

Introduction Bundle

A Smart Way to Build Religious Institutions



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TILT WALL: GETTING IT BUILT FASTER, STRONGER AND BETTER

This document will help you to learn about the benefits and processes behind tilt-up construction for your next project

Tilt Wall Ontario is a subcontractor committed to bringing a superior building product to the Ontario construction industry since 2002. With our tilt-up construction and design experience we are able to assist our clients in designing buildings with lasting beauty and value.

Tilt-up construction is a method of building developed more than 100 years ago where walls or building elements are cast on-site. They are lifted (tilted) into place and braced until permanent structural connections are completed. Tilt-up walls can be insulated and/or load bearing with a wide variety of finishes. The many applications of the tilt-up system deliver quality, speed, economics, durability and beauty. With more than 60 buildings and 3,000 panels comprising over a million square feet of panels Tilt Wall has become a leader in tilt-up construction in Ontario.

Over the years, Tilt Wall has built an impressive portfolio featuring a wide range of complex projects, from educational institutions like the University of Guelph's Bio-Products Discovery and Development Centre to multi-storey residential buildings like Muskoka Bay Resort's condominium. In doing so, Tilt Wall has received many industry accolades: 6 Ontario Concrete Awards, 5 Tilt-Up Concrete Association Awards and the TCA's 2018 Contractor of the Year.

Tilt-up construction is able to offer the following advantages:

- Energy efficiency through 100% continuous insulation and zero thermal bridging
- Thermal mass storage through exposed interior concrete
- Durability on the exterior and interior with solid concrete
- Flexibility in interior and exterior design
- Structural integrity with load-bearing concrete panels
- Security and safety
- Sustainability
- Speed of construction
- Cost saving



Tilt-Up Advantages

▶ Energy Efficiency

Insulated tilt-up panels come in a variety of type and thickness of rigid insulation, ranging from 50mm to 200mm thickness. To form insulated concrete walls, concrete is poured on both sides of the foam and the finished panel is held together with a non-thermal conductive fiberglass tie. The thickness will be determined by the thermal characteristics of the insulating material and the thermal loads on the structure. Insulation values range from R10 to R67. The higher the R value the lower the HVAC demands. Large tilt-up panels have sealed joints, reducing uncontrolled infiltration. In a site-cast tilt-up panel, the insulation is 100% continuous, spanning from edge to edge and top to bottom. The insulation is protected from sun, rain, wind, rodents and bugs by the concrete once the panels have cured. The rigid insulation is protected in the panel and retains its R-value over time.

▶ Thermal Mass

The panel's excellent thermal mass characteristics make it one of the most energy efficient methods of construction. Tilt-up concrete sandwich wall panels used as an interior surface can save materials by eliminating the need for interior framing and drywall, all while allowing concrete to gradually store and release heat to help moderate daily temperature swings. Thermal mass can improve comfort, resiliency and save energy.

▶ Durability

Concrete panels are low maintenance, which means cost savings for the entire life of the structure. Normal exterior concrete strength is 30 MPa with air to help it through the freeze-thaw cycles that exterior of building are subject to. Solid concrete on the exterior helps protect the insulation and structural integrity of the building from natural elements such as wind-driven rain, gale force winds, fires and extreme temperature swings all which can deteriorate a building over time. The panels are a cost-effective, energy-efficient, durable, strong and fire-resistant cladding system that will outlast most other building methods.

▶ Design Flexibility

Using one of the most fluid building products on the market means that any tilt-up building can be attractive which you can take great pride in. Textures produced by form liners and other methods can result in a wide variety of finish patterns including stone, brick, wood grains and others. An unlimited array of colourings can be added to the concrete, or coatings can be applied after the fact for beautiful affects. Interior wall panels with a smooth finish will resist everyday wear and tear, provide a clean, durable and mold resistant surface no matter the occupancy.





