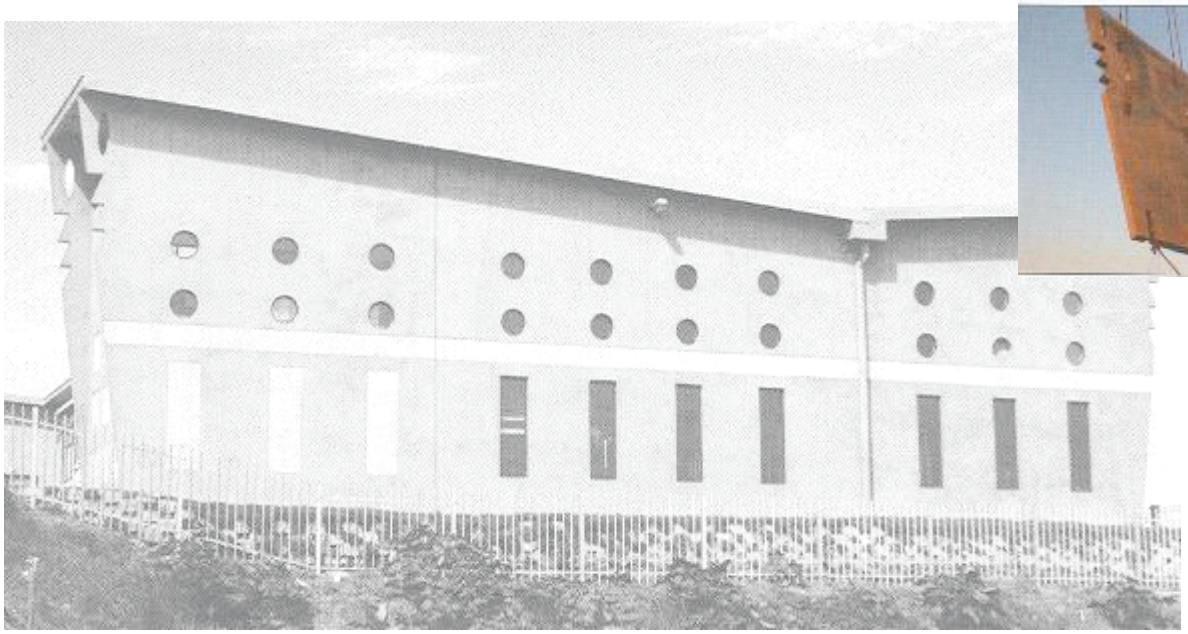
YN Construction
Tilt-Up Division



TILT-UP SOLUTIONS

YN Construction's Tilt-Up division developed out of a project for LG Electronics. Having noted the success of the tilt-up method internationally, we in association with Tilt Up Technologies Pty (Ltd) evaluated the suitability and viability of the construction method under local conditions and built the 6 000m² warehouse premises in 2003.

Upon completion of the works, the success of the project was irrefutable. The project was delivered within budget and the construction time was 30% less than that predicted had conventional construction methods been used.

Since then YN Construction has designed and erected:

- Repo Wild, a 1200m² industrial complex comprising mini-factories in Ballito Industrial Park
- McCall's Patterns Warehouse, 1200m² including the warehouse space and front offices in Ballito Industrial Park
- Delaval, 3000m² warehouse space in Westmead
- Freddy Hirsch, 4 000m² warehouse space also in Westmead
- Pinnacle Park, a 1 600m² office complex in Ballito Industrial Park
- plus, Meadowbrook Park, a 1 800m² mini-factory development in Ballito, as well as others.

TILT-UP CONSTRUCTION: CORE STAGES

While hardly a new process in construction, tilt-up has really made its mark in the 20th century, largely attributed to the development of concrete consistently being reinforced with rebar, the availability of ready-mix concrete, and the development of the mobile crane.

Used extensively in the post-War booming United States to build warehouse styled factories, tilt-up has gained in popularity, refinement and creativity. In 1986 the Tilt-Up Concrete Association (TCA) was created in the United States to establish processes and standards to ensured continued growth in quality and acceptance for this method of construction.

Tilt-up has been used in buildings as large as1.7 million square feet, with individual panels reaching as high as 91 feet and weighing 150 tons. In the United States, as reported by the TCA, 15% of all industrial buildings were created using tilt-up construction. Given its success in the

United States, builders in Australia, Mexico, Canada and more recently in South Africa are increasingly using this method.

A successful tilt-up project begins long before the first batch of concrete is poured, with an extensive planning process and successive core stages:

SITE EVALUATION

Although a large flat, open site is ideal they are uncommon. Site evaluation, therefore includes not only site specific conditions, movement of material and equipment around the casting beds, but also the effects all these factors will have on the sequencing of casting and lifting of panels. In particular, if the site is tightly spaced, casting and pouring panels may take place from within the building.

ENGINEERING

Engineering is a critical stage, and requires that the consulting engineer is experienced in and familiar with tilt-up construction and current design methods.

A well encompassed design needs to carefully consider all facets of the construction method as well as the serviceability aspects, including the correct:

- thickness of floor slabs or casting beds;
- footing and foundation sizes;
- panel thickness;
- positioning of openings and lifting inserts;
- positioning of temporary bracing components;
- connections between the various elements

PANEL FORMING

Forming and casting the panels not only provides the structure, but also the final aesthetic product of the building. The variety of form, shape and texture is endless when casting tilt-up panels. Curved and angled sections for windows and doors are easily cast.

Various textures and architectural features are uniquely created by embedding materials into the concrete which are later removed – including corrugated iron, relief patterns of numbers and words and, circular or angled cut-outs. As these features are cast of concrete they are highly durable and will not require extensive maintenance or replacing.

