www.feantm.com Issue January 2022 ISSN 2694-4707

FEA Not To Miss Software

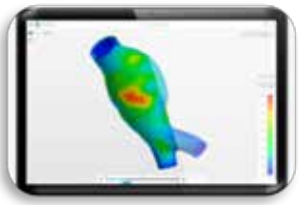
&

Engineering Solutions

Town Hall Meeting & Gossip

DYNAmore

CADFEM Medical

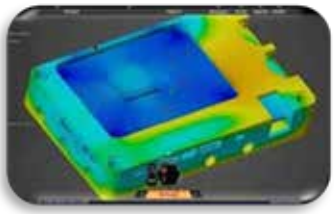


CADFEM

OZEN

ENGINSOFT

KAIZENAT

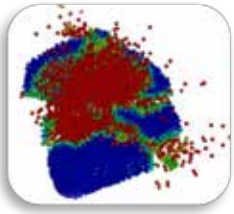


HEXAGON

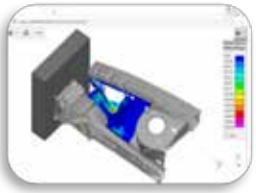
Automotive - A.Topa

Wake Forest

Library



OASYS



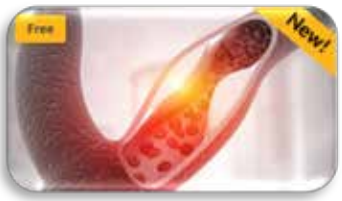
Pilot - Airport

Booth - LURI

Town Equip

Old Cattle Rancher

Booth - ANSYS Training



Free publication & independently owned

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

FEANTM does NOT receive compensation from the companies whose products we showcase. Companies and/or information included is at the sole discretion of FEA not to miss a/k/a FEANTM

DISCLAIMER

"FEANTM is not responsible for any errors or omissions or for the results obtained from the use of this information.

FEANTM contains links to other Web Sites ("Linked Sites"). The Linked Sites are not under the control of FEANTM and FEANTM is not responsible for the contents of any Linked Site, including without limitation any link contained in a Linked Site, or any changes or updates to a Linked Site.

All information in this publication and on the feantm.com website is provided "as is" with no guarantee of completeness, accuracy, timeliness, or the results obtained from using this information from the company websites.

We believe in our effort to advance information on software products. We believe this constitutes a "fair use" of the material in accordance with Title 17 USC. Section 107."

Opt-Out

Any company may opt-out at any time by writing to Marsha feaanswer@aol.com

After that, going forward from the email's receipt, content (excluding that found on Twitter, Linkedin, Youtube, FaceBook and other social media) will not be included.

Contact us at: feaanswer@aol.com

Table of contents

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.

January

:

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

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:
Christian, **Dan,** Eric, Fabian, Fauad, Jenson, Katherina, Lam,
Metin, Markus, Marco, Marko, Nanda, Rasmus, Rohit, Sagar, Satish,

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

First welcome to the town: LEAP Australia - SCALE
New library room DYNALOOK.

1. **Why are there 52 safety vests on my desk?**
2. I appreciate the note referencing how the aged fall. I now have one to wear each week.
3. Whoever calls me the Aged Supervisor, please raise your hand?
   Okay, the entire room can now lower their hands - the town secretary can lower both her waving hands.
4. Donate the vests to Town Equipment - The Town Secretary used their budget for T-Shirts!
   She purchased 886 T-shirts with the slogan "The Town 💙 our Aged Supervisor."

Town Equipment - **On the protective capacity of a safety vest for the thoracic injury caused by falling down**

Town Secretary

1. **WHY did the town secretary order a 14-foot-high guillotine for the building department?**
2. Yes, we did say a guillotine, but NOT that type - they need it for book printing
3. It could be worse - not sure how, but we try to be optimistic.
4. THEN she advises that the farmers can use it to cut the melons for sale. (I didn't answer - I fainted)
5. Who sent invitations for a melon cutting party? Why is everyone leaving work to buy watermelons?
6. That is NOT what we wanted for book printing - have the Building Dept. donate it to a museum.

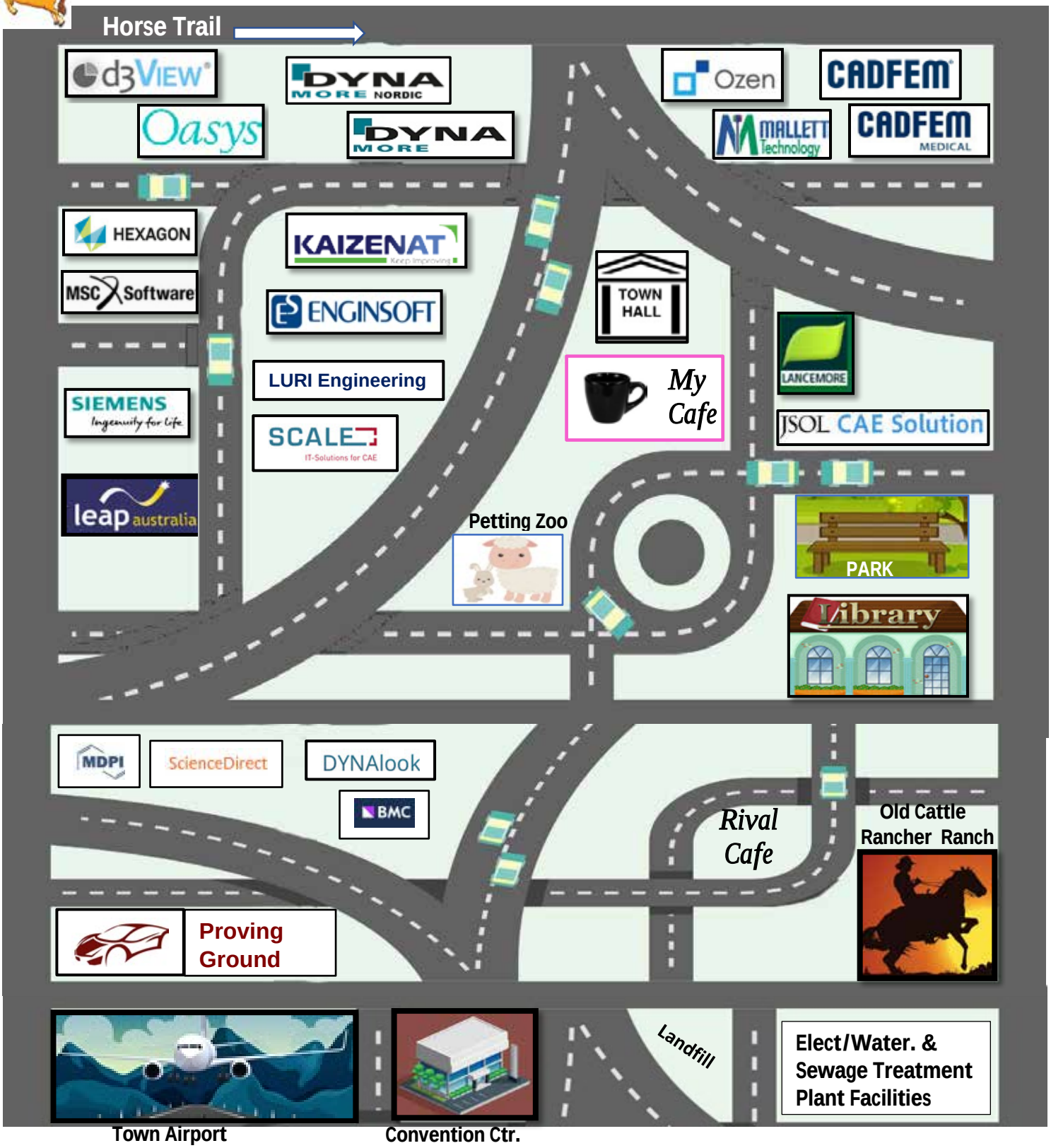
Building Department: Modelling of the Guillotine Cutting Process by Means of a Symmetrical Blade with the Defined Geometry

HI MAGNUS - "The town is waving a hello banner and yelling hello"
Don't miss this publication that we have in the library reading room:

- Testing and modelling of butt-welded connections in thin-walled aluminium structures panel - Nguyen-HieuHoang, David Morin, Magnus Langseth

NEW LIBRARY ROOM! A new library area, DYNALOOK - Additionally the papers from the 13th European Conference are available on the DYNALOOK website

Town Map



* The logos displayed, of content in our magazine, do not represent their endorsement.
* To be removed, please notify feaanswer@aol.com with the request.
* Your town lot will be auctioned, with the Town applying all proceeds to the coffee budget.
* The town map changes pending information, and rotational building rentals.

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

All videos can be viewed on the website

EXCERPT - Top 6 New Ansys Fluent Features in 2021

David Williams, Lead R&D Engineer, Ansys

Our goal at Ansys is to continuously improve all our engineering simulation products to keep up with the ever-changing needs of our customers.

We accomplish this goal by paying attention to developments across all industries, listening to our customers' needs, and constantly innovating solutions to help engineers overcome their greatest challenges. **Over the past year, we have made many improvements in Ansys Fluent, but we wanted to highlight the top six features, which includes:**

1. A new Pro capability level
2. New multiphase modeling techniques
3. Best practices for dynamic mesh adaption
4. Combustion enhancements to push for decarbonization
5. New high-speed flow modeling capabilities
6. Productivity improvements

Access Fluent at an Attractive Price - Many computational fluid dynamics (CFD) engineers rely on Fluent's industry-leading performance and accuracy, but typically work on applications that don't require the full range of physics capabilities available in Fluent.

Fluent has a Capability Level drop-down menu on the Fluent Launcher, which used to have only Premium and Enterprise options available. But now, Pro has been added as a new option. Pro is a new capability level that tailors Fluent's user-friendly interface for CFD applications that don't require the full range of physics.

The Pro level still gives you access to many of Fluent's industry-leading features and capabilities, including:

- The powerful task-based Watertight Meshing Workflow that creates high-quality Mosaic Poly-Hexcore meshes.
- Advanced solver technology with support for simulation of turbulent steady-state flows of single-phase fluids with conjugate heat transfer.
- Expressions support that makes it easy to implement spatial- or solution-dependent boundary conditions.

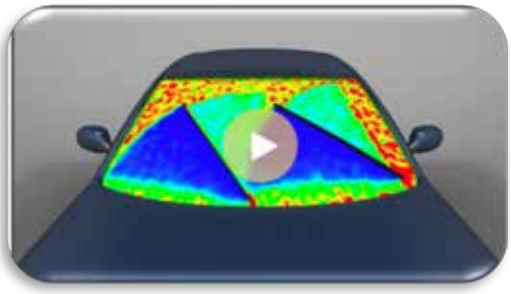
Ansys Fluent Launcher - Ansys Fluent has a new Pro capability level in the Fluent Launcher that tailors the user-interface for less complex CFD simulations.

All the powerful and interactive post-processing and visualization capabilities.

You can now access the industry's most accurate and trusted CFD solver at an extremely attractive price. As the need for more advanced capabilities arise, the Pro level offers a natural progression path to move to Premium or Enterprise. If you are interested in trying the Pro version of Fluent, there is a free trial available with a conjugate heat transfer (CHT) demo that you can download now.

Efficiently Simulate Breakup, Pooling, and Thinning of Multiphase Flows - In many applications with sprays and free-surface flows, keeping the simulation both accurate and practical requires adapting the modeling methodology throughout the domain based on the flow characteristics.

- For nearly spherical droplets, Fluent's discrete phase model (DPM) provides an efficient method for tracking droplet trajectories and breakup/coalescence without highly resolved mesh requirements.
- Thin films on walls are best modeled using Lagrangian or Eulerian wall film models.
- Intricate free surface flows and thick films/pools require the interface tracking capabilities of the volume of fluid (VOF) method, with attendant highly resolved meshes.



A given problem will often require trading off among these modeling techniques to optimize the simulation's accuracy and efficiency. With the latest release features, Fluent now allows the combination of these various approaches, so you can automatically switch between the appropriate method depending on the local conditions (droplet asphericity, film height, etc.).

Video on website - Ansys Fluent automatically switches between appropriate multiphase modeling techniques to simulate breakup, pooling and thinning of mutliphase flows.

These new modeling techniques can be used with Fluent's polyhedral unstructured mesh adaption (PUMA) method, so the volume mesh can be automatically refined and coarsened as needed.

Accelerate Fluent Simulations with Mesh Adaption - Dynamic mesh adaption is a method of refining the mesh of a simulation during the solution based on the solution itself. This scheme in Fluent enables you to start from a coarse mesh and dynamically refine high-gradient regions.

Dynamic mesh adaption can be used in combination with the PUMA method. PUMA does not rely on templates for refinement, so it works on all cell types. A mesh can also be coarsened after it has been refined.

In the latest releases, best practices for combustion and multiphase applications have been embedded in Ansys Fluent's mesh adaption setup panel as pre-defined recipes requiring minimal user input, resulting in:

- Up to 70% cell count reductions
- Up to 4X speed ups for steady state cases

HEAD Sport AG - With simulation models to the desired skiing behavior

Sensitivity analysis and calibration leads to valid ski simulation models

- **Branch** : Consumer goods/durable goods
- **Specialist field:** Structural mechanics

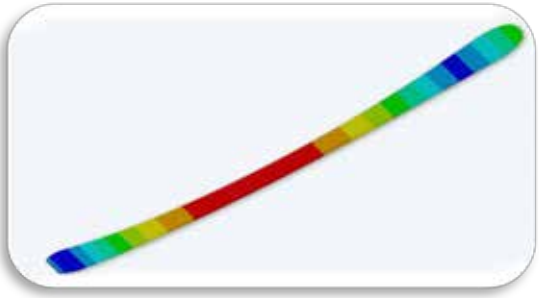
For racing skiers, there is no better feeling than being fast. Hundredths of seconds decide between victory and defeat. So, the search for better equipment never ends. HEAD Sport uses Ansys software to adapt ski performance even more efficiently to requirements.

Task	Solution	Customer benefits
Numerous prototypes and test runs are necessary in order to find an optimal design for the respective application in ski development. The layer structure of a ski is essential for its flexibility and performance. The use of simulation software should help shorten this lengthy process.	Since the properties of the material layers are often not known exactly, a calibration of the values in comparison with real tests was necessary for a valid simulation model. A sensitivity analysis resulted in eight influential parameters, which were adjusted so that the results of the simulations correlate with those of the tests.	Thanks to the systematic identification of material values, simulation in the prototype phase has become an important basis for ski development at HEAD. This allows different ski designs to be built, analyzed and compared in a short time, thereby further reducing the number of real prototypes and test runs required.

Successful ski racer
Matthias Mayer
with skis from HEAD

Task - Nowadays, skis are among the most high-tech products. They are built up in thin layers from different materials. The type of construction is essential for the ski's performance, as it determines its flexibility. Numerous prototypes and test runs are therefore necessary in order to find an optimal design for the respective application in ski development. The renowned sporting goods manufacturer HEAD SPORT GmbH has been able to shorten this lengthy process by using Ansys simulation software in ski development for the verification and evaluation of digital prototype construction.

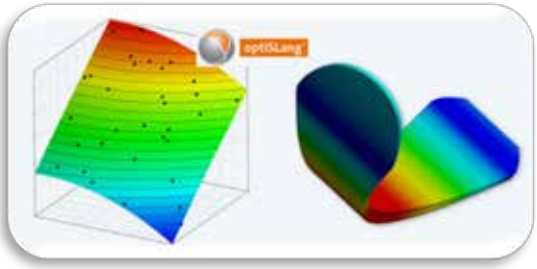
The combined use of Ansys Mechanical and Ansys optiSLang enables classic reverse engineering for the precise determination of material properties in the layer structure of a ski. HEAD is addressing the issue of simulation-driven development together with CADFEM and ANSYS Dynardo to ensure a secure foundation for the future development strategy: tests are saved due to digital development.



Solution - First, the stiffness behavior of the ski was mapped in a valid simulation model. Since the material properties of the thin layers are often not precisely known or do not lie within the specified scatter range, it was necessary to calibrate the values by comparing them with real bending and torsion tests.

