

Entering FEANTM Town  
 Research, Development  
 Camping, Horse Trails  
 population virtual

FEA - CAE Not to Miss & More  
 JANUARY ISSN 2694-4707

“Town Hall Meeting in the town that mostly exists”  
 Town Plaza: Drive slowly – Galloping Prohibited

Airport - Safran



Airport - BAYKAR



Auto - Ford



Auto - TATA



Marco - RBF



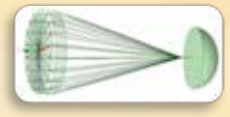
Curt - Autodesk



Metin - OZEN



Madhukar - CADFEM



Marta - OASYS



Abigail - ANSYS



Abhinav - Library



Rancher - Univ.Guanajuato



Sports Stadium - ULM Univ.



Jenson - DFETECH



Jeff - Siemens



Secretary - Museum



Town Comic Blog Chronicles  
 Rheken: Town AI Investigative Reporter  
 Dinky: Critter Emergency Response Team  
 Chat: Town Help Desk



Legal - the shortened version (town attorney is BUT it was too long to read)

**Town: We believe in our blog effort to advance knowledge and to share information. We believe this constitutes a "fair use" of the material under Title 17 USC. Section 107."**

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**Going forward information will not be included.**

Editors: **Anthony, Art, Churchill, Marnie, Marsha, Sabyl**

Town Pretend to be Editors:

<b>The Old Rancher</b>	<b>No one in town knows his name. You yell "Hey, Old Rancher."</b>
<b>The Old Pilot</b>	<b>No one in town knows his name. You yell "Hey, Old Pilot."</b>
<b>The Old Racer</b>	<b>No one in town knows his name. You yell "Hey, Old Racer."</b>
<b>Racer's Daughter</b>	<b>The whole town knows her name. You yell "HEY, Slow down!"</b>

**They are all family - strange family**

Names, & characters of AI visitors and AI editors are the products of imagination. Any resemblance to actual persons, living or dead, or actual events is purely coincidental.



**We will never forget**





Parking & Coffee are free.

# R & D - Camping - Town Map

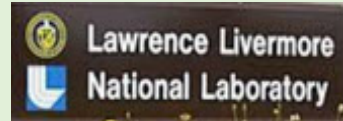
Horse Trail Yield right of way to horses

R&D Technology Business Park

RV CAMPING Park in any vacant camping site



Town Hall & Library



The Old Rancher



Race Track



Airport



JOH Sports Stadium



- **Logos represent companies/academia/research with solutions for today's world.**
- If you wish to have yours removed, kindly inform us at [feaanswer@aol.com](mailto:feaanswer@aol.com).
- Proceeds from the auction of your building will be allocated to the coffee budget.
- The map is subject to change - building sites will be rotated accordingly.

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### **FEANTM Chronicles: RheKen, Dinky the Squirrel, Chat's Help Desk**

**RheKen**, the town AI investigative reporter  
Please tell me my parents did not pull into town!

**Dinky** The Squirrel - News in a Nutshell  
Lilly & Teacup building a dam - Lilly is a Civil Engineer

**Chat** FEANTM Town Help Desk  
Exercise & steps - Keep trying - The horse mobile help desk

**Supervisor** - Goodbye Page

## Welcome to our County, Town Hall Meeting & Announcements

Town Motto: Creation is born from trying. If it doesn't work, learn & try again. You will succeed. Ideas, simulations, medical cures, creativity wouldn't exist without the passion to keep trying.  
**You've Got This**

**FEANTM Town Hall Meeting**  
**"The town that almost exists"**

**Park cars behind the building**  
**Park tractors behind the cars**

**Tie horse to the hitching rails**

**Bakery Cafe**

**Gossip, cookies, chocolate**  
**Pets welcome.**

**Horses, pet goats stay outside**  
**Technical solutions & information**  
**Caring about animals and children**

**Quiz: Did the Supervisor let the town Secretary get creative?**

**Answer: YEPPERS! We apparently have a new wood mill in town!**

**The good news is we have only allocated cover through page 6**

**What will be in March? Probably pastures, hills, cows, or more wood.**

**This month we are starting our additions, changes & consolidations:**

A major consolidation is our Fire and Police Dept are now in the Library at the Suggestions Desks. Information will be from open-source publications and government, or city safety agencies. Rheken & parents have gotten an AI upgrade.

