Entering
Our Town
FEA Not To Miss
(pop. virtual)

WELCOME

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

DYNAmore

New Features for Crash in LS-DYNA R13.0
Ansys LST & DYNAmore, October 2021

- Release R13.0 published in August 2021
- This presentation about major changes since R12
- With main focus on crash applications
- Slides put together by Ansys LST and DYNAmore
- Presented by Tobias Erhart

CADFEM Medical

CADFEM

OZEN

ENGINSOFT

KAIZENAT

HEXAGON

Automotive - A.Topa

ESI-GROUP

Library

OASYS

Pilot - Airport

Booth - ETA

Town Equip

Old Cattle Rancher

Secretary - Museum

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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.

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

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

Contact us at: feaanswer@aol.com

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

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

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Town Hall Meeting & Announcements December

TOWN HALL MEETING
FREE COFFEE

Park Cars behind building

Tie horses to hitching rails

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

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

Town secretary: A special hello wave to:

Hotaek - Jenson - Blas - Madhukar - Rasmus - Bowen - Curt - Wael Mesut - David - Sandip - Ameen - Eric - Dan - Takahiko - Marta - Jorge - Mohammed - Christian

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

1. **Why is there a tractor-trailer carrying a submarine parked in the field?**
2. I requested "a submarine sandwich," meaning sandwich with food sandwich components
3. I did not request a "nuclear submarine" HOW did that get mixed up?
4. Who requisitioned a submarine! Park the tractor-trailer in Town Equipment and call the US Navy.

Town Equipment - Bolted Joint Connections of FRP-Components in Submarines

Town Secretary

1. **WHY did the town secretary bring back 20 ducks? Mother ducks and ducklings?**
2. I said bring me back 20 bucks, meaning dollars! I did not say bring back 20 ducks!
3. It could be worse - she could have brought back 20 male fallow deer.
4. THEN she brings them to Rancher's Pond so they can swim in lines.
5. Who sent invitations for a town duck party? Why is everyone leaving work?
6. Does anyone know why they're swimming in lines?

Old Cattle Rancher: Wave-riding and wave-passing by ducklings in formation swimming

Fire Department

1. **NO, fighting fire with fire does NOT mean you start the next building on fire!**
2. Additionally, residents aren't authorized to use explosives.
3. Emergency meeting at the Fire Department for Fiery Explosion explanation.

Town Hall-Fire Dept. Simulation Proves Fighting Fire with Fiery Explosions is Possible.

Town Librarian

1. **Don't miss this publication that we have in the library:**
   How muscle stiffness affects human body model behavior -THUMS, LS-DYNA.
2. **Additionally, we have a new reading room for open-source publications.**

Town Map

Horse Trail →

d3View

DYNA MORE NORDIC

Oasys

DYNA MORE

Ozen

CADFEM

Mallett Technology

CADFEM MEDICAL

HEXAGON

MSC Software

ESI

KAIZENAT
Keep Improving

M3D FEA

ENGINSOFT

TOWN HALL

My Cafe

LANCEMORE

JSOL CAE Solution

SIEMENS
Ingenuity for life

Petting Zoo

PARK

Library

LURI Engineering

Rival Cafe

Old Cattle Rancher Ranch

Proving Ground

Landfill

Elect/Water. & Sewage Treatment Plant Facilities

Town Airport

Convention Ctr.

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

Curt Chan, Senior Product Marketing Manager

All videos can be viewed on the website

Three Exciting Capabilities In Ansys Discovery

Ansys 2021 R2 continues to expand simulation capabilities and ease of use for engineers to unlock innovation and increase productivity throughout the product development process. Whether you're an engineer or analyst, you can benefit from Ansys Discovery's geometry modeling workflows, groundbreaking live physics, and innovative user interface. The addition of Ansys associative computer-aided design (CAD) interfaces, history tracking, and Ansys Workbench connections make Discovery an ideal complement to most other tools and workflows in the Ansys portfolio.

Let's take a look at the top three new 2021 R2 capabilities within Discovery to see how you can use simulation early during concept evaluation, design refinement, and optimization. See how you can optimize products and workflows faster and on a tighter budget.

1. More Engineering Use Cases - Discovery includes porous media modeling to represent flow resistance regions such as filters, screens, or perforated plates. Combine this with improved conjugate heat transfer (CHT) modeling for fast, accurate simulation of electronics cooling, heat exchangers, and engine cooling.

2. Workbench Connectivity - Workbench connectivity now enables analysts to do geometry preparation for simulation in Discovery and then associatively transfer the model, materials, and parameters to most Ansys simulation applications as part of a connected simulation workflow.

Associative CAD interfaces, history tracking, and constraint-based sketching automate Discovery's modeling operations and provide a seamless workflow from CAD to any other Workbench-connected app.

3. Connected Geometry Workflow -

If you're working with another CAD package, you can easily update your simulation with a new design, pick up right where you left off, or simulate more complex physical behaviors with direct transfer to Ansys Mechanical and Ansys Fluent applications.

Ansys Discovery 2021 R2 not only allows a direct transfer to Mechanical and Fluent applications, but now with Workbench, which packages up the geometry, materials, physics setup and meshing.

Don't forget, the speed and interactivity of live simulation is now accessible to every engineer via Discovery on Ansys Cloud as a virtual desktop instance (VDI). With the streamlined Discovery Cloud Launcher, you can start a cloud-based session of Discovery as fast and as easily as if it were installed on a local machine

Faster than a...

The new capabilities in Discovery 2021 R2 enable more engineers to get more done more quickly. It enhances collaboration and speeds product development by moving simulation far forward in the product development cycle. Let's look at one example: generative design.

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

What if simulation was as fast as answering a call on your phone, or as instantaneous as the flip of a light switch? What if you could get the same instantaneous response with generative design, a previously slow and expensive technique, making it possible for the first time to uncover design solutions that you might have missed or never even thought of? With the speed of Discovery's Live Physics, now you can.

Explore multiple manufacturable designs in real-time through a fast and interactive experience, where you can define objectives easily and apply controls to ensure that manufacturing requirements are met, minimum material thicknesses are set, and exclusion areas are defined.

Unlike most optimization techniques, topology optimization uses a level-set–based method; meaning a precise smooth shape is defined at each step of the process making it easy to directly use shape results in your CAD system.

The shape is also fully simulated at each step, enabling designers to review the evolution of the part's behavior and performance.

Most importantly, the design can be modified while the optimization is occurring, enabling youto see where a solution is headed, take inspiration from it, and make a change to drive the solution in a different direction.

Explicit FE analysis of a coupling process with Ansys LS-DYNA
By: T. Iberer

Schwab Verkehrstechnik develops and produces automatic couplings for rail vehicles from trams to mainline trains.

Simulation of a Train Coupling Procedure
Branch: Rail vehicle construction
Specialist field: Structural mechanics

During operation and during the coupling and decoupling process, forces are introduced into the coupling. These forces cause different levels of stress in the components of the coupling and their interfaces.

Task	Solution	Customer benefits
The loads at the interface between the coupler head and the pulling and pushing device were analyzed for different impact speeds over time.	The explicit code LS-DYNA was used for the simulation. Because only certain parts of the construction are of interest for the evaluation, the other parts were simplified and idealized to reduce the model size and the computation time to a manageable level.	The analysis identified when the decisive impact occurred during the coupling process and where the highest loads were located, thus highlighting the areas most affected by the design.

Arrangement of the two couplings before the impact

TASK - Schwab Verkehrstechnik develops and produces automatic couplings for rail vehicles from trams to mainline railways. The rail vehicles are coupled at low speeds. During operation and during the coupling and uncoupling process, forces are introduced into the coupling. These forces cause varying degrees of stress in the components of the coupler and their interfaces.

The present task is limited to the coupling process. The loads at the interface between the coupler head and the push/pull device are to be analyzed for different impact speeds over time in order to be able to adapt the design if necessary.

SOLUTION - For the simulation the explicit code Ansys LS-DYNA is used. Because only certain parts of the construction are of interest for the evaluation, some parts can be idealized in order to reduce the model size and the computing time to a manageable level. For this purpose, the construction is divided into rigid and flexible bodies and masses, springs and dampers are modeled as simpler entities. Friction in the contact between the two coupling heads is also considered. The coupling process is simulated as a transient with initial speeds of 5 and 10 km/h lasting about 0.1 s and consisting of an impact on the sliding plate, a sliding phase, the stop at the jaw and the springback due to the centering. The maximum calculated forces are compared and verified with measurements.