The behaviour of the ski is mapped in a valid simulation model

Subsequently, the real tests were digitally mapped in Ansys Mechanical. Based on the CAD model, the individual layers were discretized with a continuous FEM mesh and assigned the correct material properties in each case. Since some components, such as the core with wood veneer layers, consist of a material with fiber directions, the orthotropic stiffness properties also had to be taken into account here. A total of 23 parameters were responsible for the model calibration.



The Ansys optiSlang software was used to evaluate the sensitivity and adaptation of the parameters. First, a sensitivity analysis was used to investigate the influence of the parameters. Since only eight parameters have a major influence on the stiffness of the ski, the calculation effort could be reduced considerably.

These eight parameters were adjusted in the underlying scatter range of the material in such a way that the simulation results correlate as well as possible with the test results. .

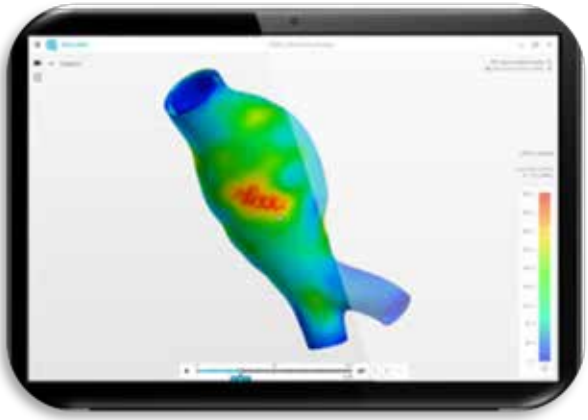
Customer Benefit - The systematic identification of material values was the basis for the further expansion of simulation-driven development at HEAD, thereby improving the understanding of the influence of diverse materials.

In the meantime, the simulation forms the basis for a general design of the layer materials in prototype construction. This allows different ski designs to be built in a short time and then analyzed and compared with Ansys.

One goal is to use simulations to compare established skis with new developments in order to better determine the skiing behavior of the new developments. On the one hand, this should eliminate some of the test runs that have been necessary up to now and, on the other hand, secure a major competitive advantage.

The most important advantages through the use of simulation:

- the material behavior and thus the driving behavior can be better estimated
- acceleration of development through simulation-based evaluation of digital prototypes
- the product quality (ski riding behavior) can be better predetermined and controlled



Risk assessment of abdominal aortic aneurysm

Research project with TU Munich

The rupture of abdominal aortic aneurysms (AAA) is one of the most common causes of death. Simulation can help to improve the estimation of the rupture risk and thus give the clinician additional guidance for treatment planning.

docq AAA at a glance - Target: Predictive assessment and classification of abdominal aortic aneurysms with respect to patient-specific rupture risk

- R&D project with TUM
- ML / AI combined with simulation for AAA risk assessment
- Joint further development of the methods of the TU Munich
- Methods from Prof. Gee implemented in docq AAA
- PLOS One paper created (**download link**)
- Identification/provision of patient-specific material parameters through database
- Comparison of patient-specific rupture statistics in database

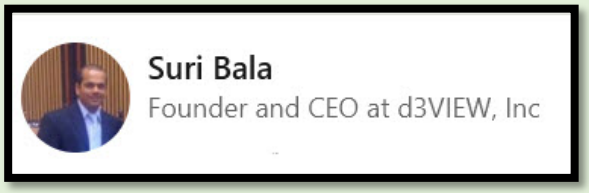
It' s a wrap - Thank you for more than 400 participants from 20 countries, 10 exciting presentations and a very interesting panel discussion.

In case you missed a presentation or would like to enjoy it again:

video Archive available: the recordings of the conference available for you.

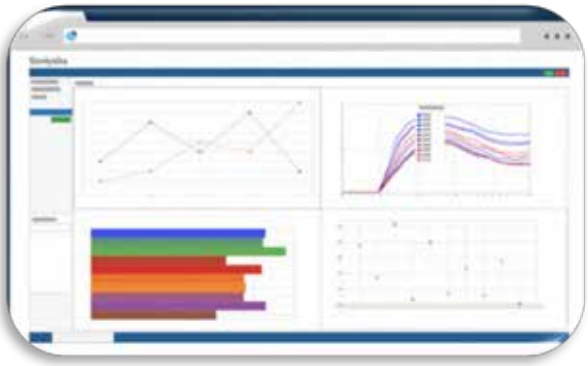
We are looking forward to CMC 2022.

The CADFEM Medical Conference is the specialist conference for the application of simulation in the field of medicine and medical technology. It demonstrates lived practice and cross-divisional ideas and approaches in order to expand existing processes or process chains with the help of simulation, and to improve them in a sustainable way. The focus is on improved product safety, optimized therapies and diagnostic options, as well as simplified process flows in the area of development and approval.



Test vs. CAE - Scientists from the early ages until now have relied on experiments to better understand nature. Today, as simulations drive product-development, experiments continue to play an important role in improving our simulations.

d3VIEW, from its earliest versions, has focused on providing a unified and simple to use platform to store and manage experimental data across sciences and most importantly to overlay Test vs CAE to increase our understanding of simulations.



January application - Simlytiks® - A Rich, Interactive Platform to Your Support Decisions.

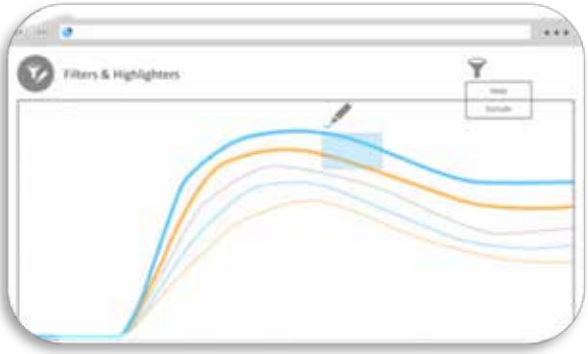
D3View - one Platform offers you 12 different applications to interpret your data for your design process.

Enhance the Experience of Exploring Data.

Simlytiks unites exploring, sharing and analyzing data into one application.

It's uses extensive visualization tools to hone in on specifics, trends, patterns or just the most important aspects of large or small datasets.

Because of this, Simlytiks creates stories from your data, so you can understand what is working and what needs improvement.

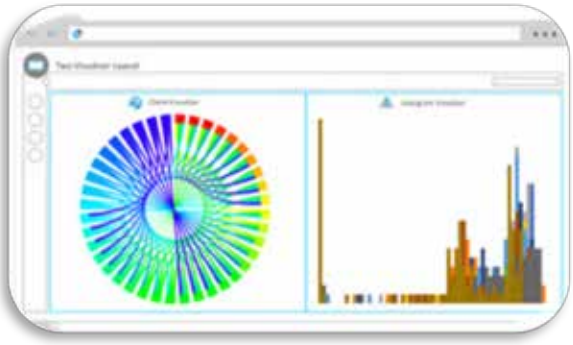


Extensive Visualization Tools

Clarify data with visualizations to answer questions that enhance, refine or reshape products, services, etc.

Exclude unwanted data or highlight important aspects with filters and highlighters.

Train, predict and identify data trends or patterns easily with A.I. and Machine Learning integration.

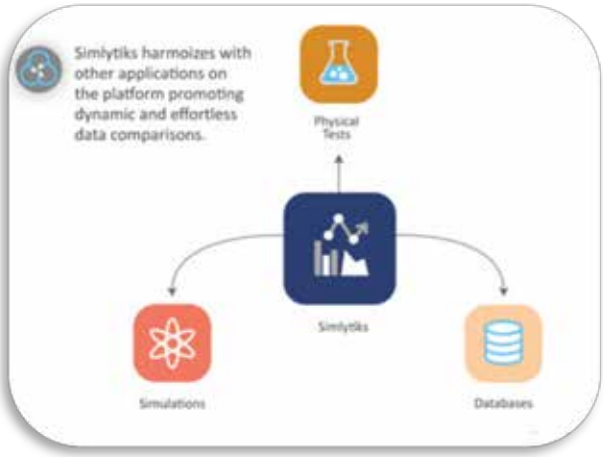


Visualizers, Pages and Layouts - Explore an extensive list of basic and advanced visualizers that include 3D options for both basic and scientific data.

Apply and save visually distinct colors through out all visualizations in a data set.

Utilize options to animate information and responses.

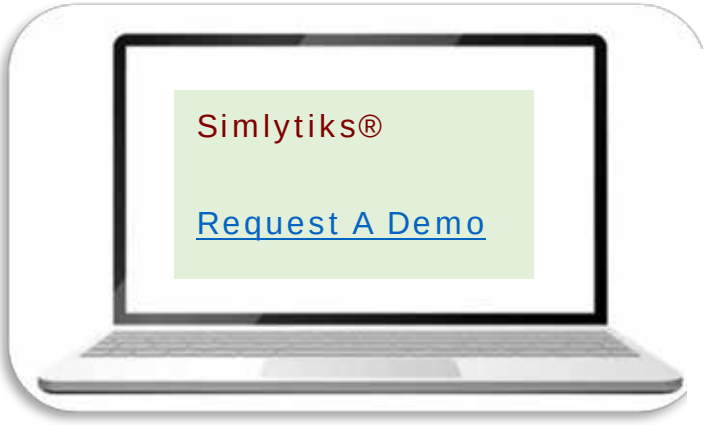
Use grid layouts to easily compare up to 16 different visualizations on one page, and create as many pages as needed to explore with multiple layouts.



Platform Integration - Simlytiks seamlessly integrates with other applications on the platform so no matter how you are reviewing your data, you can always delve into and disseminate it vividly and efficiently.

Compare records from simulations with records from physical tests directly.

Visualize and explore database records, and examine them further by applying view templates.



Make Better Decisions Today.

- Speed up and nourish your decision-making process by utilizing better more robust ways to investigate,
- Perceive, record and narrate valuable data.
- Choose the most effective and advanced path for your most significant business endeavors.
- Create a better tomorrow by making better decisions today with Simlytiks®.

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.

Your advantages at a glance

Bookable daily - Valid for 1 mo. - No VPN - Simple web interface - Upload/start prepared LS-DYNA runs

Our offer - LS-DYNA license for one job on 128 cores: 5000,- Euro per month

For parallel computations additional job licenses with 128 cores each are available. Please let us know your requirements. We will gladly put together your personal DynaXtend package.

Our add-on - Use of LS-DYNA on external hardware (e.g. T-Systems PLM Cloud): 2,500.- Euro (optionally bookable)

CONTACTS: **Kathleen Fritz** **Kathrin Faas**

Introduction to LS-DYNA Feb 01 - March 01 - April 05 - May 03 - **DYNAmore NORDIC**

Prior knowledge is not required.

The introductory seminar gives a quick, comprehensive introduction to the applications of LS-DYNA and is recommended for simulation engineers who want to use LS-DYNA as an FE code to simulate general nonlinear problems.

The main application areas of LS-DYNA are strongly non-linear tasks such as crash, metalforming, and impact problem simulation, and these are covered in the seminar.

LS-DYNA can also be used to successfully solve complex nonlinear static problems with either the explicit or the implicit solver. **The participant will be introduced to both solvers as well as coupling the mechanical solvers to the thermal solver in order to simulate multiphysics problems.**

The seminar participant works on exercise examples to help him/her understand the applications of LS-DYNA and LS-PREPOST.

Prior knowledge: The seminar is suited for users with limited or no experience of the program that want an overview of the LS-DYNA possibilities and learn how to perform basic analyses.

- LS-PrePost is the default pre- and postprocessor for LS-DYNA and will be used for the exercise examples in the seminar. Prior to the seminar, the participant will receive an LS-PrePost tutorial as an introduction.

Seminar outline:

- Introduction and application examples
- Implicit and explicit finite element methods
- Keyword format
- Elements
- Contacts
- Boundary and initial conditions
- Constraints
- Rigid bodies
- Material models
- Coupled analyses
- Control parameters
- Output format and output files
- Pre & post processing with LS-PREPOST
- Hands-on exercises throughout the seminar

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**

What lies in the future for simulation? The Red Planet may have an influence...

Published by Marisa Zanotti

Paolo Bellutta is a Mars Exploration Rover Driver, officially a "Rover Planner", at the Jet Propulsion Laboratory of NASA's Mars Science Laboratory, in Pasadena, California, which is one of NASA's R&D laboratories in the USA. Bellutta is responsible for moving the Mars rover around the Red Planet, picking the images that the vehicle captures at the end of the day, deciding where it is safe to move the vehicle to approach the various science goals that the geologists and other scientists communicate to him, and so on.

Simulation for innovation and project development - For those of us that work in an environment that is very difficult to replicate on Earth, simulation is clearly the groundwork for every project that we develop. Obviously, we cannot replicate the conditions that we have on other planets – firstly, it would be too expensive and secondly, it would be too difficult, if not impossible. Just think, for example, of how one would replicate a different gravity field on Earth; it would be practically impossible.

The way that the vehicle interacts with the soil on Mars is different from the way that the vehicle interacts with soil on Earth.

Simulation also plays a very important role in the phase of interacting with the atmosphere of the planet. More specifically, since I work on Mars, it is important for us to be able to control the entry, descent, and landing portions of the mission. Being able to simulate the behavior of the atmosphere, depending on the temperature, and the density of the atmosphere is really important.

So, innovation to us means being able to have higher and higher fidelity simulations under these conditions. While we have learnt a little bit of how Mars works, we still need to be able to simulate the entire system before we land. We cannot do real live testing before sending the vehicle to Mars; we can do some testing in real life, but not of the entire system. So for us, the only way of being able to complete our testing is to actually do it through simulation.

Benefits of simulation tools application

I don't think there is enough communication today about the possibilities of the applications for simulation. So on the one hand, we should have more widespread use of simulation, but on the other side, we sometimes trust simulation too much. By this I mean that the results of a simulation are only as good as the model; so if your model is imperfect, or if your knowledge of the problem is incomplete, your simulation is not perfect – it doesn't provide all the details that you need to have.

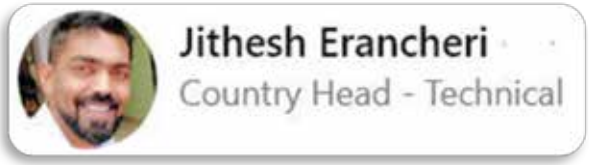
So in this sense we sometimes trust simulation too much. But, there are many, many fields where simulation could be very important. One example is politics where one could try to simulate what would happen when you make a certain decision for your population and try to figure out what the consequences of your decision would be.

Expectations and new challenges for the near future

The next level of simulation that we would like to have would be the ability to better model how the terrain interacts with the wheels of our vehicle. At the moment we can simulate the interaction of the soil with the vehicle with terramechanics, but these are pretty crude, and they can only simulate the behavior of the vehicle for a few seconds. And the simulation requires hours of computing time.

Being able to simulate what Mars is going to throw at us when we're moving the vehicle, on one hand would enable us to operate our vehicle more safely. On the other hand, when we can compare the expected results from our simulation with what we actually encounter on Mars, it would help us to determine where there are unexpected changes in the terrain.

Therefore, from a scientific perspective, it is very important. Whenever there is a different type of terrain that we travel through, it would be interesting to see why there is that change and be able to analyze the terrain immediately. For example, when you're walking on the beach, you can immediately feel with your feet when you are on dry sand versus wet sand. It is the same for the vehicle: it can detect when the terrain changes, but what are the changes relevant to? We need to be able to simulate the behavior of the terrain before we give the commands to the vehicle, and consequently the vehicle itself would then be able to collect scientific samples while driving simply by comparing the data from the simulation to what actually happens.

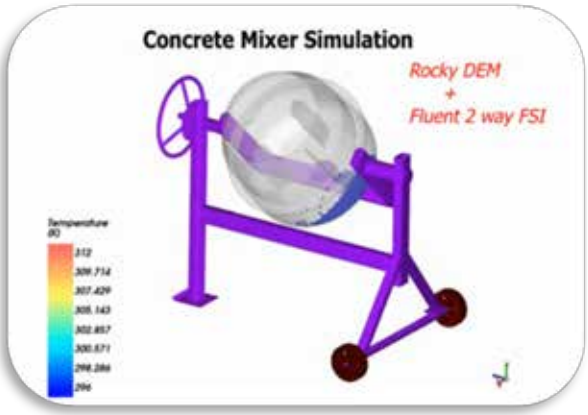


Kaizenat Technologies Pvt Ltd

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 KNOW?

