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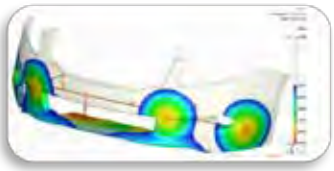
FEA Not To Miss

Software & Engineering Solutions

News, Gossip & Blog

DYNAmore Nordic



Altair

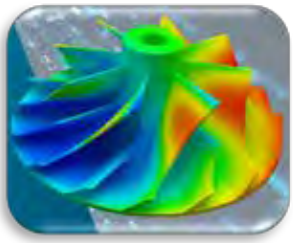
OZEN

THUMS

Oasys

Siemens

MSC.Software

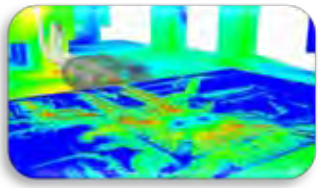


Autodesk

Cadfem

ESI-Group

ANSYS



Siemens

IBM

JSOL

FEA Not To Miss Profile

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The FEANTM publication is no fee to receive.

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FEA Not To Miss *Software & Engineering Solutions*
& News, Gossip & Blog
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Author/person who brought the article to our attention, or posting the article on social media

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Announcements

The respective website will have the larger graphics, with full resolution.
Brought to our attention:

Article - CADFEM

Memories of Dr. Alfred Zimmer, FEM pioneer and trailblazer in the automobile industry

Christoph Müller
Simulation Software and Services worldwide

Who were the brains behind simulation? Besides famous people like Swanson, Hallquist McNeal Scwendler, and many others, some well "hidden" masterminds saw the potential of simulation in automotive design when the hardware and software were still limited. At that time, not too many people believed in it. One of those persons that believed in it was Dr. Alfred Zimmer that started simulation at Mercedes in the late '60s

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The circuit editor. An ancient art now in Simcenter STAR-CCM+
By Angelo Limone

Boiler fan Rest in peace, you served me well.

YouTube Choice

An engineers perspective - episode 11

Dr. Markus Kellermeyer

Inspired by the children, simulation from the playroom! Which toy has the most aerodynamic? Motivation for young simulation talents!

Dr. Markus Kellermeyer

FEANTM Companies Not To Miss

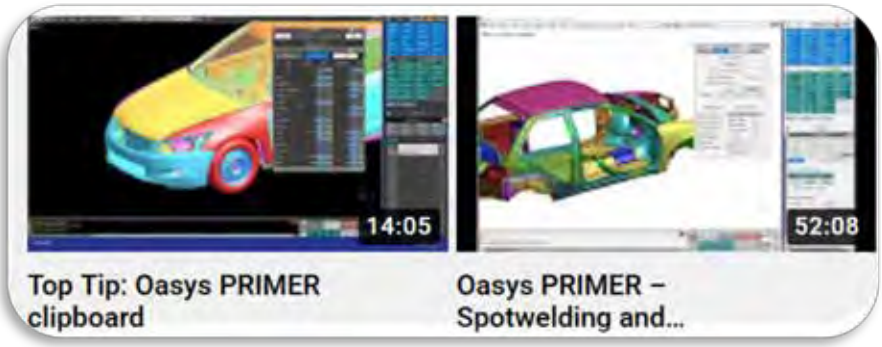
Marta Kempa, MBA - Marketing Coordinator,
Oasys LS-DYNA
&
Seppi

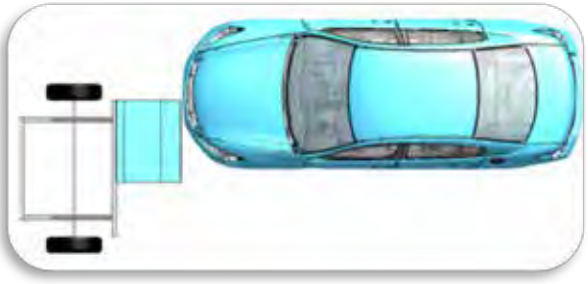
Oasys Software, Tutorials & Classes Not To Miss

View the complete on line courses, tutorials on our training page.

Introduction to LS-OPT **Apr 20 - 3 days**	**Introduction to JavaScript** **Apr 27 - 3 days**	**Oasys PRIMER Seat & Dummy Positioning and Seatbelt Fitting** **May 05 - 2 days**

Not To Miss on YouTube





Working in collaboration, Arup and Cellbond have developed a range of LS-DYNA finite element models based on the aluminium honeycomb barriers produced by Cellbond.

Introduction

These models have been developed to take advantage of the latest developments in the LS-DYNA code and are designed to provide robust and efficient analysis.

Why choose Arup Cellbond Barrier Models?

- Our calibration and validation process goes beyond the regulation barrier specification tests – we correlate our models to additional dynamic tests at component and full barrier levels.
- We have a track record with over 20 years of experience in barrier development using proven modelling techniques that demonstrate robustness and fidelity.
- The models are correlated to full speed, real vehicle tests.
- Tools and scripts for the Oasys Suite are provided with some models to fully automate post-processing of results.
- We provide expert post-sales technical support.

IIHS (Specification 2.0) Side Impact Barrier - This new specification barrier model has been developed as a Shell element model which provides a more accurate representation of the physical model. All information on the page relates to this new specification Shell element model.

The previous specification model (Solid element type) is still available and information can be found at the link below.

Upgraded Test Protocol

The specifications used for the development of the IIHS Side Impact Moving Deformable (MDB) Barrier 2.0 Specification described here have been taken from 'Side Impact Crashworthiness Evaluation Moving Deformable Barrier 2.0 Specification', Version 1, October 2020.

This moving barrier replaces the previous IIHS Side Impact Barrier developed back in 2000-2001. IIHS is now upgrading their side impact test protocol to include an updated deformable barrier (Specification 2.0) and a test setup that continues to reflect changes in vehicle types and accidents.

This new Specification 2.0 barrier has been redesigned to better represent the front-end shape of certain types of vehicles, SUVs and Pick-ups and is being introduced to make the barrier to vehicle tests more representative of real-life vehicle impacts. Planned introduction for the new test protocol is 2022.

Validation

The LS-DYNA model calibration has been done using the test data provided by Cellbond for three different impact conditions. The tests involve the barrier on a trolley impacting a vertical impactor, offset vertical impactor and a flat wall. The force-deflection curves for the barrier (generated from analyses and tests) have been compared.

Additionally, material testing has also been performed to define the material models for the different parts of the barrier. The barrier model has also been tested against a full vehicle model to calibrate its behaviour under regulation conditions.

This validation work has been carried out in both SMP and MPP versions of LS-DYNA R12.0.0 to ensure performance and accuracy.

Specifications

Element Type	LS-DYNA Release Version	Total Number of Elements	Timestep	Regulation Test	Regulation Speed
Shell	LS-DYNA 971 R12.0.0 SMP/MPP	1239920	1.0E-6	IIHS Side Impact Tests	60kph

Author: Christian Frech christian.frech@dynamore.de

Save the date!

13th European LS-DYNA Conference
October 5-6, 2021, Ulm, Germany

Conference Website: www.dynamore.de/en/conf2021

Invitation: We very much hope for a normalization of the situation and that we will be able to welcome the LS-DYNA users personally at a conference again next fall. We kindly invite all users of LS-DYNA, LS-OPT, and LS-TaSC to the 13th European LS-DYNA Conference at October 5-6, 2021 in Ulm, Germany. As usually the conference will be a great opportunity to talk with industry experts, catch up with colleagues and enjoy time exploring new ideas. In addition, attendees can meet with exhibitors to learn about the latest hardware and software trends as well as additional services relating to the finite element solver LS-DYNA, the optimization codes LS-OPT and LS-TaSC, and the pre- and postprocessor LS-PrePost. Training courses and workshops will also take place in the week before, during and after the conference.

Venue: The Congress Centrum Ulm is located directly on the river Danube. The city is best known for its cathedral, the highest church tower in the world and for being the birthplace of Albert Einstein.

Ulm is located directly on the A7 and A8 motorways and can be easily reached from Stuttgart and Munich airports.

Address: Basteistraße 40 89073 Ulm
Telefon: +49 731 922990
Telefax: +49 731 9229930 www.ulm-messe.de

Abstract submission

Please submit your abstract (maximum length 2,500 characters)
by E-Mail to conf@dynamore.de or online at: www.dynamore.de/en/2021-abstract

Important Dates

Abstract submission:	May 28, 2021	Author notification:	July 9, 2021
Paper submission:	September 3, 2021	Conference date:	October 5-6, 2021

Participant fees

Industry speaker:	420 Euro
Academic speaker:	360 Euro
Industry:	640 Euro[1)] / 690 Euro
Academic:	490 Euro[1)] / 540 Euro

[1)] Registration before 30 June 2021. All plus VAT.

Exhibiting and sponsoring

Please request further information.

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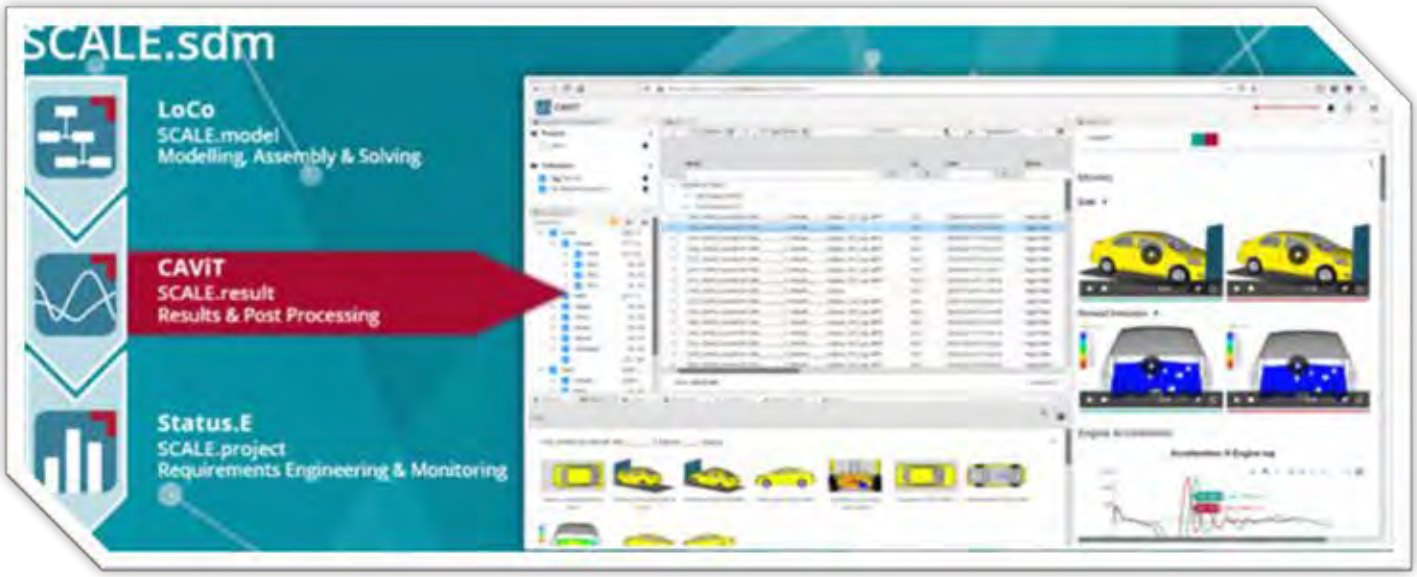
www.dynamore.de/en/conf2021

Conference Website: www.dynamore.de/en/conf2021

CAViT - SCALE.result



Post Data Management of Test and Simulation Results

- Visualization of test and simulation results
- Evaluation, reporting and export
- Intuitive user interface with customizable layout and functionality

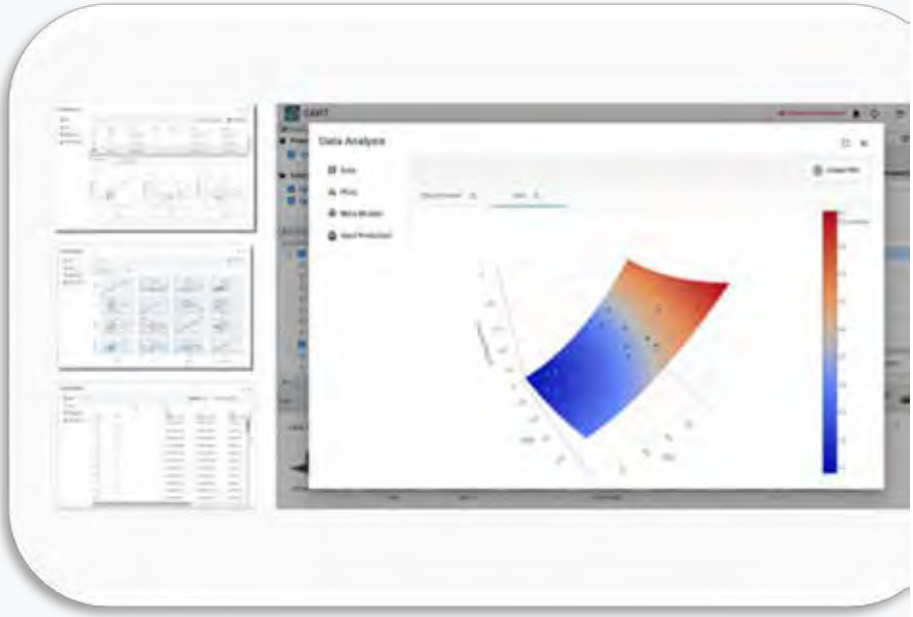
Reporting - Evaluate, Assess and Compare

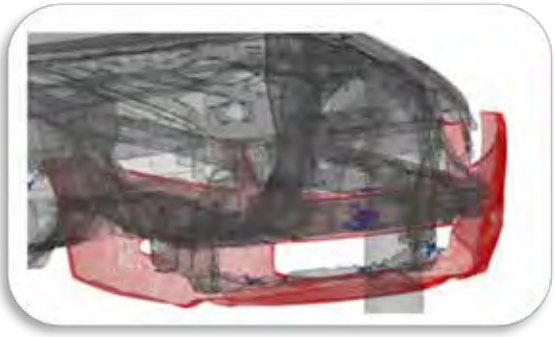
- Rich, attractive and complex report documents
- Export to Excel, PowerPoint, PDF etc.
- Interactive evaluation directly in the application

AI based Data Analysis

Visualization and Analysis of the Data with ML methods

- Scatter and surface plots
- Approximation and prediction with neural networks
- Outlier detection





Short Fiber Reinforced Plastics

Case study: Verify the strength of thermoplastics components with LS-DYNA and Moldex3D

Strength evaluation before manufacturing - is that possible?