► Structural Integrity

Tilt-up panels are load bearing, meaning they eliminate the need for beams and columns along exterior walls. They are usually designed to span between the foundation and roof beams without the need for additional intermediate supports. They can accommodate a variety of loads, including wind, seismic, equipment, structural loads and provide blast resistance.

► Security

Tilt-up concrete applications offer superior fire resistance compared to conventional construction materials. The sandwich panels can provide up to 4 hours fire resistance, they have inherent fire containment characteristics, they add safety and security which can improve insurance rates and speed mortgage approvals. Damage to a concrete building is generally minimal and easily repaired. Tilt-up structures withstand wind and hail storms and are impenetrable by the smallest rodent, insect, or even the most determined human.

► Sustainability

The raw materials used in tilt-up panel construction are generally sourced locally, reduces construction waste, and minimizes transportation and disposal costs. They can be designed to be disassembled, saving materials and extending the life of the panels. The durability creates a long life-cycle with low maintenance, reducing the need for replacement and maintenance during a building's life.

► Speed of Construction

In tilt-up construction much of the work on the walls is done simultaneously. As the walls are built the exterior and interior finishes are completed along with the insulation, air and vapour barriers. Since tilt-up panels are load bearing, the footing and foundation work tends to be simpler also speeding up the construction process. When required a temporary casting slab can be used on-site, which further accelerates the schedule. With 90% of the work happening at ground level the need for scaffolding and aerial work is also minimized, once again speeding up productivity.

► Costs

The speed of construction allows for earlier occupancy and reduces the overall construction time and costs. Elimination of most exterior steel columns and piers can also be a significant savings. With tilt-up being an all-in-one exterior wall system much of the small costly details around openings, parapets and transition points in construction materials and finishes is eliminated.

Tilt-Up Process



1 Site Preparation & Foundation Slab

All required materials and equipment are gathered for the job. Next, the concrete floor slab is poured.



2 Forming Wall Panels & Adding Formliners

The crew assembles the panel forms on the floor slab. The panel forms serve as molds for the concrete. Each form provides the panel's exact shape and size as well as openings for doors and windows.

3 Pouring Outer Layer & Adding Insulation

Concrete is poured into the prepared forms to create the panels. Sandwich insulation is also encased into each building panel to give tilt-up structures true edge-to-edge insulation.





4 Panel Reinforcement, Inserts and Embeds & Pouring Inner Layer

Up next, workers tie in the steel grid to reinforce bars into each form. This part of the process gives the panels additional structural integrity. Workers also install inserts and embeds, which will be used to lift the panels later. Then the inner layer of concrete is poured.



5 Lifting Concrete Panels In Place

The concrete panels are given time to solidify; The crew then connects the panels to a crane. The crane then lifts the panels from the floor slab into position. From here, the workers will connect the panel's braces to the slab.

6 Panel Finishings & Caulking Joints

During the last step of the process, the building begins to look like a finished product. Exterior walls are finished and the joints are also caulked to prevent water penetration.



Cost Comparison



School Name - One-Storey	Location	Type	Floor Area sq. ft.	Bid Amount	Per Foot
Holland Marsh District Christian School	Newmarket	Tilt-Up	30,490	\$ 4,488,500	\$ 147.21
Grace Christian School	Dundas	Tilt-Up	28,200	\$ 4,700,000	\$ 166.67
Half Moon Bay Elementary School II	Ottawa	Conventional	49,570	\$ 9,092,000	\$ 183.42
Avalon Catholic Elementary School	Orleans	Conventional	49,356	\$ 9,093,800	\$ 184.25

Average costs per foot for a 1-storey school:

