FEA Not To Miss Software
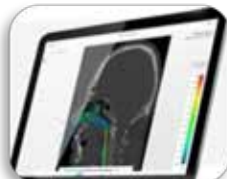## &
Engineering Solutions
Town Hall Meeting & Gossip

DYNAmore
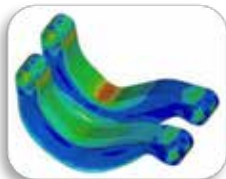
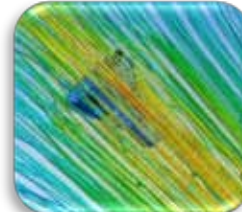**CADFEM Medical**

CADFEM

OZEN

Using Python Code Object To Keep Track of Mechanical Runs

ENGINSOFT

KAIZENAT

MSC/HEXAGON

OASYS

ANSYS

Library

Research - Avicenna Alliance

Pilot - Quiz

Booth - LURI

Town Equip

Old Cattle Rancher

Automotive - A.Topa

FEA not to miss a/k/a (FEANTM) comprises a group of interested parties sharing information. Information is presented on the website www.feantm.com and this publication ISSN # 2694-4707**.**

Goal

Our goal is to share information on companies with expertise and innovative products. Strengths that rely on smart work ethics in today's changing world.

Compensation

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Editors: (alpha order) Anthony, Art, Marnie, Marsha, Yanhua

Town Pretend to be Editors
  The Old Cattle Rancher
    No one in town knows his name. You yell "Hey, Old Cattle Rancher."
  The Old Retired Pilot
    No one in town knows his name. You yell "Hey, Old Retired Pilot."
        They are brothers - strange family

Contact us at: feaanswer@aol.com

Map Vector & town graphics in our magazine are courtesy of vecteezy

Table of contents

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Author and/or person using social media, or information from the company website
The websites used will have the complete articles, and higher resolution graphics/videos.

Town Announcements will be in this style box.
Thanks to Vecteezy for our Map Vector/town and many of the graphics in our magazine

Table of contents

All postings are copyright to the respective person or company

Town Hall Meeting & Announcements February

TOWN HALL MEETING
FREE COFFEE

Park Cars behind building

Tie horses to hitching rails

Monthly town hall meeting.
Serving - coffee & vanilla wafers!

Our town comprises companies, engineers, scientists, mathematicians, universities, professors and students, consultants, and all individuals interested in software, hardware, and solutions.
Oh, and gossip at the local coffee shop, and your pets are welcome.

Town secretary- A special hello wave to: Alice H. - Dileep - Fabian - Hailong - Jenson - J.O.H - Kambiz - Madhukar - Mahesh - Marcus - Marta - Metin - Mohammad - Nima - Pietro - Prashant - Rasmus - Sahithyananda - Saiprasad - Suhas - Thierry

As presiding town Supervisor, I call this meeting to order:

New town research hospital.   The hospital does NOT use animals in any research. We are an animal rescue town!   The bookstore declared bankruptcy, and the lot was available. We did ask for bids to demolish the building.

1. The town secretary sent invitations for a building demolition party instead of a request for bids.
2. We had at least 20 tractors playing demolition derby with the building.
3. Why was the old cattle rancher selling hamburgers, and the secretary had popcorn for sale??

   Research Hospital - Now on the map and a new area for medical information.

1. **Why are there helium balloons attached to car rims, also finger-painted pink, red, blue, and white?**
2. I appreciate the note that the secretary filled a request for lighter and designer rims.
3. Helium balloons and finger-painting the rims doesn't make them designer rims and weigh less.
4. Who requested Breyton rims for their town vehicle? Why isn't anyone raising their hand?
5. Donate the balloons and paint sets to Town Equipment - The Town Secretary used their budget.
   She purchased 3,600 balloons and finger-paint sets to create lighter-weight/designer rims.

   Town Equipment - Breyton is always working on expanding the physical & technical limits, among other things through FEM calculations with Ansys.

Town Secretary for Valentine's Day!
1. **In honor of Bertha and Karl Benz, she ordered Mercedes for the town's female employees.**
2. I am sorry that it was a conflict of interest and we had to cancel the order!
3. Bertha was the first person to drive Karl's first automobile.
4. The secretary is now yelling at the rancher; who knows, Karl didn't lecture Bertha on how to drive, be careful, and watch out for cattle & squirrels! It has been 3 hours! They are still yelling in the hall.

   Town Secretary - Bertha (Ringer) Benz (and a thanks to MBRDI)

Old Cattle Rancher
1. **WHY did the Old Cattle rancher order a Humvee 2-ct ambulance for his rodeo?**
2. Yes, we did say an ambulance has to be available for his rodeo, but NOT that type.
3. It could be worse - He could have ordered one for him and then one for the town.
4. THEN, he advised he is selling tickets for terrain rides in the ambulance. (I didn't answer - I fainted)
5. Who sent invitations for a Humvee ride party? Why is everyone leaving work to buy tickets?
6. That is NOT what we wanted for his rodeo - have the rancher bring it to the military!

   Old Cattle Rancher - AM General: Building for the Future Now

Town Map
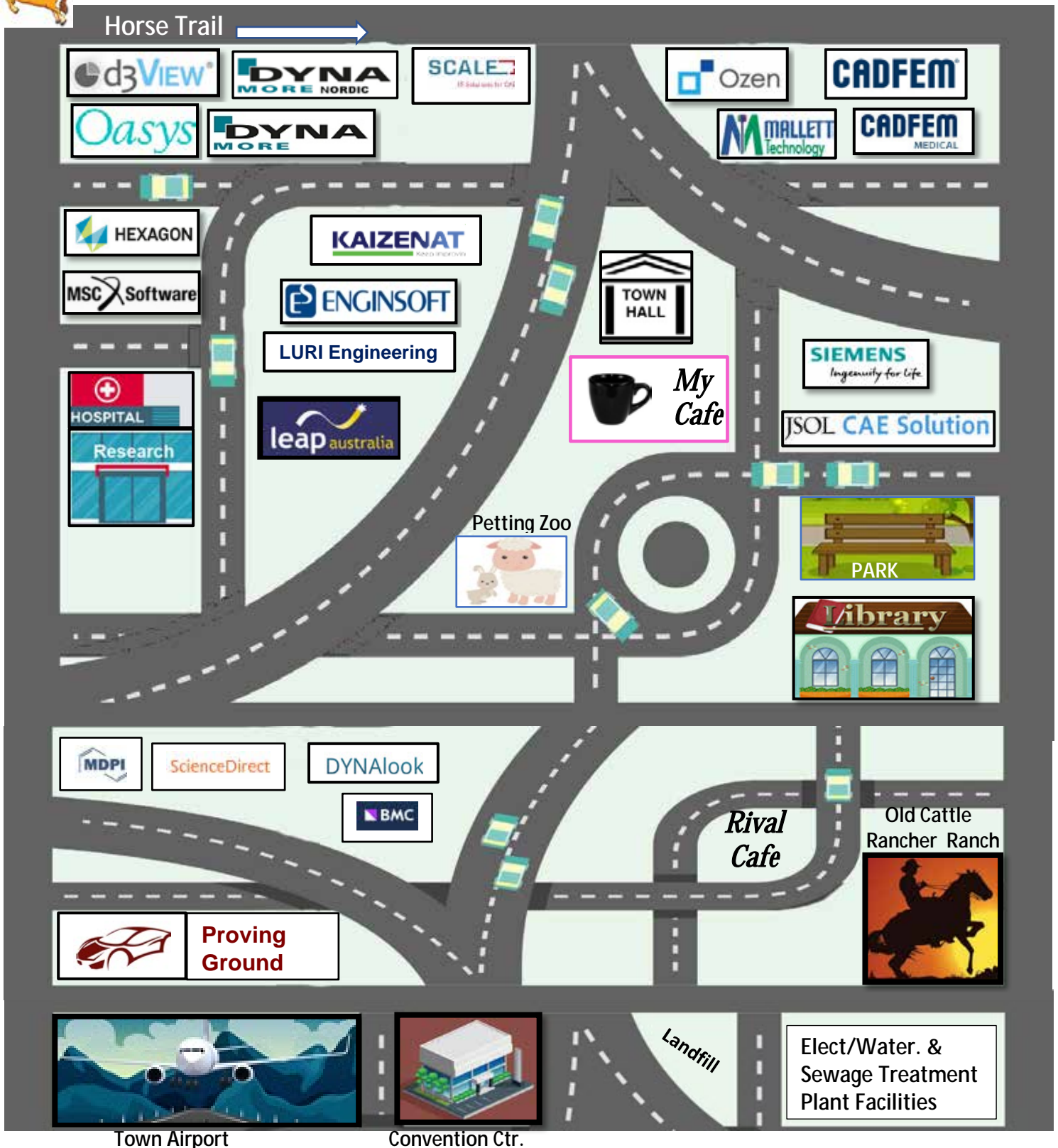
Horse Trail →

d3VIEW   DYNA MORE NORDIC   SCALE IT Solutions for CAE

Oasys   DYNA MORE

Ozen   CADFEM

MALLETT Technology   CADFEM MEDICAL

HEXAGON

KAIZENAT Keizo Improvem

TOWN HALL

MSC Software

ENGINSOFT

LURI Engineering

My Cafe

SIEMENS Ingenuity for life

HOSPITAL

Research

leap australia

JSOL CAE Solution

Petting Zoo

PARK

Library

MDPI   ScienceDirect   DYNAlook

BMC

Rival Cafe

Old Cattle Rancher Ranch

Proving Ground

Town Airport

Convention Ctr.

Landfill

Elect/Water. & Sewage Treatment Plant Facilities

All videos can be viewed on the website
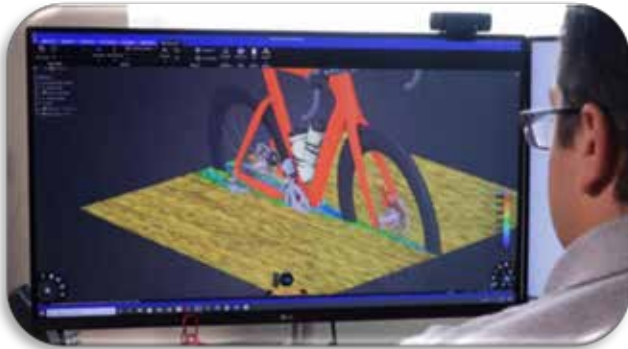
Enabling Faster Ansys Discovery GPU Simulation on Ansys Cloud Thanks to NVIDIA and Microsoft Azure - **Author: Curt Chan, Senior Product Marketing Manager, Ansys**

We've all heard the phrase "Faster than a (fill in the blank)," but what is the value of speed when it comes to bringing a product to market?

> **As Ansys SVP and CFO Nicole Anasenes says, "You can't have innovation without simulation."**

Imagine if simulation was as fast as the on switch for every electronic household item, or as instantaneous as the flip of a light switch?

What if you could get the same instantaneous response in validating your complex engineering designs, a notoriously slow process known in the product development process, or leverage Ansys' artificial intelligence (AI) technology to simultaneously generate and lightweight a design in real-time?
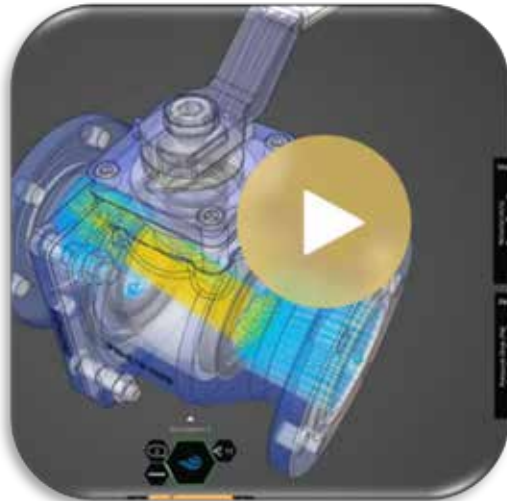
By combining interactive modeling and multiple simulation capabilities in a first-of-its-kind GPU base solver, one word to describe Ansys Discovery is fast. It enables you to address design questions earlier in the design process. Taking an upfront approach to simulation saves time and effort on prototyping as you explore multiple design concepts in real time with no need to wait for simulation results.

So how can fast get faster? Let's put this in perspective, when automotive engineers developed cars decades ago, they claimed they built the fastest production car. But what happened? It got faster. People claimed in the 1970s going 0-60mph in less than seven seconds was impossible. Well, as time evolved, cars got faster, and so did hardware. Think about this, the new Tesla Model S Plaid goes from 0-60mph in 1.9 seconds. So how can a fast GPU get faster?

Well, we're making the impossible, possible here at Ansys. Partners like NVIDIA and Microsoft are helping make our real-time simulation, more real time. Introducing infinite computing through Ansys Cloud and overcoming any GPU hurdle users might have makes this speed boost possible.

Hardware challenges are common across all industries, and addressing these concerns opened the opportunity with NVIDIA and Microsoft, providing a best-in-class hardware infrastructure and security. Why leverage the cloud you might ask? We say in the industry, "Put the customer first." This alliance between hardware and software companies ensures our customers have a ready-to-perform solution always available from anywhere without hardware barriers, providing the accessibility and scalability on demand.

Whether you're running Discovery, or any other Ansys product, this flexibility for customers leads to increased efficiency and innovation. The ability to do more faster and better with a GPU solver, can increase your resources by 10x. **Imagine going fast and then the turbo kicks in; that's what the cloud can do.**

_____
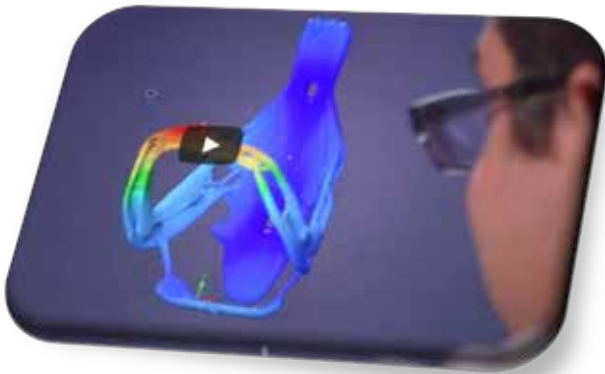
Speaking of fast, hear from Predator Cycling on how they leverage GPU solvers within Ansys Discovery to cut their product development process in half.

YouTube Video

Curt Chan - Senior Product Marketing Manager

Curt Chan is a Sr. Product Marketing Manager. He works with students, start-ups and larger companies to embrace and get the most out of the new generation of simulation-led design products like Ansys Discovery. Prior to Ansys, Curt spent several years as a Mechanical Engineer in the defense and medical industry. Aside from industry experience, Curt offers expertise in a variety of 3D CAD/CAM Tools, complementing his knowledge in Finite Element Analysis Products (FEA) and additive/subtractive manufacturing techniques. Curt holds a Bachelors Degree in Mechanical Engineering from San Diego State University.

