

SP00540 (Special Provisions for the 2024 Book) (Bidding on or after: ~~1109~~-01-26  
Last updated: ~~076-2201~~-26  
Requires ~~SP00585, SP00759~~, SP02001, SP02050, SP02080 & SP02560  
Requires SP00759 when surface finishing is required.  
Requires SP02690 when PCC Aggregate is required.  
Requires SP02210 when concrete coating is required.  
Requires SP02440 when preformed expansion joint filler is required)

## SECTION 00540 - STRUCTURAL CONCRETE

*(Follow all instructions and make all edits with "Track Changes" turned on. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the project. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)*

Comply with Section 00540 of the Standard Specifications modified as follows:

**00540.03 Required Submittals for Deck Sidewalk and Curb Ramps** - Replace the title of this subsection with "Submittals for Deck Sidewalk and Curb Ramps"

Replace the paragraph that begins "Material ordered or Work ..." with the following paragraph:

Material ordered or Work done before the Engineer reviews and returns the documents are at the Contractor's risk.

Add the following subsection:

**00540.10(a) Pigmented Sealer** - Furnish a semi-opaque, or opaque, 100% acrylic or acrylic co-polymer resin concrete sealer meeting the following requirements:

| Property                    | Test Method                        | Requirement                    |
|-----------------------------|------------------------------------|--------------------------------|
| UV Resistance               | ASTM D5894                         | 5000 hour exposure             |
| Wind Driven Rain Resistance | ASTM D6904 reference FED TT-P-555B | No visible leaks               |
| Permeance                   | ASTM E96/E96M or ASTM D1653        | Minimum 10 perms               |
| Fungal Growth               | FED STD 141                        | No fungal growth after 21 Days |

Provide colors and color samples as shown or directed. Furnish a sealer designated for vertical application when applied to walls. When applied to structures with soffits or overhangs, furnish a sealer that is designated for vertical and overhead application.

Furnish pigmented sealer color that conforms to the following colors:

*(In the following list, replace the color and color number if necessary. Delete all purple parentheses.)*

Light Gray, according to SAE AMS-STD-595C color #(36375).

Dark Gray, according to SAE AMS-STD-595C color #(36176).

**00540.15 Form Materials** - Replace this subsection, except for the subsection number and title, with the following:

Furnish wood, minimum nominal 5/8-inch-thick APA exterior grade plywood, minimum nominal 5/8-inch-thick APA plyform, metal, or other suitable form material. For round concrete columns, furnish either metal or other approved form material that produces a smooth and true surface free from fins, joints and other irregularities. Use APA plyform for all decks and slabs.

**00540.17 Acceptance of Concrete** - Replace the paragraph that begins "Acceptance of concrete ..." with the following paragraph:

Acceptance of concrete is according to Section 00165 and the following:

**00540.17(a) Aggregate** - Replace the paragraph that begins "Acceptance of Aggregate ..." with the following paragraph:

Acceptance of Aggregate is according to 02690.12.

**00540.17(b) Plastic Concrete** - Replace the paragraph that begins "Acceptance of plastic concrete ..." with the following paragraph:

Acceptance of plastic concrete is based on tests performed by the Contractor's QCT, according to the Tolerances and limits of 02001.20.

**00540.17(c) Hardened Concrete** - Replace the paragraph that begins "Cast and cure..." with the following paragraph:

Cast and cure test specimens according to AASHTO R 100 in 6-inch x 12-inch or 4-inch x 8-inch, single-use plastic molds and test at 28 Days according to AASHTO T 22.

**00540.17(c)(1) General** - Replace the paragraph that begins "For all classes of concrete ..." with the following paragraph:

For all classes of concrete, acceptance of hardened concrete is based on an analysis of compressive strength tests of cylinders cast by the QCT. Test cylinders at an ODOT certified laboratory.

**00540.17(c)(2) Acceptance** - Replace this subsection, except for the subsection number and title, with the following:

Hardened concrete with an ASTV meeting or exceeding the specified design strength,  $f'_c$  is accepted for strength. If the ASTV is less than  $f'_c$  but at least 85 percent of  $f'_c$ , the Engineer may review the results to determine if the concrete represented by the cylinders is suitable for the intended purpose. Remove concrete that has an ASTV less than 85 percent of  $f'_c$  unless otherwise authorized, in writing, by the Engineer. If the concrete is removed, the cost of removal, replacement and all related Work is the Contractor's responsibility. If the Engineer

determines that the concrete is suitable for the intended purpose, the concrete may be allowed to remain in place, subject to a price adjustment according to 00150.25.

