

Press release from Jan de Beer, cell 082 456 3677:

## Tilt-Up Construction For Cost-Effective Aesthetics And Durability

*Gary Theodosiou, engineer and lecturer at The Concrete Institute, says tilt-up construction is often overlooked in the design of structures but can be one of concrete's most cost-effective building techniques:*

Concrete has an advantage over other building materials in that concrete elements can be constructed to accommodate specific applications. Tilt-up construction is a concrete building and construction technique where the elements are cast on site and lifted into their final position, maximising many of the unique and sustainable benefits of concrete for a cost-effective building technique and efficient construction method.

Elements that are to be tilted up are formed on a concrete slab; usually the building floor, but sometimes a temporary concrete casting surface near the building footprint. After the concrete has cured, the elements are tilted from horizontal to vertical with a crane and braced into position until the remaining building structural components (roofs, intermediate floors and walls) are secured. By forming the concrete elements on the ground as opposed to the final position, tilt up provides a convenient construction method saving time, man-hours and formwork.

Conventional tilt up panels are structural elements within a building that span from base to roof diaphragm, acting as beams and capable of carrying roof and slab loads. They combine the building envelope (façade), structure and final finish in one operation. Panels are set out in accordance with a predetermined casting layout drawing. Ideally panels are cast on the surface bed of the project or on final concrete hardstand areas around the building.

### Construction:

Once the pad (casting surface or floor slab) has cured, forms are built on top. A high quality plywood or fiber board with at least one smooth face is typically used, but aluminum or steel forms can also be used. Carpenters work off engineered drawings designed for each panel or element to construct on site, incorporating all door and window openings, as well as architectural features and other desired shapes that can be moulded into the concrete. Studs, gussets and attachment plates are located within the form for embedding in the concrete. The forms are usually anchored to the casting surface with masonry nails to prevent damage to the floor slab.

Next, a chemically reactive bond-breaker is sprayed on the forms and casting surfaces to prevent the cast concrete from bonding with the slab. This allows the cast element to separate from the casting surface once it has cured. This is a critical step, as improper chemical selection or application will prevent the lifting of the panels, and may entail costly demolition and rework.

A reinforcement grid is constructed inside the forms, after the form release is applied, spaced off the casting surface to the desired distance with plastic "chairs".

Concrete is then placed, filling the desired thickness and surrounding all steel inserts, embedded features and reinforcement. The forms are removed when the concrete is cured, rigging is attached and a crane tilts the panel or lifts the element into place. In circumstances when space is at a premium, concrete elements can be cast one on top of the other, or stack cast. Quite often a separate casting pad is poured for this purpose and removed when the panels are erected.

Cranes are used to tilt the concrete elements from the casting slab to a vertical position. The slabs are then most often set onto a foundation and secured with braces until the structural steel and the roof diaphragm are in place.

Tilt up does not sacrifice quality for cost - instead it provides a finished product superior to most other alternatives as it offers the strength and durability of reinforced concrete walls while simultaneously being able to economically achieve aesthetic effects neither possible nor cost-effective with other methods of construction. The end-result is attractive, aesthetically pleasing buildings.

Ends

*Caption for tilt-up pic:*

*Concrete elements are cast on site and lifted into their final position when the tilt-up construction method is used.*

*ends*

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