

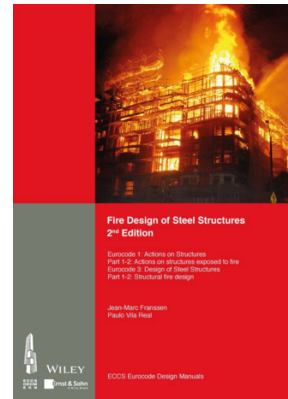
**WEBINAR ON «FIRE DESIGN OF STEEL STRUCTURES»  
6 sessions of 90 minutes**

Reference book:

**Fire Design of Steel Structures, 2<sup>nd</sup> Edition  
ECCS Eurocode Design Manuals, Ernst & Sohn a Wiley Brand, 2015**

Speakers:

**Professor Jean-Marc Franssen, University of Liege, Belgium  
Professor Paulo Vila Real, University of Aveiro, Portugal**



**OBJECTIVE**

These 6 sessions will present the fundamental concepts for fire design of steel structures using Simplified Calculation Methods according to EN 1991-1-2 and EN 1993-1-2 and Advanced Calculation Methods based on the Finite Element Method.

In the first 2 sessions, a presentation of the fire resistance of steel members and connections, followed by a full description of the capabilities of the software Elefir-EN, a software for fire design of steel structural members according to Eurocode 3, which is licensed to the purchasers of the ECCS book *Fire Design of Steel Structures* will be given. Examples from the ECCS book will be solved using the software Elefir-EN

In the following 4 sessions, the main concepts used in advanced models based on the finite element method will be presented. The presentations are not oriented to code developers; the objective is to give a better insight view to the users allowing them to make a better utilisation of numerical software. The concepts will be illustrated by some examples run with the software SAFIR®.

## PROGRAMME

<u>Date</u>	<u>Topic</u>	<u>Content</u>	<u>Speaker</u>
<b>Session 1</b>  07/11/2023 10:30-12:00	Welcome & Introduction	<ul style="list-style-type: none"> <li>- Content, objectives</li> <li>- Logic of the book and of the lectures</li> </ul>	Professor Paulo Vila Real
	Thermal actions and thermal analysis according to simple models of EN 1993-1-2	<ul style="list-style-type: none"> <li>- Nominal temperature-time curves</li> <li>- Parametric temperature-time curves</li> <li>- Localized fires</li> <li>- Temperature of unprotected steelwork exposed to fire</li> <li>- Temperature of protected steelwork exposed to fire</li> </ul>	Professor Paulo Vila Real
<b>Session 2</b>  08/11/2023 10:30-12:00	Mechanical actions and mechanical analysis according to simple models of EN 1993-1-2 including a case study	<ul style="list-style-type: none"> <li>- Combinations of actions for accidental fire design situation</li> <li>- Fire resistance of structural members.</li> <li>- Concept of critical temperature</li> <li>- Design in the three domains resistance domain, time domain and temperature domain</li> <li>- Fire resistance of simple connections</li> <li>- Case Study: Fire resistance under standard fire; Fire resistance under natural fire; Use of spray materials and intumescent painting</li> </ul>	Professor Paulo Vila Real
<b>Session 3</b>  14/11/2023 10:30-12:00	Theory of heat transfer applied in finite element modelling	The aim is not to teach how to develop a finite element software. The aim is to present the essential features of the finite element technique, with its capabilities and its limitations. The participants will then be in a better position to understand and to apply a computer code, knowing the basics behind it.	Professor Jean-Marc Franssen
<b>Session 4</b>  15/11/2023 10:30-12:00	Examples of numerical model for heat transfer using GmSAFIR and SAFIR	Two examples will be presented; an H steel section and a reinforced concrete section. The temperature will be calculated as well as the torsion stiffness.	Professor Jean-Marc Franssen
<b>Session 5</b>  21/11/2023 10:30-12:00	Theory of beam finite elements	The aim is the same as for Lecture 3. 2D and 3D prismatic beam finite elements heated by a fire will be discussed	Professor Jean-Marc Franssen
<b>Session 6</b>  22/11/2023 10:30-12:00	Example of a structural model with beam elements, using GmSAFIR and SAFIR	A simple moment resisting frame with 5 columns and 4 beams, using the sections of lecture 4 will be modelled and analysed.	Professor Jean-Marc Franssen