03 47 13 Tilt-Up Concrete Checklist

Complete form by checking the applicable box. As this checklist is generic, you should make a standard practice of reviewing it with your project's specific specifications. There are blanks at the end of the checklist to add items from that review. If the answer to any question is "NO," there should be an action item registered for follow-up.

Date: **Reviewer:**

Question	Yes	No	N/A	Action Required
Are all areas to receive concrete cleaned, wetted, or otherwise prepared per specification?	☐	☐	☐	
Are all bolts and loose items to be embedded properly located and installed?	☐	☐	☐	
Are all concrete sealer requirements known by location?	☐	☐	☐	
Are all corrective actions and open issues completed and verified?	☐	☐	☐	
Are all inspection records available to all as completed? (Daily, weekly, monthly, etc.)	☐	☐	☐	
Are all layers kept to standards and do not exceed required lifts?	☐	☐	☐	
Are all of the pertinent prints, drawings, specifications, codebooks, federal, state, and/or local regulations on hand for review?	☐	☐	☐	
Are all requirements of the concrete specifications met before delivery or placement of concrete?	☐	☐	☐	
Are all the blockouts in place?	☐	☐	☐	
Are approvals of forms and rebar obtained before pour if required per specification?	☐	☐	☐	
Are arrangements made for off-hours concrete needs?	☐	☐	☐	
Are as-builts completed based on finding underground utilities if not on existing drawings?	☐	☐	☐	
Are bars placed in proper locations with proper spacing and clearances?	☐	☐	☐	
Are beam and slab bars spliced properly?	☐	☐	☐	
Are bends within radii required and accurately installed?	☐	☐	☐	
Are bent tension members installed where approved?	☐	☐	☐	
Are bolts and loose items embedded properly located and installed?	☐	☐	☐	
Are concrete blankets and or heaters needed?	☐	☐	☐	
Are concrete test cylinders cast and stored per specification or given to 3rd party inspection for breakage testing?	☐	☐	☐	
Are concrete test cylinders numbered?	☐	☐	☐	
Are curing time and methods per specification?	☐	☐	☐	
Are cylinders cast and stored and slump and other tests performed per specification?	☐	☐	☐	
Are the date and locations of pours recorded?	☐	☐	☐	
Are design elevations per specification?	☐	☐	☐	
Are dowels installed for marginal bars at wall ends and openings, per specification?	☐	☐	☐	

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Are electrical items within pour placed correctly, inspected, and tested?	☐	☐	☐	
Are elevated precast slabs considered versus poured into place?	☐	☐	☐	
Are elevation verifications completed at required intervals?	☐	☐	☐	
Are elevations blue topped before pours?	☐	☐	☐	
Are embedded items inspected and verified for correct locations and placement?	☐	☐	☐	
Are embeds at correct elevations within proper location tolerance?	☐	☐	☐	
Are embeds designed flush with the face of concrete?	☐	☐	☐	
Are extra turns installed at the top and bottom of spiral columns as needed?	☐	☐	☐	
Are final form adjustment procedures established?	☐	☐	☐	
Are form cut-off and bulkheads in approved locations?	☐	☐	☐	
Are form surface treatment and pattern per specification?	☐	☐	☐	
Are foundations in congested areas designed with the bottom of concrete at the same elevation and can use common footings?	☐	☐	☐	
Are foundations per specification and ready to receive concrete?	☐	☐	☐	
Are frequency and amplitude checked on vibrators?	☐	☐	☐	
Are grade, slope, pitch, and thickness control provided per specification?	☐	☐	☐	
Are grades, elevations, and alignment from adjustment and supports being checked during concrete pouring?	☐	☐	☐	
Are hot and/or cold weather protection procedures being adhered to?	☐	☐	☐	
Are ice requirements identified?	☐	☐	☐	
Are joint methods and materials installed and observed?	☐	☐	☐	
Are joint patterns formed per specification?	☐	☐	☐	
Are lab tests and samples completed?	☐	☐	☐	
Are layers kept to standards and do not exceed required lifts?	☐	☐	☐	
Are material proportions, mix time, delivery rates and concrete characteristics per approved mix design?	☐	☐	☐	
Are materials qualification development and testing completed?	☐	☐	☐	
Are methods for troweling per specification and requirements?	☐	☐	☐	
Are methods in place to control slab curling?	☐	☐	☐	
Are non-corrosive nails used to hold curtains?	☐	☐	☐	
Are pipe penetrations verified?	☐	☐	☐	
Are pockets vented to prevent air entrapment?	☐	☐	☐	
Are procedures developed addressing who has to approve the addition to water at the site?	☐	☐	☐	

