

Material Modeling in LS-DYNA

LS-DYNA is a leading finite element program in large deformation mechanics, vehicle collision simulations and crashworthiness design as well as for metal forming simulations. The vast variety of application areas means that there are a great number of material models available in LS-DYNA, currently more than 150 models. In this short course we will give you the theoretical background of a number of material models in LS-DYNA, and point at their differences. In addition, the course serves as an excellent introduction to the LS-DYNA user-defined material interface. The course will include a number of computer exercises.

Prior knowledge: The course is suited for users who have used LS-DYNA to some extent and want a more in depth understanding and categorization of its material models.

Course outline:

- Continuum mechanics: motion, deformation, stresses, strains, objectivity
- Elasticity and visco-elasticity: hypo- and hyperelasticity, Kelvin and Maxwell models
- Rubbers: the Mooney-Rivlin and Ogden models
- Biomechanical materials
- Thermodynamics: its consequences for material modelling
- Plasticity and visco-plasticity: isotropic and kinematic hardening, isotropic and anisotropic yield criteria, Cowper and Symonds rate model
- Foams and composite materials: low density and crushable foams, laminates
- Damage, failure and temperature dependence: ductile and brittle failure
- Parameter fitting
- User defined material models in LS-DYNA: a thorough treatment

The course is given by PhD Thomas Borrvall, ERAB. Notify us if any of the mentioned subjects is of particular interest and we will try to meet your demands in the best way we can.

The number of accepted course attendee will be limited to 12.

Place: ERAB's office, Garnisonen, Linköping.

A roadmap is available on <http://www.erab.se>.

Date: See <http://www.erab.se/courses>

Course fee: The course fee includes course notes, lunches, refreshments and one evening meal, excluding VAT. See <http://www.erab.se/courses> for actual course fee. Hotel accommodation is not included in the course fee.

Registration: Online registration at <http://www.erab.se/courses>

Confirmation: A confirmation will be sent out by e-mail upon registration.

Cancellation: Classes can be cancelled up to 10 days before course start if the number of attendees is too small. Any fees paid to ERAB will be returned if the

class is cancelled. For cancellations by attendees received later than two weeks before course start the attendee will be invoiced 50% of the course fee.

Questions: E-mail course@erab.se