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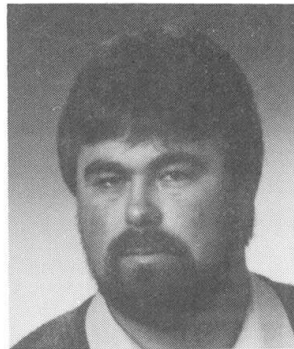
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## Cost-Effective Modernisation of Housing in Panel Structures

**Andreas RIETZ**  
Dipl.-Ing. Architect BDB  
IEMB e.V.  
Berlin, Germany



Andreas Rietz, born 1956, concluded his architectural course at the Technical University of Brunswick, Germany as a qualified engineer in 1988. Since 1992 he has been working in the field of building economics as a building research scientist at the Institute for Maintenance and Modernisation of Buildings e.V. (IEMB) in Berlin.

### Summary

The Institute for Maintenance and Modernisation of Buildings has recorded and evaluated completed modernisation projects according to its individual technical and economic measures. The measures of rehabilitation can be categorised according to cost as well as standard of repair and modernisation.

From this analysis fundamental conclusions can be developed which permit systematic planning of the modernisation and repair from an economic point of view with the aim of offering attractive and diversified housing in the slab construction estates at justifiable cost.

### 1 Cost survey

Altogether existing housing in the new lander consists of approximately 2.28 million apartments in blocks of conventional construction as well as in one- and two-family houses, 2.58 million in multiple dwellings of conventional construction as well as 2.17 million in prefabricated construction. To date approximately 50 % of block and slab construction buildings have been rehabilitated or at least partly rehabilitated. To maintain their share of the housing market rents after modernisation have to be kept within a socially agreeable framework. To achieve this the lowering of rehabilitation cost plays a decisive rôle.

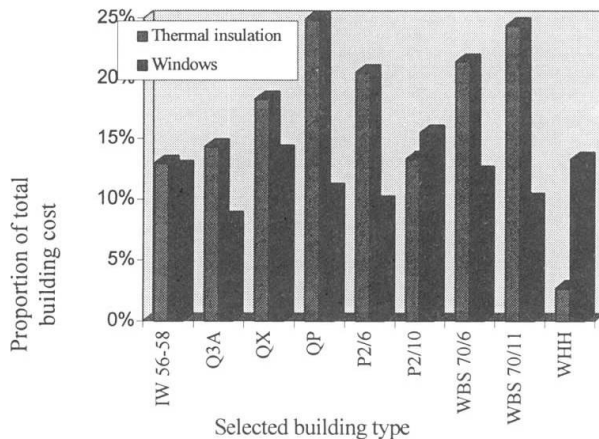
The basis of any rehabilitation forms a detailed survey despite of the standard type series we are dealing with. After assessing the deficits with regard to structure, energy, function and aesthetics, the repair and modernisation cost of the specific building is determined. Experience shows that through the application of the correct and cost effective solution cost is saved.

### 2 Evaluation

The repair of the enclosure (roof, façade, loggias, windows) and the building services installations (heating, sanitary, ventilation, electrical) in connection with energy conservation measures comprises of the largest portion of the costs of fundamental rehabilitation by far.

Technical solutions for these measures are for this reason to be optimised under economic considerations, as cost changes in this regard have far reaching effects on the financing of the overall measure.

Fig. 1 Proportional cost of thermal insulation and windows with selected building types



The individual rehabilitation measures are represented at very different proportions of the various type series. This can be demonstrated by the individual measures of the energy relevant thermal insulation and the window rehabilitation (see figure 1).

Here the cost for the actual thermal insulation of buildings and the modernisation of the building services themselves must with regard to the lowering of the running costs to a large extent be rated worthwhile, provided the required measures

are carried out together with the repairs that are required anyway and that only the required additional expense is included in the calculation.

### 3 Cost frame

The evaluated rehabilitation measures can under the aspect of calculated costs be represented in three groups:

- Cost frame 1:  
Building costs of DM 300 to DM 500/m<sup>2</sup> of living area. This comprises rehabilitation measures with which repairs predominate, while modernisation measures are carried out only to a limited extent.
- Cost frame 2:  
Building costs of approximately DM 750 to DM 1,200/m<sup>2</sup> of living area. This comprises rehabilitation measures with which basic repairs as well as modernisation measures of a medium standard are carried out.
- Cost frame 3:  
Building costs of approximately DM 1,200 to DM 2,000/m<sup>2</sup> of living area. This comprises rehabilitation measures with which basic repairs as well as large scale modernisation measures (e.g. lift installation or plan changes) are carried out.

It becomes apparent that already repairs and modernisation measures of a medium standard without structural changes of the existing building quickly reach or exceed the frame of DM 40,000/m<sup>2</sup> apartment. Here the correct selection of rehabilitation methods demonstrated in the lecture through specific examples makes a start in order to lower the costs of repair and modernisation.