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Are procedures developed showing responsibility for "cutbacks" at flanges for bolt removal?	☐	☐	☐	
Are procedures in place and being used to ensure proper time delay is made for concrete in columns, piers, walls, and openings to allow concrete to settle before placing concrete above them?	☐	☐	☐	
Are proper curing procedures being used per specifications?	☐	☐	☐	
Are pumps or standby pumps available?	☐	☐	☐	
Are quantities of concrete trucks verified?	☐	☐	☐	
Are the reasons for the rejection of concrete recorded?	☐	☐	☐	
Are recessed areas checked for elevations?	☐	☐	☐	
Are reinforcement bars installed when and where required?	☐	☐	☐	
Are screeds installed per specification?	☐	☐	☐	
Are sealers compatible with floor finishes?	☐	☐	☐	
Are special floor toppings requirements defined?	☐	☐	☐	
Are stair pads and abrasive nosing complete per requirements?	☐	☐	☐	
Are sub-base and capillary fills compacted and a membrane provided and installed per specification?	☐	☐	☐	
Are supervisors established who may reject or stop a pour?	☐	☐	☐	
Are temporary form openings for Tremies, chutes, etc. provided as needed?	☐	☐	☐	
Are testing specifications established?	☐	☐	☐	
Are tests for drainage and surface variation made?	☐	☐	☐	
Are the age of the concrete within the specified time limit and delivery tickets contain applicable information to prove the life of concrete?	☐	☐	☐	
Are the finishing treatment and texture per specification?	☐	☐	☐	
Are the inserts the proper ones?	☐	☐	☐	
Are the keyways installed correctly?	☐	☐	☐	
Are the limits of a single monolithic pour known?	☐	☐	☐	
Are the piles correct?	☐	☐	☐	
Are the sets/test specimens defined?	☐	☐	☐	
Are the sleeves for piping and conduit per specification?	☐	☐	☐	
Are the weld pads correct?	☐	☐	☐	
Are there any special hardeners involved, and are locations defined?	☐	☐	☐	
Are there cold weather specifications if needed?	☐	☐	☐	
Are unit prices determined in the contract for adds and deletes?	☐	☐	☐	
Are vertical bars at wall ends installed inside horizontal bars?	☐	☐	☐	
Are weather conditions being checked and recorded?	☐	☐	☐	
Are wood screeds removed, per specification?	☐	☐	☐	

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Can foundation concrete be neat cut instead of forming?	☐	☐	☐	
Can permanent plant roads and area paving near pipe ways be included in the site preparation package for early construction?	☐	☐	☐	
Can small equipment foundations be integrated into the slab-on-grade design?	☐	☐	☐	
Can water be added to the concrete at the site?	☐	☐	☐	
Do conduit stub outs for building extend at least 5 feet beyond the building foundation?	☐	☐	☐	
Does all concrete paving equipment meet requirements?	☐	☐	☐	
Does concrete design have flexibility about slump and air content ranges?	☐	☐	☐	
Does design provide adequate embeds in concrete surfaces for miscellaneous attachments?	☐	☐	☐	
Does finishing provide evenness, smoothness, slope, and levelness of surfaces within the tolerance indicated in the specification?	☐	☐	☐	
Does the base plate grouting require sign off before chamfering?	☐	☐	☐	
Does the batch plant have the ability to heat aggregate and use hot water during winter months?	☐	☐	☐	
Does the design allow the extension of the slab dimensions by 4" when placing walls above to accommodate setting outside form on a slab?	☐	☐	☐	
Does the project know the coldest temperature the batch plant can operate?	☐	☐	☐	
Does the sub-foundation contain the proper moisture levels?	☐	☐	☐	
Does the sub-foundation have a binding layer?	☐	☐	☐	
Has a Batch Plant inspection been done?	☐	☐	☐	
Has all concrete been cleaned up, rubbed out, and finished before coating commencing?	☐	☐	☐	
Has the investigation been completed for cost-effectiveness of different types of deep foundations; i.e., caissons, H-piles, pipe, DeWaul, auger cast or precast concrete piles	☐	☐	☐	
Has it been determined who will supply pipe sleeves/blockouts/utility openings?	☐	☐	☐	
Has it been established who can order concrete?	☐	☐	☐	
Has material and equipment protection been verified before use?	☐	☐	☐	
Has the concrete design mix been checked to make certain there is no Pyrrhotite included?	☐	☐	☐	
Has the project dimensioned concrete foundations and structures to make maximum use of commercial form sizes?	☐	☐	☐	
Has the project eliminated or minimized haunches in the design of foundations and slab-on-grade?	☐	☐	☐	

