Master Thesis Defend Examination

Presented by

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Improved design of coupon geometry offering consistent 3D stress states

Highlight Summary

The advancement of finite element analysis has earned industrial confidence in various simulations. This brings the need of accurate material models to predict the material behaviour such as in crash simulations in which failure calibration is significant. Given the complex stress states and robustness requirement, 3D GISSMO in LS-Dyna offers more precisions for failure characterization as it depicts better representation of real material's failure behaviour. The common practice of characterizing materials includes experimental coupon testing and the parallel numerical simulations combined. However, the challenges faced nowadays are due to lack of standardized and optimized coupon geometries especially in 3D discretization. Furthermore, the existing coupon geometries do not guarantee consistent stress states. Hence, this study aims to propose a new butterfly-shaped coupon geometry that offers consistent stress states for 3D GISSMO calibration by evaluating the stress triaxiality and Lode parameter. The loading angles were varied at 0°, 15°, 30°, 45° and 90°. The consistency of the stress states was evaluated and validated with experimental-numerical approach. The modified butterfly geometry produced stress triaxiality ranging from 0.03 to 0.7 and Lode parameter ranging from -0.07 to 0.99. This indicates that the modified butterfly specimens are able to achieve stress states consistencies. An experimental framework of measuring the stress states from experimental data was developed allowing a fully experiment-driven failure characterization.

27 November 2025	08:30 am –11:00 am (GMT+7)	Online (Link will be provided upon registration)

Registration is open from **today until 21 November 2025**

QR Code for Registration