Simulation by order of HENN GmbH & Co. KG

HENN is producing innovative connection technology including mufflers for the automotive industry. Numerical prototyping was being considered in order to accelerate the development process while increasing product quality.

Branch: Automotive supplier
Specialist field: Acoustics: Multiphysics, Structural mechanics

Fig. 1: Composite image from fluid, structure and acoustic analyses of a muffler connected between a turbo charger and an automotive pipe. Streamlines colored with velocity, walls with pressure or deformation and iso-surfaces from sound pressure level.

Task	Solution	Customer benefits
For the optimization of a muffler connected between a turbo charger and an automotive pipe, three key applications involving miscellaneous physics had been selected: 1. strength and tightness of the closing mechanism, 2. flow induced deformations, pressure loss, 3. customization of the acoustic transmission loss.	**As a consulting project CADEM analyses were performed with Ansys FEM, Ansys CFD and a parametric model structure and fluid behavior as well as acoustic transmissions.** This was followed with a know-how transfer that allowed HENN engineers to run further simulations and perform virtual prototyping on their own.	Dramatically reduced number of prototypes, thus ensuring a short development cycle while reducing the R&D costs and increasing product quality while reducing production costs.

Task - HENN is producing innovative connection technology including mufflers for the automotive industry. Numerical prototyping was being considered in order to accelerate the development process while increasing product quality. Key applications involving miscellaneous physics had been selected:

1. strength and tightness of the closing mechanism,
2. flow induced deformations, pressure loss,
3. customization of the acoustic transmission loss.

These cases were given to CADFEM in order to allow for a progressive, safe and robust entry into numerical prototyping including pilot projects, know how transfer and software support.
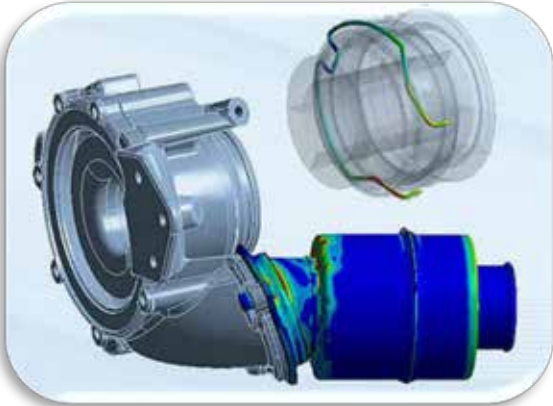
Fig. 2: Structural stresses and deformations of connector mechanism and muffler.

Fig. 3: Optimized acoustic spectrum according to a given target including comparison between simulation results and subsequent measurements (4 points sound pressure level transmission loss from a test rig).
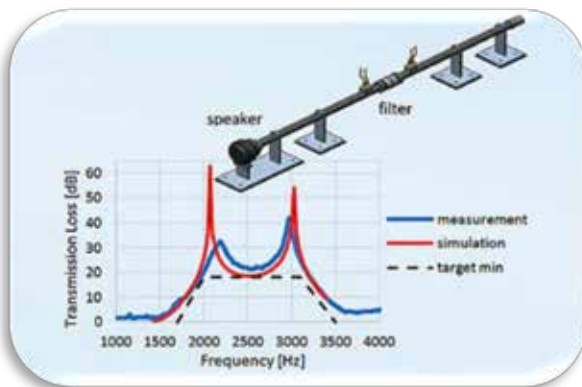
Courtesy of HENN GmbH & Co. KG

Solution - Ansys FEM structural analyses involving non-linear frictional contacts, hardening and hyper-elastic material laws were used to compute structural deformations, stresses and contact pressures under realistic conditions for the connecting mechanism (Fig. 2). An Ansys CFD analysis was used to compute pressure losses. The resulting pressure field was applied on a structural model in order to obtain structural deformations and stresses (Fig. 1). Optimizations based on a parametric model of the acoustic transmission loss measurement setup allowed the generation of custom designs automatically according to target transmission loss profiles (Fig. 3) and size reduction objectives. Consulting projects were followed by know-how transfer that allowed engineers at HENN to run further simulations and perform virtual prototyping on their own.

Customer Benefit - In house virtual prototyping:
- ability to automatically generate custom muffler designs to address specific transmission loss requirements in a few days instead of a few weeks
- dramatically reduced number of prototypes, thus ensuring a short development cycle while reducing the R&D costs
- increased product quality while reducing production costs
- safe and progressive introduction of state of the art simulation technologies thanks to a dynamic trade-off between the use of CADFEM and in-house resources.

HEAD OF ENGINEERING

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info@cadfem.ch

Christoph Müller
Simulation Software and Services worldwide

A major leap forward in the development of medical technology - Better diagnoses of obstructive sleep apnea - docq OSA

Obstructive sleep apnea (OSA) is a life-threatening and life-shortening disorder that affects more than 900 million adults worldwide.

CADFEM Medical, together with Lars Bonitz, M.Sc., Ph.D., and partners, is addressing this issue by developing an application that supports the diagnosis of severe snoring and OSA and the selection of an appropriate therapy. Efficient flow simulations of a patient-specific airway enable the identification of local anatomical causes and help in the evaluation of different therapeutic measures.

Video can be viewed on website

docq OSA at a glance - Target: Identification of an appropriate therapy for severe snoring

· Objectifying the diagnosis through numerical flow simulation
· Identify if there are anatomical / biomechanical reasons for the breathing disorder during sleep.
· Better aimed derivation of a suitable therapy
· Visualization of the patients' situation with physical simulation
· Accurate definition of why the patient suffers from breathing disorder

**Jan Hertwig
CEO CADFEM Medical**

Your contact for all questions regarding CADFEM Medical.

Suri Bala
Founder and CEO at d3VIEW, Inc

Data-aware platforms with built-in analytics must have the ability to detect events in the data. One good example is the un-supervised detection of charge/discharge in Battery Management System (BMS) time-history data of Current or other channels.

Over the past year, d3VIEW has developed and successfully implemented the detection of charge-discharge times and has features now to compute cycle-based-metrics using time-series data from any BMS systems. The event-detection has now been extended to generic time-series curves to facilitate extraction and detection in an un-supervised workflow. With this capability, d3VIEW users can benefit from automation and eliminate human errors for both simulations and experimental time-series data.
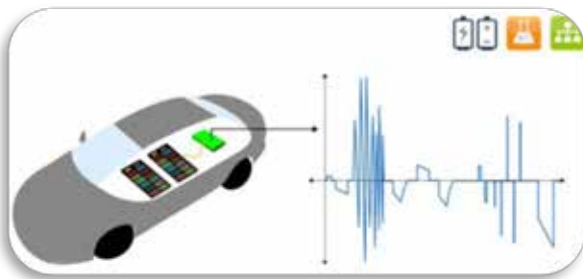
Battery Cycle Detection using 'Current' Time-series Data - **Author: Bing**

Battery data have many interesting properties. One of them is cycles. When we consider the whole range of the data, there are a few of the metrics we are interested in.

For example, test net capacity and energy, test cumulative capacity and energy, etc. From these transformed curves, we can obtain some metrics that help us to evaluate the performance of the batteries. More than often, we are interested in cycle based metrics such as cycle charge/discharge capacity/energy, cycle net capacity and energy and so on. This requires us to be able to effectively identify each cycle start time. One way to obtain this information is by analyzing the current data.

The end of a cycle (start of the next cycle) is marked by the end of a charge event. Charge events and discharge events can be easily identified by the sign of the current curve. If the current stays above zero for a period of time, it indicates a discharge event; if the current stays negative for a period of time, it indicates a charge event. It also happens that the current goes up and down crossing zero constantly within a period of time. We don't want to include any point from the noise as a cycle start time.
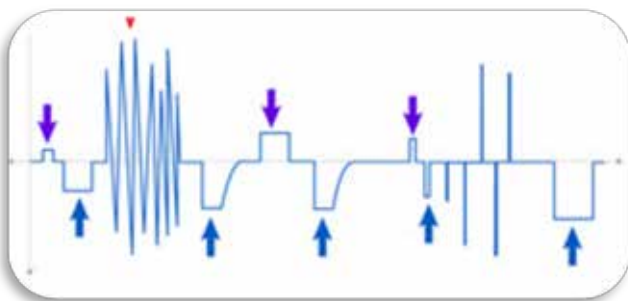
Figure 1 shows an example of current data. We can easily notice that there are a few time intervals where the current curve stays positive or negative , significantly away from zero. This provides us information about charge and discharge events of this specific data. In Figure 1, discharge events are marked by purple arrows and charge events are marked by blue arrows. The red arrow points out the noise.

Figure 1 Current curve. Discharge events are marked by purple arrows; charge events are marked by blue arrows; and red arrow points out the noise.
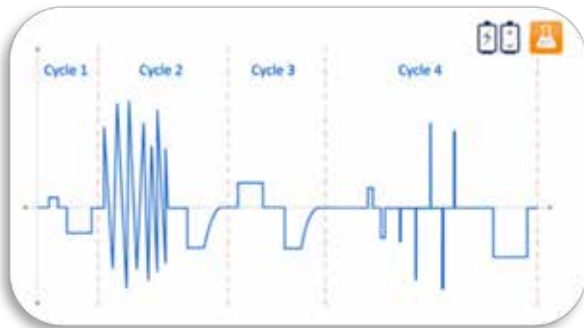
When an event reaches zero, it marks the end of the event. A cycle is counted every time a charge event lasts more than a certain amount of time and it starts when a charge event ends. Figure 2 shows the four cycles identified in this data and the cycle start time is marked by a dashed red line. The first point is considered to be the start of the first cycle. Cycle 5 starts very late at the end of the data collection process.

Figure 2 Five cycles exists in the given current curve. Red dash line indicates the boundary between two adjacent cycles.

There isn't enough information for us to conclude anything. Notice that in order to count a cycle, the charge event must last a certain amount of time. Therefore, not all charge events suggest a new cycle. This explains why no cycle starts around 35k at the end of the charge event because it doesn't meet the duration requirement.

Please visit the website to zoom in on figure: If we zoom in to the end of cycle 3, we notice that the current curve never actually reaches zero. Instead, it keeps a small distance to zero. By definition, as the current stays positive, the charge event continues. In this case, however, it is more desirable to be considered as the end of cycle 3.

Curve transformations and cycle based metrics - Figure 4 shows the corresponding voltage curve. From the current and voltage curve, we can calculate the power curve (Figure 5).

Figure 4 Voltage curve

Figure 5 Power curve computed based on current & voltage.

Contacts
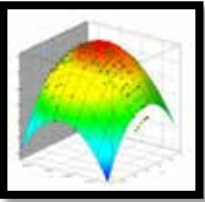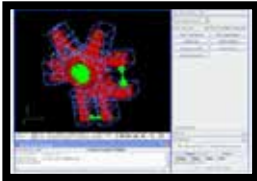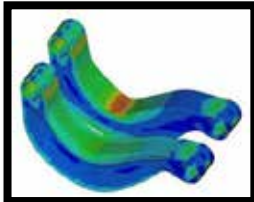
Kathleen Fritz   **Kathrin Faas**

DYNAmore offers multiple tools for optimization and stochastic analysis

We offer stand alone software able to be linked to any simulation code up to complete software packages and postprocessors in non-linear finite element applications and design optimization capabilities.

LS-OPT	ODYSSEE	GENESIS	LS-TaSC	VisualDOC
A standalone design optimization and probabilistic analysis tool. The graphical optimization tool tightly interfaces with LS-DYNA.	Optimal Decision Support System for Engineering and Expertise. It is a powerful software package consisting of the 3 modules Lunar, Quasar and Nova.	A fully integrated finite element analysis and design optimization software package, written by leading experts in structural optimization.	A tool for the topology optimization of non-linear problems involving dynamic loads and contact conditions	A general-purpose optimization tool that allows the user to quickly add design optimization capabilities to almost any analysis program. less

DynaXtend

The new offer from DYNAmore.
- More LS-DYNA analysis power
- Maximum flexibility.
- Bookable at any time!

Boost your analytical performance - with DynaXtend!   - This special offer allows you to customize your need for LS-DYNA computational runs to your requirements.

You have the possibility to choose between one or more computational runs on 128 cores each and thus to increase the computational power strongly at short notice. The daily bookability and the validity of one month guarantee maximum flexibility. This makes DynaXtend perfect for projects that require more computing capacity at short notice and for a limited period of time.
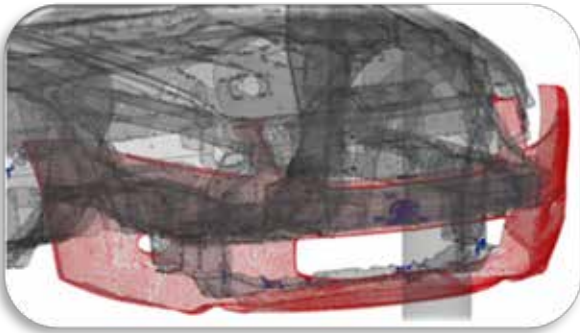
Short Fiber Reinforced Plastics

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

All videos can be viewed on the website

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.
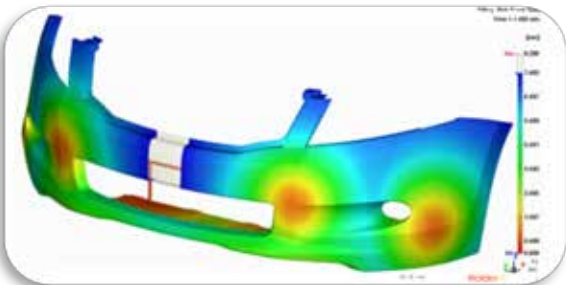
Step 1: Injection molding simulation of the bumper in Moldex3D - To assess the orientation of the fibers in the final product, start by performing an injection molding simulation in Moldex3D. It is a powerful tool and yet easy to use, considered a market leader for plastics molding simulation and fiber orientation prediction in injection molded parts [1].
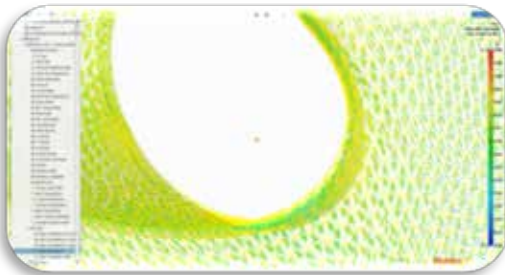
Step 2: Utilising the injection molding simulation results - Several alternative ways to make use of the fiber orientations in the subsequent LS-DYNA model exist. Based on our experience, we have two preferred ways of working. One way is to work with Digimat, an add-on material modeling software from 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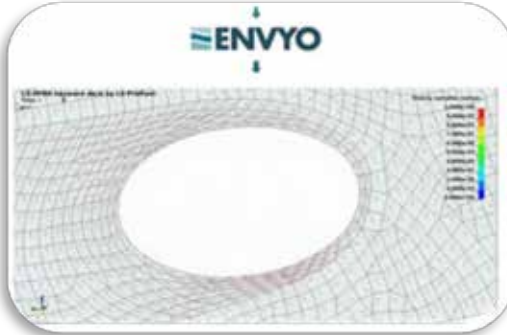_ELASTIC, *MAT_ANISOTROPIC_ELASTIC_PLASTIC, and *MAT_4A_MICROMEC. If you are already using another software than Moldex3D for the injection molding simulations, Envyo also has interfaces to other software.
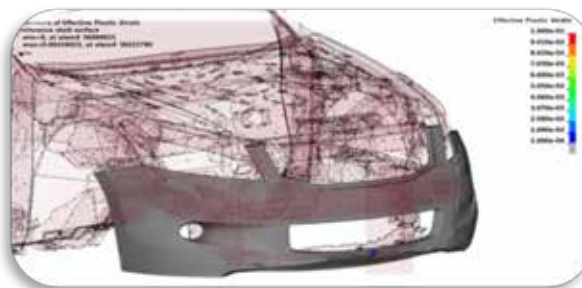
Step 3: Using LS-DYNA to check the bumper performance for the impact load - After mapping the fiber orientation from the Moldex3D analysis using Envyo or Digimat, the LS-DYNA vehicle model now includes a bumper containing mapped fiber directions. The pole impact simulation is performed as usual, illustrated in the figure below, and the verification of the bumper's performance can take place.