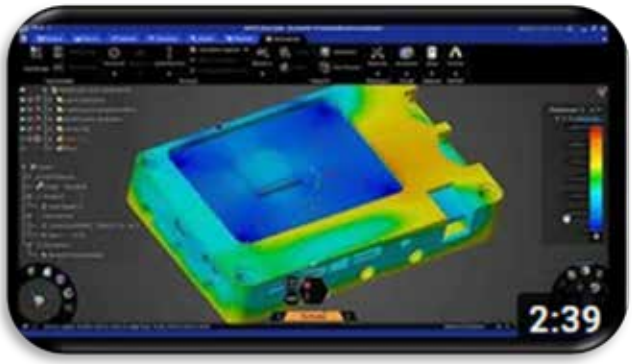


Concrete Mixer simulation using Rocky DEM | Rocky - Fluent Coupling | Particle Dynamic Simulation

A concrete mixer (often colloquially called a cement mixer) is a device that homogeneously combines cement, aggregate such as sand or gravel, and water to form concrete.

A typical concrete mixer uses a revolving drum to mix the components.

In this work, a 2-way FSI of particles and fluid is performed using ANSYS Rocky and Fluent to identify how the concrete particles are raised up with the fluid's temperature.



ANSYS Discovery – Thermal Analysis of Raspberry pi Carrier Backpack Assembly |

Electronic components are used to control the flow of Electrical currents. Obviously, components restricting the flow of electrons gets heated up. To minimize the Thermal failure scenarios,

Thermal analysis is performed. Here, Raspberry pi is the Electronic component.

A day in the life of a software engineer

By Richard Baldwin

When you think of software engineering two contrasting images come to mind.

It's either trendy offices with table tennis and takeaway pizzas, or lone programmers typing complicated code. With Hexagon at least, neither of them is anywhere near the truth.

In this blog we'll poke our heads round the door of the software department, throw open the windows and shine a light on the fascinating world of software engineering.

Here's a thought to get us going. Software engineering is a science, computer science. Ask a software engineer if their profession is an art or a science and they'll probably give you a funny look. It sounds like a silly question, but did you know that every software engineer has their own style?

Much like a literature student can tell the difference between Keats and Shelly, so software engineers can read a line of code and have a good guess at which of their colleagues created it. Without wanting to over-strain the analogy, we can push it a little further. In the strictest sense of the word, coding is creative. You're making something new. Solutions to problems can be creative too, even elegant, and that's what a software engineer does. **They solve problems. More precisely, they apply the principles of engineering to develop software that solves problems for customers**.

Finding and solving a specific problem might take weeks or even months

It might be creating new software for a particular function or fixing an issue with a piece of existing code. When you consider that a piece of software like PC-DMIS contains several million lines of code, finding and solving a specific problem might take weeks or even months.

Let's just stop and think about that for a minute. PC-DMIS consists of around 2 million lines of code. An average novel has 38 lines per page so if PC-DMIS were a book, it would be around 52,631 pages long. That's massive, 35 times longer than the Lord of the Rings trilogy and the Hobbit put together, and the plot line not nearly so compelling.

Actually, the analogy doesn't work because there's no strict definition of a line of code, and if there were it would probably be a lot longer than a line in a book, but you get the point. Solving a problem in that kind of context means a software engineer needs to be persistent, logical and thorough.

"It can be frustrating, working day after day on the same issue but it's punctuated with eureka moments" explains a senior software engineer. "When you finally identify how and why a problem is happening, it makes all that hard work worthwhile."

Take a step back and you'll see a nuanced world full of complexities, challenges and opportunities

A day in the life of a software engineer will never give an accurate picture of what it's like to do the job. You need to see the whole story of how one day fits into the next, working towards a solution. Once you take a step back, you'll find a nuanced world full of complexities, challenges and opportunities.

When a software engineer looks at code on a screen, they can see the bigger picture. It's like when a musician reading notes on a stave hears the tune in their mind, so a software engineer can 'hear the tune' of the code in front of them. Seeing that complete story is what takes the job out of the abstract and into reality.

Another aspect of that is when you realize software engineering is a group activity. Far from being lone individuals, they work together as part of global teams. Next time you talk to a software engineer, ask them who their nearest colleagues are. The answer shouldn't really be a surprise because software transcends international borders. The image of a software engineer working in isolation is very far from the truth.

To those on the outside looking in, a day in the life of a software engineer is difficult to comprehend. That's because "a day in the life" is the wrong way to look at it, the focus is too narrow. It's like looking at an individual brick and ignoring that it forms part of a building. When you take the time to dispel the myths, you'll see it's a rewarding profession for those with the persistence and tenacity to solve its many puzzles.

A profession still in its infancy - This is a profession in its infancy. It's still growing, still malleable, still testing the range of its capabilities and that is what makes it exciting.

According to the OED the first documented use of the term "Software engineer" was in the Washington Post in 1962 and it's changed a lot since then.

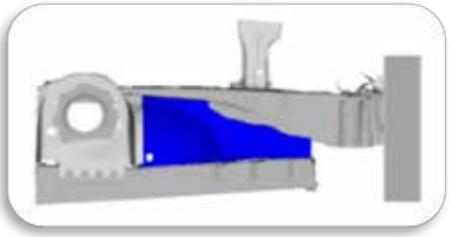
Engineering is a profession full of heroes. We admire the great engineers of the past in the same way we revere artists, scientists and philosophers. Any list of great historical figures would be incomplete without names like Brunel, Edison, Tesla, all great engineers and well worthy of the respect we give them.

Software engineering is still waiting for its share of heroes. Its Brunel and Edison are yet to come along. Perhaps you're that person? If so, we'd like to hear from you.

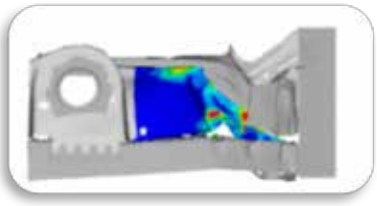
Visit our careers page for more information.

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

Not To Miss on YouTube

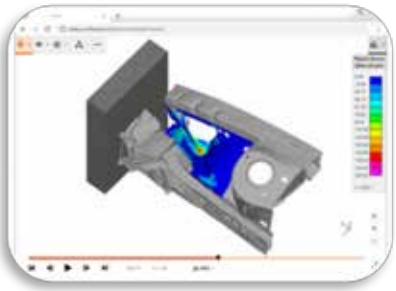


D3PLOT Viewer has the power to transform the way that you review, communicate, and deliver engineering analysis.



Break free from the 2D confines of traditional reports. With D3PLOT Viewer you can explore results in 3D with your team in meetings and design reviews, share animated 3D models with designers and suppliers, and bring the 3D experience to clients in your project deliverables.

How it works	3D Viewer Export	Try D3PLOT Viewer Now
D3PLOT Viewer is free to use – free for your team, your partners and your clients · No installation, no registration, no setup required – simply load models and start exploring in 3D · D3PLOT Viewer reads GLB files, which are generated by Oasys D3PLOT · When you open a model in D3PLOT Viewer, all of your model data stays in your browser – it doesn't get uploaded anywhere · If you need to work offline, you can download the HTML bundle	Oasys D3PLOT can export 3D models as specially-customised GLB files · Export either a single frame or an animation · Contour bar and Part Tree data is included · The GLB files are compatible with Microsoft PowerPoint and other 3D viewers, with reduced functionality	Try out the demo model in the embedded D3PLOT Viewer above · Explore this larger sled test model featuring LSTC HIII 50M with seatbelt and airbag deployment, or this fan blade-off test model from the LS-DYNA Aerospace Working Group (these larger models will take 10-20 seconds to load depending on your web browser and internet connection) · Download Oasys Suite 18.0 to start creating your own GLB files for D3PLOT Viewer · Access D3PLOT Viewer from wherever you are at d3plotviewer.com

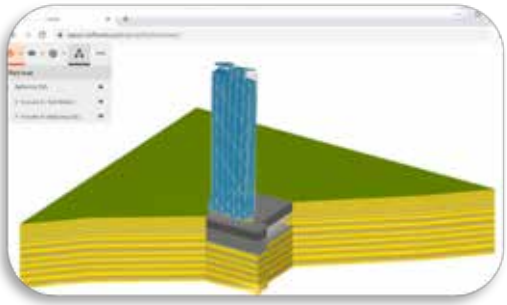


Among the features

Designers and Suppliers - Share animated 3D models with designers and suppliers to help them improve the performance of parts and assemblies

Automation and Quality Assurance

Automatically generate the output files as part of your LS-DYNA job submission - then use D3PLOT Viewer to make a quick check of results as the complete...



Clients

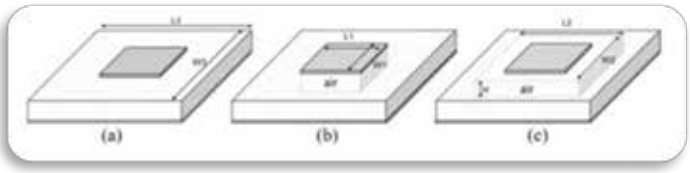
Give your clients added vale with 3D project deliverables...

Microsoft Power Point

Insert D3PLOT GLB files as 3D models in your Power-Point presentations..

Team Meeting and Design Reviews

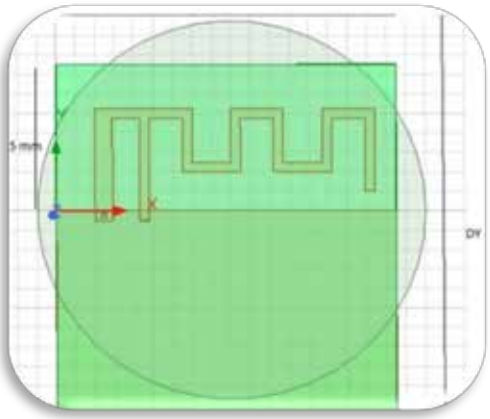
Improve productivity in team meetings and design reviews by exploring results together in 3D...



Patch Antenna Structures - Ozen Engineering co-authored with Averatek Corporation this technical paper on patch antenna structures within printed circuit boards with embedded air dielectrics for improved efficiency and directivity.

For this work, we selected two target carrier frequencies: (i) 2.4 GHz (Bluetooth and WiFi) and (ii) 5.5 GHz (WiFi). At each frequency we designed three models, for six total antennas. At a given frequency, one antenna was a baseline model with a PCB laminate dielectric between the patch and the ground plane, the same laminate used for overall construction.

For the two experimental antennas at a given frequency, we replaced the dielectric with an air pocket in the shape of a rectangular parallelepiped (box). We began with the constraint that the height of a cavity would be the same as the dielectric that it replaced in the baseline unit. Keeping the internal height as a constant, we arrived at patches and overall antenna lateral dimensions that targeted the two carrier frequencies. The difference between the two experimental antennas at a given frequency was this: for one of those antennas, the air cavity was the same lateral size as the patch, and for the other model the air cavity was larger in extent than the patch, roughly 18 – 40% greater in a particular direction.



Miniaturized IOT Antennas – What is the Size Limitation?

Nowadays, wireless communication devices such as IOT place extreme requirements on efficient, miniaturized, and wideband antennas. The antenna designer is faced with the challenging question of whether he could design an antenna to meet these specifications in such limited space. Early in a design cycle it is important to determine if the physical volume specified is, in theory, large enough to allow the design of any antenna which can meet the impedance bandwidth and efficiency requirements.

There is a practical limit to the bandwidth and radiation efficiency of electrically small antennas. Knowing these physical bounds, will help IOT antenna designer prevent diverting resources to solve insurmountable problem. Physical bounds provide information about the maximum achievable performance of antennas. Bounds are derived, in general, independently of antenna geometry, material, and type.

There are well established miniaturization techniques for antenna design . These techniques use antenna dielectric and lumped element loading, introduction of ground plane and short circuits and geometry optimization. These techniques can also be combined to further minimize the antenna size.

Part of the engineering that has gone into NASA's James Webb Space Telescope design was performed by Abed Khaskia of Mallet Technology, a sister company to Ozen Engineering, using Ansys simulation software.

NASA's James Webb Space Telescope launched at 7:20 a.m. EST Saturday on Dec. 25th. The telescope lifted off atop an Ariane 5 rocket from Europe's Spaceport in French Guiana.

This work involved the interactive magnetic/structural simulation of a MEMS micro-shutter.

PDF Iterative Magnetic/Structural Simulation of a MEMS Micro-shutter

Abed M. Ksaskia, David J. Power - Mallet Technology, Laurel, MD
James P. Loughlin - NASA/Goddard Space Flight Center, Greenbelt, MD

Excerpt from the above pdf: A finite element model has been created that simulates the magnetic actuation of a cobalt-iron covered, 0.5μm thick, silicon nitride micro-shutter. The micro-shutter will be used as a transmissible filter in a space-based Multi-object Spectrograph (MOS). A laminated tri-pole permanent magnet is scanned across an array of shutters. The applied magnetic force twists the shutter's torsion hinge and actuates the shutter from the closed, 0 degree, position, to the open, 90 degree position. A sequential analysis method was selected. This method uses the interaction between the magnetic and structural fields and is accomplished via the load vectors. The simulation results are compared to experimental measurements of fabricated micro-shutter. Devices

- Additional engineering efforts were performed using Ansys engineering software. Specifically, the powerful matrix manipulation features of the ANSYS Mechanical APDL (Ansys Parametric Design Language) was put to good use.
- Other Ansys efforts include a parametric finite-element model for evaluating segmented mirrors with discrete, edgewise connectivity.
- Ansys Tech Tip article & additional technical pdf's visit Ozen website

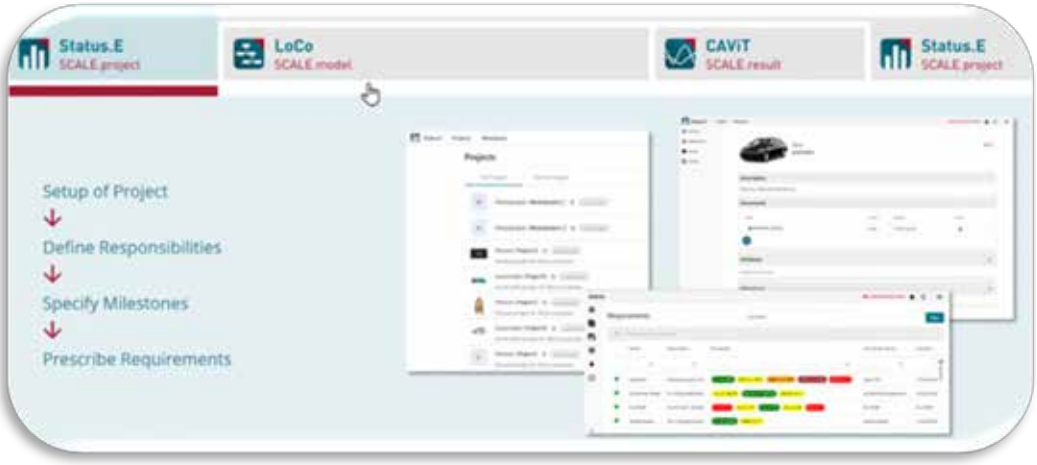
According to NASA, the James Webb Space Telescope's revolutionary technology will study every phase of cosmic history—from within our solar system to the most distant observable galaxies in the early universe. Webb's infrared telescope will explore a wide range of science questions to help us understand the origins of the universe and our place in it.

Seeking Light from the First Galaxies in the Universe - Webb will directly observe a part of space and time never seen before. Webb will gaze into the epoch when the very first stars and galaxies formed, over 13.5 billion years ago. Ultraviolet and visible light emitted by the very first luminous objects has been stretched or "redshifted" by the universe's continual expansion and arrives today as infrared light. Webb is designed to "see" this infrared light with unprecedented resolution and sensitivity.

SCALE and GNS Systems announce cooperation

The two partners specifically address simulation data management (SDM) in virtual product development. The core benefit for simulation engineers: maximum integration of innovative solutions and services for continuous data and process management - in the cloud and on-premise. In the future GNS Systems will also integrate SCALE.sdm on its engineering cloud platform, the Digital Engineering Center.

SCALE.sdm the integrative software solution for continuous simulation data and process management.



Combined the modules form a powerful system solution for virtual product development.

