**ILLINOIS TOLLWAY AC-200**

CHECKLIST FOR  
CONCRETE STRUCTURES OTHER THAN BRIDGE DECKS

This checklist has been prepared to provide the contractor a summary of easy-to-read step-by-step requirements relative to the proper construction of Concrete Structures other than Bridge Decks. The following questions are based on information found in Tollway Supplemental Specifications, Tollway Standards, IDOT Standard Specifications, IDOT Highway Standards, IDOT Constructions Manual and current policy memorandums and letters.

Have you checked the contract Special Provisions, Supplemental Specifications and plans to see if any modifications have been made to the requirements listed herein? \_\_\_\_

# 1. PLAN AND SPECIFICATION REVIEW

Prior to starting work on an item, have you reviewed the Contract Special Provisions and plans? \_\_\_\_

On bridge construction and reconstruction contracts have you checked the proposed or existing span lengths prior to starting work? \_\_\_\_

On bridge construction and reconstruction contracts have you checked the existing or proposed vertical or horizontal clearances? \_\_\_\_

Prior to the start of construction, have you checked the plan elevations of the bottom of footings, intermediate substructure components and bearing seat elevations of abutments and piers to ensure they correspond to the appropriate top of deck elevations and dimensions shown on the superstructure plans? \_\_\_\_

Are you computing the volume of concrete and weight of reinforcement bars for agreement with the quantity shown in the bill of materials? This will satisfy part of your documentation requirements, help familiarize you with the plans and, possibly, find plan errors. \_\_\_\_

# 2. PLANT & MATERIALS APPROVAL

Has the plant where the concrete is to be produced been approved by the Engineer? (Art. 1103.02) \_\_\_\_

Have you notified the Engineer of the proposed sources of materials prior to delivery? (Art. 106.05 of the Tollway Supplemental Specifications) \_\_\_\_

Has all material been inspected, tested and approved before incorporation in the work? (Art. 106.03 & 106.04 of the Tollway Supplemental Specifications) \_\_\_\_

If this contract includes the Special Provision for Quality Control/Quality Assurance (CM/CCM) of Concrete Mixtures, has the Tollway approved the Contractor's Quality Control Plan? (Special Provision) Discuss additional requirements with the Tollway Materials Engineer. \_\_\_\_

Whether QC/QA or non-QC/QA, have you reviewed all materials inspection, testing, approval, and reporting requirements for this contract? Discuss these requirements with the Tollway Materials Engineer. \_\_\_\_

# 3. EROSION AND SEDIMENT CONTROL

Prior to the start of work, has a jobsite inspection been conducted to review and designate the locations and types of erosion and sediment control protection to be placed? (Section 280 of the Tollway Supplemental Specifications) \_\_\_\_

Prior to beginning work, have all erosion and sediment control measures been installed and have they been approved by the Engineer? (Section 280 of the Tollway Supplemental Specifications) \_\_\_\_

# 4. EXCAVATION FOR STRUCTURES

When the contract provides for separate payment of excavation for structures, are you taking surface elevation measurements or cross-sections of the existing ground surface prior to the start of excavation but after clearing and tree removal have been completed? (Art. 502.02, Art. 502.12, and Art. 502.13) \_\_\_\_

If the contract provides for cofferdams or underwater structure excavation protection, have you submitted plans for approval? (Art. 502.06 and Special Provision for Underwater Structure Excavation Protection) \_\_\_\_

Is any pumping from the interior of a foundation enclosure done in a manner approved by the Engineer? (Art. 502.08) Make sure that no water with suspended silts, clays, or other contaminants is being pumped unfiltered directly into a waterway. (404 Permit) \_\_\_\_

Are you notifying the Engineer after each excavation is complete? No concrete shall be place until after the Engineer has approved the depth of the excavation and the character and condition of the foundation material. (Art. 502.09) \_\_\_\_

Has special care been taken not to disturb the bottom of any foundation excavation? In footings not supported by piling, the final removal of foundation material to grade shall not be made until just before the reinforcement and concrete is placed. (Art. 502.09) \_\_\_\_

In all footings, if the surface upon which the concrete is to be placed is soft, muddy or other unsuitable, is the material removed to an elevation directed by the Engineer and replaced with crushed stone, gravel or other material approved by the Engineer? (Art. 502.07) \_\_\_\_

