

Holcim Indonesia – A Building Fit for Purpose

How Holcim Indonesia and Akademi Teknik Mesin Industri, 'ATMI' (Industrial Machinery Technical Academy) created a new model in capacity building for Indonesia's construction sector, supporting national aspirations for economic success.

The Urban Challenge

Sustainability in the built environment is one of the most challenging issues of today. Our cities are bursting at the seams placing enormous demands for energy, water, shelter and infrastructure. During their lifecycle, buildings are responsible for about 50% of global energy use and 30% of world greenhouse gas emissions. In fact in their construction period alone, buildings are responsible for about 50% of primary resource extraction and 40% of global solid waste, while contributing 15% of global gross domestic product.

The world's population is already past the level of 7 billion and, in contemplating 9.3 billion by 2050, high population nations, such as Indonesia, must come to terms with the needs of rapidly rising numbers of city dwellers, using finite resources. Visionary pioneer in urban planning, Enrique Penalosa has pointed out that Indonesia's developing cities have yet to construct as much as 60% of their future built environment in order to reach the state of development of longer established counterparts in Europe or the United States. How quickly we learn to build and manage more with less, will determine our future.

An icon of efficiency for Indonesia's construction sector

At the close of 2013, Holcim Indonesia in close collaboration with ATMI and a number of local skilled partners completed a green, energy efficient building, the Ignatius Loyola Ecotech. This four storey campus complex was created not only as a centre for learning the disciplines of mechatronics but as an exponent of sustainability, as it operates using less than half the energy of a standard building of comparative size.



Located in Cikarang, West Java with total floor space of over 3,600 square metres, the building has been designed to be highly efficient. It features underfloor cooling systems, structural concrete slabs to radiate cool air upwards and downwards, shading to create passive cooling and a building environmental management system, all of which can save electricity in the order of half compared with conventional premises in our hot tropical climate. In addition the building has the ability to harvest water from the roof as well as solar power through photovoltaic panels. 100% fresh airflow (no return) via specially created vents is another feature to regulate the interior space for the health and comfort of those inside.

In the construction process, further efficiencies were realized, using specially formulated concrete, saving energy in delivery and application, requiring less manpower and cutting a third from the construction time normally needed. Custom developed pre-cast blocks reduced the need for

wooden formwork, and the use of pervious concrete provided solid foundations for parking areas, yet absorbed water to ensure the natural catchment was undisturbed, eliminating the risk of subsidence caused by groundwater depletion.

Vastly superior energy consumption and a range of other features will ensure over its entire working life the Ignatius Loyola Ecotech combines recycling, recovery and resource efficiency – the hallmarks of sustainability.

A sustainable business proposition

In celebrating the intelligent use of technology in building materials, construction techniques and design, perhaps the most critical success factor behind this project has been the commitment of the key partners. To attain top ten status among world leading economies by 2025, Indonesia must achieve a new benchmark level of real economic growth of 7-9% annually. Such a 'transformation' economy will require substantial capacity in knowledge and skills. The 'ATMI building' as it is often known, provides a centre of educational excellence, for the cultivation of engineering skills and knowledge necessary to support industry and the construction boom which must and will happen for Indonesia to realize the vital infrastructure, connectivity and accommodation for the citizens of its future.

And so the 'big idea' imbued in the success of this initiative is the realization that this is not just a sustainable, intelligent building in itself, but a working laboratory. It is a living demonstration of locally available skills, technology and resources from immediately accessible partners at a competitive cost, generating class after class of engineers, equipped to shape a modern construction sector and able to deliver higher levels of expertise and safety standards.

The ATMI building addresses the needs of society, offers a solution to mitigate climate change and minimizes the environmental risks associated with the inexorable march to an urban bias. While today, it may be a rare combination of economy and ecology for an enterprising result, it is surely the sign of promising times ahead.

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- 1 Under Floor Cooling System**
This system uses Uponor cooling pipes embedded in the Holcim FloCrete floor structure, to lower the surface temperature of walls and floors to 20 degrees Celsius.
- 2 Smart Control**
A computerised system allows the building thermostat to increase or decrease cooling at times of maximum usage by staff and students.
- 3 ThruCrete**
A concrete pavement solution that is porous, increasing an area's natural drainage ability and reducing potential flooding, used in the Ecotech building for rainwater harvesting.
- 4 Thermally Activated Building System**
A network of Uponor pipes carrying water embedded in Holcim's structural concrete.
- 5 FloCrete**
Specially designed concrete with greater flow-ability that can achieve flat surfaces with minimum usage of equipment and manpower.
- 6 Bataton**
A precast form of hollow concrete brick unique to the Solusi Rumah building concept that allows for fast, affordable building solutions, reducing the use of wooden formwork.
- 7 LED Smart Lamps**
Lighting technology that uses less power and is switched on only when it is needed.
- 8 Solar panels**
Installed in the Ecotech building's butterfly-shaped roof to supply power to the lighting and cooling systems of the building.
- 9 Shading**
The sides and eaves of the building are designed to maximise the most efficient combination of light and natural shade to ensure buildings are kept naturally cool.
- 10 Rain Water Harvesting**
An efficient system with a water tank ensures the building can recycle rainwater for use in wash basins, toilets and irrigation, minimising groundwater use.

