Introduction Bundle

A Smart Way to Build Specialty Structures

TiltWall

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Introduction

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 savings

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

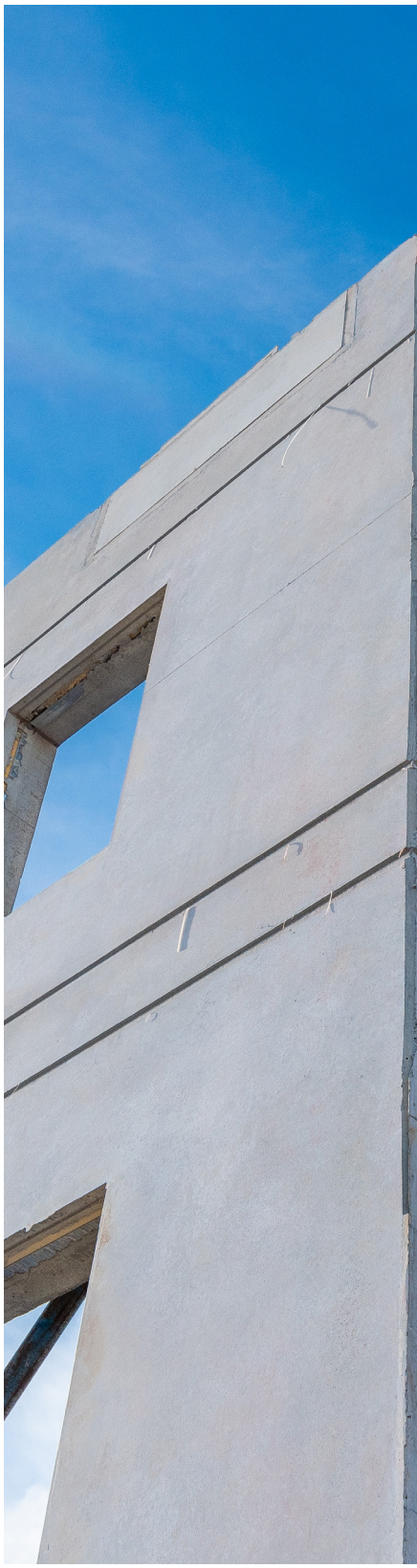
The panel's excellent thermal mass characteristics make it one of the most energy efficient methods of construction. Tilt-up concrete sandwich wall panels used as an interior surface can save materials by eliminating the need for interior framing and drywall, all while allowing concrete to gradually 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

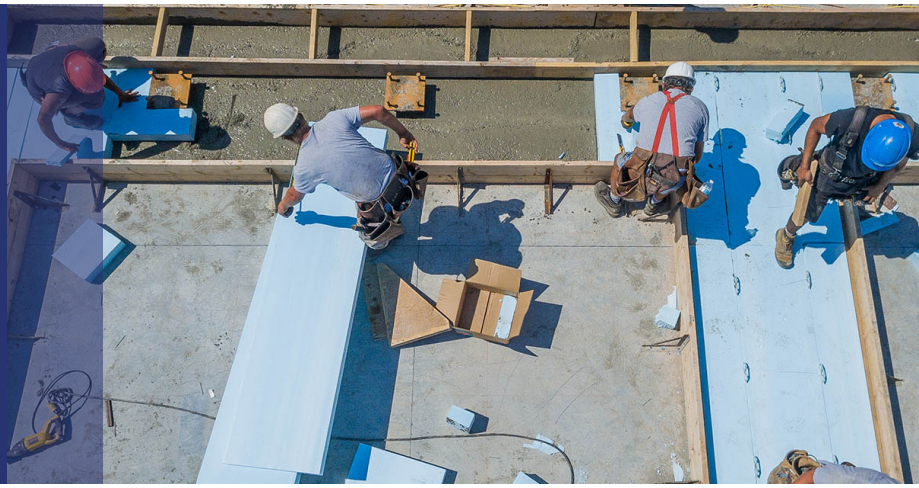
All required materials and equipment are gathered for the job. Next, the concrete floor slab is poured.

