Fire resistance check - EN 1993-1-2

esasd.05.01 Fire resistance check - EN 1993-1-2

Stress and stability verification of steel members under fire conditions in the resistance domain or in the temperature-time domain according to EN 1993-1-2 and ECCS N° 111. The work environment is identical to the steel code check environment (esasd.01.01). The user enters the used fire curve and the time interval within which the check is carried out. Different types of protective insulating material (iron cladding, spraying material) are selected. Depending on the prevailing temperature, the E-modulus and the admissible stresses are recalculated and then compared to the admissible values. If desired, the calculation note includes a detailed output of the articles consulted from the standard.

Datasheet Scia Engineer

esasd.05.01

Scia Group nv • Industrieweg 1007 • B-3540 Herk-de-Stad • Tel: +32 13 55 17 75 • Fax: +32 13 55 41 75 • info@scia-online.com

Fire resistance EC3

The fire resistance EC3 module is part of the Scia Engineer structural analysis system, and is used to check the design of steel constructions under fire conditions.
The structural engineer can use this interactive, graphical tool to carry out automatic stress and stability checks, including buckling and lateral torsional buckling tests. All checks conform to "EN 1993-1-2:2005'. Resistance domain or temperature/time domain parameters apply.

Working with fire resistance EC3

The Scia Engineer system provides a graphical environment within which to design and check steel profiles for fire resistance, similar to regular steel code checking procedures. The engineer can use the mouse pointer to select the beams to check, thus eliminating the need to work with time-consuming node and member calculations. Computer graphical functions such as Pan, Zoom in/out, Zoom Window and free viewpoint make the work easy, even for complex structures.

3D structure views graphically represent integrity checks. Colours give a clear overview of any over dimensioning and unsatisfactory parts of the construction.

The user controls numerical output to the printer or document, including the following:

- Automatic search for extremes: critical load case/combination, critical beam;
- Highlighting of over dimensioned, optimal and unsatisfactory beams;
- Free choice of output format;
  - Brief: integrity stress and stability checks only;
  - Normal: half-page containing main beam data
  - Detailed: two pages per beam with display of formulae used.

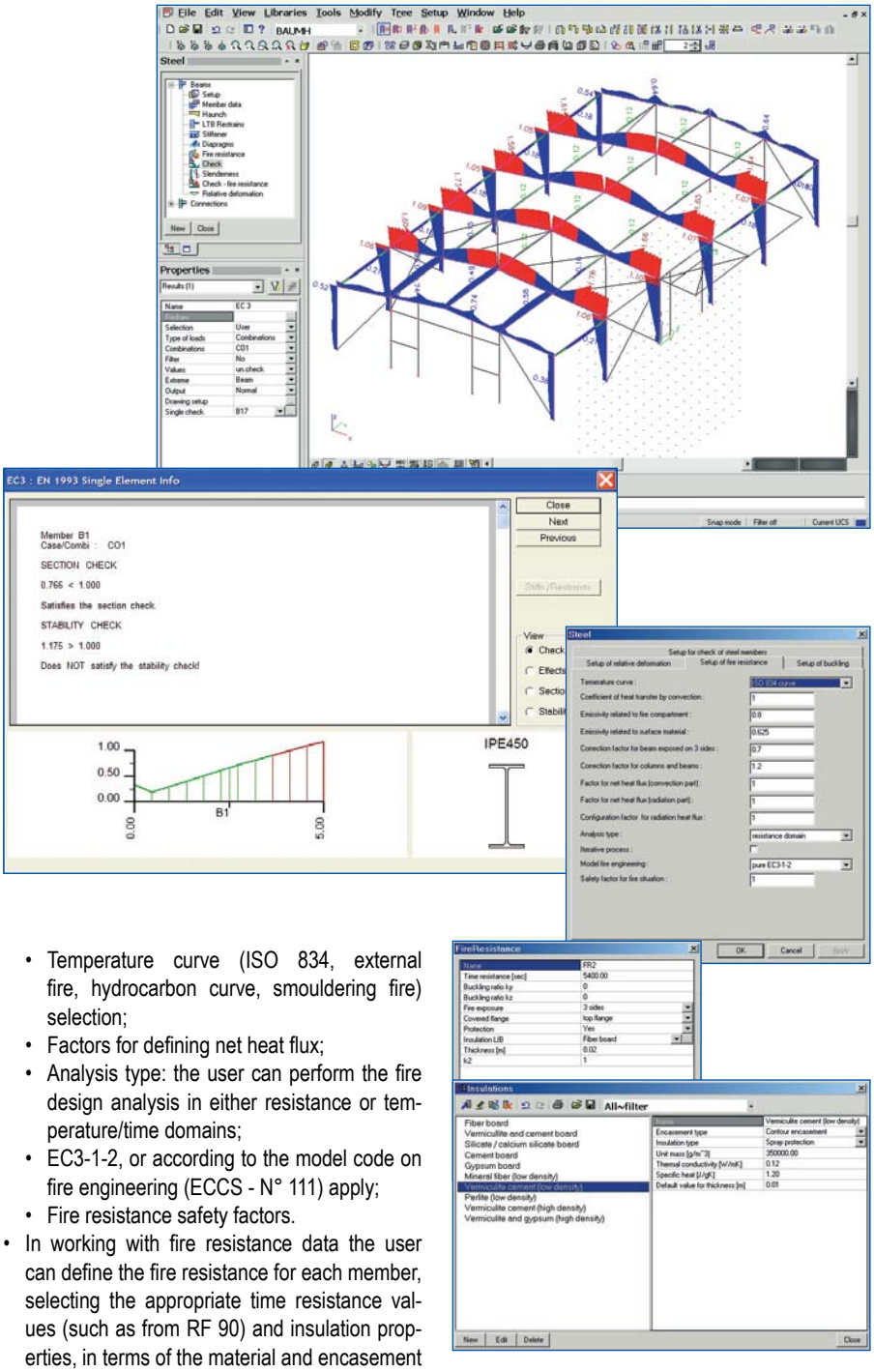
Seamless integration with structural analysis

