

## **FIRE PERFORMANCE OF A REINFORCED CONCRETE COLUMN PARTIALLY EMBEDDED IN FIREWALL**

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In this study a case of two neighbouring single-storey industrial buildings, one of which is subjected to fire is considered. Due to low prefabrication cost reinforced concrete columns are very common in single-storey industrial buildings. Besides they have a significant advantage over steel columns in load-bearing capacity in case of fire. Two separate buildings or two fire compartments of a single industrial building are separated by a firewall. Reinforced concrete column integrated into firewall is considered, instead of two separate column one for each side of the wall. In order to avoid progressive collapse of a second building, which is not subjected to high temperature, as well as to prevent fire from getting to the other side of a firewall, structural integrity must be provided. Partially embedded column must retain its ability to carry loads, while firewall should maintain its integrity and insulation for the desired time.

As the column is partially embedded in firewall, it is non-symmetrically exposed to fire. Temperature rise according to standard temperature-time curve over the whole length of a column is assumed for the purpose of this analysis. RC column is supporting steel trusses, none of which are protected from fire. Truss in over the fire compartment is subjected to the same fire conditions as column, what leads to its failure after several minutes. Assuming that connection between steel framework and head of the column allows truss to slide down, RC column is left loaded by the second truss, which is inducing relatively big eccentricity. Analysis of structural behaviour of the column is provided with respect to uniaxial bending caused by eccentricity of load and degradation of strength properties of concrete and reinforcing steel. Material models based on Eurocodes are considered.

Column pre-designed for normal conditions is assigned to appropriate fire resistance class. Methods of increasing fire resistance time are provided with respect to prefabrication cost.

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