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.

Tracked Vehicle - RecurDyn offers two Toolkits that are completely dedicated to tracked vehicles

RecurDyn offers two Toolkits that are completely dedicated to tracked vehicles.

The first is dedicated to low mobility (i.e. low-speed) vehicles, whereas the second is dedicated to high mobility (i.e. high-speed) vehicles.

In this example, a tracked bulldozer was simulated to evaluate the dynamic behavior of the vehicle on different terrains and with different obstacles. The model can also be used to calculate the loads operating on the vehicle's structure, and to analyze the forces acting between the links in detail. The Toolkit contains several components which can be automatically included in the model and then personalized based on the user's data.

The RecurDyn solver offers unparalleled performance when solving these kinds of problems, delivering reliable results in a short time.

YouTube Video   YouTube Video
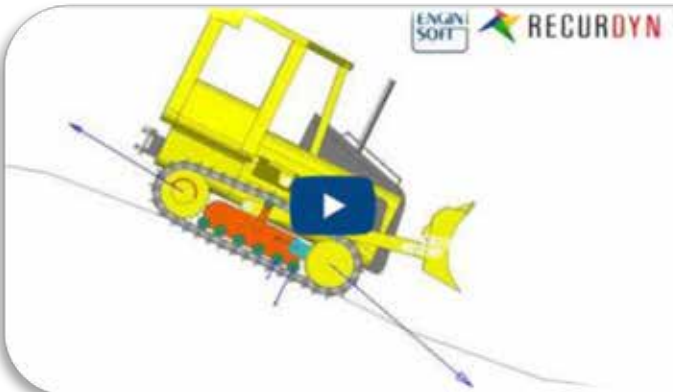
YouTube Video   YouTube Video

Jithesh Erancheri
Country Head - Technical

Kaizenat Technologies Pvt Ltd

Kaizenat Features Videos

We the Technical team of Simulation engineers at Kaizenat Technologies Private Limited support & train engineers for FEA, CFD, Electronics simulations on tools: ANSYS, LS DYNA, ANSYS Discovery etc.

Did You Ever Play Badminton?

CFD Study over Badminton Shuttle in ANSYS
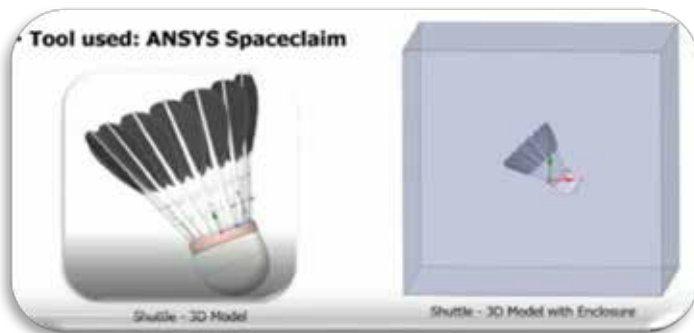
Badminton is a sport that is totally different from other racquet sports, uses a shuttlecock, which is an asymmetric projectile far away from a ball.

In this video, the airflow around a badminton shuttlecock while doing high service has been simulated in ANSYS 2021R1 and here the results were displayed.
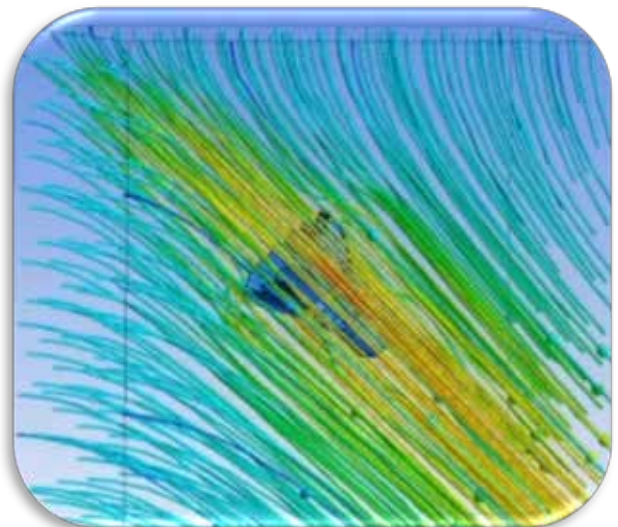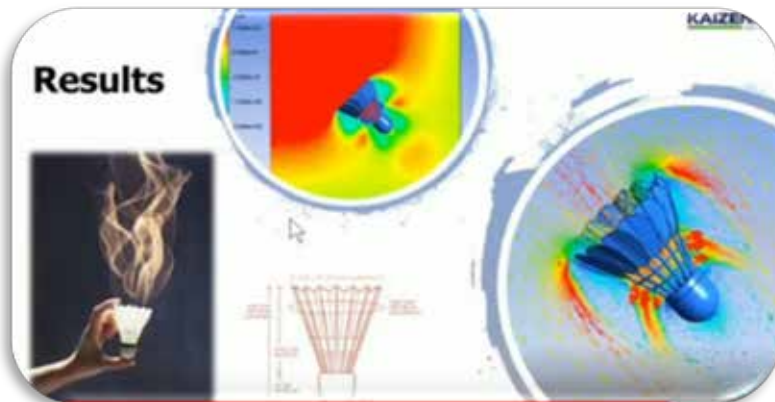
Thanks to Dan Marinac and T.J Flemings for bringing this to our attention on social media

Chris Coker, Manager at Hexagon Manufacturing Intelligence

"Nastran was used to simulate the structure of the James Web Telescope. One of the challenges of this structure is that it has to perform at ambient temperatures for ground testing, as well as the cryogenic temperatures of space. Being able to correctly simulate the thermal effects was critical to the success of the design."

Structural Analysis and Model Validation for the James Webb Space Telescope ISIM Structure

The James Webb Space Telescope is a highly sensitive instrument that is positioned using a precise optical metering support structure. This supporting structure is made from composites to reduce thermal expansion effects while reducing weight.

The instrument and structure are subjected to temperatures ranging from ambient during launch to cryogenic temperatures while in orbit. Dynamic and static loads are encountered during launch and in operation respectively.

Challenge - The support structure must meet stringent structural requirements related to distortion, dynamic and static loading events. Testing must be supplemented by analysis to verify and improve the limited number of physical tests. Methodologies must be developed to explore the design via a probabilistic approach and satisfy performance within a 2-sigma range of uncertainty.

Solution - A high fidelity MSC Nastran model (1.5 M nodes, ~5M DOF) was used to examine the structural integrity of the ISIM structure at the global level due to thermal and gravity loads (SOL 101) and a reduced Craig-Brampton model for dynamic analysis (SOL 103). Global only and global-local (Detailed stress models) approaches were used along with testing as a basis to develop and validate methodologies and allowables for the design of composite joints.

The high fidelity MSC Nastran dynamic model was validated via subassembly testing and the results were used to determine optimal placement of instrumentation, excitation load point and target modes. The high fidelity MSC Nastran model was also used to predict the thermal distortion that occurs moving from ambient to cryogenic temperatures, cryogenic thermal stability and physical distortion from 1 G loading. The model was also used to quantify error bounds and uncertainties due to material, manufacturing and spatial variability compared to a nominal analysis. The same model was used to determine and validate strength allowables via a semi-empirical approach. These allowables included composite interlamina failure, composites in-plane failure and metallic ultimate and yield failure at both ambient and cryogenic temperatures.

In addition, the global-local approach was used to validate adhesive maximum principal stress failure allowables at cryogenic temperatures.

Results/Benefits - Direct application of the MSC Nastran solver resulted in a validated design that agreed with dynamic test results with frequencies matching within 5%. Thermal distortion predictions were validated with cryogenic testing and the error bound associated with nominal predictions was established.

Allowables validated by MSC Nastran models were shown to be conservative at predicting composite joint failure at ambient and cryogenic temperatures.
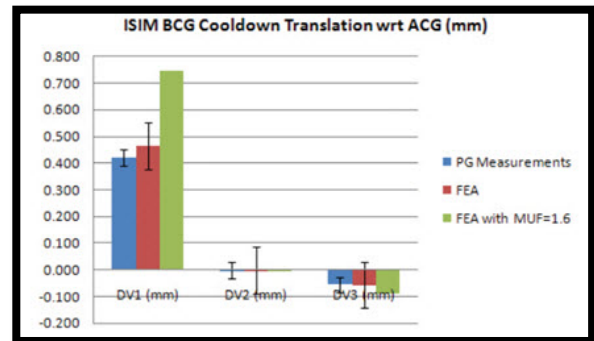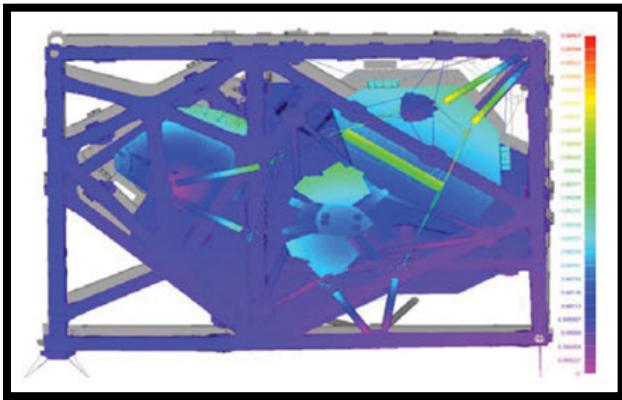
Thermal Distortion Test Results vs Analysis
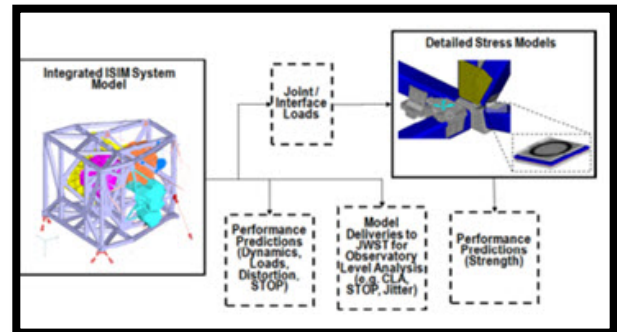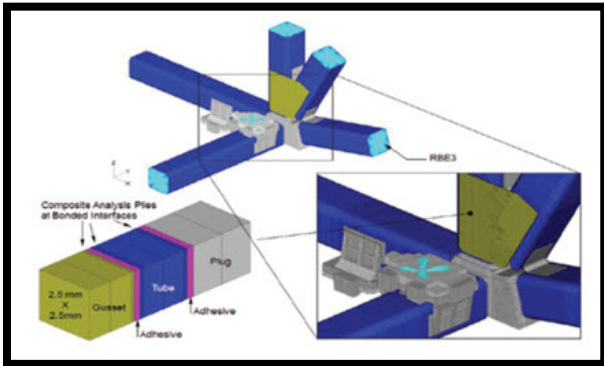
Structural Model Architecture
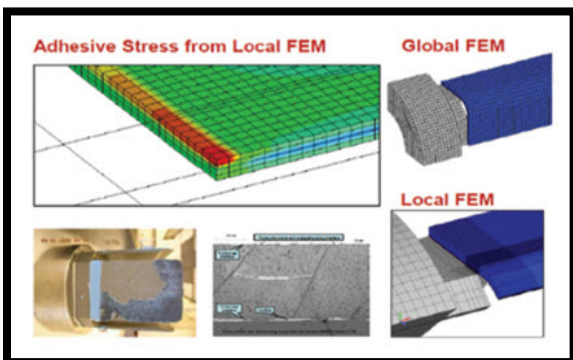
Global Local FEM Model

Marta Kempa, MBA - Marketing Coordinator & Seppi
Oasys LS-DYNA
Oasys Software, Tutorials & Classes Not To Miss

> **Not To Miss on YouTube - This webinar covers the new automotive library templates released with REPORTER 18.1, as well as previewing the templates that will be released in the upcoming REPORTER 19.0.**

AdSec — Load Analysis Software - Analysis of concrete, steel and FRP sections under combined axial and flexural load. Ideal for single pile section analysis.

Analysis and design of sections under load

AdSec demonstrates how sections respond to combined axial load and bending moments. It can analyse concrete, steel and fibre-reinforced polymer (FRP) sections and compound sections.

AdSec is ideal for tasks such as analysing a bridge beam for cracking under load, designing a composite mega column, checking a pre-stressed floor or finding the capacity of a pile. AdSec is also valuable in refurbishment projects, enabling engineers to calculate the capacity of existing beams and columns, and showing how much improvement can be achieved from FRP reinforcement or adding extra concrete to the section.

How AdSec Works

Used by engineers around the world, AdSec is one of the leading analysis programs for loaded structural sections.

Input: AdSec creates reinforced and composite sections using intuitive model wizards and DXF import to create single and compound sections of any shape and any reinforcement arrangement. The reinforcement can be with or without prestress, and use a variety of materials, including steel, GRP, and Carbon Fibre. AdSec can then combine these sections to allow you to analyse composite structures.
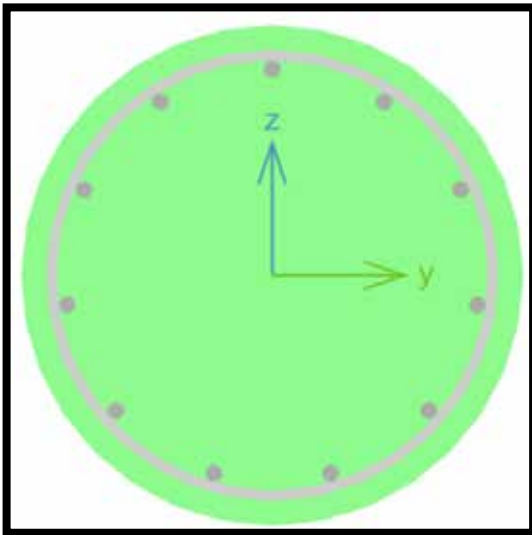
Analysis: AdSec analyses sections for serviceability and ultimate limit states under uniaxial and biaxial loads. It calculates capacities, section stiffnesses, crack widths, stress and strain values using code and user defined nonlinear materials to a variety of international design codes.

