

POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE 1
Degree in Architecture
Honors theses

**The assessment of the eco-compatibility of recycling of construction and demolition waste.
Comparative analysis of energy and environmental performances of walls made up of concrete blocks obtained from natural and recycled aggregate**

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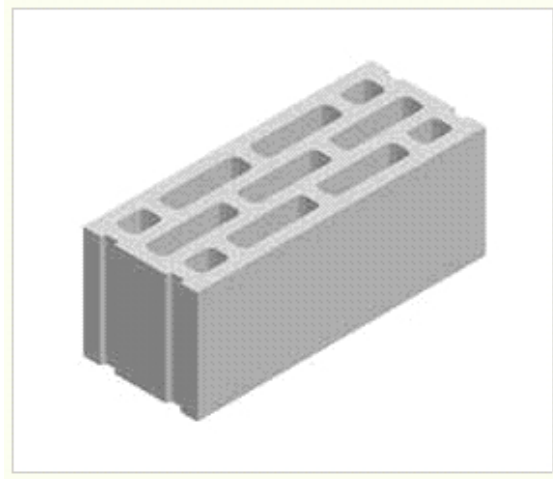
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The project is part of the University Research Programme MURST 2000 "Strategies for the Promoting of Recycling in Architecture". The University of Turin targeted the definition of criteria for the "Assessment of the eco-compatibility of demolition waste". The work is aimed at quantifying the environmental advantages of recycling the concrete obtained from the selective demolition of buildings.

The thesis is divided into three parts. The first explores the laws and technical regulations on waste, which in recent years have created a new operative frame; processed waste can be considered as a resource defined as Raw Second Material.

The second part describes the existing studies on the manner in which waste obtained from building and demolishing operations is recycled. A short description is given of the operations that are necessary to the correct planning of the mix design for the concrete obtained from recycled aggregates.

In the third part a case study is presented and the environmental and energy performances of walls made from concrete blocks produced with natural aggregates only, are compared with those made from concrete produced with recycled aggregates.



The method used is the Life Cycle Assessment (LCA), a procedure which enables the quantification of power consumption, materials and environmental impact, and the assessment of the impact on the ecosystem due to pollution and the consumption of resources.

The methodological approach lays behind the analysis of the life cycle of a product and considers, for every single material used in the process, quarrying, preparation, manufacturing, transportation, use, recycling and disposal. The manufacturing process of both traditional and recycled blocks is described. All of the data used in the analysis was gathered from Nuova Cavit in La Loggia (TO) and Maer in Sommariva Bosco (CN).

The first company deals with quarrying and crushing demolition waste, the second manufactures concrete items. Whenever data could not be drawn from the companies, information was obtained from a software, Bousted Model 4.4, that includes an updated data base on primary industrial operations. The results are shown in the Met Matrix format; a series of charts showing materials, power consumption, waste, impact on the air and water for the unit of measure considered, which is one square metre of wall.

