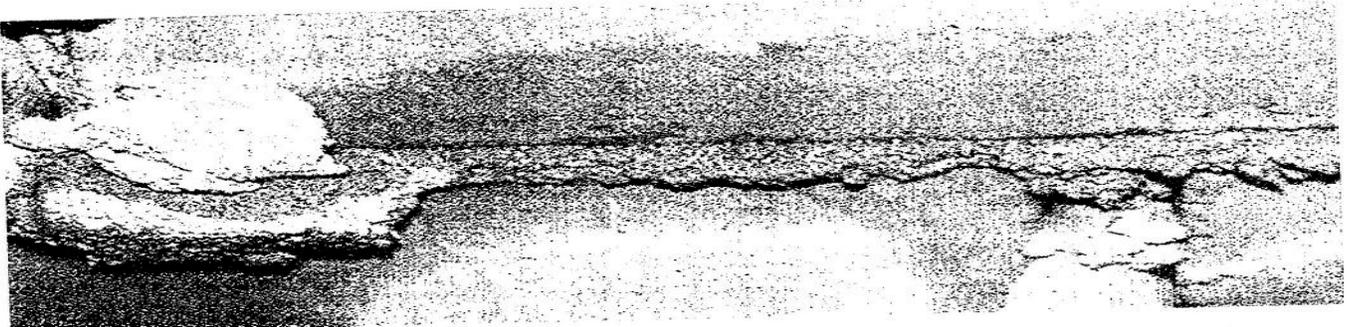


Methods of Building Physics

Mark Bomberg¹, Tomasz Kisilewicz² and Christopher Mattock³



The average energy use of MURBs in 1990 in Vancouver was 315 kWh im² year. It continued to decline and in 2002 reached 250 kWh/(m² year)(see Finch et al.,(2010). The shock, however, was to find that this energy level is equivalent to buildings in the 1920s. The masonry buildings without insulation, built nearly one hundred years ago, consumed as much energy as a shiny, glass-clad building constructed today. Yet, today we have so many measures to reduce energy consumption like thermal insulation, thermal mass, air barriers, high performance glazing systems etc.

This book is a script for students that shows how building physics moved from its beginning as a scribe for construction failures to become a Cinderella of 21st century. Building physics shows a growing discrepancy between performance tested in laboratory and that under service conditions. We see 20 - 30 percent effects of environmental factors. Yet, this difference fades out when one compares the difference in the real energy use in multi-unit building to the estimate obtained in laboratory. The same wall in a dwelling may show more than 10 times higher deviation.

Perhaps easier is to explain the same phenomenon when we compare airtightness of materials and systems. If airtightness of a material is given 100 % in a laboratory test, we typically measure a value 10 times lower in the laboratory test on the wall and even 100 times lower value when the same assembly is part of a real building enclosure and is tested under the field conditions. Why is it so?

The boundary conditions in a multi-unit dwelling depend on the connectivity of air space in the whole building.

“Methods of Building Physics is an excellent reference text that has simplified understanding the concepts of heat air and moisture flow in building materials and whole buildings so that practicing professionals such as architects and engineers can use it. The reference bibliography is also fantastic.”

Wagdy Anis, FAIA, LEED AP, Anis building enclosure consulting, Waltham, MA 02452

This book (368 pages) is a first step dealing with the road to the next generation of low energy buildings that are more focused on high quality environment for people. In doing so durability of the shell, energy efficiency and carbon emission are automatically included.

Order in the US from Dr. David Yarbrough dave@rdservices.com and in Canada from dr, Mark Bomberg mark.bornberg@gmail.com. Price: one copy \$50, three copies or more \$45.

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Experimental verification of interactive methods in teaching Physics required several preparatory phases prior to the pedagogical experiment, organisational activities during the experiment, preparation of the research, its carrying out and evaluation. The general objective of the experimental verification of interactive methods in the teaching process was in one group PI, FCI, PD. Interactive Methods of Teaching Physics at Technical Universities. 59. Each year lectures and seminars were carried out in several groups what enabled the possibility of parallel teaching using more methods. This method closely follows the physical equations. The mathematical equations for two- and three-dimensional heat conduction and the numerical formulation are presented. The numerical error for different meshes is studied and compared with analytical solutions. The effectiveness of the method of successive over-relaxation is demonstrated, while the gain using "successive subdivision" is modest. Results from calculations with two or three different meshes may be used to estimate more accurate results. The gain using this technique can be quite substantial. A limitation of this work is that it is not a thesis about numerical techniques. The focus is set on applications in building physics using discrete approximations of physical. 1. balances and other relations. Building physics. A creative use of advanced analytical tools, skills and methods defines our work with clients to design buildings that are comfortable to occupy, easy to use and light in their environmental impact. A creative use of advanced analytical tools, skills and methods defines our work with clients to design buildings that are comfortable to occupy, easy to use and light in their environmental impact. Share. Created with Sketch. Building physics is the application of the principles of physics to the built environment. Building physicists bring a fundamental understanding of physics to improving the design of building fabrics and surrounding spaces. Less energy-hungry buildings. Building physics is a design discipline. Journal of Building Physics is an international, peer-reviewed journal that publishes advanced research and state of the art papers to promote understanding thorough advancement of all the areas of non-structural performance of a building and particularly in heat, air and moisture transfer. Our goal is to enhance deeper insight and understanding, and enable the development of scientifically-based design tools, which are crucial for the implementation of a performance-based engineering approach in building design. Journal of Building Physics covers a broad range of topics including: Heat, air, ... New test procedures and improved methods of field measurement. Heat, Air and Moisture transfer modeling.