Output: AdSec will tell you if your section works or fails under the loads, what the stresses and strains are in the section and reinforcement, the crack widths (where the codes allow), section capacity, and stiffness of the loaded sections.

Key Features & Benefits
- Calculates capacities and crack widths for reinforced concrete sections
- Analyse using Eurocodes and many other International design standards

PDF

Download Product Sheet

_____

Not To Miss **Mar, 08, 2022** **Training Course** - **Introduction to LS-DYNA (online)**

Course Outline: Learn more about LS-DYNA and its capabilities gaining thorough knowledge in the explicit analysis part of the software using the newest Oasys software. This course provides a thorough overview of the explicit capabilities of LS-DYNA. Furthermore, it gives an insight to the theory behind the software. After the course, the attendees will be able to go through the process of setting up a model (Pre-Processing) to getting results from LS-DYNA (Post-Processing).

Workshop examples are used to demonstrate how to use the software together with a PowerPoint presentation.

Course Content:
- An overview of LS-DYNA software
- An ability to prepare and run LS-DYNA input files
- An ability to debug LS-DYNA data
- An overview about post-processing the results

For Who? Engineers seeking to use LS-DYNA for nonlinear static and dynamic simulations.

Extra Details: Please note that this training course is designed with an emphasis on explicit solution capabilities of LS-DYNA.

Metin Ozen
Principal & CEO at Ozen Engineering, Inc. and Mallett Technology, Inc.

Ansys America's Channel Partner of the Year

Metin Ozen, "Needless to say, I am very proud of our team; congratulations to everyone on our team!   Thank you Ansys!"

Ozen Engineering Inc. is located in the heart of Silicon Valley and serves a variety of technology companies and industries. We pride ourselves on accuracy, deep experience, responsive customer service, and dependable delivery...

Using Python Code Object To Keep Track of Mechanical Runs

by:
John Ozcan (can@ozeninc.com)
Ozen Engineering Inc.
1210 E. Argues Ave. Suite 207
Sunnyvale, CA 94085
info@ozeninc.com

Technical Support Case
#715582254

Have you ever wanted to track multiple Ansys Mechanical runs and tabulate the results in a single output file? We have the solution.

John Ozcan, one of our talented support engineers has created a Python-based script to do just that. **Keeping Track of Ansys Mechanical Runs**

Download the PDF file that will walk you through the process.   Excerpt below

Objective - We would like to achieve the following:
-- Each design iteration has certain input/output parameter set
-- Want to capture this information for all design points, in a text file, in tabulated format
-- Want to have parameter definitions in the 1st column
-- Each design iteration would be an additional column in the table
-- The text file should be appended by new design iternation
We achieve this goal, by using the "Python Code Object" in ANSYS Mechanical

_____

Ansys Lumerical Phased Array Lidar Simulations: Part 3

Last part of our video series on phased array lidar simulations.
In this video we look at photonic circuit simulations for system level analysis!

23

Perfect Support for Teamwork and Remote Working

- Simple exchange of model data
- Access to shared model libraries
- Access-, roles and rights management
- Powerful data compression

LoCo - SCALE.model

Simulation Data Management

Modern Workbench for Simulation

- Simple handling of models
- Quick overview of model features
- Management of load cases
- Job submit and monitoring

Contact

Marko Thiele
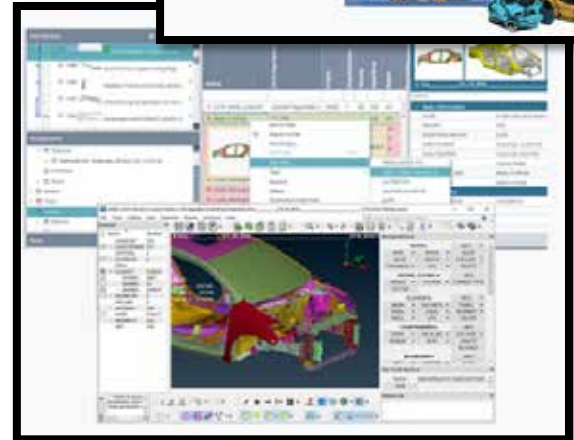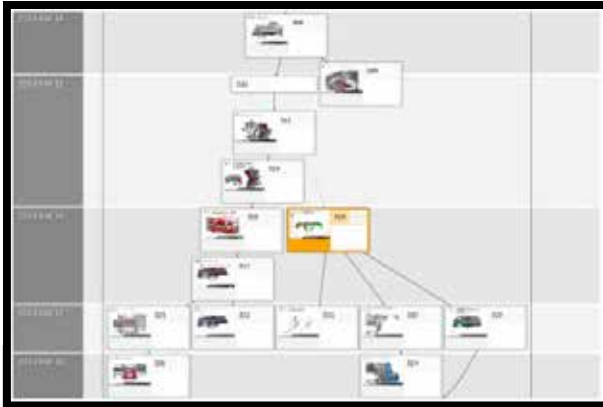
Version Management -

Complete documentation of the history of all model data

- Each object has its own version history: nets, simulation models, scripts, parameters, runs etc.
- Each version is documented with comments, images, reports etc.
- Version trees show complete parent-child relationships of all objects
- Merge and diff. functionalities between versions
- Graphical representation of the version trees with zoom option and timeline
- Filter and search functions

Comprehensive Customisation Options
Integration of any CAE Tools

- Pre- and postprocessors such as ANSA, Hypermesh, Animator etc.
- Any ssolver such as Abaqus, Nastran, PAM-CRASH, LS-DYNA, Star-CCM+ etc.
- Text editors such as Notepad, gvim, Emacs etc.
- CAE software for quality checks such as Primer
- Optimization, robustness, DOE with LS-OPT, Optimus, optiSLang etc.

Scripts for Workflow Automation

- Integration of any existing or new scripts
- High Flexibility in the adaption of individual processes

A crash simulation is a virtual recreation of a destructive crash test of a car or a highway guard rail system using a computer simulation in order to examine the level of safety.

Ameen Topa
Research Scientist at Universiti Teknologi PETRONAS
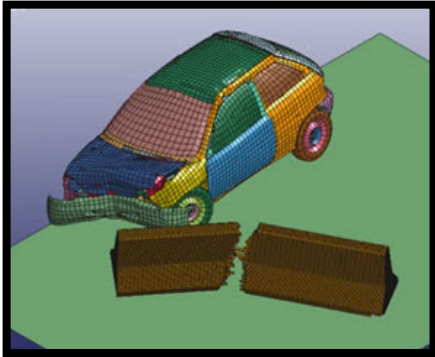
LS-DYNA: Car Hits Concrete Barrier

LS-DYNA simulation of a car running into a concrete barrier at the velocity of 15 m/s (54 km/h). The car hits one side of the barrier and displaced it. The car deforms and the barrier breaks into two parts.

The car model was downloaded from NCAC website. The barrier was model with MAT_CSCM_CONCRETE. The properties of the concrete was taken from the book: LS-DYNA for beginners.
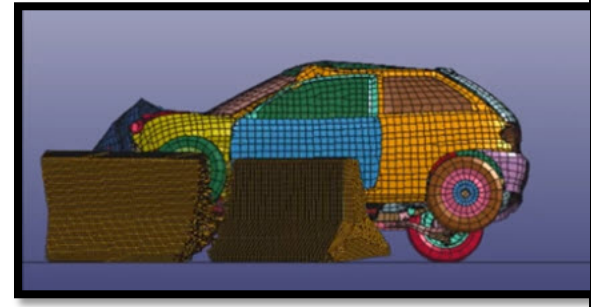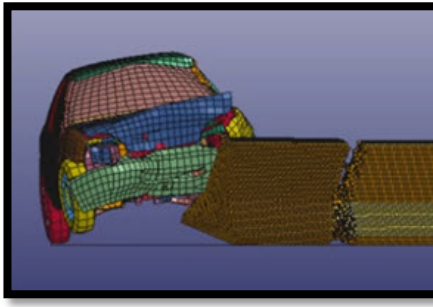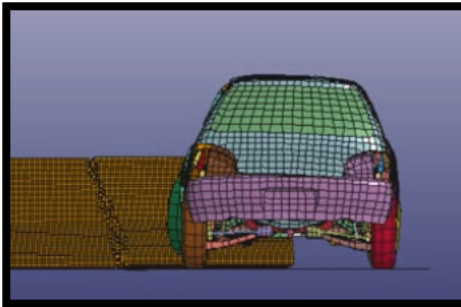
LS-DYNA Truck Pole Side Impact Test - Simulation of Truck Side Impact with dummy. Impact velocity = 8 m/s or 28.8 km/h.
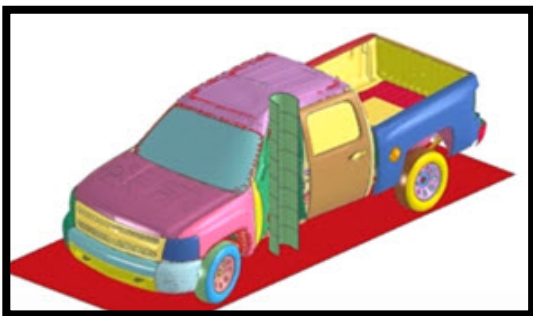
Excerpts - For the complete article please visit the links

DETROIT – GM is launching a new online parts marketplace, making its catalog of 45,000 repair and maintenance parts more convenient for Chevrolet, GMC, Buick and Cadillac owners.

General Motors Expands Digital Commerce with Launch of Online Parts Sales 2022-01-18

- GM adds 45,000 readily available maintenance and repair parts for purchase on Chevrolet.com and other brand websites
- Customers can choose home delivery or in-store pickup at participating dealers

The newly available parts catalog includes oil filters, engine and cabin air filters, batteries, brake pads, accessory belts, cooling hoses and windshield wiper blades, among other parts.

Building on General Motors' investment in digital commerce, GM's online parts store combines the most convenient aspects of online shopping and physical retail into one experience. Customers can choose home delivery or pick up their order at one of more than 800 participating dealers, where staff is available to answer questions. … **Buying through GM's online store also provides customers with confidence that they are purchasing original equipment ACDelco and GM Genuine Parts that are compatible with their vehicles**.

> "Making our parts available online marks another step in transforming the ACDelco and GM Genuine Parts brands," **said GM Customer Care and Aftersales Global Vice President John Roth.** "Our premium parts are engineered with exceptional quality to provide assurance to our customers. The launch of this trusted online sales channel extends that peace of mind to the parts-buying experience."

- GM plans to offer parts, accessories, digital products delivered over-the-air and subscriptions through a single digital storefront. For example, customers may use the store to purchase upgrades such as improved capabilities for the Super Cruise advanced driver assistance system and personalization themes for in-vehicle screens.
- "We are placing software and digital services at the center of every part of our business," said GM Chief Digital Officer Edward Kummer. "The future of GM retail lies at the intersection of digital and physical e-commerce. Whether it's selling parts or vehicles, GM will meet our customers where it's most convenient for them."   …

The quiz was left in the suggestion box by The Old Retired Pilot. No one in town knows his name. You yell, "HEY, Old Retired Pilot." We are sending it out to the residents and guests.

We started the day with the Old Retired Pilot and the Town Secretary fighting for a budget for a fortress - we don't need a stronghold, but we let them argue. THEN we realized the pilot wanted a plane and the secretary wanted to build a fortress! We had to turn them both down due to their conflict of what is a fortress. They are still arguing in the hall!

Quiz - can you name the Manufacturer, and which picture is NOT is not the same as the others?

Additionally, "D" is an extra credit question!

A hint for "D" - derives its lift from blades that rotate about an approximately vertical central axis.

(The answers are at the bottom of the Goodbye page)

A_____

B_____

C_____

D_____

EXCERPT - full article is on the Lockheed website

F-35 Lightning II - **Lethal. Survivable. Connected**. The Centerpiece of 21st Century Global Security

The F-35 strengthens national security, enhances global partnerships and powers economic growth. As the most lethal, survivable and connected fighter jet in the world, the F-35 gives pilots the critical advantage against any adversary, enabling them to execute their mission and come home safe.

The F-35 brings a decisive advantage to the battlespace, providing an asymmetric advantage across the multi-domain spectrum. The F-35's transformational capabilities enable pilots to operate in any environment, against any threat. Simply put it is the most advanced multi-role fighter in the world – delivering unmatched lethality, survivability and connectivity.
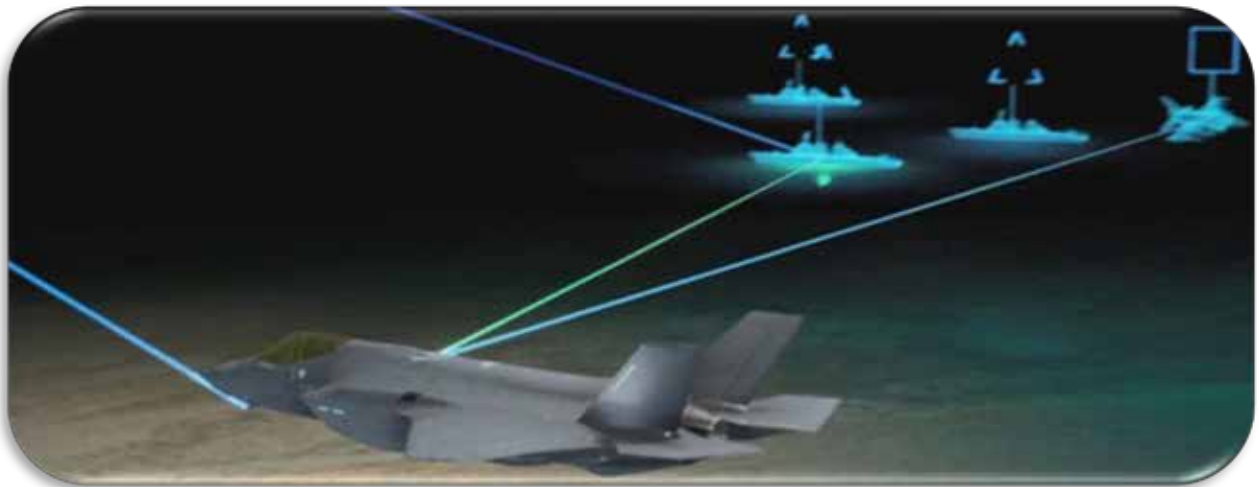
The F-35 serves as the backbone of allied airpower for 13 nations and counting. Playing a critical role in joint domain operations, the fighter brings unprecedented situational awareness, information sharing and connectivity to the coalition.

