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Use of recycled construction and demolition waste as aggregates in the production of concrete blocks.

Proposal for implementation in a developing country - Brazil

by Simone Rossi

Tutor: Delfina Maritano Comoglio

Economic imbalances on the planet manifested in the lack of access to a decent and healthy housing for millions of families. This, along with the mass urbanisation, the lack of appropriate planning policies and of social housing strategies, leads to precarious housing, with poor health standards. As a consequence, social, environmental, urban, health and safety problems arise and then deteriorate.



In order to solve this housing deficit, local authorities often implement policies requiring the demolition and the regeneration of the slums as well as the building of new social houses. These activities contribute to the almost high production of construction and demolition (C&D) waste, which is either landfilled or abandoned in unauthorised dumps. Focusing on Brazil, C&D waste is estimated to be up 40% in weight upon the total landfilled material, which reduce the working life of these plants, increases costs and consumes valuable land. This matter could be addressed by implementing selective demolition practices, selective collection and waste recovering, then recycling it as aggregates to be used in public works or be sold for profit with benefits to the local community.



This essay is the result of process meant to acquire information about a few shanty towns in Rio de Janeiro and Santo André (São Paulo), followed by the design of a C&D waste recycling plant. The first step of this process was carrying out an urban and architectural survey of Vila Canoas, in Rio de Janeiro, along with a sociological study on a group of local residents and some other relevant stakeholders.

This helped getting deeper knowledge of the typical building technology and of the typical symptoms of decay, which have effects on the health of the inhabitants as well; in addition, there was the chance to assess some urban regeneration projects promoted by the City Council and a by a local NGO. The research on public policies for shanty towns was carried on at the Housing Department of Santo André City Council, where on site surveys and the design for refurbished low quality houses were completed. On request of the Council multi-utility company (SEMASA) and in consideration of extensive demolitions expected across some of the local shanty towns, the issue of C&D waste in Santo André was analysed and a proposal for recycling these materials was developed.



This proposal was thought as part of a wider system of selective waste collection and recycling, with attention paid to benefits on the local community and to social inclusion, as per the case studies of Belo Horizonte, Salvador and Piracicaba, where such plants have been producing recycled aggregates for a few years and with good results. In particular, it was proposed to install a recycling plant using air to remove impurities and producing up to three different type of aggregates in size. After that it was consider to use these materials to produce modular concrete blocks, applying the technology designed by Prof. Piero Contini from the School of Engineering at Politecnico di Torino.

The mechanical characteristics of the blocks were tested in a laboratory as well as the their suitability for manual handling, envisaging the use of these blocks in self-build works. From the results of these test it was advised to install a plant to manufacture these blocks on an industrial scale rather than in small quantities and to employ them for social housing, as this would push the demand for recycled aggregates from the plant, with beneficial effects on employment.

For further information, e-mail:
Simone Rossi: rossimone77@gmail.com