

Accepted Manuscript

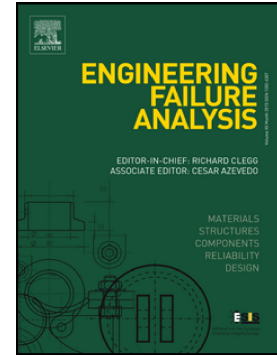
An experimental study on fire damage of structural steel members in an industrial building

Filiz Piroglu, Murat Baydogan, Kadir Ozakgul

PII: S1350-6307(16)30595-7
DOI: doi: [10.1016/j.engfailanal.2017.06.051](https://doi.org/10.1016/j.engfailanal.2017.06.051)
Reference: EFA 3216
To appear in: *Engineering Failure Analysis*
Received date: 21 July 2016
Revised date: 21 June 2017
Accepted date: 23 June 2017

Please cite this article as: Filiz Piroglu, Murat Baydogan, Kadir Ozakgul , An experimental study on fire damage of structural steel members in an industrial building, *Engineering Failure Analysis* (2017), doi: [10.1016/j.engfailanal.2017.06.051](https://doi.org/10.1016/j.engfailanal.2017.06.051)

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An experimental study on fire damage of structural steel members in an industrial buildingFiliz Piroglu ^a, Murat Baydogan ^b, Kadir Ozakgul ^{a,*}^a *Department of Civil Engineering, Istanbul Technical University, Maslak 34469, Istanbul, Turkey*^b *Department of Metallurgical and Materials Engineering, Istanbul Technical University, Maslak 34469, Istanbul, Turkey***Abstract**

In this paper an experimental study on the fire damage of the unprotected structural steel members is presented after exposure to fire in an industrial fabric established for embellishment of glass wares in 1997. Following the ignited fire flashover occurred, explosions happened, and finally 50,000 m² areas were heavily damaged. The structural bearing system of compartments was designed as moment-resistant frames having 11.80 m height. In some halls a space truss roof construction with tubular steel bars which were joining in Mero type assemblies was pin-supported on the columns which were fix on their bottom. Steel columns were made from hot rolled I sections or built-up box sections.

Tensile tests were performed on specimens taken from various columns and a tubular space truss member in order to determine post fire mechanical properties. Also, residual factors defined as the ratio of post fire mechanical properties to those at room temperature, and exposed temperatures of the samples were estimated by referring the results of a previous work in the literature. In this approximation, yield strength to ultimate tensile strength ratio of the samples subjected to controlled heating to and cooling from elevated temperatures in the previous work were taken as the reference, and the present results were evaluated based on those results.

All the findings obtained from this experimental study were used as a tool in order to get an information about the hazard level which helped for final decision whether removal, reuse

* Corresponding author. Tel.: +90 212 2856572; fax: +90 212 2856587.
E-mail address: ozakgulk@itu.edu.tr

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