Thunderbirds winter training -
The United States Air Force Air Demonstration Squadron "Thunderbirds" run through a full airshow demonstration with the pilots, showcenter and maintainers during the team's first winter training trip at Spaceport America, Truth or Consequences, N.M., Jan. 11, 2022. The team will split the trip between two sites with the second half being spent at Fort Huachuca, Ariz. (U.S. Air Force photo by Tech. Sgt. Nicolas A. Myers)

Lancer refuel - A B-1 Lancer from the 7th Bomber Wing prepares to receive fuel from a KC-135R Stratotanker over the Pacific Ocean during a Bomber Task Force deployment, Jan. 11, 2022. Bomber platforms include a variety of aircraft including B-52 Stratofortress', B-1s, or B-2 Spirits that can move to and from various dispersed U.S. bases and other departure and arrival points. (U.S. Air Force photo by Airman 1st Class Moses Taylor)af3

Unloading Globemaster III -
A C-17 Globemaster III from Joint Base Elmendorf-Richardson, Alaska, is unloaded at Eielson Air Force Base, Alaska, Jan. 11, 2022. The C-17 commonly performs tactical and strategic airlift missions, transporting troops and cargo throughout the world and is involved in additional roles including medical evacuation and airdrop duties. (U.S. Air Force photo by Airman 1st Class Elizabeth Schoubroek)

The Avicenna Alliance
Thierry Marchal, Secretary General
ANSYS Program Dir. for Healthcare Solutions

I am truly delighted to invite you to attend the free, on-line event, Avicenna Day Feb 15th & 16th 2022.

During these 2 half days, academic, industrial and regulatory thought leaders will be sharing their vision as well as the achievements of the Avicenna Alliance. We will review obstacles in front of us & the best ways to tackle them together. Let's discuss when, where and how you can use digital evidence to accelerate the regulatory approval process.

The Avicenna Alliance
- A global non-profit organization that brings together health care stakeholders
- With the goal of making in silico medicine standard practice in health care
- Through a collaborative ecosystem of patients, clinicians, academics, industries, policy makers, regulators & payers

Our Mission - Significantly accelerate medical innovation and its practical implementation, to ensure safe, affordable and cost-effective health care through the large scale adoption of in silico medicine (Computer Modeling & Simulation, CM&S)
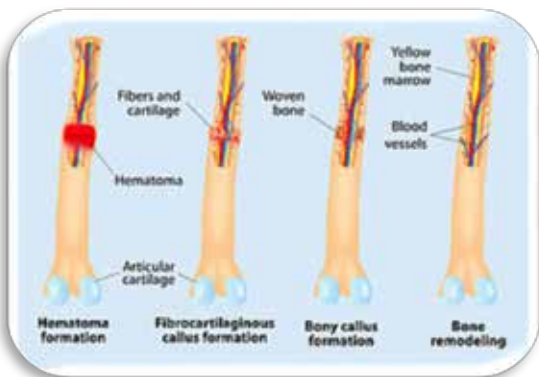
Case Study - Improving the quality of bone tissue regeneration: from bench to bedside via in silico modelling (BRIDGE project)

Tissue engineering is a biomedical engineering field designing and improving man-made living implants to replace diseased or non-functional (parts of) organs. A challenge in tissue engineering is that the complex lab procedures involve a lot of manual work and don't have clear quality criteria, which is essential for safe clinical applications.

PDF - 1.1MB In silico medicine encompasses the use of individualised computer modelling and simulations in all aspects of the disease pathway.

Excerpt: The need for in silico medicine? The foundations of our healthcare systems today are based on the limitations of the pre-digital era and an acceptance that we do not have the capacity to understand the human body on a scale necessary to provide personalised treatments.

With the advent of the digital era, our ability to turn enormous quantities of raw data into useable information compels us to re-think these assumptions and their policy structures.

Among the Members: the complete member list can be viewed in the pdf or website
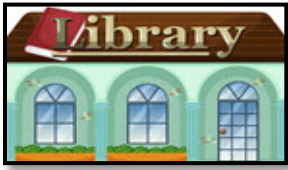
> To study the anti-blast performance of the shallow-buried BFRP bars concrete arch (BBCA), **a multi-parameter comparative analysis was conducted employing the LS-DYNA numerical method**, which was verified by the results of the field explosion experiments.
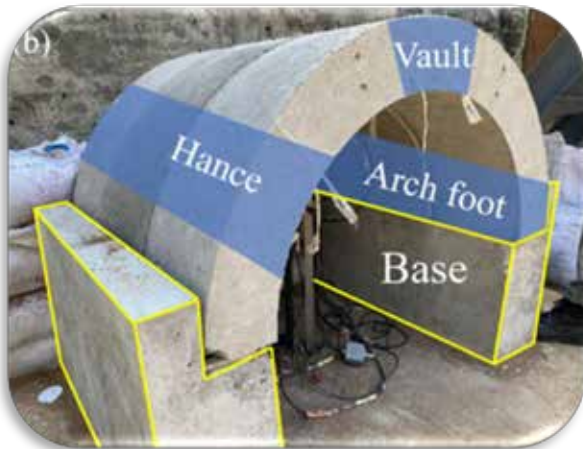
Dynamic Responses of Blast-Loaded Shallow Buried Concrete Arches Strengthened with BFRP Bars
by J. Wu, J. Zhou, Y. Xu, X. Kong, P. Wang, B. Wang, C. Zhao, F. Jin, W. Wang and F. Wang

State Key Laboratory of Disaster Prevention & Mitigation of Explosion & Impact, Army Engineering Univ. of PLA, Nanjing 210007, China

Abstract

This paper proposes a prefabricated basalt fiber reinforced polymer (BFRP) bars reinforcement of a concrete arch structure with superior performance in the field of protection engineering. To study the anti-blast performance of the shallow-buried BFRP bars concrete arch (BBCA), a multi-parameter comparative analysis was conducted employing the LS-DYNA numerical method, which was verified by the results of the field explosion experiments. By analyzing the pressure, displacement, acceleration of the arch, and the strain of the BFRP bars, the dynamic response of the arch was obtained. This study showed that BFRP bars could significantly optimize the dynamic responses of blast-loaded concrete arches. The damage of exploded BBCA was divided into five levels: no damage, slight damage, obvious damage, severe damage, and collapse. BFRP bars could effectively mitigate the degree of damage of shallow-buried underground protective arch structures under the explosive loads. According to the research results, it was feasible for BFRP bars to be used in the construction of shallow buried concrete protective arch structures, especially in the coastal environments.

1. Introduction (excerpt)

As important structural members, reinforced concrete arches are widely used in underground protective structures [1,2,3]. With the development of defense engineering, the protective structure is required not only to have excellent mechanical properties but also to be used in some special environments, such as under explosion. Besides, there are higher requirements for the durability of protective engineering. Therefore, **it is necessary to take scientific and reasonable measures to enhance the blast-resistance performance and the durability of traditional structures…**
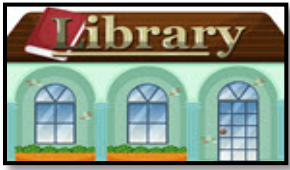
…
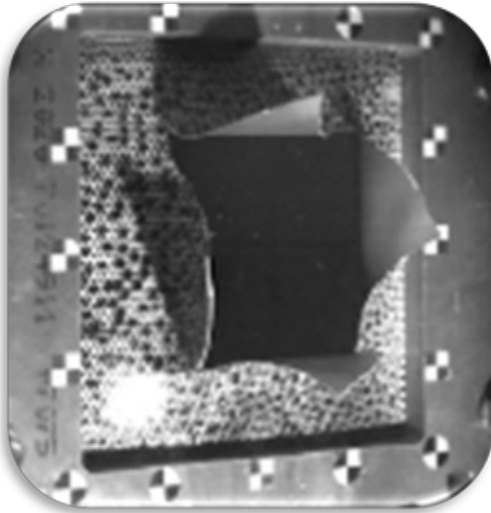
[A study on blast-loaded aluminium plates with crack-like defects subjected to blast loading](#)

H. Granum (Enodo), D. Morin, T. Børvik, O. Sture Hopperstad

(NTNU)

Uniaxial tensile specimens extracted from a plate are used in the calibration of the *MAT_258 material model available in LS-DYNA.

Abstract

This paper presents a study on AA6016 plates in temper T4 subjected to blast loading. Four different crack-like defects have been introduced in the plates to facilitate crack propagation as the dominating failure mode. Uniaxial tensile specimens extracted from a plate are used in the calibration of the *MAT_258 material model available in LS-DYNA. This material model contains a non-quadratic yields surface, isotropic work hardening and aa failure model where the onset of failure is dependent on the element size as well as its bending-to-membrane loading ratio. Four different element sizes are investigated to assess the ability of the model to predict the onset of failure and subsequent crack propagation in the blast-loaded plates by comparison to the experiments conducted in shock tube facility.

Figure 7: Contour plots of the deformation mode indicator Ω for simulations with $l_e/t_e = 1$ at $t = 1.25$ ms.
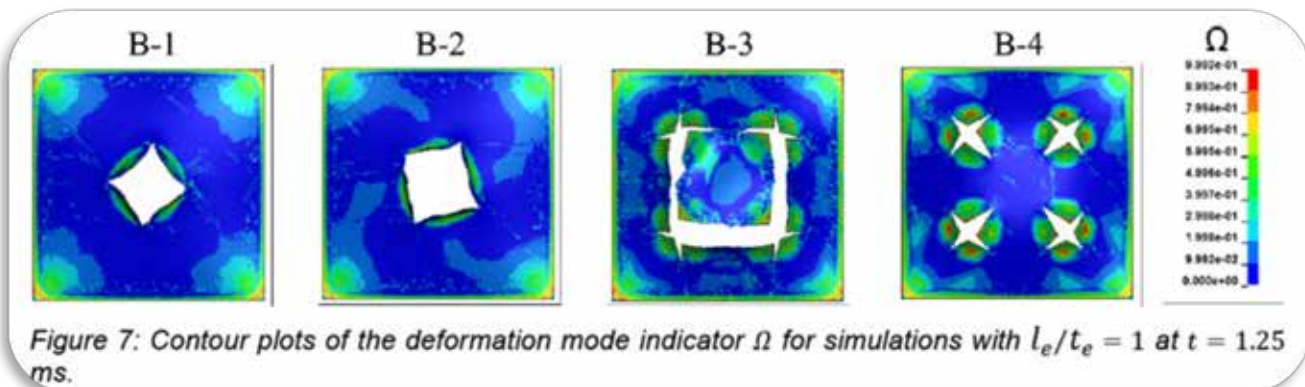
The Old Cattle Rancher's Ranch

No one knows his name. You yell, "HEY, old cattle rancher."

Agriculture, Soil, Equipment, Cattle, and whatever he wants. HUMVEE

February

Thanks to Morten for bringing AM General to the attention of the cattle rancher

The 2-CT Ambulance purchased using the town budget was donated to the US military.

Morten Rikard Jensen - CTO at CertaSIM, LLC

YouTube - **AM General: Building for the Future Now**

2-CT Ambulance

Rugged and resilient, the 2-CT™ Ambulance is an ambulance configuration of the HUMVEE family.

Equipped with advanced armor protection, this combat ambulance is built to reliably transport causalities from the battlefield to medical aid stations.

Mission Proven - Battle Ready - AMGeneral

AM General and its heritage companies have built over 1 million vehicles in the last 100 years and 250,000 automotive systems in more than 70 countries. Today, AM General builds more military light tactical vehicles than any other company in the world.

The Old Cattle Rancher's Ranch   **February**

No one knows his name. You yell, "HEY, old cattle rancher."
Agriculture, Soil, Equipment, Cattle, and whatever he wants.
www.feantm.com magazine

First - on January 13th this guy did a complete 360. He was shaken up but no damage.   WHY must people speed down this country road ON that curve! Video (the folder is (www.feantm.com/accident)

(IF anyone is hurt it will never be posted - this is to show how great the car manufacturers are with safety features - seat belts, airbags, etc.)   They can keep people safe, but not keep them from speeding.

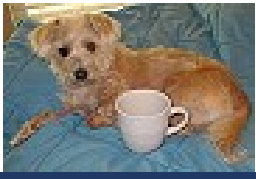|	
Oh look? Why is he going sideways past the house?	A start of a roll over? Nope he did a 360 - lucky!
Now he is facing the house!	Now he is almost all the way safe.

Accidents in Dec. - OH look, it is the same curve and they land in front of the yard OR in it!

Welcome to rat month! He is now happily living in the hills of the next town.

I know I live on a ranch, but a rat eating at night in the kitchen is out of the question. What is the question you ask? I guess it's do you want a rat eating in your kitchen?

The only good thing about it is that I cleaned that kitchen, bleached it, and now have nothing on those counters. My kitchen is my least favorite room other then for coffee. It is now cleaner then in all the years I have been married!!   The kitchen is now rat boring.   WAIT - my coffee area was always clean!

- · Did my clean, sterilized kitchen keep him away from looking for food? No.
- · Did he go in any of our traps and I bought three different kinds? No.
- · Did he like peanuts, peanut butter, etc. that was recommended? NO.
- · Did the smell of Peppermint keep him away - NO, but he probably smelled nicer if he rolled in it.

This rat only ate bananas.   Now, one can think he may have had a potassium deficiency, but I don't really care about his health.   NO, I would not use those glue traps where he would get stuck to it, and then have to drown him!

Here is Mr. Rat - although a cutie, and he does have a look on his face like "OH NO, here she comes and I'm caught on her night vision camera!" - Okay, now I knew what Mr. or Mrs. Rat looked like and started tracking its movements by moving my portable night vision camera.   Yes, I also have night vision binoculars, etc.   There are no lights at night out in the county!

SO, we put the banana at the bottom of a tall garbage can with a ramp, and he went in after it but it was tall enough that he could not jump back out.   I read they can find their way back - they must be little rat engineers and developed a rat GPS they tune to Find cheese, Find peanut butter and OH NO, someone optimized it to FIND Bananas.

SO, we drove him over 10 miles away and let him out with 7 bananas to feed him until he settles into his new field.

