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Stability and Robustness of Steel Storage Rack Systems

Dan Dubină[*1,2], Andreea Şigăuan[1], Florea Dinu[1,2]

[1]*Politehnica University Timisoara, Dept. of Steel Structures and Structural Mechanics, Timisoara, Romania*
[1]*Laboratory of Steel Structures, Romanian Academy, Timisoara Branch, Romania*

Abstract

Structural steel pallet rack systems are tall and slender structures, which are used to store goods and products in warehouse facilities, distribution centers or retail spaces. The failure of such systems may be quasi-static, due to local or global overloading with stored goods, or dynamic, due to an impact load (e.g. collision with forklift trucks), ground motions, and vibrations or unstable loads. Localized fire, which *softens* both the strength and the stiffness of steel elements, can induce the premature buckling of columns and generate progressive collapse.
The paper reviews the actual state of knowledge related to robustness design methodologies applied to storage rack systems and illustrates, by means of a case study, the potential development of progressive collapse of a real structure, when it is subjected to accidental loading scenarios.
Keywords: steel pallet rack, accidental action, local failure, progressive collapse, robustness.

Mențiuni

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[*] Date autor: Tel./ Fax.: 0256 403 917
Adresa de e-mail: dan.dubina@upt.ro