Simulation of the voltage distribution on a corner model of a furnace

Customer Benefits: The simulation shows that no unacceptably high stresses occur in the investigated areas. In addition, the analysis shows when the decisive impact occurs during the coupling process and where the high loads occur. These are the criteria for which the coupling must be designed.

Idealization with masses, springs and dampers

Products applied in the project

Structural mechanics - Ansys LS-Dyna

Professional explicit FEM analysis integrated into the familiar ANSYS Mechanical environment -
ANSYS LS-DYNA is the integration of the leading software for the transient simulation of mechanical, highly nonlinear phenomena such as crash and metal forming processes…

HEAD OF COMMUNICATION

Thomas Iberer

Christoph Müller
Simulation Software and Services worldwide

docq RPE - Preoperative planning with simulation

Symmetry through optimized cutting - One risk of rapid palatal expansion (RPE) is that the face may be asymmetrically widened by the distractor. Simulation-based optimization can aim the surgical incision to reduce the risk of asymmetric opening. Medical device manufacturers of distractors can use this process to add value to their product by providing an additional service.

Video can be viewed on the Website - KLS Martin Group in cooperation with CADFEM Medical

Solution approach of the IPS RPE

Asymmetric shift through symmetric mobilization (equal cutting lengths left/right)	**Symmetric shift through individualized mobilization (cutting length adjusted left/right)**

docq RPE at a glance - Target: Symmetry improvement through optimization of incision

· Optimal incision guidance through patient-specific simulation · Advantage physician/manufacturer: billing of individual digital planning covered by the health insurance company · Advantage for patients: Symmetrical result	· Verification & validation completed · 3 clinical studies are close to completion · KLS Martin starts commercialization

Did you know that there's a platform that will help you interpret your data for your design process?
Part 1 - Introduction to 3 of our platform applications - for information contact us

D3view - One Platform

12 different applications

Working in the office, at home, or using the cloud, we are one complete platform for all your data needs.

Our individual applications work seamlessly to make your design process smoother with time to market quickly and efficiently.

HPC Management - Submit and Process using HPC

- Whether you are on-premise, complete web-based, or hybrid configuration, you can submit your simulations using HPC.
- Rapidly decipher your data into relevant information to process, manage and explore your data in real-time.

Simulations

One of the key advantages is our **"Smooth Simulations interface"** This interface will provide you with the ability to efficiently and seamlessly create, track, update, compare and share your simulations and their data.

Data Extraction Templates - How to turn raw files into a variety of visualizations

- Specifically designed to extract data from multiple parallel simulations, they can scale to thousands of simulations simultaneously.
- Templates help turn data into information and help automate extracting data from the raw simulation or experimental files.

Did you miss the presentation on the overview of recent LS-DYNA implementations?
It was specific for crash analysis. If you missed it, you can find it below.

Tobias Erhart
DYNAmore GmbH .

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

The presentation was given at the 13th European LS-DYNA Conference on 5./6. October 2021 in Ulm, Germany. It is now available on YouTube

The purpose of the talk was on crash education.

Topics

- Contact
- Eleents
- Materials
- Connection
- Batteries
- Airbags
- Sensors
- Performance
- Miscellaneous

EXCERPT - For this month our editors have chosen the following case study

Wheel   Rim   Disc

Fig. 8 - Stress distribution on the wheel after bending moment, considering the disc forming & the force-fitting processes, on inner surface (left) and outer surface (right); increments with respect to results obtained without considering the manufacturing process are indicated

Fig. 9 - Stress distributions on the wheel after bending moment, considering disc forming & force-fitting with low (left) and high (right) interference: no significant differences are detected

A new methodology based on LS-DYNA for integrating product & process engineering of a steel wheel

Wheels are products with key geometrical and structural specifications.

ABSTRACT - Wheels are products with key geometrical and structural specifications. The wheel must fulfil load, fatigue and weight requirements, as well as geometry, stiffness and environmental resistance. In addition, new style requirements are coming from the OEM's. To satisfy these demands the wheel manufacturer must have a deep insight into new materials and manufacturing processes as well as a robust design methodology to correctly consider both process and product constraints.

Steel wheels for passenger cars and commercial vehicles usually consist of two parts: rim and disc. The rim is the part that is in contact with the tire: international norms regulate most of its geometrical characteristics to guarantee functionality of pieces developed by different wheel and tire manufacturers.

The disc is the part that provides the connection between the vehicle's suspension (hub) and the rim. Except for its central part, which is imposed by the customer, the disc profile is less standardized than the rim since it needs to be designed by taking into account several variable interfaces (brake calipers, trims, …) and performance requirements (fatigue resistance, bolt hole resistance, …) which are specific for each project.

The first part of the article describes the whole manufacturing process as well as the currently used prototype and virtual testing techniques. Afterwards, a new methodology is presented, following an integrated process-product analysis approach, showing some benefits related to increased accuracy and the potential application of new optimization methods.

Read on website: Description of the Manufacturing Process Disc Stamping Process
Integrated Simulation Approach

Summary of results

The simulation procedure can show the degree to which particular operations affect the final stress distribution on the wheel disc and therefore the fatigue behavior of the wheel submitted to a testing load:

- The distribution of stresses in the disc outer and inner surfaces, in particular at the profile wall and peak areas are significantly affected by the disc forming process, and in particular the thickness strain distribution;
- Stresses are induced especially in the vent hole area by the force fitting operation, proportional to the disc-rim interference value, but are much lower compared to the stresses due to the bench test and can be neglected.

Future opportunities

The use of an integrated simulation procedure with LS-DYNA opens new opportunities to perform a more robust design of a wheel starting from a good knowledge of all design and manufacturing constraints and the ownership of the most suitable simulation techniques. Some of possible future steps are identified as follows:

- Complete a sensitivity analysis by varying material and forming process parameters within their actual ranges;
- Based on the results of the previous step, define a methodology, based on analyses of the force-fitting operation and the bench test;
- Apply a similar procedure to the analyses of all the other manufacturing processes;
- Define & experimentally validate a methodology comprising all of the most significant manufacturing processes.

Newsletter EnginSoft Year 7 n°1
Federico Valente | ITACAe Srl
Davide Fabio Rovarino | MW Italia

Andrea Gittens
Innovation & Discovery Marketing Manager bei ESI Group

Deploying the Hybrid Twin to Aid the Automotive Industry's Digital Transformation

A reliable solution to create a truly smart EV cabin
by Anne Chambard

In the last (3rd) industrial revolution, "virtual twins" (emulating a physical system by one, or more mathematical models to describe its complex behavior) were major protagonists. Nowadays, numerical simulation is present in most scientific fields and engineering domains, making accurate designs and virtual evaluation of systems responses possible, drastically cutting the number of experimental tests. Well-established physical-based models have been partially or totally replaced by these data-based models, mainly due to their computational complexity; this is especially true for applications requiring real-time feedback.

Vast amounts of collected and carefully curated data have provided the key to interpretation and are thus able to advise users on imminent events.

This makes improved data-based predictive maintenance and efficient inspection & control possible by allowing for real-time decision making. However, arriving at an optimal learning stage takes considerable time and effort, just as the establishment of validated models took in the previous engineering revolution. The successes reported, and the many possibilities imagined, have led to an exponential increase in popularity of these "digital twins". There has been a rapid development of data-driven models that allow for the representation of a system, with all its richness, while ensuring real-time access to its governing model. However, replacing the rich history of engineering sciences, which proved their potential with spectacular success over the course of more than a century, led to feelings of bitterness and of a waste of acquired knowledge.

Did You Know that there are three types of 'twin' technology?

1. Virtual Twin - represents a physics-based replica of the reality.
Its main advantage is the solid foundations that centuries of validated physics offer.
2. Digital Twin - a data-driven representation of the reality. The main advantage is the ability to continue working with the real system and the real loading that it is experiencing.
3. Hybrid Twin - consists of a new alliance of virtual and digital. The main advantage is an additional, complementary virtual model that is built, which is necessarily physics-based and describes cause and effect relationships.

It was again at the end of the 20th century and the beginning of the 21st century that major scientific accomplishments in theoretical and applied mathematics, applied mechanics, and computer sciences contributed to new modeling and simulation procedures. Model Order Reduction (MOR) techniques were one of these major achievements. These techniques do not proceed by simplifying the model; models continue to be well-established and validated descriptions of the physics at hand. Instead, they rely on an adequate approximation of the solution that allows simplifying the solution procedure without any sacrifice of the model solution accuracy, in view of accommodating real-time constraints. In this way, the next generation of 'twins' was born. The "Hybrid Twin" combines physics-based models within a MOR framework (to accommodate real-time feedback) and data science.