# 5. REINFORCEMENT BAR INSPECTION

Are all delivered reinforcement bars being stored above the ground upon skids, platforms or other supports? Are epoxy coated reinforcement bars stored on wooden or padded steel cribbing? Are the reinforcement bars protected from mechanical injury and from deterioration by exposure? For non-epoxy bars, a light coating of rust will not be considered objectionable. (Art. 508.03, Art. 1006.10(a)) \_\_\_\_

Do reinforcement bars conform with the plan diameter, shape and dimensions? (Art. 508.04) \_\_\_\_

Have you notified the Engineer of the reinforcement bar delivery? Have you taken any samples as instructed by the Tollway Materials Engineer? \_\_\_\_

Are the reinforcement bars furnished from a Certified Producer? Check producer identification mark on reinforcement bar against latest approved certified producer list issued by IDOT Bureau of Materials and Physical Research. No reinforcement bars shall be used unless the producer has been certified. \_\_\_\_

For epoxy coated reinforcement bar, has the coating been applied by a Certified Producer? Have you given the epoxy coating producer's certifications to the Engineer? (BMPR Policy Memo 01-04, Special Provision for Epoxy Coatings for Steel Reinforcement) \_\_\_\_

For epoxy coated reinforcement bar, although reinforcement bars will be in bundles, are you making a preliminary check for damaged epoxy coating? Total damage greater than 2 percent of the bar surface in any 1 ft. of length of the bar or greater than 5 percent of the bar surface area covered with patching material shall be rejected. Scars greater than 1/4 by 1/4 inch can be repaired after placed in the deck mat. (Art. 508.05 and Art. 1006.10(a)(2)) \_\_\_\_

# 6. FORMS

Are the forms clean, braced, tight and sufficiently rigid to prevent distortion? (Art. 503.06) \_\_\_\_

When wooden forms are used, are they dressed lumber or plywood, and are they oiled prior to reinforcement bar placement? When the surfaces are not exposed to view, in lieu of form oil the wood forms may be saturated with water immediately prior to placement of the concrete. (Art. 503.06) \_\_\_\_

Are all sharp corners in forms being filleted with 3/4-inch molding , or 1/2-inch for corners on handrails and handrail posts? (Art. 503.06) \_\_\_\_

Is a V-shaped groove 1/2-inch triangular molding being formed into the exposed face of adjacent sections of retaining walls and abutment walls? (Art. 503.09) \_\_\_

# 7. REINFORCEMENT BAR PLACEMENT

Are all reinforcement bars held securely in place? (Floating or sticking bars into wet concrete is not acceptable.) (Art. 508.05) \_\_\_\_

Are all bar intersections being tied? (Alternate intersection tying will be allowed when the spacing is less than one foot in each direction.) (Art. 508.05) \_\_\_\_

Are the reinforcement bars being rigidly supported from faces of forms and bottoms of footings by approved stays, blocks, ties, hangers or other supports? (Tips of metal bar supports must be galvanized or plastic tipped or epoxy coated. For epoxy coated reinforcement bars, the supports must be made of either epoxy coated metal or of recycled plastic.) (Art. 508.05) \_\_\_\_

Are all reinforcement bar splices (laps) at least the length as shown on the plans and contact spliced? (Art. 508.06) \_\_\_\_

Are lapping reinforcement bars that are not specified to be contact spliced, placed at a clear distance apart of at least 2 1/2 inches or contact spliced? (Art. 508.06) \_\_\_\_

Do all bars have the clearance from the forms as indicated on the plans? Is the clearance being maintained by the use of chairs or other supports approved by the Engineer? (Art. 508.05) \_\_\_\_

# 8. PREPOUR INSPECTION

Prior to the placement of the concrete have the reinforcement bars, construction joints, and forms been cleaned of loose mill scale, mortar, dirt, oil, debris, and other foreign substances? (If directed by the Engineer, temporary openings shall be provided in the bottom of forms for cleaning out all extraneous material.) (Art. 508.05, Art. 503.06, Art. 1006.10(a)) \_\_\_\_

Are you inspecting and approving the placement of reinforcement before concrete is placed? (Art. 508.05) Close attention shall be given to ensure that pier and abutment cap reinforcement bars are placed as detailed in the plans so that proper clearance is provided for anchor bolt installation. Any conflicts shall be resolved with the Engineer.

