

Building Maintenance Cost of Stressed Components as a Function of Building Materials and Constructions

In the long-term, the cost of utilization (of a building) is as important as the economic aspects of the cost of building. Factors effecting the long-term economy of a building can and must be identified and considered already at the planning stage. Whatever the consideration, it is important to include time as a factor of (the) utilization (of a building).

Building maintenance cost as part of the cost of using a building is defined as "repair cost" in DIN 18960 and as "upkeep cost" in the Second Directive. Even though, the term "building maintenance cost" established for many years, is also used in this research report.

The research project intends to identify and concretize the cost effecting the maintenance expenditure of a building and discuss their interrelations. This will provide a basis on which a technology-dominated cost factor assessment is replaced by a **set of rules for planning cost versus use**.

Of the different calculation methods available, the **net present value method** is applied here. This method allows a simple and understandable presentation of the development of expected cost on the time scale of use. This approach rates the follow-up cost lower than the original cost, i.e., cost items are rated the lower the later they occur in the use period. The cost calculation by the net present value method was made for **10 stressed components** with numerous variations (outer walls, windows, flat roofs, steep roofs, chimney heads, balconies/attics, floorings, internal wall finishes, bathroom and other fittings, inner doors) and presented on totally 43 component data sheets. These sheets contain the investment cost and the discounted capital values for a period of 50 to 80 years.

Following this, **two sample cost calculations**, one for a 4-floor, 2-flats-per-floor building and one for a 2-floor terrace house, are presented as absolute, component-related investment and building maintenance cost. On the basis of these calculations, a large number of different configurations suited to the concrete **building project** can be composed out of the 43 building components and the related cost calculated. The number of versions is even larger if the calculation considers the variants specified in the component data sheets. Under this angle, the "discounted net present value method" discussed here supports a nearly unlimited number of model calculations.