Short fiber reinforced thermoplastics have been used since the middle of the last century, but calculating these parts' structural strength has been a challenge. It turns out that to get accurate predictions of the material strengths, one needs to account for the fiber orientations. The orientations will, in turn, depend on the injection molding process. To solve this problem, DYNAmore offers a complete simulation software solution to verify the strength of the final component before manufacturing any tooling.

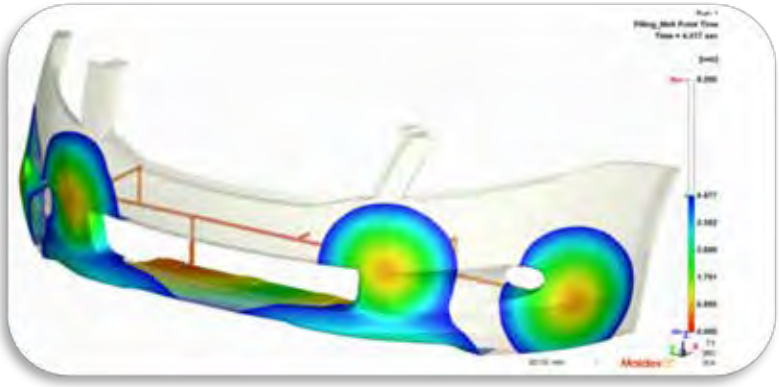
Why numerical simulations?

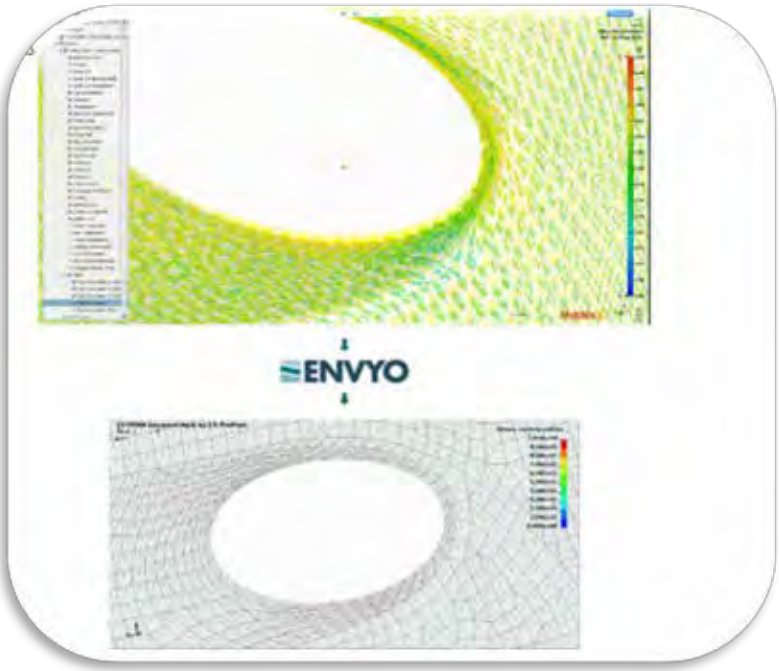
Our primary software tool LS-DYNA has always been committed to representing the actual physics of structural problems to an increasingly higher level of detail. Even though advances in numerical solution techniques makes it technically possible to do this, why should one bother? Well, the reasons for performing simulations for your products are several. Some of the most common reasons we encounter in our daily work with customers are

- understanding poor (or good) product performance
- establishing which parameters that are important to control in your process, i.e., that influence the product performance
- a virtual copy (or a digital twin if you like) of your process and product, facilitates studies of changes and improvements to the product, without potentially costly experimental studies, including manufacturing of new tools or molds
- optimization of product performance is made possible

Our technical solution – Case study: polymer bumper front - Here we demonstrate our solution for a bumper front. There are several strength requirements on the bumper front, but we will look at an impact test. The bumper front is a large fiber-reinforced component, which requires big and expensive tooling.

Step 1: Injection molding simulation of the bumper in Moldex3D - To assess the orientation of the fibers in the final product, start by performing an injection molding simulation in Moldex3D. It is a powerful tool and yet easy to use, considered a market leader for plastics molding simulation and fiber orientation prediction in injection molded parts [1].





Visit website to view simulation videos

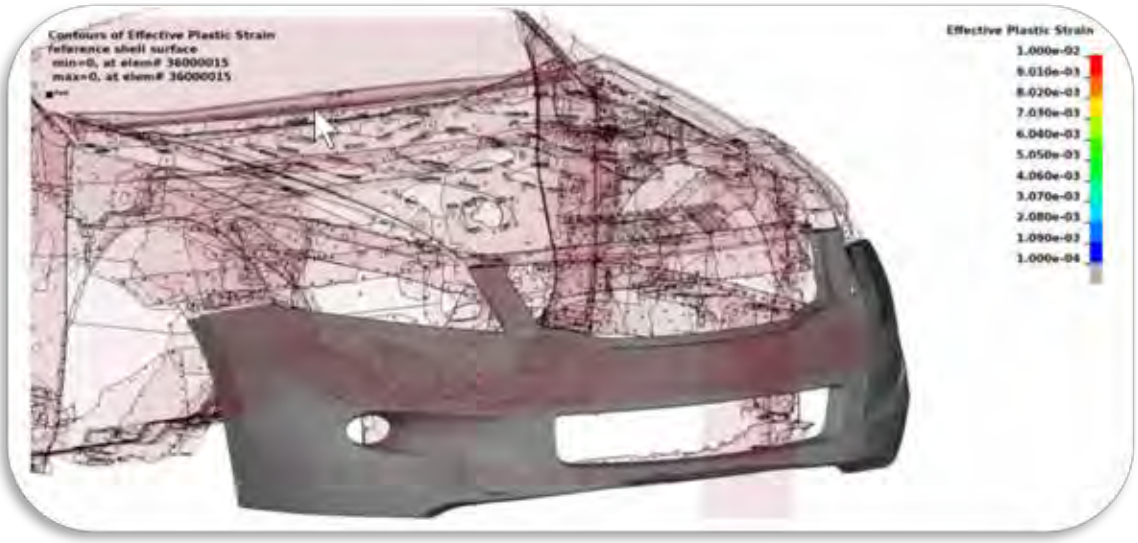
Step 2: Utilising the injection molding simulation results

Several alternative ways to make use of the fiber orientations in the subsequent LS-DYNA model exist. Based on our experience, we have two preferred ways of working. One way is to work with Digimat, an add-on material modeling software from e-Xstream. You can couple Digimat to LS-DYNA in simulations, and all the files needed by Digimat can be output directly from Moldex3D.

Another option is to use the mapping software Envyo® from DYNAmore. Fiber orientations, including possible weld lines from the injection molding process, can be mapped to existing shell or solid meshes in your LS-DYNA model. You can also perform homogenization of material properties when applicable. For the following structural analyses, we recommend the LS-DYNA material models that support anisotropic elastic and plastic behavior due to the fiber orientations, e.g., *MAT_OPTIONTROPIC_ELASTIC, *MAT_ANISOTROPIC_ELASTIC_PLASTIC, and *MAT_4A_MICROMEC.

If you are already using another software than Moldex3D for the injection molding simulations, Envyo also has interfaces to other software.
Step 3: Using LS-DYNA to check the bumper performance for the impact load

After mapping the fiber orientation from the Moldex3D analysis using Envyo or Digimat, the LS-DYNA vehicle model now includes a bumper containing mapped fiber directions. The pole impact simulation is performed as usual, illustrated in the figure below, and the verification of the bumper's performance can take place.



Visit website to view simulation videos

To learn more - Simulations have time and again proven to be a cost-effective product development tool that avoids costly tooling redesign. We have the software and knowledge required so that you may learn to perform these simulations yourself. We will guide you all the way, including training and support. To learn more, please contact one of our technical experts listed on this page.

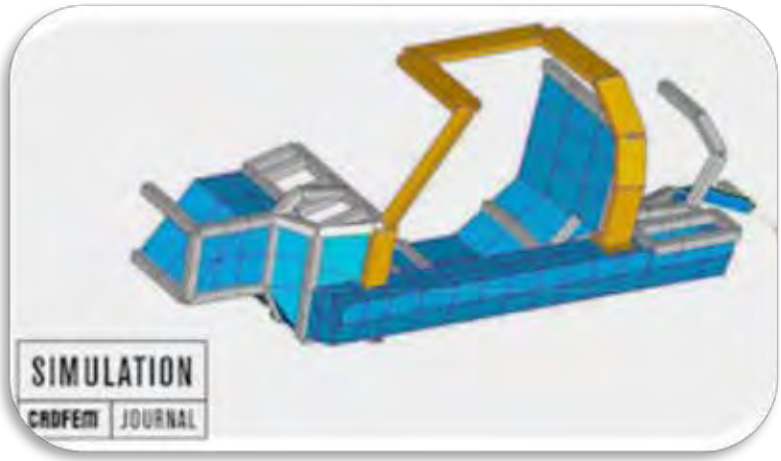
[1] Kunc, V., Warren, D., Yocum, A., Wu, F., 2017, “IV.3 Predictive Engineering Tools for Injection-Molded Long Carbon Fiber Thermoplastic Composites – Oak Ridge National Laboratory”, LIGHTWEIGHT MATERIALS FY 2016 ANNUAL REPORT, U.S. Department of Energy, Troy, Michigan, September, 2017, pp. 125-141.

The car used in this demonstration is a modified version of the publicly available Honda Accord model, provided by NHTSA, https://www.nhtsa.gov/crash-simulation-vehicle-models.

Note: This is an abridged version of an article by Klaus Zimmer, Alfred Zimmer's son

Who were the brains behind simulation? Besides famous people like Swanson, Hallquist McNeal Scwendler, and many others, some well "hidden" masterminds saw the potential of simulation in automotive design when the hardware and software were still limited. At that time, not too many people believed in it. One of those persons that believed in it was Dr. Alfred Zimmer that started simulation at Mercedes in the late '60s

Memories of Dr. Alfred Zimmer, who would have been 100 in 2020
FEM pioneer and trailblazer in the automobile industry



At the end of the fifties, the development of the finite element method (FEM) started behind closed doors at Daimler-Benz. This inaugurated an exciting era which is well worth illuminating even more than 60 years later, for Dr. Alfred Zimmer's ideas revolutionized Daimler-Benz's design process.

When it came to computers, companies were at a loss

Dr. Alfred Zimmer was a pioneer and trailblazer when it came to applying the finite element method to automotive development. He thus became a prime mover for many other sectors, such as civil engineering, bridge construction, crane design, shipbuilding, metal construction, and medicine, to name but a few. Even in the early sixties, it was only the aerospace industry that was employing FEM analysis.

In those days, people were still working on Saturday mornings. So, IBM chose Saturday afternoons as the time when they would offer initial training courses to folks interested in computers. These courses, which were paid for by the trade union, took place in Sindelfingen (in the "small tower block"). The first mainframes, IBM 650s, were at the disposal of these willing pupils.

Big companies had only a scant interest in their employees attending this type of training course. When it came to computers, they were initially at a loss. At the Daimler-Benz factory, Dr. Zimmer was told in no uncertain terms: “We make automobiles here – not computers.” Not only that: people thought that “four mainframes” would be sufficient to cover the needs of German industry for a long time to come. How wrong they were!

At the time, the use of electronic computers was reserved for the big university-based research institutes, whose level of accomplishment by 1965 can best be illustrated by looking at The Aerospace Institute (the home of Prof. Argyris) – Stuttgart University was then known. It was at this time that, while working in Daimler-Benz’s preliminary development department, the computational engineer, Dr. Alfred Zimmer, whose background was in civil engineering, started writing a calculation program for space frames, which he called “frame calculation” (FC). At Daimler-Benz, the first scientific computer to be used in engineering, the IBM 650, had just been replaced by its successor, the IBM 1620.

An IBM 650 computer at Texas A&M University (Source: Wikipedia)

Fabulously-specced memory – with a capacity of 6 kilobytes

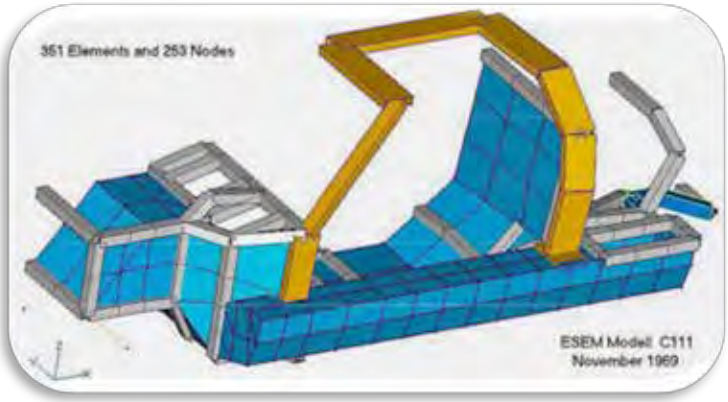
This new tool – an all-transistor, assembler-programmable system with a fabulous 6-KB memory – worked with a punch-card paper-tape-reader and a tabulator. The FC program endured a double baptism of fire. The first was in connection with calculation of the frame floor of the W 100 (the legendary Mercedes-Benz 600, built between 1964 and 1981). On its debut, following a ten-hour calculation period, the results were so accurate that the test department that had carried out the measurements assumed they were the result of data theft. The second important field test had to do with the journey of the British queen, Queen Elizabeth II, together with her husband, Prince Philip, during a state visit to Munich in 1965, during which she used the new W 100 official state car, the 600 Pullman Landaulet, which had been analyzed using the new FC program.

