind along or across any portion of the highway carrying STH 26 traffic, and entirely clear the traveled way and shoulders of such portions of the highway of equipment, barricades, signs, lights, and any other material that might impede the free flow of traffic during the following holiday and special event periods:

- From noon Friday, September 1, 2023, to 6:00 AM Tuesday, September 5, 2023 for Labor Day.

stp-107-005 (20210113)

6. Utilities.

This contract comes under the provisions of Wisconsin Administrative Code Ch. Trans 220.

stp-107-065 (20080501)

There are underground and overhead utility facilities located within the project limits. There are known utility adjustments required for the construction project as noted below. Coordinate construction activities with a call to Diggers Hotline or a direct call to the utilities that have facilities in the area as required per statutes. Use caution to ensure the integrity of underground facilities and maintain code clearance from overhead facilities at all times.

Additional detailed information regarding the location of utility facilities is available at the region WisDOT office during normal working hours.

Alliant Energy – Electric has overhead facilities within the project limits at the following locations:

- STH 26 along the west side from Station 653+70 to Station 661+18.

Alliant Energy – Elec will remove the overhead conductor and poles and install underground cable from approximately Station 655+00 to approximately Station 661+00, including anchoring going a minimum of 11' N from Pole 26/48 at approximately Station 655+00 and anchoring going a minimum 10' S from Pole 25/2 at approximately Station 661+00. The underground primary cable will be installed 3 feet east of the west right-of-way limits with a minimum depth of 3 feet. This utility remove and install is to performed to avoid conflict with the grading limits and bridge structure B-20-239 construction. This work is work will be completed prior to construction.

Brightspeed – Communication has underground facilities within the project limits at the following locations:

- STH 26 along the west side from Station 653+70 to Station 661+18.

Brightspeed does not anticipate any conflicts with their facilities during construction.

7. Information to Bidders, U.S. Army Corps of Engineers Section 404 Permit.

The department has obtained a U.S. Army Corps of Engineers Section 404 permit. Comply with the requirements of the permit in addition to requirements of the special provisions. A copy of the permit is available from the regional office by contacting Mae Sommerfeld at (920) 492-5705.

stp-107-054 (20210113)

8. Information to Bidders, WPDES General Construction Storm Water Discharge Permit.

The department has obtained coverage through the Wisconsin Department of Natural Resources to discharge storm water associated with land disturbing construction activities of this contract under the Wisconsin Pollutant Discharge Elimination System General Construction Storm Water Discharge Permit (WPDES Permit No. WI-S066796-1). A certificate of permit coverage is available from the regional office by contacting Mae Sommerfeld at (920) 492-5705. Post the permit in a conspicuous place at the construction site.

stp-107-056 (20180628)

9. Environmental Protection, Aquatic Exotic Species Control.

Exotic invasive organisms such as VHS, zebra mussels, purple loosestrife, and Eurasian water milfoil are becoming more prolific in Wisconsin and pose adverse effects to waters of the state. Wisconsin State Statutes 30.07, "Transportation of Aquatic Plants and Animals; Placement of Objects in Navigable Waters", details the state law that requires the removal of aquatic plants and zebra mussels each time equipment is put into state waters.

At construction sites that involve navigable water or wetlands, use the follow cleaning procedures to minimize the chance of exotic invasive species infestation. Use these procedures for all equipment that comes in contact with waters of the state and/or infested water or potentially infested water in other states.

Ensure that all equipment that has been in contact with waters of the state, or with infested or potentially infested waters, has been decontaminated for aquatic plant materials and zebra mussels before being used in other waters of the state. Before using equipment on this project, thoroughly disinfect all equipment that has come into contact with potentially infested waters. Guidelines from the Wisconsin Department of Natural Resources for disinfection are available at:

http://dnr.wi.gov/topic/invasives/disinfection.html

Use the following inspection and removal procedures:

1. Before leaving the contaminated site, wash machinery and ensure that the machinery is free of all soil and other substances that could possibly contain exotic invasive species;
2. Drain all water from boats, trailers, bilges, live wells, coolers, bait buckets, engine compartments, and any other area where water may be trapped;
3. Inspect boat hulls, propellers, trailers and other surfaces. Scrape off any attached mussels, remove any aquatic plant materials (fragments, stems, leaves, seeds, or roots), and dispose of removed mussels and plant materials in a garbage can before leaving the area or invested waters; and
4. Disinfect your boat, equipment and gear by either:
    - 4.1. Washing with ~212 F water (steam clean), or
    - 4.2. Drying thoroughly for five days after cleaning with soap and water and/or high pressure water, or
    - 4.3. Disinfecting with either 200 ppm (0.5 oz per gallon or 1 Tablespoon per gallon) Chlorine for 10-minute contact time or 1:100 solution (38 grams per gallon) of Virkon Aquatic for 20- to 30-minute contact time. Note: Virkon is not registered to kill zebra mussel veligers nor invertebrates like spiny water flea. Therefore, this disinfect should be used in conjunction with a hot water (>104º F) application.

Complete the inspection and removal procedure before equipment is brought to the project site and before the equipment leaves the project site.

stp-107-055 (20130615)

10. Notice to Contractor, Removing Structure Over Waterway Minimal Debris (B-20-651) and Environmentally Sensitive Area.

An environmentally sensitive area has been identified along the east and west sides of STH 26 at the existing bridge structure crossing over the West Branch of the Fond Du Lac River from Station 655+50 to Station 659+00.

The contractor should be cautious of these limits at shown in the Plans and shall strictly follow the standard specification (203.3.2.2.3) for the Removing Structure Over Waterway Minimal Debris item (203.0260) to ensure that caution is taken to minimize any items that may drop into the waterway or wetland.

Do nut run or store equipment, stockpile materials, setup materials processing sites, excavate or in any way disturb areas outside of the grading limits adjacent to this location.

11. Erosion Control and Storm Water Management.

Adequately protect and restore all disturbed bank areas as soon as possible.

If dewatering is required for any reason, the water shall be pumped into a properly selected and sized dewatering basin before the clean/filtered water is allowed to enter the waterway or wetland. The basin shall remove suspended solids and contaminants to the maximum extent practicable. A properly designed and constructed dewatering basin shall take into consideration maximum pumping volume (gpm or cfs) and the sedimentation rate for soils to be encountered. Do not house any dewatering technique in a wetland.

Restrict the removal of vegetative cover and exposure of bare ground to the minimum amounts necessary to compete construction. Restoration of disturbed soils shall take place as soon as conditions permit. If sufficient vegetative cover will not be achieved because of late season construction, the site shall be properly winterized.

All temporary stockpiles shall be in an upland location and protected with erosion control measures. Do not stockpile materials in wetlands, waterways, or floodplains.

12. Erosion Control Structures.

Within three calendar days after completing the excavation for a substructure unit, place riprap or other permanent erosion control items required by the contract or deemed necessary by the engineer around the unit at a minimum to a height equivalent to the calculated water elevation resulting from a storm that occurs on the average of once every two years (Q2) as shown on the plan, or as the engineer directs.

In the event that construction activity does not disturb the existing ground below the Q2 elevation, the above timing requirements for permanent erosion control shall be waived.

stp-107-070 (20191121)

13. Coordination with Businesses and Residents.

The contractor shall arrange and conduct a meeting between the contractor, the department, affected residents, local officials and business people to discuss the project schedule of operations including vehicular and pedestrian access during construction operations. Hold the first meeting at least one week before the start of work under this contract and no further meetings will be required unless directed by the engineer. The contractor shall arrange for a suitable location for meetings that provides reasonable accommodation for public involvement. The department will prepare and coordinate publication of the meeting notices and mailings for meetings. The contractor shall schedule meetings with at least two weeks' prior notice to the engineer to allow for these notifications.

stp-108-060 (20141107)

14. Abatement of Asbestos Containing Material B-20-651, Item 203.0211.S.

A Description

This special provision describes abating asbestos containing material on structures.

B (Vacant)

C Construction

Paul M. Garvey, License Number All-117079, inspected Structure B-20-651 for asbestos on October 25, 2019, Regulated Asbestos Containing Material (RACM) was found on this structure in the following locations and quantities: ACM was detected in the grey caulk used for crack repair at the wingwall/abutment. This ACM is about 30 feet in length and is comprised of 2% Chrysotile Asbestos.

The RACM on this structure must be abated by a licensed abatement contractor. A copy of the inspection report is included in the bid package or available from Mae Sommerfeld at (920) 492-5705, mae.sommerfeld@dot.wi.gov. According to NR447 and DHS159, ensure that DNR or DHS receives a completed Notification of Demolition and/or Renovation (DNR Form 4500-113 (R 3/20), or subsequent revision) via U.S. mail, hand-delivery, or using the online notification system at least 10 working days before beginning any construction or demolition. Pay all associated fees. Provide a copy of the completed 4500-113 form and the abatement report to Mae Sommerfeld at (920) 492-5705, mae.sommerfeld@dot.wi.gov and via email to dothazmatunit@dot.wi.gov or via US mail to DOT BTS-ESS attn: Hazardous Materials Specialist, 5 South S.513.12, PO Box 7965, Madison, WI 53707-7965. In addition, comply with all local or municipal asbestos requirements.

Use the following information to complete WisDNR form 4500-113:

- Site Name: Structure B-20-651, STH 26 over West Branch of Fond Du Lac River
- Site Address: 43˚50’11” N, 88˚40’29” W, T-16-N, R-16-E, Town of Rosendale, WI
- Ownership Information: WisDOT Transportation NE Region, 944 Van Der Perren Way, Green Bay, WI 54304
- Contact: Brad Gregorius
- Phone: (920) 213-6815
- Age: 91 years. This structure was constructed in 1931.
- Area: 1680 SF of deck

Insert the following paragraph in Section 6.g.:

- If asbestos not previously identified is found or previously non-friable asbestos becomes crumbled, pulverized, or reduced to a powder, stop work immediately, notify the engineer, and the engineer will notify the department’s Bureau of Technical Services at (608) 266-1476 for an emergency response as specified in standard spec 107.24. Keep material wet until it is abated or until it is determined to be non-asbestos containing material.

D Measurement

The department will measure Abatement of Asbestos Containing Material (Structure #) by each structure, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
203.0211.S	Abatement of Asbestos Containing Material B-20-651	EACH

Payment is full compensation for submitting necessary forms; removing all asbestos; and for properly disposing of all waste materials.

stp-203-005 (20220628)

15. Base Aggregate Dense 1 1/4-Inch for Lower Base Layers.

Replace standard spec 305.2.2.1(2) with the following:

(2) Unless the plans or special provisions specify otherwise, do the following:

1. Use 1 1/4-inch base throughout the full base depth.
2. Use 3/4-inch base in the top 3 inches of the unpaved portion of shoulders. Use 3/4-inch base or 1 1/4-inch base elsewhere in shoulders.

stp-305-020 (20080902)

16. Bar Steel Reinforcement HS Stainless Structures, Item 505.0800.S.

A Description

This special provision describes furnishing and placing stainless steel reinforcing bars and associated stainless steel bar couplers.

Conform to standard spec 505 as modified in this special provision.

B Materials

B.1 General

Furnish stainless steel reinforcing bars conforming to ASTM A955 and to one of the following Unified Numbering System (UNS) designations: S31653, S31803, S32205, or S32304. Supply grade 60 bars, all of the same UNS designation. Conform to the chemical composition specified for the given UNS designation in ASTM A276 table 1.

Supply bars that are free of dirt, mill scale, oil, and debris by pickling to a bright or uniform light finish. The department may reject bars displaying rust/oxidation, questionable blemishes, or lack of a bright or uniform pickled surface.

Furnish chairs or continuous supports made of stainless steel or recycled plastic to support high-strength stainless bar steel reinforcement subject to the plastic chair restriction stated in standard spec 505.3.4(1).

Furnish couplers made from one of the UNS alloys allowed for bar steel.

Furnish tie wire made from one of the UNS alloys allowed for bar steel or from an engineer-approved plastic or nonmetallic material. Ensure that stainless steel tie wire is dead soft annealed.

B.2 Fabrication

Before fabrication, supply test results from an independent testing agency certifying that the reinforcement meets the requirements of Annex A1 of ASTM A955.

Bend bars conforming to standard spec 505.3.2 and according to ASTM A955. Bend and cut bars using equipment thoroughly cleaned or otherwise modified to prevent contamination from carbon steel or other contaminants. Use tools dedicated solely to working with stainless steel.

B.3 Control of Material

Identify reinforcement bars delivered to the project site with tags bearing the identification symbols used in the plans. Include the UNS designation, heat treat condition, heat number, grade corresponding to minimum yield strength level, and sufficient documentation to track each bar bundle to a mill test report.

Provide samples for department testing and acceptance according to CMM 8-50 Exhibit 1 requirements for concrete masonry reinforcement for uncoated bar steel.

Provide mill test reports for the project that do the following:

1. Verify that sampling and testing procedures and test results conform to ASTM A955, ASTM A276 table 1, and these contract requirements.
2. Include a chemical analysis with the UNS designation, heat lot identification, and the source of the metal.
3. Include tensile strength, yield strength, and elongation tests results conforming to ASTM A955 for each size furnished.
4. Certify that the bars have been pickled to a bright or uniform light finish.

C Construction

C.1 General

Ship, handle, store, and place the stainless steel reinforcing as follows:

1. Separate from regular reinforcement during shipping. Pad points of contact with steel chains or banding, or secure with non-metallic straps.
2. Store on wooden cribbing separated from regular reinforcement. Cover with tarpaulins if stored outside.
3. Handle with non-metallic slings.
4. Do not flame cut or weld. Protect from contamination when cutting, grinding, or welding other steel products above or near the stainless steel during construction.
5. Place on plastic or stainless steel bar chairs. If placing stainless steel chairs on steel beams, use chairs with plastic-coated feet.
6. Tie with stainless steel wire or an engineer-approved plastic or nonmetallic material.

Do not tie stainless steel reinforcing bars to, or allow contact with, uncoated reinforcing bars or galvanized steel. Maintain at least 1 inch clearance between stainless steel bars or dowels and uncoated or galvanized steel. Where 1 inch clearance is not possible, sleeve bars with a continuous polyethylene or nylon tube at least 1/8 inch thick extending at least 1 inch in each direction and bind with nylon or polypropylene cable ties. Sleeves are not required between stainless steel bars and shear studs. Stainless steel bars can be in direct contact with undamaged epoxy-coated bars.

Cut flush with the top flange or remove uncoated fasteners, anchors, lifting loops, or other protrusions into a bridge deck before casting the deck on prestressed concrete beams.

C.2 Splices

Splice as the plans show. Provide stainless steel couplers conforming to the minimum capacity, certification, proof testing, and written approval requirements of standard spec 550.3.3.4. The contractor may substitute stainless steel couplers for lap slices the plans show if the engineer approves in writing.

If increasing or altering the number or type of bar splices the plans show, provide revised plan sheets to the engineer showing the reinforcement layout, type, length, and location of revised bar splices and revised bar lengths. Obtain engineer approval for the location of new lap splices or substitution of mechanical bar couplers before fabrication. Ensure that new lap splices are at least as long as those the plans show.

D Measurement

The department will measure Bar Steel Reinforcement HS Stainless Structures by the pound, acceptably completed, computed from the nominal weights of corresponding sizes for carbon steel deformed bars in AASHTO M31 regardless of stainless steel alloy provided. The department will not measure extra material used if the contractor alters the reinforcement layout as allowed under C.2, extra material for splices or couplers the plans do not show, or the weight of devices used to support or fasten the steel in position.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
505.0800.S	Bar Steel Reinforcement HS Stainless Structures	LB

Payment for Bar Steel Reinforcement HS Stainless Structures is full compensation for furnishing and placing stainless steel reinforcing bars, including supports. Where the plans specify bar couplers, the department will pay for the length of bars as detailed with no deduction or increase for installation of the coupler.

stp-505-005 (20190618)

17. Fence Safety, Item 616.0700.S.

A Description

This special provision describes providing plastic fence at locations the plans show.