The three main criteria of the Hybrid Twin are:
- a simulation core able to solve complex mathematical problems representing physical models under real-time constraints
- advanced strategies able to proceed with data assimilation, data curation, and data-driven modeling
- a mechanism to adapt the model online to evolving environments (control). The Hybrid Twin embraces these three functionalities into a new paradigm within simulation-based engineering sciences (SBES)

Applying the Hybrid Twin and the Electric Vehicle Revolution - You might be wondering if the Hybrid Twin can be useful to the automotive industry? The answer is, absolutely! Introducing this innovative application improves the reliability of Electric Vehicle (EV) safety and comfort. Once integrated into a connected EV via a smart human-machine interface, the solution could enable the driver to receive real-time alerts in the event that the car foresees an issue with the completion of the planned journey. The interface could then advise the driver on how to adjust the controls related to in-car comfort, for maximum driving range. Going further, the interface could advise an alternative route depending on traffic and weather forecasts, all the while ensuring the driver and his passengers are aware of degraded driving conditions that could impact their safety.

One crucial problem for all EVs is the management of energy to increase vehicle range. One of the main challenges is the passengers' consumption of thermal comfort in different weather conditions, including extreme cold or hot temperatures. Balancing battery capacity and comfort requirements are more becoming extremely demanding. Let's summarize the recent achievements made in this field and take a closer look at the results from the OPTEMUS project.

Human Skin Temperature. On the left side: no fluid computation and uniform cabin temperature. On the right side: fluid computation and non-uniform cabin temperature

ESI had the pleasure of actively contributing to the OPTEMUS project by lending our expertise in material physics and combining established 1D and 3D simulation methodologies with our latest Hybrid Twin technologies. The results are tremendous: Together we achieved up to 40% range increase for electrical vehicles, while at the same time offering the highest cabin comfort and safety.

In a recent presentation at FISITA congress in September 2021, I shared when to deploy a Hybrid Twin for EVs and how to leverage optimal energy consumption and energy harvesting.

Virtual Prototyping Paves the Way to Your Digital Transformation

Ultimately, we focused on the virtual prototyping methodology where we develop a fully detailed virtual cabin for EVs. This 3D model consists of the 3D detailed models of the cabin, the smart seat, and the human models for thermal comfort assessment, with specific thermal comfort index, and the HVAC simplified models. It interacts with the full vehicle in a holistic vehicle-occupant-centered approach. New methods in design space exploration based on the Parametric Model Order Reduction enable the real time response of complex interactions interconnected requirements such as comfort, safety and range in a wide array of weather conditions.

Author

Anne Chambard

Deputy Scientific Director

As a Mechanical and Material Engineer graduate of EPF (Ecole Polytechnique Feminine), Anne has worked for more than 30 years in the domain of software companies like SAMTECH France, SIEMENS PLM, ESI France and ESI Group, where she has occupied several projects management positions.

Today, as a Deputy Scientific Director for ESI Group, Anne supervises a team of 12 engineers and six PhDs. She also oversees the international chair program between ESI and CEU-UCH University, which is dedicated to real-time control for the simulation of manufacturing processes. The program's main activities are research programs for customers with strong participation in European programs.

Jithesh Erancheri
Country Head - Technical

Kaizenat Technologies Pvt Ltd

Kaizenat Features Videos

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

DID YOU KNOW?

Phased Array Antenna Design

FADDM Technology can be used for the simulation of phased array antenna, which is used in various applications like ADAS, 5G and Radar.

FADDM(Finite array domain decomposition Method) Technology is widely used for Phased array antenna design and simulation. For recent application like ADAS, 5G and Radar this technology is widely utilized.

Have you ever Wondered how IC Package Cooling is Performed?

Overheated components degrade product reliability, resulting in costly redesigns so, to ensure adequate cooling of IC packages, printed circuit boards (PCBs), and complete electronic systems, engineers rely on ANSYS Icepak to validate thermal designs before building any hardware.

Can I challenge you to a game of Badminton? CFD Study over Badminton Shuttle in ANSYS

Badminton is a sport that is totally different from other racquet sports, uses a shuttlecock, which is an asymmetric projectile far away from a ball. In this video, the airflow around a badminton shuttlecock while doing high service has been simulated in ANSYS 2021R1 and here the results were displayed.

Thanks to Agnes Bellini for bringing ODYSSEE A-Eye to our attention on social media

ODYSSEE A-Eye offers non-experts access to powerful digital twins through AI applications that require less input data and can read images to predict behaviour

Engineers without Machine Learning knowledge can use ODYSSEE A-Eye to develop their robust AI applications based on any particular problem that needs to be overcome.

Hexagon's Manufacturing Intelligence division has today announced the release of ODYSSEE A-Eye, a new artificial intelligence (AI) tool that enhances Computer-Aided Engineering (CAE) for a multitude of industry solutions without the need for complex CAE preparation and simulation expertise.

ODYSSEE A-Eye applies advanced pattern recognition to images, pictures, video and simple datasets so that they can be analyzed for machine learning (ML) applications in engineering simulation. The tool's unique ability to match existing CAE simulation data to imagery and provide like-for-like predictions based on a posed problem makes it an invaluable tool for use in any engineering-related problem – design optimization, cost impact, or even how long a new product will take to produce without the laborious and highly-skilled process of preparing a model and defining simulation boundary conditions.

Applying ML processes to engineering problems typically requires expert knowledge and large amounts of training data to produce valid and reliable results, which leaves it out of reach for many smaller enterprises and non-specialists. By removing the need for complex data models and allowing the user to solve their problem by inputting widely-available CAD files, imagery or scalar data and relate it to training data from Hexagon's simulation solutions, the ODYSSEE A-Eye platform makes powerful Digital Twin capabilities available to designers, production engineers, operators and other non-specialists. They can then make informed engineering decisions and explore problems interactively with near-realtime results.

Example applications include:

· Exploring how car wheel designs behave when impacting obstacles such as a kerb or debris. Engineers can build a database of different configurations using nonlinear finite element simulations such as the design or number of spokes to understand the effect of various designs. Vehicle design teams can then use this to quickly understand the behaviour of a wheel without any engineering or CAE knowledge based on only a 2D image.

- · Predicting lift and drag coefficients for new aircraft wing profiles based on a 3D image of a new wing design, by building a database of just 16 wing profile simulations from the widely-used National Advisory Committee for Aeronautics (NACA) definitions. Typically, this process would take several days, and demand the time and attention of a CAE analyst and multiple simulation tools.
- · A machinist or machine salesperson using an ODYSSEE A-Eye application to predict how long a part will take to produce with a given CNC machine tool and metal, using just the database and 3D Step file, capturing valuable process knowledge for others to better plan production and bid for projects. By applying manufacturing process simulation, the same process can be applied to predict dimensional tolerances or the strength of joinery.

Engineers without machine learning knowledge can use ODYSSEE A-Eye to develop their robust AI applications based on any particular problem that needs to be overcome, from optimising tyre-tread design to fault-analysis of computer chips, and then make them available to others who need that knowledge. The new platform integrates with all of Hexagon's CAE solutions, working seamlessly with customers' existing processes and bringing AI to industries that may not have seen this as a feasible solution to their current design needs. Its accessibility means it can be used by companies who either do not carry CAE specialists, or want the expertise they do have to solve other problems or perform final design validation. With ODYSSEE A-Eye, a single engineering expert is able to specify an application that would help progress a design, and then feed that to the product design team and operators to execute.

> **Roger Assaker, President of Hexagon's Design and Engineering Software Business Unit**, said: "AI is an increasingly valuable tool within design and engineering, helping push virtual engineering to the next level. It has the potential to shorten the time taken to complete labour-intensive design tasks that may have previously taken days or weeks down to minutes or hours without losing simulation fidelity. Furthermore, the user-friendly design of ODYSSEE A-Eye makes it simple to integrate into modern engineering practices, democratising a highly advanced process for use by non-experts, and producing the results in a very accessible format."

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

Not To Miss on YouTube

Top Tip: Oasys PRIMER Part Tree - includes and...　11:01

Oasys POST: User Defined Components　15:50

As an everyday engineering tool, Slope software is quick and easy to use for a wide range of slope stability problems.

Check out our geotechnical software OasysSlope! Examine slope stability via a number of different analysis methods

Slope provides an easy and accurate way to study a slip surface to find factors of safety against failure, and to check the improvements from reinforcement. It performs two-dimensional slope stability analysis using the method of slices and presents the results in a clear graphical format. You can also apply partial factors, including EC7, with ease.