**Welcome Jeff!!!!** We welcome Jeff Waters from Siemens to our town. HI JEFF!

**Conference Time** – Carla has started listings for 2025 Conferences, so you can start planning and writing those abstracts for submission.

If you have a conference this year let us know.

**Next month don't miss:** Web – [OZENCON 2025 - Feb. 20](#)

Mountain View, CA at the Computer History Museum

And that is how we are starting 2025 - so let's get our coffee (always) and no calorie chocolate (lie, it has calories but I like to think it doesn't) AND get the meeting started! If you need to reach me my email is ([livermorehorses@aol.com](mailto:livermorehorses@aol.com))



**Article: Machine Simulation in Autodesk Fusion:** A Game-Changer for Collision Detection – by S. Cinemre... detect collisions, optimize setups, & refine tool paths



**Article: Leveraging the power of LS-DYNA** - Simulating Safe Landing: Inflation Dynamics of Parachutes - explores the inflation dynamics of parachutes under aerodynamic loads.



**Article: PROFIL** - the roll form design software for every manufacturer of cold roll-formed profiles or seamed tubes from sheet metal and for designers of roll formers and tube mills.



**Article: Research leveraging RBF Morph technology** - "Shape Optimization of a Roots Blower Rotor Profile Using CFD Model with a Coupled Adjoint-sculpting Method"



Excerpts from the ANSYS blog, “**Guillaume, “As we progressed, the superior performance of LS-DYNA software prompted us to increasingly dedicate it to crimping simulations**, with the goal of validating the mechanical behavior of our crimped connections, including both power transmission connectors and lugs used in the automotive and aerospace industries...



**Web – [ANSYS - Sicame Advances Products, Savings, and the Energy Transition With Ansys Multiphysics Simulation](#)  
- Author :Jennifer Procario**

Sustainability has become a top priority for nearly every industry. According to the United Nations, fossil fuels contribute to over 75% of greenhouse gas (GHG) emissions and almost 90% of carbon dioxide (CO<sub>2</sub>) emissions. As such, many electrical manufacturers are developing more efficient products to contribute to the energy transition. As a global leader in electrical products and services, the Sicame Group is

dedicated to ensuring safe energy by advancing reliable, sustainable, and innovative solutions for transmission and distribution networks worldwide.

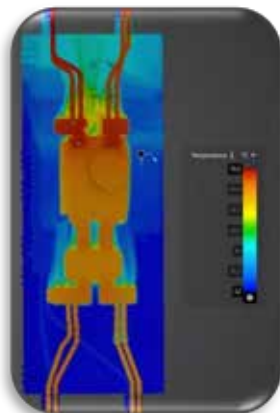
By integrating Ansys multiphysics simulation, the Sicame Group gains critical engineering insights that improve the electrothermal and mechanical behavior of its products. In addition, virtual testing and prototyping minimize the time and cost of traditional physical methods and accelerate product development, resulting in significant savings.

**Optimize Electrical Engineering with Digital Tools** - More than just a manufacturer, the Sicame Group considers itself a key player in the energy transition by designing, manufacturing, and selling electrical networks and accessories. The group specializes in products and services for electrical power transmission and distribution, renewable energies, electromobility, safety equipment, original equipment manufacturers (OEM), and commercial and industrial applications.

**Incorporating a wide range of purposes, product examples include:**

- crimped, screwed, and piercing electrical connectors
- electrical boxes, enclosures, and shelters
- damping systems for overhead lines (antivibration)
- wildlife and human life protection systems
- personal protective and safety equipment
- installation tools
- electrical connectors related to smart grids, Internet of Things (IoT) products, and printed circuit boards (PCB)