AND that is living on a ranch - I will never complain about weeds again (lie, but it sounded good)
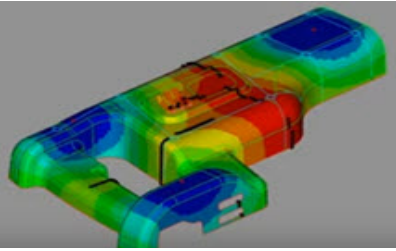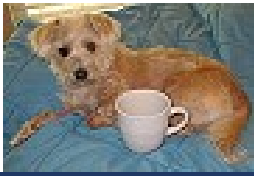
	Injection Molding simulation in ANSA
	T. Borvall - DIEM and the No-Copy option in LS-DYNA
	Ozen - Harmonic Frequencies analysis of guitar string in Ansys Mechanical
	N. Stander/A. Basudhar - LST/ANSYS LS-OPT
	Galal Mohamed - Oaysis Modelling FRP composites in LS-DYNA
	DYNAmore Express: Topology optimization of an automotive hood for multiple load cases
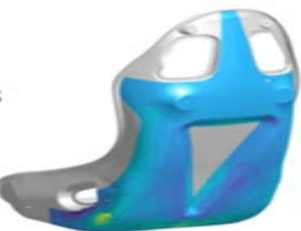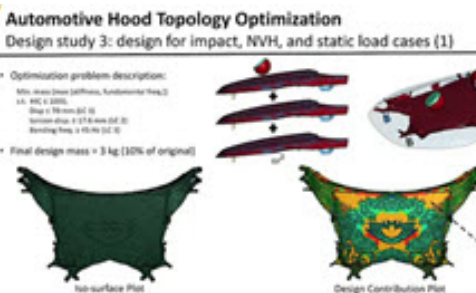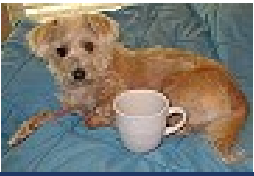
H. Dong - Truck Frame Optimization Considering Crashworthiness, NVH and Static Responses

R. Nasouri - Validation of the CHEMISTRY Solver in LS-DYNA

A. Ulbertus, Sideways launching process of a ship using the Arbitrary-Lagrangian-Eulerian approach

A. Nair - Trailing edge failure analysis of a friction pad in a clutch using thermal fluid structure interaction with LS-DYNA® ICFD solver
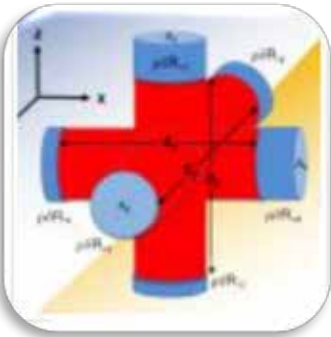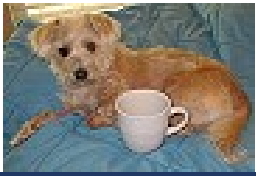
	01/31 - LLNL - Research looks at 'piston-model' to understand impacts of asymmetry on ICF implosions
	01/23 - G. Frans - SimRod experience: From Belgian blocks to vehicle durability testing (part 4)
	01/17 - Bing - D3view - Battery Cycle Detection using 'Current' Time-series Data
DYNAlook	01/10 - Dynalook - Papers from European and International LS-DYNA User Conferences
	01/03 - Cadence - Inductor Parasitic Capacitance Limits Upper Operating Frequencies
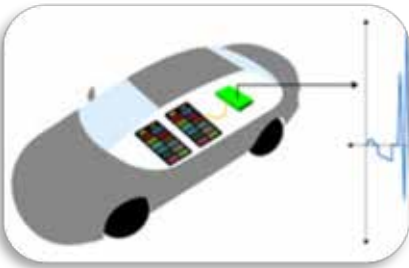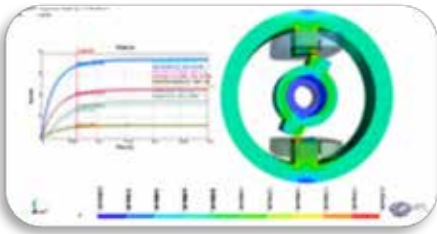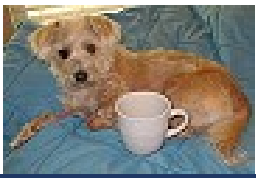
01/23 - Coffee and Extra Milk or EM. No? EM doesn't stand for Extra Milk in coffee. Okay, then off we go to YouTube for something that makes more sense.

LS-DYNA EM : TEAM Workshop Problem 24

LS-DYNA's EM solver

01/17 - Coffee and Slide that Vehicle - NO, I didn't pay a stunt driver to do a 360 past my driveway. Having coffee and here goes an almost car accident - Video makes it look like I paid a stunt driver!

360 Video Jan 13th - **2.2MB .mov file**

I keep watching this video - 3rd "altercation with the previous curve in two months" - I updated the accident folder.
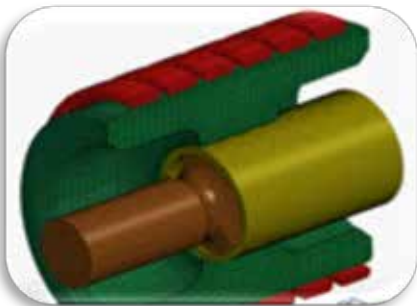
01/10 - When one is making industrial strength coffee to wake up and get moving, it's only fair to have a simulation of something industrial. Grab that strong cup of coffee, wake up, and let's head on over to YouTube.

Multiphysics channel - Industrial EM forming problem

01/03 - When not to be drinking coffee! Actually never drink and drive anything at the same time! OH NO, it is only 01/03 and I'm already lecturing you what to do. Sorry (but it's part of being a senior citizen to be allowed to nag and lecture) NOW, enjoy your coffee and THEN drive over to YouTube.

A. TOPA - Ford Taurus (at 28km/h) vs Dodge Neon (at 113km/h)

The National Motor Museum Trust -

The National Motor Museum Trust Limited is a charitable organization founded in 1972, which runs the National Motor Museum at Beaulieu. Continuing the work of the flagship Montagu Motor Museum, the Trust has a world-famous collection of vehicles and associated motoring items, which are on display in the National Motor Museum.

the Trust has a world-famous collection of vehicles and associated motoring items, which are on display in the National Motor Museum.

Thank you for joining me on my visit to this month's museum.
AND, don't forget to join me next month when I visit another museum!

The town cancelled my Valentine Order for Mercedes for all women employees. They were ordered in honor of Bertha Benz. I thank MBRDI for having her noted on their website.

Bertha Benz (wife of our founder Karl Benz), was the first person ever to drive the first automobile. The seeds of women leading the way therefore, were sown over a century back, at Mercedes-Benz. At <u>MBRDI</u>, we realize we have a tall and rich legacy to further…

In a time when "car" was not even a word yet, and people relied on horses to pull their wagons, one woman challenged the status quo. To prove to the world that her husband's invention was the future of mobility, Bertha Benz went on the first long-distance journey with an automobile, facing all kinds of challenges but stopping at nothing. The rest, as they say, is history

_____

Valentine's Day showcase - Bertha & Karl Benz
Together a force that drove the future

BERTHA BENZ - Woman Moves The World
The full article is on the Mercedes Website

Bertha Ringer was attractive, clever and socially accomplished when she reached marriageable age. And from a wealthy family. There was a long list of suitors. However, fate decreed that during a coach excursion organized by the "Eintracht" club on 27 June 1869, a penniless young engineer joined Bertha and her mother in their coach. **When he brought the subject around to the horseless carriage on which he was working, young Bertha lost her heart to him. Despite his careless appearance and odd manner: Carl Benz was the man she wanted by her side for the rest of her life.**

Better late than never. Decades of poverty and scorn now gave way to recognition and affluence. Many years were to pass before the innovation was generally accepted by the mass of the population. But in the 20th century the automobile was to become one of the most important cultural advances of the new era. Nobody would now dare to deny the great contribution to modern life made by the Benz family. And it was not least Bertha who made this possible: with her unshakeable belief, her capital and her bravery she made a major contribution to this success story. On her 95th birthday she was proclaimed an honorary senator by the Technical University of Karlsruhe. Bertha, who was never allowed to study herself because of the social constraints of her time. **When she died two days later, she departed in peace. As a woman who allowed nothing and nobody to dissuade her from her visions.**

Breyton is always working on expanding the physical and technical limits, among other things through FEM calculations with Ansys - author G. Friederici

With FEM calculation, every shot is a hit - At Breyton, the driving experience is at the heart of rim development. For company founder Edmund Breyton, both the convincing design and the high quality standards are the key to success. In order to secure this in the future, Breyton is always working on expanding the physical and technical limits, among other things through FEM calculations with Ansys.

For high-quality light alloy wheels, minimal weight is crucial for excellent driving characteristics and especially high driving dynamics. That's why Breyton wheels are among the lightest in the world. Optimum strength, based on FEM (Finite Element Method) calculations, ensures safety and comfort, while the right balance of elasticity and stiffness supports performance without compromising comfort. This, combined with an attractive and clean design, makes it clear why Breyton rims are so desirable.
Predicting future properties

Every rim is developed according to TÜV specifications and standards, and finally tested by TÜV according to the complete guidelines. That's why Breyton started replicating TÜV test stands with Ansys software more than 20 years ago, so that all necessary rim tests can be performed digitally as FEM simulations as early as possible. As a result, the rim specialists are now able to predict future characteristics and properties of their products very accurately, as well as clearly identify and rectify potential difficulties before they occur.

Initially, it was not common for other companies in the industry to rely on FEM calculations for rim development. But over the past decade, the use of FEM software has gradually become more widespread. Edmund Breyton, however, believes his company is still ahead of the curve in this respect. Other wheel suppliers, such as ABT and HOFELE, also see it that way, and therefore have entrusted Breyton with the development and calculation of new light alloy wheels, which they then launch on the market under their own names. Breyton development was strengthened a few years ago by mathematician Jan Weber, who expanded the basis and methods of the simulation to bring the calculations even closer to reality.

"Since then, we can say that every move is a success, because every design tested with the help of simulations passes the TÜV tests without a hitch," emphasizes Edmund Breyton with pride. Mathematician Jan Weber adds: "However, you have to know what you are doing. This starts with the construction of the simulation model, continues with the determination of the correct boundary conditions, and of course also concerns the interpretation of the calculation results and the conclusions drawn from them." In order to reliably meet these requirements, a lot of simulation experience and industry knowledge is needed. Jan Weber and Edmund Breyton therefore complement each other ideally.

The TÜV bending circulation test is decisive - Among other things, TÜV performs a rolling test to check the forces acting on the tire and wheel on a straight stretch of road. Another impact test simulates a lateral impact on the rim, such as occurs when the vehicle hits a curb at too high a speed. By far the most important TÜV test for the product safety of light alloy wheels is the bending test. It simulates the forces or load changes that occur on the rim during cornering and the resulting long-term stresses. To do this, the inner rim flange is fixed firmly to a test table with a clamping ring and the rim is subjected to a rotating moment on the wheel contact surface very often and over a long period of time.

Every rim design tested with simulations passes the TÜV tests without any problems.

"When simulating the bending rotation test, we have to think very carefully about how we apply the forces and the moment," explains Jan Weber. "For example, we can choose any orientation of the load angle to individual rim spokes. Should it be directly at a junction of a spoke into the rim bed or rather between two spokes, that would lead to fundamentally different results." Previous experience has shown the best way to relieve highly stressed areas. Since the energy supplied has to be dissipated through the rim, it should be distributed as best as possible over the entire geometry. For example, by making certain non-problematic areas softer.

In order to be able to localize the higher-loaded areas with sufficient precision, the mesh must be generated in a sufficiently fine manner. Since it is not possible to predict where the stress peaks will occur, the mesh must be as fine as possible everywhere so that the stress peaks become visible. **"We first calculate with a somewhat coarser mesh, usually with more than 200,000 nodes, to get an initial overview,"** reports Jan Weber. **"After that, we sometimes refine the mesh to five million nodes so that we are also be able to assess the important details accurately. Of course, we then consider the calculated results for different angles of attack and a number of load cases in each case, which leads to longer calculation times."**

The network will be refined to up to five million nodes to accurately assess the important details.

Manufacturing conditions must always remain in view - Critical areas often occur where the spoke merges into the rim bed. However, depending on the design, stress peaks also occur at completely different locations, which is not always predictable but can of course be influenced. When designing the rims, manufacturing conditions must always be kept in mind, because even relatively thin spokes must be able to be manufactured safely during the molding process. In addition, the strength depends on the solidification time during molding. If this is not taken into account, vents that are not visible from the outside can form. These reduce the strength and can negatively influence the TÜV tests. Edmund Breyton also faces similar challenges when it comes to the material data of the rims from the various suppliers.

These vary depending on the molding processes and manufacturing techniques used. This fact must be taken into account in the Wöhler curve, which represents the number of load cycles until a material breaks. In order to maintain a certain margin, calculations are therefore more conservative than with ideal material data.
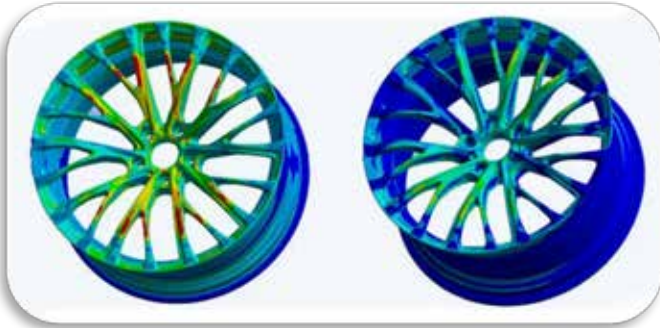
Local voltage peaks are not always predictable (left), but can be influenced (optimised right).

Simulations lead us safely to the goal - In the development phase of a new rim design, many calculations are necessary because the rim should not be produced in only one size and width.

Often, more than a dozen versions of the product are planned, all of which must be calculated, as the behavior changes with each modification. For a basic development, which is then produced in the specified parametric dimensions, small manual adjustments are often still required, which are due to the design characteristics.
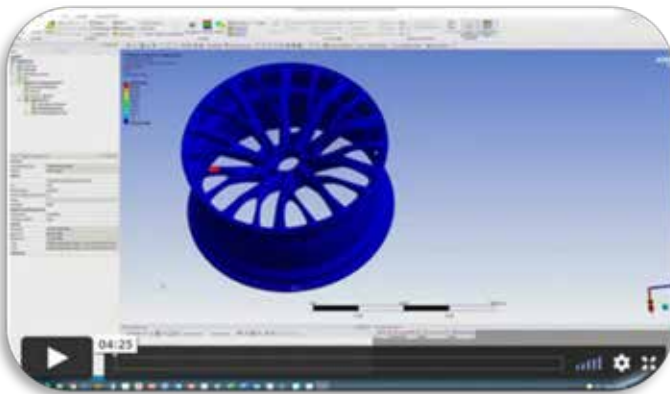
In conclusion, company founder Edmund Breyton notes: "We are a niche manufacturer with relatively small quantities. Consequently, tool production and MOT costs together can be up to 30 percent of the manufacturing costs. That's why we can't spend a lot of time trying things out. Instead, we have to strictly follow the path we have chosen, which leads us safely to our goal with simulations.

This is because the FEM software allows us to recognize and reuse not only fundamental, but also unexpected possibilities for improvement. These boundary conditions underline the importance of simulation for our business model, which would not be profitable without simulation. FEM software is also simply a tool for us to successfully drive our pursuit of quality in material, design and functionality."

bd breyton design GmbH
Edmund Breyton
www.breyton.com

Author: Gerhard Friederici, CADFEM
Images: bd breyton design GmbH

Contact CADFEM - Sales Manager Stuttgart

Ezzeddine Ammar

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(0)711-990745-12

✉ eammar@cadfem.de

> Welcome to our Convention Center exhibit hall & Coffee Cafe.   Coffee, of course vanilla, hazelnut, and other flavors are courtesy of our favorite coffee shop (not the rival coffee shop).

