

IE_Cork_CIT Zero 2020 building		
Image 01: Northwest view © Cork Institute of Technology	Image 02: Interior design-Exposed thermal mass © Cork Institute of Technology	Image 03: Natural ventilation system © Cork Institute of Technology
		
Building Specifications		
Address	Cork Institute of Technology, Bishopstown, Cork, Ireland	
Building Category	Office/ Education	
Year of Construction	1974 (renovated in 2012)	
Special Qualities	Near Zero Energy Building	
Location	51° Northern latitude, 8° Eastern longitude. Located on a college campus in an urban area, attached to the pre retrofit building and surrounded by buildings of similar size.	
Climate	Cfb (warm temperate climate, moist with adequate precipitation in all months and no dry season, warm summer)	
Vent. Cooling Site Design Elements (Solar Site Design and Wind Exposure Design, Evaporative Effects from Plants or Water)		
Building is sheltered from the wind from existing buildings in south and west. The building is not sheltered from the sun but a high performance façade is employed to reduce solar gains.		
Vent. Cooling Architectural Design Elements (Form, Morphology, Envelope, Construction & Material)		
<p>Form: the building is two story attached to the main campus building along a west – east direction. It has three exposed facades.</p> <p>Morphology: As the building is a retrofit project no morphological aspects were enhanced as part of the design.</p> <p>Envelope: The high performance envelope includes triple and quadruple glazed fenestration units with an average U-value of 1.0 W/m² K, while opaque elements of the façade have an average U-value of 0.09 W/m² K. The envelope also has a natural ventilation system which is separate to the fenestration system.</p> <p>Construction: High thermal mass</p>		
Vent. Cooling Technical Components (Airflow Guiding Components, Airflow Enhancing Components, Passive Cooling Components)		
In the retrofit space the ventilation module uses a flush faced external louvre with individual air inlet sections. Inside this louvre ventilation is supplied using side hung, inward opening, dedicated insulated doors controlled either manually or automated based on conditions in the enclosed spaces. These insulated doors are purpose provided ventilation openings and there are a number of operating configurations available with the individual opening sections split into low level and high level. The low level unit relies on manual operation by the occupants while the high level doors are controlled by an automated control system.		

IEA EBC Annex 62 Ventilative Cooling

Building Energy Systems (Heating, Ventilation, Cooling, Electricity)
Heating: Heating to the building is provided via a combination of solar thermal panels and an air source heat pump Ventilation & Cooling: Both the cooling and ventilation systems are mostly single sided natural ventilation Electricity: The buildings electrical power is supplied via a wind turbine, solar PV with battery storage also.
Actuators, Sensors and Control Strategies
There is currently a simple control strategy in operation at the building. There is one open and one closed position setting for the high level automated ventilation doors. The opening is activated on internal air temperature of 21°C within the zone being serviced. There are also actuation overrides based on external temperature conditions (< 15°C) to avoid over cooling during shoulder seasons. These set-point values are still being optimised. Manual night cooling has been implemented during previous summer months. The occupants can leave the low level manual doors open if they feel the office was uncomfortable that day. Night cooling is available on the control platform and is due to be implemented in 2015. In 2016, a simple strategy was in place ensuring conditions were broadly acceptable to occupants. This involved manual low level opening remaining open for many 24 hour periods over riding the automated system to a large extent.
Building Ownership and Building Facility Management Structures
The building is owned by Cork Institute of Technology Planners: Arup Engineers, HJL Architects, AMS Ltd, Wesco, Summerhill Construction
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