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Tilt-up Concrete Panels

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What are Tilt-up concrete panels?

Tilt-up panels are large concrete panels cast on a jobsite and picked up with a crane, or tilted, into position on the exterior walls of a building. This method has been around since the early 1900's and has been used around the world.

Where are they used?

Tilt-up panels are ideal for warehouses and commercial buildings, but also can be used on manufacturing centers, schools, churches, libraries, and data centers.

Interestingly, Iowa is the home of the [Tilt-Up Concrete Association](#), but tilt-up is not often used in this area.

What are the benefits of tilt-up panels?

Let's start with the benefits of concrete panels. Buildings with concrete panels enjoy better insulation, fire ratings, insurance costs, maintenance, operating costs, and durability that buildings with steel or wood exteriors do not. Concrete panels are typically cheaper and quicker to assemble than masonry walls.

Looking further and comparing tilt-up panels to precast concrete panels, even more benefits become apparent. Lead times from precast manufacturers can delay projects, particularly in times of high demand. Tilt-up can be more economical than precast by avoiding panel transportation and potential delays in panel arrival during erection. Tilt-up panels can also be made larger, which could mean up to a 66% reduction in panel joints. This speeds erection and can provide better insulative properties for the building.

Are there different types of panels?

There are many different styles of panels that can be cast on site. The most common are simple solid core panels, which can be either load bearing, or more of an architectural facade to a steel building. Insulated sandwich panels have become more popular, where two layers of concrete are sandwiched around a layer of foam insulation. This type of panel provides phenomenal R-values and can significantly reduce heating and cooling operating costs.

Panels can be made in many different colors, with different surface finishes, textures, or patterns. Exposed aggregate finishes are also popular.



How are tilt-up panels constructed on site?

One of the most important considerations for quality tilt-up construction is the casting bed for the panels. Often the panels are cast on the concrete floor of the building being constructed, but sometimes a sacrificial casting slab is poured adjacent to the building.

The panels are formed up on the casting slab and all layout, embeds, openings and inserts need to be accounted for and mapped out. A release agent is applied to the casting slab to prevent bond between the panels and the slab. The concrete is poured in panel forms. If sandwich panels are being used, the panels are poured to ~1/3 height and then the insulation layer is placed in the plastic concrete. The rest of the concrete is then poured on top of the insulation. The panels can be hard-troweled, broomed, or any other kind of finish applied.

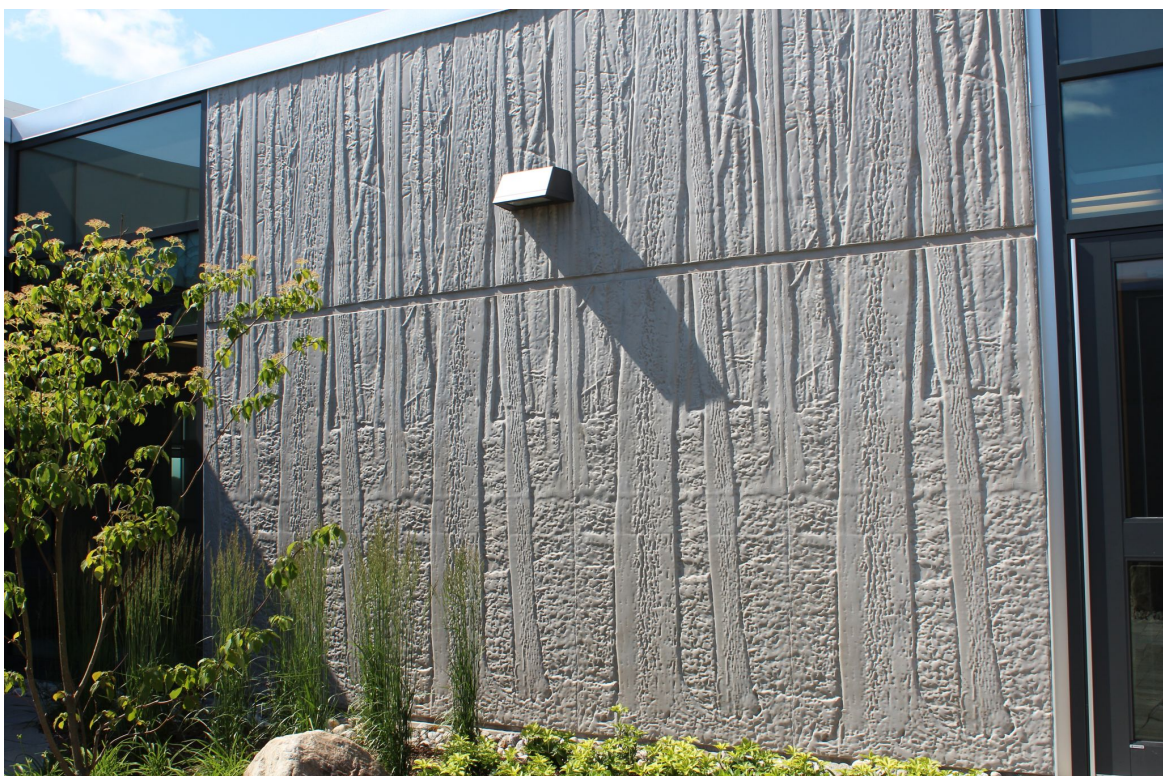
The panels must achieve 2500-3000psi before they are ready for tilting into place. Careful rigging, lifting, and placing with a crane is necessary to safely erect the panels. Bracing is critical until all panel connections or other supports are complete.





Is a special mix design needed to cast tilt-up panels?

Not necessarily, no. A regular mix design can be used as long as it meets the strength necessary to pick and tilt the panels. However, sometimes a higher strength mix may be used to tilt at an earlier age. High spread mixes might be used for an architectural finish, to reduce bug holes or flow into a pattern on the casting slab and be embossed onto the panels.



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