2 Forming Wall Panels & Adding Form liners

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.

Project Profile

Cavanaugh Station

PROJECT LINK: Tiltwall.ca/project/cavanaugh-station/

The durability and speed of tilt-up construction played a role in being the chosen method of construction for this project. Designed to house the fire suppression pump and system for the Cavanaugh Transfer Station, using the fireproof properties of tilt-up was a natural selection. The energy efficiencies of tilt-up will also ensure the building does not freeze in the winter and compromise the integrity of the pumping system.

PROJECT:	Cavanaugh Station		
YEAR BUILT:	2019	**BUILDING USE:**	Fire Suppresion Station Building
ENGINEER OF RECORD:	Barry-Bryon Associates (BBA)	**SIZE:**	357 sq ft
GENERAL CONTRACTOR:	Black and McDonald	**PANEL AREA:**	1,043 sq ft
OWNER:	Toronto Hydro		

FINISHED BUILDING

INSIDE OF BUILDING

FRONT OF BUILDING
Who says a tilt-up building needs to be big!

Project Profile

Richmond Hill Garbage Enclosure

PROJECT LINK: Tiltwall.ca/project/garbage-enclosure-richmond-london-ontario-2015/

PROJECT:	Richmond Hill Medical Building
ADDRESS:	215 Fanshawe Park Rd W, London, Ontario
YEAR BUILT:	2015
ENGINEER OF RECORD:	Barry-Bryan Associates (BBA)
GENERAL CONTRACTOR:	Grand River Contracting Inc.
BUILDING USE:	Enclosure

SQUARE FOOTAGE OF PANELS:	645 sq ft
NUMBER OF PANELS:	4
HEAVIEST PANEL:	21,300 lbs
TALLEST PANEL:	11’-1”
LARGEST PANEL:	203 sq ft

FINISHED ENCLOSURE

ERECTED PANELS

ERECTED PANELS

Project Profile

Hobby Shop Len Overbeek

PROJECT LINK: Tiltwall.ca/project/hobby-shop-woodstock-ontario-2013/

Tilt-up construction was chosen for this project because of its durability and energy efficiency. Designed and built as a hobby shop and hangout room. The insulated tilt-up panels mean that this building is heated and cooled very effectively. The e posed interior concrete surfaces also allow the entire shop and garage to be power washed clean without fear of long-term damage to a wood structure.

PROJECT:	Hobby Shop		
ADDRESS:	445603 Gunn's Hill Rd Woodstock, Ontario	**NUMBER OF PANELS:**	8
YEAR BUILT:	2013	**HEAVIEST PANEL:**	28,800 lbs
BUILDING USE:	Hobby Shop	**TALLEST PANEL:**	18'-4"
SQUARE FOOTAGE OF PANELS:	1,688 sq ft		

FRONT VIEW
Made to look like traditional construction

ERECTED PANELS
Single panels were used for each of the sides.

FINISH
Applying stain to make the concrete look like wood.

Project Profile

Shop & Rec Room

PROJECT LINK: Tiltwall.ca/project/backyard-barn-tillsonburg-ontario/

Designed and built as a hobby shop and garage with a rec room above for family hangouts. The insulated tilt-up panels mean that this building is heated and cooled very effectively for climate control in the wood shop area. With the owners familiarity with tilt-up construction a small animal housing building was also constructed using tilt-up.

PROJECT:	Shop and Rec Room
ADDRESS:	332497 Plank Line Tilsonburg, Ontario
YEAR BUILT:	2009
ENGINEER OF RECORD:	Rob McNeil Engineering
GENERAL CONTRACTOR:	Double O Construction
BUILDING USE:	Hobby Shop & Family Rec Room

SQUARE FOOTAGE OF PANELS:	3,518 sq ft
NUMBER OF PANELS:	28
HEAVIEST PANEL:	14,500 lbs
TALLEST PANEL:	10’-1”
LARGEST PANEL:	875 sq ft

FRONT VIEW
Beautifully stained panels make this building blend in its rural setting.