The modules:

- **Status.E** (SCALE.project)
- **LoCo** (SCALE.model)
- **CAViT** (SCALE.result)

Starting point is usually the definition of a project with assignment of responsibilities, schedules and requirements (Status.E). Simulation models are created, managed and simulated by sending them to high-performance computers (LoCo). The results are then evaluated and assessed and reports are automatically generated (CAViT). Finally, key results are transferred back into the Status.E module. This ensutres the controlling of the fulfilled requirements and thus the maturity level of the product to be developed.

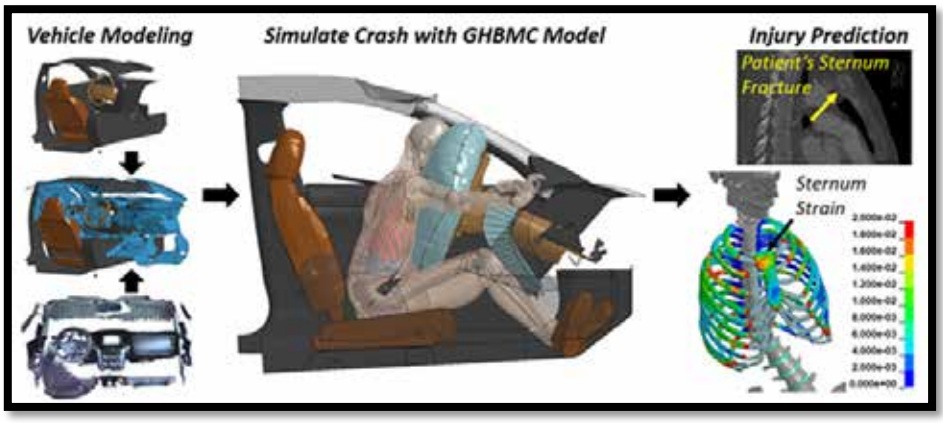
Among the benefits:

- **Standardization** of data and processes
- **Documentation** of all activities
- **Quality** improvement with automated model checks
- **Collaboration** - Support of Teamwork and Data Sharing
- **Time Savings** - Automation of processes/workflows
- **Reporting/Assessment** - Standardized and automated

For more information contact

© Heiner Müllerschön

Paper is published at Taylor & Francis Online



Development and implementation of a time- and computationally-efficient methodology for reconstructing real-world crashes using finite element modeling to improve crash injury research investigations

...All case occupants were assumed to be sitting in an upright position at the time of the crash, which was confirmed in the CIREN evidence reports. **Settling was conducted in a 500 ms simulation using LS-DYNA... Application of a 3-point belt restraint was performed in LS-PrePos**t…

Dept. of Biomedical Engineering, Wake Forest School of Medicine, Winston-Salem, NC., USA

"Congrats to Casey & team, for this paper on virtual reconstruction of Crash Injury Research & Engineering Network (CIREN) cases."

Casey Costa

Ashley A. Weaver

Joel D. Stitzel

- Fang-Chi Hsu, Dept. of Biostatistics & Data Science, Wake Forest School of Medicine, Winston-Salem, North Carolina, USA
- R. Shayn Martin, Dept. of Trauma Surgery, Wake Forest Baptist Health, Winston-Salem, North Carolina, USA
- Anna N. Miller, Dept. of Orthopaedic Surgery, Washington University in St. Louis, St. Louis, Missouri, USA
- James P. Gaewsky, Elemance, LLC, Clemmons, North Carolina, USA

Figure 1. Rigid transformation of the simplified vehicle model to approximate the case vehicle shell geometry.

Abstract - Eleven Crash Injury Research and Engineering Network (CIREN) frontal crashes were reconstructed using a novel, time-efficient methodology involving a simplified vehicle model. Kinematic accuracy was assessed using novel kinematic scores between 0-1 and chest injury was assessed using literature-defined injury metric time histories. The average kinematic score across all simulations was 0.87, indicating good kinematic accuracy. Time histories for chest compression, rib strain, shoulder belt force, and steering column force discerned the most causative components of chest injury in all cases. Abbreviated Injury Scale (AIS) 2+ and AIS 3+ chest injury risk functions using belt force identified chest injury with 81.8% success.

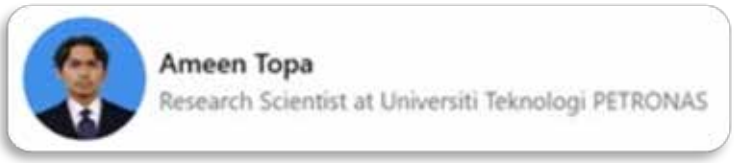
Excerpt Introduction - Finite element (FE) human body models (HBMs) have been developed as cost-efficient supplements to physical tests for investigating injury risk and motor vehicle crashworthiness at a level of detail difficult to achieve in laboratory tests (Iwamoto et al. 2002; Shigeta et al. 2009; Xu et al. 2018). Though these models have been extensively validated using data from controlled laboratory test environments, reconstructions of real-world crashes using HBMs offer valuable opportunities to compare kinematics and injury predictions against real-world crash, occupant, and injury data (Golman et al. 2014). They can also be used to supplement real-world crash investigations. The Crash Injury Research and Engineering Network (CIREN) investigates injury causations and mechanisms in real-world crashes using post-crash vehicle inspections, medical records, and police records (NHTSA 2021). CIREN eligibility is limited to occupants with severe injuries and vehicle models newer than 7 years old. Eligible occupants are enrolled by a medical center (MC) team, who compiles pertinent police, crash, medical, and radiology records to code the occupant's injuries using the Abbreviated Injury Scale (AIS). An engineering center (EC) team then develops BioTabs, a method for documenting injury causation, for each AIS-coded injury. A BioTab consists of three things: (1) an injury causation scenario (ICS) that details the source of energy, (2) the involved physical components (IPC) contacted by the occupant, and (3) the regional injury mechanism (Schneider et al. 2011). Physicians and engineers from both centers then meet for a final case review to reach a consensus for each BioTab.

Previous studies have reconstructed CIREN crashes using FE modeling (Belwadi et al. 2012; Golman et al. 2014; Danelson and Stitzel 2015), but were often limited by the scarcity of full-scale FE vehicle models. Iraeus and Lindquist (2016) addressed this common limitation by developing a simplified vehicle model representative of a range of vehicle interiors…

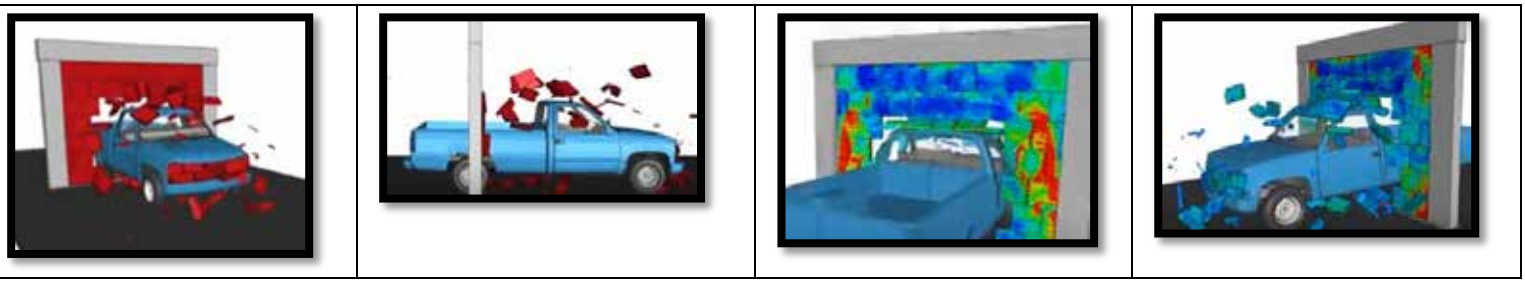
Among the Research of the Department of Biomedical-Engineering:

- **Global Human Body Models Consortium -** A multi-center, global effort to develop state of the art virtual human models for improving safety in transportation in automotive, aerospace and military applications and addressing the emerging challenges of the autonomous vehicle paradigm shift.
- **Virtual Human Models -** Human body model customization to account for aging, osteopenia, sarcopenia, and anthropometry to improve spaceflight and automotive injury risk prediction.
- **Injury Biomechanics for Soldiers -** With one goal to lay the long-term foundation for the prevention, diagnosis and treatment of veterans returning from Iraq and Afghanistan with blast-exposure injuries.
- **Regenerative Medicine for Soldiers** - The wounded warrior tissue engineering/regenerative medicine program.
- **Head Impact in Sports** - The groundbreaking Imaging, Telemetry and Kinematics Modeling (iTAKL) study that provides ongoing information to track exposure of youth football players for head impacts and concussion.

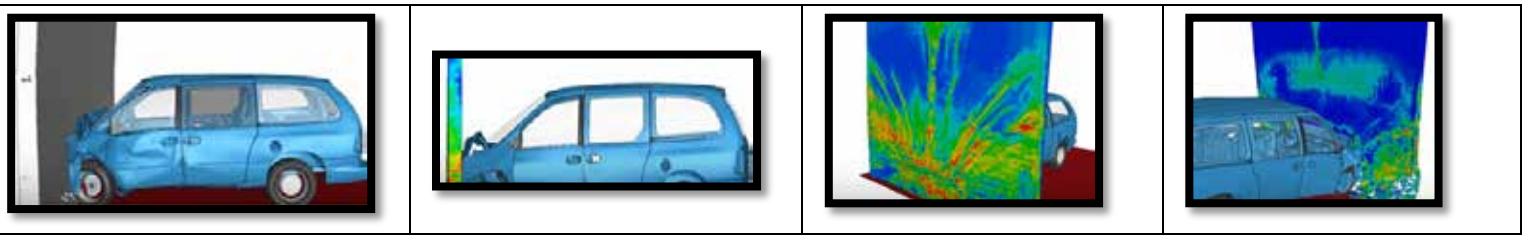
A crash simulation is a virtual recreation of a destructive crash test of a car or a highway guard rail system using a computer simulation in order to examine the level of safety.



Chevrolet C2500 Pickup Truck collision with a masonry infill wall.



Caravan vs RC Wall - **Caravan impact on reinforced concrete wall at 82km/h.**



The Lego Challenge

Car impact into wire rope safety barrier

Excerpts - For the complete article please visit the links

Ford and Purdue Patent Charging Station Cable for Research That Could Lead to Recharging EVs as Quickly as Gas Station Fill-Ups

DEARBORN, MI – Ford and Purdue University researchers have taken an important early step to make recharging EVs simple and time saving.

- Ford researchers have successfully completed an early step with Purdue University inventing a new, patent-pending method for charging stations that could one day deliver significantly more power compared to today's leading systems
- Using liquid as an active cooling agent, the concept uniquely changes the liquid to vapor, and could combine with in-development vehicle charging technology to lower the average time to recharge electric vehicles
- **This comes as Ford invests to lead the electric revolution and help the world transition to electric vehicles by pushing their mainstream adoption with vehicles such as the Mustang Mach-E SUV and soon-to-arrive F-150 Lightning™ Pickup and E-Transit Van**

Through a research alliance, researchers from both groups are working to develop a new, patent-pending charging station cable that could combine with in-development vehicle charging technology, making it even easier for people to transition to EVs with seamless re-charging.

"Today, chargers are limited in how quickly they can charge an EV's battery due to the danger of overheating. Charging faster requires more current to travel through the charging cable," said Michael Degner, senior technical leader, Ford Research and Advanced Engineering.1 "The higher the current, the greater the amount of heat that has to be removed to keep the cable operational."

Purdue researchers are focusing on an alternative cooling method by designing a charging cable that can deliver an increased current. The cable uses liquid as an active cooling agent, which can help extract more heat from the cable by changing phase from liquid to vapor – the key difference between this and current liquid-cooled technology on the market.

This innovation could one day deliver significantly more power than today's leading systems to re-charge electric vehicles, making the potential of faster re-charging times possible if vehicle charging and other technology enhancements are made in parallel. Ultimately, this could eventually lead to re-charging EVs as quickly as conventional gas station fill-ups.

The idea for this technology originated based on the Ford team's understanding of the challenges faced going to faster charging rates, as well as Purdue researchers' area of expertise. The teams collaborate regularly to review the latest results and give feedback on areas of focus as the technology is developed.

"Electric vehicle charging time can vary widely, from 20 minutes at a station to hours on an at-home charging station, and that can be a source of anxiety for people who are considering buying an electric vehicle," said Issam Mudawar, Betty Ruth and Milton B. Hollander Family professor of mechanical engineering, Purdue University. "My lab has come up with a solution for situations where the amounts of heat that are produced are beyond the capabilities of today's technologies."

Mudawar says his lab intends to begin testing a prototype charging cable in the next two years to determine more specific charge speeds for certain models of electric vehicles.

"Ford is committed to making the transition to electrification easy," said Degner. "We are glad to work closely with Purdue's research team, which has the potential to make electric vehicle and commercial fleet ownership even more appealing and accessible."

Electrifying young talent - The alliance with Ford and Purdue is part of hundreds of strategic alliances the company has with university professors around the world. Providing graduate students with opportunities to work on real world-challenges helps them develop their skills while introducing Ford to students who may choose to start their career at the company.

"The research that we are conducting in a project such as this is really advanced, and we view it as a benefit for us, the future of charging electric vehicles and as a pipeline to young talent – and we've seen success in doing this," said Ted Miller, Ford's manager of Electrification Subsystems and Power Supply Research. "Students get engaged, they like the work they're doing, and it's a sustained investment in their laboratories, while helping us solve problems."

While the fast-charging cable won't be on the market for some time as research continues, Mudawar has been developing ways to more efficiently cool electronics for the past 37 years by taking advantage of how liquid captures heat when boiled into a vapor.

"Ford has been actively involved in battery research and electric vehicles dating back to the days of Henry Ford and Thomas Edison," Miller said. "We've secured more than 2,500 U.S. patents in electrification technologies and we have more than 4,000 more pending. Working with Professor Mudawar and his students is the perfect fit to help us research the charging solutions of the future."

Excerpts - for complete information please visit the website

About Ford Motor Company - Ford Motor Company (NYSE: F) is a global company based in Dearborn, Michigan, that is committed to helping build a better world, where every person is free to move and pursue their dreams….Ford designs, manufactures, markets and services a full line of connected, increasingly electrified passenger and commercial vehicles…

About Purdue University - Purdue University is a top public research institution developing practical solutions to today's toughest challenges. Ranked in each of the last four years as one of the 10 Most Innovative universities in the United States by U.S. News & World Report, Purdue delivers world-changing research and out-of-this-world discovery…

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.

1. We started the day with the Old Retired Pilot and the Town Secretary fighting for a budget for Mustangs. Although one was horses, the other was planes! We had to turn them both down due to their conflict of budget interest. They are still arguing in the hall!

Quiz - can you name the below that are not a horse breed?

Additionally, there is an extra credit question! A hint for "D" - It is the horse breed.

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

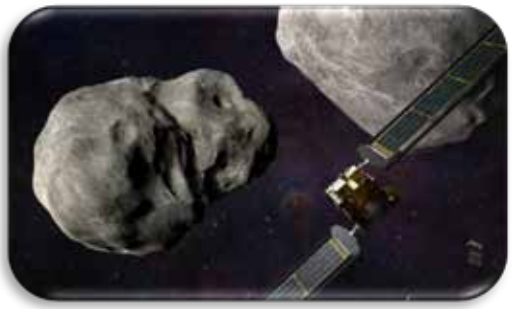
A_____

B_____

C_____

D_____

EXCERPT - full article is on the LLNL Website

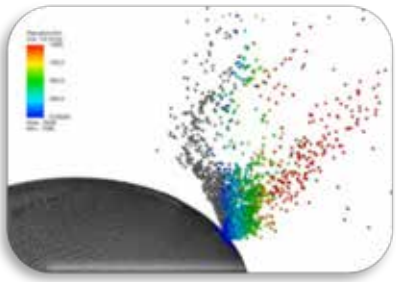


Lawrence Livermore takes part in NASA's first planetary defense test - Michael Padilla

Lawrence Livermore National Laboratory (LLNL) is taking part in NASA's first-ever planetary defense test, which deliberately collides a spacecraft into an asteroid called Dimorphos.

