



Sustainable construction

How LCA can point out green building materials

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Organisation : EFLA consulting engineers

Short description: EFLA is a general engineering and consulting firm located in Iceland with a 270 employees, 50 of whom work in foreign subsidiaries. EFLA has 6 marketing divisions: Power and Utilities, Industry, Construction, Communication and Transportation, Environmental Concerns, and Project Management, comprised of 28 service divisions with designated core activities, together with the Staff, Business Development, and Research and Innovation Divisions. EFLA has subsidiaries and associated companies in Norway, Russia, France, Poland, Slovenia, Turkey and Dubai that work on consulting and development projects.

Executive Summary of your Abstract:

LCA is a useful tool to evaluate environmental impacts of products and compare different solutions. Life cycle thinking has been used in a series of research projects in building design in Iceland with results showing a clear difference in the environmental impacts of the different materials choice for the building. Important steps have been taken by the Icelandic authorities towards further development of sustainable buildings in Iceland; public buildings are being designed under the British BREEAM scheme and use of LCA on the most common building materials.

Abstract:

The construction sector has significant influence in today's society. The construction sector counted for 11% of the gross national production in Iceland in the year 2007. The use of resources and environmental impacts related to the building sector are therefore expected to be of high importance. The awareness regarding sustainability within the building sector is growing and the increased availability of eco-labelling or certification methods for sustainable building design is an example of that.

What can LCA be used for? LCA is a useful tool in decision making if green or environmental friendly choices are desired or required in a project. When LCA of a building or building materials is performed, inputs of resources and outputs of waste and emissions to air, water and soil throughout the entire life cycle of the building or building materials are calculated into environmental impacts and use of resources.

In Iceland, a series of research projects on life cycle thinking in building design have been performed, including Life Cycle Assessment, Life Cycle Costing and social costs. The projects focused on a commonly build warehouse building that could be built with three different framework materials (glulam, steel and

concrete) and two different types of cladding panels (with rock wool insulation and polyurethane insulation). The materials are a mixture of imported and local materials; the glulam is produced in Iceland from imported wood and glue materials; the concrete is produced in Iceland from local gravel and from Icelandic and Danish cement; the steel is imported; the cladding panels are produced from imported steel and chemicals for producing polyurethane; the rock wool is produced in Iceland from local materials. The construction and operation of the building is assessed for 60 years. The projects showed a clear difference in the environmental impacts of the different materials choice for the building. The difference in the life cycle costing was minor. The results on the social cost assessment indicated the same pattern as the results of the life cycle assessment. Thus in this case, sustainable solution should be preferable from a building owner or investor point of view.

Important steps have been taken by the Icelandic authorities towards further development of sustainable buildings in Iceland. Three public buildings have been registered under the British Building Research Establishment Environmental Assessment Method (BREEAM); two buildings are visitor centres in national parks in Iceland and the third is the Centre for Icelandic Studies at the University of Iceland. All three projects are in the design phase. In addition to the BREEAM assessment of the Centre for Icelandic studies, environmental impacts from the most common building materials will be evaluated based on Life Cycle Assessment approach (LCA).

The presentation will focus on presenting results of the use of life cycle thinking in the building sector in Iceland. Furthermore how results from LCA will be used in one actual public building and how the results of LCA can be used by public authorities in their procurement processes.

Resumé:

Environmental engineer (Ph.D.) from The Technical University of Denmark (2005). Development of custom made LCA tool for road construction (ROAD-RES) and waste management (EASEWASTE). Working with LCA within various projects (e.g. buildings, road construction and waste management) and sustainable building design (e.g. BREEAM certification of buildings in Iceland).

Recommended reading:

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Conference organisers: ICLEI – Local Governments for Sustainability in cooperation with the City of Reykjavik

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