Starting in 1963, the first vehicle body calculations were carried out using a mix of bar elements and surface elements. The first of these was the Auto Union F 102, at a time when Auto Union still belonged to Daimler-Benz. In order to obtain additional comparative values, a subsequent calculation was performed for the “Mercedes-Benz 230 SL” W 113 sports car. This, above all, involved the trial and subsequent rapid, successful adoption of the shape optimization method for rigidity design – the purpose of which is to reduce weight – that is still in use today, based on the body deformation analysis method. This same method was also applied to the first bus.
A vehicle body model with 319 nodes and 443 elements

Dr. Zimmer, together with six other programmers, developed the ESEM (elastostatic element method) FORTRAN program for the IBM 360. The first important application of ESM came in 1967, during development of the W115 (the MB 200-240 D). The model used for this vehicle – calculated using half a vehicle, due to the reduction in calculation time – had 319 nodes, 443 elements, and 1,684 degrees of freedom. The entire roof consisted of six quadrilateral elements and four triangular elements. The software was only deployed about a year prior to the start of serial production, when difficulties were being experienced in the test department in connection with the vehicle.

In the fall of 1969, the calculation department led by Dr. Alfred Zimmer was given the task of analyzing the body of the Wankel-engined C 111 during the course of its development. As no drawings were initially available, all they were getting from the board of management was specifications: “…with gull-wing doors, roll bars, propulsion via a three or four-rotor Wankel engine mid-mounted behind the driver, with tanks in the outer sill.” From this starting point, the team defined the axle and the wheelbase and also the height of the vehicle. After that, the calculations relating to the design and construction of the vehicle were initiated, giving due weight to the technical constraints.

Completing the prototype C 111 only took another six months.



The ESEM model of the C 111 containing 351 elements and 253 nodes

Dr. Alfred Zimmer watching closely the C 111 sports car model at the Daimler-Benz exhibition, which was a milestone in automotive history, calculated with the legendary ESEM program of 1969.

Dr. Zimmer's groundbreaking approach makes it onto German TV

This groundbreaking approach was complimented by a lavishly produced film commissioned by IBM's marketing department. Dr. Zimmer was invited to the studios of the German TV station ZDF, in Mainz, so that he could tell other people about his methodology. IBM was intending to use this film, "The Car that Came Out of the Computer" – which was dubbed into both English and Spanish – to boost the sales of its computers.

IBM showed the film to American car-company managers, with the result that the finite element method became a standard tool for automotive manufacturers. During this period, Dr. Zimmer was engaging in a mounting number of lecture tours in England, Scandinavia, and the USA. In the early seventies, head of the calculation department of the automobile predevelopment, Dr. Zimmer had about 30 colleagues who, in addition to ESEM, were using FEM-based standard software such as ASKA, NASTRAN, and also TPS10 – a successor system which had been developed by the ESEM development team. Dr. Zimmer's ideas set in motion the systematic application of the finite element method in the sphere of automotive development throughout the world.

“Passive safety” – crash protection and occupant protection – plays an important role at Daimler-Benz. FEM simulation has meant that the number of real-world crash tests has been reduced to a minimum, which has saved automobile companies considerable time and a great deal of money!

CADFEM Users’ meeting in Dresden (from left to right):

- Guenter Mueller (CADFEM),
- Werner Dirschmid (former AUDI),
- John Swanson (former SASI/ANSYS),
- Alfred Zimmer (former Daimler-Benz)
- John Hallquist (LSTC/ANSYS)

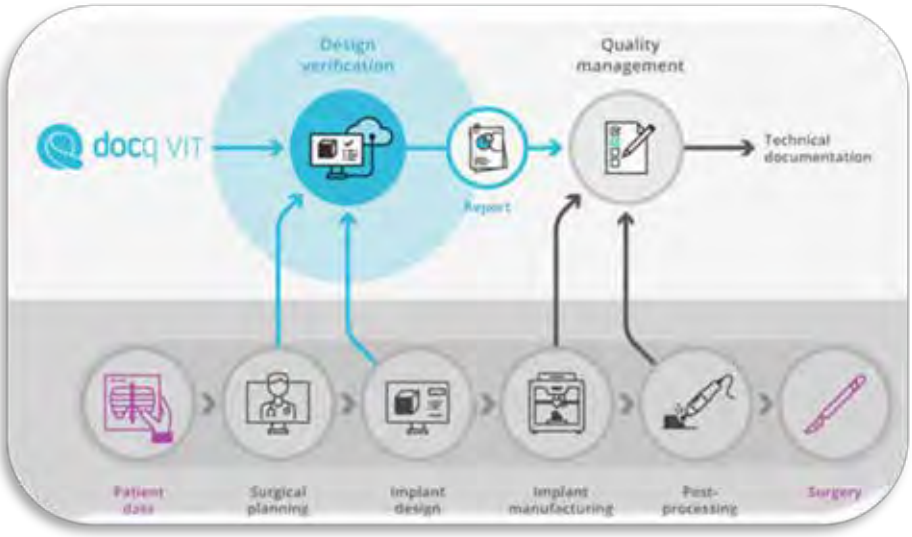
This Article is an abridged version of an article by Klaus Zimmer, Alfred Zimmer’s son …

CADFEM Medical

CADFEM Medical is a certified simulation service provider and software manufacturer in the field of medicine and medical technology and is considered a pioneer of in silico medicine.

docq VIT = virtual implant testing with simulation - one software, countless possibilities -

docq VIT is the first easy to use software for the digital verification of patient-specific implants. By virtually applying physiological or standardized loads to a patient-specific situation, the performance and safety can be checked quickly and efficiently using objective criteria.



Comes into effect exactly where decisions are made

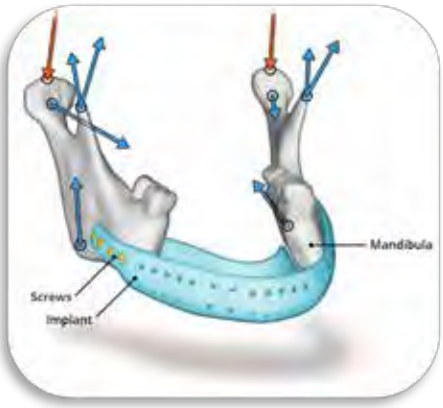
Production Process of Custom Implants

docq VIT Features

- Simulative testing of custom implants with predefined workflows
- Support for decision making in the design process
- Selection of different workflows within the software for different implant types and anatomical regions
- Creation of additional workflows for manufacturer-specific implant types
- Representation of the effective loads and forces on the custom implant
- Automated report generation based on FDA guidelines for the technical documentation

docq VIT Workflows

- **Mandibula** - This workflow was developed for the anatomical region of the mandible to simulate the muscle and joint reaction forces in interaction with an individual implant restoration, thus generating valuable information on strength and safety for both doctor and patient.
- **Thorax** - Due to the very complex thoracic movements, up to now it was difficult to design necessary restorations of the osseous structures with implants precisely and according to the effective loads. This workflow within docq VIT creates a new approach and, at the same time, more safety for the patient.
- **Maxilla** - Upper jaw implants have been used successfully for many years. However, the patient-specific production that is possible today requires precise verification. docq VIT in conjunction with the MAXILLA workflow was developed precisely for this purpose and answers questions regarding the strength and safety of individual restorations.



docq VIT Example Jaw Implant Simulation How it works

Step 1 Simulation setup

Registration and application of loads

Regardless of the implant type, patient geometry and reference geometry are first positioned or registered in relation to each other. This is done using a few predefined landmarks with the assistance of the software. The patient-specific situation oriented to the reference is then complemented by load scenarios from a library available in the software, so that the actual testing can be performed by means of simulation.

Step 2 Implant testing with simulation

Simulation of the patient-specific case

The actual simulation takes place in the background via a direct connection to a cloud-based ANSYS computing environment or, alternatively, the customer's own infrastructure. ANSYS is world market leader in the field of numerical simulation and the industrial standard. The data transfer is always encrypted and complies with medical safety requirements. Within docq, all this is just a push of a button.

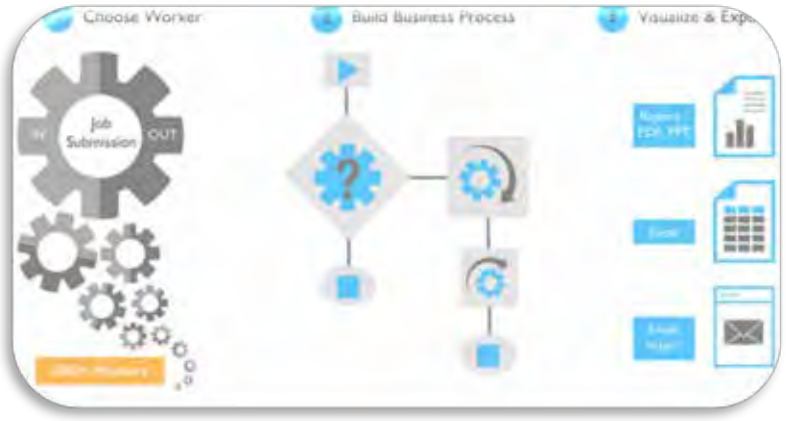
Step 3 Evaluation and reporting

Visualization of results and evaluation in docq

The simulation results are visualized in docq in comparison with the physically tested reference restoration for each patient, allowing the selection of the optimal implant design in combination with maximum safety and strength. Due to the comparable inputs, a report can be generated fully automatically for each patient in accordance with FDA guidelines (Guideline 1807). These reports can be used for the technical documentation and can be adapted to customer-specific requirements.

Alexander Volf / Product Lead docq VIT
For all questions concerning docq VIT
info@cadfem-medical.com

Workflows -
Simplifying Complex Business Processes



Increase Your Productivity With Workflows

Workflows aims to make complex business tasks more efficient by facilitating the process.

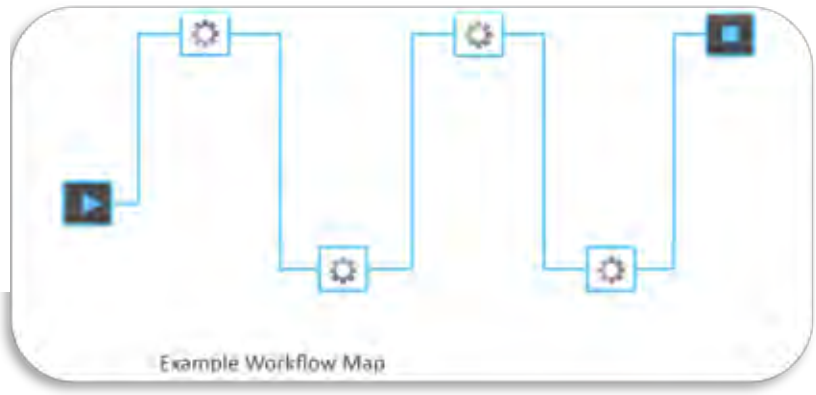
You can prepare a model, simulate it using on-premise or cloud resource, monitor during solution, perform data-extraction, and optimize with a simple intuitive workflow builder.

With the ability to save, reuse and share workflows, spend less time on manual execution and

Create Your Flow

Set up workflows by linking up workers to perform specific operations.

Choose from an array of inputs to help define your workers.



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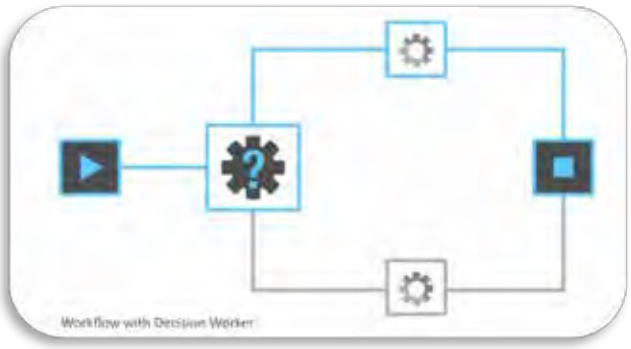
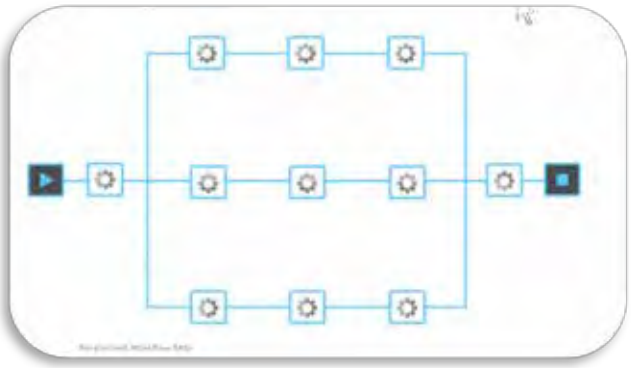


A World of Workers - Utilize the worker library of over 800 workers which you can filter through easily.

