



“Gheorghe Asachi” Technical University of Iasi, Romania



LIFE CYCLE ASSESSMENT AND LIFE CYCLE COST ANALYSIS OF A NEARLY ZERO ENERGY RESIDENTIAL BUILDING - A CASE STUDY

Iosif Boros*, Cristina Tanasa, Valeriu Stoian, Daniel Dan

*“Politehnica” University of Timisoara, Faculty of Civil Engineering, Department of Civil Engineering and Building Services
Engineering, 2nd Traian Lalescu Street, Timisoara, Romania*

Abstract

Environmental issues have received ascending attention in recent years due to the increase of their negative effects. Greenhouse gas emission levels have experienced an exponential increase in the last decades mainly on account of the development of the building sector. Life cycle assessment (LCA) of buildings is a proper tool to analyse the full environmental impact during their designed lifespan. Inventory databases have a shortage of local parameters in some countries and need to be developed constantly. Life cycle cost (LCC) analysis evaluates the global costs of an investment. Besides the initial cost of implementing a project, usage, maintenance, repair, replacement and demolition costs are also taken into account. The goal of the research presented in this paper is to evaluate the environmental impact of a highly energy efficient residential house, built in western Romania. Life cycle assessments of buildings show that in most cases the impact of operating phase is much higher than construction phase, but in case of highly energy efficient buildings, the results are slightly different. However, energy related processes play a major role in determining the impact of buildings. A cradle-to-grave life cycle analysis, using SimaPro software, offers a complete image of the studied building’s environmental impact. The main objective is to determine the fraction of each component of the building with relevant contribution to the human health and ecosystems categories.

Key words: environment, life cycle assessment, life cycle cost, nearly zero energy, passive house

Received: February, 2016; Revised final: January, 2017; Accepted: February, 2017

*Author to whom all correspondence should be addressed: e-mail: iosif.boros@student.upt.ro; Phone: +40 728 330 294; Fax: +40 256 404 010