



Class Locations:

Livermore Software Technology Corp.

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Advanced ALE Applications in LS-DYNA

Instructors: I. Do, H. Chen LSTC

3 Days - \$600 Students \$300 w/student ID

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

Includes 30-day LS-DYNA demo license to practice

Prerequisite: Students should already be familiar with LS-DYNA (and the ALE method)

Description: Hands-on training class. This application oriented class is designed to get students more proficient at using the more complex features of ALE and fluid-structure interaction (FSI) modeling.

Day 1

Reviewing some critical ALE features, FSI usage & basic concepts.

Day 2

- More complicated examples are discussed.
- Simulation techniques for each model will be reviewed.
- Discussions of model fine-tuning and procedures for debugging models, such as ways to deal with FSI leakage.
- Boundary and initial conditions, mesh resolution design, etc. will also be covered.

Day 3

- The structural ALE solver is covered.
- Construction of a few example models to illustrate its usage.
Structural ALE solver Hands-on training

Examples of Applications

- A range of possible LS-DYNA ALE-FSI examples is shown on page 2 covering a wide area of applications. If not be enough time to cover all listed examples, the instructor will select some examples in the list below and discuss them in detail.
- Examples other than those listed may also be referred to in order to clarify certain modeling concepts when necessary.
- Indicate the examples that are of interest to you, upon registration, so they can be prepared.
- All input files to models discussed in class will be made available to the attendees for reviewing at their convenience.

Advanced ALE Applications in LS-DYNA -

Instructors: Dr. Ian Do, Hao Chen LSTC

The instructor will define the physics of the problem.

1. The participants are to conceptually construct a detailed pseudo-input file for the model themselves (pencil-paper).
2. The model will be assisted by the instructor.

Please note that due to the huge amount of output for the models and long run time, participants will not have time to run the models in class. The goal is to be able construct each model conceptually. Result review may be done during the discussion of each model.

Possible Examples

Basic Concepts (< 1 day)

- (01) Introduction
- (02) ALE Multi-Material Group (AMMG) concepts and applications
- (03) Fluid-Structure Interaction (FSI) concepts
- (04) Initial and boundary condition set up with ALE element formulation (ELFORM=11)
- (05) Material failure modeling
- (06) Information on typical unit systems and references

Possible ALE Models to be Discussed

- (11) Soda can drop
- (12) Tank sloshing and impact
- (13) Extrusion
- (15) Bird strike fan blade assembly model
- (16) Projectile-target penetration modeling
- (17) Simple flow in flexible tube
- (21) Hydrostatic pressure initialization
- (22) Wave impacting floating "ship" (simple model)
- (23) Cylinder (Rocket booster) impacting water model
- (27) Tanker floating and moving through water

There may be a couple of examples related to modeling of energetic materials that are available and may be discussed depending on the attendees' interest (some security restrictions will apply).

Please contact Ian if you are interested in this area of analysis. ian@lstc.com