



Info-package No. 2

Retrofitting



Energy

Introduction:

The building envelope is the interface between the interior of the building and the outdoor environment, including the walls, roof and foundation. Acting as a thermal barrier, the building envelope plays an important role in regulating internal temperatures and helps to determine the amount of energy required to maintain thermal comfort. Minimising heat transfer through the building envelope is crucial for reducing the need for space heating and cooling. The overall design can help determine the amount of heating, cooling and lighting a building will require.

Thermal insulation materials are specifically designed to reduce the flow of heat by limiting conduction, convection or both. Radiant barriers are materials that reflect radiation and therefore reduce the flow of heat from radiation sources. Good insulations are not necessarily good radiant barriers, and vice versa. Metal, for instance, is an excellent reflector but a poor insulator.

The main goal of the insulation thickness studies is to optimise thermal insulation thickness based upon degree-day heat loss analysis. The concept of optimum thermal insulation thickness considers both the initial cost of the insulation and the energy savings over the life cycle of the insulation material.



Figure 1 External insulation implementation in Tepebaşı demo site

Goals:

For the Tepebaşı demo site, the optimum insulation thickness was determined to be approximately 12 cm for EPS or 8 cm for Rockwool. Apart from that, one of the aims of the project is to achieve, as close as possible, the passive house standards. The design team decided to implement 15 cm Rockwool insulation to reach at least $0.2 \text{ W/m}^2\text{K}$ U_{wall} value for external wall (reference $U_{\text{wall}} = 0.15 \text{ W/m}^2\text{K}$).

Another aspect of the intervention is to focus on environmental gains. Retrofitting of low energy-efficient building has an impact on energy consumption and CO_2 emissions, reducing them as well as improving the indoor air quality.

Progress:

Since the demo site is owned by the local government, Tepebaşı Municipality, a tendering process took place, which finished at the beginning of 2017. The implementation started at the beginning of the spring season.

Lessons learnt:

Managing large-scale district renovation projects, such as REMOURBAN, which include a large number of partners undertaking different parts of the interventions and strict deadlines, is complicated regardless of the country or region. But it is particularly difficult in an environment with many uncertainties including political and economic turbulence. The various limits to the authority of local government vis-à-vis national and metropolitan authorities, especially in the fields of urban mobility and energy policy, impact to a great deal interventions by local governments. It is crucial to have a good cooperation and communication between various partners of the project as well as different departments of the local government that is responsible for the implementation. It is often necessary to collaborate to some extent with relevant Metropolitan Municipality Departments and the central government. Otherwise, it is impossible to progress and reach the expected results.

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