

Contributions to Promoting Solutions for Buildings Energetically Adapted to Mountain Climate

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Summary

Our country currently has a remarkable constructions base, with a large number of housing facilities in use, located in all areas of Romania, many of which have problems concerning their comfort conditions, energy consumption and the pollution of the environment. Buildings in mountainous regions are a special case because these regions are climatically disadvantaged, but they are at the same time keepers of specific building traditions based on ecological, local materials. During the last years, this area has also seen the tendency to apply modern and often inappropriate solutions, without complying the requirements concerning the rational energy consumption stipulated by the current regulations.

The theme of this PhD thesis, through its aim to promote building solutions appropriate for the mountainous climate areas of the country from a constructive and energetic point of view, ranges among the current efforts of alignment with modern quality standards, in order to ensure normal conditions of comfort and hygiene in buildings, by saving energy and fuel, reducing environment pollution, within the framework of durable development.

In the first part of the paper, the author has performed a synthesis of the legislative



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frame and of the current technical regulations concerning the rational use of energy in the residential sector, on a European level as well as in Romania, following integration and unification of fundamental norms, emphasizing the essential objectives: reducing energy consumption by applying efficient solutions for the improvement of the insulation parameters in closing elements, solutions which have determined a cutback to half of the energy consumption for indoor heating in EU countries.

In the following section of the thesis, we present the technical basis of the analysis performed, by listing the various conditions concerning the steady-state and variable heat transfer, which determine the feeling of comfort and the possibility to reduce the necessary heat, considering also the climatic factors, materialized through the importance given to the climatic division of the country.

Following is an analysis of the buildings existing in the northern mountainous areas of the country, with an emphasis on the social, economic and technical aspects revealed by on-site investigations, based on which the author is proposing wall and roof constructive solutions that are considered appropriate for homes located in mountainous areas; the hygrothermal performances of these solutions have subsequently been assessed using analytical means.

The next chapter presents the methodology and equipments used for the experimental testing, in the hygrothermal laboratory, of the constructive solutions proposed, as well as the obtained results, which have turned out to be in accordance with the analytical ones.

An important chapter is devoted to proposing mountain home solutions that satisfy the essential hygiene, comfort and energetic efficiency requirements. These solutions have been synthesized in a technical catalogue, useful for designing new buildings, as well as for the rehabilitation of existing buildings in the mountainous areas of the country.

Keywords: durable development, mountainous areas, building traditions, comfort conditions, energy consumption, norms, thermal insulation, heat loses, on-site investigations, hygrothermal adequate solutions, scientific assessments, experimental determination, appropriate housing facilities.