If an ASTV falls below  $f'_c$ , the Contractor may submit a written plan outlining a proposed alternate method of evaluating compressive strength. Submit the plan for review by the Engineer within 3 Days of the test. Provide evidence that a reasonable  $f'_{cr}$  (over-design) was maintained and that there is credible evidence (besides low strength) that warrants consideration of this option. The Engineer may allow an alternate method of acceptance if the compressive strength test results are determined to be suspect from definable external factors.

**00540.24(a) Deck Finishing Machine Support System** - Replace this subsection, except for the subsection number and title, with the following:

Provide calculations and detailed drawings of the proposed deck finishing machine support system according to 00540.41.

**00540.25 Straightedge** - Replace this subsection, except for the subsection number and title, with the following:

Provide a 12-foot metal straightedge for checking bridge deck roadway and sidewalk surface Tolerances.

**00540.40(b)(3)(c)** - Replace this subsection, except for the subsection number and title, with the following:

On ramps, sidewalks and intersections the gap below a 12-foot unlevelled straightedge resting on high spots does not exceed 1/4 inch in any direction.

**00540.40(b)(3)(d)** - Replace this subsection, except for the subsection number and title, with the following:

On bridge decks, the gap below a 12-foot unlevelled straightedge does not vary from the testing edge by more than 1/8 inch in any direction.

**00540.41(b) General Design Loads** - Replace the paragraph that begins "Ensure design loads ..." with the following paragraph:

Ensure design loads used are the maximum loadings. Ensure deflections used on manufactured devices and assemblies do not exceed the manufacturer's recommendations. Provide catalog data that lists the manufacturer's recommendations.

**00540.41(c)(2) On Piles** - Replace the paragraph that begins "For Falsework supported ..." with the following paragraph:

For Falsework supported on piles, show on the Working Drawings the pile type, size and spacing. Accompany these drawings with calculations that show the assumptions and methods used to design the piles and the bearing values that the piles need to be driven to support the calculated loads.

**00540.41(d) Requirements at Highway and Railroad Traffic Openings** - Replace the bullet that begins "Increase the vertical post ..." with the following bullet:

- Increase the vertical post load 150 percent. If the load on the Falsework is increased by load transfer due to prestressing, increase the vertical post load by the additional load due to prestressing or by 150 percent, whichever is greater.

*(Use the following subsection .41(f) if bolt holes are allowed in the exterior girder web to support form brackets.)*

**00540.41(f) Concrete Forms on Steel Structures** . Replace the paragraph that begins "Provide sufficient temporary bracing ..." with the following paragraph:

Provide sufficient temporary bracing or temporary struts and ties to minimize lateral deflection and rotation of the exterior steel girder. Calculate exterior girder rotation according to the *ODOT Bridge Design Manual* section 1.16.3. Limit deck deflection at the edge of deck due to girder rotation to no more than 1/4 inch.

Add the following to the end of the subsection:

Shop drill bolt holes in the exterior girder web to support form brackets. Fill the holes with fully torqued ASTM F3125 Grade A325 or button-head twist-off bolts ASTM F1852 or F2280 bolts according to Section 02560. Place each bolt head on the exterior side of the web. No holes are to be made in the flanges.

**00540.42 Falsework Construction** - Replace the paragraph that begins "Construct Falsework according ..." with the following paragraph:

Construct Falsework according to the current edition of *AASHTO Construction Handbook for Bridge Temporary Works*, except where in conflict with the Specifications. Assure that Falsework is constructed according to the Falsework design and on Soils equal to or exceeding design assumptions. Within 2 Days of notice of the falsework design engineer's pending inspection, the Engineer will provide a list of construction concerns. Do not place concrete until the falsework design engineer of record, accompanied by the Engineer, field inspects that portion of the Falsework proposed for use. Do not place concrete until all construction concerns have been addressed, the falsework design engineer provides the Engineer a written statement that the Falsework conforms to the design and will serve the intended use, and the Engineer agrees in writing that the Falsework will serve the intended use.