Slope — **Slope Stability Analysis Software** - 2D slope stability analysis which can incorporate reinforcing elements - soil nails, rock bolts, ground anchors, geotextiles etc.

How Slope Works - Input: Wizards enable you to quickly input your slope data. You can also import stratigraphy data from DXF files to accurately represent your slope.

Analysis: Choose from Bishops method for circular slips and Janbu for non-circular. In both methods the inclination of the interslice forces can be horizontal, constant inclined or variably inclined.

The software program uses established methods to ensure the forces and/or moments acting on each slice are in equilibrium. Partial factors can be applied by the user and Eurocode 7 and British Standard partial factors have been incorporated into the program.

This essential slope software analyses reinforcing elements such as soil nails, rock bolts, ground anchors and geotextiles to BS8006/BS8081. You can specify water pressure, material shear strength, surface loads and horizontal ground acceleration. Slope checks a range of slip circles and gives you the option to force slips through a point or keep them tangential to a strata.

Output: Full exportable tabular and graphical outputs are available.

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

EXCERPT - Light Detection and Ranging (LIDAR)

> "If you have a project involving LIDAR photonics, we can help you with the engineering and design by providing Ansys simulation software, training, and support as well as our consulting services."

Introduction: Light Detection and Ranging (LIDAR) is a technology based on the well known RADAR technology based on radio waves in use since the early 20th century to detect distant objects. Figure 1 shows examples of some of the RADARS in use today.

One of the limitations of using a single antenna RADAR was since it radiates power in all the directions, it required a lot of power to detect far away objects. Also the directional information obtained was limited. An innovation which helped solve this problem was to use an array of antennas to create a directional beam which could be then used to probe a particular direction.

By tuning the relative optical phases between the antennas the beam could be scanned in different directions. Fig. 2(a) shows a picture of an RADAR array. Figure 2(b) shows the schematic of a typical antenna array and how different phases may be tuned to sweep and scan the beam in different directions. In case of LIDAR, optical frequencies are used instead of radio frequencies.

Figure 2a	Figure2b

Ameen Topa
Research Scientist at Universiti Teknologi PETRONAS

Simulation of Road Guard Rails and Road Barrier
and An Interesting YouTube Video on the History of Cable Guard Rails

LS-DYNA: Pick up truck and Guard Rail

LS-DYNA: Guard Rail Head Impact

Tanker Truck Impact on Road Barrier (Empty tanker vs 50% filled)

History - A Video About The History of Cable Guard Rails

Cable Guardrails - Federal Highway Administration - Video VH-2C

Cable guardrail systems are snowdrift-resistant, more aesthetic than solid-beam systems, and relatively low-cost. This video presents a potpourri of recent research and variations on the basic G1 guardrail. Flanged-channel posts, transitions between cable and w-beam barriers, wooden posts, modified terminal anchors, and low-cost installations for low volume roads are shown onsite and in crash tests.

Excerpts - For the complete article please visit the links

Ford Unveils All-Electric F-100 Eluminator Concept With New EV Crate Motor - Based on a heritage 1978 F-100 pickup, the F-100 Eluminator concept features all-wheel drive via two powerful electric motors shared with the 2021 Mustang Mach-E GT Performance Edition. Two electric traction motors drive the front and rear wheels, packing a powerful 480 horsepower and 634 lb.-ft. of torque.

GM to Celebrate Grand Opening of Factory ZERO – an American EV Factory - President Joe Biden gets behind the wheel of the 2022 GMC HUMMER EV Pickup, taking the all-electric vehicle for a drive at the grand opening of the GM Factory ZERO EV assembly plant in Detroit and Hamtramck, Michigan

Mercedes-Benz to manufacture axial-flux electric motors in Berlin, Digital Factory Campus to go live in 2022 - Mercedes-Benz prepares to go all electric by 2030, where market conditions allow. With the transformation of the Berlin site, Mercedes-Benz will reach new digitalisation and electrification milestones on the way towards a sustainable and emissions-free future.

VOLVO - Wanted: clean energy for full climate benefits - Our C40 Recharge Life Cycle Assessment report is out – how are electric car benefits affected by access to clean energy? We aim to be a fully electric car company by 2030… We believe that solving a problem starts with acknowledging there is one and being transparent about it. One way we do this is by compiling and publishing a Life Cycle Assessment (LCA) report for every new fully electric model we launch.
.

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. He mentioned he found a Falcon. The town thought he was going into bird rescue - the budget he requested caused suspicion. We explained he can't adopt it and bring it to the airport, but he can visit it at air shows!

Quiz - can you name all he requested? Additionally, there is an extra credit question!

A hint for "D" - It is silent, has night vision, uses camouflage.

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

A_____

B_____

C_____

D_____

Prime Minister Mr. Narendra Modi today handed over **HAL produced indigenous Light Combat Helicopter** (LCH) to the Indian Air Force (IAF) during the 'Rashtriya Raksha Samarpan Parv' celebrations to mark the 75th year of India's independence, held at Jhansi from November 17 to 19. The IAF Chief Air Chief Marshal Vivek Ram Chaudhari symbolically received LCH in presence of several dignitaries.

LCH is the dedicated combat helicopter designed and developed indigenously for the first time in India. LCH is the only Attack Helicopter in the world which can land and take-off at an altitude of 5000 m (16400 ft) with considerable load of weapons & fuel meeting the specific requirements of Indian Armed Forces.

HAL has proactively initiated advance action towards launching the production activities of 15 LCH LSPs with internal funding. Material procurement for all the 15 helicopters have been completed. Three helicopters are ready for delivery to users and the balance helicopters are in advanced stages of production.

HAL has initiated various planning activities and has drawn a detailed master plan for achieving the peak rate production capacity of 30 helicopters per annum in order to cater to production of balance 145 LCHs.

As in other aircraft development, LCH is also being continuously upgraded with advancement of technologies. Improved Electronics Warfare (EW) Suite, Directional Infra-Red Counter Measure (DIRCM), Air to Ground Missile (ATGM), Data link, Anti-Radiation Missile (ARM), Bombs, Nuclear, Biological and Chemical (NBC) protection and Wire cutter are being incorporated.

Being a unique helicopter in this weight category and with this kind of capabilities, LCH is also expected to have a good export potential.

More Details on LCH: The LCH is a twin-engine, 5.8-ton class helicopter featuring narrow fuselage and tandem configuration for Pilot and Co-pilot/Weapon System Operator (WSO). It incorporates number of stealth features such as reduced radar and infra-red signatures and crashworthy landing gear for better survivability. LCH incorporates advanced technologies and is designed to carry out roles such as Destruction of enemy air defense, Counter insurgency, Search and rescue, antitank, Counter Surface Force Operations etc.

Going vertical - Maj. Kristin Wolfe, F-35A Lightning II Demonstration Team pilot and commander, flies during a demonstration practice at Davis Monthan Air Force Base, Ariz., Nov. 5, 2021. Wolfe led the team at 17 air shows in the 2021 season, culminating the year at the Thunder and Lightning over Arizona Air Show held at Davis Monthan AFB. (U.S. Air Force photo by Staff Sgt. Codie Trimble)

Falcon over Phoenix - An F-16 Fighting Falcon flies over Phoenix, Ariz., during the NASCAR Cup Series Championship, Nov. 7, 2021. F-16 pilots assigned to the 56th and 944th Fighter Wings at Luke Air Force Base performed a four-ship formation flyover after the national anthem at the Phoenix Raceway to kick off the championship race. (U.S. Air Force photo by Airman 1st Class Dominic Tyler)

Seeing red - A U.S. Air Force B-1B Lancer flies over the Red Sea during a presence patrol mission, Nov. 11, 2021. The B-1B participated in the mission with several partner nation air forces. (Courtesy photo)

Thanks to **BioMedical Engineering OnLine** - an open access, peer-reviewed journal that is dedicated to publishing research in all areas of biomedical engineering.

How muscle stiffness affects human body model behavior

Niclas Trube, Werner Riedel & Matthias Boljen

BioMedical Engineering OnLine

Colored depiction of THUMS Version 5.01 AM50 (a) and an example of the two muscle systems of THUMS (b): 1D system of Hill-type muscle truss elements (red lines) and the 3D system of volumetric, solid cuboid elements (transparent skin-colored parts

Background - Active human body models (AHBM) consider musculoskeletal movement and joint stiffness via active muscle truss elements in the finite element (FE) codes in dynamic application. In the latest models, such as THUMS™ Version 5, nearly all human muscle groups are modeled in form of one-dimensional truss elements connecting each joint. While a lot of work has been done to improve the active and passive behavior of this 1D muscle system in the past, the volumetric muscle system of THUMS was modeled in a much more simplified way based on Post Mortem Human Subject (PMHS) test data. The stiffness changing effect of isometric contraction was hardly considered for the volumetric muscle system of whole human body models so far. While previous works considered this aspect for single muscles, the effect of a change in stiffness due to isometric contraction of volumetric muscles on the AHBM behavior and computation time is yet unknown.