The Double Asteroid Redirection Test (DART) will examine technologies that will prevent an impact of Earth by a hazardous asteroid. DART is the first demonstration of the kinetic impactor technique to change the motion of an asteroid in space. The asteroid is a small moon of a larger asteroid called Didymos. The impact into Dimorphos does not pose any danger to Earth.

LLNL's role as participants in the DART mission include a working group focused on modeling the impact and deflection of the asteroid.



Video Lawrence Livermore Lab takes part in NASA's first planetary defense test

Megan Bruck Syal, who leads LLNL's Planetary Defense group, said she looks forward to the experiment and is excited to assist NASA and the Lab's mission partners to use this experiment to help advance the science of planetary defense.

"Our team has been supporting DART with impact simulations and analysis since 2015, and it is an incredible feeling to be on the precipice of its launch," Bruck Syal said. "DART is an essential first test of kinetic impact deflection effectiveness and will inform how we model asteroid response to a variety of mitigation techniques in the future. Many students, postdocs and staff at LLNL have contributed to our preparedness for this experiment; it is a true interdisciplinary team effort."

Katie Kumamoto, a LLNL geoscientist and a member of the LLNL impact modeling team, said DART is a groundbreaking mission and a big step toward practical asteroid preparedness.

"We don't have a lot of data on the properties of asteroids, like their strength or density, but these properties can have a large effect on the magnitude of the deflection we would get from a kinetic impact," she said. "DART is thus a two-fold opportunity, to both demonstrate that we can actually deflect an asteroid in space and get us more data on the properties of asteroids, which will help us prepare for potential future impacts."

Team member Cody Raskin has helped develop simulation tools and methods for the inverse problem of determining the asteroid's material properties by measuring its response to the impact of the DART spacecraft. This includes adapting machine learning techniques to characterizing the mapping that connects asteroid material properties to the change in momentum imparted by the impact.

"One of the major unanswered questions in the field of planetary defense is just what these near-Earth asteroids are actually made of, and so how they might react to kinetic impactors," he said….

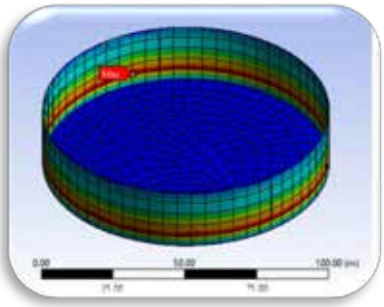
A KC-46 Pegasus assigned to Joint Base McGuire-Dix-Lakehurst, N.J. prepares for air refueling during the first mission over the North Atlantic Ocean, Dec. 2, 2021. The KC-46 maintains air refueling edge through the use of both the refueling boom and drogue systems, allowing for simultaneous air refueling of multiple aircraft with wing pods.

An F-15C Eagle takes off to conduct its final defensive counter air vul during Weapons School Integration 21-B at Nellis Air Force Base, Nev., Dec. 8, 2021. As the Air Force continues to modernize, this class marks the final F-15C Weapons Instructor Course to be taught at the United States Air Force Weapons School. (U.S. Air Force photo)

Loadmasters assigned to the 1st Special Operations Squadron look out over Mt. Fuji from the back of an **MC-130J Commando II** during a flight over Japan in support of exercise Resolute Dragon, Dec. 9, 2021. The 1st SOS conducted an airdrop in support of RD21, demonstrating their long range joint resupply capabilities. (U.S. Air Force photo by Senior Airman Jessi Monte)

Thanks to MDPI - an open access publication source including LS-DYNA papers

(The blast simulation was conducted using LS-DYNA software.)



Thin-Walled Cylindrical Shell Storage Tank under Blast Impacts: Finite Element Analysis

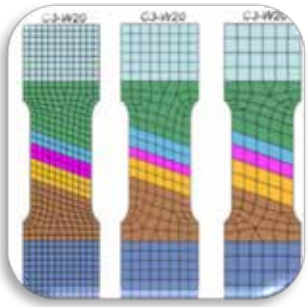
Ahmad Mahamad Al-Yacouby, Lo Jia Hao, M. S. Liew, Civil and Env. Engineering Dept., Univ. Teknologi, PETRONAS, Malaysia
R. M. Chandima Ratnayake, Samindi M. K. Samarakoon
Dept. of Mech. and Structural Engineering & Materials Science, University of Stavanger, Norway

Abstract - Thin-walled cylindrical shell storage tanks are pressure vessels in which the walls of the vessel have a thickness that is much smaller than the overall size of the vessel. These types of structures have global applications in various industries, including oil refineries and petrochemical plants. However, these storage tanks are vulnerable to fire and explosions. Therefore, a parametric study using numerical simulation was carried out, considering the internal liquid level, wall thickness, material yield strength, constraint conditions, and blast intensity, with a diameter of 100 m and height of 22.5 m under different blast loads using the finite element analysis method. The thickness of the tank wall is varied as 10 mm, 20 mm, 30 mm, and 40 mm, while the fill level of internal fluid is varied as 25, 50, 75, and 100%. The blast simulation was conducted using LS-DYNA software. The numerical results are then compared with analytical results. The effects of blast intensity, standoff distance, wall thickness, and fill level of internal fluid on the structural behaviour of the storage tank were investigated and discussed.

Deformed shape of the tank under blast intensity of 1500kg TNT equivalent mass 12.5 m away, (a) 100% filled level and (b) 0% fill level

Excerpt - . Introduction - Thin-walled cylindrical shell storage tanks are found in many commercial and industrial applications. These tanks are important facilities in the oil and gas and petrochemical industries, for they store large volumes of flammable, explosive, toxic, and harmful materials. With the rapid development of the global economy and the strategic demand and production demand of energy, the volume and quantity of storage tanks are increasing, and consequently, the scale of tank farms is expanding, showing characteristics of large-scale integration and coexistence of multiple tanks [1,2,3]. These storage tanks are subjected to internal pressure, which subjects the tanks to a uniform loading, considering that the tanks have an inner-radius-to-wall-thickness ratio of 10 or more [4]. In the last few decades, a number of major industrial accidents have occurred around the world [5,6]. Blast loading to the exterior of a cylindrical shell pressure vessels imposes severe consequences [7]. Despite the high risk of explosions in the oil and gas industry, little related research can be found in the literature, especially on the effect of tank dimensions and standoff distance from blast on the behaviours of thin-walled cylindrical shells…

Thanks to Science Direct - having open access publications including LS-DYNA papers



[Testing and modelling of butt-welded connections in thin-walled aluminium structures panel]

Numerical models of all the cross-welds tension tests were established using the commercial non-linear explicit finite elements code, LS-DYNA

Nguyen-HieuHoang (ab), **David Morin** (bc), **Magnus Langseth** (bc)
a. Dept. of Materials & Nanotechnology, SINTEF Industry, Norway
b. Centre for Research-based Innovation CASA, Norway
c. Dept. of Structural Engineering, Norwegian Univ. of Sci. & Tech., Norway

Highlights

- Welded joints of similar and dissimilar alloys (6060, 7003) were investigated.
- Extensive testing was done to study properties of material and joints.
- Modelling the gradient properties in HAZ using large shell elements is a challenge.
- A novel approach was proposed for modelling welded joints in thin-walled structures.
- The proposed approach greatly predicted the mechanical properties of welded joints.

Before manufacturing the projectile, the two selected shapes were checked using FEM with the LS-Dyna code.

[Validation of two different analysis techniques to obtain dynamic mechanical properties of concrete using a modified Hopkinson Bar]

V.Rey-de-Pedraza (a), **M.L.Ruiz Ripoll** (b), **C. Roller** (b),

D. Cendón (a), **F.Gálveza** (a)

a) Dept. de Ciencia de los Materiales, Univ. Politcnica de Madrid, Spain
b) Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach Institut, Germany

Highlights

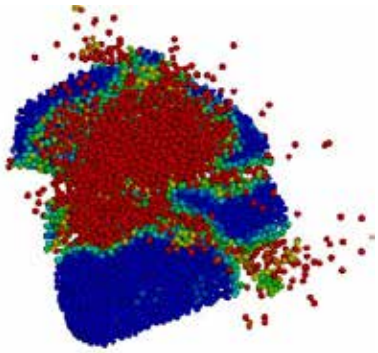
- The interest in the Hopkinson Bar technique can be appreciated in the variety of test configurations developed - Variations in the detonation system, length and geometry of the bars, instrumentation and recorded data, opens a broadband of results and interpretations
- A compared study over tensile and fracture energy tests is carried confronting two methodologies to check the validity of the results predicted.
- The influence of the projectile shape in the procedure and results is also critical and must be analysed.

The DYNALOOK site presents papers from European & International LS-DYNA User Conferences. Additionally. papers provided by other users. There are 2266 papers are available as open source.

January Showcase from the 13th European LS-DYNA Conference 2021 held in Ulm and online, 2021

Survey of four material models for ballistic simulations of high-strength concrete Simulation of the high velocity impact of railway ballast on thermoplastic train underbody structures

M. Vinot, D. Schlie, T. Behling, M. Holzapfel (DLR)



(As support to time and material expensive test methods, a numerical framework is developed within LS-DYNA at all levels from low to high impact velocities.)

Railway transportation represents an environmentally friendly alternative to automotive transportation for long distance travel. In the project Next Generation Train of the DLR, new railway solutions are developed for passenger and freight transportation for a broad range of applications (intercity, cargo, long distance).

Specifically, the high-speed train NGT HST aims at reducing travel times and specific energy consumption with new technologies. At the maximal operating speed of 400 km/h, the coupling of mechanical and aerodynamical forces leads to increasing risks of ballast stone impact on the train structures (in particular underbody structures), thus threatening primary components underneath [1]. Through the repetition of stone impacts during the entire lifetime of a structure, critical damage can occur and reparation or replacement concepts are required. The present work aims at investigating an impact-resistant underbody structure made out thermoplastic composite materials for the HST train on numerical and experimental basis. By considering multiple impact scenario in the structure sizing process, the project intends to reduce the interval at which the structure has to be replaced.

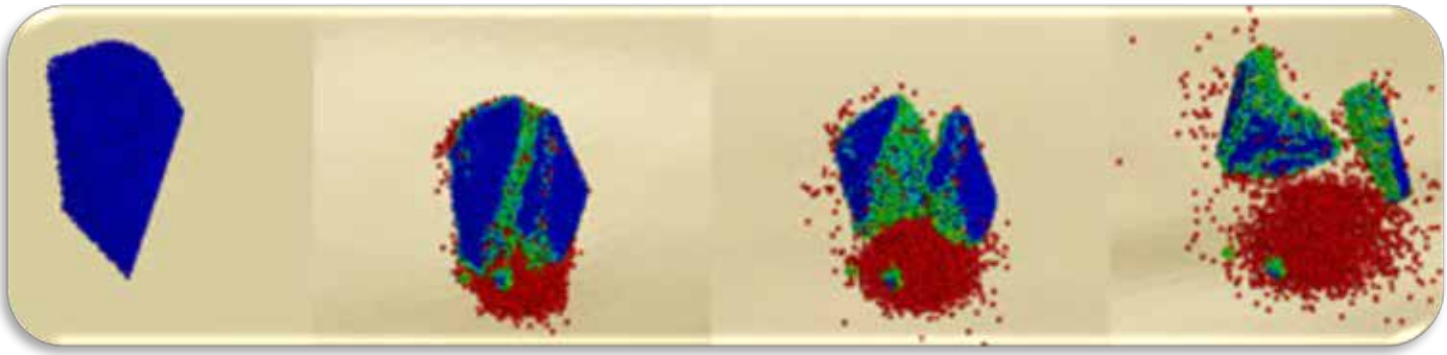
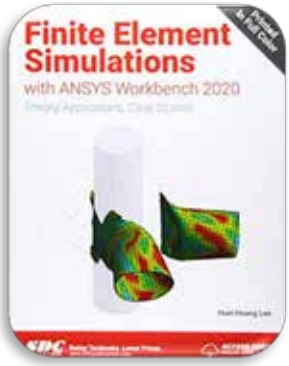


Fig 12: Failure of the ballast stone during the first impact on the composite plate

If you have a book sold on Amazon & would like it showcased, contact feaanswer@aol.com



Finite Element Simulations with ANSYS Workbench 2020

by Huei-Huang Lee (Author)

Finite Element Simulations with ANSYS Workbench 2020 is a comprehensive and easy to understand workbook. Printed in full color, it utilizes rich graphics and step-by-step instructions to guide you through learning how to perform finite element simulations using ANSYS Workbench.

Twenty seven real world case studies are used throughout the book. Many of these case studies are industrial or research projects that you build from scratch. Prebuilt project files are available for download should you run into any problems. Companion videos, that demonstrate exactly how to perform each tutorial, are also available.

Relevant background knowledge is reviewed whenever necessary. To be efficient, the review is conceptual rather than mathematical. Key concepts are inserted whenever appropriate and summarized at the end of each chapter. Additional exercises or extension research problems are provided as homework at the end of each chapter.

A learning approach emphasizing hands-on experiences is utilized though this entire book. A typical chapter consists of six sections. The first two provide two step-by-step examples. The third section tries to complement the exercises by providing a more systematic view of the chapter subject. The following two sections provide more exercises. The final section provides review problems.

This book is designed to be used mainly as a textbook for undergraduate and graduate students. It will work well in:

- a finite element simulation course taken before any theory-intensive courses
- an auxiliary tool used as a tutorial in parallel during a Finite Element Methods course
- an advanced, application oriented, course taken after a Finite Element Methods course

Table of Contents

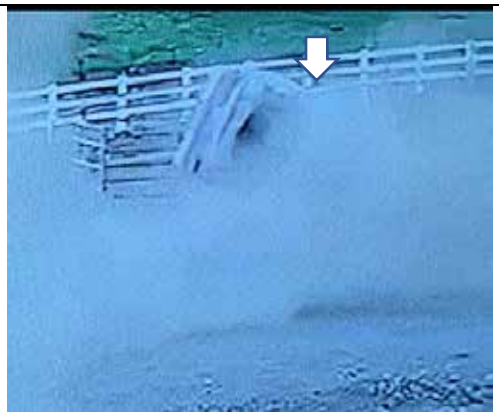
Huei-Huang Lee - Professor Lee has been working on finite element simulations for more than 30 years, including applications, software development, research, and teaching. He graduated from the Department of Civil Engineering, National Cheng Kung University, Taiwan in 1977 and was subsequently qualified as a Professional Engineer. With his P.E. license, he became a structural engineering practitioner as well as a software developer in Taipei. During that period, he and his partners designed many high-rise buildings and developed several finite element analysis programs, which were then commercialized. …

Driver had on his seat belt and luckily had no passengers. Good roof, good car, bad speeding driver! The video files are: 34M - 95M - MP4. If you want to see the crash and roll-over, they are in a folder http://www.feantm.com/accident/ Dang good thing our Town Supervisor wasn't walking her horse.

SLIDES Sideways

MEET hitching post

START FLIP - post is crushed down



Pinacle of flip round pen is 6 ft tall

Land - hitching post crushed

Driver was upside down
Good roof - seatbelt - airbag

Will they learn NOT to speed down this country road? NO! The last car crash video is also in the folder. Speed on country road + curve + gravel = CRASH BOOM!

Welcome to accident month at the ranch. Why must people speed around the curve before our ranch and they just can't control their vehicles after that curve. SO, one tire goes off the road and digs into gravel THEN they turn back onto the road and just go bat-shit all over!!!!

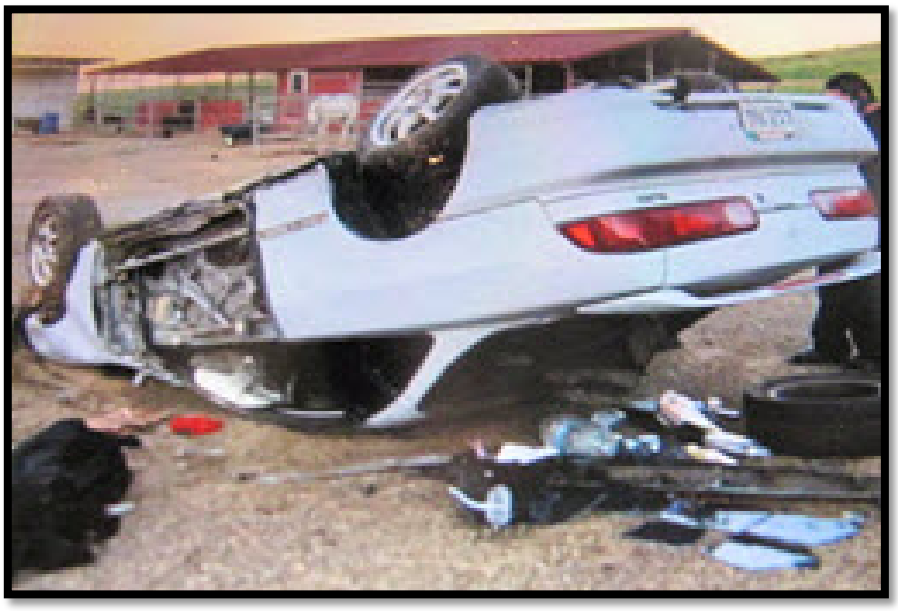
12/27/20 - We will end Xmas with telling people don't speed past my house.

