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ENVIRONMENTAL IMPACT ASSESSMENT AND THERMAL PERFORMANCES OF MODERN EARTH SHELTERED HOUSES

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Abstract

The impact of modern structures on the environment during the building process and actual life-cycle becomes more and more of a problem and needs to be minimized using unconventional architectural and building solutions, materials and overall acknowledgement of the whole concept.

This study has the task of determining the feasibility of a modern earth sheltered house solution by comparing its thermal performances and environmental impact to a conventional above-ground building solution. Although both models are studied having the same dimensions, orientation and structure materials, the noticeable differences in the final measurements are due to the fact that unconventional natural insulating and waterproofing materials were used in the case of the earth-sheltered house. Also, the buried wall and green roof of this pilot underground house determine significant differences between the two sets of results. The studies were conducted using the RDM 6 and the GaBi 6 software. The models were both virtual, with materials and basic structure given by the earth-sheltered house that is already built but not completely finished.

This study highlights the better results of this unconventional alternative to building above ground in a region where the climate and overall geographical context encourages its premises.

Due for completion in 2015, the house is the first to be built in Romania and is now under development in the northern region of the country, near the town of Iasi, Iasi County.

Key words: earth sheltered houses, energy consumption, environmental impact, global warming potential

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