**00540.43(a) Construction Joints** - Replace the paragraph that begins "Apply a concrete surface ..." with the following paragraph:

Apply a concrete surface retarder according to the manufacturer's recommendations. Remove surface mortar within the time period recommended by the manufacturer and clean the joint surface and reinforcing steel by removing loosened particles of Aggregate, damaged concrete, unconsolidated concrete and surface laitance with a high pressure washer according to 00540.28 to the extent that clean Aggregate (free of surface mortar) is exposed on 50 percent of the surface. Clean the joint surface again immediately prior to the concrete placement to remove any subsequent deposits of dirt, debris or other foreign materials.

Saturate the joint surface with potable water immediately before resuming concrete placement. Remove standing water in depressions or hollows of the joint surface.

**00540.43(e) Construction Joints Between Existing and New Concrete** - Replace the paragraph that begins "Sand-blast or water-blast existing ..." with the following paragraph:

Sand-blast or water-blast existing concrete surfaces where shown or directed. Roughen surface to a uniformly distributed 1/4-inch minimum amplitude surface profile. If approved, bush hammers or scabblers may be used for roughening existing concrete surfaces. Use pneumatic hammers, chipping guns, manual picks and chisels for area with limited access. Do not use pneumatic hammers heavier than a nominal 15-pound class. Remove loosened particles of Aggregate and damaged concrete with a high-pressure washer according to 00540.28.

**00540.45 Construction of Forms** - Replace the bullet that begins "Are retightened before ..." with the following bullet:

- Are retightened before depositing new concrete on or against concrete that has hardened.

**00540.48(a) General** - Replace the bullet that begins "Through pumps, chutes ..." with the following bullet:

- Through pumps, chutes or trunks according to 00540.22, when placement requires dropping concrete more than 5 feet. Place the bottom of pump hose, chutes, pipes or trunks as close to final placement position as practicable.

Replace the bullet that begins "In layers not more ..." with the following bullet:

- In layers not more than 18 inches thick, except for seal concrete placement, unless shown otherwise. Place and consolidate each layer before the preceding layer has taken initial set to avoid surfaces of separation between the layers.

**00540.48(b) Pumping Concrete** - Replace this subsection, except for the subsection number and title, with the following:

Pump concrete with pumping Equipment according to 00540.22. Pump a cement-water slurry through the lines before starting the mix through the pump. Operate the pump in a manner that produces a continuous stream of concrete without air pockets or segregation. When a placement nears completion, if concrete remaining in the pipeline is to be used, remove it in a manner that will not cause contamination of the concrete already in place.

There is no extra payment for additional cement or additives required to ensure a mix is pumpable.

**00540.48(c) Vibrating Concrete** - Replace the paragraph that begins "Apply vibration at the point ..." with the following paragraph:

Apply vibration at the point of freshly deposited concrete. Apply vertically at points uniformly spaced not farther apart than 1 1/2 the radius over where the vibration is visibly effective. Penetrate into previously placed plastic layers.

Replace the paragraph that begins "Do not use vibrators to ..." with the following paragraph:

Do not use vibrators to make concrete flow or to move concrete from one point to another in the Forms. Do not apply directly on or through the reinforcement to sections or layers of concrete that have hardened to the degree that the concrete ceases to be plastic under vibration.

**00540.48(g) Bridge Decks** - Replace the paragraph that begins "Use deck finishing machines ..." with the following paragraph:

Use deck finishing machines according to 00540.24 and set to run parallel to the skew of the bent lines. Place screed rails outside the finishing area. Extend screed rails beyond both ends of the scheduled placement length for a distance that allows the finishing machine to reach all of the concrete.

Replace the paragraph that begins "Before placing concrete, operate ..." with the following paragraph:

Before placing concrete, operate the finishing machine the length of the proposed placement, and check the deck thickness and clearance from the screed to the reinforcing steel in the presence of the Engineer, by an approved method. The permissible variation from the clearance indicated is plus or minus 1/4 inch. Make necessary corrections before beginning the placement.

Replace the bullet that begins "Provides wind breaks, fog ..." with the following bullet:

- Provides wind breaks, fog spray, or other approved methods when the concrete surface is exposed to conditions that may cause premature drying during placement operations.

