FEA Not To Miss Software & Engineering Solutions
News, Gossip & Blog

DYNAmore Nordic
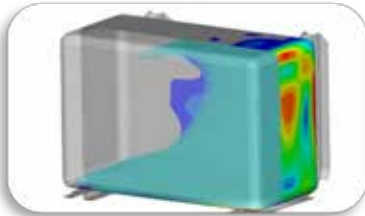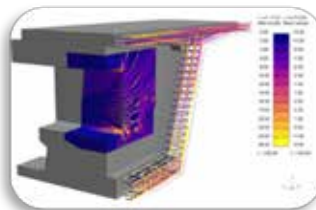

Altair
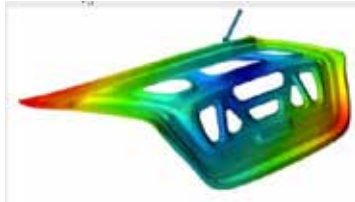
OZEN

Rescale

Oasys

Siemens

MSC.Software

Autodesk
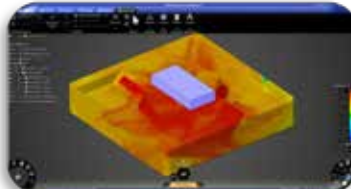

Cadfem

ESI-Group
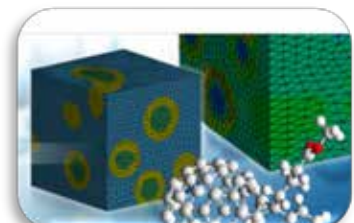

ANSYS

Siemens

HAL

Humanetics

JSOL

FEA Not To Miss Profile

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   Anthony, Art, Marnie, Marsha, Yanhua
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Announcements

The respective website for the article will have the larger graphics, with full resolution.

Among February Articles - Not To Miss

_____

February Choice Video - YouTube

Tata Harrier | Weld Shop Tour

In this exclusive video, Mohan Savarkar, VP - Product Line Head, PVBU, Tata Motors explains the key aspects of building the Harrier SUV, based on the Omega Arc platform which has a few things common with the Land Rover D8 platform. Quite a few important and interesting engineering topics discussed with Hormazd Sorabjee, editor, Autocar India, during this plant tour.

For This Month

Company Links are on the article page for the month

ALTAIR

SCALE
IT-Solutions for CAE

BETA

LANCEMORE

CADFEM
MEDICAL

d3VIEW

MSC Software

DYNA
MORE

rescale

esi

SIEMENS
Ingenuity for life

Ansys

Ozen

Oasys

JSOL

HUMANETICS

AUTODESK

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

Oasys Software, Tutorials & Classes Not To Miss

Among the training courses scheduled - View the complete on line courses, tutorials on our training page. Below are all online

Introduction to Oasys PRIMER Feb 09 - 3 days	Introduction to Oasys POST Feb 22 - 3 days	ICFD: an introduction) Feb 25 - 2 days
Introduction to LS-DYNA March 02 - 5 days	Introduction to LS-OPT Apr 20 - 3 days	

Not To Miss on YouTube

Top Tip: Oasys PRIMER tools to replace parts — 15:15

Oasys REPORTER: An Overview — 30:18

Oasys PRIMER - Mesh modifications tools — 50:42

Top Tip: adding background images and watermarks in... — 6:45

Top Tip: Oasys PRIMER shortcut keys — 14:45
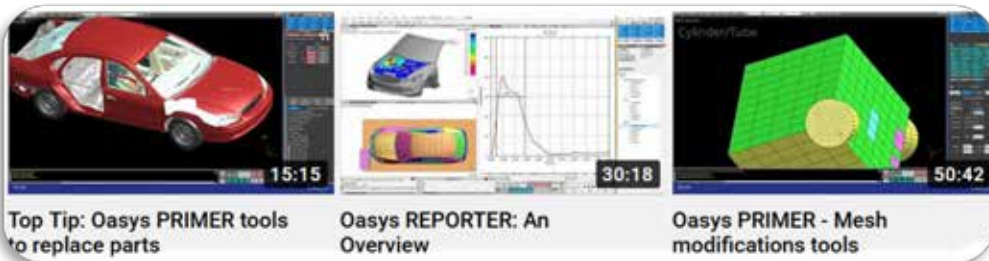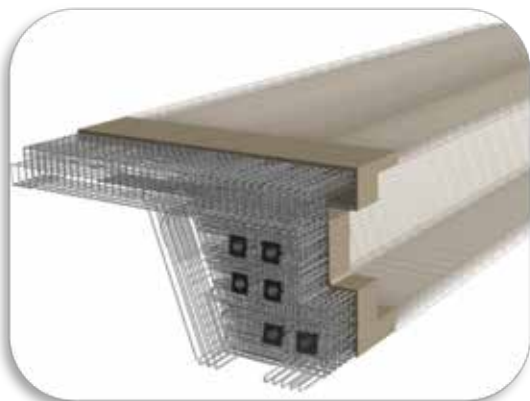
Experience in-depth 3D visualisation of LS-DYNA results with powerful multi-model post-processing tools.

- Oasys D3PLOT provides animation, extraction and derivation of over 100 data components, with advanced graphics (including shading, contouring, lighting and transparency).
- Support for multiple models as well as an Oasys T/HIS link window results in unrivalled ease of in-depth analysis, investigation and comparison of many simulations.

Main Features

- In-depth access to LS-DYNA results, including over 100 different data components.
- Fast, high-quality graphics.
- Function keys can be programmed to execute command files.
- Cut-sections can be easily created and dragged using the mouse.
- Results data is plottable by contour, principal stress (stress flow), velocity vector, ISO surface and node cloud.
- Relative value plots available, i.e. deformation relative to axes fixed in the model or change from a given time state.
- JPEG, BMP, GIF, PDF, Postscript, AVI and MPEG output.
- Multiple windows allow viewing results from a range of different models simultaneously.
- Links with Oasys T/HIS for synchronised viewing of XY and graphical data.

Additional Capabilities

- Plotting of user-defined data from an external file, formula or script.
- Quick-pick menu for on-screen manipulation of entity display characteristics.
- Setting files allow predefined views, colour schemes, and layouts to be created and stored.
- Output keyword data (nodal positions, element stresses etc) for use in other models.
- Compare results with test images or movies using the Background Image/Movie function.
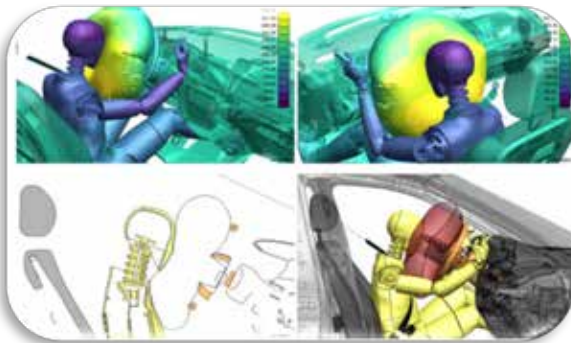
Multiple Models

Use split screen windows to view the results from a range of different models simultaneously. You can also overlay the results of multiple models in the same window.
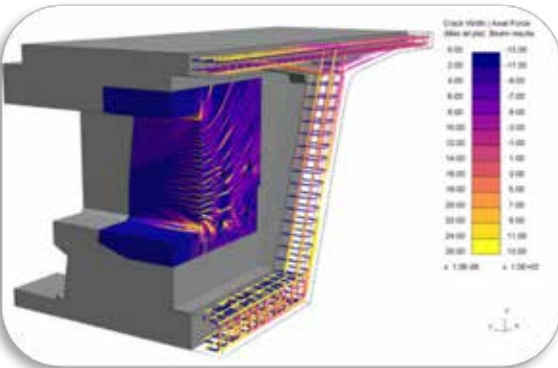
Multiple Data Components

Improve your comprehension of results by plotting multiple data components.
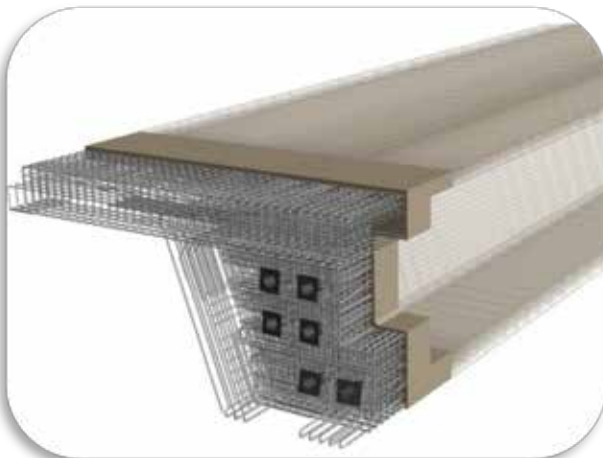
Selective Cut Sections

Selective cut sections are based on element types and parts, allowing for visulation of structures within other structures.

Additional information

Author: Christian Frech christian.frech@dynamore.de

Save the date!

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

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

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

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

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

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

Abstract submission

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

Important Dates

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

Participant fees

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

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

Exhibiting and sponsoring

Please request further information.

Contact

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Industriestr. 2, D-70565 Stuttgart, Germany
Tel. +49 (0) 7 11 - 45 96 00 - 0
E-Mail:conference@dynamore.de
www.dynamore.de/en/conf2021

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

MARCH 02, 2021 Webinar - No Fee

Webinar simulation data management and process automation with scale.sdm

Agenda -   Time   Presentation

2:00 - 2:30 pm   Introduction and presentation of the new product generation SCALE.sdm
2:30 – 3:15 pm   Administration and version management of simulation models with LoCo
3:15 – 4:00 pm   Result evaluation simulation/test
                    Reporting and requirements analysis with CAViT and Status.E

Invitation - The central task of an SDM system is the administration and version management of simulation models including all associated modules and processes. Many different evaluation scenarios are to be initiated automatically and transmitted to existing computing resources.

Furthermore, an efficient analysis and evaluation of the result data is of great importance. Combined with automated report generation, simulation results should be reported in a targeted, standardised and time-saving manner.

Very important requirements for an SDM system are consistency and transparency within the entire CAE process chain from CAD data to result evaluation. In addition, a SDM system must support collaborative work. This includes targeted authorisation management and the avoidance of conflicts or data inconsistencies when many users have access.

In this webinar, the above-mentioned aspects of process automation and simulation data management will be examined. Using the SCALE.sdm system, approaches to solutions will be presented and discussed.

 SCALE.sdm is an integrative software solution for continuous simulation data and process management. The modules Status.E (SCALE.project), LoCo (SCALE.model) and CAViT (SCALE.result) combined form a powerful system solution for virtual product development.
We hope to have aroused your interest and look forward to your participation.
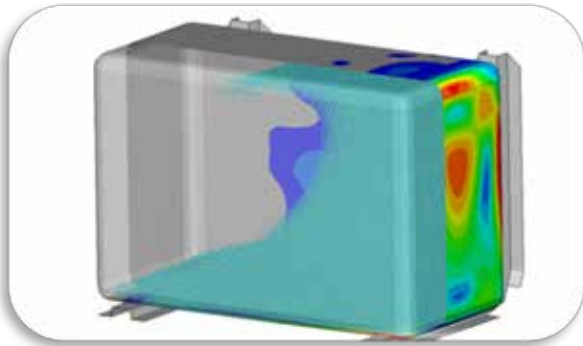
[Sloshing analysis of a fuel tank](#)

Case study: Using Multiphysics to simplify boundary conditions for a range of different simulation cases

Excerpt - Complex boundary conditions made intuitive

When dealing with complex systems it can be a challenge to create appropriate boundary conditions and loads. We demonstrate this here by looking at the calculation of stresses and deformations of a fuel tank containing sloshing fuel. Creating boundary conditions and pressure loads on the tank that accurately represents the sloshing fuel can easily become a project within itself. To further add to the complexity, a product often undergoes several different evaluations within the organization that all need specific boundary conditions and loads, making the array of simulation models required large and complex.

A more straightforward way to capture complex boundary conditions, such as fluid sloshing, is to use the wide range of multiphysics capabilities within LS-DYNA.

In the case presented here, you can learn how adding and solving more advanced physics can make the work more intuitive, reduce complexity, and save time within the organization.

Marcus Redhe
Managing Director at DYNAmore Nordic AB

"Did you know that there are new features made available for the modeling of 2D-belts using the keyword *MAT_SEATBELT_2D?"
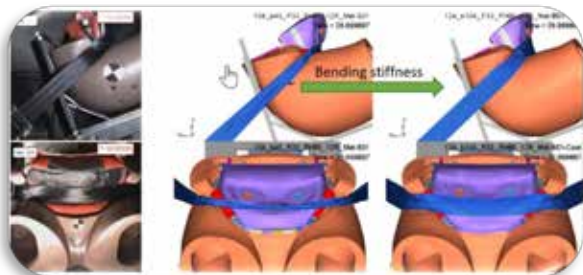
"By adding isotropic bending stiffness, orthotropic membrane behavior, and strain rate deendency a more realistic behavior of the belt can be achieved. Currently available LS-DYNA R12.0."