Tilt-up construction allows for large buildings to be constructed on a minimum amount of space. Provided the sequencing and preparation are correctly planned, individual panels can be cast on top of one another in a pre-defined sequence, outside or within the final structure.

PANEL LIFTING AND PLACEMENT

The lifting sequence is determined before any panels are cast. A well designed sequence can dramatically reduce the cost and speed of the project. The panels are obviously lifted by a crane and are placed in order to allow access to the rest of the building as it arises and to increase stability to the overall structure.

As each panel is placed on the floor slab, temporary bracing structures are put in place to hold the panel. After all the panels have been placed, grouting is placed in the joints between panels to provide further stability when the temporary braces are removed.

PANEL FINISHING

A well cast panel does not require a plaster finish, but can be finished using sandblasting, exposed aggregate finishes, face brick or slate veneers, paints and stains.

THE BENEFITS

SAVINGS IN CONSTRUCTION COSTS

Tilt-up provides numerous construction cost savings. This method of construction uses locally available materials rather than ones that need to be manufactured and shipped in. This means that raw material costs are lower, available when needed and less prone to price fluctuations.

Tilt-up work crews are typically smaller than the crews used in traditional construction and are normally comprised of local labour, resulting in reduced labour costs.

Given the economies of scale, the larger the footprint for the building, the more these savings improve the project's total cost. Another factor is the absence of notoriously expensive and unsafe access platforms required on conventional construction sites and the elimination of the need for a plastered finish.

FAST CONSTRUCTION SCHEDULE

Tilt-up offers several opportunities to ‘compress’ the schedule and deliver the building very quickly. Erecting the walls with tilt-up panels is faster than building walls using traditional construction techniques.

FAST TRACK DELIVERY

The tilt-up system is well suited to the ‘design-build’ sequence of construction. It is often possible for the construction phase to proceed while the design is still being finalized, thereby speeding up the completion of the project. Panels can be constructed while the rest of the building design is still being finalized.

FASTER OCCUPATION

Due to the speed at which the building is erected, follow on trades enjoy occupation of a completed structure much earlier than with conventional methods. It is possible to occupy large areas of the newly erected building simultaneously, thus reducing a congestion of trades at the beginning and end of the project and also provides a cleaner and safer atmosphere to work in.

AESTHETICS

Tilt-up panels are not prefabricated. Each one is custom designed for the client's needs and preferences. A full range of building finishes, wall textures and adornments, colours, even curved walls, are available with this method. Tilt-up provides architects and designers with virtually unlimited flexibility in crafting a building that is functional, durable and aesthetically pleasing.

SECURITY

Facilities that require positive security and management of the interior environment - prisons, classified manufacturing facilities, businesses with clean rooms - will appreciate the strength and control afforded by concrete and tilt-up buildings.

REDUCED OPERATING COSTS

Concrete provides excellent insulation, reducing the ongoing heating and cooling costs for the tenant. This insulation extends to sound as well as temperature. Workers in a tilt-up office building located in a noisy area will be less affected by the environment. By the same token, a manufacturing business that generates noise will have less effect on its neighbours and will find it easier to comply with local noise ordinances.

FIRE SAFETY

The concrete used in tilt-up panels meets the fire-resistance standards of even the most demanding building codes. For example, a 170mm concrete wall offers a fire resistance rating of four hours or more. Tilt-up panels are also frequently used in a building's interior as fire walls. Tilt-up buildings offer real protection and safety for their tenants' employees, property and ongoing operations.

SAFETY

Tilt-up is a proven, safe method of construction. The vast majority of the work takes place on the ground rather than on scaffolding, reducing many of the risks usually faced by workers.

DURABILITY

Tilt-up buildings are extremely durable. Many structures created in the 1940s are still in operation today, with little apparent wear. A testament to the strength of tilt-up construction,

general contractors in earthquake-prone California now use this method for 90% of their one-story industrial building projects.

EASE OF MAINTENANCE

Tilt-up buildings require little in the way of ongoing maintenance, outside of periodic cleaning and repainting as desired. Concrete is impervious to insect or rodent infestation, so this problem becomes a relative non-issue as well.

REPAIRS AND EXPANDIBILITY

In the event a wall is damaged by a forklift or truck, damages are typically more localized on a panel than in other types of structures, like steel buildings. Also, the modular design of the panels allows for easier repairs and expansion of the building.

REDUCED INSURANCE PREMIUMS

As tilt-up buildings have superior fire resistance ratings and have been proven to withstand severe weather and earthquakes, these buildings typically enjoy better insurance rates than steel buildings or other types of structures.

TYPICAL TILT-UP APPLICATIONS

Tilt-up construction is one of the fastest growing industries in the world. In the United States alone, at least 10 000 buildings enclosing more than 650 million square feet are constructed annually. This is due in part to the economies of tilt-up, which combine reasonable cost with low maintenance, durability, speed of construction, and minimal capital investment.

As a result of the flexibility and efficiency of the tilt-up method the applications are limitless, and can include without limit to:

- commercial applications
- industrial applications
- residential complexes
- schools, libraries and churches
- basements
- reservoirs
- bridges
- storage facilities
- sporting facilities and stadiums
- airports

A PROFESSIONAL TEAM

Our professional team has worked together on all our tilt-up projects, creating an experienced, creative and consistent team:

Brent Youens:	Director and Contractor – YN Construction; KwaZulu-Natal
Oliver Youens:	Director and Contractor – YN Construction; Gauteng
Hugh Fraser:	Hugh Fraser Architects
Charles van Eck:	Tilt Up Technologies (Pty) Ltd, member Tilt-Up Concrete Association
Mike Slabbert:	Slabbert & Associates (Engineers)