Researchers can directly take the results of the first order or second order calculations from the Scia Engineer modules for structural analysis, and can directly change cross-sections on the calculation model. The results are available in the project document.

Input facilities

The program offers all significant fire resistance factors and coefficients, and the user can edit these, as follows:

- Basic fire resistance settings for fire resistance;
  - Temperature curve (ISO 834, external fire, hydrocarbon curve, smouldering fire) selection;
  - Factors for defining net heat flux;
  - Analysis type: the user can perform the fire design analysis in either resistance or temperature/time domains;
  - EC3-1-2, or according to the model code on fire engineering (ECCS - N° 111) apply;
  - Fire resistance safety factors.
- In working with fire resistance data the user can define the fire resistance for each member, selecting the appropriate time resistance values (such as from RF 90) and insulation properties, in terms of the material and encasement cladding.
- The insulation library provides a choice of insulation material. The default insulation library contains the most common insulation materials for board protection, spray protection and those used in intumescent coatings.
- Besides fire resistance data, the following standard settings for steel code checks remain available:
  - Basic EC3 data (safety factors, required checks);
  - Buckling data: buckling lengths, sway system (with or without bracing);



Highlights

- Full integration into the main graphical user interface.
- Integrated library of insulations.
- Applicable in combination with both first and second order calculations.
- Clear and comprehensive report.

What's New

UPDATED

- Fire resistance according to new EC3 Code (EN 1993 - version 2005).

Required modules: esasd.01.01.

- Lateral Torsional Buckling data: LTB length, position of load (stabilising, destabilising, normal), effective length factors k and kw, LTB stiffeners on top and bottom flanges;
- Shear buckling stiffeners;
- Diaphragms.

Checks

For each member: cross section classification, section stability check.
EC3-1-2:

- Cross-section classification: art. 4.2.2;
- Resistance values for:
  - Tension members: art. 4.2.3.1;
  - Class 1, 2 and 3 compression members: art. 4.2.3.2;
  - Class 1 and 2 beams: art. 4.2.3.3;
  - Class 3 beams: art.4.2.3.4;
  - Class 1, 2 and 3 members subject to bending and compression: art. 4.2.3.5.
- Critical temperature: art. 4.2.4;
- Check for class 4 members (Annex E).

Supported cross-sections

Symmetric and asymmetric I, rectangular hollow, circular hollow, angle, U, T, rectangular, circular, composed, haunches, variable-height I, single plate cold formed, digital entered by static property, and IFB, SFB and THQ integrated (built-in).