Published Paper - Belt Modelling in LS-DYNA®

Lifetime evaluation of transport hangers with Ansys Mechanical

[Service life assessment of transport hangers with Ansys Mechanical](#)

Simulation projects that inspire! Service life evaluation of transport hangers with Ansys Mechanical. Moll Automatisierung GmbH develops high-quality products for the automotive industry in the field of conveyor and automation technology.

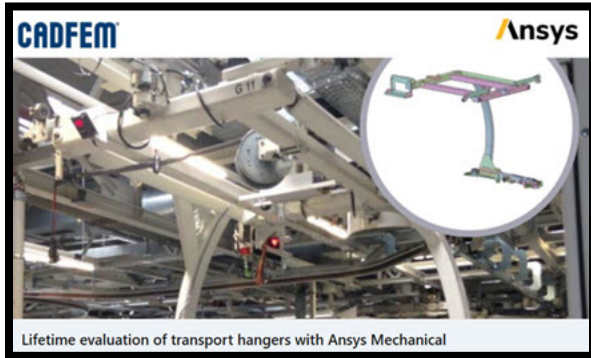Transport hangers are exposed to heavy loads. To be able to withstand these for a longer period of time. CADFEM was commissioned to simulate the loads on the hangers with Ansys Mechanical and to make suggestions for the optimization of the product lifetime.

Simulation on behalf of MOLL Automatisierung GmbH

Branch : Machinery and plant engineering   Specialist field: Structural mechanics

MOLL Automatisierung GmbH develops high-quality products for the automotive industry in the field of conveyor and automation technology. CADFEM was commissioned to simulate the loads on the hangers with Ansys Mechanical and to make suggestions for the optimization of the product lifetime.

SUMMARY

Task	Solution	Customer benefits
A service life assessment was carried out to ensure that the hangers can withstand the repetitive loads. In this context, CADFEM was commissioned to identify possible weak points of the transport hangers and to carry out corresponding service life assessments using numerical simulations.	CADFEM carried out structural mechanical simulations with Ansys Mechanical. In particular, the use of different materials, the notches caused by the design as well as the screwed and welded connections were taken into account.	Components of the transport hanger that are subject to particularly heavy loads were identified at an early stage and modified even before the practical test. The number of tests was reduced and the required service life could be proven accordingly.

CADFEM training: Live online courses and self-paced eLearning:

Attend all CADFEM courses without travelling - even in your home office. You can perform all software exercises in your web browser with guidance of our trainers. Beneath that, a rising number of trainings is offered as self-paced eLearning courses.

Simulation of Industrial Mixing Processes

Rheology of mixing and stirring processes

"stirred, not shaken" - Industrial Mixing Process Simulation. Learn the basics of industrial mixer design and how to evaluate and improve mixing processes with Ansys Fluent. The seminar will be held in English by specialist Dr.-Ing. Luciana Rudolph on April 21 as a live online training - save the date!

Live digital seminars - your instructor is at your side

With the CADFEM online seminars we bring all other attendance seminars into a digital live format. You dial into the online seminar at the fixed date where a speaker will guide you live through the seminar. Exercises can be performed easily in the browser through the included seminar cloud. By sharing screen contents, the speaker will be able to answer your questions as thoroughly as they usually would.
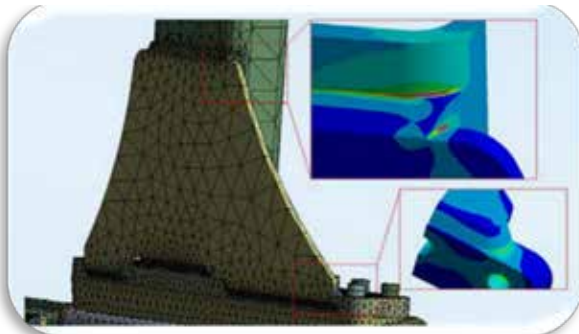
Project Details

Simulation display of the total deformation of the hanger
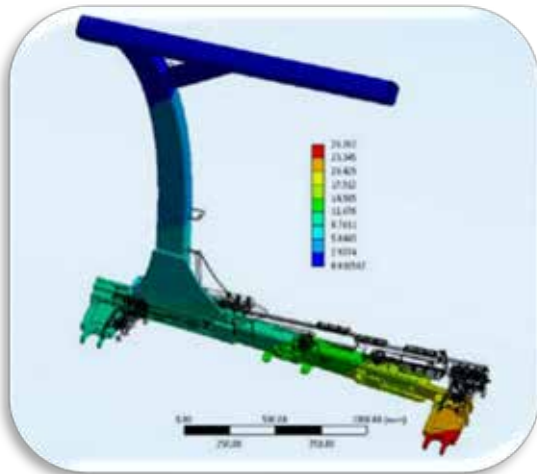
Task - MOLL Automatisierung GmbH develops high-quality products for the automotive industry in the field of conveyor and automation technology. This also includes hangers for the transport of car bodies through the production process. Due to the large number of different car bodies, the transport hangers, which are subject to high loads, are adjusted according to the current requirements. A service life assessment should be carried out to ensure that the hangers can withstand the stresses that often occur repeatedly. In this context, CADFEM was commissioned to identify possible weak points of the transport hangers and to carry out corresponding service life assessments using numerical simulations.

The detailed illustrations show the stresses on the modelled welds

Solution - Structural mechanical simulations were carried out with Ansys Mechanical for the transport hanger shown in Figure 1. The following aspects were especially considered:
- the use of different materials,
- the notches caused by the design and
- the screwed and welded joints.

Depending on the substructure, different sets of rules were used for the service life assessment. The evaluation of the bolted connections was carried out according to VDI Guideline 2230 and the FKM Guideline was used for the verification of the welded connections. Structural stresses and local stresses were obtained from the simulation as input variables for the service life assessment.

Customer Benefit - The simulations carried out by CADFEM enabled the particularly heavily stressed components of the transport hanger to be identified at an early stage and modified to suit the load before the first practical test. Thus:
- the number of time-consuming and costly tests could be significantly reduced and
- the required service life can be successfully demonstrated, so that the planned use in automotive production with the corresponding proofs was carried out in due time.

CADFEM Medical

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

RESEARCH
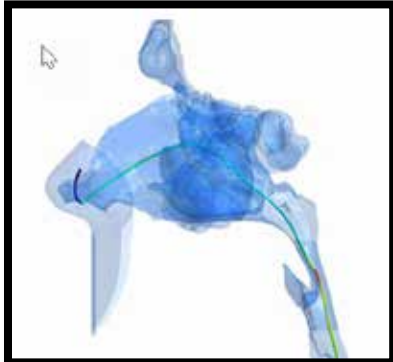
Obstructive sleep apnea (OSA)

Objective: Identification of a suitable therapy for severe snoring

The obstructive sleep apnea, colloquially referred to as strong snoring, can lead to serious health impairments. The causes are manifold. Efficient flow simulations of the respiratory tract can help sleep laboratories to locate the causes in order to derive suitable therapeutic measures.

Partners: University of Wuppertal, Klinikum Dortmund gGmbH
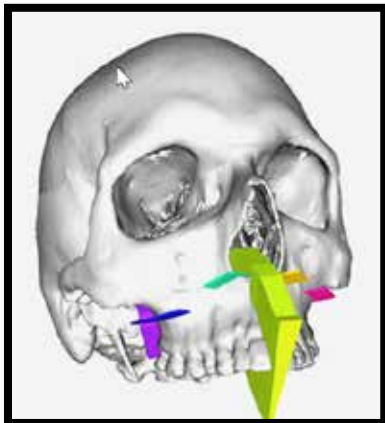
Palatal expansion (GNE) - Objective: Improvement of symmetry through optimization of the cutting guide

A risk with forced palatal enlargement is that the face is asymmetrically widened by the distractor. A simulation-based optimization can specifically optimize the surgical incision in order to reduce the risk of an asymmetrical opening. Medical technology manufacturers of distractors can use this procedure to enhance their product with an additional service.

Partners: Clinic for Oral and Maxillofacial Surgery, Klinikum Dortmund gGmbH

Abdominal Aortic Aneurysms (AAA) - Objective: Predictive assessment and classification of abdominal aortic aneurysms with regards to the patient-specific rupture risk

The rupture of abdominal aortic aneurysms is one of the most common causes of death. Simulation can help to improve the assessment of the risk of rupture and thus provide the physician with additional information for therapy planning.

Partners: Partner: Prof. Dr.-Ing. Michael W. Gee, Faculty of Mechanical Engineering, Technische Universität München

High Performance Computing - Submit, Monitor and Visualize Jobs
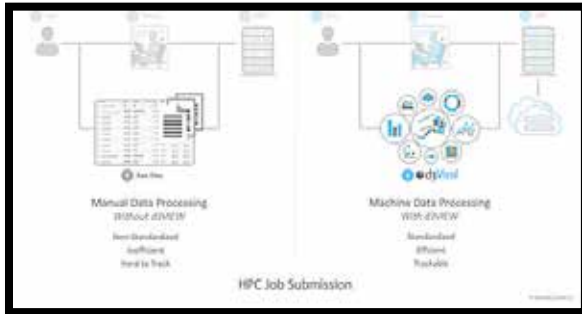
HPC Job Submission
- · With high performance comes more aptitude to keep the system running smoothly.
- · d3VIEW eliminates the tumult of managing and sustaining your HPC system by efficiently standardizing and tracking computation.

HPC Integration
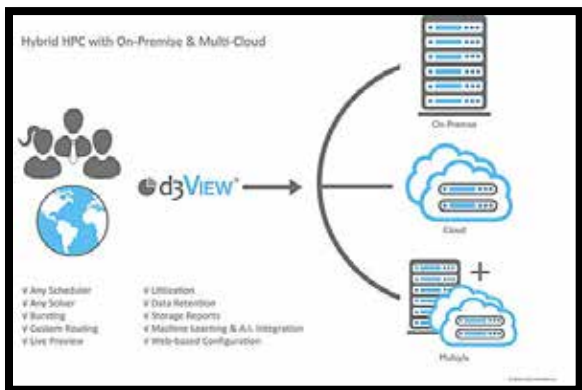- · HPC resource utilization is made easy with web-based configuration and customization.
- · Submit simulations using on-premise cloud resource or burst based on on-premise availability. Integrate any CAE solver with support for all solver options.
- · We work with an array of cluster management software to make HPC integration seamless.

Simulation Submission - Our job submission setup makes configuring jobs simple and smooth.
- · Maximize Your HPC Productivity
- · With the importance of data-driven decisions, expediting these processes derives better business solutions.
- · Let us take the reins in managing your HPC so you can focus more energy on decision-making instead of data-processing.

- · Save time by submitting multiple simulations simultaneously.
- · Examine your simulation visually in real-time while it is queued to or being processed by the HPC.
- · Explore an extensive summary and visualization of your servers, how they are being used, which users are using them and much more.
- · Use the moving time frame to examine usage in more detail.
- · Review Cores allocated, Elapsed time (hours), Wait time (hours) and Core Hours for every week
·

Curt Chan ·
Engineer | Technologist | Marketer

Qualup Meets High-Temperature 3D Printing Challenges with Simulation

Qualup SAS has been at the forefront of fused filament fabrication (FFF) 3D printer design and manufacturing since 2011. The small French company specializes in creating 3D printers with heated chambers, which differentiates its products from many hobbyist 3D printers. Heated chambers allow the company's 3D printers to work with more technical materials than PLA (polylactic acid), the most common FFF material, and branch out into markets like aerospace that require more technical materials.

The Qualup SAS team has almost 40 years of experience designing specialized machines and working with computer-aided design and manufacturing software. Still, creating a 3D printer that could work with PEEK (polyetheretherketone) was a worthy challenge because the material requires a 270 C (518 F) heated chamber to print and cool properly, according to Philippe Boichut, owner of Qualup SAS. Where there's heat, there are thermal challenges.

PEEK Inside the High-Temperature 3D Printing Process

PEEK is prized for its mechanical and thermal properties, as well as its chemical resistance. It is one of the highest performing thermoplastics available. PEEK is used in demanding applications in aerospace, automotive, oil and gas, medical and other industries. However, like many materials, it can warp if allowed to cool too quickly as the filament is melted, extruded and layered into a part during the 3D printing process.

The Qualup Qu3 high-temperature 3D printer

It's not just the effects of temperature on the printing material that are critical. Those high temperatures could also take a toll on the 3D printer.

"Since a printing cycle can last several tens of hours, these printers must be able to withstand very high temperatures for long periods of time," Boichut says. "The components used in the printer must be able to resist extreme temperatures or be cooled."
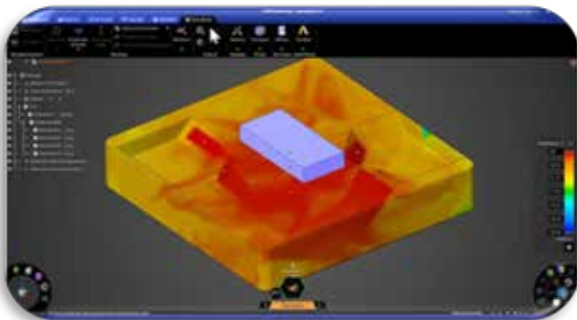

Cooling components and ventilating the chamber is a balancing act because the temperature inside the printing chamber must be maintained as constantly as possible to ensure a high-quality build. This can create a thermal conundrum when designing a 3D printer that relies on mechanical and electronic components.

