



CALTRANS PRECAST CONCRETE FABRICATION QUALIFICATION AUDIT

NAME OF PRECAST PLANT:

DATE:

LOCATION (CITY, STATE, COUNTRY):

ORIGINAL OR FOLLOW-UP VISIT:

FACILITY'S AUTHORIZED QUALITY CONTROL REPRESENTATIVE (S):

LIST PRODUCTS MANUFACTURED AT SITE:

NAME(S) OF AUDITEES:

AUDIT PROCEDURE

Before requesting an audit, each entity performing precast concrete operations for the California Department of Transportation (Department) should successfully complete a self-audit, as determined by the Department's Office of Material Management and Independent Assurance (OMMIA). OMMIA will report the results of the audit submittal in four weeks.

OMMIA will complete the Department's audit within 10 weeks after receiving a request for such an audit.

The precast facility must provide OMMIA sufficient access and cooperation so that the audit can be completed within 10 weeks. The precast facility's quality control personnel are required to be present during the audit. Successful completion of an audit does not relieve the precast facility of the responsibility for furnishing materials or producing finished work of the quality specified in project plans and specifications. An audit will be valid for up to three years from the date of successful completion of the audit, provided the designated Engineer determines the audit is for the same type of work that is to be performed on this contract.

Should a precast facility fail the audit, the facility must correct the deficiencies prior to requesting another audit. In the request, the precast facility shall include a report of how deficiencies that were noted by OMMIA have been corrected. The precast facility should allow OMMIA 10 weeks to complete any subsequent audit.

To successfully complete the audit checklist, there must be affirmative responses to all questions listed and documentation/information to substantiate responses. If there are non-applicable questions, the comments field must provide an explanation, which may be supplemented by additional documentation. Each of the items on the checklist carries equal weight; therefore, grounds for rejection is not substantiated. A negative response to questions will be grounds for a rejection of qualification. The precast facility must then follow the guidelines spelled out above for scheduling re-audits.

To answer several of the questions in the checklist, the auditors will evaluate plant practices and procedures against shop drawings and other contract requirements. The projects being evaluated may or may not belong to the Department.

If the audit is performed at a new facility prior to start of production, a response indicating

proposed methods or procedures satisfying standard Department requirements for items not yet

incorporated in the operation of the plant is acceptable.

I, the undersigned, have read and understand the "Structural Precast Concrete Fabrication Qualification Audit" checklist and am providing the following information in the enclosed audit.

Facility Authorized Representative
Date

A. QUALITY SYSTEM: Quality Control, Plan/Manual, Documented Procedures, Personnel,
Shop Drawing

Questions	YES/ NO	PAGE NO.	N/A	REMARKS
1. Does the plant have a written quality control plan/manual?				
2. Does the plan/manual cover the minimum items listed in the latest SS Section 90-4.01C(3)?				
3. Does the quality control plan document require QC inspection procedures listed in the latest SS Section 90-4.01D?				
4. Are QC individuals in the plant organization certified as a PCI Level II (for Tier 1 items) or PCI Level I (for Tier 2 items) licensed as Civil Engineers in the State of California? Provide certifications -				
5. Does the facility participate in the Independent Assurance Program (IAP) to certify QC personnel who perform California Test Methods?				
6. Does the facility have a person responsible for quality who oversees the QC personnel and reports directly to management?				
7. Do the shop drawings for the current work indicate materials to be utilized in the fabricated element?				
8. Does the facility have an interface with the design group to make certain that all the specification requirements are met?				
9. Do the materials and processes specified or indicated on the shop drawings agree with the contract document's material requirements?				

B.PRODUCTION PRACTICES Storage of Chemicals, Hardware, and Equipment Casting Areas
Curing and Finishing Areas Curing and Finishing Areas Moist Curing Accelerated Curing Finished
Product Storage Welding Forms Surface Finishes Product Identification

Questions	YES/ NO	PAGE NO.	N/A	REMARKS
1. How are the materials stored for the following a. Hardware b. Chemicals c. Precast materials d. Steel/Rebar				
2. Is fabrication hardware stored to avoid distortion beyond allowable tolerances?				
3. Are low-hydrogen SMAW electrodes used for welding bought in hermetically sealed containers and stored in accordance with the manufacturer's instructions?				
4. Is the casting area of adequate size and supplied with necessary equipment in good operating condition to ensure proper placement, consolidation, and finishing of the concrete?				
5. Is the facility capable of maintaining a minimum concrete temperature of 50°F during the initial curing cycle (prior to stripping)?				
6. Is the curing area well drained?				
7. Is adequate protection/covering provided to maintain the required relative humidity and temperature?				
8. Does the heat source and distribution system provide uniform and controlled heat?				
9. Is equipment provided to record the time and temperature as necessary during the curing				
10. For internally monitored PC components, do temperature monitoring devices provide an accurate, continuous, permanent record of the temperature during curing activities?				

