TILT-UP CONCRETE CONSTRUCTION SAVES TIME AND COSTS

By Jan De Beer

PRESS RELEASE

Tilt-up construction, a building technique where the concrete structural elements are cast on site and lifted into the final position by crane, offers several benefits in terms of time and money, says Gary Theodosiou, Cement & Concrete SA's Technical Consultant.

Theodosiou says concrete has significant advantages over other building materials. "Concrete elements or panels can be constructed to accommodate specific applications. They can cast in situ in their final positions on site, or – as for tilt-up construction - precast on the ground and lifted into final position also on site, or precast in a precast yard and transported to site and erected into position."

He says the first requirement for tilt-up construction is a casting surface area. Elements to be tilted up are formed on such a concrete slab - usually the building floor, but sometimes a temporary concrete casting 'bed' near the building footprint or hardstand area around the new building. Once this surface or floor slab has been created and cured, forms are built on top. A top-quality plywood or fibre board with at least one smooth face is used, but steel forms can also be used.

The construction team works from engineered drawings designed for each panel that incorporates all door and window openings, architectural features, and other desired shapes that can be moulded into the concrete. Studs, gussets and attachment plates are included in 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.

“A chemical bond-breaker is sprayed on the form's surfaces to prevent the cast concrete from bonding with the slab. This allows the cast elements to separate from the casting surface once they have been cured. This is a critical step, as improper chemical selection or application will prevent the lifting of the panels and lead to costly demolition and rework.

“The forms are removed when the concrete is cured; rigging is attached to the panels vertically tilted off the surface by crane and braced into position until the remaining building structural components such as roofs, intermediate floors and walls are removed and completed. By forming the concrete elements on the ground instead of the final position, tilt-up saves time, person-hours and formwork.

“When space is limited, concrete elements can be cast one on top of the other, or stack cast. Often a separate casting pad is poured and removed when the panels are erected.”

Theodosiou says the tilt-up system offers the strength and durability of reinforced concrete walls while being able to economically achieve aesthetic effects not possible nor cost-effective with other construction methods. Large tilt-up panels lend themselves to a variety of decorative treatments such as:

·Unlimited colouring can be added to the concrete mix or coats of textured paints of any colour used for beautiful effects;
·Tilt-up allows for textures produced with improvised techniques and form-liner cast surfaces in a variety of patterns, including striated, fractured fin, stone, brick and woodgrains; and
·The panels can feature exposed aggregate and mechanical tooling surface treatments.

“The tilt-up building system, which was conceptualised in the early 1900s – initially mainly for large warehouses – is now used throughout the world on virtually every building type, from distribution centres to schools, churches, libraries, shopping centres, hotels, and office buildings. In South Africa, there are also some striking examples of tilt-up, but this innovative precast concrete system has not yet been applied to its full advantage locally. Nevertheless, it deserves more consideration among developers, designers and contractors because of its numerous benefits,” Theodosiou adds.

For further information, visit www.cemcon-sa.org.za