Thermal simulation of internal ventilation chamber

Qualup meets those challenges with the help of Ansys SpaceClaim and Ansys Discovery. SpaceClaim is used for the complete design of 3D printers and Discovery is used to quickly evaluate the influences of design variations on the print chamber, as well as the influence of the design on the cooling of certain components.

For example, the Qualup Qu3 HT 3D printer has a heated print chamber that can be adjusted from 30 C to 275 C (86 F to 527 F), allowing it to print high-temperature materials such as PEEK, PEKK (polyetherketoneketone) and PEI (polyether imide), as well as more conventional filaments. It features a high-definition camera and a 21-inch screen for monitoring print runs. A high-resolution infrared thermal imaging camera is available as an option for precise temperature control.
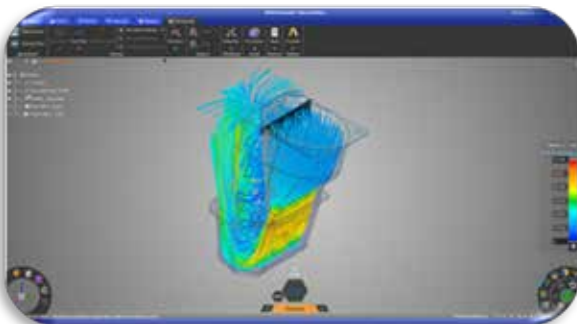
"The cooling of some critical components, such as the IR thermal camera, has been validated on Ansys Discovery," says Boichut. "A design error in the cooling of this camera was highlighted in 15 minutes. Ansys Discovery gives us the incredible possibility to modify the modeling live and to visualize the effects instantly, a perfect tool for designers."

Simulation of ventilation in the ventilated well of the thermal camera

Flexible, Agile and Accurate Design and Simulation - From the beginning, Qualup was able to quickly iterate on heating the high-temperature chamber of the Qu3 HT using SpaceClaim. The Qualup design engineering team created several iterations of different solutions in just a few hours.

"With Ansys SpaceClaim you are free," says Boichut, noting that his team isn't beholden to a demanding construction tree during the product design phase when using SpaceClaim. "We don't know how other companies design, but for us, we never succeed in designing the right part the first time. Ansys SpaceClaim allows us to change our minds and explore several designs."
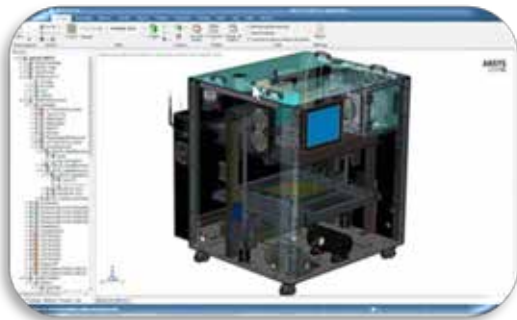
That ability to direct model without constraints is just as flexible whether Qualup is using SpaceClaim files or imported STEP files. Discovery leverages the SpaceClaim architecture, allowing Qualup design engineers to make modifications on the fly. This drastically reduces the time required to validate a design.

Full assembly of a 3D printer in SpaceClaim

For example, Ansys Discovery allowed Qualup to predefine the internal ventilation of the heated chamber in 10 minutes instead of spending weeks making and validating prototypes.

"I've been working with SpaceClaim for several years now. The first time I tried Ansys SpaceClaim, what struck me was the intelligence that has been put into this product – everything is simple, concise, easy – no need to spend hours of training to get the product up and running," says Boichut. "When Ansys Discovery Live was released, Ansys went even further by adding the ability to simulate physics directly in CAD files without hassle or any overcomplicated commands."

The heated chamber and ventilation solution designed with Discovery Live is still used in the latest version of Qualup's 3D printer.

"Without Ansys products, we would never have been able to design our new 3D printer in such a short time," Boichut says.

Excerpt - About the Author: Curt Chan is a lead product evangelist for the Ansys Discovery line of products. He works with students, startups and companies to ensure they get the most out of simulation-led design products. Prior to Ansys, Chan spent several years as a mechanical engineer in the defense and medical industries… Chan holds a bachelor's degree in mechanical engineering from San Diego State University
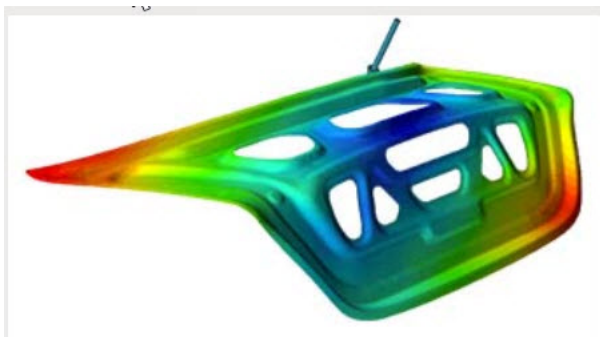
Manufacturing - Altair offers a unique set of simulation tools to evaluate product feasibility, optimize the manufacturing process, and run virtual try-outs for many traditional, subtractive, and additive manufacturing processes.

Users can validate designs early in the manufacturing process with the simplicity and affordability of the simulation software, as well as use optimization technology with specific manufacturing constraints to design better, more efficient products.

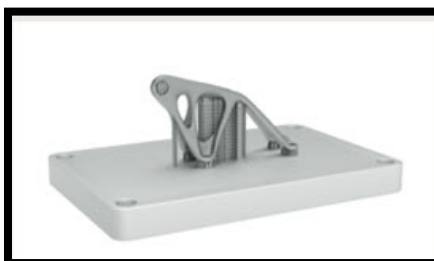For The Complet Manufacturing Products Visit URL Manufacturing
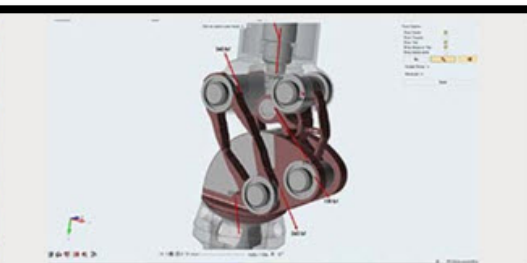
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Inspire Print 3C   **EDEM**   **Inspire Mold**
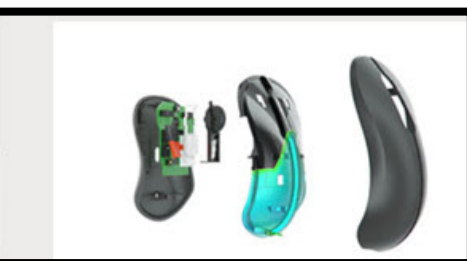
YouTube - LANCEMORE
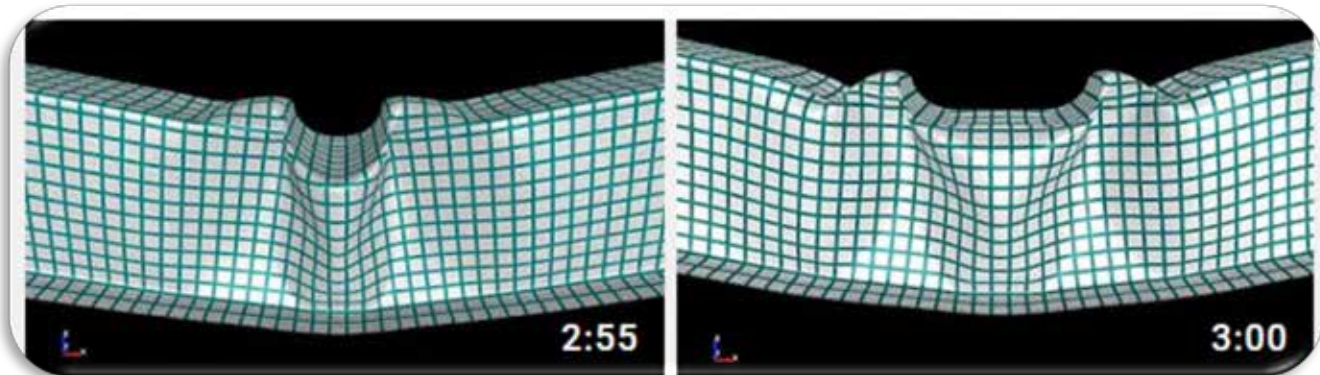
No.265 FE Analysis : Dynamic Three Point Bending Test Analysis of a Hat Channel
No 264 FE Analysis : Dynamic 3 Point Bending Test Analysis of a Hat Channel /

No.240 Finite Element Analysis of V Type Rubber...

No.238 Finite Element Analysis of V Type Rubber...

Finite Element Analysis No.125 Hyperelastic...

Finite Element Analysis No.124 Hyperelastic...

No.208 Visualization of the metal flow during the lateral...

No.505 Simulation of the Planetary Ball Mills with DEM

No.504 The in-plane uniaxial tensile deformation...

No.503 Tumbling Ball Mill Simulation using DES...

BETA CAE Systems announces the release of the v21.1.0 of its software suite

About this release - Consistently trying to minimize simulation turnaround time and accelerate the automatic setup for workflows and processes, BETA CAE Systems proudly presents the release of v21.1.0 of its software suite.

The brand new version offers a plethora of features to unlock new potential for simulation in design and analysis, as well as a range of upgrades and performance improvements for existing workflows.

Sculpting in Virtual Reality

Process shell models in Virtual Reality with the state-of-the-art Sculpting Tool.
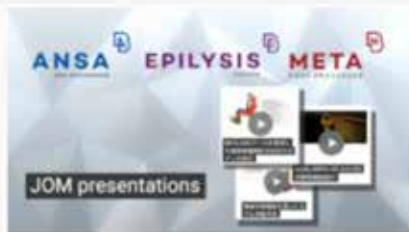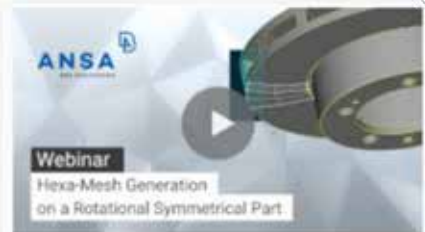

Sculpting in META Virtual Reality

2020 Japan Open Meeting presentations

Our presentations and demos, in Japanese.

Hexa-Mesh Generation on a Rotational Symmetrical Part

using the ANSA HexaBlock Tool

BETA CAE Systems YouTube Video Channel

LS-DYNA® integrates advanced finite element and meshfree methods for solving some of the most challenging multiscale problems in manufacturing processes, material design, and structural analysis. Such problems typically involve large deformation, material failure and separation, and/or crack propagation phenomena. The materials covered in these applications could be brittle (glass), semi-brittle (concrete), ductile (metal), rubber / plastics, and composites. These methods can also be coupled with thermal, fluid, and electro-magnetic solvers in LS-DYNA to perform multi-physics analysis as needed.

