Fracture, Damage and Failure Using LS-DYNA

This course will allow LS-DYNA users to model **Fracture, Damage, and Failure**. The different methodology to model failure and fracture in LS-DYNA will be presented and discussed. All formulation in LS-DYNA including Lagrangian, Eulerian, SPH, XFEM, EFG, and the DEM methods etc. will be discussed. Various examples will be presented.

Course Outline

- Introduction and Historical Review
    - Brittle Failure
    - Ductile Failure

- Introduction and Fundamental Theoretical Concepts
    - Failure Theories
    - Damage Models
    - Fracture Mechanics

- Element Erosion Advantages & Short Comings

- Current LSDYNA Capabilities to Model Failure and Damage

- Current LSDYNA Capabilities to Model Fracture

- Fracture in Lagrangian, Eulerian, SPH, XFEM, EFG, and DEM Methods

- LSDYNA Fracture Capabilities Verification examples

- MAT_ADD_EROSION and the GISSMO Model

- Material Models with Failure
    - Isotropic Materials
    - Hyperelastic Materials
    - Composite Materials
    - Geotech Materials

- Modeling Delamination and Debonding in LSDYNA
    - Cohesive Elements
    - Tied Contact with Failure

- Summary and Concluding Remark

Workshop
There will be several examples, which are designed to understand and reinforce the lectures and the concepts presented in the course.