

ADVANCES IN FIRE RESISTANCE ANALYSIS AND DESIGN OF BUILDINGS STRUCTURES

PEDRO DIAS SIMÃO^{*}, LUCIANO R.O. LIMA[†]

^{*} University of Coimbra, CERIS, Department of Civil Engineering
Rua Luís Reis Santos, Pólo II da Universidade, 3030-788 Coimbra, Portugal
ITECONS, Rua Pedro Hispano, 3030-289 Coimbra, Portugal
pedro@dec.uc.pt

[†] Departamento de Engenharia de Estruturas, UERJ – Universidade do Estado do Rio de Janeiro
Rio de Janeiro, Brazil – CEP 20550-900
luciano@eng.uerj.br

ABSTRACT

Fire resistance of buildings is a subject of paramount importance nowadays, due to the recurrent occurrence of hazardous events that cause a large number of casualties and/or the destruction of priceless heritage. Given the climate changes we are witnessing today worldwide, it is certain that tragic fires will be even more frequent in the near future, and that many of these will affect urbanized areas. All this causes an increasing demand of knowledge on the behaviour of building structures in fire conditions, and the development of alternative strategies to develop more accurate collapse criteria and novel design methodologies, such as those based on structural performance, for a more realistic design. When subjected to high temperatures, building structures experience a significant loss in strength and stiffness that may lead to their structural failure. The collapse of buildings in fire may occur in many different ways.

The present session pretends to be a forum for ideas exchange and discussion on the most recent research on the behaviour of structures in fire for computational applications, for a better fire resistance design. These topics include novel numerical methods [1], innovative design strategies [2] and new approaches to tackle the problem, such as those based on Engineering Thermodynamics concepts. Recent knowledge arising from experimental testing is also welcome.

REFERENCES

- [1] Simão, P.D., Rodrigues, J.P.C., Fernandes, H.D., *A voxels-based Rayleigh-Ritz method for the post-buckling elasto-plastic analysis of restrained steel columns in fire*, Journal of Constructional Steel Research, Vol. 201, paper n. 107736, 2023
- [2] Gernay, T., *Performance-based design for structures in fire: Advances, challenges and perspectives*, Fire Safety Journal, Vol. 142, paper n. 104036