Poster Board area is on the internet, news, or Social Media Posts Not To Miss

M E Biancolini - Don't miss our paper:

Structural Health Monitoring of civil structures through FEM high-fidelity modelling

G Mirasoli, C Brutti, C Groth, L Mancini, S Porziani and M E Biancolini

Department of Enterprise Engineering "Mario Lucertini", University of Rome
"Tor Vergata", Via del Politecnico 1, 00133 Roma, Italy

Formation Exceptionnelle

Ted KRAUTHAMMER

du 16 au 20 mai 2022

DynaS+   Ted KRAUTHAMMER travels to Europe!

Organization of an exceptional training:
"Design of Protective Structures"
(website in French)
May 16-20, 2022

Applus+ IDIADA - Understanding pre-crash occupant kinematics is key to the optimization of restraint systems. This need is highlighted when considering the possible effects that pre-crash ActiveSafety system activation may have on the vehicle occupants if the crash is not fully avoided…

SSM Engineering Website -   **Company profile (pdf)**   - SSM is an Italian consulting engineering company. The company's activities are mainly focused on:
· Product concept, Design and product engineering
· Manufacturing Engineering,   Logistic and Maintenance
· Our market is transport industry with particular focuson supporting improvement in production processes from the concept to the product.

Automotive	Aerospace	Railway,	Industry

Current videos as of: Jan 27th

Free Coffee for visiting our exhibitors

Ameen Topa
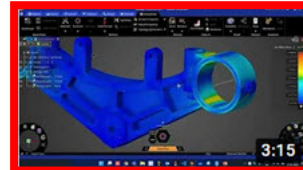
Kaizenat

3:15

LURI ENG

Oasys LS-DYNA
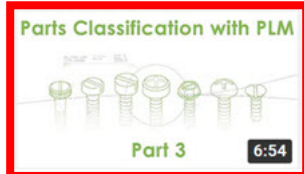
30:56

Latest REPORTER templates

LEAP Australia

Parts Classification with PLM

Part 3   6:54

ANSYS

1:26

Expert FEA

0:41

NASA

SCIENCE LIVE
WHAT'S NEXT FOR WEBB   54:40

EnginSoft UK

49:06

Ozen Engineering

12:59

MEETING ROOM

CADFEM

TRAINING INSIGHT CADFEM   2:58
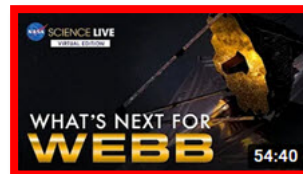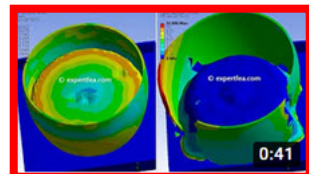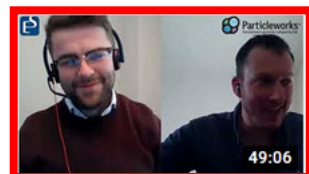
Ansys Innovation Courses are award-winning, free, online physics and engineering courses.
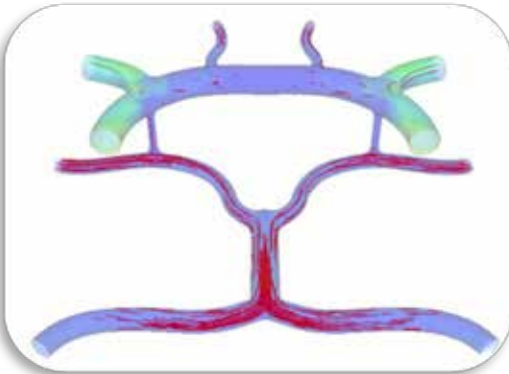
CFD in Healthcare Industry

In this session, we will introduce some industry-specific applications from the Healthcare industry and learn about how Computational Fluid Dynamics (CFD) is used in this space. We will unlock the power of fluid simulation with the model of a Bio-Reactor. We will set-up the simulation on Ansys Fluent and use advanced postprocessing tools to analyze the results of the simulation.

Finally, we will also model the flow of blood through the Circle of Willis, which is a circulatory network of blood vessels supplying blood to the brain and surrounding tissues. Engineers use fluid simulations to understand the investigate the impact of blood flow on these blood vessels to study factors leading to cerebral aneurysms.

Excerpt - **Blood Flow Through the Circle of Willis - Overview**

Biomedical researchers have been relying on computational fluid dynamics to model and understand physical mechanisms behind formation and progression of cerebral disorders, such as aneurysms, atherogenesis and atherosclerosis in the cerebral arteries. The branch of medical science stud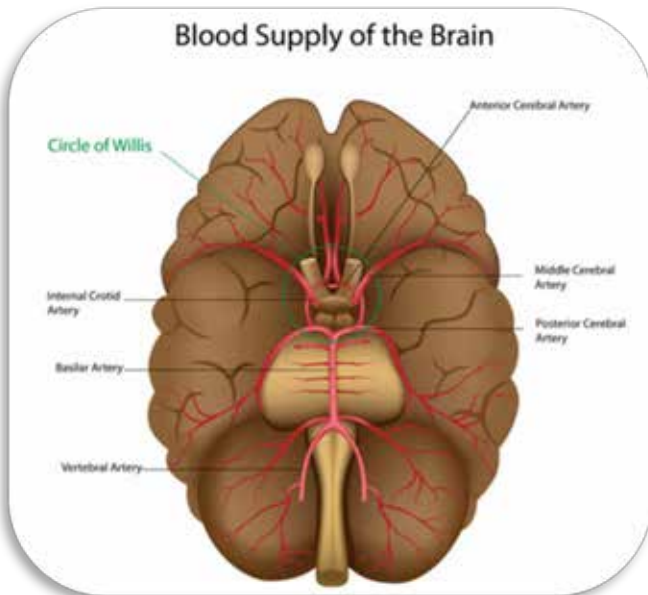ying dynamics of blood flow inside a brain is called cerebral hemodynamics. A critical area of research in cerebral hemodynamics is blood flow through the Circle of Willis, a circulatory network of blood vessels supplying blood to the brain and surrounding tissues.

This circular anatomical connectivity is located at the base of the brain and is the main distributor of oxygenated blood throughout it. Blood comes into the Circle of Willis through two symmetric internal carotid arteries (ICAs) and two symmetric vertebral arteries (VAs), which are joined together at the basilar artery (BA). Blood symmetrically leaves through the circle via the two middle cerebral arteries (MCAs), two anterior cerebral arteries (ACAs) and the two posterior cerebral arteries (PCAs), as shown in the figure.

CADFEM India

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Tutorial No. 9 - Containment Test

A special type of crash analysis, employed with turbines and other rapidly rotating components, (to ensure safety even in worst-case scenarios,) is carried out here using LS-Dyna.
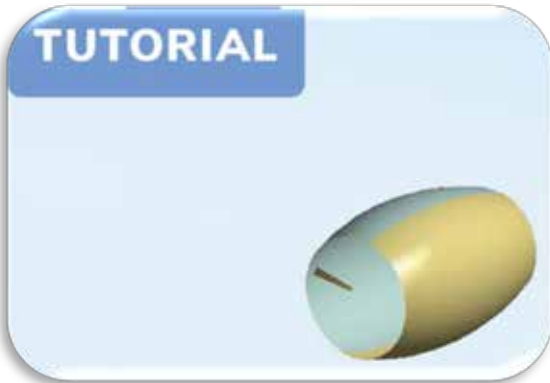
Branch :

- Automotive (motor vehicles/trucks),
- Automotive supplier,
- Construction,
- Consumer goods/durable goods,
- Rail vehicle construction

Turbine Blade Failure

Ansys Tutorial by CADFEM: What happens if a blade comes loose from the turbine? Would the housing withstand the strain, and would it retain the blade? Or would the blade penetrate this so-called containment vessel? A special type of crash analysis, employed with turbines and other rapidly rotating components, (to ensure safety even in worst-case scenarios,) is carried out here using LS-Dyna.

Agenda:

- Incorporating a time-frame
- Nonlinear contact & nonlinear materials
- Information relating to when parts fly off and penetrate another object
- Ensuring safety even in worst-case scenario

Fabian Leonov S. López - CAE Engineering Manager/COO
LURI Engineering México Automotive/ Structural Analysis FEA
Ask if you are interested in learning more-   leonov.lopez@luriengineering.com.mx

LURI Engineering Wind Load FSI Analysis on Fence under MIAMI WIND DADE CODE

The goal of this present analysis is to evaluate the mechanical integrity of several fences, with a composite material, to obtain a final light geometry but at the same time complying with a safety factor based on a wind load of 115 MPH (Miami Dade wind code) - **Fluid Structure Interaction has been used implementing LS-DYNA**
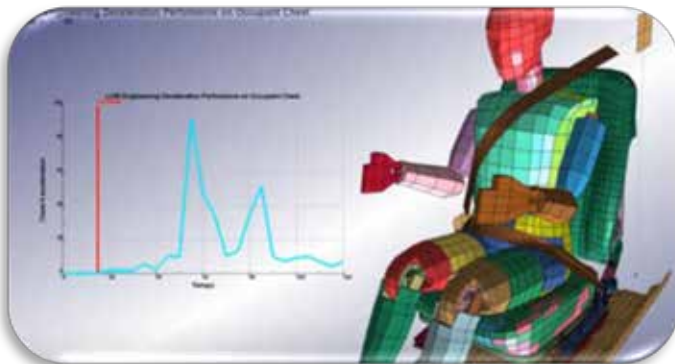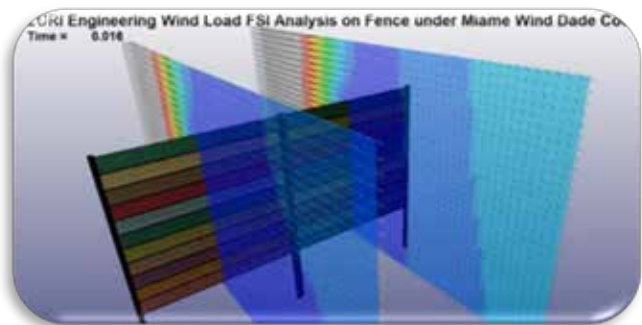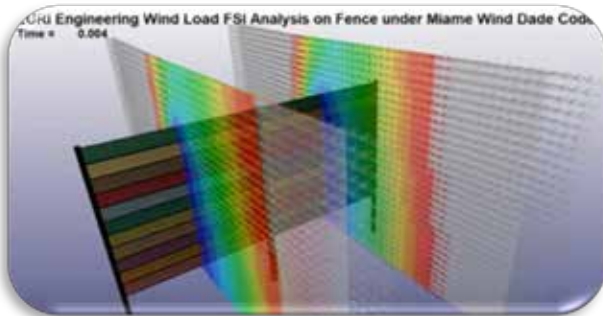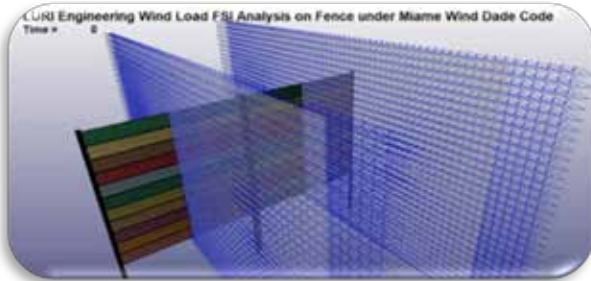
LURI Engineering Deceleration Performance on Occupant Chest through Whiplash Analysis

One of the most important targets in frontal crash analysis is to evaluate a decrease de theoretical chest acceleration to avoid atrophy on the occupant.
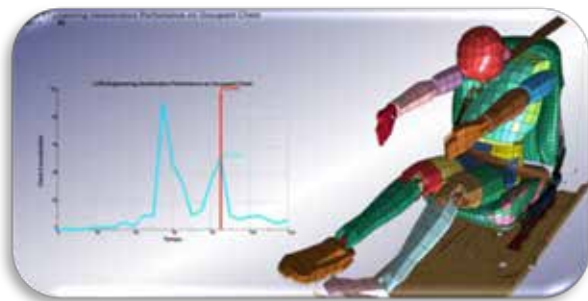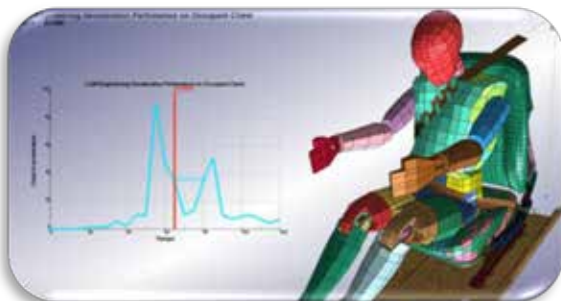
We will have 125 classes in Germany (including Swiss and France) and 36 in Sweden.
Many of them are available online and in English.

Seminars - Webinars - Information Days - Visit website for category and complete listing

Feb 16th - Introduction to Simulation Technology - Maik Schenke

Feb 10th - LS-DYNA Compact: Intro to Isogeometric Analysis with LS-DYNA - Stefan Hartmann

Feb 10th - Dummy/Pedestrian Impactor Modeling - Alexander Gromer, Sebastian Stahlschmidt

Feb 17th - Introduction to Passive Safety - Fabian Koch, Harsh Sharma

Feb 21st - LS-DYNA Compact: Element Types & Nonlinear Aspects - Christoph Schmied

March

07, 28	LS-DYNA Compact: Intro to LS-PrePost	S. Mandel
08	ALE and FSI	M. Souli, J. Lacambre
10	Welding & Heat Treatment with DynaWeld & LS-DYNA	M. Souli, J. Xu, J. Lacambre
10	Implicit Analysis using LS-DYNA	T. Erhart, P. Glay, C. Schmied
10	Smoothed Particle Hydrodynamics	
15, 23	Intro. to LS-DYNA	Dynamore staff
14, 21	Intro. to LS-PrePost	S. Mandel, P. Glay
09, 28, 30	LS-DYNA Compact: Intro to LS-DYNA	Dynamore staff
17	LS-DYNA Compact: Damage and Failure	F. Andrade
18	Support days Occupant Safety	
18	Intro to contact definitions in LS-DYNA	T. Graf, P. Glay, J. Lacambre
21	Material Failure	F. Andrade, A. Haufe, M. Feucht
21	LS-DYNA Compact: Electromagnetism in LS-DYNA	I. Çaldichoury
23	LS-DYNA Compact: Resistive Heating and Battery Modeling	I. Çaldichoury
24	CPM Airbag Modeling	S. Stahlschmidt, S. Mattern
28	Polymers/Elastomers	S. Kolling
25	Introduction to contact definitions in LS-DYNA	T. Graf, P. Glay, J. Lacambre
26	LS-DYNA Compact: Intro to Draping Simulation with LS-DYNA	T. Klöppel, C. Liebold
28	LS-DYNA Compact: Introduction to Simulation Data and Process Management in LoCo	
30	ICFD Incompressible Fluid Solver	I. Çaldichoury

Contact

Maik Schenke

Rasmus Schützer
Project Engineer på DYNAmore Nordic AB

Welcome to DYNAmore Nordic's Short Training Video Library!

