Blast Using LSDYNA

Prerequisite

This training class is intended for the LS-DYNA analysts possessing a comfortable command of the LS-DYNA keywords and options associated with typical Lagrangian analyses. An introduction to LSDYNA class is a must for people who want to attend this class.

Objective of the course

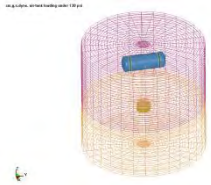
This is a short course on using LSDYNA to solve blast, vehicles (IED and mines), and home land security problems. Some mathematical theory is presented for each technique, especially Eulerian and Mesh-free Methods, to provide the typical user with sufficient knowledge to apply the appropriate analysis technique. Examples are used to illustrate the points made in the lectures and train engineers on using the code.

Who should attend?

This training class will provide analysts with the additional tools and knowledge required to model high energy events. The typical attendee is likely to have a background in defense applications, to include protective structures and vehicles, Homeland Defense topics, and terrorist threat mitigation design techniques using simulation.

1-Introduction

- **Introduction to Wave Propagation**
  - Wave propagation in incompressible material
  - Wave propagation in compressible material
- **Blast Effects**
- **Numerical Techniques to solve High energy problems**
  - Lagrangian, Eulerian and ALE, SPH , EFG, DEM
- **Load_Blast_Enhanced & INITIAL_IMPULSE_MINE**

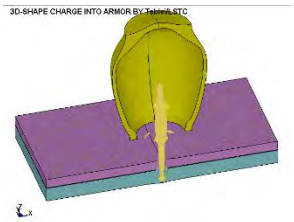


2-Blast Wave Simulations Techniques

- Applications:
  - Vehicles
  - Underwater Structures
  - **Energy Balance**

3-Material Behavior Under Sever Loading

- Strain Rate Effect
- Material Models Library
- What is Available That Works for the Defense Problems
- Isotropic
- Composites
- Soil
- Concrete



4-Bomb Modeling

- Shape charges, EFP, & IED
- Bomb fragmentation modeling

5-Hybrid-III Dummy Response to Blast

- Dummy models
- Dummy response to blast

6-Modeling Techniques

- Mesh design
- Problem initialization
- Post-processing

7-Impact Data Reduction and analysis

- Filtering the data
- Intermittent eigen value analysis

8-Introduction to FSI

9-Introduction to SPH

10-Blast Mitigation Structures (Literature Review, No Lectures)

11-References