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Spotlight on *Structures*

Editor's Featured Article

The Featured Article for Volume 80 of *Structures* is now available. Associate Editor, Luciano Lima, has chosen a paper investigating a model for cold-formed steel under tension at elevated temperatures.

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Ductile damage model for cold-formed steel under tension at elevated temperatures

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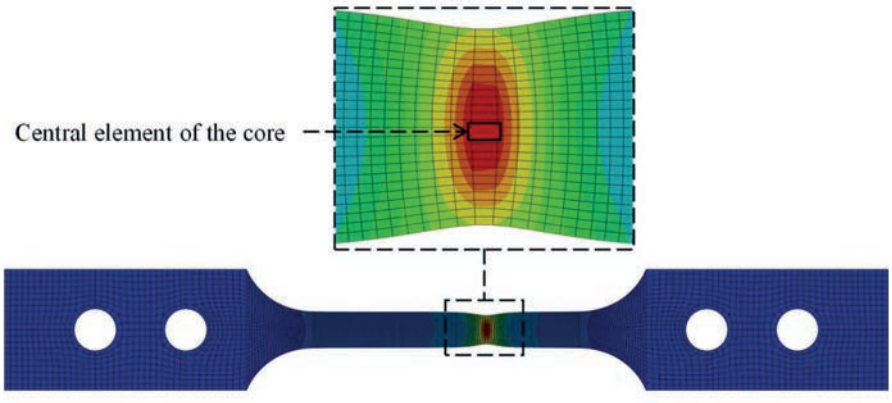
Cold-formed steel (CFS) profiles are widely used in modern construction due to their lightweight, cost-effectiveness and versatility. However, their behaviour under fire conditions remains a critical concern, as elevated temperatures can significantly reduce strength and stiffness, potentially resulting in brittle fracture and catastrophic failure. This study addresses this challenge by developing a comprehensive ductile damage model to predict the fracture behaviour of CFS at elevated temperatures. The model incorporates a damage initiation criterion and an associated damage evolution law, calibrated using experimental data and numerical simulations. A weighted average method is employed to accurately predict post-necking behaviour, distinguishing between damaged and undamaged material states. A new empirical formula is proposed to estimate the weighting factor for the undamaged response, enhancing the accuracy of the model. The methodology is validated using experimental data from S280 CFS and extended to other grades, including G550, S350, S700 and S1200, covering yield strengths from 300MPa to 1200MPa. The results showed that the simulations agree with experimental results, accurately capturing stress-strain relationships, fracture initiation and crack propagation across a temperature range of 20°C to 700°C. The proposed approach provides a robust framework for predicting CFS's mechanical performance and failure behaviour under fire conditions, contributing to the design of safer and more efficient fire-resistant structures. This study advances the understanding of CFS behaviour at elevated temperatures and offers a reliable tool for engineers and researchers in structural fire safety applications.

→| Read the full paper at **https://doi.org/10.1016/j.istruc.2025.109916**



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