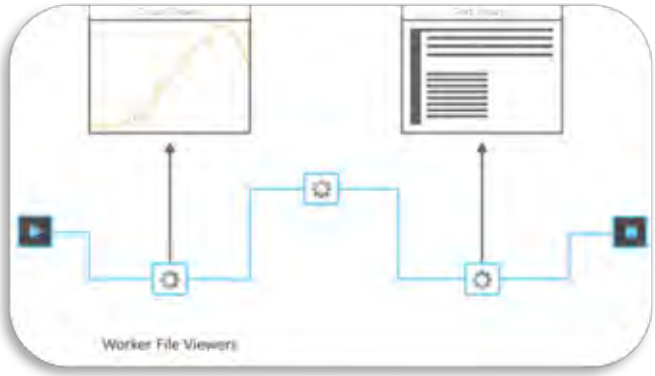
Explore an array of mathematical and scientific workers to help with your data.

Employ decision workers based on a provided decision matrix to powerfully resolve functions, auto optimize tasks and store previous results.



Flow Faster - Run multiple workers in parallel under the same workflow to help speed up execution or process multiple simulations simultaneously.

Clone workers, duplicate workflows and even import a JSON workflow file to increase efficiency.



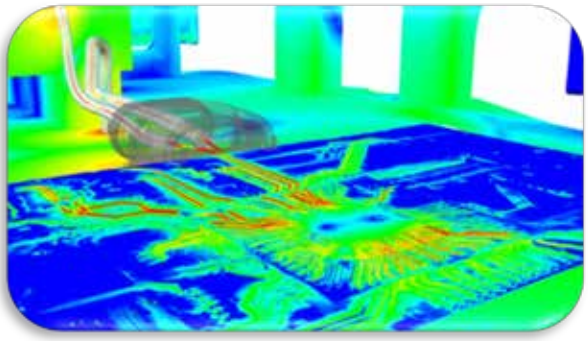
Review Your Flow - With Workflow's built-in data viewer, you can study and overlay curves from different workers; view, overlay and analyze images using the image comparer; or visualize and explore charts and datasets related to your workflow.

You can also review configuration and execution logs as well as your file inputs.

R**eview Your Flow -** With Workflow's built-in data viewer, you can study and overlay curves from different workers; view, overlay and analyze images using the image comparer; or visualize and explore charts and datasets related to your workflow.

You can also review configuration and execution logs as well as your file inputs.

Build - Execute - Review - Share



Solving Larger, More Complex Systems Using Ansys 2021 R1

by Shane Emswiler

Ansys 2021 R1 delivers groundbreaking enhancements in the electronics suite.

It seems to be a law of engineering that systems tend to get more complex over time. What starts as a single component is soon interacting with other components mechanically or electronically as a system, and then individual systems interact on a larger scale of increasing complexity. This is certainly happening in the fields of 5G communications, autonomous vehicles, the electrification of cars and aircraft, and the internet of things, among others. Engineering tools must expand their capabilities to keep up with these trends.

Ansys 2021 R1, our latest software release, gives you the power and capabilities to handle this complexity challenge. By keeping in close contact with all industries, we are able to anticipate their needs and incorporate changes into our simulation software so you have the tools you need when you need them.

In Ansys 2021 R1, this means we have enhanced the power and functionality of the Ansys Cloud so you can use high-performance computing (HPC) on-demand to increase the number of cores available to solve larger challenges in record time. For example, the introduction of Ansys HFSS Mesh Fusion simulation technology in this release makes it easy to simulate entire electromagnetic systems at once, like the electromagnetic transmissions of an entire room, with the help of Ansys Cloud.

Announcement - ANSYS Simulation World 2021

Bhoomi Gadhia
Product Marketing Manager at Ansys, Structures | LS-Dyna and Ansys Motion

Simulation World 2021 is designed to inspire and educate executives, engineers, R&D and manufacturing professionals about the transformative powers of engineering simulation.

Please visit the ANSYS Blog - among the features are:

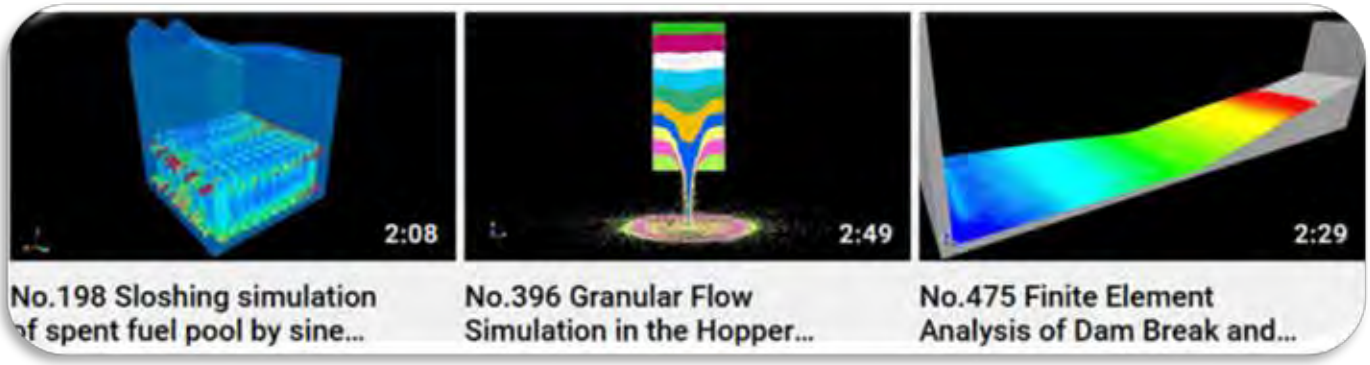
Electromagnetics

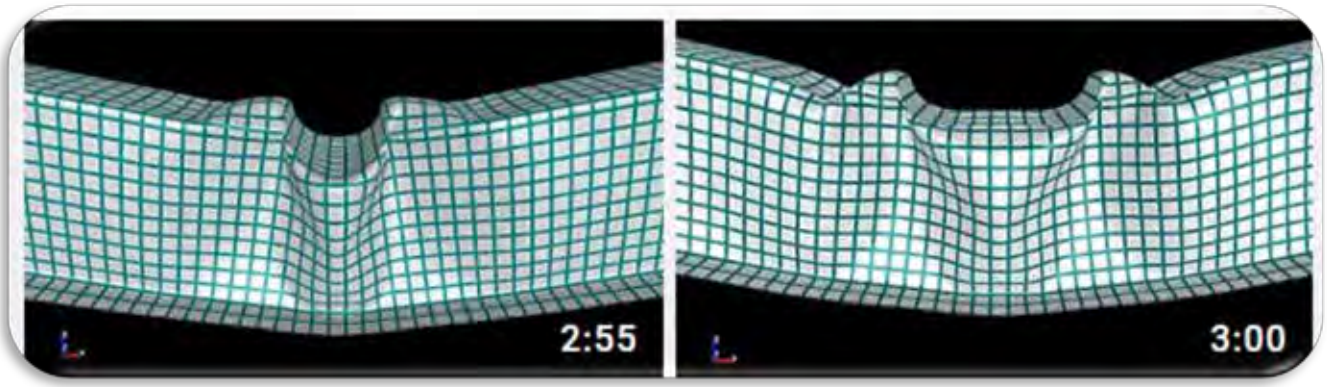
Altair software is used across industries to solve a broad range of electromagnetic problems from static to low and high frequencies.

Whether your application requires multiple frequency and time-domain techniques with true hybridization to enable the efficient exploration of a broad spectrum of electromagnetic performance, other the simulation of magneto static, steady-state and transient conditions, we have the tools you need.

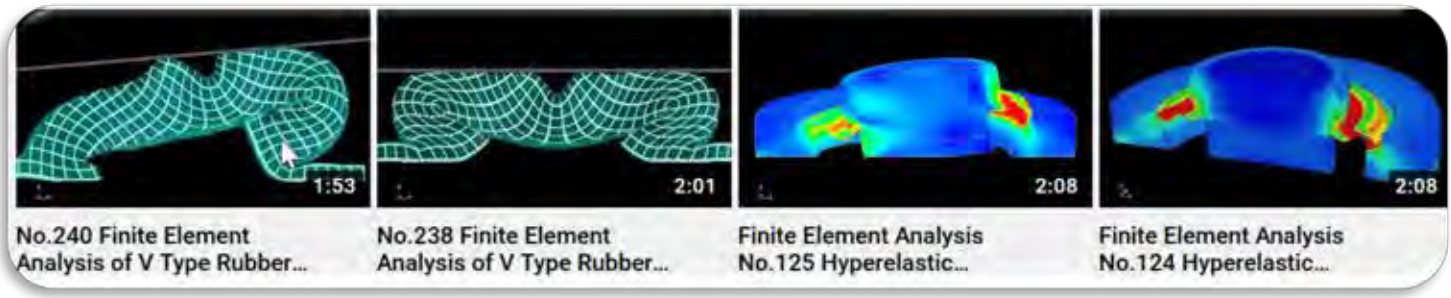
Among the Electromagnetic products - Visit the Webpage for full product list

YouTube - LANCEMORE





No.265 FE Analysis : Dynamic Three Point Bending Test Analysis of a Hat Channel
No 264 FE Analysis : Dynamic 3 Point Bending Test Analysis of a Hat Channel /



The advanced CAE pre-processing software for complete model build up

ANSA is an advanced multidisciplinary CAE pre-processing tool that provides all the necessary functionality for full-model build up, from CAD data to ready-to-run solver input file, in a single integrated environment.

ANSA is the users' preference due to its wide range of features and tools that meet their needs. The list of productive and versatile features is long and the alternative tasks and processes to be completed using them are countless.

Environment

All software features are accommodated in an integrated environment, with highly customisable GUI. The software is available for all contemporary popular operating systems in 32bit and 64bit architecture with multi-core CPU usage. The accelerated graphics, the rapid confirmations and function access, the GUI customisation options, the model browser and lists handling, the filtering and modification operations, and the integrated search engine comprise a user friendly environment that ensures outstanding performance and productivity.

CAD data input & clean up - CAD definitions and model structure data in CATIA V4, CATIA V5, NX, Pro/ENGINEER and JT formats can be converted into ANSA files using the available translators. Moreover, custom interfaces to PDM or SDM systems, powered by scripting, bring product and model structure data into the heart of the software.

CAD geometry can be also read in from neutral file formats (iges, step, vda-fs), manipulated and healed by the proprietary powerful built-in geometry engine. A wide range of geometry healing functions, including those for the generation of neutral fibers, deliver geometry descriptions ready to be meshed.

ANSA data management

ANSA Data Management (ANSA DM) is a centralized data management system, used to collect and store in a structured and hierarchical form all engineering data that are used during the development process of a vehicle simulation model. It assures the effective and efficient data handling throughout projects, by streamlining updated model data to engineering teams, allowing the easy sharing of common data and offering access to library items for the analysis dependent solution settings. The DM Browser, moreover, allows the browsing of the DM Root to identify the available CAD versions, study versions and representations for comparison and model update.

Model Comparison and update

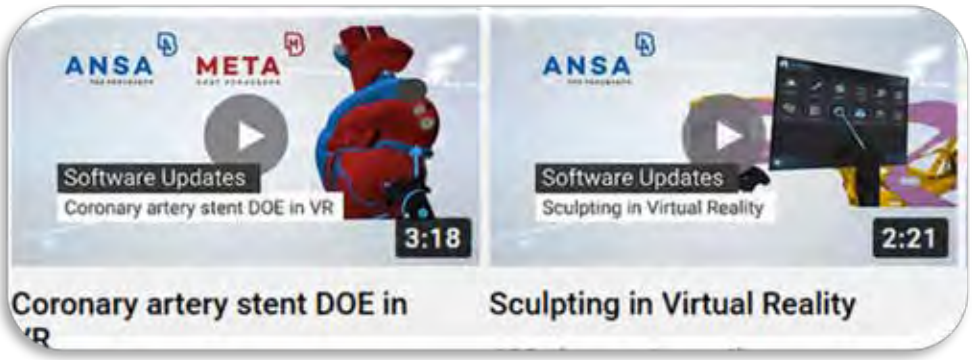
An integrated tool that compares two models in order to identify differences in geometry, attributes, solver-specific definitions, as well as connections. User friendly navigation and identification features are provided while a complete or partial replacement can be performed, updating the model according to user directions.

Process Automation

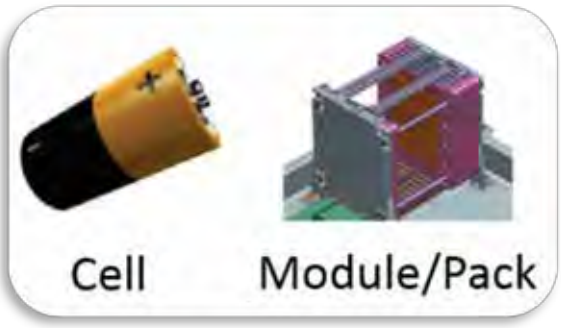
Task Manager and scripting language provide a unique modeling solution for automated and effective applications.

Task Manager is an integrated workflow manager that includes all individual tasks of a simulation model development. The process template is built up by the CAE expert who sets the boundaries between distinct modeling actions and predetermines all modeling parameters that must be respected, leaving to the inexperienced user a minimum degree of interference and limited decision making.
The scripting language is an enhanced programming tool that boosts productivity providing the power to access data and perform custom operations in an automated way.

Full Information is located on the website - The advanced CAE pre-processing software for complete model build up



[BETA CAE Systems YouTube Video Channel]



Battery Solutions: Battery Management System (BMS)

February 18, 2021/in Battery Solutions /by ozen

Battery Management System (BMS) is crucial to battery pack safety and performance.