B Materials

Furnish notched conventional metal "T" or "U" shaped fence posts.

Furnish fence fabric meeting the following requirements:

Color:	International orange (UV stabilized)
Roll Height:	4 feet
Mesh Opening:	1 inch min to 3 inch max
Resin/Construction:	High density polyethylene mesh
Tensile Yield:	Avg. 2000 lb per 4 ft. width (ASTM D638)
Ultimate Tensile Strength:	Avg. 3000 lb per 4 ft. width (ASTM D638)
Elongation at Break (%):	Greater than 100% (ASTM D638)
Chemical Resistance:	Inert to most chemicals and acids

C Construction

Drive posts into the ground 12 to 18 inches. Space posts at 7 feet.

Use a minimum of three wire ties to secure the fence at each post. Weave tension wire through the top row of strands to provide a top stringer that prevents sagging.

Overlap two rolls at a post and secure with wire ties.

D Measurement

The department will measure Fence Safety by the linear foot along the base of the fence, center-to-center of posts, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
616.0700.S	Fence Safety	LF

Payment is full compensation for furnishing and installing fence and posts; maintaining the fence and posts in satisfactory condition; and for removing and disposing of fence and posts at project completion.

stp-616-030 (20160607)

18. Installing and Maintaining Bird Deterrent System Station 657+75, Item 999.2000.S.01.

A Description

This special provision describes inspecting, installing and/or maintaining approved deterrents that prevent migratory bird nesting on bridges and culverts. Swallows or other migratory birds' nests have been observed on or under the existing culvert or bridge at the station identified. All active nests (when eggs or young are present) of migratory birds are protected under the federal Migratory Bird Treaty Act. One deterrent system shall be installed and/or maintained for each applicable structure. Deterrent methods selected shall be appropriate for structure type, size and/or site-specific constraints.

B Materials

B.1 Hardware and Lumber

Lumber, hardware, and fastening devices shall be durable enough to last through the length of the nesting season. Fastening devices and deterrence system must be approved by the engineer prior to installation on culverts and bridges that will remain in service after removal of deterrent systems. The method of fastening should not compromise the culvert or bridge concrete surfaces or steel protection systems. The attachment locations must be restored and repaired as needed by use of engineer approved fillers, sealers and paint systems

B.2 Netting Materials

Exclusion netting is material either wrapped around or draped and fastened to bridge decks/abutments and culvert corners to prevent bird entry.

Furnish exclusionary netting to deter nesting in bridge decks and abutments and corners of box culverts, consisting of either:

a. 1/2” x 1/2” or 3/4" x 3/4” knotless, flame resistant, U.V. stabilized polyethylene or polypropylene netting with minimum 40-pound breaking strength per strand, or engineer approved equal.

b. Galvanized wire mesh (hardware cloth) with a wire diameter of .040 inches (19-gauge) and opening width of 1/2-inch.

At a minimum, use either 1” x 2” (nominal) lumber or 3/4” x 2” pressure treated plywood strips and of equal length as the netting.

B.3 Plastic Strip Curtain

Plastic strip curtains are strips of plastic attached to vertical surfaces in areas suitable for nesting.

Furnish 3-foot wide lengths of 6 mil minimum plastic sheeting with the lower 2 feet cut into vertical strips 2 inches wide.

At a minimum, use either 1” x 2” (nominal) lumber or 3/4” x 2” pressure treated plywood strips and staples to attach plastic strips to wood to fabricate the strip curtain.

Furnish concrete screws to attach strip curtain to structure.

B.4 Corner Slope Materials

Corner slopes are pieces of curved plastic placed in corners suitable for nesting. They are particularly effective in preventing nesting in top corners of box culverts.

Furnish U.V. stabilized pre-fabricated PVC or polycarbonate corner slopes from commercial bird-deterrent manufacturers or an approved equal.

C Construction

C.1 General

If active nests are observed after construction starts, or if a trapped bird or an active nest is found, stop work that may affect birds or their nests, and notify the engineer to consult with the Wisconsin Department of Natural Resources transportation liaison, Jay Schiefelbein at (920) 360-3784, or the department regional environmental coordinator, Mae Sommerfeld at (920) 492-5705.

Efforts should be made to release trapped birds, unharmed.

C.2 Nest Removal

Remove unoccupied nests prior to the beginning of the nesting season as designated in Prosecution and Progress. Nest removal involves the removal and disposal of unoccupied or partially constructed nests without eggs or nestlings. Removing all evidence of nesting (e.g., cleaning droppings from structures) eliminates a visual cue for a potential breeding location, especially for first-time breeders. Nest removal is not a type of deterrent and does not prevent nest establishment but can delay the process. As such, it should only be used in conjunction with other methods. It cannot be used on its own to ensure compliance. Nest removal is not required if deterrents are installed before the start of the avoidance window unless nests interfere with successful installation of the deterrent.

Remove nests on the structure by scraping or pressure washing prior to established avoidance windows to deter nesting. Remove only unoccupied or partially constructed nests without eggs or nestlings. Remove newly built nests every two days before eggs are laid. Nest removal is intended to be used prior to and in conjunction with other nesting deterrents.

C.3 Exclusion Netting

C.3.1 Installation

Using concrete screws, anchor lumber to bridge or culvert along perimeter of intended netting. Fasten netting to lumber until netting is held taut. Eliminate any loose pockets or wrinkles that could trap and entangle birds. Ensure the net is pulled taut in order to prevent flapping in the wind, which results in tangles or breakage at mounting points.

For culverts, attach netting at a 45-degree angle at the culvert corner so it extends at least 12” below the corner.

C.4 Plastic Curtains

C.4.1 Installation

Attach plastic curtains along the entire length of vertical surface or corner on which nest building is to be deterred. Affix plastic curtain strips to treated lumber with staples spaced a minimum of 1 foot O.C. Wrap plastic curtains around lumber prior to attaching it to the structure to reduce the likelihood of it tearing out at the staples. Screw lumber into the underside of the bridge deck or top of box culvert with concrete screws placed 24-inches O.C. minimum.

C.5 Corner Slopes

C.5.1 Installation

Attach corner slopes to the structure per the manufacturer's recommendations. Use urethane-based adhesives if manufacturer supplied hardware or adhesives are not available or no recommendations are provided. Install end caps or seal ends of corner slopes to prevent entry of birds or other animals.

C.6 Inspection and Maintenance

Inspect bird deterrent devices every two weeks both during and prior to construction when deterrents have been installed to exclude birds prior to nesting windows, and after large storm events or high winds. Ensure that netting is taut, that no gaps or holes have formed, and that the nets are functioning properly. Ensure that corner slopes are not cracked or otherwise damaged and are functioning properly. Ensure that curtains are undamaged, with no tears, holes, or creases. Repair any damaged or loose deterrent devices. Inspect, maintain, and repair nesting deterrents whether installed by the contractor or others. Repair, replace, supplement deterrents as necessary with materials meeting the requirements of this specification.

Remove any unoccupied or partially constructed nests without eggs or nestlings.

Repair deterrents to prevent birds from attempting to nest again.

Record all inspection, removal, and maintenance activities. Provide inspection, removal and maintenance records to the engineer upon request.

C.7 Removal and Structure Repair

Maintain the deterrent until the engineer determines that the deterrent is deemed no longer necessary. Upon completion of the project, remove any remaining migratory bird deterrent from the project site. If the existing bridge or culvert is to remain after construction, restore and repair as needed by use of engineer approved fillers, sealers and paint systems.

D Measurement

The department will measure Installing and Maintaining Bird Deterrent System (Station) as a single unit at each structure, acceptably completed.

The department will measure Maintaining Bird Deterrent System (Station) as a single unit at each structure, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
999.2000.S.01	Installing and Maintaining Bird Deterrent System Station 395+00EB	EACH

Payment for Installing and Maintaining Bird Deterrent System is full compensation for providing and installing deterrents that prevent migratory bird nesting; removing and disposing of unoccupied or partially constructed nests without eggs or nestlings; maintaining, repairing, replacing, supplementing, existing deterrent materials; repairing damage to structures resulting from installation of deterrents; removal and disposal of materials.

Payment for Maintaining Bird Deterrent System is full compensation for inspecting structures for the presence of migratory birds, inspecting deterrents installed by others; maintaining, repairing, replacing, and supplementing existing deterrent materials; repairing damage to structures resulting from installation of deterrents; removal and disposal of materials.

stp-999-200 (20220107)

19. Foundation Backfill, Item SPV.0035.01.

A Description

This special provision describes providing foundation backfill that conforms to standard spec 520.

B Materials

Furnish Foundation Backfill according to standard spec 520.2.5.2.

C Construction

Place foundation backfill in layers no more than 8 inches thick after compaction to the top of subgrade. Mechanically compact entire length of each layer to the same degree as the material abutting the trench.

D Measurement

The department will measure Foundation Backfill by the cubic yard, acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0035.01	Foundation Backfill	CY

Payment is full compensation for placing, shaping, and compacting.

ner-520-025 (20190409)

20. Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-IV 53x83-Inch, Item SPV.0090.01.

A Description

This special provision describes installing culvert pipes according to the pertinent requirements of standard spec 522 and the construction details shown in the plans.

B Materials

Furnish materials according to standard spec 522.

C Construction

Perform work according to standard spec 522.

D Measurement

The department will measure Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-IV 53x83-Inch by linear foot, acceptably completed.

E Payment

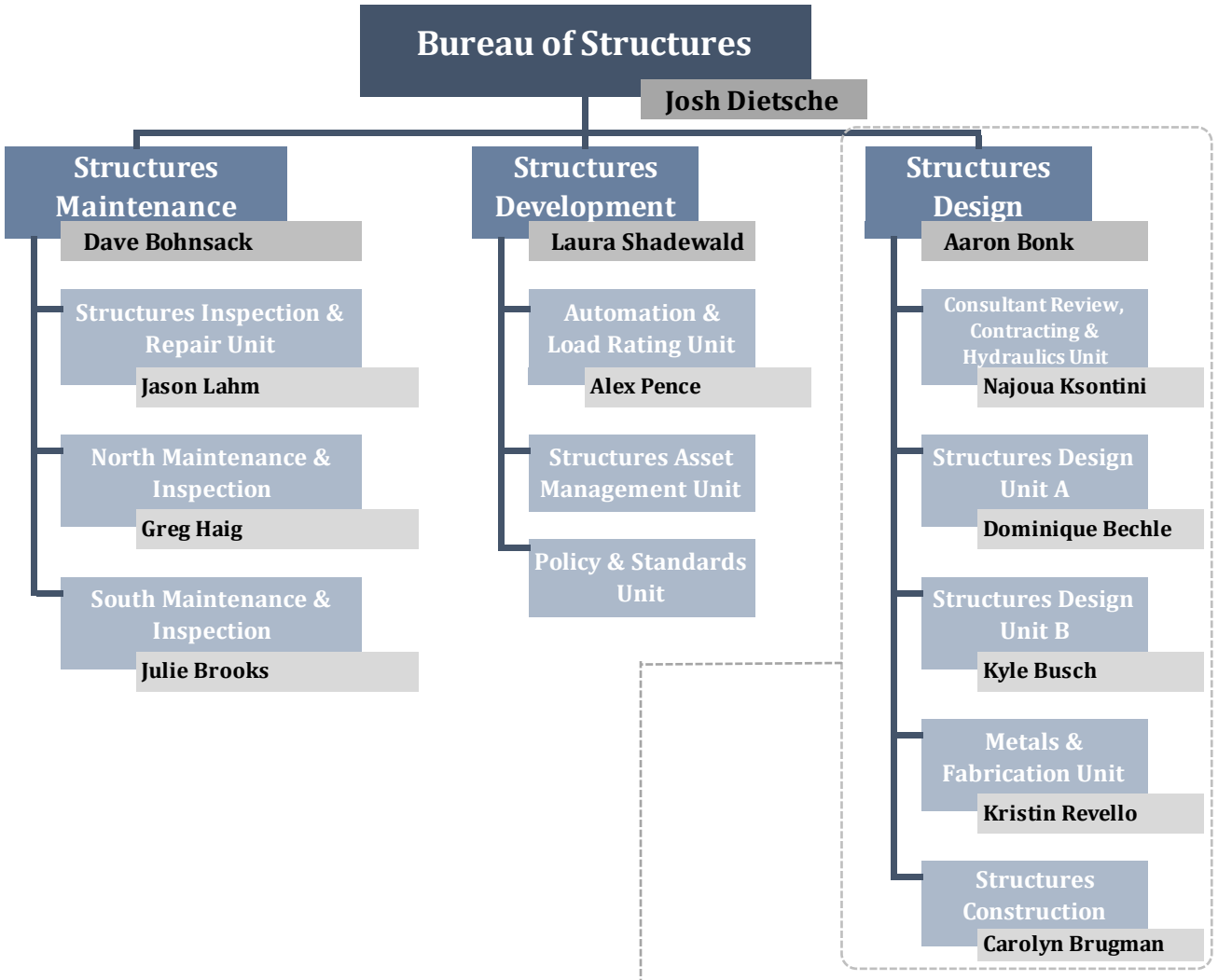
The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.01	Culvert Pipe Reinforced Concrete Horizontal Elliptical Class HE-IV 53x83-Inch	LF

The department will pay for the work according to standard spec 522.5.

Session 1
BOS Contacts &
Organization Chart

Bureau of Structure Organization Chart



Structures Design

Design Chief
Aaron Bonk

Consultant Review, Contracting & Hydraulics Unit

Unit Supervisor
Najoua Ksontini

Consultant Review
Steve Revello
Ruth Coisman
Max Kulick
Emily Kuehne

Hydraulics
Steve Neary
Ann-Marie Kirsch
Azeem Ahmed

Administration
Sarah Wright

Structures Design Unit A

Unit Supervisor
Dominique Bechle

Structural Engineers
Chris Doll
Ann Thielman
Jon Resheske
Isatou Ceesay
Lexi Hanley
Ian Lindloff

Specialists
Joel Huenink
Dimitrious Haftoglou

Structures Design Unit B

Unit Supervisor
Kyle Busch

Structural Engineers
Alex Crabtree
Dan Monroe
Micah Brooks
Ryan Harris
Vista Shahriari
Chris Kusiak
Sarah McAllister

Specialists
Warner Risser

Structures Construction

Program Manager
Carolyn Brugman

Metals & Fabrication Inspection Unit

Unit Supervisor
Kristin Revello

Structural Engineers
Carla Principe
John Rublein

Specialists
Bill Hardy
Ryan Janssen

Construction Questions

current staff as of 01/02/2025

WisDOT Plans

1. Structure Design Contacts
(as stated on structure plans)

Structure Designer ..... (see plans)
Design Unit Supervisor .... (see plans)

2. Region Liaison

(SE) Emily Kuehne 608-266-5089
(SW) Jon Resheske..... 608-266-8491
(NE) Ryan Harris..... 608-266-2963
(NC) Max Kulick..... 608-261-6108
(NW) Dan Monroe..... 608-266-8490

3. Structures Construction Program Manager

Carolyn Brugman.....715-420-6414

4. Supervisor

Kyle Busch 608-267-0465
Dominique Bechle 608-261-8205

5. Design Chief

Aaron Bonk 608-261-0261

Consultant Plans

1. Structure Design Contacts
(as stated on structure plans)

Consultant Contact..... (see plans)
Aaron Bonk 608-261-0261

2. Region Liaison

(SE) Emily Kuehne 608-266-5089
(SW) Jon Resheske..... 608-266-8491
(NE) Ryan Harris..... 608-266-2963
(NC) Max Kulick..... 608-261-6108
(NW) Dan Monroe..... 608-266-8490

3. Structures Construction Program Manager

Carolyn Brugman 715-420-6414

4. Supervisor

Kyle Busch 608-267-0465
Dominique Bechle 608-261-8205

*Note that Bridge Maintenance Engineers in North and South Maintenance & Inspection Units (formerly Region Structures Maintenance staff) may also be contacted with structures construction questions.