**00540.49(a)(2)(a) General** - Replace the paragraph that begins "To place concrete when the ..." with the following paragraph:

To place concrete when the temperature is below 40 °F, submit a Cold Weather Plan that identifies the methods that are used to prevent the concrete temperature from falling below 50 °F. Methods include heated enclosures and insulated Forms. Also include in the plan measures that are taken if the concrete temperature falls below 50 °F. Provide a 24-hour continuous recording thermometer to verify the concrete temperature.

**00540.49(a)(2)(b) Enclosures** - Replace the bullet that begins "Furnish and use, within ..." with the following bullet:

- Provide and use, within the enclosure, a 24-hour continuous temperature/humidity recorder to record the air temperature and relative humidity every hour during the cure period.

**00540.50(b) Deck Roadway Finish** - Replace the paragraph that begins "After the deck roadway concrete ..." with the following paragraph:

After the deck roadway concrete has been screeded with a finishing machine according to 00540.24, float, if necessary, to produce a uniform surface, according to 00540.55. If the Work does not conform to the prescribed limits, stop the operation until revised methods, changes in Equipment, or correction of procedures are approved for trial. Also stop the revised operation if it does not produce a specified surface.

**00540.50(d) Deck Sidewalk and Curb Ramp Finish** - Replace this subsection, except for the subsection number and title, with the following:

Finish concrete surfaces on pedestrian facilities including but not limited to sidewalks, curb ramps and pedestrian structures that contain a Pedestrian Accessible Route according to 00759.50.

**00540.51(a) General Requirements** - Replace the paragraph that begins “If the ambient temperature falls ...” with the following paragraph:

If the ambient temperature falls below 50 °F, or is forecasted to be below 50 °F, provide a 24-hour continuous recording thermometer and place it directly on the surface of the concrete. Once placed, leave the thermometer in place for the duration of the cure period. Use methods approved by the Engineer to maintain a concrete temperature of at least 50 °F during the cure period.

**00540.51(b) Curing Concrete Bridge Decks** - Replace the bullet that begins “Provide wind breaks or ...” with the following bullet:

- Provide wind breaks or other approved methods when exposed to conditions that may cause premature drying during placement operations. Premature drying is defined as an evaporation rate equal to or greater than 0.10 pounds per square foot per hour, as determined from Figure 00540-1, or as the loss of surface sheen when the evaporation rate at the surface exceeds the bleed rate.

Replace the bullet that begins “Maintain a continuous water...” with the following bullet:

- Except for HPC(IC), maintain a continuous water cure of the concrete surface for 14 Days. For HPC(IC), maintain a continuous water cure of the concrete surface for 7 Days.

**00540.52 Removal of Forms and Falsework, and Subsequent Loading** – Replace the paragraph that begins “In determining when to remove ...” with the following paragraph:

In determining when to remove Forms and Falsework, and when to place subsequent loads, the Engineer will consider the Contractor's proposed schedule, the location and character of the Structure, the weather, and other conditions influencing the setting of the concrete. If appropriate, these operations are controlled by compressive strength tests of cylinders cast by the Contractor and witnessed by the Engineer. Test the cylinders at a recognized testing laboratory at no additional cost to the Agency. Cast and cure cylinders according to AASHTO R 100 (field cured) that is equivalent to the most unfavorable field conditions for the portions of the concrete that the cylinders represent.

Replace the paragraph that begins “<sup>2</sup> Where continuous spans ...” with the following paragraph:

<sup>2</sup> Where continuous spans are involved, the time for all spans is determined by the last concrete placed affecting any span.

**00540.53(b) Class 1 Surface Finish (Ground, Sacked, and Coated)** - Replace the paragraph that begins “After completion of the general ...” with the following paragraph:

After completion of the general surface finish, grind the surface with a power grinder or an equivalent method to remove laitance and surface film. Sack the surface to fill all holes using a paste of fine mortar sand, cement, water, and bonding agent. The ratio of bonding agent to water is one part bonding agent to two parts water, or as recommended by the manufacturer. Apply coating according to 00540.53(d).

