SUSTAINABLE PERSPECTIVE

Fire & Emergency Training Institute

Mississauga, Ontario, Canada

The Fire and Emergency Services Training Institute (FESTI), completed in January 2007, is the GTAA's first LEED project. FESTI was designed by Kleinfeldt Mychajlowycz Architects and is located off Courtneypark Drive in Mississauga, at the Western end of Pearson International Airport. The project was built in 18 months at a cost of $13.5.

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The project managers were given objectives to create a revolutionary fire and emergency training facilities to enhance the existing program offered by the GTAA and expand its clientele.

The project team was also mandated to construct the facility using globally accepted environmentally friendly building standards. FESTI was designed to conform to the Leadership in Energy and Environmental Design (LEED) Silver Rating.

FESTI consists of numerous training structures used to simulate a wide range of emergency scenarios, including a Confined Space Building, Rescue Tower, Burn Building and Aircraft Training Mock-ups.

The main building has 2,804 sq m (30,200 sq ft) of space to house classrooms, a learning theatre, cafeteria, office space and truck bays to accommodate 160 students and staff.

FESTI will provide significant long-term through reduced energy consumption, water usage, maintenance and groundskeeping.

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Architect Carol Kleinfeldt, Kleinfeldt Mychajlowycz Architects, said that the main building couldn't have achieved the large energy savings without the TermoDeck technology. Hollow core slabs are cost effective industry standard products that are well known to designers and were easy to adapt to provide the required thermal mass.

Distinctive sustainable design features of FESTI include:

TermoDeck - The team worked extensively with TermoDeck, a firm specializing in in-slab air distribution systems. This system reduces peak energy by using the hollow core building structure to store excess building heat for later use or rejection.

Green roof - Classrooms are located below an extensive green roof system that allows for improved temperature control in all seasons.

Solar wall - This serves to augment the performance of the air handling system by providing "free" solar heated air induction. Perforated steel cladding on the south elevation has been designed to form a solar air heating plenum, which can preheat incoming air by up to 170C above outdoor temperatures to reduce the building's energy use.

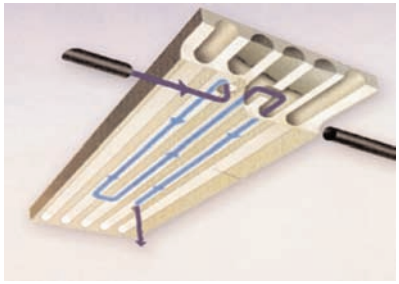
Waste saving initiatives - Water consumption is reduced and the need to store domestic hot water is eliminated through the use of waterless urinals and remote, tankless water heaters.

Material procurement - Materials used during the construction were sourced from the closest possible suppliers to eliminate long distance hauling.

Recycled building materials - Recycled concrete was used as aggregate prior to paving. Other materials were selected based on post-industrial recycled content as well as for low organic compound emissions. The whole project is using in excess of 15% of construction material value representing recycled materials - 2 LEED points.

Hollow core: Over 2140 sq m (23,000 sq ft) of 8" and 10" hollow core slabs were used on the project + 1 solid slab - 3 sq m.

Thermal Mass: The thermal inertia of heavy materials is well known from an operating energy perspective, in both warm and cold climates. The thermal conductivity of concrete is suitable for all climates.

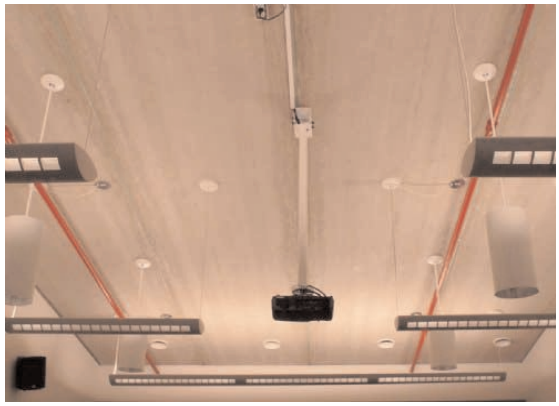


TermoDeck: TermoDeck uses the thermal mass of hollow core slabs. Precast concrete hollow core slabs can be strategically incorporated into a project design at the pre-construction stage without altering the architectural design of your building. -placed hollow core slabs between the building's walls and floors ensures hot and cold temperatures can be stored and released upon demand. Consequently, the need for bulky mechanical equipment that otherwise forms the very basis of conventional energy-guzzling buildings is eradicated.

Through the use of hollow core slabs, TermoDeck constructs buildings that consume significantly less energy. Based on the interactive relationship between the outdoor environment and the energy being stored internally through hollow core slabs, surplus energy is stored to heat and cool a building, naturally. This method provides the added benefits of improved indoor air quality, ventilation, and comfort by constantly importing fresh, clean air into the building, and exporting old, stale air.

The effects of using the heat storage capacity of hollow core slabs varies during spring, summer, fall and winter conditions. Surplus heat, generated from body heat, lighting, computers, sun radiation, etc, can be stored in

hollow core slabs increasing their temperature by 2-3°C during the day without affecting the comfort of the occupants. In the summer this excess heat is dissipated from the slabs by lowering the slab temperature with cool night air. During the winter, heat is stored in the hollow core slabs overnight and is used to maintain comfortable internal conditions for the occupants the next day.



CREDITS:

Owner: Greater Toronto Airports Authority

Architect: Kleinfeldt Mychajlowycz Architects Inc., Toronto, ON

Mechanical Engineer: PT Engingeering Ltd, Burlington, ON

Mechanical Consultant: TermoDeck Canada Inc

Structural Engineer: Halsall Associates Ltd., Toronto, ON

General Contractor: Aquicon Construction, Brampton, ON

Precast Concrete: Coreslab Structures