Are you ensuring that no concrete will be placed on ice, snow or frozen foundation material? (Art. 503.07) \_\_\_\_

Is the Foreman aware that he/she is not to place any concrete until the Engineer has approved the depth of excavation, condition of the foundation material, line and grade of forms, form dimensions, and reinforcement placement? (Art. 502.09, Art. 503.06 and Art. 508.05) \_\_\_\_

# 9. DRAINAGE OPENINGS

Are 3-inch diameter drainage openings (weep holes) at 8-ft. centers, 2 ft. above the flowline or grade, being constructed in abutment walls, wing walls, retaining walls and culvert sidewalls unless the plans provide other means of drainage? (Art. 503.11) \_\_\_\_

Is a cubical deposit 2 ft. x 2 ft. x 2 ft. of gravel or crushed stone (Art. 1004.01) deposited behind each drainage hole with the backfilling operation? (Art. 502.10 and Art. 503.11) Is the cubical deposit completely enclosed in a fabric envelope? (Art. 502.10) \_\_\_\_

# 10. PLACING AND CONSOLIDATING

Is the air temperature above 40° F and rising? (Art. 1020.14) \_\_\_\_

Are open troughs, chutes, tubes or tremies being used to place the concrete so that the concrete will drop no farther than 5 feet? (Art. 503.07) \_\_\_\_

Is the concrete being deposited as near to its final position as possible? (Running concrete with vibrators is not permitted.) (Art. 503.07) \_\_\_\_

Is all structural concrete being internally consolidated with vibrators? Vibration shall be supplemented by spading for inaccessible locations. (Art. 503.07) \_\_\_\_

When consolidating concrete around epoxy coated reinforcement bars, do the vibrators have non-metallic heads that were coated by the manufacturer? Slip-on covers are not allowed. (Article 1103.17(a)) \_\_\_\_

For vertical construction, is the concrete being placed in continuous horizontal layers? Is the concrete being delivered such that there is no more than 20 minutes between successive layers? (Art. 503.08) \_\_\_\_

# 11. CONCRETE MIX DESIGN

Are you verifying that the proper concrete mix design is being delivered? \_\_\_\_

# 12. TEMPERATURE CONTROL

Are temperature checks of the plastic concrete being taken? The allowable limits for structural concrete are 50 °F to 90 °F. When insulated forms are used, 50 °F to 80 °F ((Art. 1020.14(b)) \_\_\_\_

# 13. CONCRETE DELIVERY TICKET

Are all truck tickets being collected and retained? (Art. 1020.11(a)(7)) \_\_\_\_

Do concrete tickets show section number, time of batch, batch quantity, truck number, etc? (Art. 106.03 and Art. 1020.11(a)(7)) \_\_\_\_

Are you recording on each truck ticket the inspector’s initials, the results of air/slump tests, concrete temperature checks, time of discharge, water or admixtures added, drum revolutions of transit mix trucks upon arrival and strength specimens taken? As an alternative, air/slump test results can be recorded and retained in job records via means of a hardback field book and through Illinois Material Inspection Reporting System (I-MIRS). \_\_\_\_

Are all jobsite air, slump, water or admixture additions and beam test results being submitted to the proportioning technician daily for posting? \_\_\_\_

# 14. REVOLUTIONS

For transit-mixed or shrink-mixed concrete, are you immediately inspecting the revolution counter (Art. 1103.01(b)) on all arriving truck mixers to ensure the required number of revolutions at mixing speed have been obtained? (Art. 1020.11) \_\_\_\_

Does the number fit within the allowable number of revolutions shown in the table below? \_\_\_\_