Fabrication Questions

Steel Structures, Railing, Expansion Joints, Sign Structures, Bolting Questions:

Kristin Revello .....608-266-5090 kristin.revello@dot.wi.gov
Carla Principe .....608-261-6110 carla.principe@dot.wi.gov

Design/Build Retaining Walls, Noise Walls, Prefabricated Bridges & Box Culverts:

John Rublein.....608-246-7953 john.rublein@dot.wi.gov
Kristin Revello .....608-266-5090 kristin.revello@dot.wi.gov

Highway Structure Information (HSI):

Pile Driving Records:. DOTDTSDStructuresPiling@dot.wi.gov
DOTDTSDGeotechnicalPiling@dot.wi.gov

As-Built Mailbox: DOTDTSDStructuresRecords@dot.wi.gov

Session 1
Rebar Size Chart &
Lap Lengths

U.S. Rebar Size Chart

Per ASTM Specifications

Bar Size Designation	Nominal Dimensions		
	Nominal Diameter (not including deformations)	Weight (lbs./ft)	Area (in^2)
#3 (#10)	0.375	0.376	0.11
#4 (#13)	0.500	0.668	0.20
#5 (#16)	0.625	1.043	0.31
#6 (#19)	0.750	1.502	0.44
#7 (#22)	0.875	2.044	0.60
#8 (#25)	1.000	2.670	0.79
#9 (#29)	1.128	3.400	1.00
#10 (#32)	1.270	4.303	1.27
#11 (#36)	1.410	5.313	1.56
#14 (#43)	1.693	7.650	2.25
#18 (#57)	2.257	13.600	4.00

9.9 Bar Tables and Figures

(f'_c = 3500 psi; f_y = 60 ksi)											
BAR SPACING	BAR SIZE		4	5	6	7	8	9	10	11	TYPE
6" OR MORE	CLASS A 1.0 ℓ_d	TOP [1]	1-2 1-5	1-5 1-9	1-9 2-1	2-3 2-9	3-0 3-8	3-9 4-7	4-10 5-10	5-11 7-2	UNCOATED EPOXY
		OTHERS	1-0 1-0	1-0 1-6	1-3 1-10	1-8 2-5	2-2 3-3	2-9 4-1	3-5 5-2	4-3 6-4	UNCOATED EPOXY
	CLASS B 1.3 ℓ_d	TOP [1]	1-6 1-9	1-10 2-3	2-3 2-8	3-0 3-7	3-11 4-8	4-11 5-11	6-3 7-7	7-8 9-3	UNCOATED EPOXY
		OTHERS	1-1 1-3	1-4 2-0	1-7 2-5	2-2 3-2	2-9 4-2	3-6 5-3	4-5 6-8	5-6 8-2	UNCOATED EPOXY
	CLASS C 1.7 ℓ_d	TOP [1]	1-11 2-4	2-5 2-11	2-11 3-6	3-10 4-8	5-1 6-2	6-5 7-9	8-1 9-10	10-0 12-1	UNCOATED EPOXY
		OTHERS	1-5 1-8	1-9 2-7	2-1 3-1	2-9 4-2	3-8 5-5	4-7 6-10	5-10 8-8	7-2 10-8	UNCOATED EPOXY
LESS THAN 6"	CLASS A 1.0 ℓ_d	TOP [1]	1-5 1-9	1-9 2-2	2-2 2-7	2-10 3-5	3-9 4-6	4-9 5-9	6-0 7-3	7-4 8-11	UNCOATED EPOXY
		OTHERS	1-0 1-3	1-3 1-11	1-6 2-3	2-1 3-1	2-8 4-0	3-5 5-1	4-3 6-5	5-3 7-10	UNCOATED EPOXY
	CLASS B 1.3 ℓ_d	TOP [1]	1-10 2-3	2-4 2-10	2-9 3-4	3-8 4-6	4-10 5-10	6-1 7-5	7-9 9-5	9-6 11-7	UNCOATED EPOXY
		OTHERS	1-4 1-7	1-8 2-6	2-0 3-0	2-8 3-11	3-6 5-2	4-5 6-7	5-7 8-4	6-10 10-2	UNCOATED EPOXY
	CLASS C 1.7 ℓ_d	TOP [1]	2-5 2-11	3-0 3-8	3-7 4-5	4-10 5-10	6-4 7-8	8-0 9-8	10-2 12-4	12-5 15-1	UNCOATED EPOXY
		OTHERS	1-9 2-1	2-2 3-3	2-7 3-10	3-5 5-2	4-6 6-9	5-9 8-7	7-3 10-10	8-11 13-4	UNCOATED EPOXY

Table 9.9-1
Tension Lap Splice Length or Development Length - Deformed Bars
LRFD [5.11.2.1, 5.11.5.3.1] – 7th Edition (2014)

[1] Top Bar – is a horizontal or nearly horizontal bar with 12 inches of fresh concrete cast below it.

CLASS A - [A_s provided/A_s required] $\geq$ 2; Bars spliced are 75% or less.

CLASS B - [A_s provided/A_s required] < 2; Bars spliced are 50% or less (or) [A_s provided/A_s required] $\geq$ 2; Bars spliced are greater than 75%.

CLASS C - [A_s provided/A_s required] < 2; Bars spliced are greater than 50%.

(f'_c = 4000 psi; f_y = 60 ksi)											
BAR SPACING	BAR SIZE		4	5	6	7	8	9	10	11	TYPE
6" OR MORE	CLASS A	TOP [1]	1-2 1-5	1-5 1-9	1-9 2-1	2-2 2-7	2-10 3-5	3-6 4-3	4-6 5-5	5-6 6-8	UNCOATED EPOXY
	1.0 ℓ_d	OTHERS	1-0 1-0	1-0 1-6	1-3 1-10	1-6 2-3	2-0 3-0	2-6 3-9	3-3 4-10	3-11 5-11	UNCOATED EPOXY
	CLASS B	TOP [1]	1-6 1-9	1-10 2-3	2-3 2-8	2-9 3-4	3-8 4-5	4-7 5-7	5-10 7-1	7-2 8-8	UNCOATED EPOXY
	1.3 ℓ_d	OTHERS	1-1 1-3	1-4 2-0	1-7 2-5	2-0 3-0	2-7 3-11	3-3 4-11	4-2 6-3	5-1 7-8	UNCOATED EPOXY
	CLASS C	TOP [1]	1-11 2-4	2-5 2-11	2-11 3-6	3-7 4-5	4-9 5-9	6-0 7-3	7-7 9-3	9-4 11-4	UNCOATED EPOXY
	1.7 ℓ_d	OTHERS	1-5 1-8	1-9 2-7	2-1 3-1	2-7 3-10	3-5 5-1	4-3 6-5	5-5 8-2	6-8 10-0	UNCOATED EPOXY
LESS THAN 6"	CLASS A	TOP [1]	1-5 1-9	1-9 2-2	2-2 2-7	2-8 3-3	3-6 4-3	4-5 5-4	5-7 6-9	6-10 8-4	UNCOATED EPOXY
	1.0 ℓ_d	OTHERS	1-0 1-3	1-3 1-11	1-6 2-3	1-11 2-10	2-6 3-9	3-2 4-9	4-0 6-0	4-11 7-4	UNCOATED EPOXY
	CLASS B	TOP [1]	1-10 2-3	2-4 2-10	2-9 3-4	3-5 4-2	4-6 5-6	5-9 6-11	7-3 8-10	8-11 10-10	UNCOATED EPOXY
	1.3 ℓ_d	OTHERS	1-4 1-7	1-8 2-6	2-0 3-0	2-6 3-8	3-3 4-10	4-1 6-2	5-2 7-9	6-5 9-7	UNCOATED EPOXY
	CLASS C	TOP [1]	2-5 2-11	3-0 3-8	3-7 4-5	4-6 5-6	5-11 7-2	7-6 9-1	9-6 11-6	11-8 14-2	UNCOATED EPOXY
	1.7 ℓ_d	OTHERS	1-9 2-1	2-2 3-3	2-7 3-10	3-3 4-10	4-3 6-4	5-4 8-0	6-9 10-2	8-4 12-6	UNCOATED EPOXY

Table 9.9-2

Tension Lap Splice Length or Development Length – Deformed Bars

LRFD [5.11.2.1, 5.11.5.3.1] – 7th Edition (2014)

[1] Top Bar – is a horizontal or nearly horizontal bar with 12 inches of fresh concrete cast below it.

CLASS A – [A_s provided/A_s required] $\geq$ 2; Bars spliced are 75% or less.

CLASS B – [A_s provided/A_s required] < 2; Bars spliced are 50% or less (or) [A_s provided/A_s required] $\geq$ 2; Bars spliced are greater than 75%.

CLASS C - [A_s provided/A_s required] < 2; Bars spliced are greater than 50%.

Session 2 Exercises
Bridge Layout

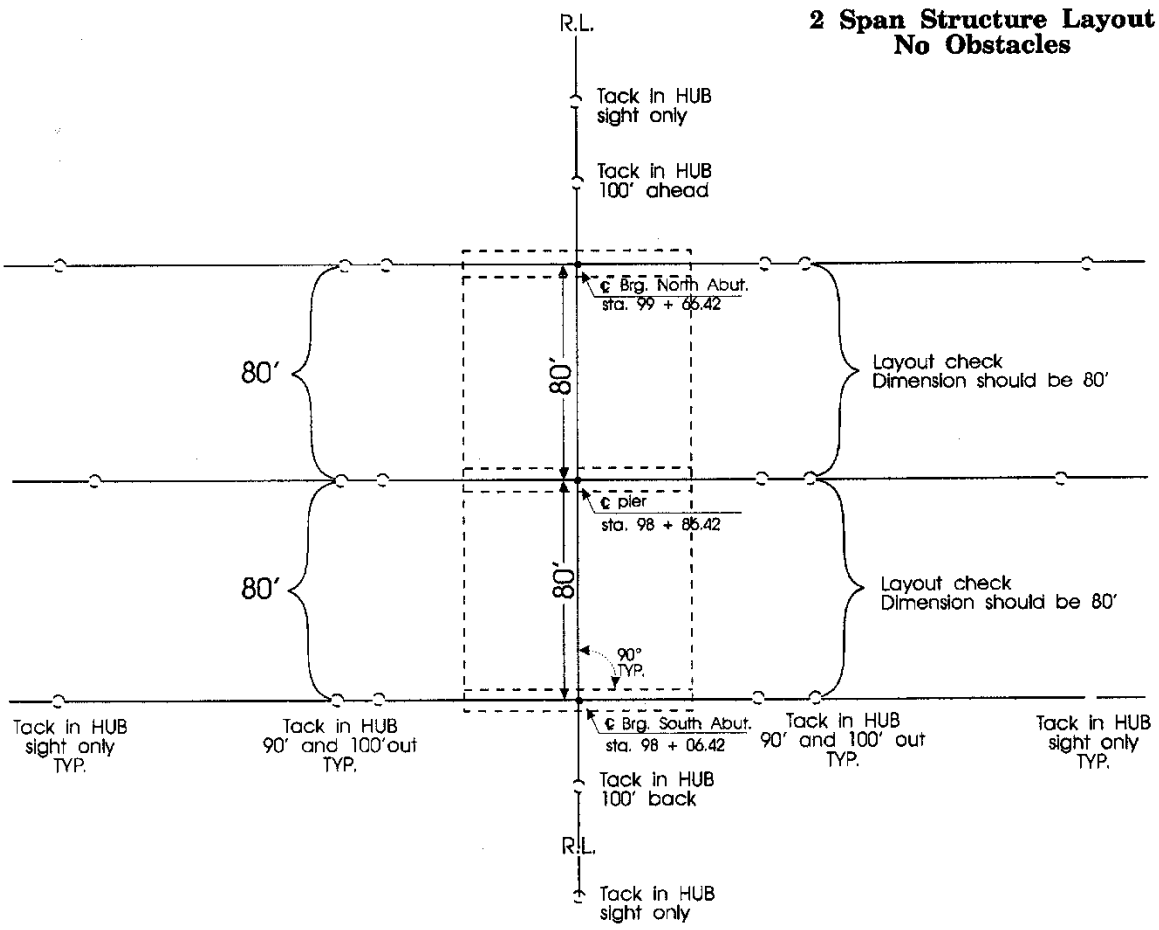
Session 2 Exercises

Suggested Bridge Layout Procedure

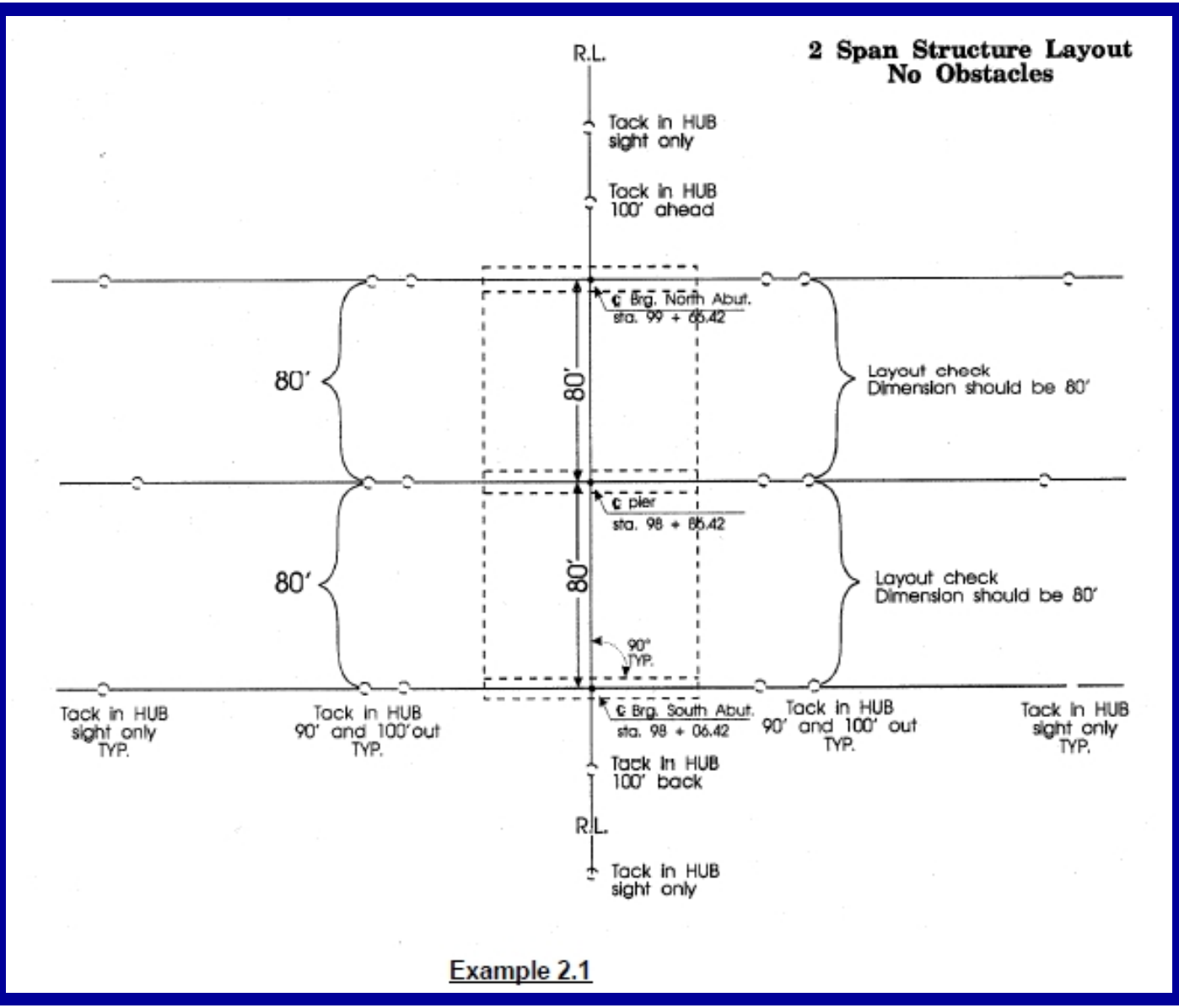
(Table based on WisDOT Guidelines for Construction Staking)

