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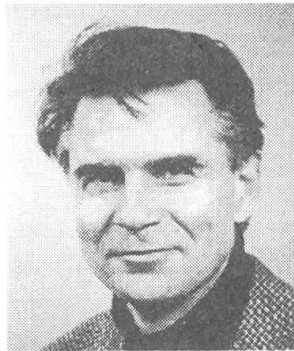
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Panel Buildings Torn between Demolition and Rehabilitation

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1. Introduction

The paper focuses on the following topics: First to the dimensions of panel building construction, then look at the structure of the existing stock, at the subject of repairs, costs and sponsorship development and finally at examples for a process of upgrading and revitalisation. Ecological aspects of building are not omitted, and the presentation concludes with "directions for action". Building is a central issue in our society. Building attracts the attention of newspaper readers on the pages covering politics, culture, science and also sport when it is a case of building stadia or organising Olympic Games. Every society is reflected in what it builds. *One invested Mark activates 2.40 DM*. Economists tell us that the upstream and downstream sectors of the construction industry have to be rated with a factor of 2.4. One invested Mark activates DM 2.40, a billion's worth of investments creates 13,000 jobs.

2. Cities within Cities

If one considers Berlin-Marzahn - a giant housing estate with endless rows of housing blocks, all eleven storeys high, a perpetual repetition; monotony which is depressing. Marzahn has 59,000 dwelling units. Assuming 2 to 2.5 persons per dwelling unit - that means that entire cities within Berlin are without an adequate social and cultural infrastructure - how should one address these prefabricated panel buildings in terms of their conservation, their upgrading and their future? First, a detailed analysis of the existing buildings needs to be undertaken if one hopes to arrive at solutions for conserving, improving and upgrading them.

A total of 7.04 million apartments exist in the new German Länder. 2.17 million of the apartments are contained in prefabricated buildings, 2.58 million apartments are found in conventionally built multiple-dwelling units and 2.29 million apartments exist in single and two-family houses. The latter categories are also faced with serious problems, however the present survey only concerns prefabricated construction - often referred to under the collective term "panel building construction" - with just over 2 million dwelling units.

No WBS building has to be demolished

After the opening of the Wall everyone said that the panel buildings had to be demolished because they were unstable. However, a rational consideration of the problem based on the housing stock analyses that have been undertaken shows that not one panel building has to be pulled down for technical reasons. The IEMB (Institute for Rehabilitation and Modernisation of Buildings) has analysed and documented these findings, as have other experts.

1. Repair	2. Partial refurbishment	3. Complex reconstruction	4. Luxury reconstruction
Elimination of damage/ Correction of defects	Repair + partial refurbishment (mainly of the common consumer systems)	Extensive modernization	Extensive modernization and special measures
Measures in stage 1	Measures in stage 1+2	Measures in stage 1-3	Measures in stage 1-4
Stufe 1: <ul style="list-style-type: none"> ▪ Joints ▪ Roof ▪ Windows/doors ▪ Sanitary ware ▪ Other structural elements acc. 3. Bauschadensbericht	Stufe 1 Stufe 2: <ul style="list-style-type: none"> ▪ Facade / thermal insulation ▪ Entrance hall/corridors (possible with lifts) ▪ Rising mains (stacks) ▪ Central heating plant ▪ Fire protection measures ▪ Repair of balconies (including renewal of the balcony wall unit) ▪ Valves of radiators ▪ Repair of windows (possibly renewal) 	Stufe 1 Stufe 2 Stufe 3: <ul style="list-style-type: none"> ▪ Bathrooms/kitchen (sanitary ware/tiles) ▪ Electrical installation (renewal / extension) ▪ Renewal of windows ▪ Renewal of building entrance and apartment unit doors ▪ Radiators / heating pipes (as required) ▪ Creation of a new, high quality environment 	Stufe 1 Stufe 2 Stufe 3 <ul style="list-style-type: none"> ▪ Changes of layout / joining or separation of apartments ▪ Extension or renovation recessed balconies/glazing ▪ Building of completely new bathroom/additional WC ▪ Sound insulation of walls/floors ▪ Installation of passenger lift ▪ Completely new entrance area
Costs			
Appr. 100-400 DM/sq.mtr floor area	Appr. 300-750 DM/sq.mtr floor area	Appr. 600-1200 DM/sq.mtr floor area	Appr. 1500-2500 DM/sq.mtr floor area
Measures of occupied buildings			... of unoccupied buildings

Stages of reconstruction for unit and panel building structures in the new German *Länder*.

In order to reduce the CO₂ emission in Germany by a quarter by the year 2005, older buildings would have to be reconstructed at an annual rate of 3 %.

In 1990 room heating for the entire housing stock and small consumers accounted for approximately 28% of the primary energy consumption in the new German *Länder*. The total CO₂ emission accounted for some 15 % of their national economy.

The implementation of measures to reduce energy consumption in the shell (thermal insulation, windows) and of the service installations led to a reduction of the annual heating requirement by 30 - 50 %. Fig. 9 contains an overview of representative types of industrial housing construction, of which about 80 % are supplied with a long-distance heat supply. In terms of energy they are characterized by different initial statuses as regards structural thermal protection and heating engineering.

As regards the total energy balance of a building, which is derived from the manufacture, operation and finally demolition - interrupted at any time by refurbishment and reconstruction measures - the panel buildings are in a favourable range. The figure summarizes the conclusions that can be drawn.

The conservation, reconstruction and long use of existing building substance protects the environment

- Saves energy
- Reduces CO₂ and pollutant emissions
- Reduces intervention in the soil and groundwater
- Reduces the need for waste disposal sites

My last point is a kind of "direction for action". It is a quotation of Paul Valéry: "Poorly observed facts are worse than wrongly drawn conclusions". A doctor cannot diagnose a patient over the phone, he needs to see and examine the patient. In principle, the same applies to the analysis of a structure. Engineers bear the responsibility for analyzing buildings and structures in a rational manner. Only then should they draw conclusions on how to handle them.