

POLITECNICO DI TORINO
FIRST SCHOOL OF ARCHITECTURE
Master of Science in Architecture (Construction)
Honors theses

Temporary equilibrium. Application of phase change materials in temporary constructions in Ttukseom, Seoul

by Mariana Michalcikova

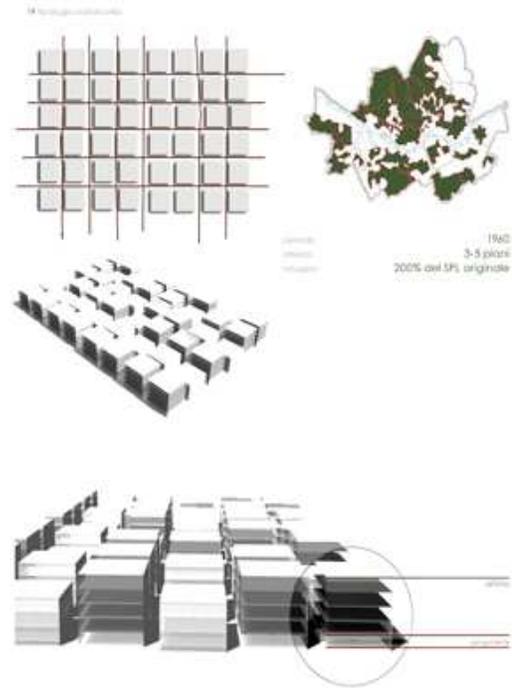
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The thesis takes up the idea launched at the design unit Steel Housing in Seoul, held in autumn 2008 in cooperation with the Konkuk University in Seoul. The design unit was focused on finding solutions and design proposals with regard to urban issues arising from the development of the hectic metropolis of Seoul - issues such as density, zoning, or sustainability in architecture - identified through a careful analysis on the different urban aspects, sociological and cultural.

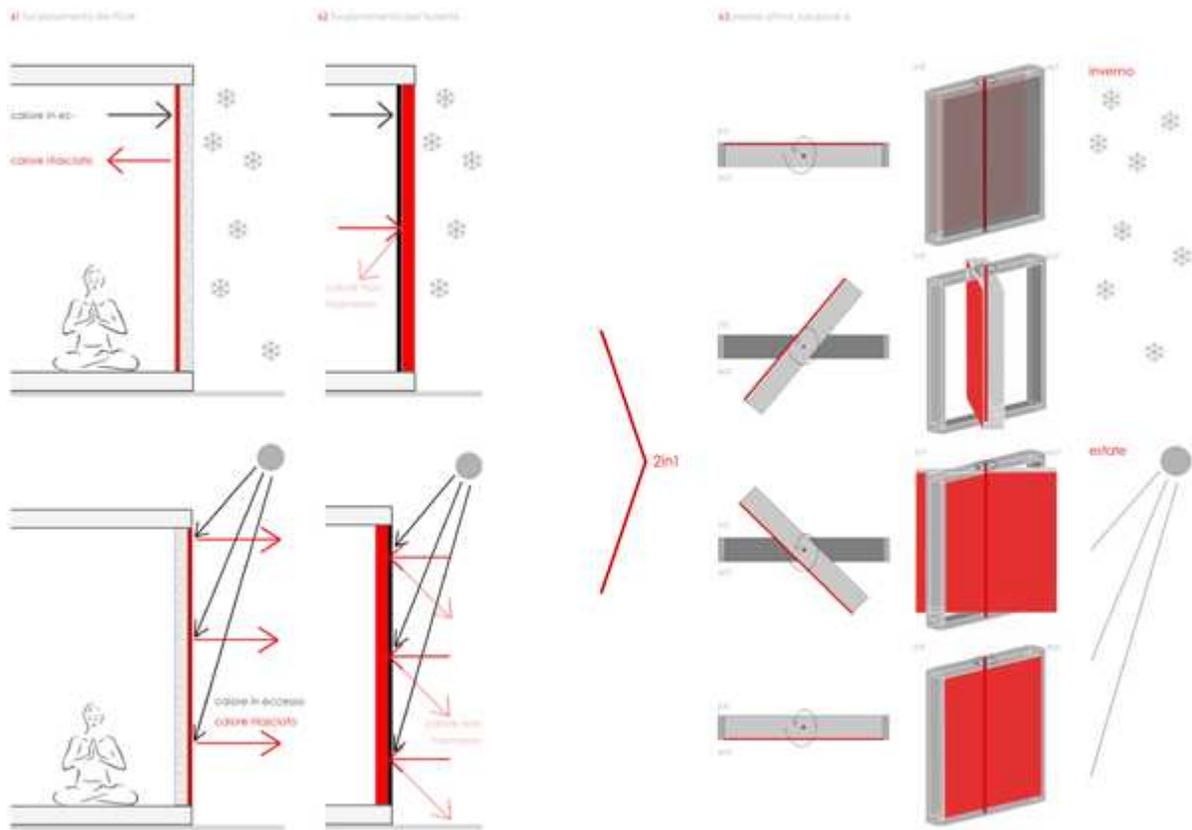
The group of eight students developed three variants of the masterplan for the Ttukseom area, as a result of the work of the group and interactive discussions with teachers and students of the Polytechnic University of Turin and Konkuk University. The issues discussed were further depth during the study stay in Seoul and further worked out in the individual theses.

The thesis shows the significant phases of the design path taken in the last two years of constant work. In the first part of thesis, the master plan is presented. You can notice like the decisions taken during the design units changed after the study stay in Seoul, facing the Korean reality, described below through the brief analysis of the city's urban development.

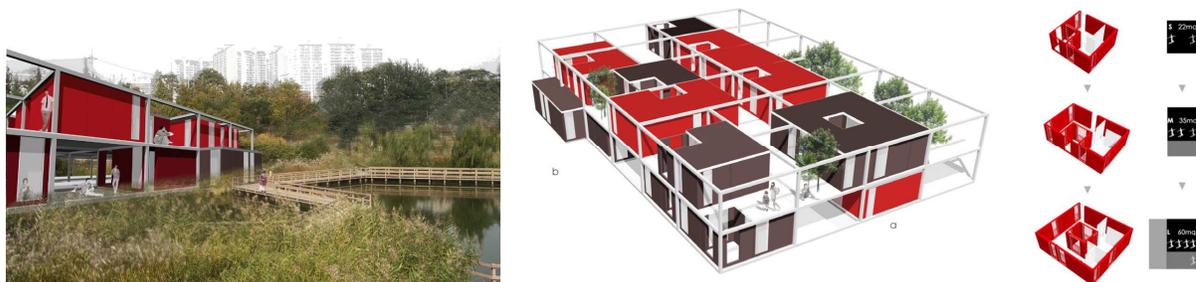


After a brief point on the energy situation in South Korea the climate conditions will be considered through the Mahoney method. The climate study is followed by the analysis of architectural principles of the traditional Korean house, hanok, closely linked to climatic conditions and the site.

In the thesis hanok principles are reinterpreted in an innovative system based on the application of phase change materials (PCM): it is assumed that an active wall could be able to adapt to the different needs of the thermal comfort variables throughout the year because of its flexibility, leading to better control of energy and thus saving energy. The research is focused on establishing a temporary heat balance within the environment.



In the next phase, the system is developed in a structured proposal for temporary housing, which can be used during the urban transformations in Seoul. In these occasions, the residents of entire neighborhoods are transferred to temporary residences in different parts of the city, or they are offered a financial reward. A solution to this troublesome situation may be the construction of removable and reusable housing. The assembly system allows the maximum flexibility and variety of applications.



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