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| 60 Mixing Revs. Required | | | | | 70 Mixing Revs. Required | |
| Time | | | (Simultaneous Charging) | | | (Separate Charging) | | |
| Minutes | | Minimum | | | Maximum | | Minimum | Maximum |
| 10 | | 60 | | | 119 | | 70 | 119 |
| 15 | | 66 | | | 144 | | 72 | 144 |
| 20 | | 76 | | | 169 | | 82 | 169 |
| 25 | | 86 | | | 194 | | 92 | 194 |
|  | |  | | |  | |  |  |
| 30 | | 96 | | | 219 | | 102 | 219 |
| 35 | | 106 | | | 244 | | 112 | 244 |
| 40 | | 116 | | | 269 | | 122 | 269 |
| 45 | | 126 | | | 294 | | 132 | 294 |
| 50 | | 136 | | | 319 | | 142 | 319 |
| 55 | | 146 | | | 344 | | 152 | 344 |
| 60 | | 156 | | | 369 | | 162 | 369 |
| 65 | | 166 | | | 394 | | 172 | 394 |
| 70 | | 176 | | | 419 | | 182 | 419 |
| 75 | | 186 | | | 444 | | 192 | 444 |
|  | |  | | |  | |  |  |
| 80 | | 196 | | | 469 | | 202 | 469 |
| 85 | | 206 | | | 494 | | 212 | 494 |
|  | |  | | |  | |  |  |
| 90 | | 216 | | | 519 | | 222 | 519 |
|  | |  | | |  | |  |  |
| Agitating Speed | Mixing Speed | | |  | | |  |  |
| 2-5 rev/min. | 5-16 rev/min. | | |  | | |  |  |

For transit-mixed or shrink-mixed concrete, whenever water or admixtures are added to the truck at the jobsite or the revolutions on the truck are below the minimum revolutions shown on the above chart, an additional 40 revolutions at mixing speed shall be put on the truck.

No additional water may be added at the jobsite to central-mixed concrete if a reduction in the cement factor has been given for central-mixed concrete. (Art. 1020.11(a)(4))

# 15. TIME OF HAUL

Is all concrete which is being hauled in truck mixers or truck agitators being deposited within the specified haul time? (Art. 1020.11(a)) \_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Concrete Temperature at | | | Haul Time | |
| Point of Discharge oF | | | Hours | Minutes |
|  | | |  |  |
| 50-64 |  | 1 | 30 |
| 65-90 |  | 1 | 0 | (without retarder) |
| 65-90 |  | 1 | 30 | (with retarder) |

No water may be added in excess of design water to maintain/increase slump. When design water has been incorporated into the mix, further increases in slump shall be effected only through the use of an approved water-reducer or retarder. \_\_\_\_

If central-mixed concrete is being hauled in nonagitator trucks, is the concrete being deposited within 30 minutes? (Art.1020.11(a)(7)) \_\_\_\_

# 16. AIR CONTENT DETERMINATION

On non-QC/QA jobs, are you making an air content test on the first load each day and at least once each 50 cu.yd. of concrete thereafter or when mix water or air entrainment admixture is added at the jobsite? \_\_\_\_

Note that a slump test and air test is required when a strength specimen is made.

On QC/QA jobs, the sampling and testing frequency is in accordance with the applicable Special Provision and stand-alone documents.

Allowable air content = 5% - 8% (Art. 1020.08) \_\_\_\_

# 17. SLUMP TEST

Allowable slump compacted by vibration (Art. 1020.07): 2 to 4 inches for Class SI Concrete without high-range water-reducing admixture. The maximum slump may be increased to 7 inches when a high-range water-reducing admixture is used.

On non-QC/QA jobs, are you making a slump test at least once each 100 cu. yd.; min. 1/day? \_\_\_\_

Note that a slump test and air test is required when a strength specimen is made.

On QC/QA jobs, the sampling and testing frequency is in accordance with the applicable Special Provision and stand-alone documents. \_\_\_\_

# 18. STRENGTH TEST

On QC/QA jobs, the sampling and testing frequency is in accordance with the applicable Special Provision and stand-alone documents.

Note: If the Contractor intends to load the concrete before the completion of specified curing period, then additional beams or cylinders should be made to ensure the concrete has adequate strength.

# 19. CONSTRUCTION JOINTS

Are construction joints being made only at locations shown on the plans or approved by the Engineer, except in cases of breakdowns or other unforeseen and unavoidable delays? (Art. 503.09)

Are all construction joints bonded unless otherwise specified on the plans? (Art. 503.09)

a. Unbonded construction joint. Is the new concrete thoroughly consolidated against the previous placed concrete? The first pour should be formed or struck to a true and even surface. (Art. 503.09(a)). \_\_\_\_

b. Bonded construction joint. Is the existing surface prepared by washing with water under pressure or by sandblasting to expose clean, well bonded aggregate? (Art. 503.09(b)) \_\_\_\_

Removal of cement paste on the first pour may be facilitated by thoroughly coating the form in contact with surface retarder, or by applying surface retarder directly to the exposed, fresh concrete surface.