BUILDING CONSTRUCTION
Panels were only used for the ground floor

OUT-BUILDING
Small building used for animal housing is also constructed out of tilt-up.

Signs

The fluidity of concrete and the simplicity of tilt-up allow a company to easily create a sign displaying their unique business identity. Two great examples below show how Tilt Wall was able to build a sign that reflects the design ethos of their main headquarters.

PROJECT:	Tilt Wall Ontario Sign
ADDRESS:	1269 Commerce Way, Woodstock, Ontario
YEAR BUILT	2014
PANEL HEIGHT:	20’

PROJECT LINK:
Tiltwall.ca/project/sign-tiltwall-inc-woodstock-ontario-2014/

PROJECT:	Barry-Bryan Associates Sign
ADDRESS:	250 Water Street
YEAR BUILT	2016
PANEL HEIGHT:	21’

PROJECT LINK:
Tiltwall.ca/project/barry-bryan-associates-sign/

Letter of Reference

BARRY BRYAN
ASSOCIATES

Architects
Engineers
Project Managers

December 12, 2014

Letter of Reference for Tilt Wall Ontario Inc.

To whom it may concern:

On behalf of Barry Bryan Associates (BBA), Architects, Engineers, it is my pleasure to provide this positive letter of recommendation for Tilt Wall Ontario Inc.

Tilt Wall Ontario Inc. has worked with BBA on numerous occasions over the past 12 years on a variety of Tilt-Up Projects. Noteworthy project would include:

- Humber College, Building 'B', New Academic Services Building
- Cargowall Industrial Warehouse
- Russell Reid Public School Addition
- Port Hope Police Facility
- London medical Centre Building

We have consistently found the management and staff at Tilt Wall Ontario to be professional, thorough and possess a high level of technical expertise.

I have no hesitation in recommending Tilt Wall Ontario Inc. as a highly competent concrete tilt-up contractor, capable of handling any project, based on our years of experience working with them.

Yours very truly,

Barry Bryan Associates
Architects, Engineers, Project Managers

Dennis L. Bryan, P. Eng., OAA, MRAIC, CAHP
Principal

DLB/gs

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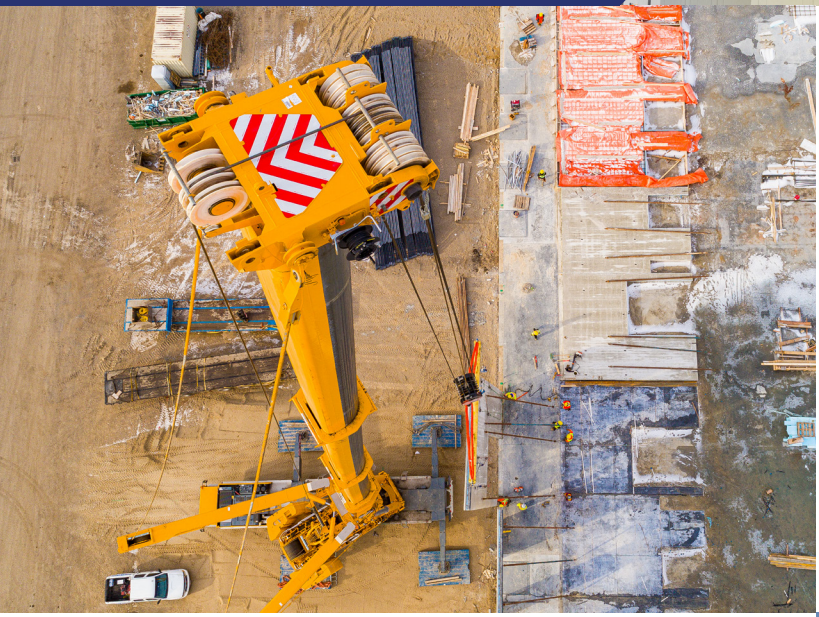

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