**00540.53(d) Concrete Coating** - Replace the paragraph that begins “Apply either a concrete paint...” with the following paragraph:

Apply either a concrete paint or a pigmented sealer as shown or specified. Where a Class 1 or Class 2 surface finish is shown, apply a concrete paint unless specified or shown otherwise.

**00540.53(d)(1) Concrete Paint** - Replace the paragraph that begins “Thoroughly saturate the surface ...” with the following paragraph:

Thoroughly saturate the surface with water and coat it, while damp, with a coating Material according to 02210.30. Apply a minimum of two coats of coating Material. Apply coating according to the manufacturer's instructions. The second coat may be applied any time after the previous coat, when touched lightly, does not adhere to the finger. Additional coats may be required to provide uniformity in coverage and color. Mortar sand may be added to the coating Material to help achieve a uniform surface.

**00540.53(d)(2) Penetrating Concrete Stain or Sealer** - Replace this subsection with the following subsection:

**00540.53(d)(2) Pigmented Sealer** - Prepare concrete surfaces and apply 2 coats of the pigmented sealer according to the manufacturer's recommendations. Follow all recommended curing schedules for newly placed concrete prior to application and for recoat or repair. Monitor and follow all environmental limitations as published by the manufacturer during application, and curing.

**00540.54 Crack Inspection and Deck Sealing** - Replace the paragraph that begins “Perform crack sealing Work ...” with the following paragraph:

Perform crack sealing Work at no additional cost to the Agency. Complete all crack sealing Work before opening to traffic. If the Bridge is opened to traffic at the Contractor's request before completing crack sealing, all additional traffic control to complete crack sealing is at no additional cost to the Agency.

**00540.55 Final Acceptance of Bridge Deck Surface** - Replace the paragraph that begins “Ensure the finished ...” with the following paragraph:



Ensure the finished bridge deck roadway surface meets the Tolerance specified in 00540.40(b)(3)(d) at every point. Provide a 12-foot straightedge and use it under the Engineer's direction.

*(Use the following subsection .80(a)(1) when concrete is paid for on the lump sum basis. List by bridge number then by bid item name. Add items as appropriate. Delete what does not apply. Obtain information from the Bridge Designer.)*

**00540.80(a)(1) Lump Sum** - Add the following to the end of this subsection:

The estimated quantity of concrete is:

Bridge No. \_\_\_\_\_

| Type and Class                           | Quantity (Cu. Yd.) |
|------------------------------------------|--------------------|
| Foundation Concrete, Class _____         | _____              |
| Deck Concrete, Class _____               | _____              |
| General Structural Concrete, Class _____ | _____              |

Bridge No. \_\_\_\_\_

| Type and Class                           | Quantity (Cu. Yd.) |
|------------------------------------------|--------------------|
| Foundation Concrete, Class _____         | _____              |
| Deck Concrete, Class _____               | _____              |
| General Structural Concrete, Class _____ | _____              |

*(Use the following subsection .80(b) if surface texturing is required.)*

**00540.80(b) Sawcut Texturing** - Replace this subsection with the following subsection:

**00540.80(b) Surface Texturing** - The quantities of surface texturing will be measured on the area basis and is the area of each bridge deck or approach slab as shown, less 16 inches along each curb and 6 inches from joint blockouts and bridge ends. Field measurement of surface texturing will not be made.

*(Use the following subsection .90 if surface texturing is required.)*

**00540.90 Payment** – Replace the Pay Item Sawcut Texturing with the following Pay Item:

| Pay Item                   | Unit of Measurement |
|----------------------------|---------------------|
| (d) Surface Texturing..... | Square Yard         |

Replace the paragraph that begins “In items (a), (b) ...” with the following paragraph:

In items (a), (b), and (c), the class of concrete is inserted in the blank.

Replace the paragraph that begins "Payment will be payment ..." with the following paragraph:

Payment will be payment in full for furnishing and placing all Materials, and for providing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

*(Include the following falsework design checklist when required by the Bridge Designer.)*

## FALSEWORK DESIGN CHECKLIST

**Instructions** - This checklist was developed to facilitate the design, review, and erection of falsework to be used for Oregon Department of Transportation bridge construction projects. This checklist is intended to act as a reminder to design or check for specific important aspects of this construction. It is not a substitute for plan and/or design criteria or specification requirements.