Methodologies
- Adaptive Finite Element Method (AFEM)
- Deep Material Network (DMN)
  - Ø Mechanistic Machine Learning (MML)
- Element Free Galerkin (EFG)
  - Ø Adaptive EFG (AEFG)
- eXtended Finite Element Method (XFEM)
- Meshfree Enriched FEM (MEFEM)
- Peridynamics (PERI)
- Representative Volume Element (RVE)
- Self-consistent Clustering Analysis (SCA)
- Smoothed Particle Galerkin (SPG)
  - Ø Immersed SPG (ImSPG)
  - Ø Incompressible SPG (ISPG)
  - Ø Momentum Consistent SPG (MCSPG)
- Smoothed Particle Hydrodynamics (SPH)
  - Ø Adaptive SPH (ASPH)
- Two-Scale Co-Simulation (TSCS)

Applications: non-failure
- Manufacturing: forging, extrusion, 3D printing, compression molding
  - Ø AFEM, AEFG, ImSPG
- Material design: unidirectional composites, particle reinforced polymer, polycrystalline
  - Ø RVE, SCA, DMN/MML

Group Website: https://www.lstc-cmmg.org
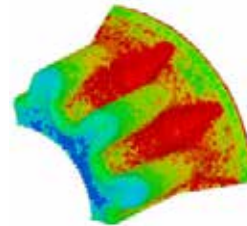
Gear forging
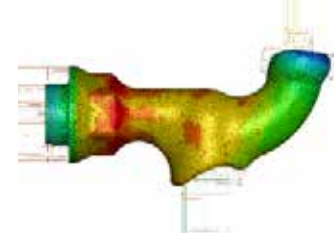
Extrusion of plastics
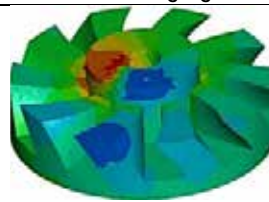
3D printing
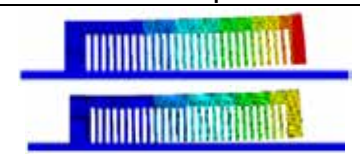
Distorsion prediction of 3D printed components
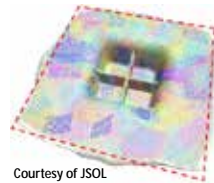
Courtesy of JSOL

Compression molding of FRP

Crack in double-notched coupon using SCA

MML + RVE package

25
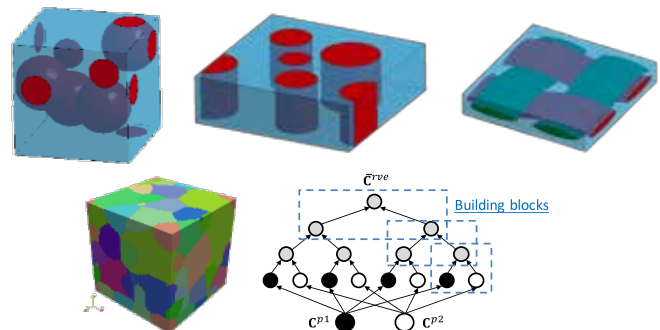
Applications: failure

- Crack propagation: brittle (glass, composite) and ductile (metal) materials
  - Ø PERI, XFEM
- Impact: bird strike, penetration
  - Ø SPH, SPG
- Machining process: blanking, cutting, drilling, grinding
  - Ø SPG, MCSPG, SPH
- Joining process: flow drill screwing (FDS), friction stir welding (FSW), self-piercing riveting (SPR), solder reflow
  - Ø SPG, MCSPG, ImSPG, ISPG, SPH
- Structural failure: crash tube, joint strength
  - Ø TSCS, SPG, MCSPG, ImSPG

Features

- Element formulations
  - Ø Solid: AFEM, EFG/AEFG, MEFEM, PERI, RVE, SPG
 - Ø Shell: EFG, XFEM
  - Ø Mixed: TSCS (solid-in-shell/solid)
  - Ø Discrete: SPH / ASPH
- Explicit and implicit solvers
  - Ø Both: AFEM, EFG/AEFG, RVE
  - Ø Explicit: PERI, SPG, SPH, TSCS, XFEM
- Multi-physics analysis
  - Ø Coupled thermomechanical, fluid structure interaction
- Applicability
  - Ø Small to extremely large deformations
  - Ø Low to very high strain rate loadings
- Material failure and separation
  - Ø Physics-based failure mechanism
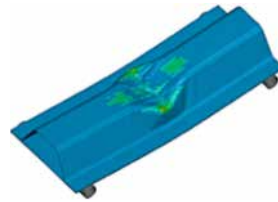
CFRP laminate failure
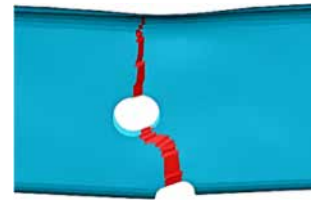
Ductile cracking in shell
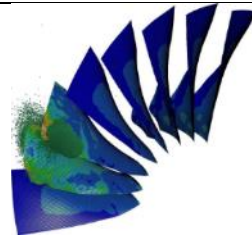
Bird strike
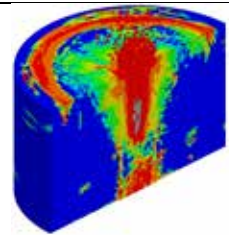
Penetration into concrete
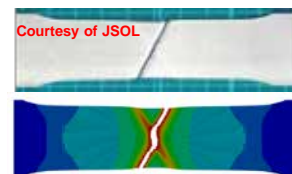
Shear band in uniaxial tension
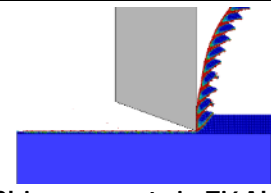
Chip segments in Ti6Al4V cutting
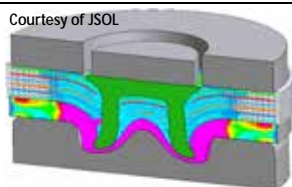
SPR: CFRP to steel
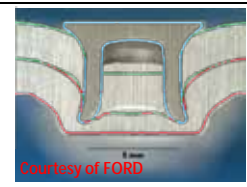
SPR: Al to Al
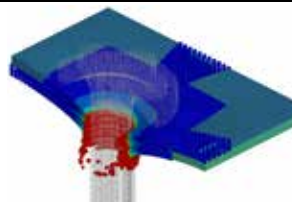
FDS joining steel plates
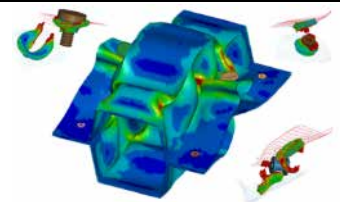
Crash tube
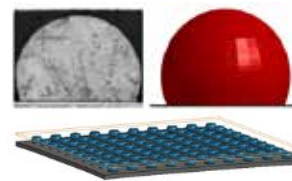
Solder reflow
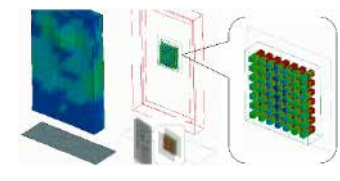
IC drop test

Platform Aerospace Prime Contract Award – NAVAIR NAWCAD, Vanilla UAS Digital Twin

The digital twin solution will be developed with the assistance of Ozen Engineering, Inc.

Hollywood, MD – Platform Aerospace announces the award of a Department of the Navy (DON) Small Business Innovation Research (SBIR) Phase I prime contract to develop Digital Twin Technologies to Improve Mission Readiness and Sustainment.

Digital twin solutions are virtual twins of a physical product, and can be used to refine engineering designs, assist in predictive maintenance, and mock-operate a product in a variety of operational environments prior to actual fielding. For this SBIR, digital twin techniques will be applied to Platform Aerospace's Vanilla Unmanned UAS, a world-record holding ultra-long flight endurance ISR UAS.

The digital twin solution will be developed with the assistance of Ozen Engineering, Inc., an ANSYS certified Elite Channel Partner. The digital twin solution will produce a physics-based digital replica of Vanilla's final drive assembly that mimics actual conditions in a test environment. This model in turn gives the Platform-Ozen team the ability to predict and measure actual wear and deformation from operations, as well as document any variations caused by new parts being added to the aircraft.

"The digital twin program places Vanilla on the cutting edge not only of long-endurance ISR UAS, but also predictive modeling. This technology will simultaneously accelerate Vanilla's fielding and provide valuable modeling lessons-learned to the Navy's air fleet writ large," says Platform Aerospace CEO, Kurt Parsons.

Following validation of the modeling techniques, the team intends to expand the number of modeled components and conditions thereby giving operators the ability to predict the impact of adding new equipment as well as operational changes, such as flying over a mountain range in extreme weather conditions. This technology will greatly enhance the long endurance capabilities of Vanilla UAS.
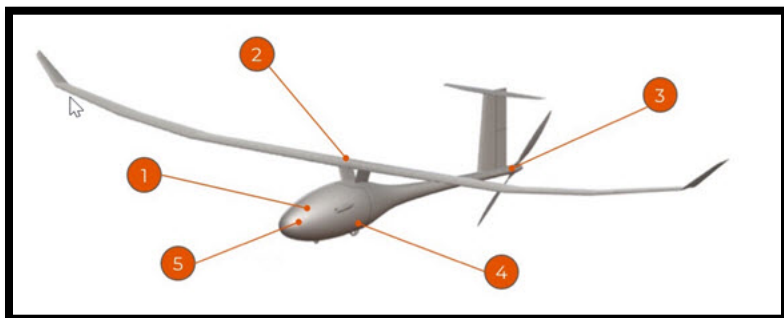
(1) Robust Avionics
(2) High-Performance Airframe
(3) Efficient & Reliable Propulsion
(4) Sailplane-Inspired Launch & Recovery
(5) Flexible Payload Provisions

If you're interested in hearing more or would like to tour our operation in Hollywood, MD, please contact Greg Pappianou (greg.pappianou@platformaero.com).

Vanilla Unmanned is owned and operated by Platform Aerospace - Platform Aerospace is a service-disabled veteran-owned small business (SDVOSB) dedicated to supporting the warfighter and its customers' success.   Platform is AS9100D and ISO 9001:2015 certified, and specializes in manufacturing, modification and prototyping, and engineering services on a rapid timeframe. Platform has demonstrated its ability to take complex systems from "the back of the napkin to flight" through hundreds of successful projects over the past 27 years for defense, civil government, and commercial customers.

COMFRC Public Release 2020-307. Distribution Statement A – Approved for public release; distribution is unlimited.

YouTube Videos

Turbomachinery - Axial Fan Design and CFD simulation…   1:10:43

Quick Introduction to Ansys Discovery GUI   12:11

Structural Analysis using Discovery 2020R2.5 (Part 1)   15:42

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A simulation approach for autonomous heavy equipment safety
By Gaetan Bouzard

Are you working for a heavy equipment manufacturer or supplier? Or, like me, do you have a job related to the heavy equipment industry?

If so, you might be as excited as I am by the release of the Monarch new jewel: the world's first fully autonomous electric tractor.

The Monarch tractor combines electrification, automation, machine learning, and data analysis to enhance farmer's operations, and increase labor productivity and safety. As Praveen Penmetsa, Monarch Tractor co-founder and CEO, summarized: "Monarch Tractor is ushering in the digital transformation of farming with unprecedented intelligence, technology, and safety features." In this context, a strong autonomous heavy equipment simulation platform is mandatory.

Figure: Monarch Tractor electric autonomous tractor

The rise of autonomous operations in the heavy equipment industry

The objective of this article is to give insights into how a simulation-driven approach can support the development of heavy equipment autonomous operation systems. An approach going from sensors design to control system verification and validation.

The heavy equipment customer's main objective is to increase their machine efficiency in the field by producing more with less while keeping a strict eye on operator safety. But with machines that become more and more specific, more and more complex, guaranteeing people safety and machine integrity also depends a lot on the operator's skills.

Partly or fully automated machine operation is a solution that most of the industry stakeholders are already investigating to increase safety and improve operability. Consequently, they can lead the digital revolution we face today.

With an increasing number of Advanced Driver Assistance Systems (ADAS) features to improve operator safety, such as remote-control driving/actuation or fully autonomous driving, the interactions between the operator and the vehicle are being reshaped. Nevertheless, working on heavy equipment autonomous operations means partially or fully replacing a skilled operator. These operators bring four main elements to their position: his/her senses, his/her brain, his/her experience, and the environment they interact with.

Therefore, in this article I will deliver some insights on the following key pillars to build a strong comprehensive digital framework to support autonomous heavy equipment development.

- · The role of simulation and of the digital twin
- · Natural environment simulation
- · Physical sensor modeling
- · Heavy equipment vehicle modeling
- · Automate and accelerate the verification workflow

The role of simulation and of the digital twin

Model-based systems engineering (MBSE) is an approach that fits perfectly with the development of autonomous vehicles – many companies have been using it for years. Today, we've entered a period of intense innovation, and manufacturers are under tremendous pressure to reduce program costs. We see more system autonomy to deliver new mission capabilities leading to more interactions between the thousands of systems, interfaces, and components on a single heavy machine.

When it comes to product design and performance engineering, the MBSE approach brings the so-called 'Digital Twin' of the product/vehicle as well as its environment. It allows engineers to virtually explore the autonomous vehicle designs, as well as accelerate advanced control verification and validation, which can be tough for vehicle durability and expensive if pursued using a classical physical testing approach. Even if you work with the state-of-the-art data acquisition solution dedicated to ADAS.

Autonomous heavy equipment natural environment simulation

When it comes to the natural environment modeling, the simulation solution should be open and flexible enough to allow the import of any type of:

- · off-road vehicle geometric models,
- · geometric terrain with a relevant drop, slopes, and obstacles like rocks, trees, pedestrians, other vehicles,
- · harsh conditions implied by the natural environment seasonality (rain, fog, dirt, day & night, sunset or sunrise, etc.)

This allows to perfectly match with conditions regularly encountered by heavy-equipment vehicles.

To create a good virtual digital twin of the field environment, Simcenter Prescan, the solution developed by Siemens Digital Industries Software (DISW), ensures objects have a good enough geometric description and material property description by considering what is important for each sensor modality: camera, LiDAR, radar.
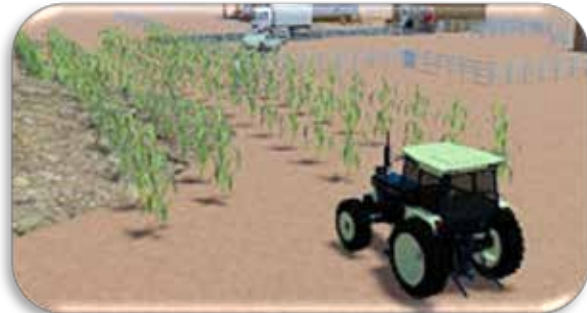
Figure: Examples of agricultural and construction environments, both including natural obstacles, crossing pedestrians, and moving machines.