Conventional:	\$	183.83
Tilt-Up:	\$	156.94
Savings:	\$	26.89

School Name - Two-Storey	Location	Type	Floor Area sq. ft.	Bid Amount	Per Foot
Findlay Creek Elementary School	Findlay Creek	Tilt-Up	73,000	\$ 12,797,000	\$ 175.30
Half Moon Bay Elementary School	Ottawa	Tilt-Up	63,720	\$ 11,652,000	\$ 182.86
Broadview Public School	Ottawa	Tilt-Up	74,180	\$ 15,547,000	\$ 209.58
Kingston Centre Catholic Elementary School	Kingston	Conventional	35,000	\$ 7,953,000	\$ 227.23
Fernbank School	Stittsville	Conventional	110,000	\$ 25,178,000	\$ 228.89
École élémentaire catholique Avalon II	Orleans	Conventional	47,790	\$ 11,676,000	\$ 244.32

Average costs per foot for a 2-storey school:

Conventional:	\$	233.48
Tilt-Up:	\$	186.84
Savings:	\$	46.64

Tilt-Up Construction has saved the public:

275,210.00 sq. ft. of school at \$ 46.64 per foot:	\$ 12,835,794.40
58,690.00 sq. ft. of school at \$ 26.89 per foot:	\$ 1,578,174.10
Total:	\$ 14,413,968.50

Please note:

- Values are bid results and may not reflect actual construction costs.
- Note: All school construction timeframes are from 2014 to current day.

Energy Usage Comparison

Among its many benefits, one of the biggest draws of tilt-up construction is its energy efficiency. At a time when environmental impact is top of mind and school districts are looking for ways to cut energy costs, tilt-up buildings are an ideal solution.

Some of Ontario's school districts have the unique challenge of responding to drastic enrollment increases while increasing the sustainability of their buildings. Tilt-up makes it possible to achieve both goals.

Tilt-up construction takes advantage of concrete's thermal mass properties as well as more energy-efficient insulation systems and reduced air infiltration. This results in less air leakage and stable indoor temperatures, which can cut energy costs by up to 35%.

Traditional Construction VS Tilt-Up Construction



York Region School Board Average

Electrical: 5.29 kWh
Gas: 1.00 m³



King Christian School

Electrical: 4.58 kWh -14%
Gas: 0.58 m³ -42%



CEPEO School Board Average

Electrical: 12.4 kWh
Gas: 1.24 m³

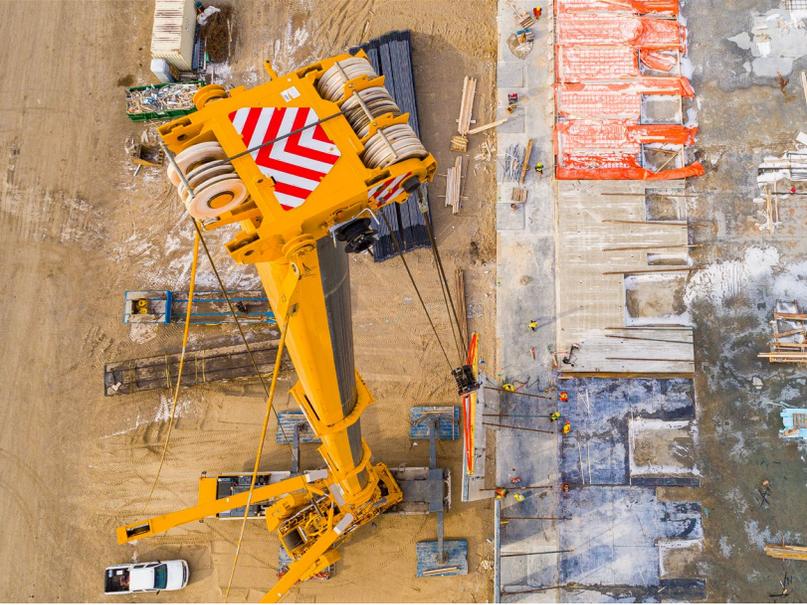


Des Sentiers School

Electrical: 9.30 kWh -25%
Gas: 0.39 m³ -68%

*School energy usage per square feet

Contact Us



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Experts in Tilt-Up Construction Since 2002