The Checklist is to be completed and signed by the Falsework Design Engineer. Answer every question. Attach to the Checklist an explanation of any negative responses.

Submit the Checklist according to 00540.41(a).

| <b>A. Contract Plans, Specifications, Permits, Etc.</b>                                                                                                                                      | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| 1. Are the falsework plans prepared, stamped and signed by an engineer registered to practice in Oregon?                                                                                     | _____      | _____     | _____      |
| 2. Have three complete sets (five if railroad approval is required) of the design calculations been included with the falsework drawings submittal?                                          | _____      | _____     | _____      |
| 3. Are falsework plans in compliance with the requirements of the construction plans general notes?                                                                                          | _____      | _____     | _____      |
| 4. Are falsework plans in compliance with contract plan structural details?                                                                                                                  | _____      | _____     | _____      |
| 5. Are falsework plans in compliance with the requirements of the Oregon Standard Specifications for Construction, subsection 00150.35?                                                      | _____      | _____     | _____      |
| 6. Are all existing, adjusted or new utilities in proximity with the proposed falsework shown on the falsework plans and is protection of these utilities addressed?                         | _____      | _____     | _____      |
| 7. Are clearance requirements satisfied and shown on the falsework plans?                                                                                                                    | _____      | _____     | _____      |
| 8. For construction in or over navigable waters have all requirements for construction of falsework that are called for in the Coast Guard Permit been incorporated in the falsework design? | _____      | _____     | _____      |
| 9. Has possible damage from traffic been considered in the falsework design?                                                                                                                 | _____      | _____     | _____      |

|                                                                                                                                                                               |            |           |            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| 10. Has damage from stream drift been considered in the falsework design?                                                                                                     | _____      | _____     | _____      |
| 11. Is the concrete placing sequence shown and is it consistent with the contract plans?                                                                                      | _____      | _____     | _____      |
| <b>B. Foundation Requirements</b>                                                                                                                                             | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Are driven falsework piling provided as called for on the contract plans?                                                                                                  | _____      | _____     | _____      |
| a. Is a minimum pile tip elevation or penetration indicated on the drawings?                                                                                                  | _____      | _____     | _____      |
| b. If timber falsework piles are specified, are the recommended order lengths sufficient to virtually eliminate the possibility of pile splices?                              | _____      | _____     | _____      |
| c. Is a detailed static pile capacity analysis included in the calculations?                                                                                                  | _____      | _____     | _____      |
| d. If lateral loads are applied to the piling by equipment, dead loads, flowing water, or drift, is a detailed lateral load analysis included in the calculations?            | _____      | _____     | _____      |
| e. When piling are in an active waterway, have the potential effects of scour on axial and lateral pile support been addressed in the calculations?                           | _____      | _____     | _____      |
| f. Does the proposed falsework pile hammer meet the minimum field energy requirements as listed in 00520.20(d)(2)?                                                            | _____      | _____     | _____      |
| g. Will a driving criteria graph [FHWA Gates Equation, in 00520.42(b)] plotting blow count versus stroke for an acceptable pile hammer be provided for the project inspector? | _____      | _____     | _____      |
| 2. Is falsework supported on spread footings or mud sills?                                                                                                                    | _____      | _____     | _____      |
| a. Are the spread footing elevations shown on the drawings?                                                                                                                   | _____      | _____     | _____      |
| b. Has a rational method for determining the ultimate bearing capacity of the foundation materials been presented and described in the calculations?                          | _____      | _____     | _____      |
| c. Have the soil parameters used in calculating the ultimate bearing capacity been listed and confirmed by the designer?                                                      | _____      | _____     | _____      |