Additionally, Siemens DISW teams have been working in the past years on the coupling between its environment and its system simulation software, as well as investing in improved ground modeling technology. The Simcenter Amesim AMETrack feature is an example. This feature allows the implementation of bumpy soil, with a certain penetration coefficient to consider the impact of the soil on autonomy sensor performance at vehicle low or high speed. The interactions between vehicle dynamics, traction on soft soil, and the powertrain are crucial.

See website - Video: Tractor vehicle dynamic model driving over random field.
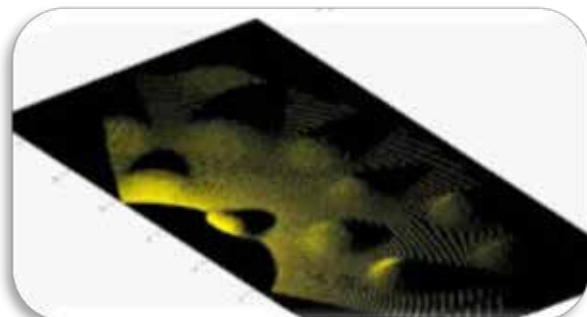
Figure: Excavator model evolving in a bumpy environment used for sensor perception algorithm verification and validation.

Any relevant obstacles associated with the scenarios of interest can be implemented as part of the environment. The objective is to analyze the sensor's detection and object recognition algorithm performances. Rocks, trees, buildings, crops, pedestrians, wildlife, infrastructures, etc. are elements that are relevant for our autonomous heavy equipment simulation environment, adding object motion when necessary.

To view video please visit the article on the website

Video: Camera detection of a pedestrian in cornfield and traffic management in farm within Simcenter Prescan. Co-simulation with Simcenter Amesim for tractor dynamics modeling during emergency braking activation.

Physical sensor modeling

When it comes to the replacement of the operator senses, one question summarizes the engineering challenges of implementing sensors like cameras, radars, LiDARs: How can you predict what the machine will or will not sense?

Consider that a physical sensor modeling solution is mandatory for a simulation platform dedicated to autonomous operations development. Indeed, optimization of the sensor design and their configuration can be done virtually to a large extent.

From basic ground truth sensors (that identify all objects that appear in the sensor range), through probabilistic sensor models (that allow for fault insertion and filtering), up to physics-based sensor models (for raw data simulation), we can support engineers with balancing accuracy and computational time of sensors simulations based on mission/scenario requirements, for an improved engineering workflow efficiency. To have a robust sensor simulation, it is important to take into consideration three key components

- The physical sensor device,
- The world,
- The simulation engine.

The simulation engine is what brings together the physical device and the world. It allows us to handle important effects based on real-life physical equations. For example, for the radar and the LiDAR simulation, an in-house ray-tracing framework accurately captures how light or a beam is propagated through a scene got developed in Simcenter Prescan. We believe that having a high accuracy simulation engine is important to ensure that developers, testers, integrators, and authorities can trust Siemens as a key partner.
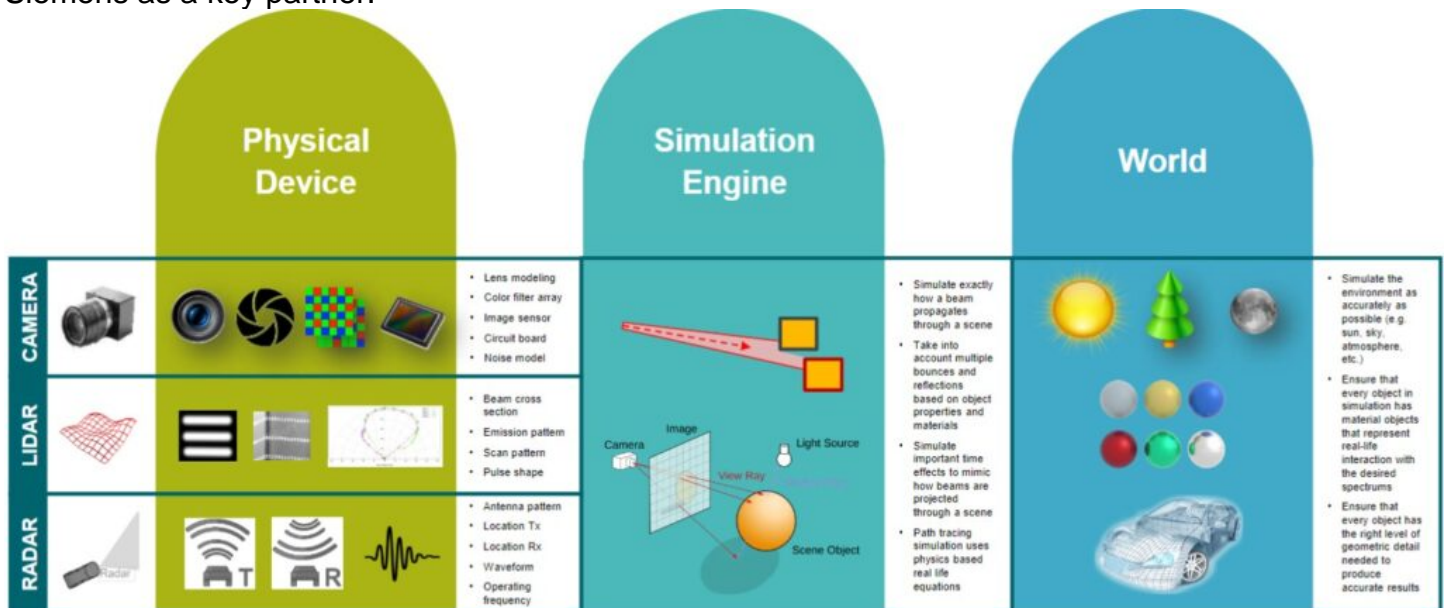
Figure: Summary of sensor modeling capabilities and principles

On top of the sensor modeling, engineering departments can use simulation to optimize the machine design itself for better sensor performances. For example, to prevent sensor soiling or too much electric/electromagnetic disturbance from a metallic bumper covered by mud or rain, both of which. impact heavy equipment vehicles daily and yet not considered enough in current solution portfolios.
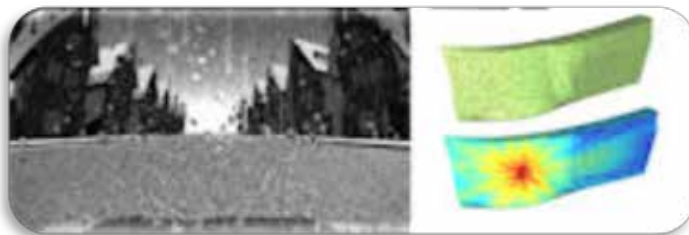
Figure: Analysis results on the effect of rain and mud drops on the camera lens and radar antenna gain

Heavy equipment vehicle modeling

A skilled operator has hours of machine operations background experience. In order to improve the performance of the autonomous operations of the vehicle, it is mandatory to include accurate dynamics within the control virtual training, verification, and validation process. From soil and tire model to the vehicle dynamics, the more physics you implement the more robust your control will be, improving operability and safety.

The automation of the machine positively impacts other attributes. Indeed, it enables to better control the energy distribution, or yet powertrain actuation resulting in improved powertrain durability, keeping the machine within the safety zone of loads.

Simcenter simulation platforms, like Simcenter Amesim system simulation software and Simcenter 3D Motion, propose a large heavy equipment vehicle modeling capability: from construction equipment, transportation, agriculture, to military intervention autonomous robots, including the relevant vehicle and powertrain dynamics for each application. Simcenter Amesim, for example, can connect to the natural environment model using smart co-simulation FMI/FMU technology as has been shown in the previous video of the autonomous tractor in the cornfield. Engineers can thus consider the realistic vehicle dynamics impact on sensor and algorithm performances along the development workflow.
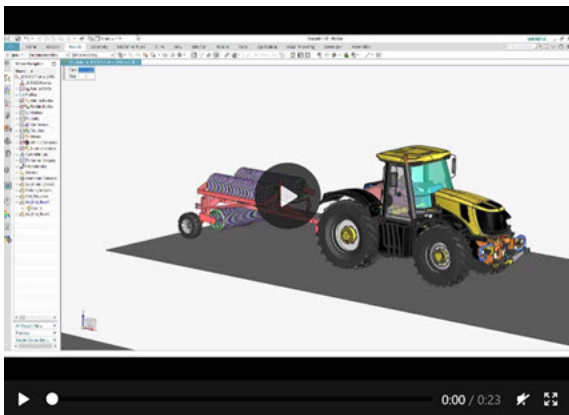
To view video please visit the website article

Video: Autonomous tractor driving on road with obstacle leading to accessory actuation to avoid accessory load failure.

The machine type does not limit itself to the ground vehicles. Siemens DISW also proposes the integration of autonomous drones, including flight dynamics. That capability is usually used for terrain recognition, crop identification, and supporting to autonomous vehicle decision strategy.
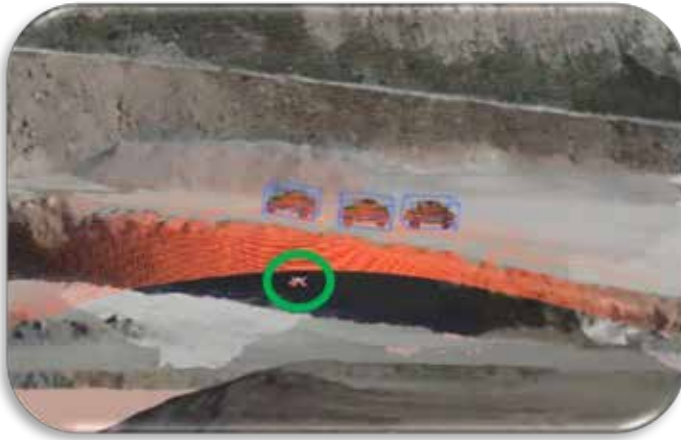
Figure: Recognition drone with embedded FHD 50Hz RGB Camera as a support of Humvees platooning in harsh environment.

Automate and accelerate the verification workflow

A key element leading to a significant reduction of the cost of autonomous heavy equipment simulation is the automation of the algorithm verification and validation workflow. Indeed, automating the validation of algorithms performance under various weather or lighting conditions, or simply making sure that the workflow covers all possible scenarios, allows an improved coverage of your perception algorithm validation, not talking about development time and cost-saving associated with this automation.
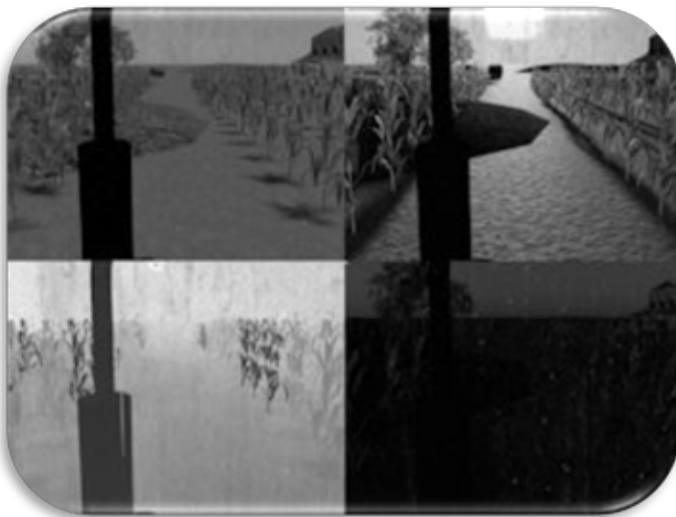
Figure: Camera detection of pedestrian in cornfield, natural conditions sensitivity study. Top left: nominal conditions. Top right: sunset reflection. Bottom left: dirt on camera. Bottom right: night conditions.

Sensor and vehicle configuration, sensor mounting, and vehicle design exploration can also be automated. In the example to the left, Simcenter HEED, Siemens DISW design space exploration, and optimization software package allow this performance verification automation.

The objective is the deployment of the virtual verification framework of ADAS and autonomous vehicle systems, allowing easy scenario generation, efficient critical case identification, and systematic virtual verification of requirements. In other words, automate and accelerate the scenario set-up, the interaction between the different simulations, and the post-processing of relevant metrics, for a quick and efficient Key Performance Indicators (KPIs) analysis.

Conclusion

To conclude, I would like to pass along the message that Siemens DISW with its comprehensive Xcelerator portfolio of software, services, and applications can support the development of your autonomous machine and its operations, and can also virtually provide you with a simulation platform to validate your machine performances.

The Simcenter simulation platform allows the development of models from the environment, to the sensor or yet machine dynamics as support of advanced control algorithm.

Join me during iVT Virtual Event, on February 9, which includes a presentation track dedicated to "Technologies and strategies advancing autonomous solutions".