BMS is batterie's control center and keeps cells within specified operating range and shuts off battery when safety issues are detected. Software & hardware work in tandem to monitor battery performance and usage. BMS impacts weight, mechanical and thermal subsystems and requires compliance to Functional Safety Standards such as ISO 26262 (ASIL C, D). Ansys solution is to use Medini, SCADE and Twin Builder in tandem to develop the BMS in a very efficient way as the following

- Using Ansys Medini for Safety analyses i.e. FTA, FEMA and HARA
- Ansys SCADE to connect safety requirements to generate a compliant code (Model Based)
- Using Twin Builder to do Physics-Based Battery Simulation

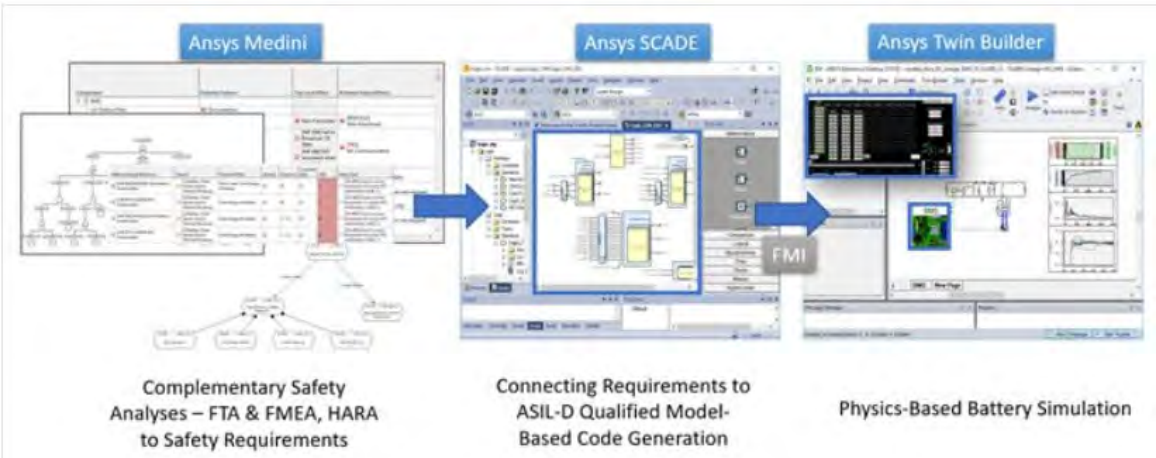


Fig. 1) Steps of developing and testing BMS using Medini, SCADE and finally Twin Builder

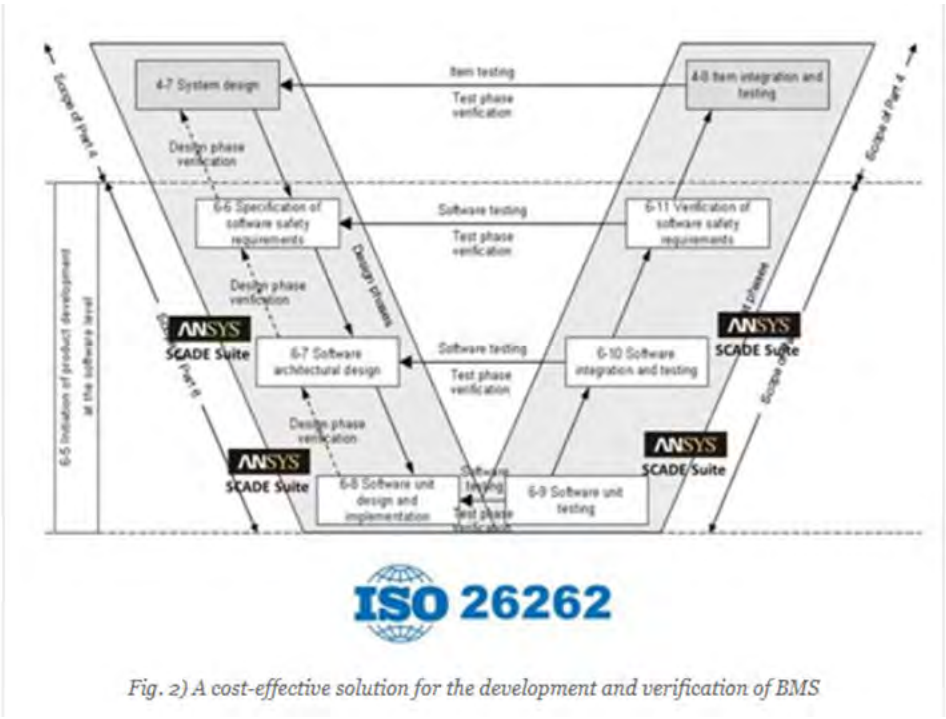


Fig. 2) A cost-effective solution for the development and verification of BMS

Fig. 2) A cost-effective solution for the development and verification of BMS

The benefits of using Ansys method can be listed as below:

- ANSYS Medini supports all Functional Safety Activities for ISO 26262
- ANSYS SCADE flow supports all software development activities for ISO 26262, ASPICE, AUTOSAR
- The gains of the approach are 40% to 50% of cost reduction demonstrated on user cases
- 2x Increase in time to market: Early detection of flaws, automated production of readable, portable, high performance and high-quality codes, and improved long-term maintainability

Learn more about battery simulation solutions on our [Battery Solutions webpage.]

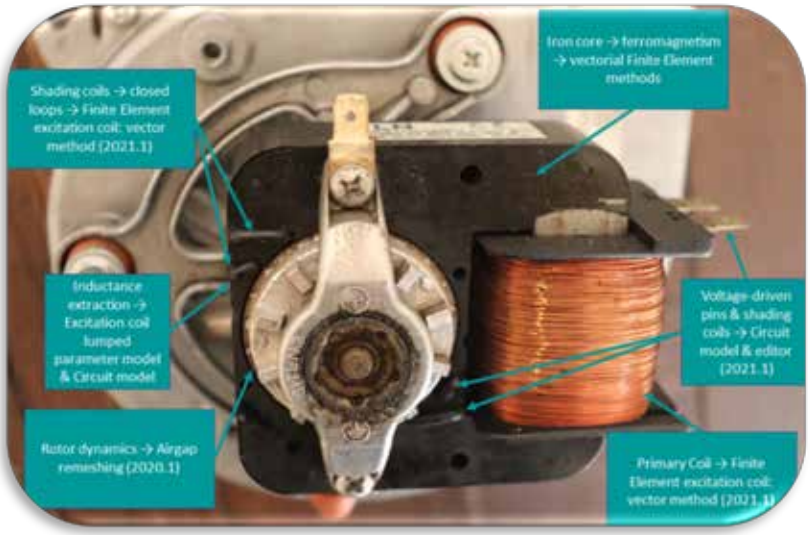
[YouTube Videos]

[The circuit editor. An ancient art now in Simcenter STAR-CCM+]
By Angelo Limone

"Boiler fan Rest in peace, you served me well."

A couple of months ago I faced a hilarious surprise: my boiler broke. It refused to fire up, no matter what. The temperature in my home plummeted down to 7 °C. I had to take part in work videoconferences wearing a scarf and hat, with the occasional colleague (rightly) making fun of the situation. My numb fingers produced a spectacular number of typos-per-sentence. And, on top of all of this, the gym and the office (for a hot shower) were inaccessible due to the national lockdown. A disaster!

This “tragicomic” experience was eventually ended by my plumber Jorden finding the culprit: the boiler fan (picture above). If you read my previous blog you will know that I tend to see the world a bit through the eyes of Simcenter STAR-CCM+. So when Jorden grievously passed me the dead body of the fan, all I could see was literally the following:



Close-up of the electric motor of the fan. And how Simcenter STAR-CCM+ sees it

From the autopsy I could tell that this fan was a single-phase electric motor, technically a so-called shaded-pole motor. A simple, clever (and 133-years-old) idea still used today. To have an idea of its working principles, take a look at this video.
Have fun with the fan

I bet that one of the first foundation tutorials you ever had with Simcenter STAR-CCM+ was the setup of the CFD of a blower fan (refresh your memory here). However what if you were interested in also adding the electric motor to the computational fluid dynamics (CFD) simulation and the mechanical part?

View video on the website article - The circuit editor. An ancient art now in Simcenter STAR-CCM+

By AngeloLimone

The 3D CAD of my motor, in all its glory. I didn't know how to include the greasy dirt though.

The endeavor to electrify the world is quite challenging, we know. Let me show you how we can support you by sharing that burden. With Simcenter STAR-CCM+ 2021.1, we have introduced a graphical electric circuit editor and we have improved the Finite Element (FE) excitation coil model. The digital twin of the electric car you are working on will benefit from those new features. You will spend less time setting up your simulation, the coil currents of your e-machine will gain robustness and realism. You will be able to model any 3D shape of your coils. Last but not least, you may be able to drastically reduce your simulation turn-around time.

And maybe you will be able to improve the durability of your boiler (very important, believe me).

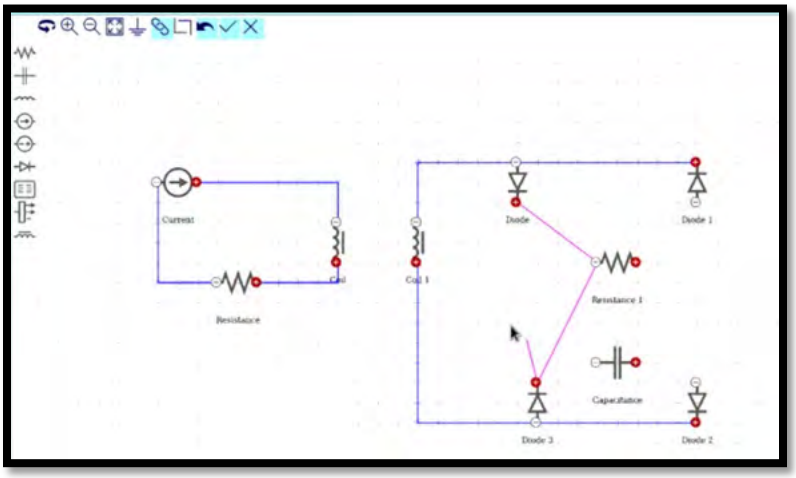
The electric circuit editor

Electric circuitry with its graphical incarnation is an old art. Its foundation theorems date back to more than a century ago thanks to pioneers like Ohm, Helmholtz, Kirchhoff, Norton, Thevenin and Meyer (who was, by the way, a Siemens researcher and the anonymous protagonist of a mind-blowing episode of World War II). Well, we didn't want to miss the opportunity of empowering our users with this well-established technique. A new electric circuit editor allows you to graphically set up, interpret, inspect or modify your electric circuits.

Gone are the days when you had to set up your electric circuit from within the simulation tree. From now on you will create your circuits in a circuit editor with fewer clicks. The setup will be less error-prone. You will be able to finally focus on the important details of your simulation.

All you need to do now is to place the circuit element symbols on the canvas and connect the desired terminals. Maybe play with the layout a little bit. And don't forget to place a ground (safety first!)

"The new network sketcher in Simcenter STAR-CCM+ 2021.1 greatly simplifies the setup of complex circuits" - Development Engineer, LS Electric



View video on the website article - The circuit editor. An ancient art now in Simcenter STAR-CCM+

Circuit setup with the new electric circuit editor

The Finite Element (FE) excitation coil model

Are you analyzing and simulating a novel wheel hub motor? Let me guess, it's an axial flux machine, one of those that are very short and compact, with great torque density and high power density. And tell me, I suppose you need to model the typical axial flux machine's closed coils.

Or maybe you 'just' needed a simple way to model stranded coils with any 3D shape in presence of ferromagnetic materials and you can't do it with a Finite Volume approach. Yeah, I know, I can feel your pain, but now keep reading!

The new FE excitation coil model in Simcenter STAR-CCM+ 2020.3 allows you to model stranded coils by using FE methods. As you know, you need FE methods for cases with sharp spatial discontinuities of the magnetic permeability. Ferromagnetic materials typically introduce those permeability jumps, for instance in the case of the iron core of the fan motor (or practically any electric motor). Notably, the FE excitation coil model populates the coil region with the right electric current density, which will be by design divergence-free (so you don't need to take care of that, the code does it for you in a robust way).

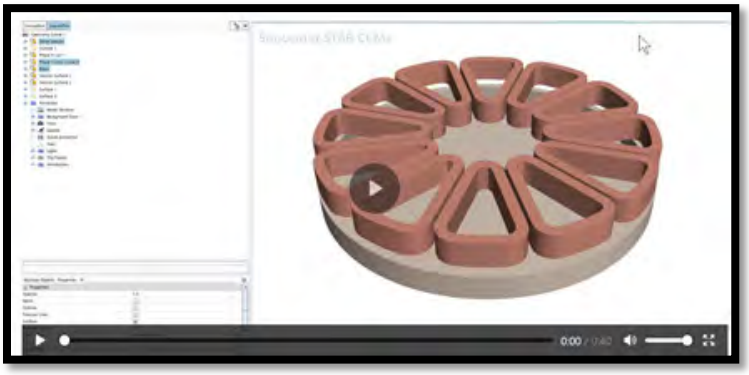
"Ok, but how do you input the coil current?" I hear you asking. With the new FE excitation coil model there are two ways: via the boundary method (already available in Simcenter STAR-CCM+ 2020.3) and now also via the vector method (Simcenter STAR-CCM+ 2021.1).

The boundary method is a robust topology-based method where you input the current as a boundary condition at the coil inlet. It is easy to set up and easy to template and automate, so you can explore your parameter space faster. However the boundary method is less general than the new vector method.

The vector method

Typical pancake-like shape of an axial flux motor.

The image shows a typical pancake-like shape of an axial flux motor. In such a device, the magnetic field in the stator-rotor gap is aligned with the rotational axis. Coils are closed, uninterrupted loops, so requiring the vector method for a proper setup. Axial flux machines have a short axial length, an advantage in some applications, such as wheel hub motors.

