

RE: CONCRETE IS OUR PASSION: THE ENVIRONMENT and PEOPLE OUR PRIORITY!

March 2009

Dear Architectural Student,

It is my pleasure to announce the Third Annual Architectural Competition, sponsored by the C&CI. It is intended for this competition to become the primary student competition questioning issues of sustainability in architecture. As such, I trust that your participation will allow much more debate; lead to an increase in the promotion of innovation and contribute to the information exchange around issues of sustainability in our profession.

The C&CI is a non-profit organisation established in 1938 whose mission is to provide information; technical, research and educational assistance, as well as regulatory services to both users and decision makers in the built environment. It is nationally recognised as the impartial authority on all matters pertaining to concrete and cement usage. The Institute encourages the creative and environmentally responsible applications of architectural concrete and cementitious products, through supporting and promoting new application possibilities; related product developments, and resource efficient creative use of concrete and cement in South Africa. As such, the C&CI wishes to highlight the need for informed design and specification strategies in the construction of buildings.

Concrete it is the most commonly used building material in the world, yet much of what concrete can offer as a sustainable material is overlooked. According to the official UN Brundtland report of 2007; 'sustainability' is definable as that which meets the needs of the present without compromising the ability of future generations to meet their own needs.

It is a fact that the construction industry is the largest single human activity contributing to emissions. It is also a fact that the cement industry accounts for 5% of all emissions worldwide. In SA 2,7 m tons of CO₂ was produced, consuming 1,2 m tons of coal, as reported in the ACMP Report of 2008. Moreover, this should be seen in the context of the latest urgent and serious data, which highlights the fact that to prevent not more than 2°C of warming, all emissions must be reduced to below 60% of 1990 levels.

The SA Green Star Rating and other similar evaluation tools such as LEED; places emphasis on the strategic design and operational management of buildings, which emphasize the critical energy consumption-, water use and waste efficiency of buildings during its entire life cycle. Materials specification must play a critical role to reduce the embodied energy in a building; the manufacturing of which also needs to be factored in terms of measurable emissions, energy and finite material consumption. Buildings now must be constructed with a longer lifespan in mind; which emphasis aspects of durability and retrofitting rather than demolition.

The cement and concrete industry has committed itself to responsible manufacturing. Firstly, it has managed to increase cement production demanded by industry, whilst decreasing the usage of raw finite materi-

als: Blending waste by product cement extenders such as Fly Ash with Portland cement has reduced the clinker portion to 40% in certain cement products (FENN, O., 2008. Achieving a Sustainable SA Cement Industry, 8-12.) Secondly, the same report indicates that efforts in modernising plants and more efficient manufacturing processes, has enabled the cement producers to succeed in reaching 50% of the set target by the DME to reduce energy consumption by 15% by 2015 (FENN ET AL, 15-18.) Some manufacturers have reported a 16% reduction over the past five years (COKAY, R., 2008. The Star, 12 Nov, 19.) By embracing the use of alternative fuels and resources, including the use of hazardous waste and scrap tyres as a fuel source, further reductions is becoming eminent.

Particulate air emissions through the fitment of bag house filters, or electrostatic precipitators is currently reducing particulate emissions to levels equivalent to world best practice. The ACMP Report (FENN ET AL, 17-19) reflects that from 1990 to 2006; a 15% reduction of CO₂ generation per ton of cementitious material was achieved. This was made possible, partly through chemical admixtures achieving 10% + cement content reductions- with added durability and strength in less time and at less cost. Innovation in water-reducing admixtures is already increasingly achieving significant savings without any compromises.

Product innovations allow hybrid construction frame structures to exploit concrete's thermal properties and allow naturally ventilated, low-energy buildings at lower cost; using less concrete, with longer spans by using large units or by pre-stressing or post tensioning. By using lightweight void form precast slabs, such as 'Cobiast', the volume of in situ concrete is reduced by 35-50%. For a 6000 m² building this results in an embodied energy saving of 184 tonnes of carbon and a 66% reduction in operational costs (MAARTEN, A., 2008. Green Precast Concrete, BPCF, 50-51).

New concrete products such as permeable concrete pavers, soil erosion blocks and embankment stabilising blocks save water and prevents storm water run-offs and floods. The role of Self Compacting Concrete in sustainable developments allows architectural achievements previously thought impossible. In addition, the minimal embodied energy in concrete masonry makes it a preferred choice over more traditional block products.

Moreover, new research is returning exciting data on re-absorption of CO₂ by hardened concrete, called 'carbonation'. A Danish study (KJELLEN ET AL, 2005) reports that 50% of the volume of concrete will be carbonated in the service life period of 70 years of all buildings. This sponge effect makes concrete a more 'green' choice than previously thought. In fact, how sustainable can a world then be without concrete?

The C&CI is proud to be part of this awareness campaign, and we look forward to seeing your creative submissions. You are welcome use of our information services; our website and library, which is the biggest of its kind in the southern hemisphere!

Take care - keep your carbon footprint small, and see you at the Architectural Student Congress 2009, in September at the University of Pretoria.

Regards



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