

Construction Stages FEM



This module is an extension of esas.27, "Construction Stages Frame". It is aimed for plate and shell constructions.

Since civil constructions are more frequently designed and constructed with miscellaneous materials (e.g. steel, prefab and in-situ cast concrete), the static system of the structure changes during its erection. This module enables calculating the structure in different phases. The stress history is calculated by taking added or removed supports, members, load cases, changing cross section properties etc. into account.

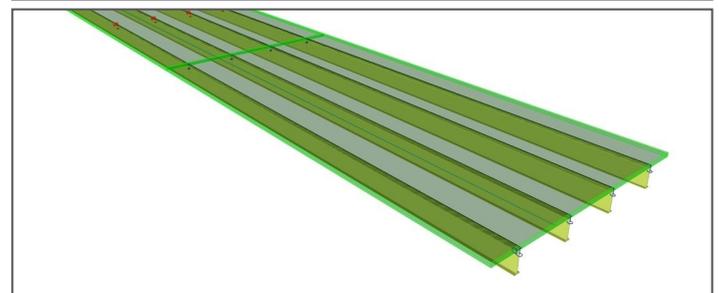
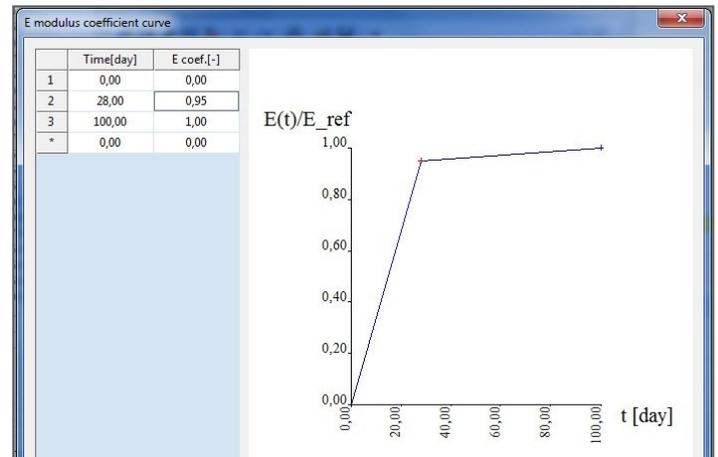
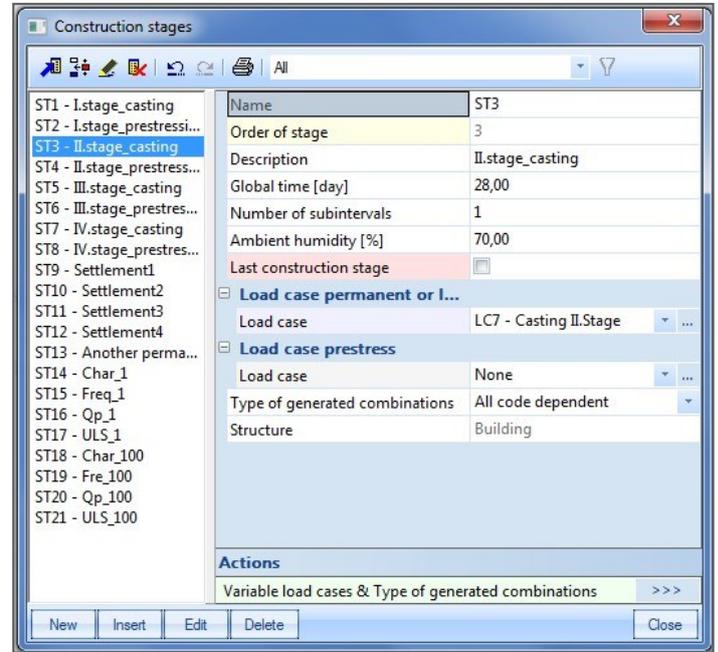
Highlights

- Successive assembling or casting of structural elements.
- Progressive construction of cross-sections.
- Gradual application of loads and prestressing.
- Changes of boundary conditions.
- Removal of temporary structural elements.

Modern civil engineering structures are often designed and constructed as hybrid systems consisting of steel, pre-cast concrete and cast-inplace concrete. Main load-bearing elements are frequently fabricated in advance and are used as a supporting system for parts of a cross-section or structure to be produced later. Thus, the static system of the structure changes during its construction.

Evolution of the static system of the structure in each stage is taken into account through:

- addition or removal of structural members,
- addition or removal of supports,
- progressive construction of members (e.g. composite bridge deck),
- gradual application of loads and prestressing (when combined with Prestressing module, esas.40).
- Variation of E modulus over time can also be taken into account.
- The pre-tensioned tendon becomes an integral part of the structure after cutting. Its stiffness is added into the stiffness matrix of the structure. All loads carried by the structure will automatically cause the change of prestressing of that tendon (when combined with Prestressing module, esas.40).



Required modules

esas.27