

Sustainable Construction

Strategic approach to construction material management for waste reduction



RESEARCH SCHOOL
INTEGRAL DESIGN OF STRUCTURES

Speerpunt BOUW

Subject

The Construction sector takes up to 50% of all materials extracted from the earth's crust and in combination with energy produces goods and huge amounts of waste (reported up to 44% of the waste stream arriving at landfills). And the question is why so much material is lost as waste?

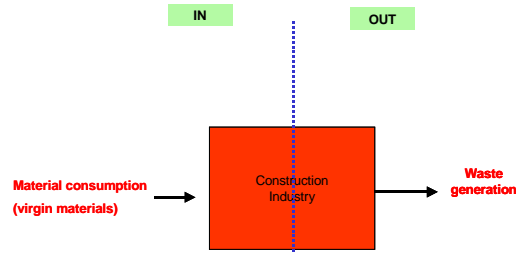
Goal

It is to investigate the construction sector in a developing country (Costa Rica) focusing on construction materials (mainly concrete, steel and wood) and processes.

This research looks into the flows of materials going into the construction process, the ways how they are "metabolized" (consumed) and the major factors (causes) that influence the production of solid waste.

Expected Results

The expected results fall into theoretical developments of Industrial Metabolism, a documented example of the use of the Material Flow Analysis (MFA) approach for construction materials and an improved MFA for the construction sector



Construction waste dumped in the ocean



Construction waste dumped on a river side



Typical construction sites in developing countries



3TU.

Researcher
Supervisor
Program/Subprogram
Host University

Lilliana Abarca/ l.abarca.guerrero@bwk.tue.nl phone: 0638147502
Prof. Ir. F.M.Scheublin F.J.M.Scheublin@tue.nl
Construction Technology
TU/e / Architecture, Building and Planning Department

TU/e Technische Universiteit
Eindhoven
University of Technology

Sustainable Construction

Towards a strategic approach to construction material management for waste reduction

Lilliana Abarca Guerrero¹, Prof. ir. Frits J.M. Scheublin², Dr.ir. Emilia L.C.van Egmond² and Dr.ir. A.J.D. Lambert²



¹PhD Researcher, E - mail: l.abarca.guerrero@bwk.tue.nl

²Supervisors

Eindhoven University of Technology, Department Architecture, Building and Planning, Eindhoven, the Netherlands

Subject

The construction sector plays a key role in shaping and developing the built environment. It also has an undisputed and significant impact on it due to the amounts of materials extracted and produced as waste.

The construction industry has emphasized to recycling construction waste (CW), however, relatively less emphasis has been paid on construction waste minimization. CW reduction can be achieved through changes in design concepts, material and construction methods selection and material management and very few studies are found in the literature related to these topics.

Goals

The motivation for this research is to examine the physical processes that convert raw materials, plus labour, into finished products and wastes.

Research Question

To which extend industrialised construction contribute to the reduction of CW in Costa Rica?

Strategy

The strategy is to use industrial metabolism theories in order to model the construction system and the mutual interchange of physical flows between its subsystems, and the interchange of physical flows between the industrial system and its natural environment".

Expected Results

One of the results is to develop and test a strategy for material flow analysis (MFA) for the construction industry, a second result is to develop a documented example of the practical use of MFA approach and to enrich the studies on material management practices in the sector.

Preferred Partners Applications/Sponsors

Construction Sector

Prime Publications

- Abarca, L., Scheublin, F.M. and Egmond van, E. (2007)

Proc. 6th International Conference on Technologies for waste and wastewater treatment, energy from waste, remediation of contaminated sites and emissions related to climate. Eco-Tech 07, Kalmar, Sweden, 2007.

- Abarca, L., Scheublin, F.M. and Egmond van, E. (2008)

Proc. Buhu 8th International Postgraduate Research Conference, Czech Republic.

Research period

January 2006 – December 2010