YEP, this one rolled over 7 times past my house and ended up in the neighbor's field.

NO one got hurt - I wouldn't post a video if there was serious injury. Video is stopped at the beginning for a few seconds, or it goes by quickly!!

VIDEO is a .mov video 927KB

12/20 - no posting this week since my back is still in pain and I have not really been outside doing anything for two weeks. I have one more week to go and this should resolve the muscle injury. SO that said , don't pull something while you are backing up if it is a heavy corral rail - if you fall your ass hits the ground like a meteor from space and everything feels like your spine just compressed downwards!

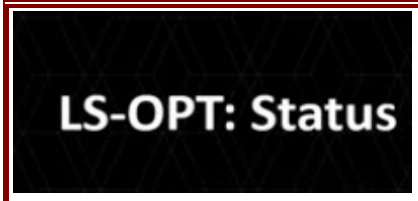
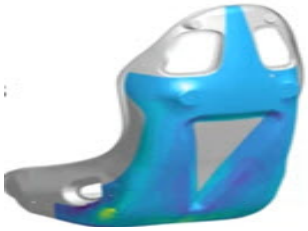
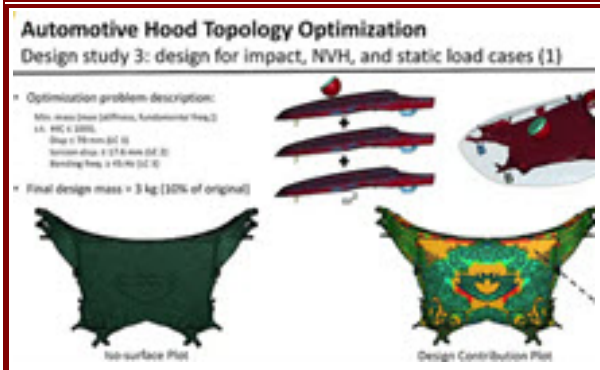


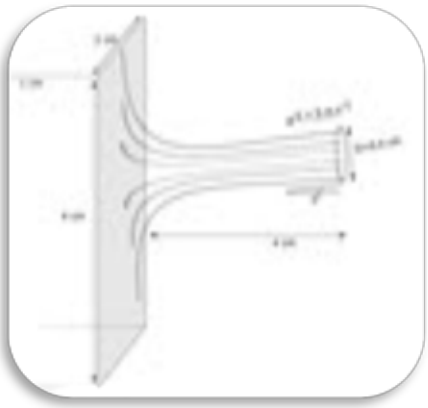
12/13/2021 - Well, sitting having coffee and I hear this loud crash!

Heard that sound before so knew someone was speeding down the country road AND missed and went through our fence - crashed into our yard! Landed upside down! Driver crawled out and was okay! Now that car is made safe - roof didn't crush, seatbelts and airbag saved his life.

Video is an MP4 video -and large file - it takes a few seconds to fly by the second camera
First camera 34MB

Second Camera 95MB

	**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



E. Yreux, I. Caldichoury -

Impingement jet flows for cooling using LS-DYNA®: an introduction to ISPH and ICFD approaches

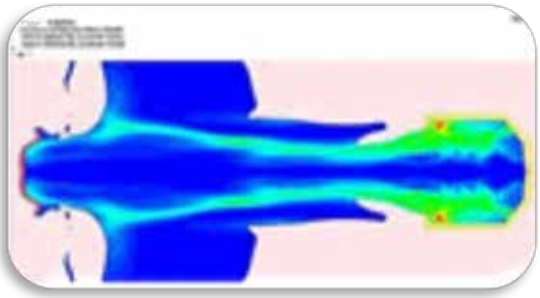
Huei-Huang Lee -

Finite Element Simulations with ANSYS Workbench 2020

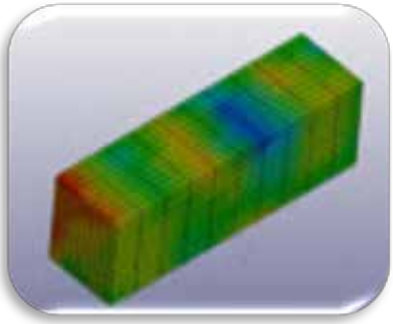
Y. Zhang - Northwestern Poly. Univ. -

Thin-Walled Cylindrical Shell Storage Tank under Blast Impacts: Finite Element Analysis (The blast simulation was conducted using LS-DYNA software.)

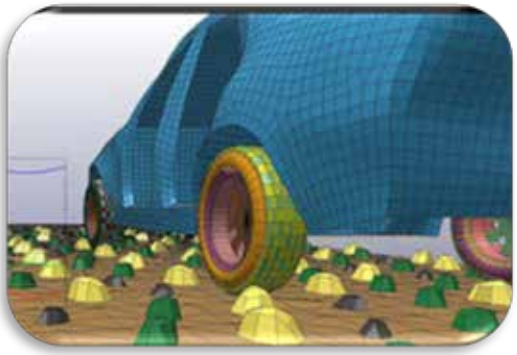
	M. Chapin - ESI - Manufacture Composite Wind Blades Right the First Time With Nearly Zero Physical Tests or Prototypes
	D3View - Test vs CAE in d3VIEW
	S. Coleman - ANSYS - Ansys Supports Formula Bharat and Other Student Teams in Their Success on and off the Track



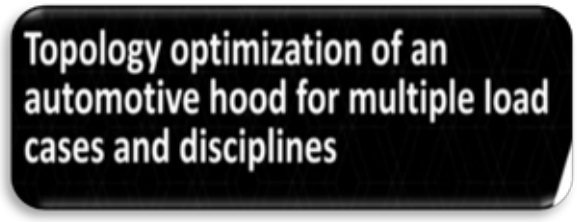
EFP: Explosively formed penetrator/projectile.



A. Karn- Rubber elongation in LS-DYNA



LURI Engineering VPG Tire Model and Stiffness Calibration LS-DYNA



Willem Roux (Ansys/LST) - Topology optimization of an automotive hood for multiple load cases

My Virtual Travel Outing

Thanks to Prakash Krishnaswamy liking a post by William Collick, Director of Sales at Czinger Vehicles for bringing the Czinger Vehicle and the Petersen Museum to our attention

Czinger Vehicles Express the Cutting-Edge of the Human Mind

The Future of Human-AI Design and Sustainable Systems

Czinger represents the pinnacle of automotive engineering, innovation, automotive art and technology-based design

Petersen Automotive Museum

EXHIBITION ABSTRACT - Although the term “supercar” first appeared in the 1920s, the modern notion of supercars was born in the late 1960s, when automotive marvels such as the Lamborghini Miura and the Shelby AC Cobra 427, capable of performance targets far exceeding anything that had come before, made their debuts. For the next several decades, the term supercar was applied to a handful of automobiles that occupied the top tier of excellence.

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!

This town needs DDDM - The End

Thanks to social media that was "liked" by R. Bomphrey.

Dirk Werling, Dir. Ctr. Vaccinology & Regenerative Med. at Royal Veterinary College, U. of London
He used houses as an example of his teaching method - DATA, Sorted, Arranged, Explained.

I tried it using horses, since our town has a lot of them. For this town it is a start to learn!

FIRST - This month at the coffee shop I tried to explain **DATA**: **Get - Sort - Arrange - Explain.**

I made it simple for the town residents. I chose a simple **GOAL FOR THE DATA**. I explained I wanted to help horses that need behavior training. I then took pictures of the town horses in the pasture for my first **DATA COLLECTION**. The horses are all the same breed and coloring wearing the same-colored halter. I took photos of all the horses in the pasture.

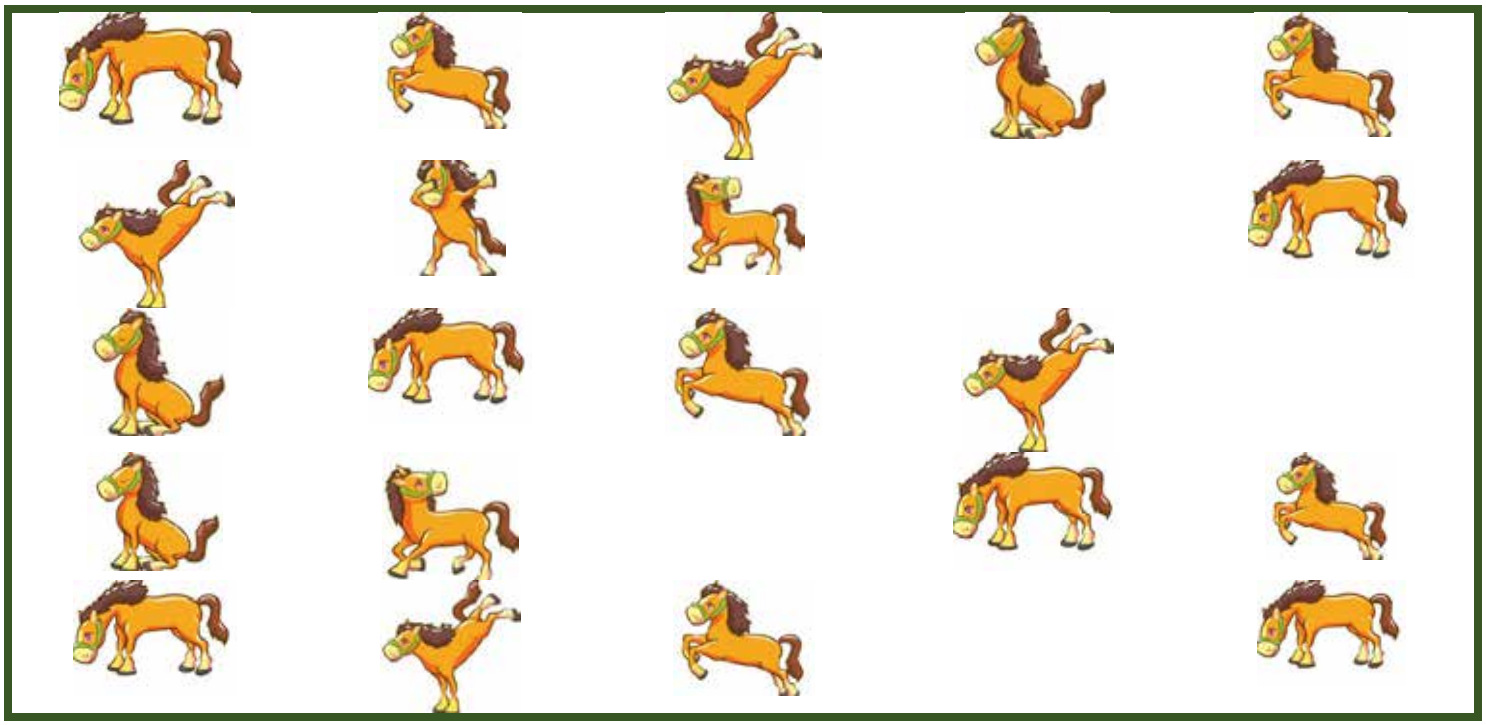
Question - "HEY, Old Cattle Rancher - to save you time, would you rather sit in the pasture and write down and sort by hand like "back in the day" #2 pencil, eraser and paper. Or, using a software program?"

Answer: "I'll save time by sending Cowboy Dawson to do the chore." (I had no response)

Cowboy Dawson then ruined my below diagrams by yelling, "We're in a doughnut shop! See how they're already sorted into the trays? Get the idea? Ya could see which is a best seller - empty tray. Okay, let's look at your horse pictures. Git on with it - yeehaw!"

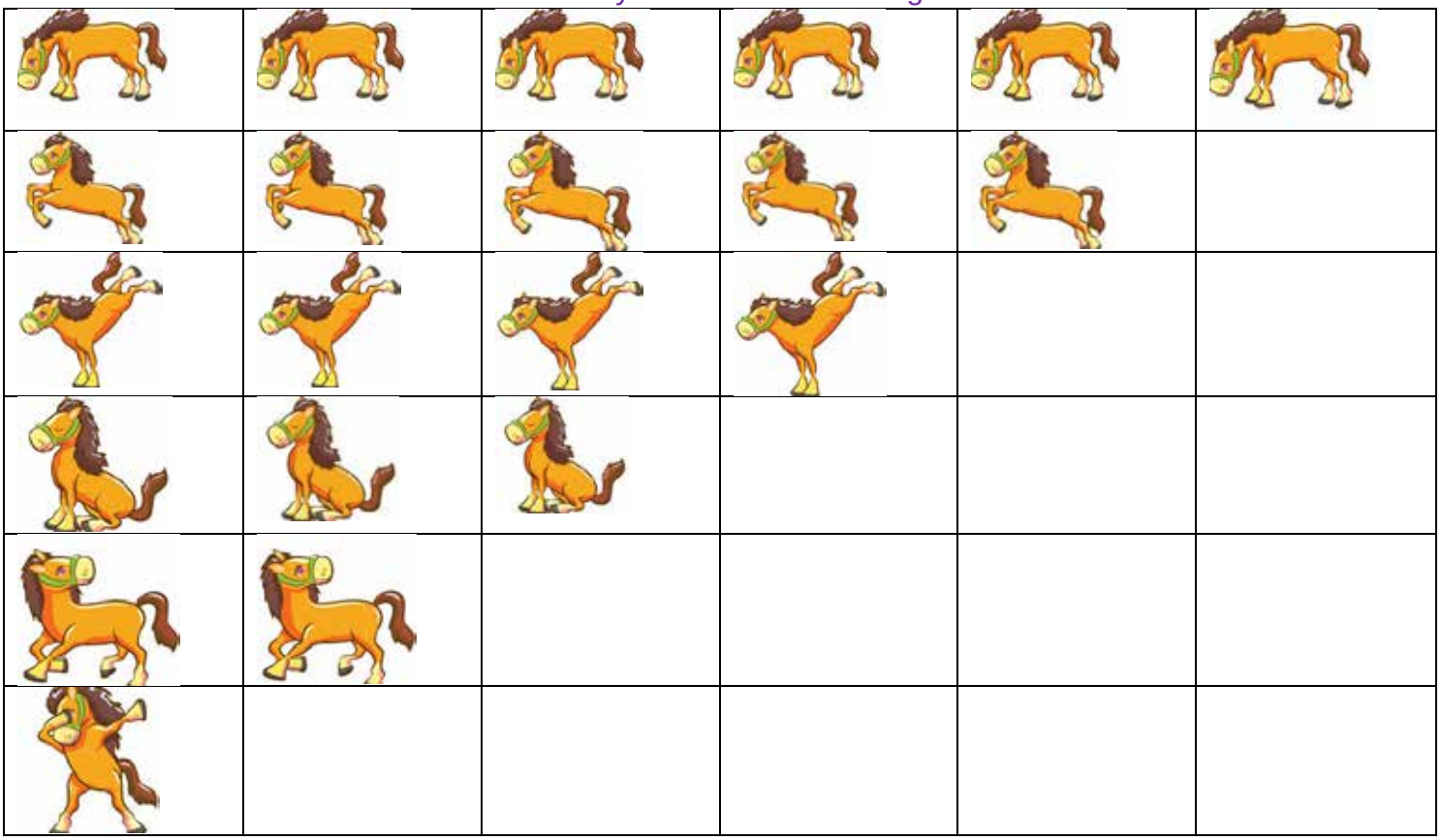
Then the entire coffee shop started arguing what the best doughnut was, which was more popular, who ate more doughnuts - it was all supposition, biased, back in the day, and their favorite doughnut.

