

Sustainable Renewal of 1960–70's Multi-Family Dwellings



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Summary

The Norwegian research project Bærekraftig oppgradering av boligblokker or REBO is presented in this paper. This project deals with the comprehensive upgrading of multi-family dwellings which included both internal and external renovations. The focus areas of research are energy efficiency, universal design and resident involvement in the planning process. Two typical Norwegian owner occupied multi-story concrete blocks are presented to illustrate general design principles and the application of various measures. The main findings are:

- It is possible to make upgrades according to the Passive House concept economically profitable when the building mass is in poor condition and a major renovation must be undertaken. In this circumstance upgrading with Passive House components may be more lucrative – additionally; this will improve the indoor climate and comfort of the residents. Retrofitting the most urgent repairs needed, with only slightly better standards, may easily become unaffordable in the long run, and ruin the chances for more ambitious renovations in the future.
- Universal design is of great importance because it provides people greater choice in where to live. A number of actions simple or extensive can be carried out when renewing a dwelling area. Examples are installation of lifts, elimination of door sills, creation of pathway surfaces for wheeled walkers, and markings for ease of orientation. Some measures can be expensive, while others are only small expenditures. In the cases presented, actions have been taken to increase the accessibility of persons with impaired movement, while actions to increase orientation for the visually impaired were not prioritized.
- A well functioning board, and trust between the residents and the people in charge of the rehabilitation process is a requirement for success. When the residents were sufficiently informed about the rehabilitation their participation was of great value in making a success of the project. They were not necessarily a part of every decision made, but showed great confidence in the leadership of the project.

Keywords: dwellings; retrofitting; energy efficiency; design for all; resident participation

Upgrading with a focus on energy efficiency

The starting point is the application of measures to reduce energy demand, and then supply the remaining demand with an energy supply system utilising renewable energy sources. Passive energy design is in principle applicable to both low energy buildings and Passive Houses.



*Fig. 2 Myhrerenga before upgrading.
Photo Arkitektskap AS*



*Fig. 3 After upgrading.
Photo SINTEF Byggforsk*

Myhrerenga housing cooperative was the first apartment complex renovation in Norway which used Passive House components. Façades in need of renovation, together with complaints about draft, cold floors and poor air quality, as well as requests for larger balconies, initiated the renovation process in 2006. Since the buildings were in need of a major renovation anyway, the Norwegian State Housing Bank in cooperation with SINTEF suggested an ambitious «Passive House renovation», which was assumed to cut the net space heating demand by 80–90%. At the same time, the ambitious renovation should not be more expensive than a conventional façade renovation, expressed in figures of total monthly costs for loan, energy, maintenance and property management. After a two year long process, the cooperative decided to go for the ambitious renovation. Now, in April 2011, most of the interior work is already finished.

Upgrading with a focus on universal design

Working with universal design a broad spectre of solutions will be necessary, such as installation of lifts, avoiding long distances from parking places to the entrance door, making antiskid pathways free of steps, and installation of automatically opening entrance doors. Measures to ease the orientation for visually impaired persons are lane lines and contrasts by colours, materials, or lightening, differing one part from another. Hearing impairment, which is also common among elderly, requires the need for visual signals, such as visual fire detectors, and generally good acoustical conditions. Strategies to increase accessibility inside each flat can involve making one room out of two to enlarge the bath or bedroom, removing door sills at the front door and to the balcony, and replacing narrow doors with broader ones.



Fig. 4 Before upgrading. Photo Jarl Høva



Fig. 5 After upgrading. Photo Jarl Høva

Barkaleitet housing cooperative has implemented several smart universal design solutions; wheelchair access to the entrance doors and outside areas, and extensions with new staircases and lifts. The flats on the new top floor have meet standards for wheelchair use. However, improvements to door sills at the front doors and to the balconies have not been done. Also attention has not been given to make orientation easier for visually impaired persons.