About: Gaétan is heavy equipment industry lead at Siemens Digital Industries Software. He is responsible for capturing Siemens customers' needs to feed solution portfolio strategy and drive selected integrated solution prototyping as well as innovation initiatives, to ensure Siemens simulation and test solutions answer today the engineering challenges of tomorrow. Gaétan has a master's degree in mechanical physics. He began his journey within Siemens 10 years ago delivering simulation projects to the company's customers globally, as part of the Siemens Engineering Services Group. He switched to a business development role followed by a marketing manager role, supporting the growth of Siemens solutions for vehicle electrification and energy management.
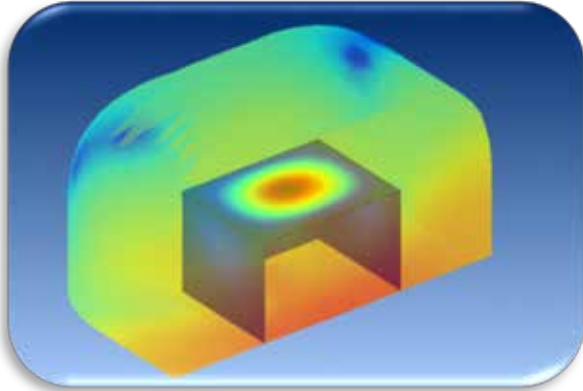
Acoustic design of enclosures to minimize noise

Bangalore-based B.M.S. College of Engineering (BMSCE) is an autonomous engineering college affiliated with the Visvesvaraya Technological University. It has the distinction of being India's first private engineering college and is known as a quality educational institution.

As part of their curriculum, final year engineering students of the College are expected to undertake a project that solves a specific real-life/industry challenge. One group of final year chemical engineering students from the College decided to use this opportunity to address the issue of equipment noise in the chemical engineering department laboratories on campus. The chemical engineering laboratories have several noisy machines and equipment. The noise levels force certain restrictions in terms of the time of day during which the machines can be used for experiments, so as to minimize disturbance to other students.

The group decided to focus on solving the acoustics problem associated with the enclosures that housed these noisy machines, as part of their final year project. Initially, the students planned to physically create acoustic boards using different materials, test them through experimentation, and then follow this up with simulation.

However, there were several challenges to this approach. First, there were issues such as non-availability of certain components such as impedance tubes, due to the pandemic-induced lockdown. Second, the organizations that possessed the physical testing capability for these materials had certain confidentiality clauses and restrictions around data sharing. Given these circumstances, the team decided to go ahead with a simulation-only set-up to solve the problem at hand. Simulating for different eco-friendly materials and enclosure dimensions.

Using Actran Student Edition, the team conducted simulations with three different materials, and two different enclosure dimensions, to identify the best material as well as the optimum enclosure size to minimize noise. They considered three materials made out of natural waste materials – corn cobs, corn stovers, and banana stalks. The students studied the sound pressure level at a distance of one meter, along with sound pressure and enclosure deformation contours for the different iterations. The team found that the larger enclosure had a better performance up to 65 Hz, and beyond this frequency, the smaller enclosure was better. Changing material properties too had an effect, especially for the frequency range of 40 Hz – 75 Hz for the smaller enclosure and 30 Hz – 65 Hz for the larger enclosure. The results showed that banana stalks had better sound absorption potential followed by corn cobs and corn stovers at frequencies in the range 40 Hz – 70 Hz. Ease of use and in-built material properties.
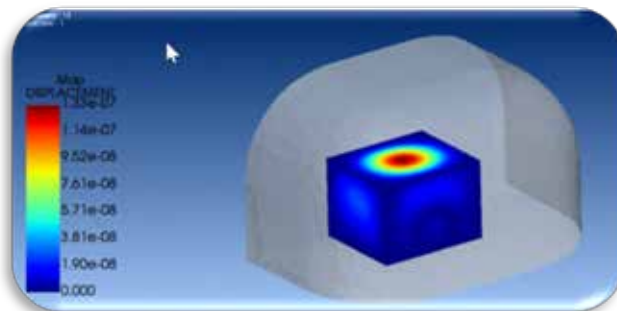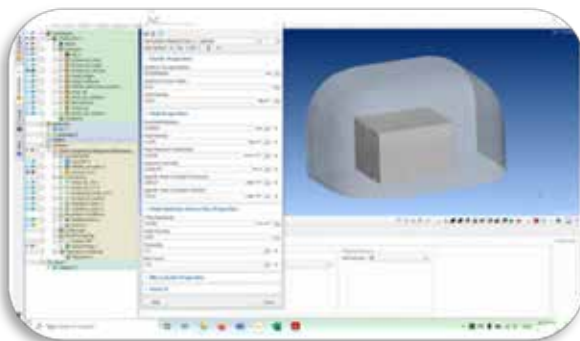
The various in-built features allowed the students to set values for parameters such as thickness of the board/equipment, the inner and outer air volume, and porous materials properties. Using Actran, the students could achieve desired results, plot graphs with in-built plotters, and iterate with material properties through various options to get detailed insight into the enclosure performance. Given the ease of use and quick results, the students were able to get the desired results in a timely manner. Despite the lockdown, the students could get the results using just their laptops, without the need for any high-end physical infrastructure. The students were also able to publish the results of their study through a paper in the Global Journal of Material Science and Engineering, also winning a prize for Best Presentation.

[5 Common Sheet Metal Forming Processes and Applications](#)
by Emily Engle

There's no denying that sheet metal plays a pivotal role in projects across numerous industries. Sheet metal is commonly fashioned from steel or aluminum and typically takes a thin and flat form. Despite this, sheet metal alterations are commonplace — and essential — depending on the application in question. This is where the forming of sheet metal parts comes into play.

Sheet metal is widely used due to its formability, ductility, and tensile nature. Manufacturers thus have a central goal: manipulating malleable metals accordingly while preserving structural integrity. Manipulation is achieved in multiple ways and to multiple tolerances. This article will break down some sheet metal forming processes and their relevance within specific industries.
Bending Sheet Metal

As one might expect, bending involves altering sheet metal's shape through applied pressure. Doing this by hand isn't typically possible, and thus industrial methods become necessary to reach the desired shapes. Manufacturers employ different types of presses to achieve this, such as high strength roll forming machines. They must also have intimate knowledge of their medium's physical properties to avoid causing damage or excessive deflection during the machining process.

Press brakes and machine presses are ideal in these situations. Hydraulic, pneumatic, mechanical, or electrical forces may be applied to different locations along with the sheet. These, paired with a forming die, help the metal reach its intended form. The metal on-hand will determine how much force is applied, as well as its direction.

Press brakes are convenient since punch and die combinations are plentiful. These lend themselves to numerous types of jobs.

Applications

Sheet metal bending is indispensable for automotive production. Today's vehicles aren't just boxes with four wheels, and panel corners have a certain radius, which helps create visual consistency. In the case of supportive pillars, sheet-metal bending forms a bridge between aesthetics and occupant safety.

In terms of architecture, a key focus of modern building construction is flow. Gentle curves and geometric structures — both internally and externally — are hallmarks of parametric design.

Any application requiring a unique shape will rely on bending processes. Another notable example is the aerospace industry. Manufacturers commonly fashion passenger-and-military aircraft from aluminum alloy and titanium alloy. These metallic compounds are highly flexible and retain their shapes (aka "have memory"). Such attributes are essential for curved structures like fuselages, wings, and engine mounts.

Curling Sheet Metal

Not to be confused with bending, curling focuses on fixing imperfections stemming from a sheet's production. Sheet metal is cut to various predetermined dimensions during the manufacturing process. While tooling can effectively create precise (straight) edges, there's a significant drawback: burrs. Just like cutting wood sharply produces rough edges, the same happens to steel and aluminum.

Burrs aren't just a safety risk — these sharp edges cause tolerance issues that can potentially hamper fitment and product quality later on. Additionally, a type of residue called "slag" forms during specific cutting processes. These splatters of cooled metal must be removed. Special deburring machines do this, while grinders smoothen out any hazardous artifacts.

Applications

Curling has widespread importance across multiple industries. Consider modern architectural design, where panels must meet cleanly and seamlessly. The same goes for automotive applications — particularly bodywork like doors and quarter panels. These aren't only common touchpoints for owners or passersby. Finished edges elevate one's overall impression of quality, craftsmanship, and harmony within a given design.

Ironing Sheet Metal

When uniformity is paramount, companies typically resort to ironing. This process involves taking an inconsistently thick piece of sheet metal and creating consistent edge-to-edge thickness. Pressure is required on each side of the sheet, which is applied progressively by two opposing dies; a punch forces the sheet through until completion.

Ironing is also related to deep drawing, which relies on directional pressure to stretch a metal sheet. An attached punch facilitates this by pressing between two binders, holding the sheet in place. Unlike bending, the focus isn't necessarily on shaping. Deep drawing aims to change the height or thickness of a metal wall.

Applications

Ironing and deep drawing have great importance in the automotive industry. These processes are used to form body panels while ensuring that bent pieces won't be inconsistent. Also called stamping, deep drawing helps make the following:

- · Engine control components
- · Cylinders
- · Frames and suspension components
- · Seals

Both processes are also essential in the beverage industry because drink cans have a required thickness across their walls. They must be adequately robust and sized consistently for packaging and display. The ironing process guarantees that weaknesses stemming from thin spots are eliminated.

However, the options are vast. The list of compatible metals is long because ironing and deep drawing leverage acute pressure. Aluminum, steel (low or high-carbon), brass, and other alloys respond well to these techniques.

Laser Cutting Sheet Metal

Companies now leverage powerful applications like Autodesk's Fusion 360 in modern manufacturing workflows. The advent of CAD and CAM have unlocked laser cutting — a precise sheet metal forming process that directly influences a sheet's size and silhouette.

Fabricators favor laser methods for their granular control, speed, and compliance with pre-programmed cutting blueprints. For example, a laser cutter may follow schematic-based instructions to achieve the desired result. CNC machines make this possible.

While not bucking the issue entirely, laser cutters produce less burring than metal-on-metal cutting processes. However, improperly-calibrated lasers (poor focus, alignment, beam power, or speed) can cause burring. Other forming processes may be needed to resolve this.

Applications

Any application that demands precisely-shaped sheet metal will benefit from laser cutting. The fact remains that few metal sheets will immediately fit an application without modification. However, to cite one example, laser cutting is useful in the art industry, where precise cutouts may boost a product's visual flair. Automakers may also leverage laser cutting to craft a variety of internal and external parts. Punching Sheet Metal

The punching process is fairly straightforward. A punch and die team up to form holes of specific shapes in sheet metal. The end goal is to craft a sheet with precise punchouts, changing its original form to fit a design. The material removed is recycled or discarded.

The blanking process — a derivative — also relies on punching. However, the material extracted from the original sheet metal is the prize.

Applications

Punching and blanking are used to produce multiple diverse, specifically-shaped components. Vehicles, for example, require numerous gaskets that keep fluids from escaping their proper channels. In particular, head gaskets have precise cutouts for engine oil passageways, cylinders, and the engine block's overall shape.

Companies may also use these processes to form power-tool components and electronic components. Manufacturers who produce microelectronics at scale can create multiple parts from one piece of sheet metal using these methods.

Autodesk's Fusion 360 features a sheet metal workspace that lets you create sheet metal bodies and produce manufacturing data for sheet metal parts. Download Fusion 360 to experience a comprehensive sheet metal workflow for your next project.

Emily is the Content Marketing Manager of Autodesk Fusion 360 where she focuses on shaping the overall Fusion 360 content strategy, including the Fusion 360 blog and social media directions. Prior to Autodesk, Emily was the DMTV Content Coordinator at Design Milk, the Business Editor at HYPEBEAST and an Editor at Core77. During her time at Core77, she also served as co-chair of the 2018 & 2019 Core77 Conferences.

This is a rare photo of a mother vise-grip feeding her baby wrenches. Nature really is amazing.

Previous Favorite

Surprising Mask Math   - To stop the spread of COVID-19, we need to keep the virus effective reproduction rate, Rt, beneath 1. When this happens, on average, a contagious person will infect less than one person, and the epidemic will grind to a halt. So how many people need to wear a 50% effective mask to stop the spread of COVID-19? This interactive essay lets you predict then answer to this question (https://aatishb.com/maskmath/).

How to Perform Operational Weather Forecasting on Rescale

Rescale Solutions Live (webinar)

See how Rescale can supplement current capabilities and enable running large scale simulations and time-critical runs for use in forecasting weather.

Operational Weather Forecasting (OWF) applications can be notoriously complex. Results are required to be within a tight tolerance and with little variance. These weather computations can be affected by any part of the software or hardware stack. Running OWF on commercial cloud computing platforms can surface these challenges. It's essential that the deployment of hardware and software on the cloud is managed to mitigate any variance in results.

[Adapting to the 'New Normal': Stay Safe and Productive Through Virtual Collaboration](#)
By Peter Larsson

During these trying times, we must all pivot towards innovative ways of working and, at the same time, keep employees safe. In this blog, we discuss a proven solution to keep your business on track, while safely 'coming together'.

According to Wikipedia, a new normal is a state to which an economy, society, etc. settles following a crisis when this differs from the situation that prevailed prior to the start of the crisis. Today, we cannot say for certain what the 'new normal' will look like post-pandemic. What we do know, however, is that the current crisis is neither the first nor the last that this world will need to overcome and that we must continue nurturing our ability to prepare and quickly adapt to future unforeseen situations.