11. For internally monitored Tier 1 PC concrete members, is concrete internal temperature maintained equal to or below 165 degrees F?				
12. For internally monitored Tier 1 PC concrete members, is concrete internal temperature gain maintained equal to or below 40 degrees F per hour?				
13. For internally monitored Tier 1 PC bridge components, are temperature sensors accurate to within ± 2 degrees F?				
14. For internally monitored tier 1 PC bridge components, are temperature readings automatically recorded at least every 15 minutes?				
15. For internally monitored tier 1 PC bridge components, are measures taken to ensure that the ends of temperature sensors do not meet the concrete supports, forms, or reinforcement?				
16. For internally monitored tier 1 PC bridge components excluding piling and deck panels, are temperature sensors connected to a data acquisition system and is the system capable of recording, printing, and downloading temperature data to a computer?				
17. Is the temperature QC data being entered into the Caltrans DIME site?				
18. Are storage areas clean, well-drained and stabilized?				
19. Are storage racks designed to minimize warping, bowing, chipping, cracking, or discoloring of the product?				
20. Does the fabricator have a welding Quality Control Plan?				
21. Are welded structures and/or specific welds traceable to the welder(s) and/or welding crew that completed the job?				
22. Do welders know and understand which WPS is to be used with each specific weld?				

23. Does quality control verify that forms are constructed to conform to the profiles, dimensions, and tolerances indicated by contract documents and authorized shop drawings?				
24. Does quality control verify that forms are constructed to maintain dimensional stability during handling and repeated use?				
25. Is formwork constructed tightly to prevent leakage and result in a structure with correct profiles, dimensions, and tolerances?				
26. Is formwork kept clean and maintained in a manner consistent with project requirements?				
27. Does quality control verify that embedment's, inserts, and miscellaneous hardware are installed in accordance with authorized shop drawings?				
28. Are precast concrete units clearly marked with a unique identification as shown on shop drawings?				
29. Do identifying markings distinguish the date of casting and trace the precast unit to associated quality control records?				
30. Does quality control verify that the surfaces of precast concrete units have finishes per shop drawings and project specifications?				
31. Are detailed repair procedures provided to personnel?				
32. Does quality control verify that repairs are performed in accordance with repair procedures?				

C.RAW MATERIALS AND ACCESSORIES Concrete Materials, Reinforcement, and
Hardware Proportioning Batching

Questions	YES / NO	PAGE NO.	N/A	REMARKS
1. Is documentation available to show that the following materials are following the latest standard specifications? a. Aggregate – SS 90- 1.02C b. Water - SS 90- 1.02D c. SCMs – SS 90-1.02B d. Chemical Admixtures – SS 90- 1.02E				
2. Are aggregates stored such that they do not get contaminated prior to use, and do they have a hard base with good drainage?				
3. Are measures taken to control the moisture content in the aggregates so that it is kept as uniform and stable as practical?				
4. Is the cement and SCM weighed separately from the aggregate, and is the discharge controlled so that the cement is flowing while the aggregate is being delivered?				
5. Are the hopper gates, water and admixture valves, and cement and SCM gates functioning properly and completely stopping discharge?				
6. Is documentation available to show that the following materials are following the latest standards specifications? a. Steel reinforcing bars b. Welded wire reinforcement c. Strand materials (e.g., with mill certificates) d. Anchorages for post-tensioning - SS 50- 1.03B(2)(c) or current project specifications e. Ducts for bonded post-tensioned tendons - SS 50- 1.02D and 50- 1.03A(3) or current project specifications f. Insulation for curing - SS 90-1.03B				

D. CONCRETE Mixing Consolidation Equipment, Consolidation Equipment, Curing Concrete, Curing Concrete, Post-Tensioning, Tendon Grout

