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The Optimization of Construction Works for the Thermal Retrofitting of the Buildings Based on Energetic Efficiency Criteria

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Summary

Nowadays our country has in use an outstanding fund of buildings. Unfortunately most of these buildings have been constructed between 1960 … 1980, in unfavorable conditions in that concerns the materials, the work force the quick time imposed for construction works and also wilt low quality requirements regarding the normal service of the buildings. All these lacks impose the necessity to make rational retrofitting intercession in order to bring the buildings to the actual requirements of quality.

The subject of the thesis regards these aspects of great importance in the process of effective service of the existing buildings. The main focus regards the optimization of hygrothermal computation and design of the enclosing elements in order to elaborate efficient solutions for the thermal retrofitting of the buildings. The result must be higher indoor condition of hygiene and comfort with judicious energy consumption.

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In the first part of the paper, after an ample documentation, the author presents general aspects regarding the national economy strategy for the rational energy usage in the dwellings and tertiary division buildings. An ample study is dedicated to the analyses of classical and modern solutions for the hydrothermal retrofitting of the existing buildings and of the implications generated by the presence of the thermal bridges in building elements.

Forwards, after a critical analyze of the present national standards and regulations provisions regarding the hydrothermal calculation of the building elements, the author propose a new methodology for the assessment of the linear and point-wise heat transfer coefficients and for the optimization of the supplementary thermal insulation dimensions required by the thermal retrofitting of the buildings.

The proposed methodologies are verified by digital simulation of a great number of thermal bridges from the building envelope and validate comparing the results from a case study of a whole building with accurately values existing form other established studies. The first method presents the advantages of some much simple mathematic equation than those stipulated by C 107/3 Regulation, generating clearer and more rational estimation process. The second method eliminates the necessity of calculation by several try-outs, specific for the standard methodology, using interpolation functions determined in the thesis.

The elaboration of an algorithm and a logical diagram for the proposed optimization method represents a useful capitalization of the researches in the design of the thermal retrofitting of the existing and new buildings.

Key words: existing buildings, reduced thermal comfort, deficient thermal insulation, excessive heat losses, thermal bridges, thermal retrofitting, hydrothermal estimations, linear and point-wise heat transfer coefficients, optimal thickness of the thermal insulation, buildings revamping / modernization.

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