1.	Locate all required information from the approved plan: • Longitudinal lines and stationing • Centerline of bearing of abutments, centerline of piers, abutments, walls, barriers or other pertinent structures (transverse reference lines) Note: Bearing centerline of the abutment and reference line of abutment is not *always* the same line.
2.	Re-establish the roadway reference line from control points when needed.
3.	Before construction begins, transfer the existing benchmark elevation to at least two other benchmarks on opposite ends of the structure.
4.	Establish and clearly identify the longitudinal reference line from control points: • Line may be off to one side of the bridge, being the roadway reference line, or a line tangent to the roadway curve or on curve. 1. Set line ties beyond structure's construction limits but close enough for structure contractor's use. 2. Line tie point may be a stake and tacked hub, chiseled cross, PK nail or other stable marker. 3. Locate tie points such that construction operations will not destroy. 4. Document all information in the survey field book for the project.
5.	Field-locate the proposed points for the centerline of substructure units on the longitudinal reference line at the proper station.
6.	Set and clearly identify points to establish the transverse reference lines on both sides of the bridge since visibility to the opposite side may be disrupted by construction. • 'Close' points should be approximately 90 to 100 feet from structure to stay out of the path of all the equipment. (In urban areas or areas with restrictions, this may need to be reduced). • 'Far' points are for line of sight only and should be located at least 25 feet past the 'Close' points.
7.	Staking Contractor must systematically verify angles, span lengths, plan distances, and stationing of staked points.
8.	Record all the data in field notes and make available to inspector within 24 hours as work progresses. Field notes should include: • Date, time, crew, and location • Control used (Horizontal and Vertical) • If conventional: Instrument heights and other back sights, foresights, etc. • A layout sketch of the structure as staked • A layout diagram of staked point locations • Distances from stakes to centerline • All other pertinent information

1. Using the following bridge layout drawings, participants will identify the approach and stakes they would use to stake the bridge. This will provide participants with an example of the sketches the staking contractors should provide to the inspector. Participants may work alone or in groups and may then present their results to the class.

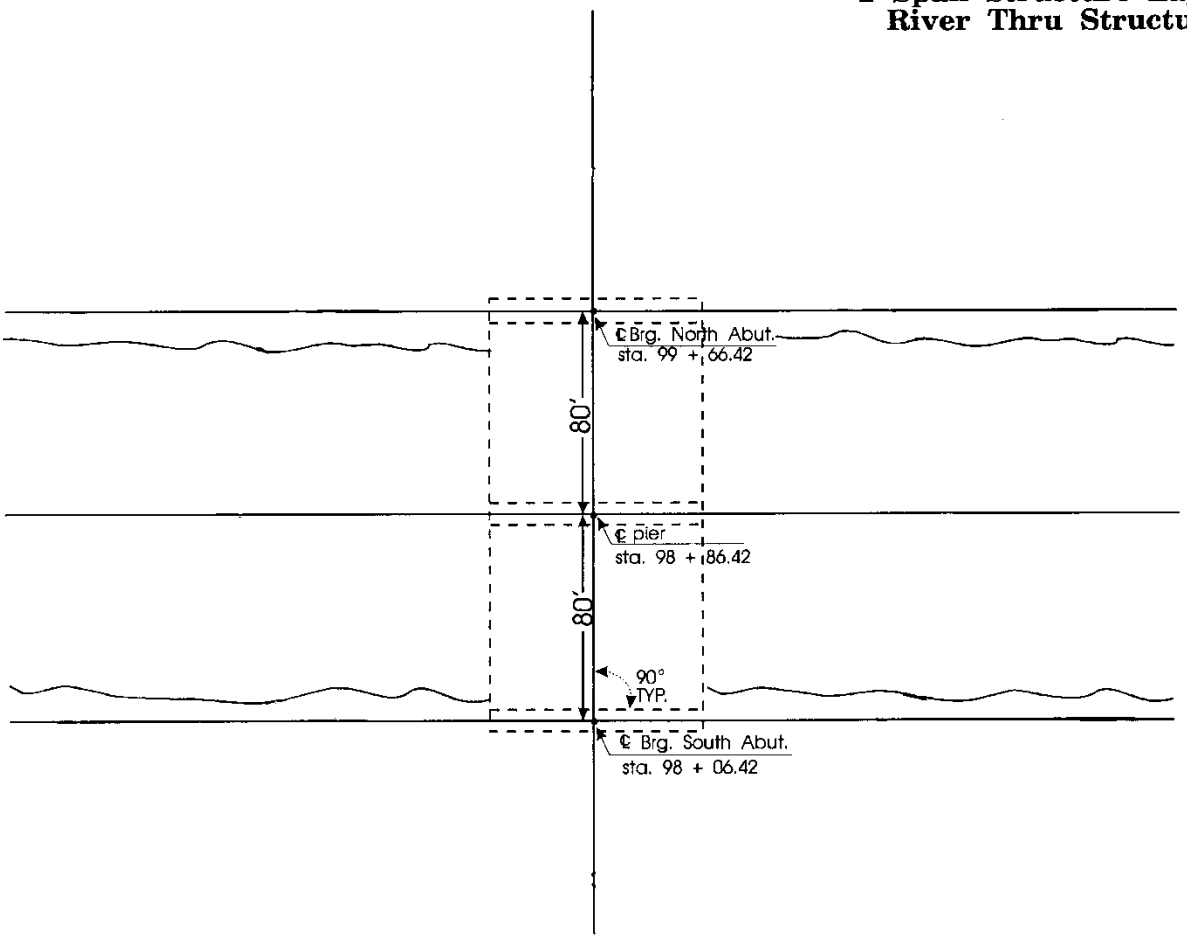


Example 2.1


2 Span Structure Layout
No Obstacles
R.L.
Tack in HUB
sight only
Tack in HUB
100' ahead
℄ Brg. North Abut.
sta. 99 + 66.42
80'
80'
Layout check
Dimension should be 80'
℄ pier
sta. 98 + 86.42
80'
80'
Layout check
Dimension should be 80'
90°
TYP.
Tack in HUB
sight only
TYP.
Tack in HUB
90' and 100' out
TYP.
℄ Brg. South Abut.
sta. 98 + 06.42
Tack in HUB
90' and 100' out
TYP.
Tack in HUB
sight only
TYP.
Tack in HUB
100' back
R.L.
Tack in HUB
sight only