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Has the project evaluated the use of standard diameter concrete piers and pedestals instead of odd-sized rectangular shapes?	☐	☐	☐	
Has the project maximized our use of straight, flat, easily formed shapes and surfaces instead of offsets, tapered sections, and other complicated concrete shapes?	☐	☐	☐	
Has the project maximized the use of pre-cast manholes, pull boxes, and other miscellaneous concrete items?	☐	☐	☐	
Has the project verified procedures and/or limitations concerning water at the site?	☐	☐	☐	
Has the project verified that chamber strips, nailer strips, chases, and rustifcation strips are accurately placed, adequately aligned, and fastened?	☐	☐	☐	
Has the project verified that loading, traffic, etc., is controlled over surfaces to protect concrete?	☐	☐	☐	
Has the project verified that the mortar-tight condition prevails? (offsets and defects)	☐	☐	☐	
Has the structure been accepted by the civil inspector?	☐	☐	☐	
Have all agency inspections been performed (if required) before pouring?	☐	☐	☐	
Have calculations been completed for elevated slabs about use during equipment installation?	☐	☐	☐	
Have circular foundations been eliminated or minimized for ease of construction with standard forms?	☐	☐	☐	
Have concrete mix designs been tested at least 30 days in advance to first pours?	☐	☐	☐	
Have hot weather specifications been developed?	☐	☐	☐	
Have inspection intervals been determined?	☐	☐	☐	
Have shoring locations and bearing been verified?	☐	☐	☐	
Have the number and location of cleanouts and parts been verified?	☐	☐	☐	
Is all foundation engineering scheduled for early release, ahead of underground utilities that will eliminate free access?	☐	☐	☐	
Is all saw cutting aligned and in the proper layout?	☐	☐	☐	
Is the adjacent concrete surface free of water?	☐	☐	☐	
Is the area investigated for existing underground utilities/substructures before starting excavation?	☐	☐	☐	
Is the backfill installation approved and released?	☐	☐	☐	
Is the backup placement equipment available?	☐	☐	☐	
Is the base course maintained per specification?	☐	☐	☐	
Is the batch plant checklist approved?	☐	☐	☐	
Is the bonding agent ready?	☐	☐	☐	
Is the colored concrete, if required per specification, proper type, tone, and amount?	☐	☐	☐	
Is the concrete inspected for damage once forms are removed?	☐	☐	☐	
Is the concrete maturity method of testing concrete allowable, versus conventional cylinders?	☐	☐	☐	

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Is the Concrete Pour Card completed on every pour and immediately made part of the project files?	☐	☐	☐	
Is the concrete tested for allowable moisture before floor coverings/adhesives application?	☐	☐	☐	
Is the cross-bracing per specification?	☐	☐	☐	
Is the delivery ticket verified before unloading?	☐	☐	☐	
Is the delivery time on concrete known?	☐	☐	☐	
Is the excavation approved before the beginning of formwork?	☐	☐	☐	
Is the finish on unformed surfaces verified to comply with specifications? Verify that smooth, rubbed, broomed, non-slip, exposed aggregate, colored, etc.	☐	☐	☐	
Is the frequency and amplitude of vibrators checked before each pour?	☐	☐	☐	
Is the ground wire connected and approve?	☐	☐	☐	
Is the grout or bonding agent used for congested areas?	☐	☐	☐	
Is the Grout Release Record completed?	☐	☐	☐	
Is the Grout Release Record Form completed and approved?	☐	☐	☐	
Is the hardened concrete watered and wetted for 24 hours minimum?	☐	☐	☐	
Is the jointing of old concrete to new work properly performed?	☐	☐	☐	
Is the miscellaneous metals scope coordinated with concrete documents?	☐	☐	☐	
Is the modified grout provided at first lift and/or where rebar congestion occurs?	☐	☐	☐	
Is the notification timing established for the batch plant for off-hours concrete needs?	☐	☐	☐	
Is the periodic testing of concrete truck contents sampled independently of regular testing?	☐	☐	☐	
Is the previously placed concrete properly prepared to receive new concrete?	☐	☐	☐	
Is the procedure developed for live load usage for elevated slabs?	☐	☐	☐	
Is the procedure in place for monitoring and verifying measurements of super flat floors?	☐	☐	☐	
Is the procedure in place to ensure there is no concrete cracking if welding is required on base plates?	☐	☐	☐	
Is the project able to get early foundation sizes for pipe racks?	☐	☐	☐	
Is the project able to get early foundation sizes for pumps?	☐	☐	☐	
Is the project able to get early foundation sizes for structures?	☐	☐	☐	
Is the project able to get early foundation sizes miscellaneous supports?	☐	☐	☐	
Is the project able to standardize building bay dimensions?	☐	☐	☐	

