B5-HSB

Reinforced Concrete Column: Option Temperature Design

B5 + calculates reinforced concrete columns and walls under uniaxial and biaxial loading.

Temperature design can be purchased as an additional option.

Temperatur Design

In EN 1992-1-2 / NA: 2010, 4.1 it is stipulated that general calculation methods may be used for temperature design to calculate the component temperatures and the load-bearing capacity in the event of a fire.

This is why such a process for four-sided fire exposure was implemented in the program.

The temperature is determined via the program "TA - Temperature Analysis Cross Section" that calculates the exact temperature distribution for rectangular and circular cross-sections with any cross-sectional dimensions.

Compared to the previously used method with temperature profiles, this calculation method is significantly more flexible with regard to the boundary conditions.

The fire design dialogue offers the selection of the fire resistance class.

Calculation bases

With the additional option B5-HSB, the proof of fire protection for cantilever columns is carried out according to the general procedure (temperature determination) with the TA program, whereby the thermal expansions are also taken into account.

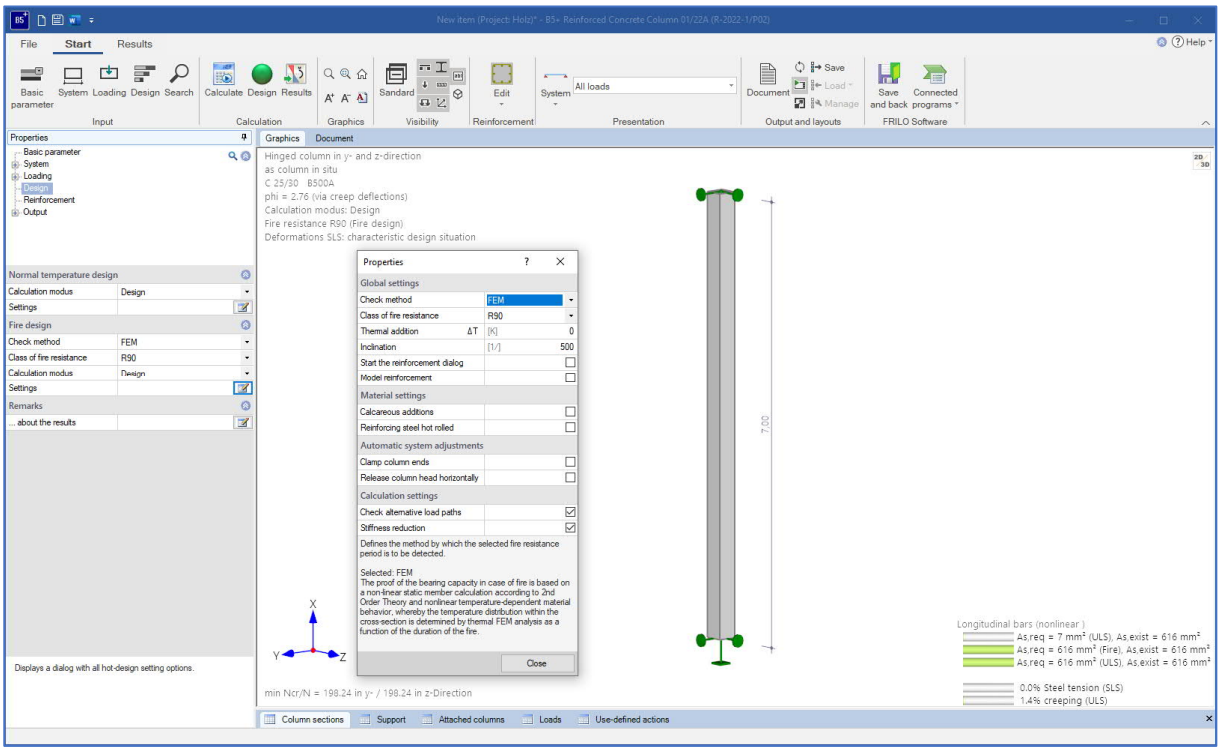
To determine the internal forces of the concrete, the concrete cross-section is divided into elements with an edge length of 1 cm.

The internal forces of the concrete steel result according to the temperature in the reinforcement points.

Calculation method

The "cold" design is carried out for the permanent/transient situation and, if available, for the accidental situation. The column is divided into subsections. Then the stiffnesses in state II are determined and the calculation is carried out according to the second order theory. Idealized reinforcement layers are used as a basis.

The determination of the internal forces for the "hot" design is to be carried out for the accidental situation in the event of a fire. Accidental actions from the cold design are not taken into account. The calculation process largely corresponds to the procedure for the "cold" design. However, the reinforcement distribution or the exact description of the position of the existing longitudinal reinforcement has a significant influence on the result, as the reinforcement is in the area of the hot edge zone. The strengths of the steels are reduced



by 10% to 80% according to Table 3.2 EN 1992-1-2; the stiffness of the member sections is correspondingly lower.

For further information see the product data sheet B5plus.