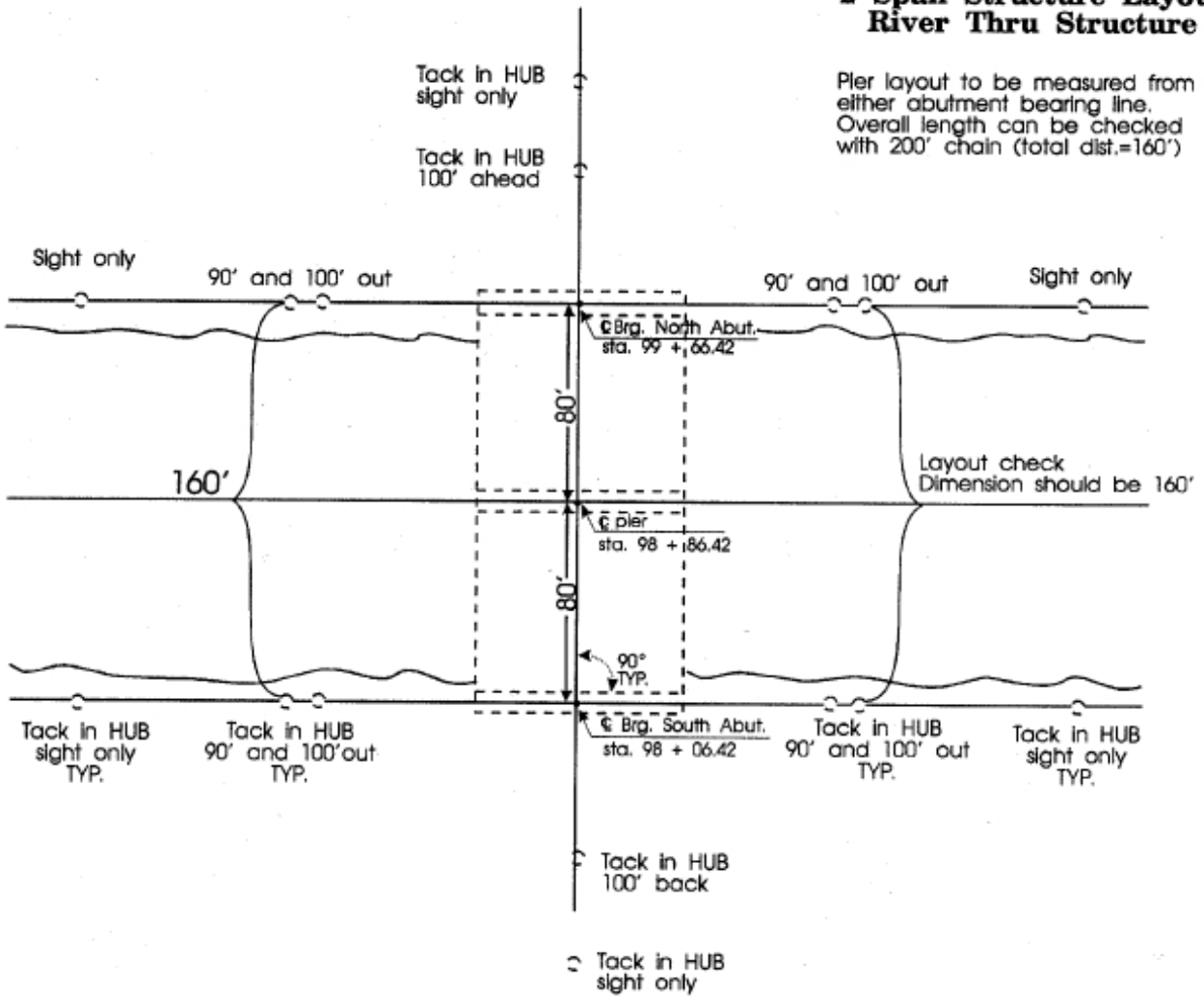
Example 2.1

2 Span Structure Layout
River Thru Structure

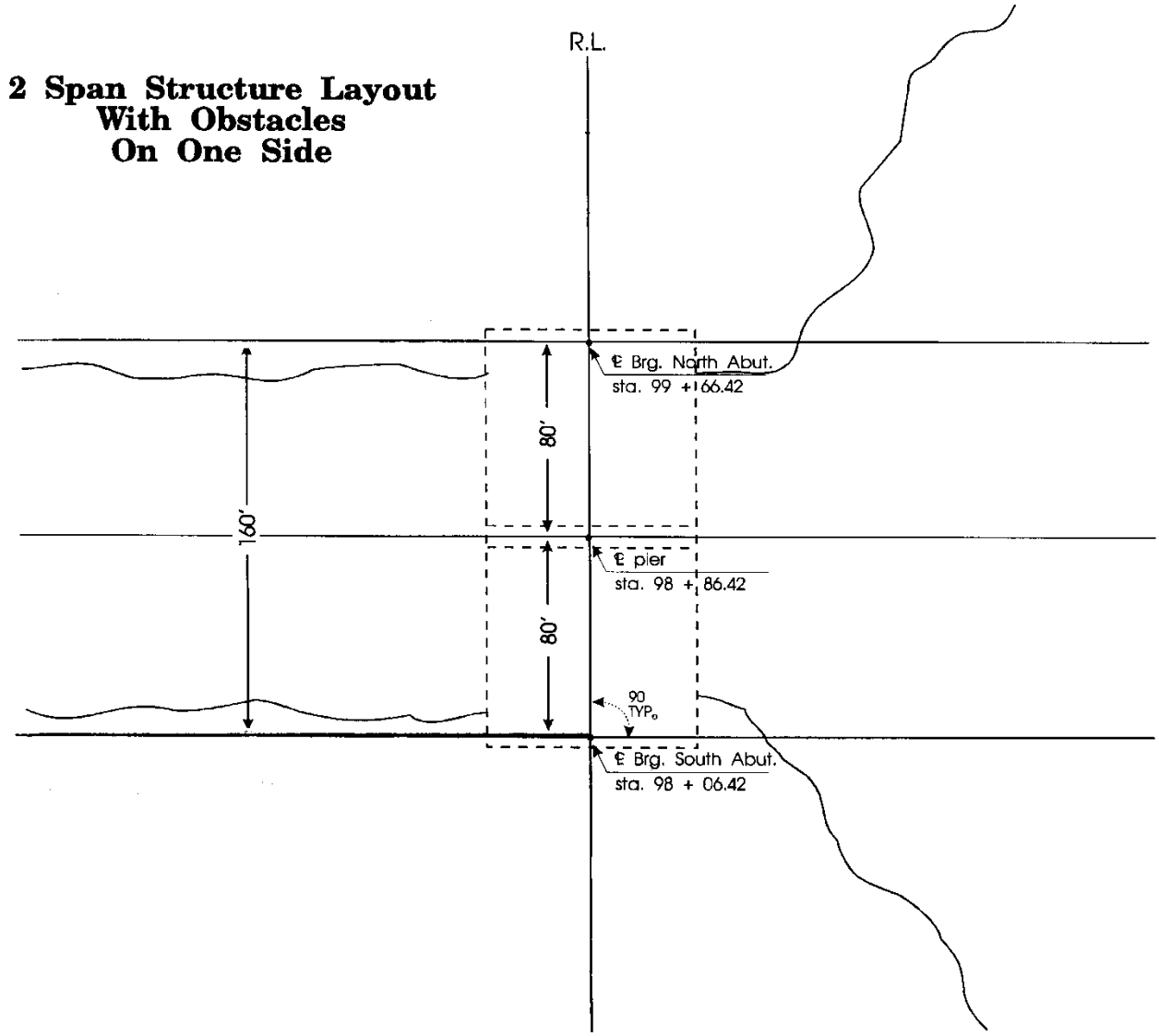


Example 2.2

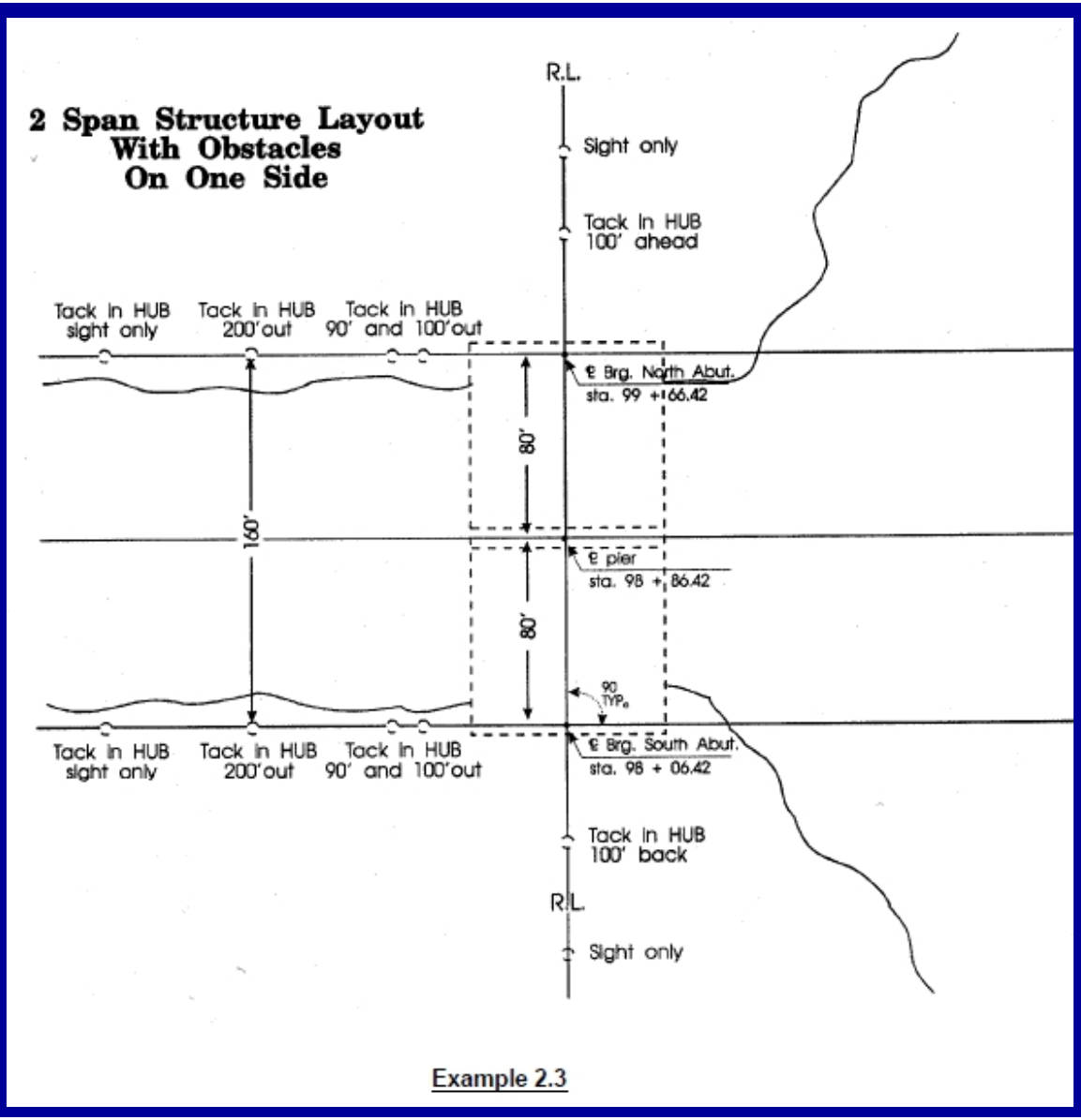
2 Span Structure Layout
River Thru Structure



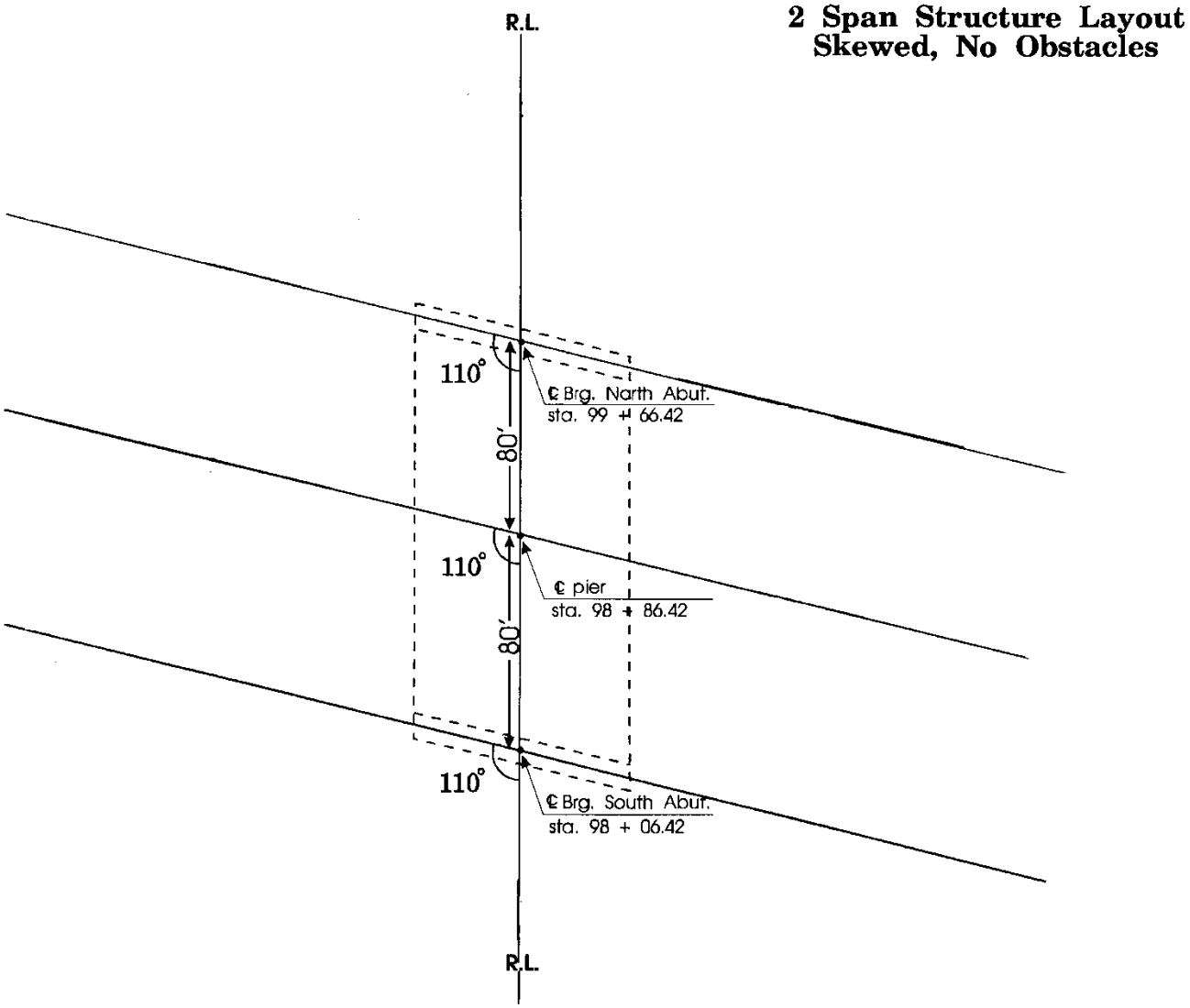
Example 2.2


2 Span Structure Layout
With Obstacles
On One Side
R.L.
℄ Brg. North Abut.
sta. 99 + 66.42
80'
160'
℄ pier
sta. 98 + 86.42
80'
90
TYP.
℄ Brg. South Abut.
sta. 98 + 06.42

Example 2.3

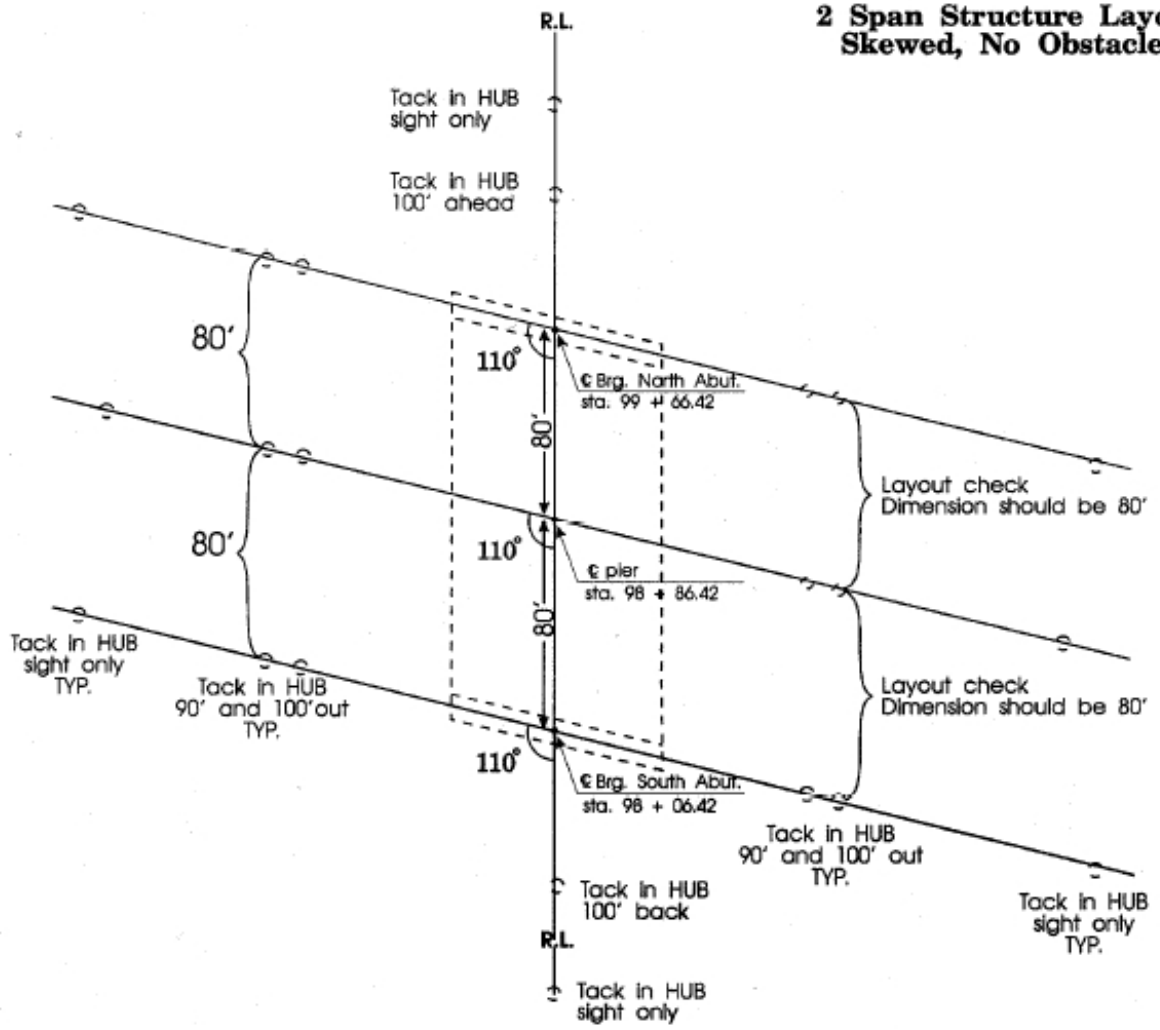

2 Span Structure Layout
With Obstacles
On One Side
R.L.
Sight only
Tack In HUB
100' ahead
Tack In HUB
sight only
Tack In HUB
200' out
Tack In HUB
90' and 100' out
℄ Brg. North Abut.
sta. 99 + 66.42
80'
160'
℄ pier
sta. 98 + 86.42
80'
90°
TYP.
Tack In HUB
sight only
Tack In HUB
200' out
Tack In HUB
90' and 100' out
℄ Brg. South Abut.
sta. 98 + 06.42
Tack In HUB
100' back
R.L.
Sight only

Example 2.3


2 Span Structure Layout
Skewed, No Obstacles
R.L.
110°
℄ Brg. North Abut.
sta. 99 + 66.42
80'
110°
℄ pier
sta. 98 + 86.42
80'
110°
℄ Brg. South Abut.
sta. 98 + 06.42
R.L.

Example 2.4

2 Span Structure Layout Skewed, No Obstacles



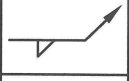
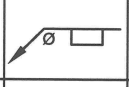
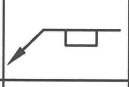
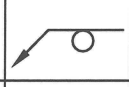
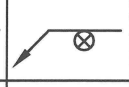
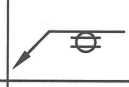
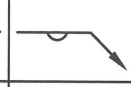
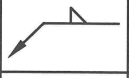
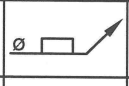
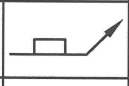
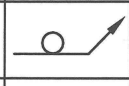
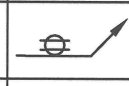
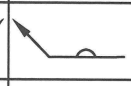
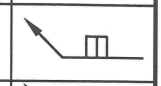
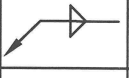
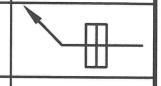
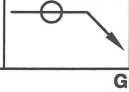
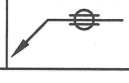
Example 2.4

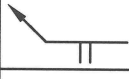
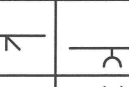
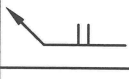
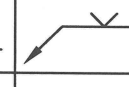
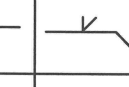
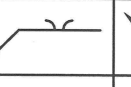
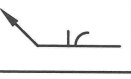
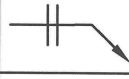
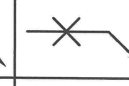
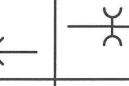
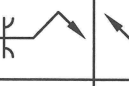
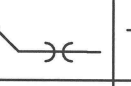
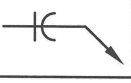
Session 3

Weld Symbols & Photos of Acceptable Welds

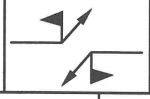
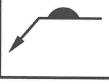
American Welding Society Welding Symbol Chart

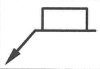
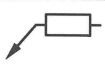
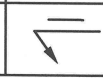
Basic Weld Symbols and Their Location Significance within the Welding Symbol

Location Significance	Fillet	Plug	Slot	Spot or Projection	Stud	Seam	Back or Backing	Surfacing	Edge
Arrow Side									
Other Side					Not Used			Not Used	
Both Sides		Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	
No Arrow Side or Other Side Significance	Not Used	Not Used	Not Used		Not Used		Not Used	Not Used	Not Used

Location Significance	Groove							Scarf for Brazed Joint
	Square	V	Bevel	U	J	Flare-V	Flare-Bevel	
Arrow Side								
Other Side								
Both Sides								
No Arrow Side or Other Side Significance	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used	Not Used

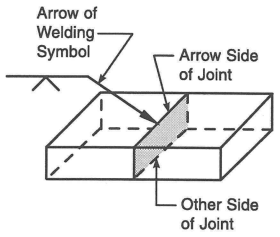
Supplementary Symbols

Weld-All-Around	Field Weld	Melt-Through	Consumable Insert (Square)
			

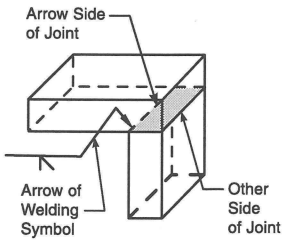
Backing (Rectangle)	Spacer (Rectangle)	Contour		
		Flush or Flat	Convex	Concave
				