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Is the project ensuring that there is no form damage while vibration is occurring?	☐	☐	☐	
Is the reinforcement cleaned of loose or flaky rust or scale, dried concrete, oil, bond breaker, and other foreign material that might reduce bond in addition to all tags being removed?	☐	☐	☐	
Is the reinforcement tied and supported per specification?	☐	☐	☐	
Is the repairing of defective areas per concrete repair procedure?	☐	☐	☐	
Is the steel installed per approved drawings and of sizes indicated? (Bar length, bar diameter, bar-to-bar spacing, etc.)	☐	☐	☐	
Is the sub-foundation clean?	☐	☐	☐	
Is the temperature of mixed concrete being recorded?	☐	☐	☐	
Is the testing arranged to be done on the site?	☐	☐	☐	
Is the testing laboratory notified before pouring?	☐	☐	☐	
Is the time delay made for concrete in columns, piers, walls, and openings to allow concrete to settle before placing concrete above them?	☐	☐	☐	
Is the time interval between adding water to concrete and placement in a final position known and guidelines being followed?	☐	☐	☐	
Is the type of finish known to the crew?	☐	☐	☐	
Is the type of soil at the bottom of the excavation per soil report?	☐	☐	☐	
Is the underground piping installation inspected and tested?	☐	☐	☐	
Is the vibration performed properly to dissipate air entrainment?	☐	☐	☐	
Is the waterproofing specification met?	☐	☐	☐	
Is the wire mesh for SOG supported per specification?	☐	☐	☐	
Is there a concrete loading plan developed and being adhered to?	☐	☐	☐	
Is there a system to track shelf life of grouting material?	☐	☐	☐	
Is there an established location for bad concrete dumping?	☐	☐	☐	
Is there rain out the plan during floor placement?	☐	☐	☐	
Is there a special coating for concrete for high toxic areas?	☐	☐	☐	
Were any patching and pointing approved?	☐	☐	☐	
Will precast wall panels or any other precast except elevated slabs be done on-site or purchased from the site?	☐	☐	☐	
Will the design be done early enough to allow concrete approach aprons at the site entrance to be put in Site Preparation Package?	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

	☐	☐	☐	
	☐	☐	☐	
	☐	☐	☐	

Batch Plant Inspection Checklist

Date	Job Site Location	Client	Project Number
Inspector	**Concrete Supplier**	**Batch Plant Operator**	**Class of Concrete**

Material Storage and Handling

Description	Approved	Approver
Aggregates	☐ Yes ☐ No	
Cement	☐ Yes ☐ No	
Material Used	☐ Yes ☐ No	
Mix Design Used	☐ Yes ☐ No	

Batching Tolerances & Scale Zero

Description	Comments
Admixtures	
Cement	
Coarse Aggregate	
Drum Blades	
Drums Clean	
Fine Aggregate	
Revolution Counter	
Transit Mix Trucks	
Water	

Remarks

Non Conformance Report

Contractor Name	Job Site Location	Client	Project Number
Date	**System Number**	**Report Number**	**Quality Manager**

Non-Conformance Description	
Prepared By:	**Date**

Proposed Disposition	
Prepared By:	**Date**

Approved Disposition	
Engineer	**Date**
Quality Manager	**Date**

Disposition Complete and Accepted

☐ **Yes** ☐ **No**

Supervisor	Date
Quality Manager	**Date**

Non Conformance Report Closed

☐ **Yes** ☐ **No**

Quality Manager	Date

Comments

Quality Assurance Case Study

Throughout the entire sales process, Bill's Battery Corporation (BBC) was told their project was going to be designed and built with the highest quality possible. All BBC wanted to be was their project built to the plans and specifications they approved. **That's all that 99.9% of Owners want but seldom get.** They were told about the hundreds of quality checks that were going to be made during their project. So many, in fact, it was hard to fathom. There were literally thousands of checks. Nevertheless, third party checks were not what they really wanted. They wanted to see the quality approach built into the normal process of executing work.

