



# **TCA SAFETY GUIDELINE FOR TILT-UP CONCRETE CONSTRUCTION**

a publication of the

**TILT-UP CONCRETE ASSOCIATION**

produced by the

**Safety Committee of the Tilt-Up Concrete Association**

published

**June 2013**

Version 13.1

## Tilt-Up Concrete Association

Promoting growth and achievement in innovative tilt-up design and construction for over twenty-five years.

Founded in 1986, the Tilt-Up Concrete Association was created by a dedicated group of construction professionals interested in improving the quality and acceptance of tilt-up concrete construction.

Our mission is to expand and improve the use of tilt-up as the preferred building system by providing education and resources that enhance quality and performance.

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## FOREWORD

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The TCA's Safety Guidelines is the latest resource in a long history of safety information for the tilt-up industry. TCA safety recommendations began as billfold cards that workers could carry. These were available in both English and Spanish and introduced the primary elements of the tilt-up construction process essential to the safety for crews. The worker cards eventually were broadened into a guideline document that became available to companies looking for messages formatted to deliver at safety meetings. Lift day became the primary schedule component where this safety message was delivered and the entire industry became ingrained to the concept of refreshing and orchestrating worker activities and more importantly, where crew members were not to be, during these safety meetings. The guideline document was adapted into a checklist in the early 2000s providing both safety- and quality-control information. Procedures for ensuring both safety and quality were the focus as the tilt-up industry was largely defined by its safe practice and then turned to a more definitive message of quality control and quality assurance. Today, the TCA returns to a more formalized message of safety guidelines with a new product that expands on the succinct areas of focus of previous documents. This product of the TCA Safety Committee brings together the leading methods and protocols of some of the top tilt-up minds in the industry to produce an authoritative position from which companies can build their safety and QA/QC programs. The TCA Safety Guidelines 2013 prepares the industry for a return to high activity, greater volume and faster schedules with a strong attention to the details for protecting crews and delivering quality.

# 1 PRIOR TO CONSTRUCTION

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1. Perform a site logistics review to determine any unusual challenges and identify access and egress for equipment, material deliveries, and crane.
2. Verify design for a proper sub-base under the floor slab. This will be the casting area as well as a working surface. The slab is only as good as the sub-base upon which it is placed.
3. Check the floor slab design for adequate strength to support the designed brace loads, and the crane, if the crane will be on the floor slab.
4. Obtain approved shop drawings for each panel showing all pertinent information.
5. Obtain a properly designed and detailed Tilt-Up package stamped by a registered professional engineer.
6. Obtain a bracing manual with braces designed for the proper wind loads.
7. Develop a panel casting and erection sequence.
8. Select an erection subcontractor and/or crew experienced in handling Tilt-Up panels.
9. Select a crane with a capacity capable of lifting the heaviest panel plus the weight of the rigging gear. (Note: Crane selection will not only be based upon weight but also how far the crane must reach and how far the crane may have to travel with a panel.)
10. Obtain all crane certification and inspection documentation as well as certification of insurance.
11. Verify the bondbreaker compatibility with all curing or sealing compounds, paint and sealers that may have been or will be used on the floor slab or panels. (Note: Always test the bondbreaker prior to casting any panels.)

## 2 PRIOR TO ERECTION DAY

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1. Perform a site inspection. Identify any underground hazards, overhead wires, rough terrain, or soft subgrade upon which the crane will travel. Make notations of any corrections that need to be made or any hazardous areas.
2. Perform a detailed rigging inspection and Rig the crane prior to the date erection is to start.
3. Verify that all rigging is sized to the required capacity of the heaviest lift, and that all sling lengths are according to the project specific Tilt Up Manual
4. Ensure that a crane inspection is performed after assembly by a certified third party inspector, and Verify that the crane is in good working condition.
5. Perform final check for all lifting inserts (properly located), strong backs (properly installed), required brace types per manual ( installed properly), and concrete strength (attained required strength), and refer to all information in the erection manual.
6. Install entrance and exit ramps for the crane to position itself onto the floor slab. Do not allow the crane to exert its weight on the extreme edge of any portion of the slab.
7. Check to make sure all the block-outs are covered. (Note: If water were to get under the slab, it could weaken the subgrade and the crane may crack the slab.)
8. Itemize the equipment required for a proper and safe lift. Ensure that the tools and equipment are well maintained.
9. Identify erection subcontractor's crew. A minimum crew should consist of the crane operator, rigger foreman, two journeyman riggers, brace handlers, and welders if required.
10. Provide a clean working area with all debris and obstacles removed. Locate proper shim points on the footing to prevent overloading the footing prior to grouting under the panels. (Note: The engineer of record can help you with these locations.)
11. Hold a safety meeting before any lifting starts!
12. Ensure that each member of the crew understands their position and the responsibility that goes with it.