Basic Joint Types
Identification of Arrow Side and Other Side Joint

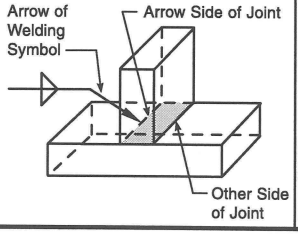
Butt Joint



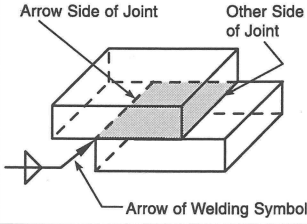
Corner Joint



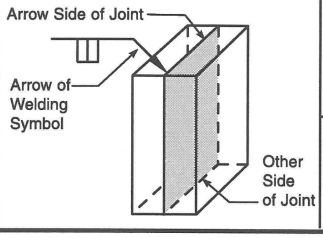
T-Joint



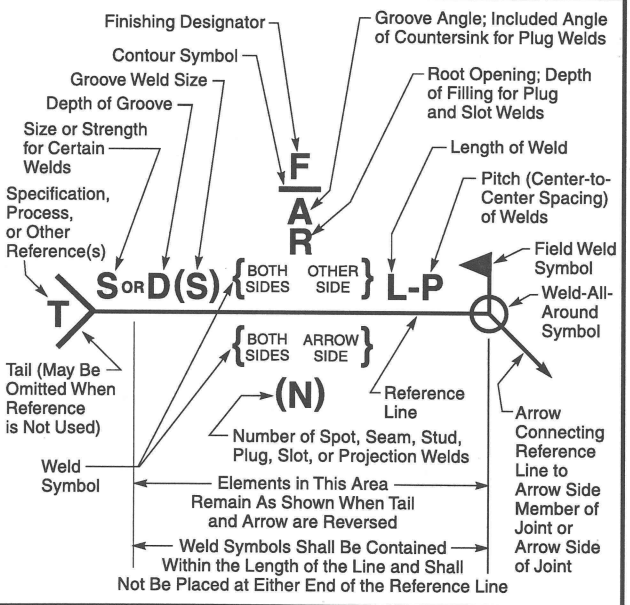
Lap Joint



Edge Joint



Standard Location of the Elements of a Welding Symbol



Letter Designations

Where letter designations are to be included in the tail of the welding symbol, refer to Annex A (Normative) Tables of AWS A2.4:2012

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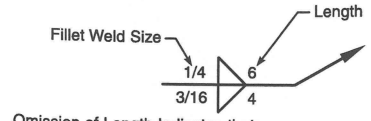
Miami, FL 33126
www.aws.org

American Welding Society Welding Symbol Chart

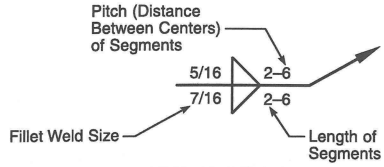
Typical Welding Symbols

Double-Fillet Welding Symbol

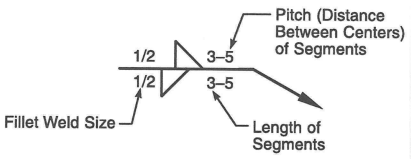


Omission of Length Indicates that Weld Extends Between Abrupt Changes in Direction or as Dimensioned

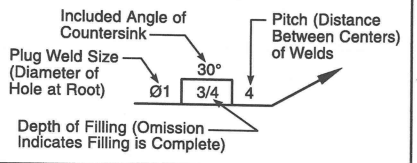
Chain Intermittent Fillet Welding Symbol



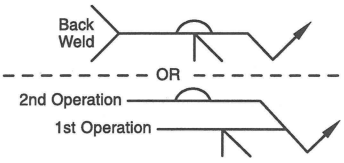
Staggered Intermittent Fillet Welding Symbol



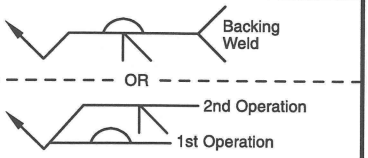
Plug Welding Symbol



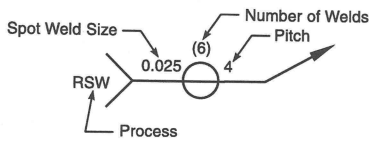
Back Welding Symbol



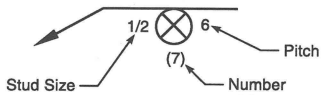
Backing Welding Symbol



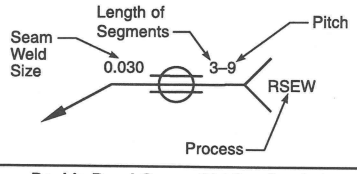
Spot Welding Symbol



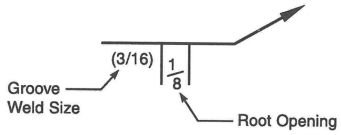
Stud Welding Symbol



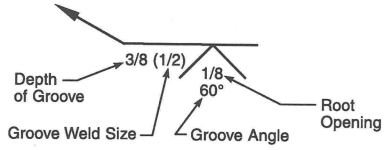
Seam Welding Symbol



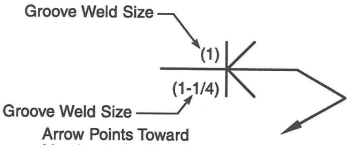
Square-Groove Welding Symbol



V-Groove Welding Symbol

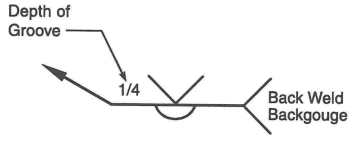


Double-Bevel-Groove Welding Symbol

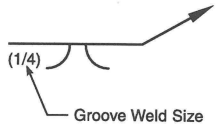


Arrow Points Toward Member to be Beveled

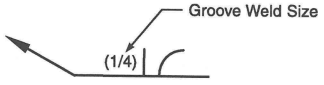
Symbol with Backgouging



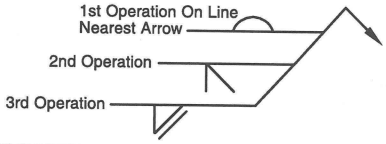
Flare-V-Groove Welding Symbol



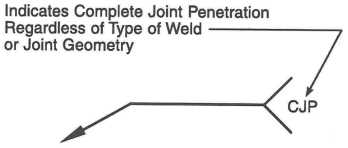
Flare-Bevel-Groove Welding Symbol



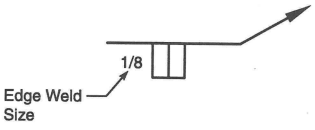
Multiple Reference Lines



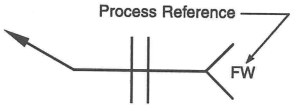
Complete Joint Penetration



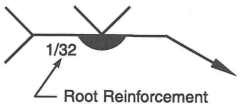
Edge Welding Symbol



Flash or Upset Welding Symbol



Melt-Through Symbol

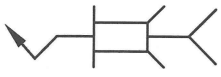


Joint with Backing

'R' Indicates Backing Removed After Welding

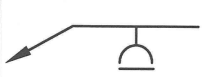
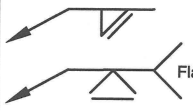
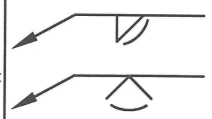
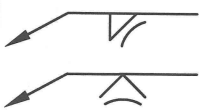
Joint with Spacer

With Modified Groove Weld Symbol



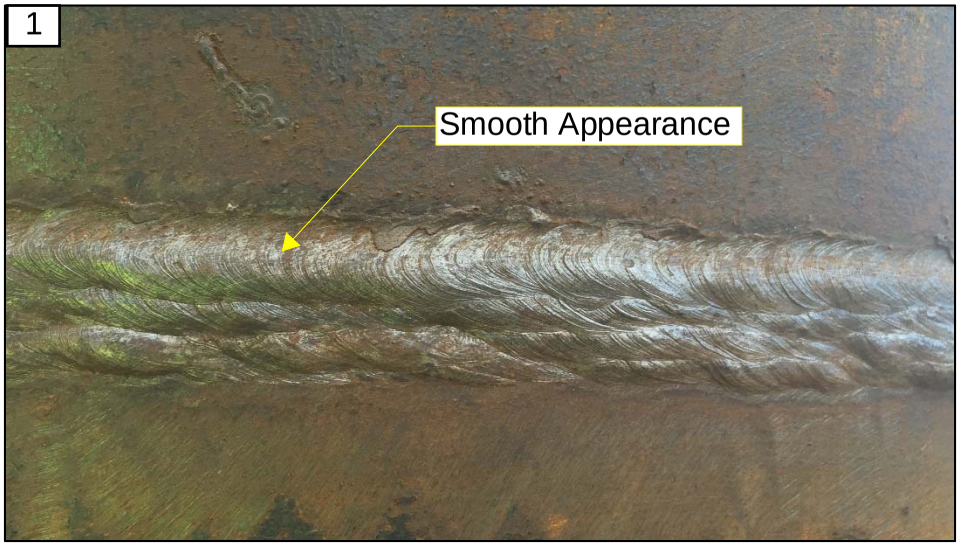
Double-Bevel Groove

Contour Symbols

Flush	Flat	Convex	Concave
	 Flat		

ACCEPTABLE WELDS

1



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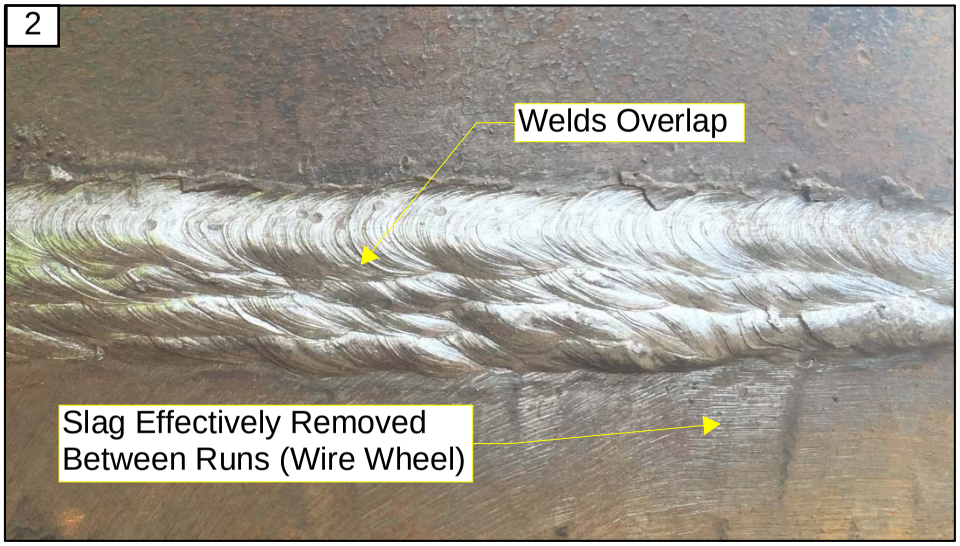
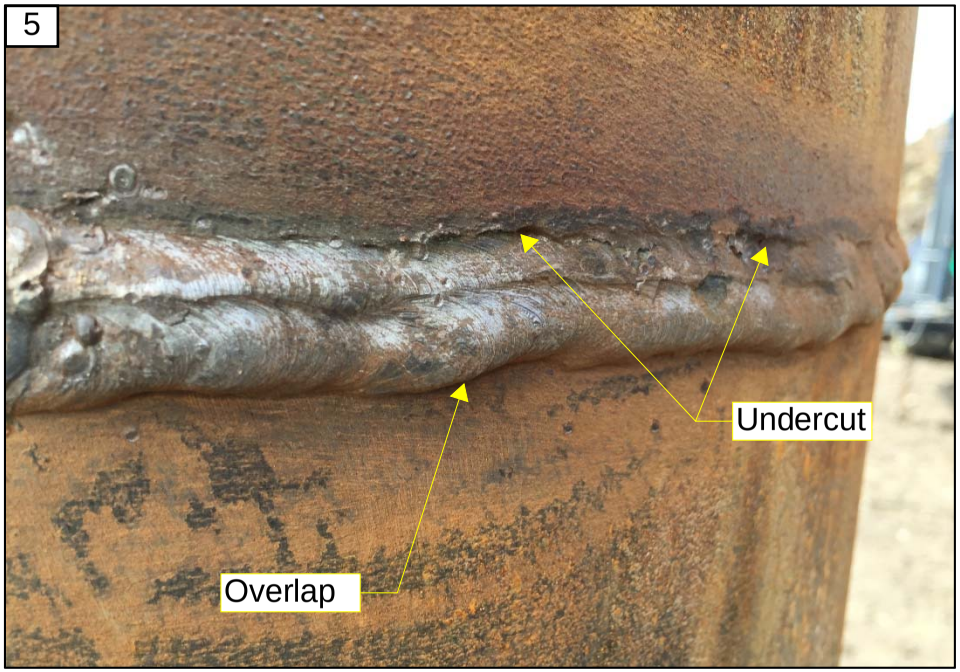


3

4

UNACCEPTABLE WELDS

5



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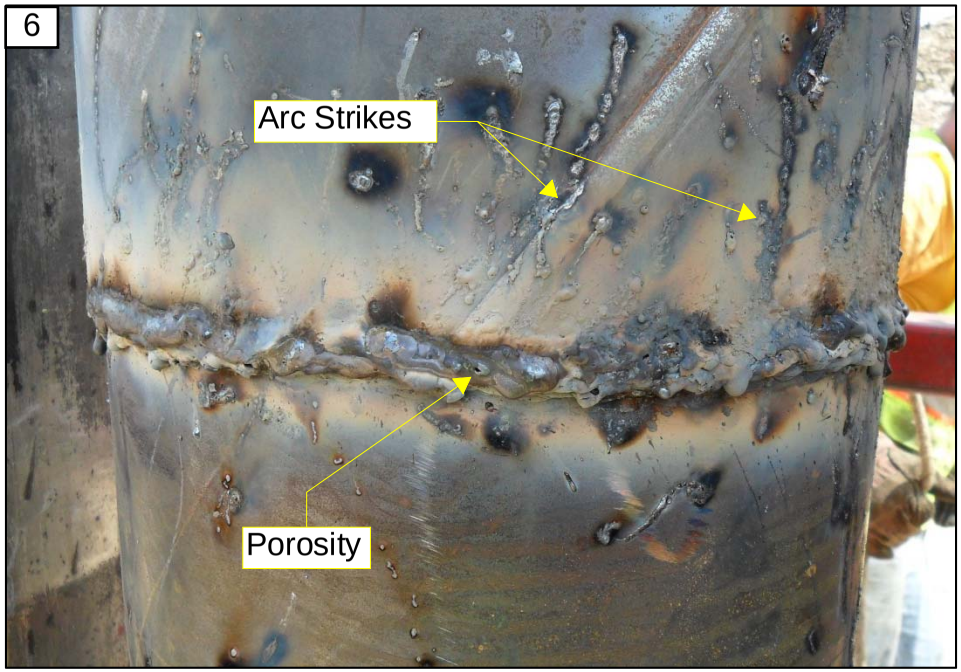
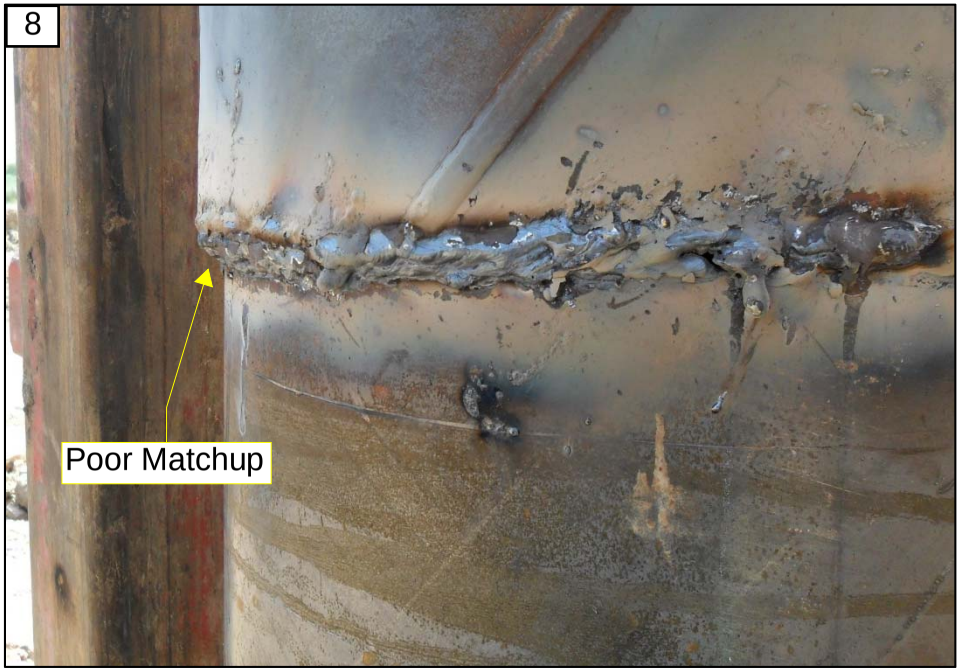


7

8



Session 3 Exercises – Bridge Substructure

Session 3 Exercises

1. **Where do you find the required bearing resistance values of the piling?**
   You will find them in two places, 1) on the foundation data sheet 8, 2) with each footing unit on the plan.