CONTRACTOR was awarded the project. It was about a $40 million design-build effort. The location was Lowell, MA. It wasn't a difficult project from the process, cost, or schedule standpoint. Safety was, of course, always first, but BBC's number two concern was quality. They did not want to know they would not spend one penny for rework that was caused by anything other than Owner Change. A few examples:

1. No money for overtime caused by errors in drawings or specifications – design or construction
2. No money for construction changes caused by errors in drawings or specification
3. No money for construction crews that did not build to specification and drawings

BBC would not pay for any cost incurred because of a quality issue. They wanted their project "perfect" according to the design specification and drawings, no more, no less.

The exercise in the quality section is to prove to the BBC that the CONTRACTOR Quality Approach to the project is integrated into each step. This integrated approach to quality does not depend on a third party to find quality issues, but only to find the minor exceptions. If you can prove this approach to BBC, then they consider absorbing some of the cost of the "minor exceptions," otherwise, the entire cost is born by CONTRACTOR.

You may use the entire CONTRACTOR STEPS to help you in this approach but definitely must use the Quality STEPS approaches to project execution. Your approach needs to include assurances of Design, Procurement, Construction, and Startup.

The following is an example: If your group was assigned the Waste Water Pump. You need to explain how you are going to ensure that the Waste Water Pump:

1. Is sized and specified correctly
2. has appropriate vendors selected to bid alternatives are analyzed and approved
3. is ordered in a timely fashion
4. uses or considers vendor surveillance
5. has proper shipping arrangements
6. has proper receiving and ongoing storage requirements, how those requirements are met
7. has details for construction crews for proper installation
8. has detailed startup and commissioning requirements

The above are guides for your thought process. Remember, you are only limited by those processes and procedures that the CONTRACTOR has in place within STEPS to assure quality. It is not just the Quality Program, but also the entire STEPS Process.

Quality Assurance Case Study

Depending on the size of your group, you can break down in groups of 4 or 5 people. You must break down into at least two groups to complete the exercise. Remember, you are potentially playing for many dollars. According to CII, project rework, not including Owner changes, averages over 2% of TIC and major industrial projects. You can do the math for this project. Subjects to address, and again it is stressed work from beginning to end – not just the design or construction, everything needed to get a quality installation. Remember how critical Safety is to quality!

1. Batching, Mixing and Delivery of Concrete
2. Piping
3. Skid Mounted Equipment
4. Tanks
5. Hydrostatic Testing

Each team shows their process or steps to ensure quality. After each group is complete, the preceding group must list 5 additional steps to ensure quality that is within the procedural process. The point of this exercise is to show that quality is integrated into the CONTRACTOR process from beginning to end, not just an ending exercise to catch quality errors.

Quality Plan for Design

Purpose

This procedure describes the requirements for a quality plan necessary on every engineering project over 10,000 work-hours. The development of the plan is led by the Project Manager and is documented in a **Quality Plan.** The intent of the plan is to provide a guideline for developing high-quality deliverables based on a systematic quality process that progressively measures the project documents, methods, and practices used in the project execution. The plan is included in the **Project Execution Plan**.

Methods

The PM is designated as the Project Quality Oversight Team Leader. The Quality Oversight Team is selected by the Project Team (normally consisting of the PM, Discipline Project Leaders, and Client's PM). The Oversight Team is responsible for the development of the **Quality Plan**.

The Quality Oversight Team provides continuous oversight of the project quality effort. When a problem arises, they quantify the impact and determine the root cause and the corrective action required. They support the Project Team in taking corrective action.

The Oversight Team works under the PM's direction to evaluate the FEL package. They participate in the evaluation using **FEL Evaluation and CII-PDRI Criteria Design Procedure** (when used by Client). They determine the weak points and upgrade the FEL when necessary.

During design, the Oversight Team ensures that quality reviews and checks are completed in a timely fashion and in accordance with the respective department procedures.

Responsibilities

Project Manager

- Ensure the Quality Plan is developed early in the project process (during FEL, if possible, but no later than the **Kickoff**). Distribute to the Project Team no later than the first month of Production Design.

Quality Oversight Team Leader

- Provide the focal point for the project team's quality efforts and support and audit the team's execution of the Quality Plan
- Report progress on Quality issues and any root cause analysis required during the Monthly Project Reviews.

Discipline Project Leaders

- Ensure that all quality reviews and checks are completed appropriately for the respective disciplines.

Quality Oversight Team

- Participate in the FEL evaluations (CII and IPA-if used) and ensure that their portion of the Quality Plan is properly carried out.

Manager of Projects

- Approve the Project Quality Plan