Methods - In this study, a simplified frontal impact using the THUMS Version 5 AM50 occupant model was simulated. Key parameters to regulate muscle tissue stiffness of solid elements in THUMS were identified for the material model MAT_SIMPLIFIED_FOAM and different stiffness states were predefined for the buttock and thigh.
Results

During frontal crash, changes in muscle stiffness had an effect on the overall AHBM behavior including expected injury outcome. Changes in muscle stiffness for the thigh and pelvis, as well as for the entire human body model and for strain-rate-dependent stiffness definitions based on literature data had no significant effect on the computation time.

Discussion

Kinematics, peak impact force and stiffness changes were in general compliance with the literature data. However, different experimental setups had to be considered for comparison, as this topic has not been fully investigated experimentally in automotive applications in the past. Therefore, this study has limitations regarding validation of the frontal impact results.

Conclusion - Variations of default THUMS material model parameters allow an efficient change in stiffness of volumetric muscles for whole AHBM applications. The computation time is unaffected by altering muscle stiffness using the method suggested in this work. Due to a lack of validation data, the results of this work can only be validated with certain limitations. In future works, the default material models of THUMS could be replaced with recently published models to achieve a possibly more biofidelic muscle behavior, which would even allow a functional dependency of the 1D and 3D muscle systems. However, the effect on calculation time and model stability of these models is yet unknown and should be considered in future studies for efficient AHBM applications.

Core statements

1.   The effect of isometric contraction of lower extremity muscles on occupant safety was analyzed by defining different stiffness states for the volumetric muscle elements of THUMS Version 5. Altering the muscle stiffness influenced the overall active human body model (AHBM) behavior during frontal crashes, as well as the predicted injury outcome.

2.   Altering the muscle material stiffness via the scaling factor of the ordinate value (SFO) of the load curve referenced in all muscle and soft tissues of THUMS in the LS-DYNA material model MAT_SIMPLIFIED_FOAM has no significant impact on the computation time.

3.   Stiffness parameters of the human body model THUMS™ Version 5 are identified, varied and compared to experimental literature data for verification. Results are in general correlation, but verification by precise numerical simulations of the experimental setups should be followed in future studies.

4.   Based on strain-dependent injury prediction, the injury risk for muscle and soft tissues during frontal impact is reduced with higher muscle stiffness. Further, based on contact force evaluation, increasing muscle stiffness leads to higher probability of hip fracture or dislocation and to lower probability of knee injuries. Higher risk with increasing muscle stiffness was also found for effective plastic strain evaluation, while first principal strain results rather show an arbitrary influence of muscle stiffness on the injury risk of cortical and spongy bones. Further studies are necessary to investigate the exact influence of muscle stiffness on bone injury risk in detail.

	Numerical Simulation of Rock Mass Structure Effect on Tunnel Smooth Blasting Quality: A Case Study **(ANSYS/LS-DYNA was used to simulate the blasting process.)** Jianxiu Wang, Ansheng Cao, Jiaxing Liu, Huanran Wang, Xiaotian Liu, Huboqiang Li, Yuanwei Sun, Yanxia Long, Fan Wu
	Meshing characteristics and failure analysis of shearer walking wheel considering torsional deformation **(ANSYS/LS-DYNA used for the finite element solution.)** DejianMa, Lirong Wan, Xin Zhang, Qingliang Zeng, Kuidong Gaoa
	Design of In-plane Torsion Experiment to Characterize Anisotropic Plasticity and Fracture Under Simple Shear **(Simulations are performed with LS-DYNA.)** Vincent Grolleau, Christian C.Roth, DirkMohr
	A bayesian optimisation methodology for the inverse derivation of viscoplasticity model constants in high strain-rate simulations **(Numerical simulations performed in LS-DYNA.)** Shannon Ryan, JulianBerk Santu, Rana Brodie McDonald, Svetha Venkatesh

	CFD Simulations of Multiphase Flows: Interaction of Miscible Liquids with Different Temperatures P. Rodríguez-Ocampo - E. Mendoza - R. Silva - M. Ring -J.. Hernández-Fontes - J. Alcérreca-Huerta
	Material Model Development of Magnesium Alloy and Its Strength Evaluation Wenjia Huang - Ninshu Ma - Yunwu Ma Toshiro Amaishi - Kenji Takada - Takayuki Hama
	Continuum damage modeling of delamination in paperboard Jakobsson, Erik
	Cork Core Sandwich Plates for Blast Protection Jesús Pernas-Sánchez, Jose A. Artero-Guerrero, David Varas, Filipe Teixeira-Dias
	Aerodynamic drag in cycling team time trials Bert Blocken, Yasin Toparlar, Thijs van Druenen, Thomas Andrianne,
	Numerical Analysis and Experimental Test for the Development of a Small Shaped Charge Piotr Malesa, Grzegorz Sławiński, Karolina Pęcherzewska
	Computational ballistic analysis of the cranial shot to John F. Kennedy C. Then, K. Nelson, T.J. Vogl, K.E. Roth
	Cyclist aerodynamics through time: Better, faster, stronger Fabio Malizia Bert Blocken

The Old Cattle Rancher's Ranch   **December**
No one knows his name. You yell, "HEY, old cattle rancher."
Agriculture, Soil, Equipment, Cattle, and whatever he wants. **DUCKS**?

Thanks to bringing this to our attention: Tobias Holzmann and Sagar Vinchurkar - Posted on Social Media by Asmaa Hadane - Postdoctoral Researcher at École normale supérieure Paris-Saclay

Wave-riding and wave-passing by ducklings in formation swimming
Published online by Cambridge University Press:

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It has been commonly observed on open waters that ducklings/goslings follow their mothers in a highly organized formation. The questions arise: (1) why are they swimming in formation? (2) what is the best swimming formation? (3) how much energy can be preserved by each individual in formation swimming? To address these questions, we established a simplified mathematical and numerical model and calculated the wave drag on a group of waterfowl in a swimming formation.

We observed two new and interesting findings: wave-riding and wave-passing. By riding the waves generated by a mother duck, a trailing duckling can obtain a significant wave-drag reduction. When a duckling swims at the 'sweet point' behind its mother, a destructive wave interference phenomenon occurs and the wave drag of the duckling turns positive, pushing the duckling forward. More interestingly, this wave-riding benefit could be sustained by the rest of the ducklings in a single-file line formation. Starting from the third one in a queue, the wave drag of individuals gradually tended towards zero, and a delicate dynamic equilibrium was achieved. Each individual under that equilibrium acted as a wave passer, passing the waves' energy to its trailing one without any energy losses. Wave-riding and wave-passing are probably the principal reasons for the evolution of swimming formation by waterfowl.

This study is the first to reveal the reasons why the formation movement of waterfowl can preserve individuals' energy expenditure. Our calculations provide new insights into the mechanisms of formation swimming.

The Old Cattle Rancher's Ranch

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

Agriculture, Soil, Equipment, Cattle, and whatever he wants. **Ranch Roxor**

Thanks for bringing this to our attention - great ranch/off road video
Mahindra & Mahindra Ltd. [Automotive and Farm Equipment Business]

YouTube
Ladies and Cowboys!
Off-roaders and outsiders!
Friends and Cattlemen!
Introducing the new ROXOR!

www.roxoroffroad.com

Presenting the new Mahindra Roxor, redesigned to better reflect the Mahindra and Roxor brand for the US market.

Catch what customers have to say about this tough, rugged and durable off-roader.

Our pink cowgirl hat ranch hand discovered the tractor. She's to small to reach the pedals by herself. BUT she can steer it! AND, her Dad had better not take his hand off his leg and try to help! That girl has it under control!

I feel like this is one of those internet verification tests to see if I am a real person. How many Ravens are in the picture?

You will understand WHY our solar light stopped working. YES, I had to use a ladder and clean off bird shit. You would think rain would have washed it off! It was like cement!

This horse is named Minow and he is using his famous I am blind, give me a lot of attention.

Yes, he is blind, but he does get a lot of attention and exercise.

The ranch hand loves horses, but is allergic to them, so she started wearing gloves and mask. That so far seems to be working.