2. **What happens when piling tightens up quickly and you cannot count a whole foot as it is being driven?**
   Have the contractor mark the piling, count ten (10) blows, mark it again and measure the distance. Equate the distance to inches per blow and check the hammer table for the corresponding bearing. Repeat until bearing is achieved.

3. **Do different piling require different pile driving caps?**
   Yes, each shape requires a different cap. The pile cap must fit the configuration of the pile. There are different caps for different types of piling and the cap must be formed for the type of pile used in the field.

4. **Assume a pile reaches bearing after driving it down 6 feet, and the pile next to it reaches bearing when driven down 40 feet. What action might you take in this instance?**
   Pull up the pile driven to 6 feet and move it over 2 feet toward the closest pile driven to the proper depth and try again. Check soil borings and removal plans for obstructions. You may also request that the contractor dig down six feet to determine the nature of the obstruction. The minimum depth of embedment for acceptance is typically 10 feet. If these options fail, check with your supervisor. Record all piling location changes in the pile records and as-built plans.

5. **Steel piling starts to bend. What do you do?**
   Stop pile driving immediately. It has most likely reached refusal and the required bearing capacity. Cut the piling off and use it. Contact your area supervisor if the pile is driven less than 10 feet.

6. **The contractor is driving piling with a diesel hammer in a sensitive urban area. What precautions might you suggest to the contractor?**
   The contractor should contact the manufacturer to identify an adequate way to contain any spray or contaminants. For example, one manufacturer produces a curtain that encloses the hammer to contain the spray. The hours of pile driving can also be restricted to eliminate driving early in the morning or late in the evening. Public relations should be maintained and nearby structures video documented and surveyed prior to commencing driving operations.

7. **Exercise. Your instructor will show...**
   how to read the bearing chart,
   how to fill out a pile driving diary and why,
   how to fill out a test pile form,
   how to prepare a final bearing report form.

MODIFIED GATES

MANUFACTURER Delmag
MODEL D-19-42
TYPE S-A- DIESEL

MAXIMUM CAPACITY 309.3 TON (WHEN S=0.1)

MAX. HAMMER DROP 10.5 FEET
STRIKING WT. 4015 POUNDS DROP INCREMENT 0.5 FEET

Range of BLOWS/FOOT desired: 20 minimum
100 maximum
Increment of BLOWS/FOOT desired: 2 BLOWS/FOOT

Required Driving Resistance (tons) as Determined by Modified Gates Formula

	HAMMER DROP IN FEET								
BLOWS/FT.	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
20	122.7	129.2	135.5	141.6	147.5	153.2	158.8	164.2	169.5
22	128.6	135.3	141.8	148.1	154.2	160.1	165.9	171.5	177.0
24	133.9	140.8	147.5	154.0	160.3	166.4	172.3	178.1	183.7
26	138.8	145.9	152.8	159.5	165.9	172.2	178.3	184.2	190.0
28	143.4	150.7	157.7	164.5	171.1	177.5	183.8	189.8	195.8
30	147.6	155.1	162.3	169.2	176.0	182.5	188.9	195.1	201.2
32	151.6	159.2	166.5	173.6	180.5	187.2	193.7	200.0	206.2
34	155.3	163.0	170.5	177.7	184.8	191.6	198.2	204.6	210.9
36	158.8	166.7	174.3	181.6	188.8	195.7	202.4	209.0	215.4
38	162.1	170.1	177.8	185.3	192.6	199.6	206.4	213.1	219.6
40	165.3	173.4	181.2	188.8	196.2	203.3	210.2	217.0	223.6
42	168.3	176.5	184.4	192.1	199.6	206.8	213.9	220.7	227.4
44	171.1	179.5	187.5	195.3	202.9	210.2	217.3	224.3	231.0
46	173.8	182.3	190.4	198.3	206.0	213.4	220.6	227.6	234.5
48	176.5	185.0	193.3	201.2	209.0	216.5	223.8	230.9	237.8
50	179.0	187.6	195.9	204.0	211.8	219.4	226.8	234.0	241.0
52	181.4	190.1	198.5	206.7	214.6	222.3	229.7	237.0	244.1
54	183.7	192.5	201.0	209.3	217.2	225.0	232.5	239.9	247.0
56	185.9	194.8	203.4	211.7	219.8	227.6	235.2	242.6	249.8
58	188.1	197.1	205.7	214.1	222.2	230.1	237.8	245.3	252.6
60	190.2	199.2	208.0	216.4	224.6	232.6	240.3	247.9	255.2
62	192.2	201.3	210.1	218.7	226.9	235.0	242.8	250.4	257.8
64	194.1	203.3	212.2	220.8	229.2	237.3	245.1	252.8	260.3
66	196.0	205.3	214.3	222.9	231.3	239.5	247.4	255.1	262.7
68	197.8	207.2	216.2	225.0	233.4	241.6	249.6	257.4	265.0
70	199.6	209.0	218.1	226.9	235.5	243.7	251.8	259.6	267.3
72	201.3	210.8	220.0	228.8	237.4	245.8	253.9	261.8	269.5
74	203.0	212.6	221.8	230.7	239.4	247.7	255.9	263.8	271.6
76	204.7	214.3	223.6	232.5	241.2	249.7	257.9	265.9	273.7
78	206.3	215.9	225.3	234.3	243.0	251.5	259.8	267.9	275.7
80	207.8	217.5	226.9	236.0	244.8	253.4	261.7	269.8	277.7
82	209.3	219.1	228.6	237.7	246.6	255.2	263.5	271.7	279.6
84	210.8	220.7	230.2	239.3	248.2	256.9	265.3	273.5	281.5
86	212.3	222.2	231.7	240.9	249.9	258.6	267.1	275.3	283.3
88	213.7	223.6	233.2	242.5	251.5	260.3	268.8	277.0	285.1
90	215.0	225.1	234.7	244.0	253.1	261.9	270.4	278.8	286.9
92	216.4	226.5	236.2	245.5	254.6	263.5	272.1	280.4	288.6
94	217.7	227.8	237.6	247.0	256.1	265.0	273.7	282.1	290.3
96	219.0	229.2	239.0	248.4	257.6	266.5	275.2	283.7	291.9
98	220.3	230.5	240.3	249.8	259.1	268.0	276.7	285.2	293.5
100	221.5	231.8	241.7	251.2	260.5	269.5	278.2	286.8	295.1

Ram Weight	4015 Pounds	PILE DRIVING DATA
Hammer	D-19-42 Delmag	(BEARING IN TONS)

Required Driving Resistance (tons) as Determined by Modified Gates Formula

INCHES PER 10 BLOWS	HAMMER DROP IN FEET								
	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5
0.000									
0.125	360.4	375.9	390.8	405.3	419.3	432.9	446.1	459.0	471.6
0.250	317.8	331.7	345.1	358.0	370.6	382.8	394.7	406.2	417.5
0.375	292.9	305.9	318.4	330.4	342.1	353.5	364.6	375.3	385.8
0.500	275.3	287.5	299.4	310.8	321.9	332.7	343.2	353.4	363.4
0.625	261.6	273.3	284.7	295.6	306.3	316.6	326.7	336.4	346.0
0.750	250.4	261.7	272.6	283.2	293.5	303.4	313.1	322.6	331.8
0.875	240.9	251.9	262.5	272.7	282.7	292.3	301.7	310.8	319.7
1.000	232.7	243.4	253.7	263.6	273.3	282.7	291.8	300.7	309.3
1.125	225.5	235.9	245.9	255.6	265.0	274.2	283.0	291.7	300.1
1.250	219.0	229.2	239.0	248.4	257.6	266.5	275.2	283.7	291.9
1.375	213.2	223.1	232.7	241.9	250.9	259.7	268.1	276.4	284.5
1.500	207.8	217.5	226.9	236.0	244.8	253.4	261.7	269.8	277.7
1.625	202.9	212.4	221.7	230.6	239.2	247.6	255.7	263.7	271.4
1.750	198.4	207.7	216.8	225.5	234.0	242.2	250.2	258.0	265.7
1.875	194.1	203.3	212.2	220.8	229.2	237.3	245.1	252.8	260.3
2.000	190.2	199.2	208.0	216.4	224.6	232.6	240.3	247.9	255.2
2.125	186.4	195.4	204.0	212.3	220.4	228.2	235.8	243.3	250.5
2.250	182.9	191.7	200.2	208.4	216.4	224.1	231.6	238.9	246.0
2.375	179.6	188.3	196.6	204.7	212.6	220.2	227.6	234.8	241.8
2.500	176.5	185.0	193.3	201.2	209.0	216.5	223.8	230.9	237.8
2.625	173.5	181.9	190.0	197.9	205.5	212.9	220.2	227.2	234.0
2.750	170.6	178.9	187.0	194.7	202.3	209.6	216.7	223.6	230.4
2.875	167.9	176.1	184.0	191.7	199.2	206.4	213.4	220.2	226.9
3.000	165.3	173.4	181.2	188.8	196.2	203.3	210.2	217.0	223.6
3.125	162.8	170.8	178.5	186.0	193.3	200.4	207.2	213.9	220.4
3.250	160.4	168.3	176.0	183.4	190.5	197.5	204.3	210.9	217.4
3.375	158.0	165.9	173.5	180.8	187.9	194.8	201.5	208.0	214.4
3.500	155.8	163.6	171.1	178.3	185.3	192.2	198.8	205.3	211.6
3.625	153.6	161.3	168.8	175.9	182.9	189.6	196.2	202.6	208.8
3.750	151.6	159.2	166.5	173.6	180.5	187.2	193.7	200.0	206.2
3.875	149.6	157.1	164.4	171.4	178.2	184.8	191.2	197.5	203.6
4.000	147.6	155.1	162.3	169.2	176.0	182.5	188.9	195.1	201.2
4.125	145.7	153.1	160.2	167.1	173.8	180.3	186.6	192.8	198.7
4.250	143.9	151.2	158.3	165.1	171.7	178.1	184.4	190.5	196.4
4.375	142.1	149.4	156.4	163.1	169.7	176.0	182.2	188.3	194.2
4.500	140.4	147.6	154.5	161.2	167.7	174.0	180.2	186.1	192.0
4.625	138.7	145.8	152.7	159.3	165.8	172.0	178.1	184.0	189.8
4.750	137.1	144.1	150.9	157.5	163.9	170.1	176.1	182.0	187.7
4.875	135.5	142.5	149.2	155.7	162.1	168.2	174.2	180.0	185.7
5.000	133.9	140.8	147.5	154.0	160.3	166.4	172.3	178.1	183.7
5.125	132.4	139.3	145.9	152.3	158.6	164.6	170.5	176.2	181.8
5.250	130.9	137.7	144.3	150.7	156.9	162.9	168.7	174.4	179.9
5.375	129.5	136.2	142.8	149.1	155.2	161.2	167.0	172.6	178.1
5.500	128.1	134.8	141.3	147.5	153.6	159.5	165.3	170.8	176.3
5.625	126.7	133.3	139.8	146.0	152.0	157.9	163.6	169.1	174.5
5.750	125.3	131.9	138.3	144.5	150.5	156.3	162.0	167.5	172.8
5.875	124.0	130.6	136.9	143.0	149.0	154.8	160.4	165.8	171.2
6.000	122.7	129.2	135.5	141.6	147.5	153.2	158.8	164.2	169.5

PILE DRIVING DATA

DT1924 5/2013 (Replaces EC68)

Wisconsin Department of Transportation

Project Number 1229-04-76		
Name of Road CTH C (Pioneer Rd) Over IH 43		
Name of Structure		
Structure Number B-45-105	County Ozaukee	
Highway CTH C	Contract Number	
Contractor		
Required Bearing 210 TON	Plan Length 100' - 0"	
Pile Number 2	In (Abt. Or Pier Number) West Abutment	
Location	Stationing	Offset
Footing Elevation		
☒ Service Pile	☐ Test Pile	
Date Driven 3/21/2022	Ordered Length from Test Pile	

TYPE

Timber	Untreated	Treated
Steel	H Sections (Give size and wt.)	
Concrete	Cast-in-place (Give Shell Thickness) 0.375"	Diameter 12.75"
	Precast	
Others	Describe fully	
Diameter	Butt	Tip
Length	50.2 ft.	0 in.
Mandrel (if used)	Description	
Length	50.2 ft.	0 in.
Follower (if used)	Description	
Length	50.2 ft.	0 in.

HAMMER

Make and Model: Delmag D-19-42 S-A Diesel

(Check one)

- ☐ Gravity
- ☒ Single-Acting (Steam or Air)
- ☐ Double-Acting (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer

Weight of Striking Part of Hammer 4015 Lbs	Height of Fall 10.5 ft

For Double-Acting Hammer

Area of Piston	Steam or Air Pressure at Hammer Psi
Manufacturers Rated Energy ft. lbs.	

Driving Cap, Anvil, Helmet, etc.

Weight lbs.	Description

(Make Sketch on back)

Inspector

**Note any falling off in rated speed and height of fall during driving*

This driving record shall be kept for all test piling. It shall be kept for the first service piling in each pier or abutment when there is no test piling item. Show any delays to the driving operation. Show all auguring through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

Submit an electronic copy to the Bureau of Structures at: DOTDTSDStructuresPiling@dot.wi.gov and to the Bureau of Technical Services, Geotechnical Unit at: DOTDTSDGeotechnicalPiling@dot.wi.gov
Also submit a copy to the Regional Office.

