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## Upgrading of Residential Buildings in Precast Construction

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### Summary

The housing stock was erected in industrialised precast construction in central and East European countries, particularly in the new German federal lands, over the years since 1955. It will be lasting far beyond the year 2000, thus offering the tenants a home. Constant repair and modernisation are the prerequisite for a long service life of all buildings. With regard to the so-called panel buildings a basic upgrading of the housing stock will be required to ensure a letting in the long run.

**Keywords:** Panel buildings in precast construction; modernisation; repair; balconies and loggias, steel and concrete floor; railing of aluminium and steel; complete reconstruction of panel structures; new plans for flats

### 1. Concepts for Upgrading the Residential Amenity of the Panel Structures

At the present time, about 2.2 million existing panel structures are comprehensively repaired and modernised in the 5 new federal lands, including Berlin.

The main tasks in doing so are as follows:

- roofs and basement walls are insulated,
- façades are given thermal insulation with insulating systems, thus treating concrete damages caused by corrosion,
- balconies and loggias are structurally secured, upgraded in their colours, provided with new parapets or disassembled and erected anew,
- building entrances and staircase wells are newly designed and
- kitchens and bathrooms are modernised comprehensively as well.

Today, some residential homes are basically reconstructed in the course of privatisation. The flat plans are changed in their horizontal and vertical level by cutting open the floors and load-bearing walls. By way of building in the staircases between the living levels, also other housing forms are offered within the stock of panel buildings.

Entire residential areas are decisively upgraded by design possibilities in façade repair as well as by parapet design and new construction of balconies. The examples executed show that the residential amenity of these housing areas is highly appreciated by the citizens and a growing demand for dwellings is to be seen there.

## 2. Complete Solutions for Placed-in-front Balconies and Loggias

Compared to all structural units in a building, balconies and loggias are most severely exposed to the loads of the 4 seasons. At the same time they have to meet the demands on a roof skin, façade, floor, load-bearing structure as well as on the removal of rain water and are decisive for the residential amenity and the impression of a building as a whole.

For the client and architect the fulfilment of these complex requirements is decisive what balcony solution is chosen. Individual design, functionality, structural stability and service life are the dominant fundamentals for deciding on a balcony solution.

To them belong

- complete balcony installations** in steel, aluminium and reinforced concrete, placed in front of the house, built in or retrofitted, connected with the façade in an optimal manner structurally and functionally,
- balustrades** for all application cases, in all forms, durable materials and fastening modes, colours and coatings,
- balcony glazings, partition walls and linings.**

Experience showed that balconies will be placed in front of a house in case if repairs to existing balcony installations will not guarantee a service life in the long run. Moreover, the erection times become increasingly a criterion of decision-making. As a matter of fact, inconvenience for the tenants followed by rent reduction and judicial hearings right up to the moving out from the dwelling, as well as liability disputes are expensive.

New balconies and loggias (see Fig. 1) ensure:

- a design upgrading of the residential buildings in accordance with the client's ideas and the architect's designs,
- adaptation of the usable balcony area to today's requirements,
- decisive increase in service life by high-grade materials,
- assembly and completion services without the need for entering the dwelling,
- retrofit of balconies to improve the tenantability and residential amenity,
- use of railing and parapet variants, as well as glazings.

### 2.1. Balcony Structures

**Balconies made of reinforced concrete** are produced in moulds with a concrete grade of not less than B 35 WU (waterproof). The casting is supervised in concrete factories near the building sites and has to comply with the "Generally recognised rules of technology". The German Award Rules for Building and Construction Work (VOB), part B and C in their latest version, make up the fundamental data for contracts.