

Contributions to Modernizing Experimental Hygrothermal Determinations in Constructions

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Summary

The experimental hygro-thermal determinations concerning the closing elements of buildings currently hold a special significance for correctly appreciating the thermal insulation capacity, in relation to satisfying the hygiene and comfort conditions in buildings, to the rational use of energy during exploitation and to ensuring durability. Experimental quality control in constructions is currently performed according to the European regulation system, which has become mandatory for our country following EU joining. According to this system, laboratory tests must be carried out on the basis of a standardized methodology, which call for a modernization of the means and methodology for determinations in our country as well.

The theme of this PhD thesis and the topic it debates belong to this very fashionable trend of perfecting and modernizing the methodology and technologies used in performing experimental quality control tests in constructions. From this point of view, the author's choice of theme was an inspired one, considering the rich experience he has gathered in the course of a long activity as a scientific researcher with the Hygrothermics Laboratory in Iasi, having significant contributions to the modernization of this laboratory.



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The research objective consists of proposing new competitive methods and means of experimental testing in the Hygrothermics of Constructions, according to European norms. To this purpose, it is important to have knowledge of the situation of experimental scientific research in the field of Hygrothermics worldwide as well as in our country, an issue debated in the first part of the thesis. Further on, we present the factors that dictate experimental hygrothermal determinations in constructions, the necessary means and methods of experimental research, the composing elements and the stages of the experimental process characteristic of this domain.

The paper goes further with the presentation of the hygrothermal research laboratory as an instrumental complex, describing its structure, organization and the necessary equipments, followed by an inventory of the laboratories for thermophysical determinations functioning throughout the world as well as in our country, with an emphasis on the Hygrothermal Testing and Research Station of INCERC Iași, the only laboratory of this kind in Romania. Following is the description of the way of determining the characteristics of the indoor microclimate, the assessment of the comfort degree based on the measured data, and the performing of thermo physical determinations for establishing the specific parameters of constructions materials and elements.

The next chapter analyzes the balance between demands and possibilities in the case of experimental hygro-thermal research methods, in a laboratory and on-site, as well as the methodological and technical limitations of determination performing and data processing; It also presents the current trends in experimental hygrothermal research.

The final part of the paper consists of a synthesis of the author's contributions to the modernization of experimental hygro-thermal determinations in constructions, by means of actual interesting proposals in the field of development strategy, as well as proposals of methods and equipments for measuring, converting and processing experimental data, materialized as inventions and functional technical equipment.

Keywords: building physics, thermal insulation, experimental research, hygrothermal laboratory, on-site measurements, methodologies, technical means, modernization, methods and equipment.