Here we have our Ranch Hand cutting Quincy's hair

	Oasys **Oasys PRIMER Part Tree - includes and assemblies** Did you know that you can move items between includes and assemblies in the Oasys PRIMER Part Tree?
	Simutech - **Using Dynamic Relaxation to Generate Preload in Ansys LS-DYNA**
	Calum Ridyard - Oasys - **User Defined Components** LS-DYNA gives control over the results you can output from your simulation and provides hundreds of different data components for this. However, as engineers, we often need to derive results from these basic outputs that aren't available by default. This webinar is for experienced D3PLOT users looking to take their analyses and reporting to the next level by defining and plotting their own data components.
	Kaizenat - **PCB Cooling using LS Dyna – ICFD for Natural Convection** PCB cooling is one of the emerging domains in the field of electronics. The temperature of the PCB plays a vital role in the longevity of the component. There are various aspects that control the cooling of the PCB or assist in the reduction of temperature.
	DYNAmore -**New Features for Crash in LS-DYNA R13.0**

B. ZHANG Aalborg Univ. - An inverse strategy to determine constitutive parameters of tubular materials for hydroforming processes

F. R-Gil - Inst. Univ. Pascual Bravo,- Through-thickness perforated steel plates optimized for ballistic impact applications

M. Mohsin - Imperial College London -

Experimental and Numerical Analysis of Low-Velocity Impact of Carbon Fibre-Based Non-Crimp Fabric Reinforced Thermoplastic Composites

Johannes Främby - Chalmers Univ.

An adaptive shell element for explicit dynamic analysis of failure in laminated composites Part 2: Progressive failure and model validation

C.P.Yi - Luleå Univ.

Numerical modeling for a simulated rockburst experiment using LS-DYNA

	G. Siguier - Continental Automotive How Continental Uses Electromagnetic Simulation for RF Human Exposure Assessment
	DYNAmore - Support Site LS-DYNA answers to basic and advanced qustions
	R. Almenar -ESI How to push the boundaries of CFD modeling and the need to move towards democratization of numerical simulation
	R. Scott - Hexagon Agile development is for electric vehicles, not just software
	N. Kochhar - Siemens A glimpse into the future of mobility – Nand Kochhar chats with MIT Technology Review

This week since Willem stopped into the coffee shop, we are taking all our To Go Coffee and he is going to give us a presenation at YouTube!

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

This week we are finding who has a hole in their muffler driving past my coffee shop. Well, with that said let's grab our coffee to go cups and visit YouTube for a video on an engine muffler simulation

Kaizenat Technologies - Exhaust engine muffler Simulation - LS-DYNA ICFD

This is probably what my husband thinks I sound like when I don't realize he has his hearing aid in. Oh well, I realize it when he covers his ears and yells back "Stop yelling so loud!"

Lancemore   - Sonic Boom

I know I had this in April, but I love magnets - yes, my refrigerator door has a lot of them. SO, to learn about magnets let's grab our coffee and head on over to YouTube.

LS-DYNA EM : Magnet snapping

First, a must place to visit on YouTube. I love the Model A Ford this channel is all Model A

Model A Ford Archive Channel

I am tired but that is not what is meant by fatigue analysis - I will head for coffee to perk up while you head to YouTube.

Kaizenat Technologies - Fatigue analysis of connecting rod | Fatigue tool | Ansys Mechanical |

Thanks to John Cooper and Steven Croley using social media, I learned about the Shelby American Collection in Boulder Colorado.

Shelby American Collection - Cobra, Shelby Mustang and Ford GT 40

The Shelby American Collection historic car museum was established in 1996 and is located in Boulder, Colorado. Dedicated to the history of Carroll Shelby and the Shelby American Team…The Shelby American Collection celebrates the rich heritage of the Cobra, Shelby Mustang and Ford GT 40 cars that changed the face of auto racing in the 1960s… The museum and their website are dedicated to serve as a resource for all enthusiasts, and to memorialize & preserve one of the most important eras in American automotive history for all generations.

Cobras & Coups

GT40s

Shelby Mustangs

The Shelby American Collection is fortunate to display some of the most famous Shelby American cars ever built. This is made possible through the generosity of many Shelby owners and collectors.

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!

"Explained below DDDM doesn't mean Driving Dawson's Diesel Mower."

I'm tired of guessing on decisions, using intuition, or worse listening to town residents base a decision recommendation on, "Well, back-in-the-day we used educated guessing and our gut feelings."

DATA Driven Decision Making vs. Gut feeling Decisions while Mowing.

I do respect "back-in-the day" - "gut feelings will tell ya" - "In my day we flew by the seat of our pants" AND I do like the old cattle rancher's Model A Ford, but we need data driven decisions in this town. And to totally faint the town supervisor agreed with me!

Here are some issues I had this month trying to educate the town on using data for decisions:

My First Visit: The old rancher - I said, "HEY, old rancher, I have some **big data** to go over."   He then asked, "is it as tall as the city hall and how wide?"

I explained that it wasn't tall or wide, but it had **large amounts of complex information**. Then he explained, for three hours, how they did it "back-in-the-day."   If everyone keeps using their "gut" for decisions, this entire town will have ulcers.

I then said, "HEY, old cattle rancher, I want to be **"data-driven" and collect data, and find the patterns and facts, then use those to base my decisions for our town."**

Old Cattle Rancher - "patterns? I have a kaleidoscope you can use." I promptly thanked him and left.   I gave up explaining that **I need the patterns and facts from my data to make a decision not based on town opinions using intuition, guessing, or back-in the day**. Dawson probably uses a magic 8 ball**.**

My Second Visit: The coffee shop. I figured the caffeine would give the older patrons a brain boost.

I announced, "Going forward we should use **DDDM.** Does anyone know what that means?"   Cowboy Dawson yelled, "Ain't that Driving Dawson's Diesel Mower."   I answered, "No Cowboy, that **means Data-Driven Decision Making** so our decisions are organized and we use actual data."   Cowboy yelled, "What about the mower?"   Before someone could start on "back-in-the-day" or their gut decision always worked for them, I had to leave. I didn't have the fortitude to explain **they're using bias and would come to fake assumptions** then their decision wouldn't work - plus I may be banned from the coffee shop!

I decided it would be best, as Cowboy Dawson said, "Honey, you didn't even get out of the shoot - your explanation ain't making sense. Ya best go practice what you're thinking and then come on back to the coffee shop."

Next time, **if there is one**. **I may try showing them one step in How to Make Data-Driven Decisions.** Maybe if I have "Show and Tell" like they did in school back in the day, it will make sense to them. Explaining why we have to catch up with the times using DDDM didn't quite work.   Taking Cowboys advice, I need to get out of the shoot before trotting, or galloping. Does anyone even have a kaleidoscope other then the Old Cattle Rancher? That was definitely back-in-the-day! Now, what day, what century? And what first step to show them? Not and easy task in this town!

Simulation shows how an explosion (blue) emanating from a steel chamber can snuff out a flame (red).

Simulation Proves Fighting Fire with Fiery Explosions Is Possible - Chris Quan - ANSYS

Could you really fight fire with fire? This age-old adage has been touted for years, but when taken literally does it have any scientific merit? Simulation will solve this burning question

How to Fight Fire with Fire Using Explosions

In theory, a shock wave traveling through the air could suppress a flame by blowing it away from flammable materials.

Dr. Graham Doig, from the University of New South Wales, proved this theory in a series of experiments captured on video:

Fighting bushfires with explosives - clip 1

Fighting bushfires with explosives - clip 2

Ansys Autodyn simulations can explain the results of this experiment numerically.

Understand How to Fight Fire with Fire Using Simulations: The first step is to build a model using the Explicit Dynamics system from Ansys Workbench and Autodyn's multi-material Euler solver.

The simulation demonstrates how a fire can be snuffed out by an explosive shockwave emanating from a steel chamber. The chamber aims the shockwave toward the flame by reflecting the wave off its surface and semi-spherical end.

View Animation on the ANSYS website - Animation shows how the shockwave pushes the flame away from its fuel.

As predicted, the shock wave blows the flame away from the burning materials and suppresses the fire, as shown in this animation:

So, it appears you can fight fire with fire. But, stick to an extinguisher — unless you want to burn off those eyebrows.

Fig. 1: State-of-the-art non-nuclear submarine.

