



**Livermore Software Technology Corp.**

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## Fracture, Failure, and Damage in LS-DYNA

**Instructor: Dr. Ala (Al) Tabiei** [atabiei@lsdyna-online.com](mailto:atabiei@lsdyna-online.com)

**2 Days - \$1,250 Students \$625** w/student ID

Includes on-site continental breakfasts, lunches, breaks, class dinner

Includes 30-day LS-DYNA demo license to practice

**Description:** This training class will provide analysts with the additional tools and knowledge required to model fracture, damage, and failure. The typical attendee is likely to have a background in failure analysis. Attendees will use LS-DYNA keywords and options associated with advanced LS-DYNA analyses to analyze fracture and failure in materials and structures. Examples are used, which are designed to understand and reinforce the lectures and the concepts presented in the course.

### Course Contents:

- **Introduction and Historical Review**
  - Brittle Failure
  - Ductile Failure
- **Introduction and Fundamental Theoretical Concepts**
  - Failure Theories
  - Damage Models
  - Fracture Mechanics
- **Element Erosion Advantages & Short Comings** (*solution to the problem*)
- **Current LS-DYNA Capabilities to Model Failure and Damage**
- **Current LS-DYNA Capabilities to Model Fracture**
- **Fracture in Lagrangian, Eulerian, SPH, XFEM, EFG, and DEM Methods**
- **LS-DYNA 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 LS-DYNA**
  - Cohesive Elements
  - Tied Contact with Failure
- **Summary and Concluding Remarks**