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## Modeling and characterization of spot weld material configurations for crash analysis

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This paper attempts to introduce a proper methodology to develop detailed weld model the structural stress when the applied load range is beyond the yield strength of the joint. Three-dimensional finite element models of spot welded joints are developed. It is unrealistic to include all the sub-zone details in the FE model of the spot weld joints for full vehicle crash simulations. So simple beam spot weld model developed based on detailed model behavior. In the car industry i.e., in the modeling of car body, beam elements are used to represent spot weld. The purpose of this study is to explore force estimation model of spot welds. As known in engineering practice, spot welds are normally not modeled in detail but as connection elements which transfer forces and moments. In present study, welds in the tests specimen are treated in the same way. In order to generate testing data, virtual tensile testing simulation carried out with mesh sensitivity in necking zone. This high mesh resolution around necking zone is required to capture the steep gradients in pressure and stress tri-axiality, etc. Once the stress strain curve are generated in the simulations needs to be calculate damage function and evolution. The advanced high strength steels used in this study include DP 800 GI with the same modulus of elasticity but different yield strength and ultimate strength.

### Biography

Sachin Patil is doctoral student of Dr. Hamid M Lankarani. He is Professor and NIAR Senior Fellow, Wichita State University. He has published more than 25 papers in reputed journals/conferences and Member of ASME Technical Committee on Multibody Systems and Nonlinear Dynamics.

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