Figure 1

Pdf Excerpt- [Bolted Joint Connections of FRP-Components in Submarines Subjected to Underwater Shock](#)

A. Rühl, B. Özarmut, B. Hennings, O. Nommensen, A. Paul

thyssenkrupp Marine Systems GmbH, Werftstraße 112-114, 24143 Kiel, Germany

1 Introduction - The application of fiber reinforced plastic (FRP) and sandwich components is an established practice at various locations in state-of-the-art submarines. Due to acoustic reasons, easy formability and low mass density at comparatively high strength values, these components bear a huge potential for buoyancy related constructions. The shock-design and -calculation of these components as well as their connecting parts are crucially supported by Finite Element simulations using LS-DYNA.

The present work shows an investigation of FRP-based bolted joint connections in today's submarines and their connection to the pressure hull in terms of modelling and simulation. The transfer from detailed models to simulation of a full-scale shock submarine, as shown in Fig. 1, is presented and discussed.

2 Load Case UNDEX - An important load case for the design of modern submarines are underwater explosions. An underwater explosion (UNDEX) is caused by the detonation of an explosive charge with a defined mass and distance to the investigated object. Typical UNDEX threats are remnant World War II or modern naval mines.   After a submerged detonation, a shock wave forms a shock front that travels radially from the charge's center and eventually impinges a submarine's structure. The principle shock wave formation due to different particle velocities is shown in Fig. 2.

Fig.2:   Visualization of a detonation (left) and the resulting shock front formation (right) [1].

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

Photo & Author by Abigail Klein

Wichita State's College of Engineering

Sponsored by GoBabyGo -

Wichita State students created accessible Halloween costumes for children with special needs -

It involved engineering students and physical therapy students who worked together to modify off-the-shelf ride-on toy cars for kids with disabilities.

Keith Hanna

Realtime CFD: the advent of AI/ML and operational CFD digital twins   -

Very rarely in one's career does something happen which is simultaneously a paradigm shift and a game-changer related to the industry that you've devoted most of your career to but recently, I have seen something I thought I would never see in my long career – a viable approach to realtime Computational Fluid Dynamics, CFD, (and indeed realtime CAE, Computer-Aided Engineering) that delivers repeatable engineering-level fidelity suitable for engineering simulation analysts.

Matt Barsotti

Protection Engineering Consultants (PEC)

Visit our new website and our five key expertise areas:
- · Protective Design
- · Applied Research
- · Data Science
- · Security Engineering
- · Risk Mitigation

CONVENTION CENTER
YouTube Booths

**Current videos
as of:
Nov 27th**

**Free Coffee for
visiting our exhibitors**

Ameen Topa			Kaizenat
LURI ENG			Oasys LS-DYNA
Alexander Kazantsev			ESI Group
DYNAmore			MSC. Software
R.P Santiago			Ozen Engineering
MEETING ROOM			BETA CAE Systems

CADFEM Tutorial No. 37 - Fluid mechanical simulation of a Venturi tube with ANSYS Fluent

Have you learned how to calculate a fluid mechanics task in an ANSYS workbench environment and know-how meshing and setup are done to calculate your simulation quickly and efficiently?

Fluid Mechanical Simulation of a Venturi Tube With ANSYS Fluent.   In this tutorial we will show you how to calculate a fluid mechanics task in the Ansys Workbench environment.

No. 37 - Fluid mechanical simulation of a Venturi tube with ANSYS Fluent
Branch : Construction

A Venturi tube is simulated, which is loaded into Fluent after meshing with ANSYS Meshing. There, the fluid mechanical setup is defined. Besides the general workflow, some tips are presented to set up and calculate your simulation quickly and efficiently.

****

Have you learned about ANSYS Minerva

Product page - Integrate the simulation and development process using ANSYS Minerva!!

YouTube How to Use ANSYS Minerva - his video demonstrates the collaborative simulation workflow within ANSYS Minerva and highlights many of Minerva's capabilities. These include designer–analyst communication, metadata extraction, lightweight visualization, life cycle traceability and job management.

Get Fast Access to simulation data with consistent versioning and traceability with efficient Multiphysics

Product Highlights

- Fast access to simulation data with consistent versioning and traceability
- Efficient multiphysics analysis process setup up to robust design analysis
- Easy provision of best-practice simulation workflows for quality assurance
- Neutral data exchange between simulation and existing PDM systems
- Securing the simulation knowledge by integration into the product development process

Thanks to Bert Blocken for bringing this to our attention on social media

GLOW - Moved by Light Aftermovie - 2021

GLOW Eindhoven

This edition of GLOW - spread across the entire city - was able to take place thanks to the close collaboration with artists from home and abroad. We have worked together with the municipality of Eindhoven and other key partners to make this event a great success. GLOW 2021 was bigger than ever. **About 35 light artists from home and abroad have created some of the most inspiring and innovative light exhibits ever seen at GLOW.**

A new challenge was the enlarged exhibition area spread over four sites and two satellite locations, in and around the city. The intention was to give both visitors and the incredible light installations more space. To make this year's event more corona compliant and allow more parts of the city to participate. Visitor flows were well controlled but this didn't detract from the experience. People were transported by the exhibits; they were literally moved by the light.

Although the expansion to the new locations was a challenge at times, we can definitely say GLOW 2021 was a very successful edition. Local residents and visitors (from far and wide) were surprised, thrilled, challenged and inspired. **This year's light art was often referred to as "breathtaking". www.gloweindhoven.nl**

Video production by @HouseofYellow.nl
   Drone by @PaulRaats

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

TRUE LOAD - Did you know that it is currently possible to perform a strain gauge test based on your finite element model?

With True Load it is possible. One of the most challenging tasks for an analyst is to develop load cases for their FEA model that match measured strain values. Typically, it will take weeks to develop the right load cases that match just one or two strain gauges at a single point in time. True-Load makes that situation a thing of the past

True-Load will determine optimal gauge placement based on the FEA model. Once strains are collected at these optimal gauge locations, the strain data is read into True-Load to calculate load time histories that will typically match the measured strain to within 2% at every point in time…

LS-DYNA

Explicit analysis of Top Load over PET plastic Bottle

With LS-DYNA we have simulated the case of Top Load loading in a plastic bottle using a mathematical model of *MAT_089 material (*MAT_PLASTICITY_POLYMER).

Credit: Fabian Leonov Santoyo Lopez

Free Fall Test of a PET Bottle Using SPH

Our simulation with LS-DYNA shows a Free Fall Test of a PET bottle with water fluid inside it.

For the replication of this model, the Smoothed Particle Hydrodynamics technique is applied to generate a fluid-structure interaction model.

Mauricio Horacio Colin Velasco
Jr. CAE Engineer. en LURI Engineering

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"Good afternoon convention center visitors, I would like to share the simulation of airbags. The set-up of this analysis was done using the tools of Engineering Technology Associates, Inc. more specifically the airbag module of "PreSys" and was solved with LS-Dyna."

In the video below I show the bending of 1 passenger airbag (PAB "Passenger Airbag") consisting of 5 steps:

The bending and packing of the airbags play an important role both for their positioning and their performance when deployed, that is why it is necessary to simulate the bending and packing process to then use the results of these simulations for subsequent deployment simulations and to take into account the residual efforts resulting from bending and packing on the fabric at the time of deployment.

In the following video you can see the steps

Step 1: Scrunch Fold	Step 2: Thin Fold 1 — Step 3: Thin Fold 2
1.- Scrunch fold: The air bag is inflated to then be compressed by two plates and thus obtain a flat section of the bag.	**2 and 3.- Thin Fold**: Four single folds are made
Step 4: Roll Fold — **4.- Roll fold:** Two tools are used that could well be circular to roll the bag	Step 5: Compress Fold — **5.- Compress Fold:** Finally, the bag is compressed to obtain an even smaller packaging

Additionally, I welcome you to follow Luri Engineering on LinkedIn.

Marco Evangelos Biancolini
RBF Morph CTO & Founder - Associate Professor of Machine Design

MeDiTATe ("the Medical Digital Twin for Aneurysm Prevention and Treatment") will deliver a comprehensive framework of simulation and imaging technologies, targeted at industrial and clinical-translation to accelerate the process of personalised cardiovascular medical procedure, validated through an integrated experimental programme to ultimately improve patient care.

News: On March 23rd our Early Stage Researchers had the chance to attend a webinar by Dr Elisabetta Bianchini, the Vice-Chair of VascAgeNet.

The full webinar can be found l on YouTube: **"VascAgeNet Webinar 7: Medical Devices Regulation"**

Elisabetta Bianchini

ANSYS/Fluent will be combined to RBF Morph and static ROM Builder

Project Objective: The objectives of the project are related to the combination of efficient mesh morphing, computational static reduced order models (SROMs) and haptic devices in order to manage and solve hemodynamic simulations over geometric changes of tissues. The combined use of the three tools is expected to allow real-time solution, visualization and feedback, in view of the Digital Twin MeDiTATe is planning to build.

