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## GREEN ISSUE 2011



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## SAMWOH ECO-GREEN BUILDING

Samwoh Eco-Green Building is the first building in this region to be built with concrete that contains up to 100 percent recycled concrete aggregate (RCA). RCA is formed by processing and recycling of construction waste from demolition of concrete structures.

The building was constructed as part of a research project which was awarded the Ministry of National Development (MND) research grant to evaluate the use of RCA in structural concrete. The three-storey R&D centre-cum-office building aims to provide live data on the long-term performance and effects of using RCA in concrete under actual loadings for a sustained period of time. To monitor the performance, fibre-optic sensors were embedded in the support columns of the building. The results obtained will contribute to existing building standards and codes on the use of RCA in structural concrete.

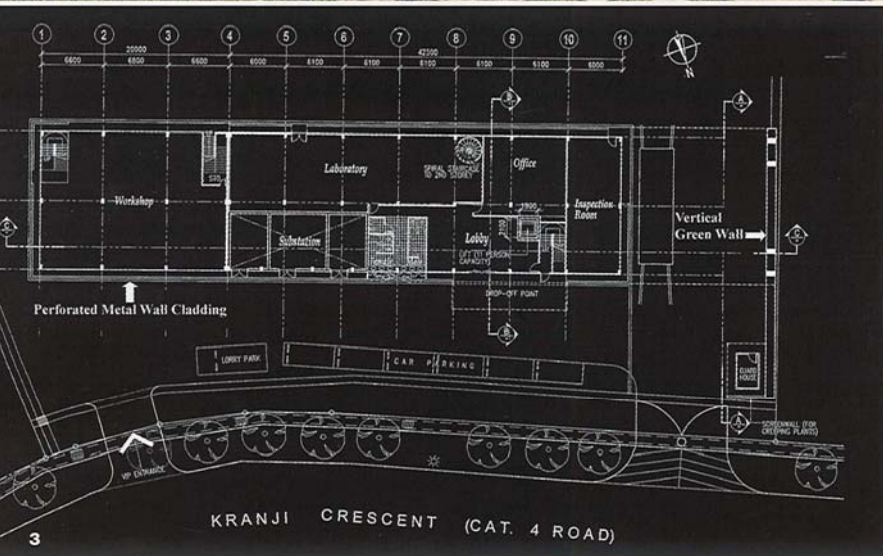
Ultimately, the project aims to steer the construction industry towards embracing the idea of sustainable construction, reducing our dependence on natural aggregating, and alleviating the problem of Construction and Demolition (C&D) waste, while contributing towards Singapore's goal of sustainable development.

The Samwoh Eco-Green building was officially opened in 2010 and was awarded Green Mark Platinum by the Building and Construction Authority of Singapore (BCA). Other than the sustainable use of construction materials, the building was also designed with other Green features.

### ENERGY

T5 high frequency ballast lightings for the laboratories and office areas, which lower energy consumption as well as increase the lifespan of lighting fixtures, are used. Variable Refrigerant Volume (VRV) III air-conditioning systems are installed, leading to greater energy efficiency and less heat production. Staircases and toilets have also been equipped with motion detectors which activate lights only when required, and elevators come with a sleep mode feature.

1 Exterior view 2 Rooftop garden  
3 Floor plan 4 Processing of C&D waste  
5 Vertical green wall



In addition, several features are implemented to reduce the Envelope Thermal Transfer Value (ETTV) including:

- Vertical green wall on the west-facing façade of the building
- Perforated metal wall cladding
- Sun control window film
- Natural ventilation system for common areas such as staircases and corridors
- Rooftop garden as well as greenery to cool surrounding air

These help to keep the building cool, reduce the amount of energy required and provide greater comfort for the staff in the building. The energy consumption savings of the Eco-Green Building is 25.1 percent, derived from comparing the energy consumption of the building to a similar-sized conventional building.

### WATER

Most of the sanitary ware are equipped with water-efficient fittings that have a good Water Efficiency Labelling Scheme (WELS) rating. Sub-meters are incorporated to monitor the water usage of different areas such as toilets, pantries and irrigation systems for the planter boxes and rooftop garden. It is estimated that the building will save 2,828 m<sup>3</sup> of water per annum. This figure is derived from the estimated water savings of installing good WELS-rated water fittings as compared to using WELS-unrated water fittings.

### MATERIALS

The mineral ceiling boards used are 100 percent recyclable. Dry partition walls contain a minimum of 30 percent recycled material and wooden doors are made of 100 percent recycled wood. Carpet tiles contain more than 60 percent of polyester chips made from used polyethylene terephthalate (PET) bottles, while used carpet tiles are finely ground into powder as backing material. Driveways, hardstanding, apron drain and slabs, road kerbs, boundary walls are constructed with RCA and washed copper slag, a by-product of shipyard activities.

### HUMAN HEALTH AND COMFORT

The air-conditioning system allows for cooling load variations thus maintaining a consistent room temperature and humidity, providing occupants with thermal comfort. Noise levels are less than 50dBA, in line with the recommended ambient sound levels stated in the Code of Practice for Mechanical Ventilation and Air-conditioning in Building (SS CP13). Public transport is easily accessible with the nearest bus stop being 220 metres away from the building. There is a significant amount of greenery in the complex, including a rooftop garden (green plot ratio of 1.91) which contributes to improving the air quality as well as cooling the surroundings.

### PROJECT DATA

- Project Name** Samwoh Eco-Green Building
- Location** Singapore
- Completion** 31 October 2009
- Site Area** 2,240 m<sup>2</sup>
- Gross Floor Area** 2,800 m<sup>2</sup>
- Number of Rooms** 24
- Building Height** 13.7 metres; 3 storeys
- Client/Owner** Samwoh Corporation Pte Ltd
- R&D Team** Samwoh Corporation; Building and Construction Authority of Singapore; Nanyang Technological University
- Principal Investigator for R&D Team** Dr Ho Nyok Yong (Samwoh Corporation Pte Ltd)

- Architecture Firm** CLLA Architects
- Principal Architect** Lim Koon Yong
- Main Contractor** Megastone Holdings Pte Ltd
- Mechanical & Electrical Engineer** YP Ng & Associate Engineers
- Civil & Structural Engineer** TP Seow Consultants
- Images/Photos** Samwoh Corporation Pte Ltd