DATA (see how confusing?) Horses behaving differently all over the pasture



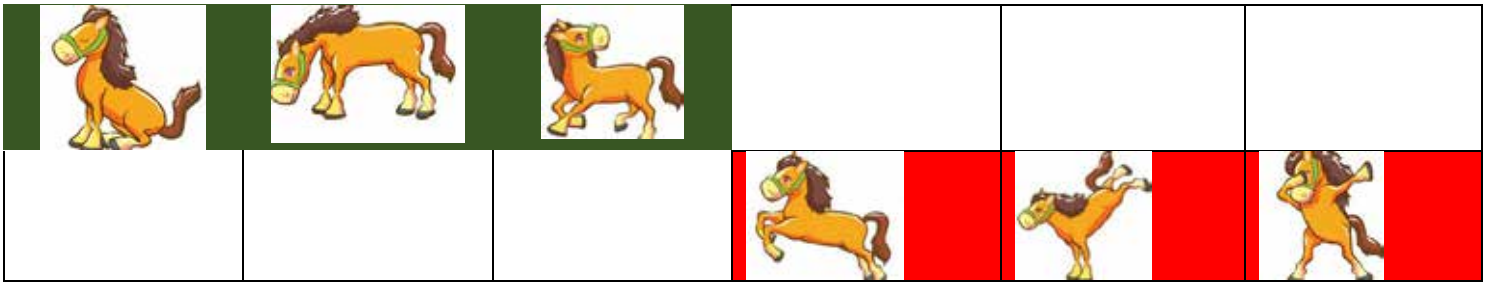
This town needs DDDM

SORTED - now we can see how many horses are doing the same behavior



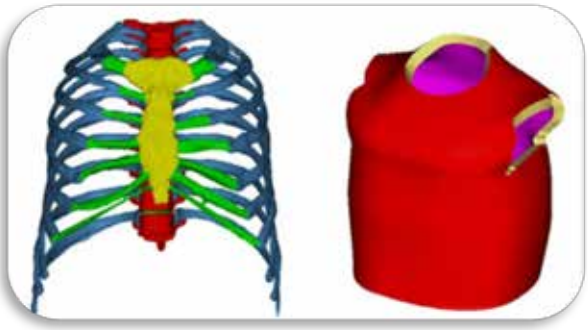
ARRANGED Each type of horse behavior

EXPLAINED 3 horses not needing training - 3 horses needing training



Well, not the best explanation. Cowboy Dawson said, "Honey, when ya fall out of the saddle, ya just get up, dust your butt off, and get back in that saddle - grab ya cup of coffee and go learn more, or next time use the dang doughnuts as the explanation - YeeHaw."

Biomedical Engineering On-Line



EXCERPTS On the protective capacity of a safety vest for the thoracic injury caused by falling down

Jing Li, Duanduan Chen, Xiaoying Tang & Hanjun Li
Beijing Institute of Technology

……all the simulations were performed with the FE solver LS-DYNA (LSTC Inc., USA), and post-processing with LS-PREPOST…

Background - **Aged people all over the world are prone to fall down accidentally and be injured with fracture, such as the rib fracture**. **To protect the elderly, the safety vest has been developed to protect them from being injured when falling down.** To effectively protect the elderly, more analysis on the protective capacity of a safety vest under different situation are needed.

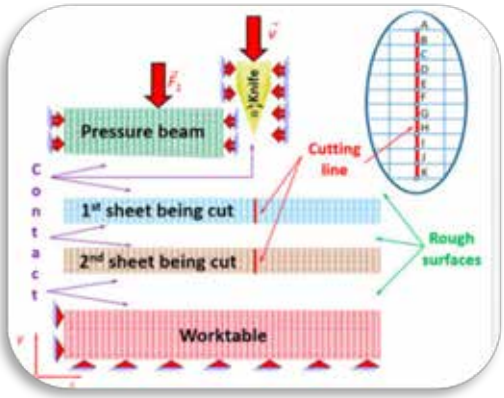
Results - Herein, a finite element model based on the computed tomography CT scanning data of a Chinese old female was built, and then used to simulate the process of falling down at different velocities. Analysis and comparison were done on the maximum shear stress, kinetic energy curves and internal energy curves with and without safety vest…. The maximum shear stress indicated that the Abbreviated Injury Scale (AIS) 2+ injury risks of rib were 8%, 100% and 100% at the velocities of 1.5 m/s, 2.0 m/s and 2.5 m/s, respectively. The corresponding risks were lowered to 0%, 0% and 60% by the vest, respectively. Furthermore, the vest could absorb the internal energy resulted by the deformation of the thoracic osseous tissue by about 20%, thus decreasing the shear stress and the injury risk.

Conclusion - It is concluded that the safety vest decreases the injury risk when the elderly fall down, thus protects them from being injured.

Introduction - Population aging has been a common problem all over the world. … **Because of the functionality degeneration of the body, the elderly are prone to fall down, which is defined as "unexpected events in which the participant unintentionally comes to rest on the ground, floor, or lower level" …** Since falling down in the elderly usually results in bad consequence, they are afraid and restricted to do exercise, lowering their life of quality….

The purpose of this study was to assess the risk of the rib fracture for the Chinese elderly when falling down, and the protective capacity of the safety vest by a finite element method to better describe the structure of the Chinese population, we constructed a new finite element model of the thoracic osseous tissue based on the computed tomography (CT) scanning data of a Chinese old female…Lastly, through comparing the computed results with and without safety vest, its protective capacity was then analyzed.

Method - ... we chose the CT scanning data from a Chinese female to construct our finite element model… The geometry was built with Mimics (Materialise Inc., Belgium) and Geomagic Studio (Geomagic Inc., USA), …all the simulations were performed with the FE solver LS-DYNA (LSTC Inc., USA), and post-processing with LS-PREPOST…



[Modelling of the Guillotine Cutting Process by Means of a Symmetrical Blade with the Defined Geometry] by J. Kaczmarczyk - Dept. of Theoretical & Applied Mechanics, Silesian Univ. of Tech., Gliwice, Poland

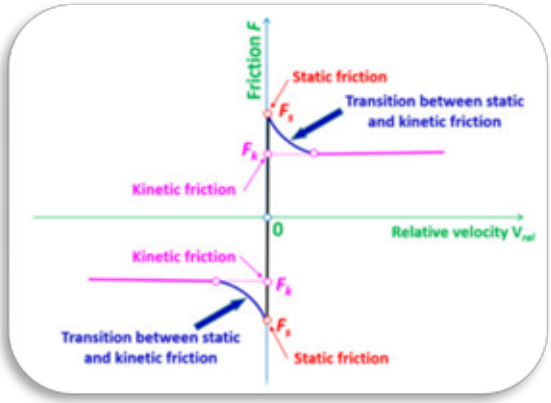
The geometry of a cutting tool with given dimensions was assumed. **A bundle of sheets being cut was modelled as deformable, the cutting tool was rigid, and the finite element method along with computer system LS-DYNA was employed.**

Abstract - This paper modelled the cutting process of a bundle consisted of ultra-thin cold-rolled steel sheets using a guillotine. The geometry of a cutting tool with given dimensions was assumed. A bundle of sheets being cut was modelled as deformable, the cutting tool was rigid, and the finite element method along with computer system LS-DYNA was employed. Numerical simulations of the complex state of stress and of the corresponding complex state of strain were carried out. Cutting processes belong to fast changing physical phenomena, and therefore, highly nonlinear dynamical algorithms were applied in order to solve this particular problem. Experimental investigations were also conducted by means of the scanning electron microscopy. It was found that the fracture region consisted of two distinct zones: brittle and ductile separated from each other by the interfacial transition. Morphological features of the brittle, ductile, and the transition regions were identified. The ductile and brittle zones were separated at the depth of ca. 1/5 thickness of the cut steel sheet. Finally, the numerical results obtained by usage of the finite element method as well as experimental ones in the form of microscopic images were compared, showing quite good agreement.

Excerpts

- …The cutting process is very often used in everyday life as well as in many branches of industry—for example, in the printing industry as matrices for printing books, newspapers, magazines, etc., in the production of metal cans as well as foil for food storage and in automotive industry for cutting out car bodies…
- …The cutting of ultra-thin cold rolled steel sheets is highly important in terms of modern industry, but there are many technological problems encountered during the process, such as too high deflection of the edge bending, too small brittle zone, and a too large plastic zone, which influenced the quality of the sheets being cut…

The direction of normal force is perpendicular to the surfaces of sheets being cut. The values of friction force have been estimated for each individual iteration by LS-DYNA software.



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).

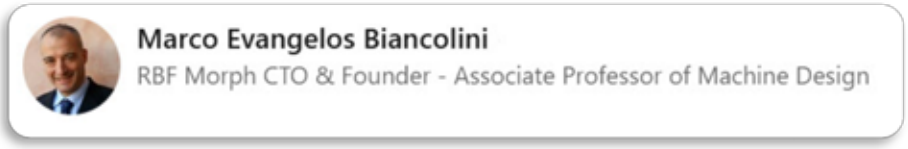
Poster Board area is sent to us, on internet news, or Social Media Posts Not To Miss

Tobias Holzman brought to our attention
Jozsef Nagy, CFD Engineer at eulerian-solutions e.U.

Please enjoy these excellent contributions to the community.

Hello everyone! Very exciting news!
The OpenFOAM Journal channel just released all the talks from the OpenFOAM Workshop as a playlist to watch:

Thank you the Philp Cardiff and the OpenFOAM Workshop Committee as well as all the presenters to share these videos with the general public!



Presentation pdf - Reshaping the Tokamak TF Coil of DEMO with high fidelity multi physics CAE and advanced mesh morphing

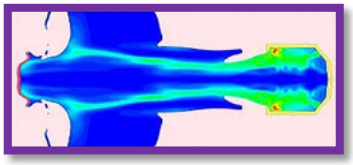
In our joint work with University of Rome “Tor Vergata” Reshaping the Tokamak TF Coil of DEMO with high fidelity multi physics CAE and advanced mesh morphing Corrado Groth researcher in Machine Design will show the optimisation strategy adopted for the TF coils of the ADCs, searching for the best compromise between electromagnetic (EM) and structural compliances based on mesh morphing enabled by the tool RBF Morph.

CONVENTION CENTER
YouTube Booths

Current videos
as of:
Dec 27th

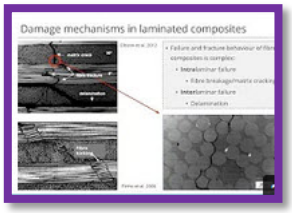
Free Coffee for
visiting our exhibitors

Ameen Topa



Kaizenat

LURI ENG

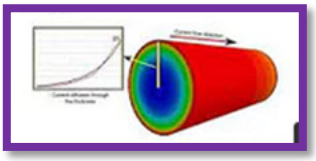


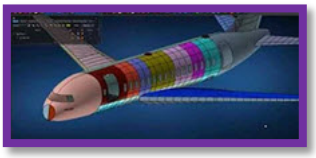
Oasys LS-DYNA

LEAP Australia

ANSYS

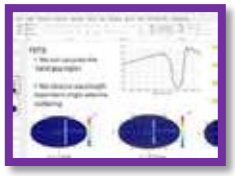
DYNAmore





MSC. Software

R.P Santiago



Ozen Engineering

MEETING ROOM

CADFEM

Ansys Innovation Courses are award-winning, free, online physics and engineering courses.

3D Bifurcating Artery (Steady) Today's fast-paced lifestyle has forced changes to our eating habits, including, for some, the consumption of more fast-foods.

These are usually highly processed and contain large amounts of sugars, unhealthy fats, and sodium. Unhealthy eating habits are detrimental and might lead to the formation of plaque inside arteries. Plaque is made up of fat, cholesterol, and other substances found in the blood.

Over time, plaque formation may narrow and block (in extreme cases) the arteries and adversely affect the blood flow in them. The study of blood flow through arteries can help understand the level of plaque formation inside the artery. In such scenarios, it is important to understand the velocity, pressure, and wall shear stress to determine the efficiency of blood flow. Monitoring these parameters is critical to administering the right medical treatment. **Simulation can help doctors, medical practitioners, and the medical devices industry to understand the underlying causes and to design bio-medical solutions to alleviate these health conditions.**

This SimCafe course was developed by Dr. Rajesh Bhaskaran, Swanson Director of Engineering Simulation at Cornell University, and Keith Alexander Works, in partnership with Ansys. It serves as an e-learning resource to integrate industry-standard simulation tools into courses and provides a resource for supplementary learning outside the classroom. **In this course, we learn to model the blood flow through the artery by following the end-to-end workflow in Ansys Fluent.**

Course Content

- Problem Specification — Lesson 1
- Pre-Analysis & Start-Up — Lesson 2
- Geometry — Lesson 3
- Mesh — Lesson 4
- Physics Setup — Lesson 5
- Numerical Solution — Lesson 6
- Numerical Results — Lesson 7
- Verification & Validation — Lesson 8
- Exercises — Lesson 9
- Post Completion Survey
- Meet the Instructor

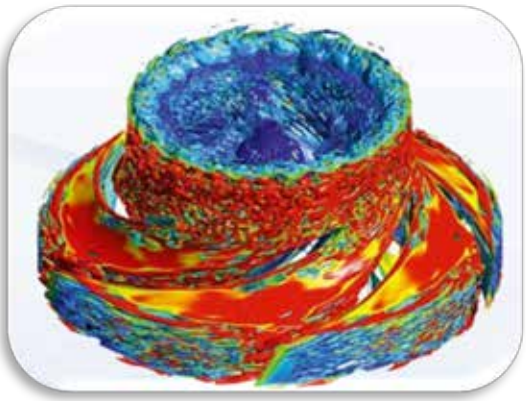
CADFEM India

No. 38 - Falling drop in Ansys Fluent
Branch : Construction, Machinery & plant engineering

Have you learned how to simulate a drop of water surrounded by air and falling onto a surface?

In this tutorial, we show you the complete Workbench workflow from geometry creation to evaluation. In the example shown, we compare different wetting angles and demonstrate a timestep animation in CFD-Post.

****



Have you learned about ANSYS Fluent

Product page - Fluid Dynamics - Make flow visible with Computational Fluid Dynamics

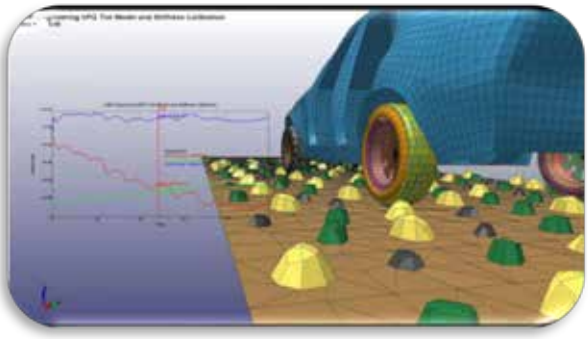
Product Highlights

- Tried-and-tested solvers including Fluent, CFX, Forte, Chemkin Pro, and Polyflow
- Many special extensions such as TurboTools for turbo machines
- Mapping of multiphase flow and phase transitions, chemical reactions
- Solutions for thermal management and cooling problems
- High-performance aerodynamic calculations
- Mapping of the interaction between fluid dynamics and structures
- Suitable for HPC (high-performance computing)
- Offers solution options for virtually every flow problem

Sai Santhosh Manepally
Technology Specialist, CADFEM India Pvt. Ltd., Hyderabad
ebusiness-lead@cadfem.in

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 VPG Tire Model and Stiffness Calibration LS-DYNA

ETA - (LURI Engineering partner)

ETA VPG module, Virtual Proving Ground (VPG) is a customized finite element tool. The technology was developed by ETA (Engineering Technology Associates) in 1995, and proposed the theory and method to simulate the real proving ground.

Currently, LURI Engineering uses this technology extensively in vehicle durability, NVH and crash safety analysis.

The tire is the most important subsystem component in vehicle analysis and transfers different driving forces or resistance to the car body by its contact with the ground.

