

Testing of high strength steel S960 at elevated temperatures

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Since steel is nowadays one of the most used materials for structural engineering, it is important to check how it behaves in fire conditions. From the point of fire safety engineering, the strength of steel at elevated temperatures is of the biggest interest.

In this Master's thesis, the behaviour of S960 high strength steel at elevated temperatures is investigated. In order to see what happens with the steel strength, fire conditions are simulated. Five different temperatures (20 °C, 400 °C, 550 °C, 700 °C and 900 °C) with two different strain rates (0,2 %/min and 1,0 %/min) are tested.

Reduction factors for Effective yield strength, Proportional limit and Young's modulus are obtained. Results are compared with EC3 recommendations for structural steel design at fire. It is concluded that EC3 underestimates reduction factors for Effective yield strength. Effects of two different strain rates used are also observed. Possible relationship with microstructure of high strength steel is discussed, according to the latest research done in this field.