

Summary

Heat Insulation of Houses

in the process of modernization in Japan

-From acceptance of the ideas to practical use by architects-

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Background and purpose of the research

Compared to other developed countries, the spread of heat insulation of houses has been significantly slow in Japan. Also, the knowledge of building environmental engineering has been rarely applied to housing design until the end of the 20th century.

To investigate the cause of this situation, it is highly useful to clarify the whole history of heat insulation in Japan. So far, most of the preceding researches on this topic have treated the transitions after the 1960s, because major technological improvements for heat insulation with regard to, for example, methods, performance, and materials, have been achieved in this period. However, the idea of heat insulation was brought to Japan originally in the Meiji era (1868-1912), and it is reasonably assumed that the precursory history before the 1960s has set a basis how the Japanese society has been accommodating the concept.

This paper aims to clarify the earliest situation of the heat insulation of houses in modern Japan, particularly from the viewpoint of ideas, thoughts, and designs.

In this study, the process of modernization in the history of insulation was defined as from 1885 to 1959.

Conclusion

The history of heat insulation in Japan during the modern period (1885-1959) can be roughly divided into two stages: The idea of heat insulation and the basic knowledge of heat insulation were acquired until around 1930, while insulation materials with limited performance were experimentally tested and utilized after 1930.

In the latter half of Meiji era (1885-1912), the idea of heat insulation was mostly acquired

from German hygiene, and one can hardly find unique developments originating from Japan.

From the end of the Taisho era to the beginning of the Showa era (1923-1933), basic knowledge of heat insulation and heat transfer were gained, while searching for heat insulation methods suitable for Japan's climate and building customs. At that time, insulation researches was an interdisciplinary field of hygiene, mechanics, and architecture. Up to this stage, heat insulation has been treated in the academic field under the strong influence of German researches.

In the 1930s, pioneering architects have started to test insulating materials in the dry construction method that had just been introduced in Japan at that time. Insulation was used in experimental houses by the modernist architects, and the use of heat insulating materials projected the image of hygiene and daily life, which was the basic concept of modern architecture.

In the 1950s, a stylized concept that "dry construction requires insulation" has appeared. This concept has led to the misunderstanding that the conventional wet construction method has sufficient heat insulation performance, and hindered the idea of improving heat insulation performance. Nevertheless, some architects have proposed original insulation details that transcended such stylization. Their motivation for the heat insulation was to pursue the Western technology so as to raise the standard of living in Japan to the same affluent life as in the West. Although the insulation of housing has not become popular before the 1960s, the pioneers' conviction that the heat insulation will improve the living environment and the quality of life of people has led accomplishment of valuable practical cases.