Currently, many enterprises are struggling with how to simultaneously keep their processes safe and productive, while at the same time reducing travel and maintaining strict social distancing requirements, whether in the offices, production facilities or out in the field.

So then, what are some critical questions enterprises should be asking?

- How can we keep our engineering, manufacturing, and service teams safe and productive now that more of our employees are working from home and traveling less due to safety, cost, or our effort to reduce our carbon footprint?
- How can we ensure 'safety first' for our production line workers and maintain high productivity in spite of unforeseen events, changes in demand, or fluctuation in workforce availability?
- How can we safely and efficiently manage our maintenance operations to secure product uptime or 'product-as-a-service' contracts while reducing travel? How can we more quickly and efficiently ramp-up and guide local maintenance operators?

The evolution of Virtual Reality (VR) and Extended Reality (XR) technology has taken off at the speed of light in recent years. Even though we can't provide full Star Trek holodeck experiences (yet!), the possibility of creating highly realistic virtual representations of products and industrial processes is very much a reality. And this is not just true just for visual realism but also in terms of simulating the physics and system behaviors, as well as enabling highly realistic interaction between humans and the virtual world.
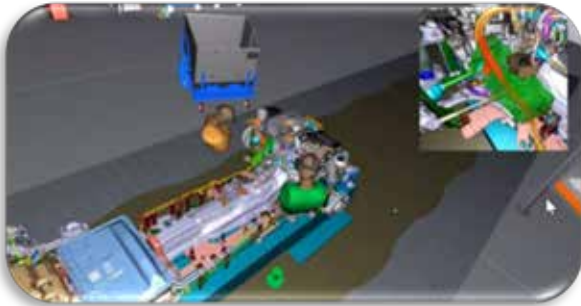
Validation of the high-voltage connection between the car battery and plug-in battery

VR/XR based solutions(link is external) are ready for deployment and integration into the business processes of extended enterprises. By integrating these solutions, enterprises can virtually communicate, explore, validate, and resolve critical challenges in the product design, production, or maintenance processes, while augmenting and even replacing physical tests, prototypes, or in-person instructor-lead operator training.

Now is a crucial time to ask yourself what your company could achieve if you had access to highly realistic Immersive Workspaces for your teams, offering them safe and remote collaboration to support product & process definition and communication, while effectively emulating a Virtual Product Representation, a Virtual Assembly Line, and a Virtual Service Center.

Imagine being able to provide your company and teams with:

- efficient virtual collaboration between product, manufacturing, and service engineering teams, reducing the need for physical builds and minimizing travel and in-person reviews
- efficient virtual collaboration between your manufacturing engineering teams, suppliers, pilot facilities, industrialization partners, and assembly line operations, to get a 'first-time-right' start of production and efficient ramp-up of your assembly line operations, with less travel and shipping of physical prototypes
- efficient virtual exploration and validation of assembly line processes to quickly adapt to changes in demand or available workforce
- efficient virtual ramp-up and guidance of your in-field maintenance operators with less travel and shipping of physical products and sample parts

The good news is that solutions like this already exist and can support your business in achieving these standards.
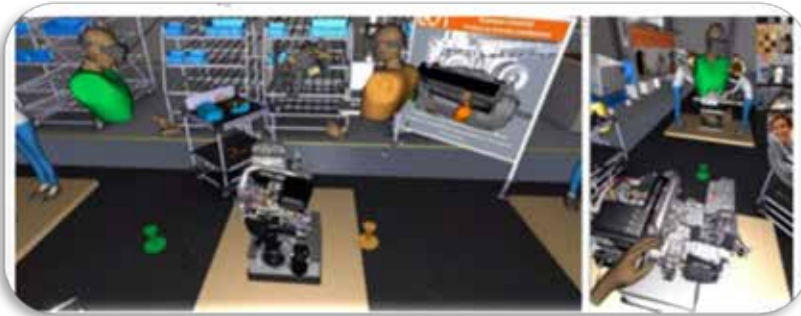
Cross-functional validation of PHEV engine pre-assembly

Let's all learn to shift by growing from our experiences so that we are equipped to face our current and future challenges.

Stay safe and productive!

About Peter Larsson, Industry Channel Director for Heavy Industry

Peter Larsson joined ESI in 2016, bringing with him his expertise in industry strategy, business development and product management. For more than 20 years, Peter has been managing B2B software solutions targeting major enterprise customers in manufacturing industries such as automotive and transportation, aerospace and heavy industry.

Since the late '90s, he has been actively involved in the areas of design engineering, manufacturing engineering, visualization & virtual reality offerings, with a focus on helping customers address key digitalization challenges to efficiently deliver high-performance, quality products, on time, with a key focus on health and safety considerations for both products and processes.

Peter holds a Master of Science in Computing Science from Gothenburg University, Sweden, and Business Management from IHM School of Business.
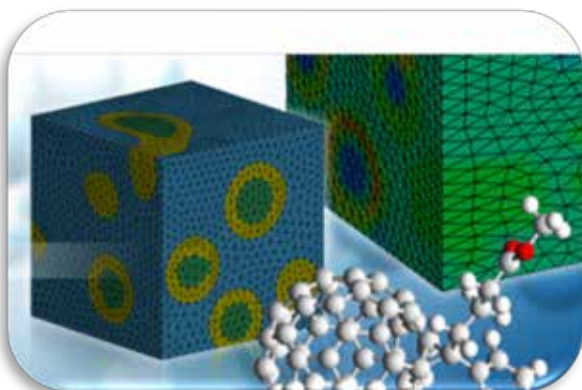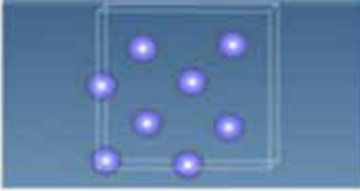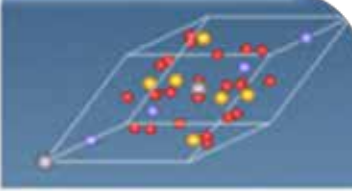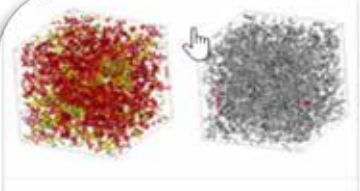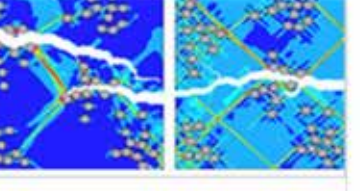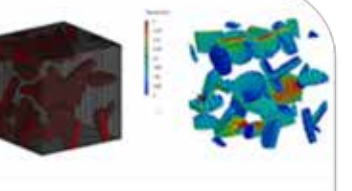
J-OCTA is useful at the forefront of material research and development

J-OCTA is a material property analysis software that predicts material properties from atomic scale to micrometer scale on a computer when developing a wide range of materials such as rubber, plastics, thin films, paints and electrolytes.

It can be used as a knowledge discovery tool to understand complicated phenomena and physical properties which could not be grasped only by experiment results. We will support state-of-the-art material design and material development by linking and operating simulators corresponding to each scale on a common platform.

Among The Case Studies - J-OCTA case studies and links to the OCTA/J-OCTA simulation cases.

Calculation of solubility coefficient

J-OCTA's solubility module calculates the solubility coefficient from the val...

Evaluation of mechanical properties

Evaluation of various mechanical properties of Si crystals

Thermal expansion of crystals

SIESTA analyzes temperature changes in crystal cell volume due to potassium and KZP

Cross-Linking of Epoxy Resin by the Monte Carlo method using activation energy

Creating cross-linked structures and ...

Fracture of CFRTP / Interface

We evaluated the effect of the interfacial property for different CFRTP fiber dispersi...

Thermal analysis which considers the dispersibility of graphene sheets

Modification of thermal conductivity of CFRTP...

Autonomous Vehicle (AV) ATDs

Autonomous vehicles represent the future of mobility, and future focus of vehicle safety.

As automated driving systems take the driver's seat in controlling vehicles in motion, occupants can relax more focussing less on driving, and more on relaxing, working, or interacting with fellow passengers.

Autonomous vehicles represent the future of mobility, and future focus of vehicle safety.

As automated driving systems take the driver's seat in controlling vehicles in motion, occupants can relax more focussing less on driving, and more on relaxing, working, or interacting with fellow passengers.

All these new modes present unlimited new challenges for safety testing. New seating positions and new seating directions will require new ways to keep occupants safe from impact, and safe from each other during and impact.

Our Autonomous Vehicle Dummies - using the latest THOR technology, with 150 data channels - can adapt to reclined seating positions with a more flexible pelvic structure.

THOR-AV-5F   THOR-AV-50M

Brought to our attention on Blog Before Flight (BBF) - About - founded in 2011 by Italian photoreporter and Military Aviation Analyst Matteo Sanzani. Over the years BBF has evolved from a personal blog to a website managed by a team composed of photoreporters, pilots and spotters from different countries.

HAL today successfully test fired a Smart Anti Airfield Weapon (SAAW) from the Hawk-i aircraft

HAL Website

Bengaluru, January 21, 2021: In a big boost to the indigenous Hawk-i program, HAL today successfully test fired a Smart Anti Airfield Weapon (SAAW) from the Hawk-i aircraft off the coast of Odisha. The indigenous stand-off weapon developed by Research Centre Imarat (RCI), DRDO is the first smart weapon fired from an Indian Hawk-Mk132.

"HAL has been focusing on the Atmanirbhar Bharat campaign. The Company owned Hawk-i platform is being extensively used for certification of systems and weapons developed indigenously by DRDO and CSIR labs" said Mr. R. Madhavan, CMD, HAL.
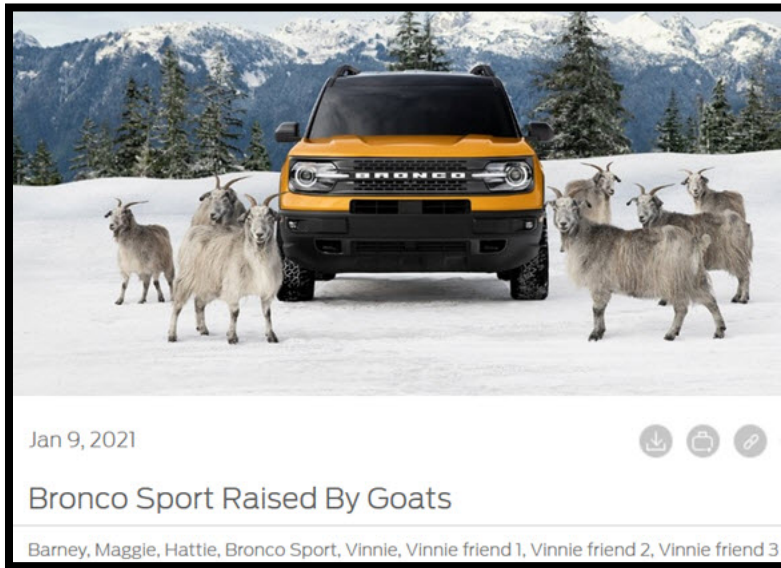
The aircraft flown by HAL test pilots Wg Cdr (Retd) P Awasthi and Wg Cdr (Retd) M Patel executed the weapon release in a text book manner and all mission objectives were met. The telemetry and tracking systems captured all the mission events confirming the success of the trials.

Mr. Arup Chatterjee, Director, Engineering and R&D, HAL said HAL is indigenously enhancing the training and combat capability of Hawk-i. HAL is in discussions with Indian Armed Forces for integration of various weapons on Hawk platform.

The Hawk-i is HAL's internally funded program offering the Indian Armed Forces an upgrade and combat capability for the Hawk, transforming it into an Advanced Jet Trainer providing training on sensors and weapons in peacetime into a potent combat platform during conflict.

The SAAW is an aircraft launched, advanced, precision strike weapon of 125 Kg category used to attack and destroy enemy airfield assets such as radars, bunkers, taxi tracks, runways within a range of 100 kms. SAAW has been earlier successfully test fired from Jaguar aircraft.

Jan 9, 2021

Bronco Sport Raised By Goats

Barney, Maggie, Hattie, Bronco Sport, Vinnie, Vinnie friend 1, Vinnie friend 2, Vinnie friend 3

'Raised by Goats': The (Almost) True Story Behind the Power, Immense Capability of All-New Ford Bronco Sport

G.O.A.T. was actually the original internal code name for the '66 Bronco project: Goes Over All Terrain.