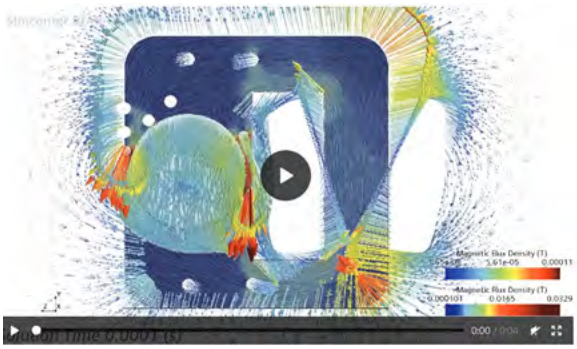


The newly implemented vector method in action: a graphical method to specify the current by simply placing a point and an arrow in your Scene

View video on the website article - The circuit editor. An ancient art now in Simcenter STAR-CCM+

The vector method is a graphical method where you specify the current by simply placing a point and an arrow in your Scene, namely by creating a Plane Section crossing your coil. This will greatly simplify the setup of your electric machines. Moreover, contrary to the boundary method, the vector method allows you to model closed loop coils, as the ones in axial flux motors (see picture above), or in transformers, or in my boiler fan. This kind of coils, being uninterrupted loops, do not offer inlet/outlet boundaries for the coil current specification, however the new vector method would successfully impose the current. Finally, you can use the vector method even when you have periodic interfaces, so you may enjoy a significant decrease of the number of degrees of freedom if your geometry is prone to symmetry reduction.

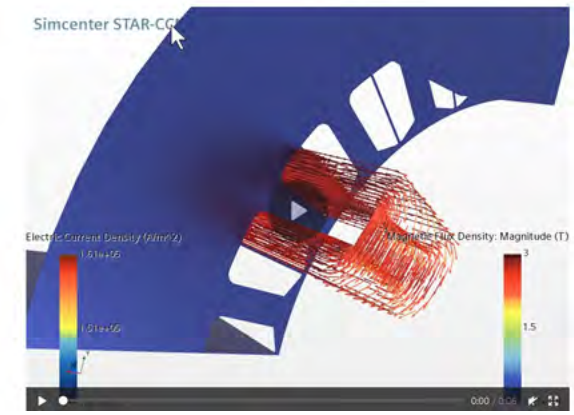
The FE excitation coil model In action - View video on the website article - The circuit editor. An ancient art now in Simcenter STAR-CCM+



Magnetic Flux Density of my boiler fan motor computed in Simcenter STAR-CCM+ 2021.1.

The animation shows the magnetic flux density of my boiler fan motor computed in Simcenter STAR-CCM+ 2021.1.

The short-circuited shading coils retard the magnetic flux variations in the shaded portions of the core, producing a slight imbalance between the two oppositely rotating stator magnetic fields. Result: a net rotation, which can move a rotor.



We tested our brand new features on the Nissan Leaf e-motor geometry:

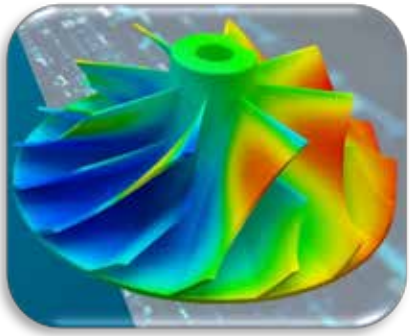
Nissan Leaf e-motor geometry simulated using the FE excitation coil model and the all new vector method for current specification. Animation by Kaushik Illa. For further info, please contact Angelo Limone (angelo.limone@siemens.com), Product Manager for Electromagnetics or Gaëtan Damblanc (gaetan.damblanc@siemens.com), Product Manager for e-Mobility

A word of wisdom

They say you appreciate things only when you don't have them anymore. After that mystic experience of living without heating in the British winter I became way wiser and even more grateful for the invention of boilers, fans and electric motors. Don't you make my same mistake: start appreciating our new capabilities in Simcenter STAR-CCM+ right away from their introduction. And get a great plumber.

MSC Solution for Additive Manufacturing - YouTube

3D Printing: First Time Right
We are leading the Additive Manufacturing market with our unique combined simulation and test solution.



MSC's current offerings for engineers involved in additive manufacturing (AM) of polymers or metals are designed to optimize the 3D printing process in order to:

- reduce production costs,
- increase robustness/reliability and
- improve performance by optimizing design and printing parameters.

Additive Manufacturing (AM) has been successfully applied using both metals and plastics in the aerospace, automotive, bio-medical, tooling, and other applications.

Additive Manufacturing = 3D Printing: First Time Right **-** Additive Manufacturing (AM) has been successfully applied using both metals and plastics in the aerospace, automotive, bio-medical, tooling, and other applications.

MSC's solution offerings:

Metal AM - Polymer & Composite AM - Material Lifecycle Management - Generative Design

MSC vision for the Future of Additive Manufacturing - MSC's vision for the future is to provide a complete AM toolkit that helps companies to optimize their entire AM process chain - including CAE, selection of raw material, manufacturing, and quality assurance.

Some of the challenges that currently exist in this space include ill-defined and poorly tracked process parameters, which leads to engineers running several print jobs against several parameters. This in turn leads to longer process development time, high amounts of material waste, and time wasted on printing parts that are unfit for service.

Complete Information on the website - Additive Manufacturing = 3D Printing: First Time Right

Autodesk Tandem Digital Twin Platform Launches for AEC - Bob Bray

Autodesk Tandem digital twin platform transforms rich data into business intelligence

Autodesk strives to help the architecture, engineering, and construction (AEC) industry break down silos between their respective disciplines and along the entire project lifecycle. Through the digitization of design and construction, we see our customers addressing inefficient processes, lack of coordination, and wasted time and money. Today, with the availability of the public beta of Autodesk Tandem™, a digital twin solution, we're excited to help AEC professionals and their customers – the owners and developers of the built environment – take another giant leap forward. The end goal: ready-to-go operations that help owners get the most out of their investment, whether it's a bridge, facility, building, or any other structure.

Autodesk Tandem is a digital twin platform that allows a building project to start digital and stay digital, from design to build to operations, and transforms rich data into business intelligence. Autodesk Tandem harnesses the building information modeling (BIM) data created throughout the project lifecycle essential to creating a true digital twin of the asset. At the project's completion, the project team can deliver a comprehensive digital handover to owners of easily accessible and insightful data, accelerating operational readiness and empowering better business decisions.

Autodesk Tandem harnesses the building information modeling (BIM) data created throughout the project lifecycle

Disorganized Data Means Lost Opportunities

That's the vision, but the reality for much of the industry is different. Without a digital twin at handover, mounds of disorganized data in varying formats end up buried in electronic folders, rendering useless a treasure trove of valuable data insight. For an owner, that's lost opportunity and money that cannot be recovered. Autodesk Tandem unlocks the treasure by freeing, organizing, and standardizing data from design and construction, creating a simple and intuitive digital replica of all the components, systems, and spaces in a facility.

Owners are asking Marin Pastar for this type of information several times a week. Pastar, a valued contributor to the development of Tandem beta, is Global Technology Leader of Vertical Information Modeling at Jacobs, a leading design, construction, and consulting firm, where he evangelizes the power of technology to break down silos and maximize efficiency. With approximately 80 percent of a facility's total lifecycle cost realized during operations, Pastar says AEC professionals have an enormous opportunity to add value by helping owners reduce costs through tools like digital twins.

"Our ability to affect and reduce total cost of ownership drops drastically the farther we progress from design to construction to completion," said Pastar. "If we consider what an owner will need at handover from the start, we can ensure proper management of assets based on their business goals and processes. We have an obligation to maximize our clients' investment."
Connecting Systems, Reducing Risk, Saving Money

Chief Technologist Brian Melton of Black & Veatch, a globally renowned engineering and construction company, is collaborating closely with Autodesk on the direction of Tandem's development.

"We see Autodesk Tandem interfacing with data systems like Computerized Maintenance and Management Systems (CMMS) and supervisory control and data acquisition (SCADA) systems. This provides owners and operators access to all information though a connected experience that allows them to proactively reduce risk and increase resiliency," said Melton. "Owners can start asking: Where are all the assets that currently have open maintenance work orders? What are the chances of this asset failing in the next five years? Is safety equipment near work areas? More connected systems and predictive insights that are visually aggregated using modern BIM/design data will be part of the handover package of the future."

Melton sees Autodesk Tandem and digital twins as part of the broader digital transformation, where every system becomes more and more connected as data is generated. In that future, systems learn from one another, share insights, and optimize performance in real-time. This data-connected world requires cooperation and openness from the technology community, and Autodesk is committed to doing its part. Last year, Autodesk became a Founding Member of the Digital Twin Consortium, an organization collaborating on digital twin best practices and standards, and a member of the Open Design Alliance, a nonprofit technology consortium that provides support and access to design file formats. These efforts are part of helping Autodesk's AEC customers enjoy an optimal experience throughout a project's lifecycle, including at handover.

Autodesk Tandem can help you take the next step on your digital journey and realize the benefits of a digital handover. Whether you're an owner, operator, or AEC professional, join our beta program today and find out how Autodesk Tandem can support projects, drive business, and maximize investments.

As the senior director and General Manager of Autodesk Tandem, Bob Bray leads Autodesk's newest business initiative to transform the built asset lifecycle with Digital Twin technology.

Quotes I found on the Pandemic:

- This virus has done what no woman has been able to do. Cancel sports, shut down all bars & keep men at home!
- I need to practice social distancing from the refrigerator.
- I hope the weather is good tomorrow for my trip to the Backyard. I'm getting tired of the Living Room.
- Never in a million years could I have imagined I would go up to a bank teller wearing a mask & asking for money.

Previous All time Favorites:

Cars in 1940 had about 15,000 parts and weighted 3,000 pounds. The B-24 Liberator Bomber had 450,000 parts, 360,000 rivets and weighed 18 tons. Ford was up for the challenge and produced 1 aircraft per hour at the Willow Run assembly plant helping to win World War II.

Latest Video on YouTube

Simulation Reigns Supreme in Reducing Model Preparation Time by 50%

Virtual Prototyping helps manufacturers ensure the safety, driveability, and durability of their vehicles – under all road and driving conditions – using water flow management simulations.
By Alain Tramecon

There is a constant struggle in today's automotive landscape to predict a vehicle's behavior under all road and driving conditions as it relates to vehicle safety and durability. Even more so, this type of testing is usually limited in many countries, with only a few shared facilities with endless wait times, making physical tests nearly impossible. In this blog post, we introduce a range of water flow management simulations to help manufacturers optimize vehicle drivability, negating the need for physical testing.

An estimated 10% of traffic fatalities are a direct result of wet roadways, according to research from the National Highway Traffic Safety Administration (NHTSA) in the United States. Hydroplaning, for example, occurs when a driver loses control in wet road conditions, putting motorists and other road users in great danger. Autonomous vehicle systems must make the right decisions in real-time to avoid crashing, while at the same time mitigating the risk of hydroplaning. And as electric vehicles gain popularity, how do you ensure your vehicle's critical components won't become damaged by water?

To test these potentially hazardous scenarios, in the hopes of better understanding our customers' challenges, we simulated a range of different driving conditions to test the vehicle's response without relying on any physical prototypes. These situations included normal rainy-day driving, deep flooding for vehicles encountering waters depths of up to 30cm, and soiling.

"Water impact has a destructive force that is more powerful than expected. In the worst-case scenario, if the strength of the underside of the vehicle body is inadequate and the quantity of splashed water is large, the impact could cause parts on the underside to fail. – Honda Engineer

Tackling drivability on an ordinary rainy day

Most of the time spent behind the wheel is under normal driving conditions. On a rainy day, we are most likely to encounter shallow puddles of water at average speeds. What does that scenario yield with respect to drivability and will it incur any damage to the vehicle? To get answers, we used simulation (link is external)to analyze the displacement of a volume of water as it was pushed away by a car to predict whether critical areas like the vehicle's electrical components need protection from the water or if other special countermeasures, such as changes to the vehicle's geometry, are required.

We started by simulating the effects of shallow water spray patterns repeatedly hitting the underside of a vehicle. The scene was a car driving at an average speed of 60km/h speed on a wet road with 3cm of water. Then, we investigated three important areas to ensure the short- and long-term drivability of the car under these circumstances.

First, we simulated the effects of high-velocity water splashes on the plastic undercover parts of the car to ensure they were not at risk of rupturing. Second, we completed a salty water splash projection to simulate what areas were susceptible to corrosion during the winter months and how to mitigate that. Last, we verified the appropriate locations of thermal shields to prevent thermal shocks in the exhaust pipes.

One very important thing to note is that if you want to accurately predict water splash patterns and their effect on the vehicle, it's not enough to simply perform CFD simulation. You must concurrently simulate the tread of the tire, meaning the tire deformation and suspension, as well as the tire pressure. This is also important when it comes to dynamic effects, like potholes or bumps in the road, as they will definitely have an impact on the splash pattern.

All these realistic physics-based simulations are critical in obtaining the most accurate results, which you can get(link is external) via a single model using simulation.

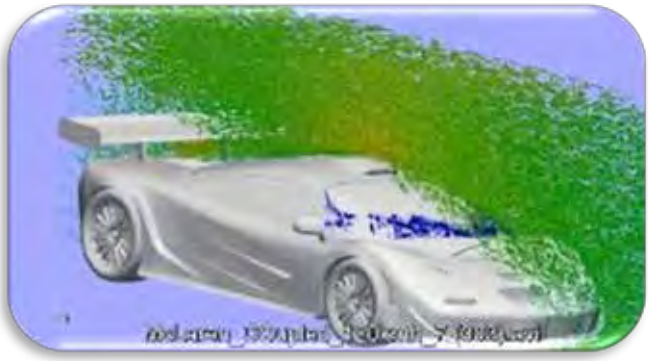
Predicting soiling and keeping your drivers safe

Rainwater can also adversely affect a driver's visibility as it makes contact with the driver's side window, side view mirror, and windshield.

One of our very own ESI engineers took to the roads of a French motorway on a rainy day and recorded his findings to show the effects rain has on driving visibility.