When surface retarder is used, is it approved by the Engineer in advance of beginning the work? \_\_\_\_

Has the prepared surface of the existing concrete been wetted for a minimum of one hour before application of the new concrete? (Art. 503.09(b)) \_\_\_\_

Is all excess water being removed immediately prior to the second pour? (Art. 503.09(b)) \_\_\_\_

# 20. CURING

Is concrete not covered by forms being cured for 7 days but not more than 10 days by one of the following methods in accordance with Table 1020.13? \_\_\_\_

a. Waterproof paper method (Art. 1020.13(a)(1)) \_\_\_\_

b. Polyethylene sheeting method (Art. 1020.13(a)(2)) \_\_\_\_

c. Wetted burlap method (Art. 1020.13(a)(3)) \_\_\_\_

d. Membrane curing method (Type I only for substructures and retaining walls) (Art. 1020.13 and 1020.13(a)(4)) \_\_\_\_

e. Wetted cotton mat method (Art. 1020.13(a)(5))

Note: In addition to the above curing methods, footings, foundation, seal coats and bottom slabs of culverst may be inundated with water providing the water temperature can be maintained at 45° F or higher. (Art. 1020.13 Note 6)

Are you permitted to remove the forms prior to the end of the 7-day curing period if the concrete curing continued as specified in Article 1020.13? (Art. 503.06) \_\_\_\_

The curing period may be reduced to 3 days if high-early-strength cement is used and test beams break at not less than 650 p.s.i. The test beams shall be formed, cured and protected along side and in a manner similar to the work. \_\_\_\_

# 21. PROTECTION

Is all concrete which is placed during the winter period, December 1 through March 15, being protected by one of the following methods? (1020.13) \_\_\_\_

a. Method I. The concrete and forms shall be completely covered with a 2-inch thick insulating material for 7 days. The insulating material shall be completely enclosed on all sides and edges with a waterproof liner. (Art. 1020.13(d)(1)) \_\_\_\_

b. Method II. The concrete shall be enclosed in adequate housing for the entire 7-day curing period. The air surrounding the concrete shall be kept between 50 °F and 80 °F. (1020.13(d)(2)) Exposed concrete within the enclosure (not in forms) shall be cured in accordance with Article 1020.13(a). \_\_\_\_

c. Method III. For structures not specified and for incidental construction including footings and slope walls. This method may not be used when structural steel or structural concrete is in place above. As soon as the surface is sufficiently set to prevent marring, the concrete shall be coverd with 12 inches of loose, dry straw followed by a layer of impermeable covering. The edges of the covering shall be sealed to prevent circulation of air and prevent the cover from flapping or blowing. The protection shall remain in place until the concrete is seven days old. (Art. 1020.13(d)(3)) \_\_\_\_

If the concrete is placed outside the winter period and the temperature is forecast to be below 45 °F the concrete shall be protected. (Art 1020.13(d)) \_\_\_\_

If the actual temperature drops below 45° F and the concrete is less than 72 hours old, the concrete shall be protected. \_\_\_\_

# 22. SURFACE FINISH

Are all depressions resulting from the removal of ties, rods or bolt anchorages and all air pockets or rough places larger than 1/2-inch diameter being carefully and neatly pointed with mortar? (Art. 503.15) \_\_\_\_

a. Normal Finish. Are all surfaces that will be exposed to view after completion of the work (except floors, sidewalls, curbs and medians on bridges) being given a normal finish consisting of the removal of all fins, rough spots, stains, hardened mortar or grout and form lines by rubbing with a #16 carborundum stone or equal abrasive quality? (Art. 503.15(a)) \_\_\_\_

Note: If the surface of concrete is oil-stained or is otherwise not of uniform color, are you requiring a grout rub as specified in Article 503.15(a)? \_\_\_\_

b. Rubbed Finish. Are you requiring this special finish on only those areas shown in the plans or special provisions? (Art. 503.15(b)) \_\_\_\_

c. Are bearing seats finished in accordance with Article 503.15 (c)? (Note: This provision is not applicable to integral abutments.) \_\_\_\_

# 23. WATERPROOFING

When the plans specify designated surfaces of concrete to be waterproofed, are the material options, applications rates, temperature requirements and construction procedures of Article 503.18 being met? \_\_\_\_