Video 1
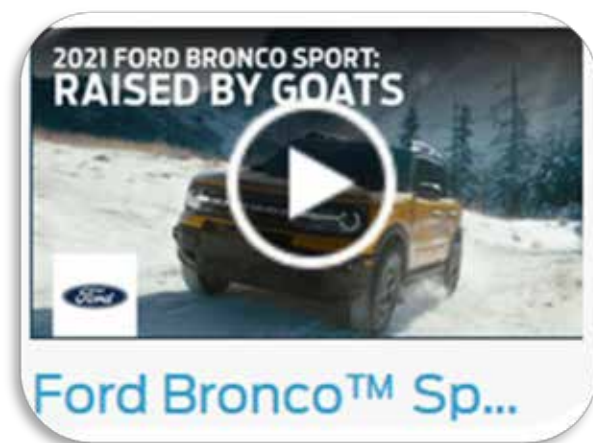
*The first spot celebrating the launch of the all-new Ford Bronco Sport is "Raised by Goats," a piece that creates a mythical origin story of the vehicle featuring live goats and horses, and details how it developed its impressive off-road capability
*The spot is the first of three produced by Wieden+Kennedy New York; the first two highlight the Bronco Sport G.O.A.T. Modes equipped with up to seven terrain management modes, while the third focuses on its versatility and customization options
*The all-new Ford Bronco Sport expands the rugged Bronco family of 4x4-only vehicles, giving outdoor adventurers Bronco off-road capability, durability and technology

DEARBORN, Mich., Jan. 9, 2021 – So the story goes that a herd of goats came upon a colt in the mountains trapped under a rock. They rescue him, then raise him as their own, teaching him to navigate the craggy terrain and rough waters of the region. Sturdy, confident and now immensely capable, the horse transforms – into the adventure-ready, all-new Ford Bronco® Sport.

That's the crux of "Raised by Goats," the first of three campaign spots produced by Wieden+Kennedy New York for Ford to celebrate the launch of its all-new Ford Bronco Sport, specifically highlighting its G.O.A.T. Modes™ equipped with up to seven terrain management modes helping drivers "go over any type of terrain."

All three spots are under the umbrella of the "Built Wild™" campaign platform, with the first two focusing on the extreme capability and power of the Bronco Sport. All models feature an independent front and rear suspension engineered and performance-tested in demanding environments across North America. The suspension, complemented by the terrain management technologies, is optimized to help drivers confidently maintain vehicle composure while aggressively taking on rugged terrain.

The third piece of the campaign, debuting in February, focuses on the versatility and customization options available for the Bronco Sport.

"The Bronco Sport is ready to introduce even more outdoor enthusiasts to the wild," said Matt VanDyke, director, U.S. marketing. "This campaign kicks off with a fun, mythical story of how the Sport – the Bronco of small SUVs – developed its impressive off-road capability."

G.O.A.T. was actually the original internal code name for the '66 Bronco project: Goes Over All Terrain.

Keeping it Authentic

Shot in Washington state on Mt. Baker, a legendary volcano in North Cascades National Park, the production came with its own set of challenges – namely, casting and training the proper goats and horses for the piece.

"We decided early on that we wanted to make this true to nature, using real animals in an authentic environment," said Stuart Jennings, creative director, Wieden+Kennedy New York. "So we were doing a lot of work even before the cameras were rolling, researching breeds of goats, hiring animal trainers, talking through the performances and developing our visual script."

Extra time was built in to the shoot to consider the needs of the animals, he emphasized. Horses can be trained somewhat easily, but goats are another story.

Jan 6, 2021

Bronco Sport Raised by Goats

Hattie and Bronco Sport

"Goats are highly intelligent, but they're stubborn. Sometimes, they just don't want to listen. If they want to eat grass, they'll eat grass," Jennings said. "We just had to wait sometimes and cheer them on to do their performance."

In fact, he added, the animal trainers "interviewed" a wide variety of goats, since each has a distinct personality and temperament, choosing ones that would best work for the piece.

"We really wanted to walk the line on this one – the animals are adorable, but the focus is truly on Bronco Sport," he said. "The idea is this vehicle is built for the wild, it's rugged and tough, and the ultimate takeaway is Bronco has G.O.A.T. Modes. We allude to that all the way through. It's not just a knob on the vehicle – it's a system that can take you nearly anywhere you want to go."

Directed by Stacy Wall, who also shot Ford's Built for America campaign, the 60-second spot debuts Saturday during the Rams-Seahawks NFL Playoffs Wild Card game.

[Video It will be complemented by a second piece](#), "Go There," a high-energy, capability-focused spot that also features the G.O.A.T. Modes capabilities. This piece, debuting Jan. 11 on Good Morning America, was directed by both Wall and Lisa Gunning and cuts quickly in and out of multiple outdoor environments to showcase how the Bronco Sport is ready for any adventure.

Video 3

The final spot, "Find Your Wild,"

The final spot, "Find Your Wild," was directed by Gunning and highlights the versatility of the vehicle, as well. Bronco Sport offers more than 100 factory-backed and aftermarket accessories for maximum personalization, enabling dealers to provide outfitting-on-demand for each owner's individual adventure needs. Buyers also can opt for any of four lifestyle accessory bundles themed Bike, Snow, Water and Camping.

A flip-glass rear window, low-load floor cargo area, overlanding-ready roof rack with capacity to make roof-top tent camping easy, and front fender peaks allowing the driver to see the corners of the vehicle easily from behind the wheel confirm Bronco Sport is purpose-built for adventure.

Bronco Sport can quickly help with basecamp setup thanks to an innovative slide-out working table, part of the available five-way configurable Cargo Management System, plus an available class-exclusive 400-watt inverter and standard liftgate floodlamps that illuminate up to 129 square feet for when the adventure ends after sundown.

"Whatever you're into, you can make this vehicle work for you," said Jennings. "The Bronco Sport is amazing, and we wanted to show that in the most impactful way possible."

01-25 **E. Day** -

[Hybrid III 95th Percentile Large Male Finite Element Model Neck Alteration](#)

01-18 **W. Hu** -

[A Meso-Macro Scale Method for Jointed Structures and Their Failure Analysis](#)

01-11 **T. Dutton** -

[Optimising Run Timesfor Sheet Metal Forming Simulation](#)

01-04 **P. L'Eplattenier** -

[A Path Towards Including Batteries in Electric or Hybrid Car Crash Simulations with LS-DYNA®](#)
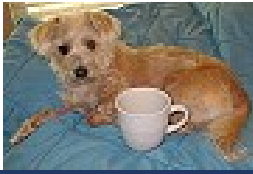
Previously Showcased:

B. Paul	[Driving Through Flooded Road](#)
M. Seulin	[Drag Coefficient Optimization for a Sports Car Using the Coupling…](#)
J. Puryear	[Wear Analysis of Machinery Componentsin Buildings](#)
J. Johnsen	[Calibration & Application GISSMO & *MAT_258 for Simulations …](#)
M. Dahlgren	[Belt Modelling in LS-DYNA®](#)
X. Zhu	[A Dedicated Forming Package LS-FORM for Stamping Simulation with LS-DYNA](#)
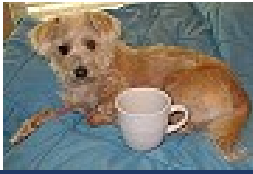
	01/25/2021 - T. Fokylidis, Beta CAE Systems, - ANSA and META Solutions on Interior-Impact Simulation for Occupant Protection
	01/18/2021 - NVN - perform analysis of ball plate impact using LS-DYNA
	01/11 - DYNAmore Express - S. Mandel - LS PrePost News, Tips and Tricks
	01/04 - Oasys - Top Tip: PRIMER tools to replace parts

Previously Showcased

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

|			
	01/25/2021 - E. Engle - AutoDesk - 5 Common Sheet Metal Forming Processes and Applications		01/11/2021 - G. Deppe - MSC - CAD to CAD: MSC Apex Generative Design new release brings fluent optimization workflow
	01/18/2021 - W. Chanatry - Siemens - Using Fibersim and Mendix to enhance development of composite parts and low-code applications		01/04/2021 - T. Duncan - ANSYS - Solving Composites Design Challenges With Engineering Simulation

Previously Showcased

	N. Baccari - ESI - Dirisolar Reclaims the Sky with Its Ecological Airship
	Curt Chan - article by **T. Palucka** - AdvenChair Rolls Boldly Into Adventure With Off-Road Wheelchair Design
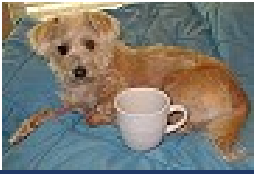
01/25/2021 - Well, although I would prefer waves of coffee being stirred by the cylinder that would defeat the engineering purpose. SO we will have to visit YouTube and see the real waves!

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

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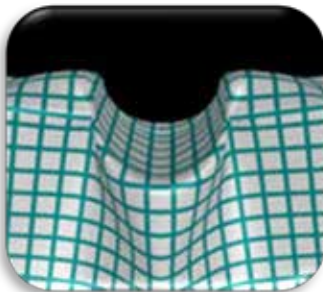
01/18/2021 - Yes, I do know what a hat channel is! Okay, whoever yelled "She probably googled it." Well, fine, your're right I googled it! Anyway, we shall have Lancemore Coffee this week to go!   So, grab that to go cup and let's take a look at YouTube.

Dynamic Three Point Bending Test Analysis of a Hat Channel - with 590 MPa Class High Tensile Strength Steel part 2.
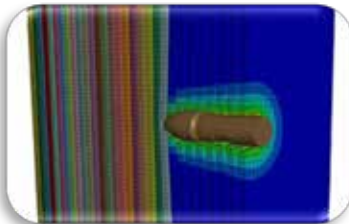
01/11/2021 - I have a battery pack but anyone with projectiles? Nope - you do not get coffee today IF you are aiming at my battery pack! SO, let us trot over to YouTube to learn how LSDYNA-EM will show you what happens when you don't get coffee.

LSDYNA-EM : Projectile penetration in battery pack - The projectile is modelled as rigid. It penetrates several battery cells, causing deformation and failure.
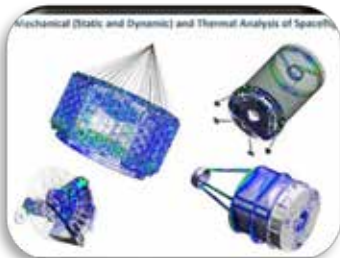
01/04/2021 - UH OH, did I make a resolution this year? Same one as last year, and the year before - lose weight.   AND whoever just yelled "How much did you lose last year?" IF you think I'm answering that question you obviously didn't read my new resolution!   MEN! UGH! You NEVER ask that question!

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

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

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


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

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

01/04/2021 - So we will stretch into the new year - YES, I know that was so bad but I really enjoyed Romo taking a stretch right on the coffee cup floor mat!
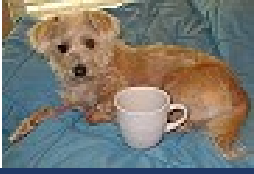
LATTE & GRAPPA
Life and food in the foggy Veneto countryside

Savoy cabbage rolls

Excerpt: *"… At this time in my life, I would gratin everything. I find myself craving soft vegetables covered with a crispy crust of bread and parmesan, potato pies golden with butter and cheese on the surface, orange-scented fennel and herb-flavored breadcrumbs ... continue ??*

My diet goes in stages: I fall in love with a dish, I reproduce it for a while until another one arrives to make my heart beat. Meanwhile, I admit, I still follow a fairly balanced diet, with moments of "butter" and "bacon…". Lidia Mattiazzi

Ingredients & Recipe URL

- A firm, medium-sized cabbage
- 1 thick slice of homemade bread
- Milk, about 100ml
- 1 handful of chopped parsley
- Little bit of grated nutmeg
- salt
- Freshly ground pepper
- 300 gr minced meat
- 1 egg
- Grated peel of half an untreated orange
- 1 mozzarella cheese, about 150 g
- 12 thin slices of bacon
- 1 or 2 tablespoons of grated parmesan
- Extra virgin olive oil

First of all, clean the cabbage and get 6 large firm and intact leaves: if they are small, double the quantity and use two for each roll.

Boil a pot of lightly salted water and dip the leaves for a minute, just to blanch them, then collect them with a skimmer and spread them out to cool on a clean cloth.

Meanwhile, soak the bread in milk.
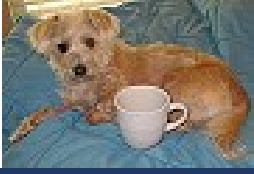
Prepare the filling by mixing the soaked and squeezed bread, chopped parsley, grated nutmeg, salt and black pepper, meat, egg and grated orange peel in a bowl.

Divide the meat mixture into 6 parts. Take a leaf, salt a little inside and fill it with a portion of meat, put a piece of mozzarella in the center, then wrap it well and close with a slice of bacon on the outside.

If you want, you can stop with a toothpick or kitchen twine.

Put all the rolls in order in a pan that goes both on the fire and in the oven, with a bit of oil on the bottom.

Pour a little water on the bottom, cover with a lid, and put the pan on medium heat for 20/25 minutes.

When the water has dried, uncover the rolls, sprinkle them with grated parmesan and put in the oven at 180 degrees for another 20/25 minutes, until golden brown.

About Lidia Mattiazzi and her blog: Latte&Grappa is a project about food and lifestyle in the Veneto region. It is a fair way to get to know the healthy cuisine and tradition with seasonal and fresh ingredients, but still up with the times which drag us more and more to dishes simple and fast to prepare…