|                                                                                                                                                                 |            |           |            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| d. Has an appropriate Factor of Safety been used for calculating the allowable bearing capacity of the foundation materials?                                    | _____      | _____     | _____      |
| e. Are spread footing settlement estimates included in the calculations?                                                                                        | _____      | _____     | _____      |
| f. Have effective stresses been used in the calculations, when applicable?                                                                                      | _____      | _____     | _____      |
| g. When spread footings are founded near the top of a slope or in a slope, have the ultimate bearing capacity calculations been modified accordingly?           | _____      | _____     | _____      |
| h. When spread footings may be subjected to flowing water, have the potential effects of scour on ultimate bearing capacity been addressed in the calculations? | _____      | _____     | _____      |
| <b>C. Loads</b>                                                                                                                                                 | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Are the magnitude and location of all loads, equipment and personnel that will be supported by the falsework shown and noted on the falsework plans?         | _____      | _____     | _____      |
| 2. Has the mass of specific equipment units to be supported by the falsework been included in the calculations or on the falsework plans?                       | _____      | _____     | _____      |
| 3. Is the deck finishing machine supported in a manner that will not impose load on concrete forms except deck overhang brackets?                               | _____      | _____     | _____      |
| 4. Are design loads and material properties used to determine design stresses for each different falsework member shown on the falsework plans?                 | _____      | _____     | _____      |
| 5. Is the worst loading and member property condition, rather than the average condition, used to obtain design loads?                                          | _____      | _____     | _____      |
| 6. Are deck forms for concrete box girders supported from the girder stem and not from the bottom slab?                                                         | _____      | _____     | _____      |
| 7. Are diaphragm loads or other concentrated loads included in the analysis of supporting beams?                                                                | _____      | _____     | _____      |
| 8. If sloping structural members exert horizontal forces on the falsework, is bracing or ties used to resist these loads?                                       | _____      | _____     | _____      |
| <b>D. Allowable Stresses</b>                                                                                                                                    | <b>YES</b> | <b>NO</b> | <b>N/A</b> |

|                                                                                                                                                                                              |            |           |            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| 1. Has the method used for falsework design of all members except for manufactured assemblies been noted in the design calculations?                                                         | _____      | _____     | _____      |
| 2. Are manufactured assemblies identified as to manufacturer, model, rated working capacity and ultimate capacity?                                                                           | _____      | _____     | _____      |
| 3. Is the allowable stress and the calculated stress listed in the summary for each different falsework member, except for manufactured assemblies?                                          | _____      | _____     | _____      |
| <b>E. Timber Falsework Construction</b>                                                                                                                                                      | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Are timber grades consistent with material to be delivered to the construction site, and noted on falsework drawings, and in accompanying calculations for all timber falsework material? | _____      | _____     | _____      |
| 2. If "rough" lumber is specified for falsework by the falsework designer are the actual lumber dimensions used in calculations shown?                                                       | _____      | _____     | _____      |
| 3. If plywood spans are governed by the strength of the plywood, are the allowable stress and the calculated stress shown on the submitted calculations?                                     | _____      | _____     | _____      |
| 4. If plywood spans are governed by the allowable spacing of supporting joists, are the allowable and the proposed spacing shown on the falsework plans?                                     | _____      | _____     | _____      |
| 5. Have timber stringers been checked for bending, shear, bearing stresses, and 1/240 of the span length deflection?                                                                         | _____      | _____     | _____      |
| 6. Are joists identified as being continuous over 3 or more spans when they are not analyzed as simple spans?                                                                                | _____      | _____     | _____      |
| 7. Have stringers and cap beams been checked for bearing stresses perpendicular to the grain as well as for bending and shear stresses?                                                      | _____      | _____     | _____      |
| 8. Have posts been checked as columns as well as for compression parallel to the grain?                                                                                                      | _____      | _____     | _____      |
| <b>F. Steel Falsework Construction</b>                                                                                                                                                       | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Are steel structural shapes and plates identified by ASTM number on the falsework plans and in the calculations?                                                                          | _____      | _____     | _____      |

