

I herewith register for ...

- Seminar: Modeling Polymers and Elastomers in LS-DYNA, 31 March - 1 April 2014, Stuttgart
 Industry: 1.100 € University: 550 €
- Webinar (free of charge):
 Composite Analysis with LS-DYNA, 2 April 2014
- Seminar: Introduction to Composite Modeling with LS-DYNA, 3-4 April 2014, Stuttgart
 Industry: 950 € University: 475 €

Students free of charge, provided there are vacancies.

Sender

First name: _____

Last name: _____

Company/University: _____

Dept.: _____

Street: _____

Zip-code, city: _____

Phone: _____

Fax: _____

E-Mail: _____

Date, Signature: _____

Please complete and fax to +49(0)711-459600-29, send to DYNAmore GmbH, Industriestr. 2, D-70565 Stuttgart, Germany, or E-mail to seminar@dynamore.de.

Online registration at www.dynamore.de/seminars

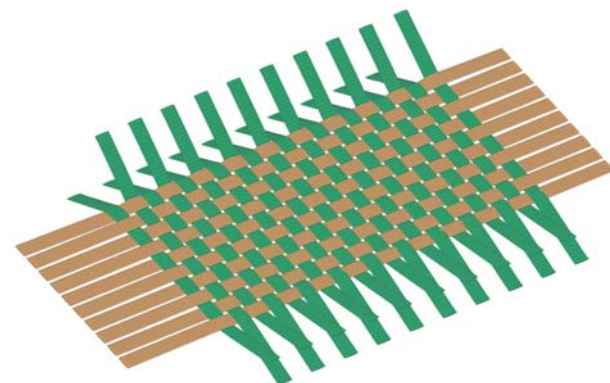
LS-DYNA

LS-DYNA is one of the world's leading finite element software systems and is perfectly suited to perform numerical simulations of highly nonlinear problems encountered in industry and research. Typical applications include crashworthiness, metal forming, impact and drop tests, detonations, penetration/perforation and fluid-structure interaction as well as thermomechanically and electromagnetically coupled problems.

With LS-DYNA, the Livermore Software Technology Corporation (LSTC) offers a well-equipped toolbox that includes explicit and implicit time integration schemes and spatial discretization methods such as FEM, BEM and ALE as well as meshfree methods like EFG, SPH and DEM. The primary focus of the developers at LSTC lies on the one code strategy to integrate different solution algorithms within a single software environment which includes coupling abilities of the structural solver with the solvers for incompressible and compressible fluids, temperature and electromagnetism.

This allows different simulation stages to be joined together within LS-DYNA without the need to define a time-consuming transition to other software packages. And this in turn means that LS-DYNA can be used to efficiently perform simulations across multiple processes.

Besides LS-DYNA and LS-OPT, LSTC also develops the free pre- and postprocessor known as LS-PrePost. The programs support the Linux, Windows and Unix operating systems as well as various cluster architectures and HPC systems.

DYNAmore GmbH
Gesellschaft für FEM Ingenieurdienstleistungen

DYNAmore is dedicated to support engineers in solving nonlinear mechanical as well as multiphysical problems numerically. Our product portfolio includes the finite element solver LS-DYNA, the pre- and postprocessor LS-PrePost and the optimization software LS-OPT as well as numerous finite element models needed for crashworthiness simulation (dummies, barriers, pedestrian and human models, ...). Our main field of activity is to sell, teach, support, and co-develop the software LS-DYNA and LS-OPT. In addition, we provide engineering services for numerical analysis and integrate simulation software in your CAE environment.

Our advanced training offer includes classical seminars, workshops, webinars, support and information days as well as LS-DYNA user conferences. More detailed information can also be found on our support and tutorial websites.

We are one of the first addresses for pilot studies and development projects with respect to the simulation of nonlinear dynamic problems. We are always at your disposal to answer your questions on specific application as well as test licenses.

You will find DYNAmore in Stuttgart, Dresden, Ingolstadt, Berlin, Langlingen, Zurich (CH), Linköping (S), Gothenburg (S) and Torino (I).

Organization

Location

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 Industriestr. 2, D-70565 Stuttgart, Germany
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www.dynamore.de

Webinar access information

We will send more details together with your registration confirmation.

Registration

Please use the registration form or register online at www.dynamore.de/seminars.

Invitation to the event series

Simulation of Polymers,
Elastomers and Composites
in LS-DYNA

Seminar: **Modeling Polymers and Elastomers in LS-DYNA** 31 March - 1 April

Webinar (free of charge):
Composite Analysis with LS-DYNA 2 April

Seminar: **Introduction to Composite Modeling with LS-DYNA** 3 - 4 April

Data protection and competition law declaration of consent:

With your registration you allow us the use and the processing of your data for seminar organization and own promotional purposes. You may at any time revoke these commitment. For this, please contact DYNAmore GmbH by phone or in writing.



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Modeling Polymers and Elastomers in LS-DYNA

For a variety of industrial applications, polymers (i. e. thermoplastics, foams and rubber materials) have become more and more important. Especially foams are widely used in the automotive industry because of their energy absorbing properties and their beneficial stiffness to density ratio. Compared to other commonly used materials, as for example, steel or aluminum, the material behavior of foams is much more complex. Rubber and glue materials are in general nonlinear elastic. Especially for rubber materials, rate-dependency and damage have a great influence on the hysteresis formation. Thus, these properties need to be considered in the constitutive material formulation. Moreover, thermoplastics exhibit a very complex material behavior ranging from viscoelasticity to viscoplasticity with fundamental differences to the properties of metallic materials.

