

# SPECIALTY CONCRETE CONSTRUCTION

## CONCRETE HOUSE



### PROJECT CREDITS

#### OWNERS

John Pylypczak and Diti Katona

#### ARCHITECT OF RECORD

Angela Tsementzis Architect

#### ENGINEER OF RECORD

Blackwell Structural Engineers

#### GENERAL CONTRACTOR

Marcus Design Build

#### MATERIAL SUPPLIER

Innocon Inc.

#### ADDITIONAL PARTICIPANTS

- BASF Canada Inc.
- Building Science Consulting Inc.
- LIUNA Local 183

### PROJECT FACTS

**LOCATION** Toronto, Ontario

**COMPLETION** January 2015

**PROJECT TYPE** Single-family, detached residence

**FLOOR AREA** 380 square meters (4090 square feet)

#### QUICK PROJECT FACTS

- Cast-in-place concrete sandwich panels
- Board formed finish exposed at interior and exterior
- Concrete soffit at 4.5 m long cantilever
- Concrete floors at lower level and ground floor





**CONCRETE HOUSE** The Concrete House is a new, 380 square meter residence sited on a Toronto ravine. The cantilevered structure responds to the zoning and site topography and the concrete sandwich panel construction provides an economical and air-tight building enclosure. Board-formed concrete is the predominant finish in the house, exposed at both the interior and the exterior. The property offers stunning views and access to a wooded area but had many zoning restrictions, including a required setback from the top of the ravine slope and the inclusion of a parking space behind the front wall of the house. Through these site constraints and opportunities, the building took shape as three stacked volumes with each level shifting to respond to its own set of criteria: setbacks, views both into and out of the house, daylight, structural design.

To realize the conceptual design of the house, the design led away from vernacular wood-framed construction. Concrete was selected both for its aesthetics and because its use also resolved many of the design issues: structural challenges, durability of the two volumes at grade, potential for vertical and horizontal application, and the desire for an edited material palette.

Ultimately, a building system of cast-in-place concrete sandwich panels was employed: the inner wythe of concrete is structural, the outer wythe forms the cladding, and between the two is a continuous layer of extruded polystyrene insulation. With the concrete left exposed on both sides, this construction method allows the exterior cladding, insulation, vapour barrier, structure, and interior wall finishes to be completed in a single casting. A novel, horizontal application of this concrete wall system was developed in order to more completely express the idea of the stacked volumes – at the middle floor the board-formed soffit hangs from the structural concrete slab above so that the finish of the exterior wall wraps around to the underside.

The casting process also offered an opportunity to consider the texture of the concrete finish. Rough sawn wood boards were used to form walls and soffits imparting a wood grain texture to the surfaces.

This is a wall assembly more typically used in buildings such as warehouses and distribution centers where it is preferred for its durability, low maintenance, fire resistance, and speed of construction. In the case of the Concrete House, however, it was also possible to consider details – such as the recessed window mullions to the art hanging track around the perimeter of the interior – and how to incorporate these into the concrete casting.