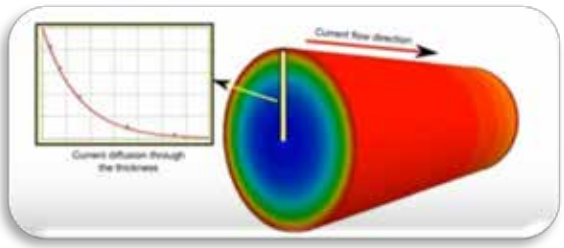
The tire must satisfy the following three basic functions during the simulation processes:

- Support and transfer the load in a vertical direction to reduce vehicle vibration caused by pavement irregularity.
- Provide longitudinal force when the vehicle accelerates or decelerates.
- Provide the lateral force necessary for the steering of the vehicle.

YouTube

Applicaciones - LS-DYNA

Did you miss the webinar by Iñaki Caldichoury?
If you missed it, you can find it below.



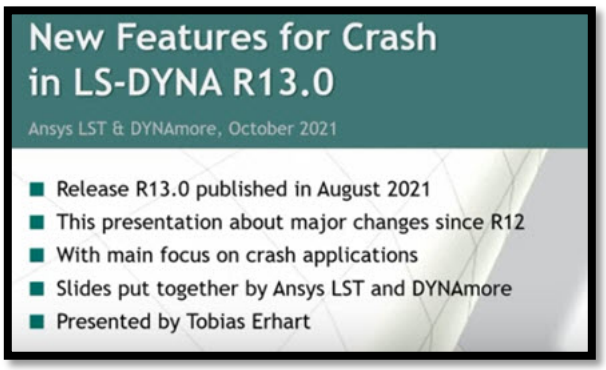
Magnets, Ferromagnets and Actuators simulated with LS-DYNA

Iñaki Caldichoury (Ansys/LST)

Latching magnets, snapping magnets, stranded conductors interacting with ferromagnetic materials, actuators and so forth are all applications heavily present in the information technology ecosystem as well as in manufacturing or automotive. Among those industries, there is a growing need of providing a Multiphysics solution allowing magnets and ferromagnets to freely move and interact with other conductors.

LS-DYNA's EM solver already had an Eddy current solver allowing such couplings which traditionally focused on magnet metal forming applications. The R13 release of LS-DYNA extends those capabilities by allowing users for the first time to model magnets and ferromagnetic materials.

In this webinar, those capabilities will be introduced, the challenges that can be encountered discussed and examples with keyword description will be provided.



Tobias Erhart
DYNAmore GmbH .

Tobias gave an overview on recent LS-DYNA implementations, crash analysis.

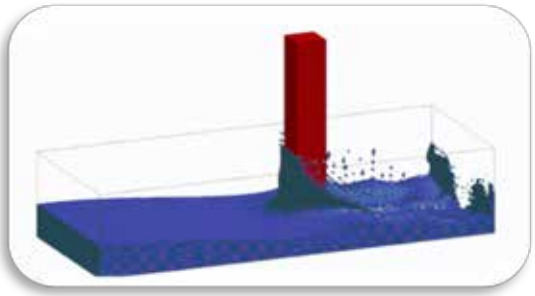
Rasmus Schützer
Project Engineer på DYNAmore Nordic AB

Welcome to DYNAmore Nordic's Short Training Video Library!

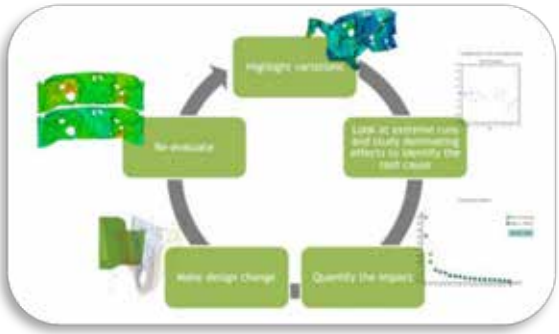
In our library you will find short training videos and tutorials about numerous LS-DYNA applications and all other products that DYNAmore Nordic provides.

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

Structured-ALE solver - Curious about LS-DYNA's multi-physics capabilities? One technique available is the Structured-ALE solver based on an automatically generated block-structured mesh performed internally in LS-DYNA. Thus, it is possible to perform mesh generation, progressive spacing, trimming, refinement, mesh motion, and more.



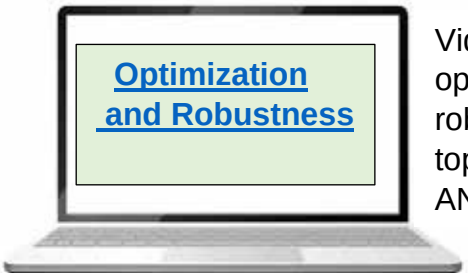
Form to learn more, head over to our Video Library, where a new short video demonstrates the possibilities of S-ALE, including a comparison to ALE, new keyword cards, examples of mesh generation, and other functionality - **Start now, gain knowledge of the possibilities of S-ALE**



Optimization and Robustness

Introduction to DIFFCRASH

DIFFCRASH is an extremely powerful tool to investigate the robustness of large-scale models. After providing a set of simulation results to the software, you can visualize the variations and identify regions of large scatter. Then, with the help of Principal Component Analysis, PCA, you can investigate the causal chains in complex simulation models.



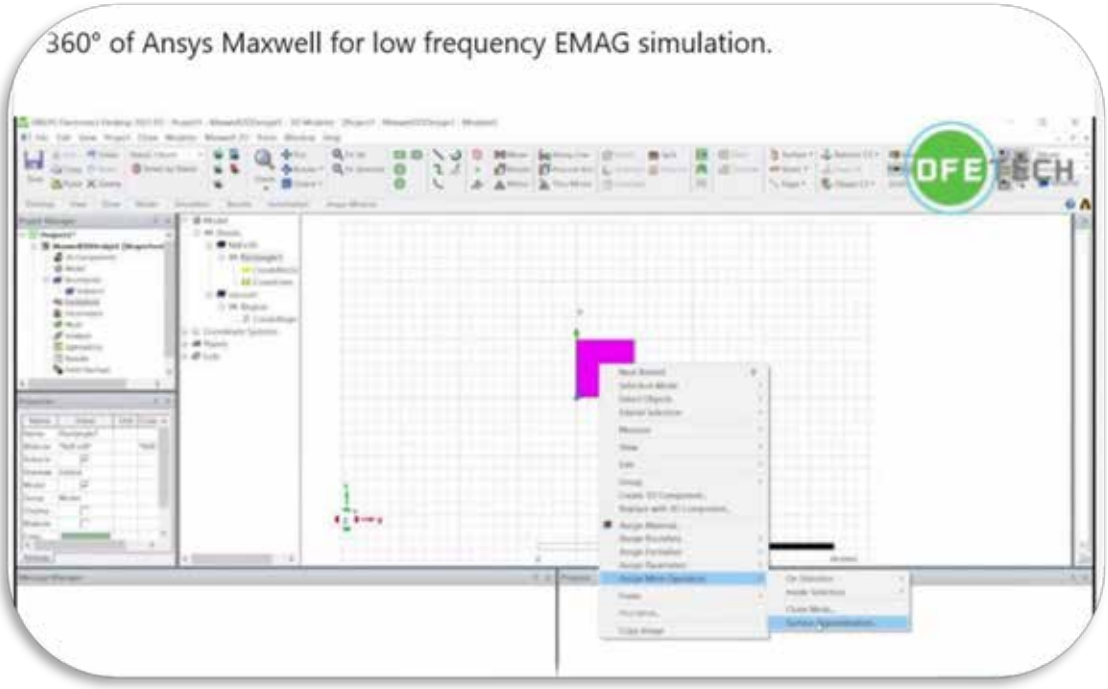
Videos about optimization- and robustness -related topics, using on the ANSYS LST products LS-OPT and LS-TaSC as well as DIFFCRASH from SIDACT GmbH.

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.

YouTube - 10 minutes Ansys Maxwell 360° - Ansys Maxwell enables engineers to easily set up and run low frequency electromagnetic simulations for electric machines, transformers, wireless charging, permanent magnet latches, actuators and other electro-mechanical systems before real hardware prototype is built.

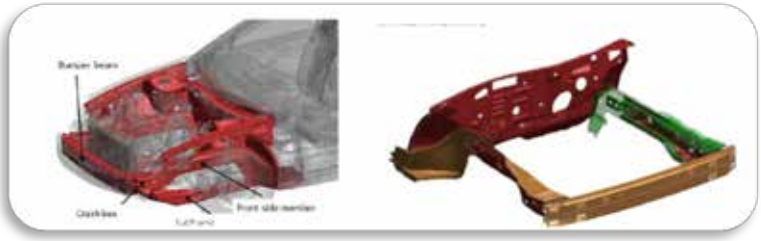


Ansys Maxwell - Low Frequency EM Field Simulation

Ansys Maxwell is an EM field solver for electric machines, transformers, wireless charging, permanent magnet latches, actuators and other electr mechanical devices. It solves static, frequency-domain and time-varying magnetic and electric fields. Maxwell also offers specialized design interfaces for electric machines and power converters.

13th European LS-DYNA Conference 2021, Ulm, Germany copyright DYNAmore GmbH Conference

Excerpts



(a) The engine room of NCAC Ford Taurus model
(b) Selected parts for the parameter study

PDF Publication - An enhanced Design exploration using Modal decomposition of Key events in Frontal crash simulation

M. Okamura, H. Oda (JSOL)

In recent years, CAE has been used extensively in vehicle development, and parameter study of sheet metal thickness for design exploration and optimization is one of the major applications. Response surface method is commonly used for this application among various analysis tools.

The concept is to connect input variables such as sheet metal thickness and output variables such as firewall intrusion with non-linear functions such as radial base, kriging, and neural network…

Introduction: In recent years, CAE has been used extensively in vehicle development, and parameter study of sheet metal thickness for design exploration and optimization is one of the major applications. Response surface method is commonly used for this application among various analysis tools. **The concept is to connect input variables such as sheet metal thickness and output variables such as firewall intrusion with non-linear functions such as radial base, kriging, and neural network.**

…

Proposed approach using DIFFCRASH - The proposes approach takes into account the time and spatial chain during crash events as well as the deformation mode of important assemblies at key events. The deformations of important parts are captured for each major event such as the collapse of the crash box and maximum firewall intrusion. Deformed shapes from Monte-Carlo simulation runs are transformed into modal spaces with principal component analysis so that the coordinates in the modal space represent how the assembly behaves during the crash at the point of time. Regression analyses among the input parameters, the coordinates in modal space, and the output values for each event give engineers clues to the causal chains of phenomena during crash events.

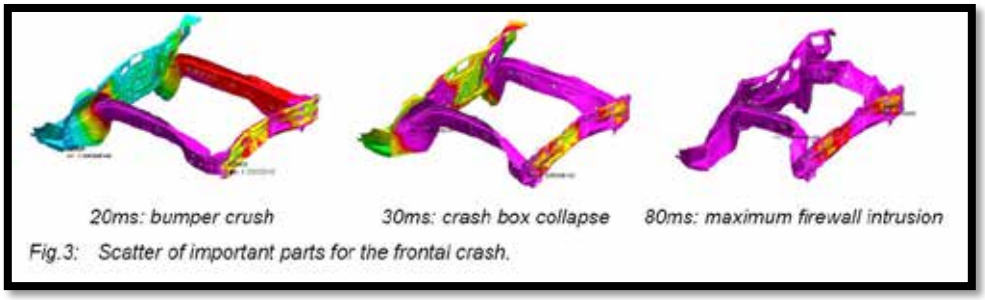


Fig.3: Scatter of important parts for the frontal crash.

DIFFCRASH BASIC METHOD was used for scatter contour plots of the behavior of the energy absorption area. Fig 3 shos the animation of important parts filtered by DIFFCRASH visualization.

The major events are the following. The bumper crushes at around 20ms. The left and right crash boxes collapse at around 30ms. The maximum intrusion of the firewall is at around 80ms. With this process important parts and the timing of major events have been determined.

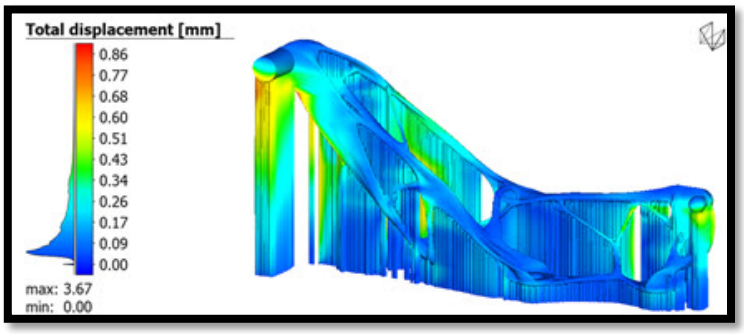
…

New version of Simufact Additive 2021.1 with new supports and full parametric control

by Michael Tran

Simufact Additive 2021.1 brings an enormous improvement in support structure generation. **The latest version now allows the user to create new support types, such as tree supports, easily and automatically, which can be fully parameterised.** You can now create support structures with the parameters you need, or simply create new supports and test them virtually to optimize your metal AM process.

Furthermore, the GUI has been further modernized with new icons that improve the overall look and feel and other elements such as the graph in the results view that shows the distribution of the results to get an initial assessment at a glance.



The new graph shows the distribution of the results to get an initial assessment at a glance

Upgrade to Simufact Additive 2021.1 to benefit from the huge improvements in support structure generation and the usability of the modernized GUI!

About Simufact Additive

Simufact Additive is a scalable software solution for the simulation of metal-based additive manufacturing processes which focuses on laser powder bed fusion (L-PBF) and metal binder jetting (MBJ) processes. Simufact Additive is a software solution designed to predict and compensate for distortion, residual stress and temperature distribution throughout the printing, heat treatment, cutting, hot isostatic pressing (HIP) as well as machining processes virtually before the part is manufactured by the 3D metal printer in reality.

Print your 3D AM parts first-time-right with Simufact Additive:

- Sustainability: Save material, time and money by replacing expensive and time-consuming physical tryouts with virtual tests
- User-friendly, intuitive and process orientated GUI
- Optimise your metal AM process:
- Compensate distortion automatically to get the part as-designed
- Optimise the build-up orientation and the support structures
- Indicate criteria-based part failures, i.e. shrink lines
- Estimate your costs for single parts and the entire printing job

If you have any questions , or would like assistance with Creo please contact the team at LEAP.

Advanced Assembly Design with Creo - Any time a team works with complex assemblies, they risk miscommunications, gaps, and overlap. The result? Errors and rework. That's why Creo develops powerful capabilities for managing all of your most complex assemblies.

Recently Taju Joseph, Application Engineer at LEAP Australia presented a webinar looking at the advanced assembly design capabilities within Creo and how they can help improve the quality of your models. This post provides a summary and includes video clips of the live demonstrations presented in this webinar.

YouTube Video In this first clip Taju discusses the challenges designers face when managing large assemblies. These include time-consuming concurrent design processes for larger teams of designers, difficulties in protecting and sharing company IP and the challenges associated with swapping parts in and out for design variations.

YouTube Video - Taju then provides a live demonstration of the core advanced assembly features within Creo showing how features can be published and shared between team members. The demonstration provides a quick look at the reference viewer and how the overall design and its parts can be managed, controlled and updated via the reference system.

YouTube Video - Next, Taju discusses the key benefits of using a top-down design approach which can improve common issues such as regeneration performance, external references, retrieval performance and more. He then goes on to take a closer look at the reference control capabilities within Creo and how they can improve the quality of the design and the effectiveness of collaboration within a design team as well as the overall performance of Creo itself. This is followed by a live demonstration of Creo's reference control features including how to set permissions for users, restrict the copying of references to only published geometry and how to control reference scope to restrict users to their own design scope

.

YouTube Video - In this final clip, Taju explains how the top-down design approach can greatly assist with variant design allowing you to easily substitute or swap out parts in an assembly. This can be done using:

- Assembly configuration (interchange groups)
- Pro/PROGRAM for assemblies (use simple logic to show, replace or delete parts)

Again, Taju goes on to demonstrate this live within Creo, explaining how Pro/PROGRAM works and providing examples of how it can improve the design workflow.

Graphics Courtesy of Vecteezy

Goodbye and Come Back Soon

QUIZ Credit - Correct Answers A-C
you are served chocolate chip cookies!
Correct Answer D you are served chocolate chip and oreo cookies!!! Love those!

A- Avro Vulcan B. Mk.2
B - Avro-Canada CF-100 Mk. V Canuck
C - P51 Mustang
D - Mustangs

Our Town Salutes our US military and military of friends of the US.