Following this, the reproduction of the material behavior of thermoplastics, foams, glue and rubber materials within a finite-element analysis represents a challenging task for the simulation expert. The program LS-DYNA offers its users a wide range of material models that have been developed exclusively for the modeling of these materials. The choice and the application of such special material models require thorough knowledge of the theoretical as well as the numerical background.

The goal of this seminar is to provide an overview of the available material models for thermoplastics, foams, rubbers and glues in LS-DYNA and to give guidance to apply them properly. Additionally, their practical usage will be discussed and the theoretical background of these models will be presented. Also addressed will be the topics parameter identification, experimental set-up and evaluation of experimental results. Small example problems will illustrate various application cases of the material models implemented in LS-DYNA.

Content

- Presentation of various applications
- Discussion of the material behavior of polymers
- Foams: reversible, crushable and semi-crushable foams; appropriate material models; preparation of test results
- Rubber materials: quasi-static and dynamic behavior; Incompressibility; Experimental set-up; data preparation; parameter identification
- Glue materials: Structural glue, installation glue, screen glue; modeling of a glue lines; material behavior and material modeling of glue; experiments for the evaluation of material parameters
- Thermoplastics: material models for small and large deformations; experimental set-up, data preparation; validation and verification

Date: 31 March - 1 April, 9:00 - 17:00
 Location: DYNAmore Stuttgart
 Lecturer: Prof. Dr. Stefan Kolling, TH Mittelhessen
 Language: English
 Fee: 1,100 € per participant
 50% academic discount, students free of charge, provided there are vacancies.
 All prices are subject to VAT, if applicable
 Registration: www.dynamore.de/polyelasto-e



Webinar: Composite Analysis with LS-DYNA

Due to the increasing importance of lightweight construction, where the aim is not only to economize on weight but also to improve rigidity and strength, the use of composite materials has increased dramatically over recent years. If considerations are made regarding the use of such materials for crash-relevant components, the requirements of simulation tools increase enormously - especially in automotive construction. As a consequence, numerous enhancements have been implemented in LS-DYNA.

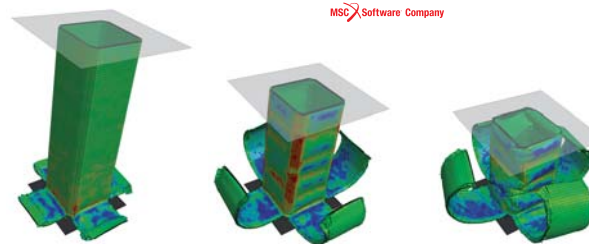
The aim of this information day is to inform participants about the state of the art in simulating composite materials. In particular, an overview of existing options in LS-DYNA for simulating composite materials is given and current developments will also be discussed. A further focus will be on the presentation of the software DIGIMAT, which allows to analyze the microstructure of composite materials. The possibility of coupling DIGIMAT with LS-DYNA will also be addressed.

Agenda

- 14:00 Login Phase
 14:10 Welcome and Introduction
 T. Klöppel (DYNAmore)
 14:20 Simulation of the Manufacturing and Serviceability of Continuous Fiber-reinforced Plastics
 T. Klöppel (DYNAmore)
 15:10 Efficient Modeling of the Process Chain for Short and Long Fiber-reinforced Plastics using DIGIMAT-RP
 J. Seyfarth (e-Xstream)

Date: 2 April
 Fee: Free of Charge
 Language: English
 Registration: www.dynamore.de/info-comp-e

In collaboration with



Introduction to Composite Modeling with LS-DYNA

Increasing requirements on resistance and durability in conjunction with weight reduction have advanced the development of composite materials very strongly within the last decades. Composites are no longer used for special applications or subordinate components, but increasingly for components in volume production. Hence, concepts are on demand to capture the complex mechanisms of load transfer and failure within numerical simulations.

A very important subgroup of "composites" consists of long-fiber-reinforced composite materials. They typically consist of high-strength carbon or glass fibers which are unidirectionally embedded in thin layers of an epoxy resin matrix.

This seminar gives an overview on potential modeling techniques of this subgroup. The strong anisotropy of these composite structures leads to a complex mechanical behavior which has to be captured in the simulation. Therefore, the available material models in LS-DYNA are introduced and discussed in-depth. Some of these models are implemented and co-developed with the support from DYNAmore employees. Furthermore, different possibilities to model the phenomena of delamination are shown. The applicability and limits are demonstrated by means of small numerical examples.

Content

- Introduction to composite materials
- Laminate theory
- Structure modeling and model assumptions
- Material modeling
 - Discussion of existing material models in LS-DYNA
 - Failure criteria of Chang-Chang, Tsai-Wu and Hashin
- Modeling of delamination
 - Cohesive-elements and tiebreak contact
- General effects by means of examples
- Visualization of simulation results with LS-PrePost

Date: 3 - 4 April, 9:00 - 17:00
 Location: DYNAmore Stuttgart
 Lecturer: S. Hartmann, T. Klöppel, C. Liebold (DYNAmore)
 Fee: 950 € per participant
 50% academic discount, students free of charge, provided there are vacancies.
 All prices are subject to VAT, if applicable
 Language: English
 Registration: www.dynamore.de/composites-e