Questions	YES / NO	PAGE NO.	N/A	REMARKS
1. Has the mix design being used been authorized by the engineer of record?				
2. Has the Batch Plant been certified per Caltrans Test Method 109?				
3. Are weight indicating devices in full view and near enough to be read accurately by the operator while charging the hopper?				
4. Are exposed fulcrums, clevises, and similar working parts of scales clean?				
5. Are the scales calibrated and sealed within the past 6 months and when the plant was set up?				
6. Are means of control provided so that, as the quantity desired in the weigh hopper is approached, the material may be shut off with precision?				
7. Are adequate standard test weights available for checking the accuracy of the scales?				
8. Are the hopper gates, water and admixture valves, and cement and mineral admixture gates functioning properly and completely stopping discharge?				
9. Are proportioning devices certified to meet the latest SS Section 90-1.02F(3) requirements?				
10. Are scales zeroed between loads?				
11. Is compensation for free moisture in aggregates performed?				
12. Do batch tickets record actual quantities, not nominal?				
13. Does the operator read the revolution counter, or time the mixing at first addition of water?				
14. Does the batch ticket contain the following information? a. Name of ready mix plant, if applicable b. Serial number of ticket c. Date d. Truck number e. Name of Purchaser f. Specific designation of job g. Amount of concrete in cubic yards h. Time loaded or first mixing of cement and aggregates				

15. Are the mixer blades clean and in good condition?				
16. Has the contractor performed testing to verify the mixer can combine the ingredients of the concrete within the specified time or number of revolutions into a thoroughly mixed and uniform mass and is capable of discharging the concrete in accordance with 2022 SS section 90-1.02G?				
17. Is the mix design coded or are there other positive means to assure proper mix is delivered?				
18. Is documentation available to show that the time from start of concrete mixing to placement does not exceed the parameters listed in the latest SS section 90-1.02G?				
19. Is vibratory equipment operated by trained personnel?				
20. Is documentation available to show that vibratory procedures are established at the beginning of each project?				
21. Is concrete maintained in an ambient temperature of not less than 50 °F and not greater than 150 °F during the curing prior to reaching stripping strength?				
22. Are measures taken to ensure that one portion of the element does not cure differently than another portion of the element?				
23. Is documentation available to show that test cylinders are cured in accordance with CT 521 and/or CT 540?				
24. Is documentation available to show that accelerated steam curing is performed in accordance with the latest SS section 90-4.03?				
25. If elements are cured without supplemental heat, are the surfaces kept covered until the compressive strength reaches the specified strength for transfer or stripping?				
26. Are moisture retention enclosures resistant to tearing and positively fastened in place to avoid displacement?				
27. Is documentation available to show that grout materials are in accordance with the latest SS section 50-1.02C?				
28. Is documentation available to show that grout equipment and procedures are in compliance with the latest SS section 50-1.03B(2)(d)?				

E. REINFORCEMENT AND PRESTRESSING Reinforcing Steel Tensioning, Prestressing,

Questions	YES / NO	PAGE NO.	N/A	REMARKS
1. Are reinforcing steel deliveries identified with a heat number that can be tied to a mill certificate?				
2. Is reinforcing steel kept free of contamination and stored separately in a neat and orderly fashion, straight and free of kinks?				
3. Is equipment used for handling coated welded wire or reinforcing bar protected at contact areas and does the equipment lift to prevent sagging of the bundles?				
4. Is documentation available to show that fabrication tolerances are in accordance with the latest SS section 52-1.03D?				
5. Is documentation available to show that fabrication has been reviewed by quality control personnel to check that material is cut and bent to the correct size and shape using the size and grade required per project specifications?				
6. Are reinforcing bars bent cold, unless otherwise permitted by the Engineer?				
7. Is damage to epoxy coated reinforcing steel repaired using appropriate materials conforming to project requirements?				
8. Is documentation available to show that quality control personnel have checked the size, placement, and spacing of all reinforcement against current shop drawings?				
9. Are spacers and anchors used to ensure that reinforcement does not shift during placement of concrete?				
10. Are rebar supports compliant with the latest SS section 52-1.03D?				
11. Is documentation available to show that concrete cover and other critical dimensions are measured?				
12. Is documentation available to show that tensioning is performed within stated tolerances and that tensioning operations are subject to quality control procedures?				
13. Do methods of measuring tensioning conform to the requirements of the latest SS section 50-1.01D(2)?				
14. Is documentation available to show that tensioning equipment is calibrated as a system in the same manner used during tensioning operations?				

