Faculty Member

Timken Foundation Center for Precision Manufacturing

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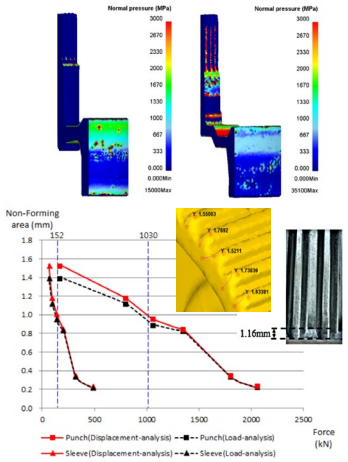
Research Interests

- Engineering Design with emphasis on Structural Integrity, Materials, and Manufacturing Technologies
- Stress analysis on structural integrity and failure prevention considering static, dynamic, and thermal loads / linear and nonlinear contact / elasto-plastic behaviors
- Topology and robust optimization for lightweight design based on the applications of materials and manufacturing engineering
- Product verification focusing on reliability engineering based on the evaluation of the fundamental material properties and the functional performance of components, modules, and systems

Sample Research I: Back-pressure Cold Forging Analysis

- To minimize non-forming area of gear teeth for the output and reaction hubs in an automatic transmission.
- The analysis was conducted in both displacement and load control cases and compared with the measuring results from real workpieces.
- The results show that the punch load depends on the reduction area of workpiece, and the backup force is determined by the cross-section-area of sleeve.



Sample Research II: Spot and Plug Welding Effects on Thin Panels

- Experimental comparison of spot and plug welding effects on automotive body panels.
- The results show that spot welding has higher failure strength under both normal and shear tensile loadings, and plug welding is more vulnerable to shear tension than normal tension.
- This study can be applied to further researches for practical optimization of welding effects on thin panels.