In this video (on the website), you can see that, depending on his speed and the wind velocity, the water flow changes. Soiling of the side windows can become a safety issue as it hinders the driver's vision of the side view mirror.

Testing typically requires physical testing on the road or in a wind tunnel with the exact external makeup of the vehicle. This means that as soon as even one body component is changed (e.g. side view mirror, spoiler, etc.), the test would have to be repeated. These issues arise late in the development cycle when it is usually too late to make the change.



Visit site for video's & high-resolution graphics.

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Virtual Prototyping makes it easy to simulate the water trajectory across the vehicle at various speeds. As a result, you can optimize the position of rainwater drainage systems and the vehicle's shape to improve the flow of rainwater and, most importantly, driver visibility, early in your design cycle and without the need for a physical prototype.

In deep water

If you drive towards a flooded road, is it safe to cross? Will the car remain operational when it comes out on the other side or will the engine flood? Of course, the answer depends on a range of factors, including the water depth, your speed, and your vehicle type. Again, as we did in our 'rainy day' scenario, we analyzed the shape of a volume of water as it was pushed away by a car. This is necessary for predicting possible damage to critical areas, specifically electrical components, and creating a plan to rectify those flaws.

Making any changes late in the car's development cycle can be a disaster in terms of delays and cost. Automakers face the tough decision of risking a major setback in getting their car to market or omitting changes to the design that remains essential to the vehicle's performance.
Amend your problem before it's a problem

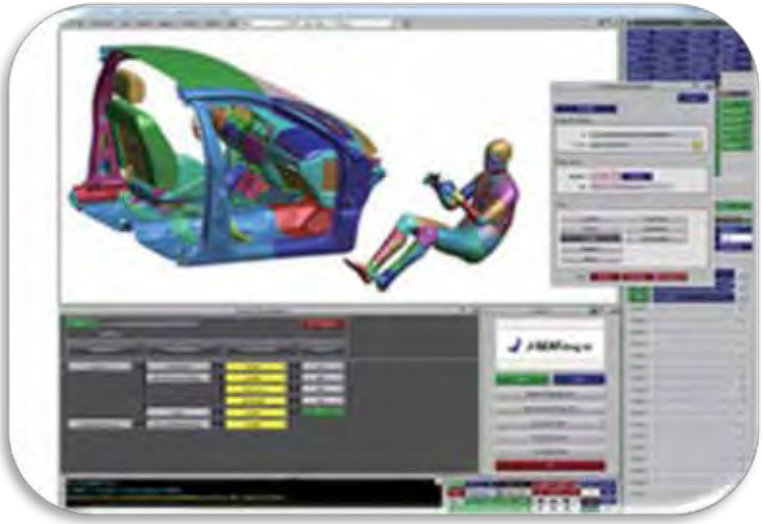
Virtual Prototyping allows car manufacturers to certify a vehicle across a broad range of domains, including crash, safety, NVH, durability, and, of course, water flow management. Users gain access to all these domains, with one single core model, avoiding model conversion, simplifying variants evaluation, and at the end saving a vast amount of modeling time.

Using a standard structural model, they set up the driving conditions with minimal effort on model preparation, as no CFD-specific mesh is needed. This saves a minimum of 50% in model preparation time.

Thanks to the combination of this unique approach and predictive physics-based simulation, manufacturers can predict early in the development phase, the drivability of today's vehicles, whatever the weather.

Read more((link on website) on how Honda Motor Reduced Trial and Development Time Thanks to the Accuracy of Water Impact Simulation Testing.

Alain Tramecon - Manager Outcome Expert Team Lead, Pre-Certfication & Validation, Alain Trameçon has more than 30 years of experience in the development, research, innovative industrial projects, and software solution management of numerical simulation. He is a technical expert in Fluid-Structure Interaction and Composite Crash for ESI Virtual Performance Solution (VPS) Virtual Prototyping software.



LS-DYNA preprocessor for seat design with data management and auto assembling

The recent automotive crash simulation is associated with a direct evaluation of the dummy injury criteria. Appropriate setups for a seat model and/or restraints are required to improve the accuracy of that evaluation.

J-SEATdesigner (JSD) manages various simulation cases with the model files in the database and auto assembles appropriate models based on the determined conditions.

A wide range of regulations/assessments stored in the database can be loaded instead of the user input value. Measurement of H-points and pre-simulations including seating simulation are also available.

In the automotive crash simulation, the model becomes complicated and large to achieve a more accurate result. J-SEATdesigner is a powerful integrated system for seat design, supporting design engineers' challenges.

Complete Information on the website including:

- Database management: Models and the assembly data
- Assembly information creation
- Developers
- Model auto assembling
- Pre-simulation
- Strong support by JSOL

Bought to our attention by Roger Oswald

These are difficult times. Traditional methods of training are changing. NAFEMS is stepping up to the challenge by providing you with a range of training options, all available remotely, all available from home, and all keeping to the same, internationally renowned, independent standards.

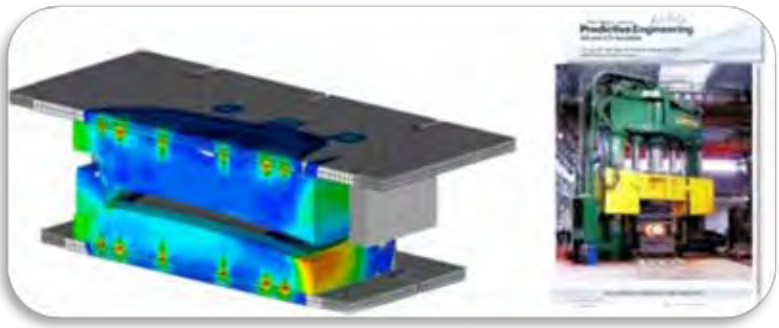
Among the many courses and training options offered:

March 10	eLearning, Online	CFD for Structural Designers & Analysis
March 15	Training Online-Course	The Complete Guide to Automatic Design Optimization
March 23	Training Online-Course	Verification and Validation in Engineering Simulation
March 25	eLearning, Online	Metals Material Modelling: Welding Simulation and Residual Stresses
April 06	eLearning, Online	Composite Finite Element Analysis
April 8-	eLearning, Online	Non-Linear FEA

- **e-learning -** World-class online training from the experts on a range of topics. you and your team can use a combination of live sessions, discussion forums, and recorded sessions to learn .
- **virtual classrooms -** Our best-in-class public training courses, now being delivered entirely online. complete courses delivered in full day sessions over the course of one or more days.
- **custom classes -** Our custom classes cover whatever topics you need, with examples related to your industry, in a private, online delivery format that suits you and your team precisely.
- **learning modules -** online, self-paced learning with tutor support. Learn at your own pace, with experienced guidance on-hand all the way.
- **learning hub -** guided learning, exclusive to nafems members. From key concepts to detailed learning, there's something for everyone.

Predictive Engineering FEA Consulting Projects 2020

Welcome to our overview of Predictive Engineering's FEA consulting services. We have tried to make it brief and useful for a prospective client. We are FEA engineers that are generalists across pretty much all industries. The big difference we bring to our clients is our experience over the decades to ensure that our



YouTube Channel

Shanghai Hengstar & Enhu Technology sells and supports LST's suite of products and other software solutions. These provide the Chinese automotive industry a simulation environment designed and ready multidisciplinary engineering needs, and provide a CAD/CAE/CAM service platform to enhance and optimize the product design and therefore the product quality and manufacture.

Contact us for our LS-DYNA training courses and CAD/CAE/CAM consulting service, such as

- Crashworthiness Simulation with LS-DYNA
- Restraint System Design with Using LS-DYNA
- LS-DYNA MPP
- Airbag Simulation with CPM
- LS-OPT with LS-DYNA

Our classes are given by experts from LSTC USA, domestic OEMs, Germany, Japan, etc. These courses help CAE engineers to effectively use CAE tools such as LS-DYNA to improve car safety and quality, and therefore to enhance the capability of product design and innovation.

Consulting - Besides solver specific software sales, distribution and support activities, we offer associated CAD/CAE/CAM consulting services to the Chinese automotive market.

Solutions - Our software solutions provide the Chinese automotive industry, educational institutions, and other companies a mature suite of tools - powerful and expandable simulation environment designed and ready for future multidisciplinary CAE engineering needs.

Shanghai Hengstar provides engineering CAD/CAE/CAM services, consulting and training that combine analysis and simulation using Finite Element Methods such as LS-DYNA.

Contact: Shanghai Hengstar Technology Co., Ltd

hongsheng@hengstar.com

For complete information on applications, videos please visit the website

DOWNLOAD THUMS (LS-DYNA)

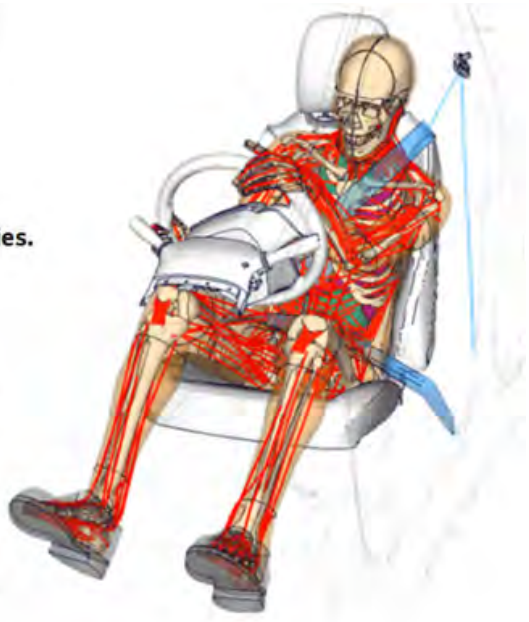
Thums®

Total HUman Model for Safety

Virtual human body model for analysis of vehicle collision-related injuries.

Download THUMS (LS-DYNA)

Toyota Motor Corporation makes Total Human Model for Safety (THUMS) software freely available as part of its efforts toward a safe mobility society. THUMS is a virtual human body model software program for computer analysis of human body injuries caused in vehicle collisions. Free access to THUMS, and subsequent use by a wider variety of users, is expected to enhance vehicle safety.



What's New

17 Feb, 2021 - Article of "Development Story" was added to the "About THUMS" page.

28 Jan, 2021 - Website for free access to THUMS was established.

Total Human Model for Safety (THUMS) is a human body finite element model jointly developed by Toyota Motor Corporation and Toyota Central R&D Labs., Inc. THUMS is capable of simulating human body injuries such as bone fracture, brain and internal organs damage in vehicle collisions. Compared to the physical crash dummies commonly used in vehicle collision tests, THUMS is able to analyze collision-related injuries in more detail because it precisely represents the shapes and durability of human bodies.

THUMS has continually evolved to add a range of models with different genders, ages and physiques that include skeletal structures, brains, internal organs and muscles.

Jeff Rogers, global research lead for IBM Research's Digital Health platform, at work in the IBM Home Health Lab.

As many as 5.5 million Americans are estimated to have Alzheimer's disease. Recent studies suggest it may be the third leading cause of death in the U.S. behind heart disease and cancer, according to U.S. Health and Human Services: National Institute on Aging.

A team of researchers from IBM and Pfizer have designed an AI model that uses small samples of language data (obtained from clinical verbal cognitive tests) to help predict with 71 percent accuracy the eventual onset of Alzheimer's disease within healthy people. [1] The research, published today in The Lancet eClinicalMedicine, advances the quest to predict Alzheimer's in several major ways.

Using a short, non-invasive language sample from a standard verbal cognitive test given to a patient, the new AI model produces valuable predictive feedback significantly better than clinical-scale predictions (59 percent) based on other available biomedical data.

Video is on the IBM website - 5 Things to Know About IBM's AI Predictor for Alzheimer's Disease

Here are 5 things to know about IBM's AI research to predict a patient's chances of developing Alzheimer's:

IBM Research's study is one of the first major studies to use AI to predict outcomes in healthy individuals with no other risk factors.

The vast majority of other Alzheimer's prediction research has focused on individuals already starting to show signs of cognitive decline, or those with risk factors such as family history or genetics.

Elif Eyigoz, one of the lead researchers in the IBM Alzheimer's study.

IBM's work also focuses on using AI to assess the risk of Alzheimer's disease in the general population.

That's in contrast to research that focuses solely on high-risk groups or those with a genetic history or predisposition to the disease. Alzheimer's disease can affect a wide spectrum of individuals—including those with no family history of the disease or other risk factors— making this broader study critical.

Researchers trained the AI model using long-term longitudinal data from the expansive Framingham Heart Study, a multi-generational study initiated in 1948 that has spurred thousands of health studies.

Because of the nature of this data, researchers were able to verify their model's predictions against actual outcomes. For example, if the AI model analyzed a speech sample from a participant at the age of 65 and predicted they would develop by the age of 85, researchers could then check records to determine whether a diagnosis had actually occurred.

One of IBM's goals is to be able to train the model using expanded datasets.

Guillermo Cecchi, IBM's principal researcher for computational psychiatry and neuroimaging.

That would include data that might become newly available to the healthcare research community and reflect wider geographical, socioeconomical and racial diversity of data. As a result, IBM researchers' algorithms could serve as a potential clinical asset for health professionals when gauging a holistic view of an individual's health and risk factors.

This work is part of a larger platform IBM Research is building to better understand neurological health and chronic illnesses through biomarkers and signals in speech and language.

The Alzheimer's research will be a significant pillar in this platform and progress this work, which is now moving into prospective studies. IBM Research recently announced a related initiative with the National Institutes of Health to analyze speech to uncover risk factors for schizophrenia and psychosis.

IBM Research continues to explore ways AI can be applied to predicting a person's risk for Alzheimer's disease, which so far has no effective cure or prevention.

[1] To use a measurement commonly used in clinical studies, the researchers achieved an accuracy of 0.74 AUC (area under the curve), which is a measure of the ability of a classifier to distinguish between classes.

