



## THERMAL-STRUCTURAL FIRE MODELLING WITH FINITE ELEMENTS METHODS

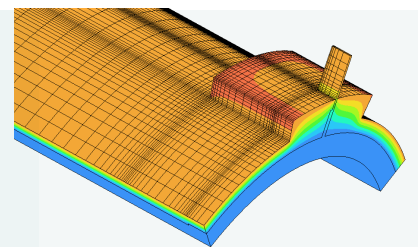
Conducting a heat transfer analysis using the correct finite element modelling (FEM) software is an effective method to determine temperature development of a specific structural element during a fire. The analysis can be done in combination with a stress analysis that calculates the mechanical response of the element, such as deformations, concrete cracking, etc. Efectis successfully uses TNO DIANA software for such analyses. TNO DIANA offers all of the necessary functionalities. And when the correct input is used the performance of a FEM analysis can be a smart and economical solution.

### WHAT CAN EFECTIS DO FOR YOU

Each situation has its own most suitable solution. The Efectis analysis method, using the heat(-stress) analysis, gives all needed information to evaluate the fire resistance and if necessary find the best protection of a structural element. Optimising the fire protection leads to a well-considered and supported decision and chosen risk level.

#### The conducted analyses can have the following dimensions:

- 1D (slab or wall protected by a continuous fire protection layer)
- 2D (fire-protected beam, column or complex cross section geometry)
- 2D axisymmetric (anchor or circular hollow section penetrating a fire protection)
- 3D (more complex elements with varying dimensions in all directions)



### WHY CHOOSE EFECTIS

In case of modelling the output is fully dependent on the knowledge of the engineer, the chosen model, calibration with test results and the available data. Knowledge of thermal- structural fire engineering and the time-dependent thermal properties obtained from a representative fire test or from a reliable material library is vital in order for the calculation result to be a trustworthy source for decision makers. Efectis is one of the principal founders of thermal- structural fire engineering and has over 20 years of experience on projects worldwide.

That is why Efectis is your preferred partner for thermal-structural fire modelling with finite elements.