15. Is documentation available to show equipment calibration records which are consistent with calibration requirements in the latest SS section 50-1.01D(2)(b)?				
16. Are certified calibration curves provided with each tensioning system?				
17. Do calibration records show the following information: ▪ Date of calibration ▪ Agency, laboratory, or registered engineer supervising the calibration ▪ Method of calibration ▪ Full range of calibration with gauge readings indicated against actual load				
1. Are prestressing steel reels and coiled tendons identified with tags listing the heat number to relate the reel to a mill certificate?				
2. Are prestressing steel reels and coiled tendons stored in a neat and orderly manner?				
3. Is prestressing steel stored off the ground and in such a manner as to avoid corrosion?				
4. Are tensioning procedures performed by trained and authorized personnel?				
5. Do tensioning procedures include the following information: ▪ Operation and control of jacking equipment ▪ Operation and control of gauging system ▪ Tensioning to an initial force and marking strand in preparation for measuring elongation ▪ Tensioning to a given final force, measuring, and recording the corresponding elongation ▪ Checking for strand anchor seating ▪ Procedures in case of out-of-tolerance results ▪ Procedures in case of wire failure ▪ Alternative tensioning methods or measurements ▪ De-tensioning and stripping procedures				
6. Are strands pulled and stored per manufacturer's directions?				
7. Are strands positioned in accordance with dimensions shown in current shop drawings?				

F. QUALITY CONTROL Inspection

Questions	YES / NO	PAGE NO.	N/A	REMARKS
1. Is documentation available to show the acceptance by quality control personnel of all materials and embeds prior to concrete placement?				
2. Is documentation available to show the acceptance by quality control personnel of forms and new setup changes prior to concrete placement?				
3. Is documentation available of daily inspection reports of batching, mixing, conveying, placing, compacting, curing, and finishing of concrete?				
4. Is documentation available of stripping procedures?				
5. Do daily inspection reports include general observations of the plant, weather, and other items affecting production?				
6. Do inspection reports show preparation of concrete specimens for testing and performance of concrete tests such as slump, air content, and compressive strength?				
7. Do inspection reports show that the finish of concrete elements has been inspected for defects, cracking and other problems?				
8. Is a final inspection performed of completed products during loading to check for proper blocking, damage, stains, and other problems that may affect the quality of the product?				
9. If an independent laboratory performs quality control, is that laboratory accredited to perform the CTM, ASTM, and AASHTO tests required in the contract documents?				
10. If mill certificates are not supplied, is representative testing of each cement shipment performed before use?				
11. Does documentation exist from aggregates suppliers showing that the specific gravity, absorption, and petrographic analyses have been performed in the last five years?				
12. Does documentation exist showing that the aggregate has been tested for alkali-silica reactivity based on at least 15 years of exposure to moist conditions of structures made with aggregate or petrographic analysis?				
13. Does documentation exist showing that aggregates have been tested for alkali-				

carbonate reactivity or deleterious substances and organic impurities?				
14. Does documentation of mortar cube tests exist using non-potable or questionable water, if applicable?				
15. If mill certificates are not supplied, does documentation of in-plant testing of reinforcing steel, welded wire reinforcement, and prestressing materials exist?				
16. Does the plant have mill certificates for all reinforcing materials filed for at least the last five years?				
17. Is documentation available showing that welded wire reinforcement has been inspected when it is received?				
18. Is certification filed for all steel hardware and insert materials and each different grade of steel?				
19. Does written documentation exist showing that vendor-supplied assemblies are in conformance with project specifications?				
20. Do vendor personnel maintain records of stud welding on vendor-supplied assemblies on an hourly basis that are provided to the precast plant?				
21. Are all precast concrete units marked with the date produced and a unique identification number that can be referenced to production, erection drawings, and testing records?				
22. Is the following information provided in the tensioning records: ▪ Date of tensioning ▪ Cast bed identification ▪ Description, identification, and number of elements ▪ Manufacturer, size, grade, and type of strand used ▪ Coil or pack number of strand, identifying number of strands ▪ Sequence of stressing Identification of jacking equipment				
23. Is the following information documented for pre-tensioning procedures: ▪ Required total force per strand ▪ Initial force ▪ Calculated and actual gauge pressure for each strand or each group of strands stressed in one operation ▪ Calculated and actual elongation for each different jacking force				



Any unanticipated problems encountered during tensioning.				
24. Are operating instructions, calibration curves, and national and industry standards for all testing equipment maintained on site kept on file on site?				