Ford is expanding the Expedition

DEARBORN, Mich., Feb. 16, 2021 Expedition full-size SUV lineup with the new STX Package, a spacious choice with an attractive price for customers who need seating for five plus the versatility and capability of a full-size SUV.

Hyundai Motor Manufacturing Alabama Celebrates Launch of All-New 2022 Tucson

Montgomery, Ala. February 23, 2021 – Hyundai Motor Manufacturing Alabama (HMMA) celebrated the launch of the all-new 2022 Tucson SUV on Monday, February 22, 2021.

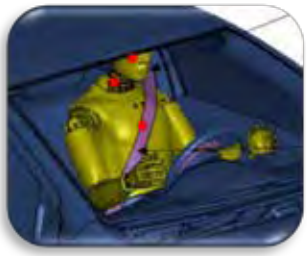
Chevrolet Grows EV Lineup with 2022 Bolt EUV and Bolt EV

All-Electric Bolt EUV is first Chevy to offer Super Cruise1

DETROIT – Today, Chevrolet expanded its electric vehicle portfolio with the introduction of the new, all-electric 2022 Bolt EUV, alongside the redesigned 2022 Bolt EV.

02-15 - B. Khaled, -

Using *MAT_213 and *MAT_187 to PredictFailure in Unidirectional Composites

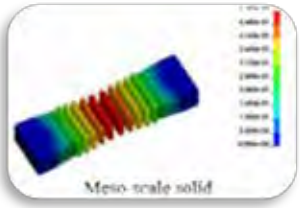
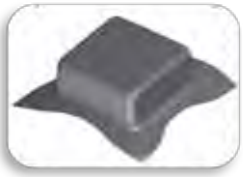


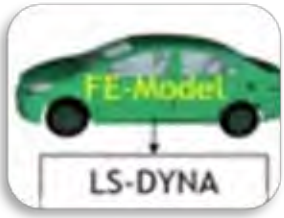
02-08 -

Y.Meng, C.Untaroiu (Virginia Tech) - Occupant Injury Risk Assessment ...

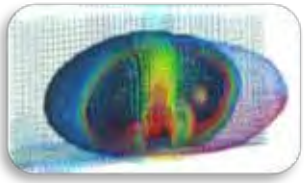
02-01 P.

Caldaza - Ford - Side Curtain Airbag Folding Methodology

	01-25 **E. Day** - Hybrid III 95th Percentile Large Male Finite Element Model Neck Alteration
	01-18 **W. Hu** - A Meso-Macro Scale Method for Jointed Structures and Their Failure Analysis
	01-11 **T. Dutton** - Optimising Run Timesfor Sheet Metal Forming Simulation
	01-04 **P. L'Eplattenier** - A Path Towards Including Batteries in Electric or Hybrid Car Crash Simulations with LS-DYNA®

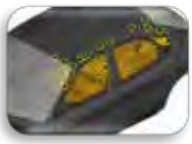


02/15/2021 - Anders Jonsson (DYNAmore Nordic AB) - Hints when switching from an explicit to an implicit deck



02/08/2021 - Steffen Mattern (DYNAmore GmbH) - Airbag Modeling Possibilities in LS DYNA

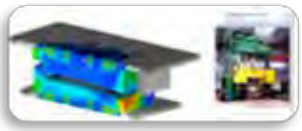
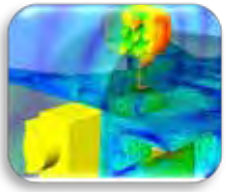
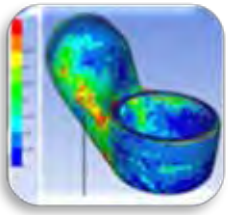
02/01/2021 - Emily Owens - Oasys PRIMER – Spotwelding and Connections

	01/25/2021 - T. Fokylidis, Beta CAE Systems, - ANSA and META Solutions on Interior-Impact Simulation for Occupant Protection
	01/18/2021 - NVN - perform analysis of ball plate impact using LS-DYNA

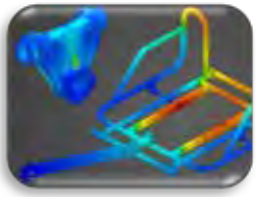
	01/11 - DYNAmore Express - S. Mandel - LS PrePost News, Tips and Tricks
	01/04 - Oasys - Top Tip: PRIMER tools to replace parts

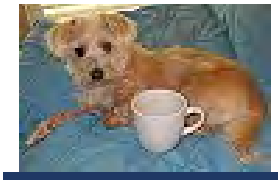
Previously Showcased

BETA CAE	How to set-up a Topology Optimization task in ANSA using a motorbike's swingarm.
A. Remmel	Ozen Engineering - How to model the Battery Pack impact and submodeling using ANSYS Workbench LS-DYNA
A. Parkes	Oasys REPORTER: An Overview
T. Erhart	LS-DYNA R12.0 New Features
J. Murad	Navier-Stokes Equations

	02/15/2021 -Predictive Engineering - Brief overview of Predictive Engineering's FEA consulting services. Video		
	02/01/2021 - M. Commens - ANSYS - From Chips to Ships, Solve Them All With HFSS		02/08/2021 - MSC - Software - Simulating extreme vehicle loads using Adams, and an invitation
	01/25/2021 - E. Engle - AutoDesk - 5 Common Sheet Metal Forming Processes and Applications		01/11/2021 - G. Deppe - MSC - CAD to CAD: MSC Apex Generative Design new release brings fluent optimization workflow
	01/18/2021 - W. Chanatry - Siemens - Using Fibersim and Mendix to enhance development of composite parts and low-code applications		01/04/2021 - T. Duncan - ANSYS - Solving Composites Design Challenges With Engineering Simulation

Previously Showcased Favorirw

	**Curt Chan** - article by **T. Palucka** - AdvenChair Rolls Boldly Into Adventure With Off-Road Wheelchair Design



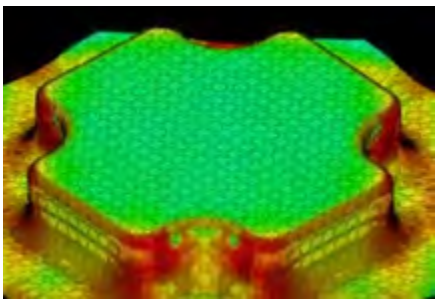
02/15/2021 - I like this simulation video because I can see the air flow AND it includes the engine! Many simulations only have airflow. That would be like airflow around my coffee cups but not showing the coffee! SO let's head on over, with our coffee, and watch the video.

Multiphysics Group -Air flow around Sedan Model (engine included)

2/08/2021 - First, the people in the crash had minimal ouchies (pics below) The car went airborne! I was watching our outside camera for the Amazon delivery and actually had to replay the video since it was really airborne when he flew up a large rock through the fence and landed in the yard!

This week, we will give thanks to AIRBAGS! Coffee-A-La-AirBag. Let's get started with the simulation of an airbag, and then two pics of the car airborne. All airbags deployed and did their job. The car went over a first curb with rebar, rocks, another curb with rebar, then up a sizeable slanted rock for lift-off - luckily missed that tree by a few feet and landed in my front yard.

The impact is frontal, on a rigid wall, with an initial velocity of 35 mph.



02/01/2021 - HEY! this is your reminder that it's February. That means Valentines Day is this month. SO, get that special someone a new coffee cup with different flavored coffee. They will either love it, or look at you like you'll be sleeping on the couch! BUT, at least you'll have a good cup of coffee, while you watch below simulation.

Lancemore, Japan - Cross Shaped Cup Deep Drawing Analysis

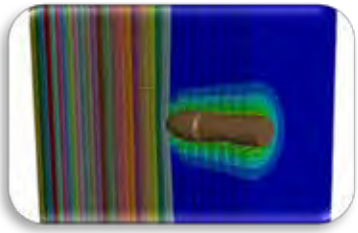
01/25/2021 - Well, although I would prefer waves of coffee being stirred by the cylinder that would defeat the engineering purpose. SO we will have to visit YouTube and see the real waves!

LS-DYNA CFD: wave generation in FSI+Free-Surface flow

Wave train deforming an elastic cylinder

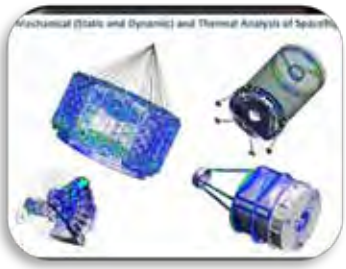
01/18/2021 - Yes, I do know what a hat channel is! Okay, whoever yelled "She probably googled it." Well, fine, your're right I googled it! Anyway, we shall have Lancemore Coffee this week to go! So, grab that to go cup and let's take a look at YouTube.

Dynamic Three Point Bending Test Analysis of a Hat Channel - with 590 MPa Class High Tensile Strength Steel part 2.



01/11/2021 - I have a battery pack but anyone with projectiles? Nope - you do not get coffee today IF you are aiming at my battery pack! SO, let us trot over to YouTube to learn how LSDYNA-EM will show you what happens when you don't get coffee.

LSDYNA-EM : Projectile penetration in battery pack - The projectile is modelled as rigid. It penetrates several battery cells, causing deformation and failure.



01/04/2021 - UH OH, did I make a resolution this year? Same one as last year, and the year before - lose weight. AND whoever just yelled "How much did you lose last year?" IF you think I'm answering that question you obviously didn't read my new resolution! MEN! UGH! You NEVER ask that question!

NOW, (yes, I will stop yelling) on to the first video of 2021 - NASA - (that wasn't yelling, it was their initials) Goerge Laird always has something interesting you should learn about.

G. Laird - Predictive Engineering FEA Consultants NASA 5020A Fastener Spaceflight Hardware

02/15/2021 - I am counting down to when the US changes back from Daylight Savings Time. My dogs wake up now at 5AM - to them it 's really 6AM. What does that mean you ask? It means I wake up at 5AM! Anyway, I know you aren't here to listen to me complain BUT Don doesn't wear his hearing aid so he doesn't even hear me complain! (how husband convenient for him!) Here is Dusty getting some sun - he looks so huggable you want to just sleep on him - NOT a good idea to try,

02/08/2021 - Quincy and Dusty decided to be book-ends. They are the oddest miniature horses with weird personalities (Whoever yelled my miniature horses take after me, NO coffee for you this week) - Dusty and Quincy either like someone or run away from them! Well, better than kicking someone they don't like (OKAY, who keeps yelling the horses are just like me? Are you in the EU? Asia? Here in the US? WAIT - maybe it's all 3 locations!

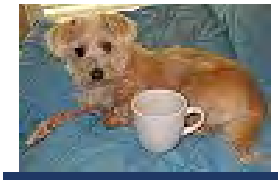
02/01/2021 And below is our Valentine - Her favorite place is snuggled in Don's arm with a blanket around her! She thinks she's a princess - WAIT, we caused that! I better think of that sentence I just said - Okay, thought about it, and yes, she is a princess.

01/25/2021 - We are going to start this week with a picture of Tiki. I wasn't watching him and he was standing in his food bowl! His front paws and mouth are all sticky! His only eye now is only 10% visual. BUT he still can follow the rug runners to the kitchen. For 4 pounds he is a chore and a joy!

01/18/2021 - Know when you're being stared at! You feel like you have ants crawling on the back of your neck! So I looked around for the Bobcat or the Coyote. I fed the horses after sunset - OOPS, not my space after sunset! I can sense when someone or something is staring at me - I finally looked up. There was my owl staring at me like, "Gramma, go inside. This is now our time." I am continually lecturing the ferals about my space, your space. After sunset, it is not my space. During the day, it isn't theirs, but they ignore that part.

01/11/2021 - My minis were watching the NYorker jackass in Washington on Jan 6th. He said, "Trial by Combat" - My mini's suddenly wanted to settle things by "trial by combat" - Here they are squaring off. They then decided they didn't know how to duel, and we are in the 21st century. I was proud they weren't as stupid as the person on TV. Next week they will have a dance-off like in the old movie West Side Story since that was in NY like the idiot was from - they call it "trial by dancing"

01/04/2021 - So we will stretch into the new year - YES, I know that was so bad but I really enjoyed Romo taking a stretch right on the coffee cup floor mat!



Cuisine by Corrado Tumminelli

CORRADOT

PROVANDO E RIPROVANDO....

Foreword - To reproduce a dish of Italian cuisine out of Italy is simple. It's sufficient to use exactly the listed ingredients (no substitutions, no changes, no additions) with the listed quantity, and to respect the listed cooking time.

Stuffed Peppers - Peperoni ripieni

Serving: 2 - Total time: 40 min

Ingredients

- Red or yellow Peppers: 2 big or 3 medium size White (or red)
- Onions 5 oz (50 grams)
- Minced meat 1 pound (450 grams)
- Bacon 2 oz (65 grams)
- Bread (even stale bread) 4 oz (120 grams) Milk 1 cup (200 ml)
- Egg 1
- Olive oil 1/3 of cup (80 ml) Oven at 350 °F

		
Put the chopped bread in a bowl. Pour the milk on it and let it soak.	Open the peppers and clean their inside, throwing away the seeds and the placenta.	Peel and chop grossly the onion.

Take a saucepan or a pot, pour in it the olive oil, and add the chopped onion and the bacon pieces. Let's cook at medium heat for 7-10 minutes, or until they are transparent and NOT colored.
Stir frequently.

Now add the minced meat and let cook for at last 10 minutes, stirring frequently

In the meantime squeeze the soaked bread and pass it in a mixer. After the meat is cooked add the mixed bread and one egg.

Add two big pinches of salt and stir vey well.

With a spoon abundantly stuff the peppers

Cook in the oven for about 15-20 minutes, or until you see a little colored crust.

Tender and tasteful. Good appetite!!!

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