

Resumen de Tesis Doctoral



UNIVERSITAT POLITÈCNICA DE CATALUNYA
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Escola de Doctorat

DNI/NIE/Pasaporte

Nombre y apellidos

Título de la tesis

Unidad estructural

Programa

Códigos UNESCO

(Mínimo 1 y máximo 4, podéis verlos en <http://doctorat.upc.edu/gestion-academica/carpeta-impresos/tesis-matricula-y-deposito/codigos-unesco>)

Resumen de la tesis de 4000 caracteres máximo (si se superan los 4000 se cortará automáticamente)

The construction sector contributes to current environmental problems. It is responsible for the impact of the production of building materials and for the waste generated in construction works. Strategies for alternative production of construction materials need to be found that use construction and demolition waste (secondary production), rather than original raw materials (primary production).

In the literature, there are several studies on the management of construction and demolition waste (CDW), as well as laboratory and field studies on the technical performance of recycled CDW products and their incorporation into stone materials. However, there is a noticeable lack of standardized tests to assess the environmental viability of these processes, and a lack of studies on the economic viability of CDW use in the production of new construction materials.

Considering the above, the increasingly competitive economic, and the growing demand for more responsibility in construction works to comply with environmental legislation, an assessment tool is required that can compare the alternatives of producing and using building materials from original raw material and/or from recycled material. The tool should take into account technical criteria, which have been studied by other authors, as well as environmental and economic criteria.

Consequently, this thesis develops a proposal for a tool that can support decision-making by assessing the production of building stone materials from original raw material and/or recycled material. The tool should help to choose the best alternative, considering a multi-criteria approach and different weights or rankings of the evaluated criteria.

In the doctoral research, the methodology was applied to some key stone materials in construction, specifically, in the context of Spain: gypsum, cement, aggregates and concrete.

The results of this thesis show, first, that the tool supports the decision-making process by obtaining indices associated with each criterion evaluated, and generates lists of preferred alternatives, which can help to define the best options from different perspectives.

The tool can be used to evaluate production scenarios and classifications for the criteria "environmental advantage", "economic advantage" or "equal importance to both criteria." It can provide numerical data, which means that the choice of a material is not simply based on intuition.

Besides checking the functionality and validity of materials, this tool can evaluate and compare, both environmentally and economically, primary and secondary production alternatives for the main stone materials in Spain, and choose the best option considering different classifications of the criteria.

The results of implementing this proposal for the materials under study confirm that, in general, CDW recycling for the production of stone materials is feasible in Spain, from an environmental and economic perspective, compared to primary production of the same kind of materials.

Lugar

Fecha

Firma