|                                                                                                                                          |            |           |            |
|------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| 2. Have steel beams been checked for bending, shear, web crippling and buckling of the compression flange?                               | _____      | _____     | _____      |
| 3. Has horizontal plane bracing been shown where required to limit compression flange buckling?                                          | _____      | _____     | _____      |
| <b>G. Deflections and Settlement</b>                                                                                                     | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Is falsework deflection for concrete dead load shown on the plans for all falsework spans?                                            | _____      | _____     | _____      |
| 2. Is falsework deflection from concrete dead load limited to 1/240 of the span length for all falsework spans?                          | _____      | _____     | _____      |
| 3. Do stringers supporting cast-in-place concrete compensate for estimated camber?                                                       | _____      | _____     | _____      |
| 4. For beam spans with cantilevers, has the upward deflection of the cantilevers due to load placed on the main spans been investigated? | _____      | _____     | _____      |
| 5. Are provisions shown for taking up falsework settlement?                                                                              | _____      | _____     | _____      |
| <b>H. Compression Members, Connections and Bracing</b>                                                                                   | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Has general buckling been evaluated for all compression members?                                                                      | _____      | _____     | _____      |
| 2. Has bracing been provided at all points of assumed support for compression members?                                                   | _____      | _____     | _____      |
| 3. Was bracing in each direction considered in establishing the effective length used to check post capacity?                            | _____      | _____     | _____      |
| 4. Is bracing strength and stiffness sufficient for the intended purpose?                                                                | _____      | _____     | _____      |
| 5. If temporary bracing is required during intermediate stages of falsework erection, is it shown on the falsework plans?                | _____      | _____     | _____      |
| 6. Have all connections been designed and detailed?                                                                                      | _____      | _____     | _____      |
| 7. Are web stiffeners required on steel cap beams to resist eccentric loads?                                                             | _____      | _____     | _____      |
| 8. Are wedges required between longitudinal beams and cap beams to accommodate longitudinal slope or to reduce eccentric loading?        | _____      | _____     | _____      |
| 9. Has the width to height ratio of wedge packs been verified to fall within the limits given in the special provisions?                 | _____      | _____     | _____      |

|                                                                                                                                                                                    |            |           |            |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|
| 10. If overhang brackets are attached to girder webs, has the need for temporary bracing to prevent longitudinal girder distortion been investigated?                              | _____      | _____     | _____      |
| 11. Have beams and stringers with height/width ratios greater than 2.5:1 been checked for stability?                                                                               | _____      | _____     | _____      |
| 12. Have sloping falsework members that exert horizontal forces on the falsework been braced or tied to resist these loads?                                                        | _____      | _____     | _____      |
| 13. If beams supporting cast-in-place concrete have cantilever spans, have the falsework plans been noted to require the main spans be loaded before loading the cantilever spans? | _____      | _____     | _____      |
| 14. Have timber headers set on shoring towers been checked for eccentric loads, and for shear and bending stresses produced by the eccentricity?                                   | _____      | _____     | _____      |
| <b>I. Highway and Railroad Traffic Openings (For falsework over or adjacent to highway or railroad traffic openings.)</b>                                                          | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Do falsework plans satisfy construction clearances shown on the contract plans?                                                                                                 | _____      | _____     | _____      |
| 2. Are posts designed for 150% of the calculated vertical loading and increased or readjusted for loads caused by prestressing forces?                                             | _____      | _____     | _____      |
| 3. Are mechanical connections 2,000 pounds minimum capacity shown at the bottom of posts to footing connections?                                                                   | _____      | _____     | _____      |
| 4. Are mechanical connections 1,000 pounds minimum capacity shown at the top of the post to cap connections?                                                                       | _____      | _____     | _____      |
| 5. Are beam tie downs 500 pounds minimum capacity shown for all beams?                                                                                                             | _____      | _____     | _____      |
| 6. Are 5/8 inch or larger diameter bolts used at connections for timber bracing?                                                                                                   | _____      | _____     | _____      |
| 7. Are temporary erection and removal bracing shown?                                                                                                                               | _____      | _____     | _____      |
| <b>J. Additional Requirements for Railroad Traffic Openings</b>                                                                                                                    | <b>YES</b> | <b>NO</b> | <b>N/A</b> |
| 1. Do falsework plans show collision posts as shown on the contract plans?                                                                                                         | _____      | _____     | _____      |



2. Do posts adjacent to the openings have a minimum section modulus of?

a. steel - 9.5 cubic inches

\_\_\_\_\_

b. timber - 250 cubic inches

\_\_\_\_\_

3. Are soffit and deck overhang forming details shown?

\_\_\_\_\_

4. Are falsework bents within 20 feet of centerline of the track sheathed solid between 3 feet and 17 feet above top of rail with 5/8 inch thick minimum plywood and properly blocked at the edges?

\_\_\_\_\_

5. Is bracing on the bents within 20 feet of the centerline of the track adequate to resist the required assumed horizontal load or minimum 5,000 pounds, whichever is greater?

\_\_\_\_\_  
Designer's Signature

\_\_\_\_\_  
Date