13. Establish a controlled access zone prior to and ensure that it is maintained during erection of panels.

### **3 AT THE SAFETY MEETING**

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1. Review the TCA Workers Safety Checklist and have all crew members sign and check the list after the safety meeting.
2. Instruct personnel never to place themselves:
  - under a panel while it is being tilted,
  - on the blind side of the panel while the crane is traveling with it,
  - between the crane and the panel,
  - between the panel being lifted and an adjacent panel
3. Instruct personnel to never:
  - allow horseplay or unnecessary talking
  - reach their hands under a panel to adjust a shim or a bearing pad
4. Instruct personnel to:
  - remain alert at all times, look out for fellow workers & other heavy equipment.
  - to wear proper and required attire at all times. (i.e. hardhats, shoes, gloves, etc.)
5. Address all fall protection requirements.
6. Distinguish the rigging foreman with a colored vest. Ensure the rigging foreman and crane operator understand all hand signals they will use to communicate
7. Instruct the other personnel that the only person who should signal the crane operator is the rigging foreman. However, under any unusually dangerous situation, any crew member, has the authority and obligation to signal the crane to stop all operation using the agreed upon signal.
8. Clearly define the function and responsibility of each person on the lifting crew.
9. Demonstrate the use of the lifting hardware, bracing hardware, and proper use of tools and

equipment to be used.

10. Flag the crane's swing radius and provide crane operator with weights of individual panels, a copy of the erection manual, and instruct operator on lifting sequence.

## **4 DURING THE LIFT**

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1. Maintain a clean working area with all debris and obstacles removed.
2. Do not lift panels when wind conditions would produce unsafe conditions during a lift.
3. Keep any personnel not involved with the panel lifting procedure clear of the lifting area.
4. Maintain fully extended outriggers and use cribbing to spread the outrigger loading. If outriggers cannot be fully extended, then the crane capacities must be reduced.
5. Inspect all rigging gear prior to loading the inserts for proper alignment and free of snags.
6. Verify the rigging configuration matches that are shown in the erection manual.
7. Check to be sure that the rigging will not trap braces once the panel is in its final position.
8. Be alert for panels that may be stuck to the casting surface. Loads to the lifting inserts may be twice that designed for causing possible insert failure..
9. Carefully release the panel off the casting surface using pry bars and wedges.
10. Be alert to all obstacles in the path of the crane and the crew, especially if you must walk a panel.
11. Take extra precautions when lifting panels with special shapes or special rigging.
12. Do not use any damaged or bent braces, lifting hardware or bolts.
13. Make certain that any strong backs shown on the erection details are included on the panels.

## 5 AFTER THE LIFT

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1. Be alert when plumbing panels to their final upright position. Be sure that the panel being plumbed does not strike another previously erected panel.
2. Plumb panels as close as possible prior to attaching braces to the floor slab.
3. Never release the crane load if the bracing does not appear adequate.
4. If the bracing design calls for a support system of knee, lateral, end or cross bracing, it should be checked for complete installation prior to releasing the crane load.
5. If the lateral and end bracing cannot be installed with the panel load still on the crane, the completion of this bracing must not be further than one panel behind the lifting schedule.
6. All bracing should be installed on all erected panels at the end of the workday.
7. At the beginning and end of the workday, check all brace connections to ensure that they are tight and have not worked loose throughout the night or day.
8. Check all panel alignments each work day.
9. If at all possible, grout under all erected panels prior to the end of the workday.
10. Do not remove any braces until all the structural connections are completed and the lateral resistive system is in place and completed. The structural engineer of record can help you determine if it is safe to remove any or all of the panel braces.
11. Be careful when backfilling the pour strip so that you do not exert excessive pressure on the tilt-up panel.