



A Short Course on
**Progressive Composite Damage Modeling in LS-DYNA
(MAT162 & Others)**

Bazle Z. (Gama) Haque, PhD

*Senior Scientist, University of Delaware Center for Composite Materials (UD-CCM)
Assistant Professor of Mechanical Engineering, University of Delaware, Newark, DE 19716
P: (302) 831-6805 | F: (302) 831-8525 | C: (302) 690-4741
E: gama@udel.edu*

Upcoming Workshop:

Tuesday, March 28, 2017 | 9am-5pm

Cost:

In-House Class: \$595 per person

Includes: Coffee, Lunch, Parking, & CD with Course Content

Web Conference: \$595 per person

Includes: CD with Course Content

Description:

Progressive damage modeling of composites under low velocity impact, and high velocity impact is of interest to many applications including car crash, impact on pressure vessels, perforation and penetration of thin and thick section composites. This course will provide a comparison between available composite models in LS-DYNA for shell and solid elements, e.g., MAT2, MAT54, MAT59, & MAT162. Among these material models, rate dependent progressive composite damage model MAT162 is considered as the state of the art. This short course will include the theory and practice of MAT162 composite damage model with applications to low and intermediate impact velocities, understanding the LS-DYNA programming parameters related to impact-contact, damage evolution, perforation and penetration of thin- and thick-section composites. Printed copies of all lecture notes will be provided along with a CD containing all example LS-DYNA keyword input decks used in this short course.

Topics Covered in this Short Course:

Impact and Damage Modeling of Composites

Application of MAT162 in Engineering and Research Problems

Introduction to Composite Mechanics

Introduction to Continuum Mechanics and Composite Mechanics

Composite Material Models in LS-DYNA for Shell and Solid Elements

Discussion on MAT2, MAT54, MAT59, & MAT162

Theory and Practice in MAT162 Progressive Composite Damage Model for Unidirectional and Woven Fabric Composites

MAT162 User Manual – Version 15A 2015

Progressive Damage Modeling of Plain-Weave Composites using LS-Dyna Composite Damage Model MAT162

Unit Single Element Analysis

Comparison between Different LS-DYNA Composite Models

Sphere Impact on Composite SHELL & SOLID Plates

Low Velocity Impact and Compression after Impact Applications

Modeling the Low Velocity Impact and Compression after Impact Experiments on Composites Using MAT162 in LS-DYNA

Perforation Mechanics of 2-D Membrane and Thin Composites

Penetration Mechanics of Composites and Soft-Laminates

Introduction to LS-DYNA (Document Only)

**For more information and to register,
please visit the MAT162 Course Webpage at
http://www.ccm.udel.edu/software/mat162/mat162_workshop/**