In our library you will find short training videos and tutorials about numerous LS-DYNA applications and all other products that DYNAmore Nordic provides.

All for free, all you have to do is **enter your contact info before accessing a category Access is valid for 72 h.**

Join Lecturer Anders Jonsson for a Webinar March 15th

From Explicit to Implicit Simulation Models in LS-DYNA - Product development today means satisfying requirements within a variety of fields like crash safety, durability, and sound comfort for a passenger car. In a CAE-driven development process, this puts high demands on the multi-disciplinary capabilities of analysis tools. The one-code strategy of LS-DYNA provides a complete solution for these demands, making it possible to use the same analysis model for many different load cases, from large deformation rapid events like drop test and crash analyses to non-linear quasi-static analyses, and linear dynamics in the frequency domain.

Support for Master Thesis 2022 Information

For DYNAmore Nordic current customers using LS-DYNA in their thesis work. You now have the opportunity to get some extra support from us here at DYNAmore Nordic

By registering your thesis with us, you can access our expertise and knowledge of LS-DYNA through personal support, courses, webinars, and guidelines.   Please share this with other you know that may be interested. **Thesis Information 2022 with DYNAmore Nordic**

Nordic LS-DYNA Forum 2022
October 18-19

Save the date - October 18-19 2022

Dyna Forming Engineering & Technology DFETECH

DFETECH is an engineering firm established since 2005 to provide advanced engineering solutions to industries ranging from automotive and aerospace to electronics, consumer products, civil engineering and defense. Our expertise includes CAE, modern stamping engineering, dimensional engineering and variation prediction.

Ansys Granta products have been developed over 25 years to capture, safeguard and capitalize on your organization's Material Intelligence.

Ansys Granta offers a range of materials information management software, designed for companies to realize their in-house Material Intelligence.

Ansys Granta MI™ **offers a scalable solution to create, control and store your company's valuable material data,** offering seamless integration with leading CAD, CAE and PLM systems for enterprise-wide consistency.

Make smarter materials choices with Ansys Granta Selector. Trade-off various materials properties from a comprehensive database to help you select the best-suited material for the application. Boost your simulation accuracy with access to our unrivalled materials data library.

Product and Products Area Excerpts

Products

JSTAMP
Sheet metal forming

J-Composites
A tool to set up composite material analysis

JWELD
Simulation Software for Welding Distortion

JSTAMP - Support tool design and process design for forming Integrated forming simulation system JSTAMP

- Dieface Design Support
- Blankline/trim line development
- Crack, wrinkle, and springback prediction
- CAD output of SB-compensated tool
- Material database as standard equipment

J-Composites - Supports a variety of composite material forming processes Modelling tool for LS-DYNA composite forming simulation. A tool to set up composite material analysis

Ease complex and difficult composite material model creation

- User-friendly interface
- Advanced computer simulation by using the multi-purpose solver LS-DYNA
- Auto-conversion of material test data into material parameters
- Stiffness analysis that considers various forming factors

JWELD - Examine process design and assembly issues in advance through simulation

UI specially designed for welding simulation

Simulation Software for Welding Distortion

- Investigate different assembly orders to reduce weld deformation
- User-friendly Interface
- Evaluate different manufacturing scenarios
- Support for friction stir welding simulation

Marco Evangelos Biancolini
RBF Morph CTO & Founder - Associate Professor of Machine Design
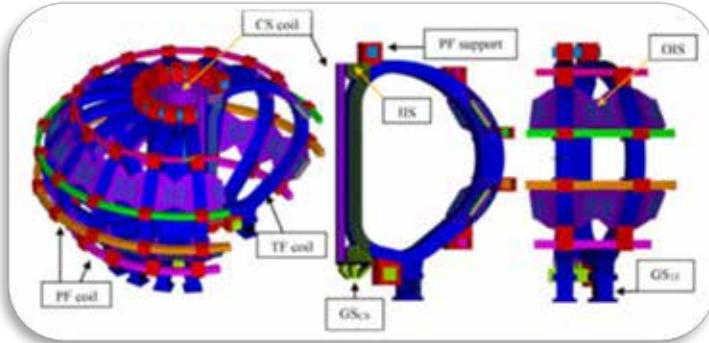
"**So proud to be part of DEMO. Download our paper to learn more about magnet system design and the challenges we are facing.**"

The DEMO magnet system – Status and future challenges

The finite element analysis is done with ANSYS for static stress state, in 3-dimensional geometry using homogeneous material property.

Abstract: We present the pre-concept design of the European DEMO Magnet System, which has successfully passed the DEMO plant-level gate review in 2020. The main design input parameters originate from the so-called DEMO 2018 baseline, which was produced using the PROCESS systems code. It defines a major and minor radius of 9.1 m and 2.9 m, respectively, an on-axis magnetic field of 5.3 T resulting in a peak field on the toroidal field (TF) conductor of 12.0 T.

Four variants, all based on low-temperature superconductors (LTS), have been designed for the 16 TF coils. Two of these concepts were selected to be further pursued during the Concept Design Phase (CDP): the first having many similarities to the ITER TF coil concept and the second being the most innovative one, based on react-and-wind (RW) Nb3Sn technology and winding the coils in layers. Two variants for the five Central Solenoid (CS) modules have been investigated: an LTS-only concept resembling to the ITER CS and a hybrid configuration, in which the innermost layers are made of high-temperature superconductors (HTS), which allows either to increase the magnetic flux or to reduce the outer radius of the CS coil. Issues related to fatigue lifetime which emerged in mechanical analyses will be addressed further in the CDP. Both variants proposed for the six poloidal field coils present a lower level of risk for future development. All magnet and conductor design studies included thermal-hydraulic and mechanical analyses, and were accompanied by experimental tests on both LTS and HTS prototype samples (i.e. DC and AC measurements, stability tests, quench evolution etc.). In addition, magnet structures and auxiliary systems, e.g. cryogenics and feeders, were designed at pre-concept level. Important lessons learnt during this first phase of the project were fed into the planning of the CDP. Key aspects to be addressed concern the demonstration and validation of critical technologies (e.g. industrial manufacturing of RW Nb3Sn and HTS long conductors, insulation of penetrations and joints), as well as the detailed design of the overall Magnet System and mechanical structures.

Excerpt 1. Introduction: The overarching strategy of the European DEMO project is based on systematically increasing the technical, manufacturing and integration readiness of all systems in view of construction to start immediately after confirmation of successful ITER DT operation [1].

LEAP's PTC Technical Manager, Allan Thompson recently presented a webinar entitled Reduce Costs by Improving Parts Re-use with Windchill Parts Classification which explained how, by reducing the number of duplicate parts and drawings, manufacturing and service engineers can more easily plan, assemble, test and execute – reducing costs and increasing efficiency across the enterprise. Read on and watch clips of the presentation below to learn more.

Reduce Costs by Improving Parts Re-use with Windchill Parts Classification

Throughout the product development process how much time would you estimate is wasted by design teams searching for existing parts? And when one can't be found, how often is a duplicate part created, and at what cost? Chances are, too much engineering time is being spent on these non-value adding tasks.

"With parts classification, you can get the majority of that time back!"

Improving Parts Re-use with Windchill Parts Classification - Windchill PLM Overview Part 1 of 3	Improving Parts Re-use with Windchill Parts Classification - Classification Part 2 of 3	Improving Parts Re-use with Windchill Parts Classification - Demonstration Part 3 of 3
Parts Classification with PLM Part 1 5:45	Parts Classification with PLM Part 2 9:04	Parts Classification with PLM Part 3 6:54

We hope you found this presentation informative. If you would like any further information about Windchill or Partslink please contact LEAP and one of our experts will be in touch to discuss your needs.
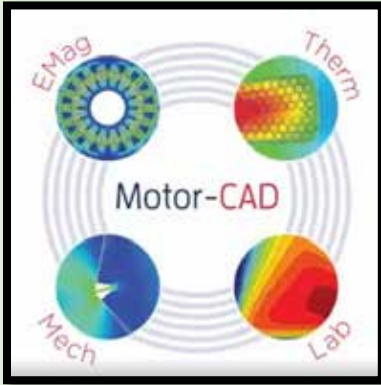
The eLearning "Design of electrical machines with motor CAD" has just left the CADFEM production halls.

The speaker and author Philipp Siehr has completely restructured and rebuilt the existing seminar.

Learn how to design motors and generators quickly and reliably with simple simulation methods.

Starting with the basics of torque and loss calculation, the consideration of maximum torque and efficiency, through thermal networks for the investigation of cooling concepts, to advanced topics such as Automatisierung and Optimierung with optiSLang.

Overview Level: Basic

Target group: Users, Instructors, General enthusiasts

Prerequisites: Knowledge of electrical machines

Benefits: 1) Easily calculate characteristic curves, maps and driving cycles of motors

2) Model and simulate multiphysics interactions

3) Efficiently optimize electric motors with automated workflows

Applications: Low frequency
Software used: Motor-CAD

Agenda Day 1	Agenda Day 2	Agenda Day 3
· Basic introduction to Motor-CAD and its modules · Electromagnetic simulation with Motor-CAD Emag: Basis of the motor design · Force computation with respect to NVH analysis in the design phase · AC loss computation and a quick look into mechanical analysis	· Calculation of continuous torque, maximum torque and efficiency maps with Motor-CAD Lab · Calculation of temperatures in winding and magnets in seconds with Motor-CAD Therm · Cooling concepts · Adaption and calibration of the lumped circuit	· Python basics and first steps · Automating Motor-CAD · Efficient methods for optimizing an electric motor · Automated workflows for optimization

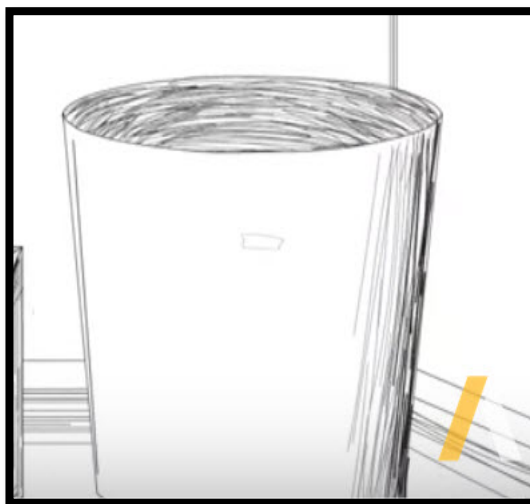**Thanks to Ozen Engineering and Curt Chan for bringing Dr. A to our attention.**

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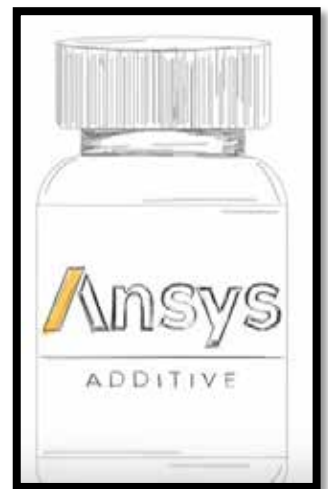
Jan Hertwig, CEO CADFEM Medical

Your contact for all questions regarding CADFEM Medical

Together with the Department of Oral and Maxillofacial Surgery, Universitätsspital Zürich, we supported a study to compare two-versus three-screw osteosynthesis of the mandibular condylar head.   The study supports the clinical impression that two-screw osteosynthesis provides adequate fracture stability and should be considered as an alternative to three-titanium screw osteosynthesis, as it has the potential to reduce bone resorption and ultimately improve patient outcomes.

The preprocessing of the finite element model and mapping of the obtained boundary conditions was done in docqVIT.

Two-versus three-screw osteosynthesis of the mandibular condylar head: A finite element analysis

Daphne Schönegg, Günter T. Müller, Michael Blumer, Harald Essig, Maximilian E.H.Wagner

Abstract - Titanium screws are commonly used for osteosynthesis of mandibular condylar head fractures. Evidence suggests that the insertion of three screws may result in better fracture stability. Two screws only, on the other hand, could reduce adverse effects, mainly bone resorption. This study aimed to investigate the biomechanical differences in mandibular condylar head osteosynthesis with two versus three titanium screws using finite element analysis. A finite element model of the mandible with a right type P condylar head fracture fixed with two or three titanium screws was analyzed in ANSYS Mechanical.
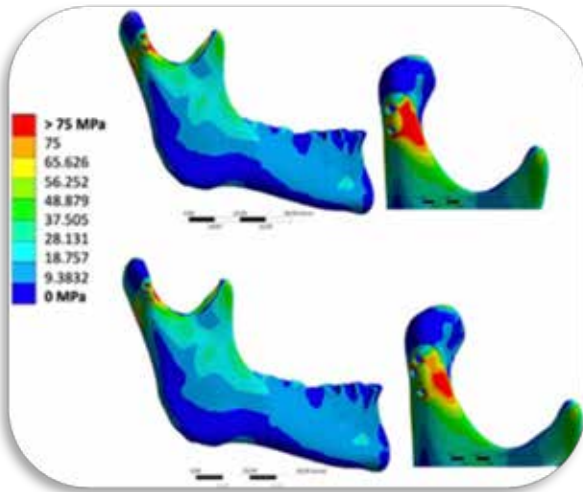
The geometry of the model assembly was constructed in ANSYS Spaceclaim. Biomechanical load boundary conditions were obtained from a validated musculoskeletal model in AnyBody Modeling System™. The preprocessing of the finite element model and mapping of the obtained boundary conditions was done in docq VIT. Fracture displacement, fragment deformation, von Mises stress distribution, and reaction forces within the screws were evaluated in ANSYS for three different loading scenarios.

Finite element analysis showed similar results when comparing osteosynthesis with two versus three titanium screws for all three loading scenarios. Contralateral molar loading resulted in the highest stress on both the fracture and the screws with the maximum von Mises stress being found at the condylar neck. Stress concentration within the screws was found in the fracture gap and was higher in the lateral fragment. In all scenarios, maximum von Mises stress values were smaller when forces were distributed among three screws. However, stability was also adequate when two screws were used.

Mandibular condylar head osteosynthesis with two titanium screws appears to provide sufficient fracture stability. Further clinical studies are needed to clarify the implications of these results.

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Correct Answer D you are served chocolate chip and oreo cookies!!! Love those!

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B - Boeing B-29 Superfortress
C - Boeing B-52D Stratofortress
D - Boeing CH-47D Chinook

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