

## SAFETY LEVEL RELATED TO LIFESPAN CLADDING CONSTRUCTION



With regard to the concept of longevity, or life span, a number of notions are confusing. We distinguish the concepts:

**The economic life span:** The period during which future revenues are higher than future costs.

**The functional life span:** The period during which the building meets all the requirements and wishes of the user.

**The esthetic life span:** The period during which the esthetic value of the building meets the requirements and wishes of the user.

**The technical life span:** The period during which a facade or applied product can reliably continue to fulfill the desired functions. A facade construction consists of different elements, all of which have a different technical life span. The technical life span of each component is therefore different. The concept of technical life span is ambiguous!

Table 2.1 of the EN 1990:2002 Eurocodes requires that a product be maintained at a level which allows for a well-designed and executed operation, in the case of a structural and/or component to be replaced, for the life of a product, the 'design life category: 2' and 'workinglife category: normal', a reference period of 25 years applies. Bonded cladding is proven by more or less 40 years of experience in this.

**The design Life span:** According to the Eurocode, NEN-EN 1990, to be used for new construction. The design Life-span is intended, in accordance with the current safety philosophy, the theoretical static approach whereby calculation values (load and material factors) are used in this static assessment for constructive safety purposes, based on a reference period for loads and material strength respectively, are added to static verification using the representative or usage value.

For example, by means of static calculations, the consequence and reliability class to be used for the reference period of 50 years, the desired level of safety of a construction(s) can be theoretically assessed in the probability of collapse over a relevant period of time.

The Eurocode has adopted a safety approach to design structures based on partial load and strength factors, the so-called LRFD concept (Load and resistance Factor Design).

In this process, the so-called characteristic values for the design parameters are first derived,

which are 5% lower or 95% higher limit estimates for strength and load parameters respectively. Instead of using characteristic values, we also work with so-called representative values.

These are safe values estimated in a different way from statistical, which may be assumed to lead to at least the same level of safety of a design as characteristic values.

For this reason, we recommend that the static tests use the representative or use value of 1 MPa.

This representative strength parameter is then divided by a partial safety factor on strength (the material factor) and then multiplied by stress factors.

This way, design values (also called calculation values) of strength and load are found.

The safety criterion of a design, then, is that the strength of the construction calculated with the calculation values for strength parameters must be greater than or equal to the load effects calculated with the calculation values for loads.

In this respect, a reference period has been introduced for the sake of constructive security, which requires the calculation of the values for taxes and strength to be determined.

For example, by means of static calculations, the level of safety of a construction(part) can theoretically be defined in the probability of collapse over a relevant period of time.

TWEHA, 2020