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
	0	1		Start 9:03am
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
	16	17		
	17	18		
	18	19		
	19	20		
6	20	21	4	
"	21	22	4	
"	22	23	4	
"	23	24	4	
"	24	25	3	
"	25	26	3	
"	26	27	3	
"	27	28	3	
"	28	29	4	
"	29	30	4	
"	30	31	4	
"	31	32	6	
"	32	33	7	
"	33	34	8	
6.5	34	35	10	
"	35	36	10	
"	36	37	10	
"	37	38	10	
"	38	39	11	
"	39	40	13	
"	40	41	12	
"	41	42	13	
"	42	43	13	
7	43	44	15	
"	44	45	17	Stop Splice
6.5	45	46	13	9:23am
7	46	47	15	Start 9:55am
"	47	48	16	
7.5	48	49	17	
"	49	50	17	
"	50	51	18	
"	51	52	19	
"	52	53	18	
"	53	54	19	
"	54	55	21	

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
8	55	56	22	
"	56	57	23	
"	57	58	23	
"	58	59	23	
"	59	60	24	
"	60	61	23	
"	61	62	24	
"	62	63	22	
"	63	64	24	
"	64	65	26	
9	65	66	36	
"	66	67	35	
"	67	68	34	
"	68	69	35	
8.5	69	70	27	
"	70	71	27	
"	71	72	26	
"	72	73	27	
"	73	74	26	
"	74	75	27	
"	75	76	27	
"	76	77	27	
"	77	78	27	
"	78	79	27	
"	79	80	27	
"	80	81	28	
"	81	82	27	
"	82	83	28	
"	83	84	26	
"	84	85	26	
"	85	86	26	
"	86	87	27	
"	87	88	28	
"	88	89	26	
"	89	90	27	
"	90	91	28	
"	91	92	26	
"	92	93	27	
"	93	94	27	
"	94	95	27	
"	95	96	27	Stop Splice
8.5	96	97	27	10:32am
"	97	98	28	Start 11:03am
"	98	99	28	
"	99	100	29	
"	100	101	31	
"	101	102	29	
"	102	103	30	
"	103	104	31	
"	104	105	32	
"	105	106	31	
"	106	107	29	
"	107	108	30	
"	108	109	31	
"	109	110	32	
"	110	111	32	
"	111	112	31	

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
"	112	113	33	
"	113	114	34	
"	114	115	35	
"	115	116	34	
"	116	117	35	
"	117	118	33	
"	118	119	34	
"	119	120	35	
"	120	121	36	
"	121	122	35	
"	122	123	35	
9	123	124	37	
"	124	125	39	
"	125	126	41	
9.5	126	127	42	
	127	128	Cutoff 23.8'	Stop 11:34am
	128	129		
	129	130		
	130	131		
	131	132		
	132	133		
	133	134		
	134	135		
	135	136		
	136	137		
	137	138		
	138	139		
	139	140		
	140	141		
	141	142		
	142	143		
	143	144		
	144	145		
	145	146		
	146	147		
	147	148		
	148	149		
	149	150		
	150	151		
	151	152		
	152	153		
	153	154		
	154	155		
	155	156		
	156	157		
	157	158		
	158	159		
	159	160		

PILE DRIVING DATA

DT1924 5/2013 (Replaces EC68)

Wisconsin Department of Transportation

Project Number 1229-04-76		
Name of Road CTH C (Pioneer Rd) Over IH 43		
Name of Structure		
Structure Number B-45-105	County Ozaukee	
Highway CTH C	Contract Number	
Contractor		
Required Bearing 210 TON	Plan Length 100' - 0"	
Pile Number 3	In (Abt. Or Pier Number) West Abutment	
Location	Stationing	Offset
Footing Elevation		
☒ Service Pile	☐ Test Pile	
Date Driven 3/21/2022	Ordered Length from Test Pile	

TYPE

Timber	Untreated	Treated
Steel	H Sections (Give size and wt.)	
Concrete	Cast-in-place (Give Shell Thickness) 0.375"	Diameter 12.75"
	Precast	
Others	Describe fully	
Diameter	Butt	Tip
Length	50.2 ft.	0 in.
Mandrel (if used)	Description	
Length	50.2 ft.	0 in.
Follower (if used)	Description	
Length	ft.	in.

HAMMER

Make and Model: Delmag D-19-42 S-A Diesel

(Check one)

- ☐ Gravity
- ☒ Single-Acting (Steam or Air)
- ☐ Double-Acting (Steam, Air or Diesel)

For Gravity or Single-Acting Hammer

Weight of Striking Part of Hammer 4015 Lbs	Height of Fall 10.5 ft

For Double-Acting Hammer

Area of Piston	Steam or Air Pressure at Hammer Psi
Manufacturers Rated Energy ft. lbs.	

Driving Cap, Anvil, Helmet, etc.

Weight lbs.	Description

(Make Sketch on back)

Inspector

**Note any falling off in rated speed and height of fall during driving*

This driving record shall be kept for all test piling. It shall be kept for the first service piling in each pier or abutment when there is no test piling item. Show any delays to the driving operation. Show all auguring through fills. Show all jetting. The driving record may be continued on the back of this report along with any remarks, or on additional sheets.

Submit an electronic copy to the Bureau of Structures at: DOTDTSDStructuresPiling@dot.wi.gov and to the Bureau of Technical Services, Geotechnical Unit at: DOTDTSDGeotechnicalPiling@dot.wi.gov Also submit a copy to the Regional Office.

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
	0	1		Start 12:01pm
	1	2		
	2	3		
	3	4		
	4	5		
	5	6		
	6	7		
	7	8		
	8	9		
	9	10		
	10	11		
	11	12		
	12	13		
	13	14		
	14	15		
	15	16		
	16	17		
	17	18		
	18	19		
	19	20		
6	20	21	4	
"	21	22	4	
"	22	23	4	
"	23	24	4	
"	24	25	3	
'	25	26	3	
"	26	27	3	
"	27	28	3	
"	28	29	4	
"	29	30	4	
"	30	31	4	
"	31	32	6	
"	32	33	6	
"	33	34	8	
6.5	34	35	10	
"	35	36	10	
"	36	37	9	
"	37	38	9	
"	38	39	9	
"	39	40	10	
"	40	41	12	
"	41	42	13	
"	42	43	12	
7	43	44	15	
"	44	45	15	
"	45	46	15	Stop to Splice
7.5	46	47	16	12:23pm
"	47	48	17	Start 12:56pm
"	48	49	17	
"	49	50	18	
"	50	51	19	
"	51	52	21	
"	52	53	18	
"	53	54	19	
"	54	55	20	

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
7.5	55	56	19	
"	56	57	21	
"	57	58	21	
"	58	59	22	
8.5	59	60	33	
"	60	61	29	
"	61	62	28	
"	62	63	30	
"	63	64	31	
"	64	65	32	
9	65	66	39	
"	66	67	38	
"	67	68	34	
"	68	69	33	
8.5	69	70	32	
"	70	71	35	
"	71	72	33	
"	72	73	31	
"	73	74	27	
"	74	75	28	
"	75	76	27	
"	76	77	26	
"	77	78	27	Stop Refuel
8	78	79	25	1:17pm
8.5	79	80	32	Start 1:32pm
"	80	81	32	
"	81	82	31	
"	82	83	31	
"	83	84	31	
"	84	85	33	
"	85	86	32	
"	86	87	32	
"	87	88	31	
"	88	89	31	
"	89	90	32	
"	90	91	31	
"	91	92	32	
"	92	93	31	
"	93	94	32	
10	94	95	10/2.5"	Stop 1:43pm
	95	96	Cutoff 5.2'	
	96	97		
	97	98		
	98	99		
	99	100		
	100	101		
	101	102		
	102	103		
	103	104		
	104	105		
	105	106		
	106	107		
	107	108		
	108	109		
	109	110		
	110	111		
	111	112		

DRIVING RECORD

Fall H	Depth Below Ftg. Elev.		Penetration Resistance	Bearing
Feet	From	To	Blows/ft.	Tons
	112	113		
	113	114		
	114	115		
	115	116		
	116	117		
	117	118		
	118	119		
	119	120		
	120	121		
	121	122		
	122	123		
	123	124		
	124	125		
	125	126		
	126	127		
	127	128		
	128	129		
	129	130		
	130	131		
	131	132		
	132	133		
	133	134		
	134	135		
	135	136		
	136	137		
	137	138		
	138	139		
	139	140		
	140	141		
	141	142		
	142	143		
	143	144		
	144	145		
	145	146		
	146	147		
	147	148		
	148	149		
	149	150		
	150	151		
	151	152		
	152	153		
	153	154		
	154	155		
	155	156		
	156	157		
	157	158		
	158	159		
	159	160		

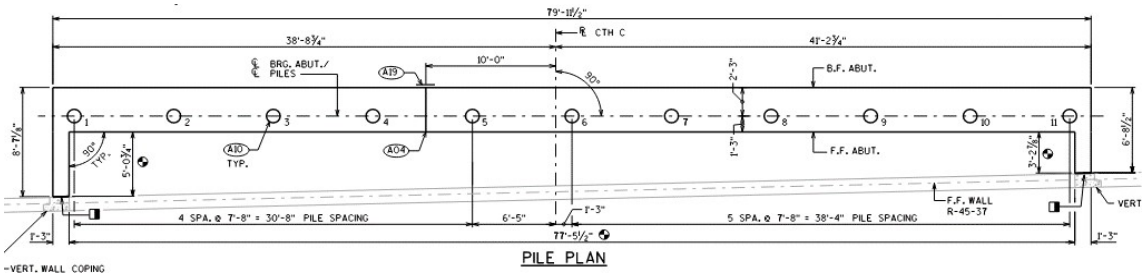
PILING RECORD

Wisconsin Department of Tr

DT1315 4/2013 (Replaces EB569)

County	Highway Number	Bridge Number
Ozaukee	CTH C	B-45-105
Project Number	**Bridge Contractor**	
1229-04-76		
Pile Type	**Plan Length**	**Design Bearing Value**
12.75" x 0.375" CIP	100'-0"	210 TONS
Type of Driver – Type and Size of Hammer		
Delmag 19-42 S-A Diesel		

Plan of Unit:
West Abutment



PILE PLAN

Pile Number	Set (inches per 10 blows)	Stroke (feet)	Nominal Resistance (tons)	Delivered Length (feet)	Splice Length (feet)	Cutoff Length (feet)	Driven (pay) Length (feet)	Date Installed (m/d/yy)
1	3.000	10.00	217.0	50.2	50.2	6.5	93.9	3/21/22
2	42/ft	9.50	213.9	50.2	100.4	23.8	126.8	3/21/22
3	2.500	10.00	230.9	50.2	50.2	5.2	95.2	3/21/22
4								
5								
6								
7								
8								
9								
10								
11								
		Average:	**220.6**			**Total:**	**315.9**	
						Average:	**105.3**	

Project Engineer	Date (m/d/yyyy)

Submit an electronic copy to the Bureau of Structures at: DOTDTSDStructuresPiling@dot.wi.gov
and to the Bureau of Technical Services, Geotechnical Unit at: DOTDTSDGeotechnicalPiling@dot.wi.gov
Also submit a copy to the WisDOT Regional Office.

Use extra page for remarks

Session 4 Exercises – Bridge Superstructure

Session 4 Exercises

4.1: Dry Run Adjustments

You are an inspector on a bridge construction project. The contractor has constructed the decking, installed the reinforcement and setup the Bidwell. He is ready to proceed with the dry run to verify deck thickness.

- The bridge is a single span structure, 100 feet long with a 4-girder cross section.
- The bridge deck will be 8 inches thick.
- The survey crew has surveyed each bay elevations at every 1/10th point.

Determine what options are available to adjust the Bidwell.

Rail to Decking

Plan Depth	4.82

Dry Run Rail to Decking Measurements											
1/10th Points / Girder Bay	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
Girders 1 - 2	4.84	4.83	4.84	4.83	4.82	4.83	4.80	4.79	4.80	4.82	4.82
Girders 2 -3	4.81	4.84	4.83	4.83	4.83	4.83	4.81	4.81	4.79	4.82	4.84
Girder 3 - 4	4.83	4.84	4.81	4.82	4.83	4.80	4.79	4.79	4.81	4.83	4.85

Answer:

The low spots at the beginning of the span between Girders 1-2 and Girders 3-4, respectively, may be ignored as they are within 1/8 inch (0.01') and the adjacent locations are at or just above the required deck thickness.

Bigger concerns are between 0.5 PT and 0.8 PT. 3/8" low at the worst.

There are two methods the engineer may employ; adjusting the carriage during the placement or adjusting the Bidwell rails after the dry run, but before the pour. The latter method provides less chance of missing the adjustments during the deck placement. This also will provide the better ride as you are not relying on manual adjustments during the pour.

Adjust the rails from 0.5 PT to max adjustment of 3/8 inch (0.03') at the 0.7 PT. Gradually reduce the elevations uniformly starting at the 0.7 PT to 0.9 PT.

4.2: Determining Haunch Heights

Determine Span 1, Girder 2 haunch heights for bridge B-45-105. (Use the bridge plans, girder elevations, and pantry spreadsheet located in the handouts to complete the exercise.)

B-45-105 Survey

Location	El	Span/Gir	Pt Desc
W end	694.20	S1G2	West Abut
0.1	694.25	S1G2	TOB
0.2	694.32	S1G2	TOB
0.3	694.38	S1G2	TOB
0.4	694.42	S1G2	TOB
0.5	694.47	S1G2	TOB
0.6	694.50	S1G2	TOB
0.7	694.51	S1G2	TOB
0.8	694.49	S1G2	TOB
0.9	694.45	S1G2	TOB
E end	694.43	S1G2	Pier 1

PROJECT NO. _____ SPAN NUMBER _____

BRIDGE NO. _____ GIRDER NUMBER _____

		0	1/10	2/10	3/10	4/10	5/10	6/10	7/10	8/10	9/10	1
TOP OF DECK ELEV. AT FINAL GRADE (ft.)	A - plan	695.14	695.20	695.25	695.29	695.33	695.35	695.36	695.36	695.36	695.35	695.32
DEAD LOAD DEFLECTION (in.)	B - plan	0.00	0.70	1.30	1.80	2.10	2.20	2.10	1.80	1.30	0.70	0.00
TOP OF DECK ELEV. PRIOR TO DECK POUR (ft.)	C - comp (=A+B/12)	695.14	695.26	695.36	695.44	695.51	695.53	695.54	695.51	695.47	695.41	695.32
DECK THICKNESS (in.)	D - plan	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
BOTTOM OF DECK ELEV. (ft.)	E - comp (=C-D/12)	694.39	694.51	694.61	694.69	694.76	694.78	694.79	694.76	694.72	694.66	694.57
TOP OF GIRDER ELEV. (ft.)	F - shoot	694.20	694.25	694.32	694.38	694.42	694.47	694.50	694.51	694.49	694.45	694.43
HAUNCH HEIGHT (ft.)	**G - comp (=E-F)**	**0.19**	**0.26**	**0.29**	**0.31**	**0.34**	**0.31**	**0.28**	**0.25**	**0.23**	**0.21**	**0.14**

Session 5 Exercises – Bridge Rehab

Session 5 Exercises

Questions	Answers
1. List at least six basic bridge deck overlay inspection duties that you would consider critical to ensuring a renovated bridge deck meeting contract requirements.	1.Identify and mark deteriorated areas in deck using a sounding technique. 2.Ensure all deterioration removed from identified areas. 3.Spot check sandblasting operation to ensure all rust removed from reinforcement. 4.Ensure correct rail settings for required grades and profile. 5.Ensure finishing machine adjusted correctly for required depth of overlay. 6.Calibrate the mobile mixer and check the calibration settings daily. 7.Ensure workers vibrate the concrete in deck prep areas, full depth areas, and joint repair areas. 8.Inspect straight edging, surface finishing and texturing for required finish. 9.Maintain daily records including start and stop times, delays, weather conditions, cubic yards of concrete produced, slump and air test results, problems and remarks.
2. What is chaining a bridge deck? How is it performed and what does it do?	Chaining a bridge deck is a technique used to identify deteriorated areas under the deck surface. An inspector sweeps a long chain across the deck surface in a back and forth motion. Deteriorated areas make a hollow sound when the chain crosses them. The inspector will sound out the perimeter of the deteriorated area, marking the boundary with spray paint as they go along.

3. What is the requirement for chipping hammers when removing concrete from around reinforcing bars?

Under Part 5, Structures, Section 509, Concrete Overlay and Structure Repair, Per Subsection 509.3.4(2)5 of the Standard Specifications, after reaching the top of the reinforcing steel, do not use hammers heavier than 15 pounds within one inch of the steel.

4. What is neat cement or slurry?

Neat cement is a slurry made out of water and cement (five gallons per 94 lb. sack). Neat cement is thoroughly brushed over the prepared concrete surface and acts as a bonding agent between the old concrete and the new overlay.

5. You have calibrated a meter reading of 68 for a 94 lb. sack of cement and 5.7 for the correct quantity of stone. How many pounds of stone will be included in the mix per sack of cement with this dial setting of 5.7 for stone?

   The following values are taken from 501.3.2.2 of the Standard Spec. for Grade E concrete:

   823 lbs. of cement per CY
   50% fine aggregate (sand)
   2,810 lbs aggregate per CY

   50% #1 – ¾ inch (stone) (design)
   3.7 gallons water per sack (design)
   4.0 gallons water per sack (max)

2,810 lbs. agg/cy x 50% = 1,405 lbs. stone

823 lbs. cement/cy ÷ 94 lbs./sk = 8.8 sk/cy

1,405 ÷ 8.8 = 159.6 lbs. stone/sack