The assessment of this approach will be carried out and compared to dynamic results of ESR2. In the first part, starting from the definition of feasible variations of anatomical geometry and the corresponding control points to manage them, the variability will be reduced to a small set of parameters. **The use of ANSYS/Fluent will be combined to RBF Morph and static ROM Builder in order to prepare and solve a design of experiments scenario able to produce a ROM for the hemodynamic solution.** In a second part, the definition and implementation of the communication with the haptic device will be addressed in order to enhance the interactive spatial creation and displacement of control points on the anatomical tissue giving a real-time force-feedback to the user. This part will be completed by the study of possible real-time interaction to the static ROM to retrieve fast and reliable information about the hemodynamic simulations. The interaction is intended in two ways in order to actively update the geometry of the model and have a force-feedback (i.e. force and vibration) in order to enhance the interpretation of the results through an augmented probe (visual and haptic feedback).

Christian Liebold
Project Engineer bei DYNAmore

Did you know that here at DYNAmore GmbH we develop **a mapping tool called Envyo.**

It is licensed separately from LS-DYNA and is available for Windows and Linux operating systems.

What is Envyo? A multi-purpose mapping tool dedicated to LS-DYNA.

Rasmus Schützer
Project Engineer på DYNAmore Nordic AB

Welcome to DYNAmore Nordic's Short Training Video Library!
Below is two of our short training videos and tutorials about numerous LS-DYNA applications.

Our goal is to assist for you gaining knowledge and expertise regarding LS-DYNA.
Our library has informative videos on topics that range from multiphysical simulation techniques to automation of the simulation process.

All for free, all you have to do is enter your contact info before accessing a topic.
Start now, gain knowledge with LS-DYNA Explicit & General and LS-DYNA Implicit.

Here you'll find videos about explicit simulation and more general information for LS-DYNA, such as introductions to our guidelines, tips on how to getting started, examples on common applications for explicit simulation, and much more.	Here you'll find videos about implicit simulation in LS-DYNA, such as introductions to our guidelines, tips on how to getting started, examples on common applications for implicit simulation, and much more.

Listen to our informative webinar on Accelerating Sheet Metal Forming using All New Dynaform

Host - **Jenson Chen**
VP – Global Software
Sales & Support

Host - **Ming Zhang**
Dynaform Sr. Project
Engineer & Support

Curtis Hsiung
Dynaform Technical
Sales & Support

Mohsin Mirza
Dynaform Project
Engineer & Support

You can listen to the webinar in full on our YouTube Channel where we will discuss:
Corporate Overview - Dynaform Background - Dynaform Module
Live Demo, Polling and time for Questions and Answers

Complete Information - visit our DYNAFORM product page

Airbag folding JFOLD
Accurate airbag deployment simulation
Airbag-folding simulation system for LS-DYNA
- Easy, user-friendly, interactive tool setting
- Preview for checking tool performance
- Manage complicated folding process using a flowchart
- Save calculation results and patterns periodically
- Sewing simulation for 3D airbag

Building an airbag model with intuitive and interactive tools and flow-charted process management	View and modify the action types for tool setting	Positioning and resizing with mouse operations
Preview of the tool mesh behavior	Airbag-folding process management using a flowchart (tree view)	Airbag sewing simulation for the 3D airbag

A presentation was given at the 13th European LS-DYNA Conference held in Ulm, Germany
Using JFOLD and LS-DYNA to Study the Effects of Passenger Airbag Folding on Occupant Injury - R. Taylor (Arup), S. Hayashi, M. Murase (JSOL)

"JFOLD is a software tool for simulation-based airbag folding in LS-DYNA®. This paper presents how JFOLD and LS-DYNA can be used effectively to research how slight changes in automotive passenger airbag folding can lead to significant changes in occupant injury prediction…"

Object of this study
- Demonstrate JFOL as an effective tool in the study of airbag folding bariability
- Investigate effects of folding on injury in a challenging loadcase using CPM and LS-DYNA
- Document what we learned and share with others to help advance improvements in vehicle safety

Dan Marinac
Director Global Product Marketing at MSC Software

eMobility - Engineer Next-generation Electric Vehicles

The battle between cylindrical and prismatic cell technology continues in the EV Battery market.

100% EV - Accelerating electrification - Discover a faster, more integrated, sustainable approach to the design, development and production of electric vehicles.

Electrification is the largest disruptor that has occurred to the automotive industry in decades. Environmental concerns are fueling vehicle electrification; switching from gasoline to electricity is a vital solution for reducing emissions to avoid the worst impacts of climate change. eMobility promises a new era for transportation. To develop your optimal EV faster, Hexagon provides not only the technologies in terms of software and tools, but also the expertise for designing world-class electric vehicles…

ePowertrain Engineering Video	EV Battery Manufacturing	**System Dynamics for eMobility**
From solving engineering issues like reducing gear whine noise, improving drivetrain efficiency, enhancing electric motor cooling, all the way to delivering turnkey ePowertrain designs to EV start-ups…	The battery affects the efficiency of an EV and is key to the safety of its passengers…	…Electric vehicle development requires interactions between additional integrated sub-systems (battery pack, power electronics, electric drive, etc.) to be understood and optimized.

Romax eMobility Solutions	Hexagon EV Solutions	EV Quality Inspection
Leads the world into powertrain electrification. Incorporating world-class engineering consulting, gold-standard simulation tools, and a wealth of expertise in rotating machinery…	We aim to offer a new set of smart manufacturing technologies for engineers, designers and OEMs, blending our experience in automotive design and engineering, production and metrolog…	The increasingly integrated design of electric motors, power electronics and drivetrains is placing new demands on the quality inspection for EV…

EXCERPT from TATA Motors Junkyard diaries

India's scrappage policy is about to bring a sea of change in the way we look at the vehicle lifecycle. We dive deep to understand what's in it for you and the ecosystem, at large.

You go to a premium branded clothes store and pick a nice T-shirt for yourself. You receive compliments wearing it and so it becomes your new favourite. You wear it at a few social gatherings and a few months later, it seems to lose its sheen, you then decide to wear it for your local runabouts, grocery trips and the likes.

A few more washes later, the T-shirt seems to lose its shape with the continued twisting and spinning in the washing machine, and then you move it through the racks in the wardrobe and place in the 'house wear' section.   After some time, with a few holes and colour fades, it moves from your wardrobe to your kitchen and does the duty of a rag – soaking up the spilled milk and cleaning the counter tops and so on. A typical household lifecycle of a T-shirt, isn't it?

Vehicles, too, have a predictable pattern through their life. **Once bought as a shiny new car, the pride of the family, gets handed over to the teenager, learning to drive.** A car once used as a reliable piece of machinery to ferry the family in comfort over long distances, gets confined to the city, used as the second car or even sold to another family that is upgrading to a four-wheeler from a two-wheeler. **Slowly through its life, the care and monies spent on the maintenance start to shrink and it then gets into the vicious circle of breakdowns and frequent service station visits.**

Trucks and buses, too, go through the similar grind. Put through the long-distance haul carrying vital and heavy cargo from Delhi to Chennai, or Mumbai to Kolkata, for example, eventually changes hands to smaller transporters as they age and wear down. They are now doing shorter and lighter intra-state routes and then eventually gets side-lined to doing non-essential duties with significantly reduced kilometres per day runs and require higher maintenance which isn't forthcoming for the return on investment and is fast depreciating.

All objects and vehicles go through analogous lives and have a designed 'life span', except that an old shirt isn't going to pollute the air, or an aged curtain on the window isn't going to be a potential threat to the lives of its owners and other users.

But an old, poorly maintained run-down vehicle most certainly, will. And that's where **the recently-announced Vehicle Scrappage Policy will bring about a world of change in the way we look at vehicle lifecycles. 75 years after independence, India is about to mature as an auto market, looking forward to new technologies, greener fuels and safer vehicles, while putting the old, aged, polluting vehicles to sleep….**

Goodbye and Come Back Soon

You are now leaving
Our Town
FEA Not To Miss

Please come back
Real estate available

Our Town wishes all our readers, contributors, and their families a special holiday. Remember all those not able to be with you for this holiday. Love never dies, nor does memories.

QUIZ Credit - Correct Answers A-C
you are served Holiday cookies - all kinds!
Correct Answer D you are served MORE cookies!!!

A- 10C   Thunderbolt II
B - B-1   Lancer
C - F-16 Fighting Falcon
D - Our Ranch Owl

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