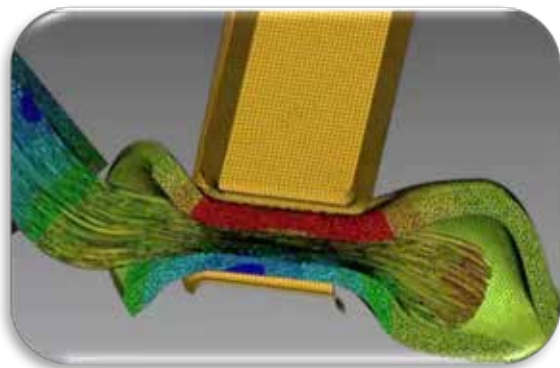
To optimize its engineering workflow, the Sicame Group started to integrate Ansys simulation about seven years ago. Today, the group applies Ansys multiphysics simulation to analyze a wide range of engineering dynamics, from structures and air flow to shock and vibration. “The main objective (to integrate Ansys multiphysics simulation), when I proposed to my managers and top management, was to work out the same test, which is performed in our Cofrac laboratory,” says Guillaume Morin, digital simulation head at the Sicame Group. “These tests combine thermal, mechanical, and electrical behavior. Moreover, these physics are combined with each other. This is the main reason to improve our understanding of digital engineering to achieve this massive goal.” [fluid-thermal-coupled-analysis-ansys-discovery](#)



Left: Fluid-thermal coupled analysis in Ansys Discovery 3D product simulation software. Cofrac laboratories are accredited by the French Accreditation Committee (Cofrac). As a big proponent of multiphysics dynamics, Guillaume created the company's first simulation division and works closely with the electrical networks research and development (R&D) department.

The main goal, he says, is to create a digital lab that can model the electrothermal behavior of a new electrical connection throughout its life cycle. In addition, he hopes to leverage Ansys multiphysics' simulation to study the electrostatic behavior of underground electrical accessories and safety equipment, including material selection, such as elastomer.

"The Sicame Group is offering its customers solutions for developing renewable energy efficiency, and coping with climatic changes," he adds.



**Left: Crimping analysis in Ansys LS-DYNA nonlinear dynamics structural simulation software**

**Uncover Deeper Insight With Multiphysics Simulation -** Guillaume and his team frequently use Ansys Mechanical structural finite element analysis (FEA) software to evaluate structures for product performance, especially different types of materials to understand durability. For example, they perform rheology and mechanical analyses to anticipate failures linked to the plastic material in transmission overhead accessories.

"Today, Ansys Mechanical software is used every day to analyze some structure," says Guillaume.

The team also integrates Ansys Discovery 3D product simulation software for structural analyses as early as the design phase to assist in the dimensioning of mechanical products. But Guillaume says the software's main use is to determine airflow inside electrical junction boxes and define the best locations for electrical accessories, including air inlets and outlets for natural convection. Discovery software is frequently used by Sicame Group subsidiaries, including Seifel and Hydel, which specialize in electrical boxes.

For shock, vibration, and crimping components, Guillaume and his team use Ansys LS-DYNA nonlinear dynamics structural simulation software.

Initially, the group developed expertise with explicit solvers by using Ansys Autodyn nonlinear dynamics software to conduct shock tests for electrical enclosures. However, wanting to expand their dynamics simulation use, Guillaume implemented LS-DYNA software into the workflow for shock and perforation testing...

...**"As we progressed, the superior performance of LS-DYNA software prompted us to increasingly dedicate it to crimping simulations, with the goal of validating the mechanical behavior of our crimped connections, including both power transmission connectors and lugs used in the automotive and aerospace industries," he says. "Additionally, we are advancing a methodology for validating the perforation resistance of our connectors using LS-DYNA software, enabling the simulation of cables with a very high number of stranded wires."**





Article, “The model was validated with PC-Crash simulations and with actual accident cases. Zhang et al. estimated the impact velocity of a car in a real accident using PC-Crash to then analyze with MADYMO the dynamic responses of the car occupants. LS-DYNA was finally used to simulate the impact between the head of the driver and the left shoulder of the passenger.”



**Web – Science Direct - [A methodology for crash investigation of motorcycle-cars collisions combining accident reconstruction, finite elements, and experimental tests](#)**

**K. Santos, N.M. Silva, J.P. Dias, C. Amado**

IDMEC, Inst. Superior Técnico, Univ. de Lisboa, PT  
Dept of ME., Inst. Superior Técnico, Univ.de Lisboa, PT  
Dept. Math.&CEMAT, Inst. Superior Técnico, Univ. de Lisboa, PT

**Abstract - Motorcycle and in general motorized 2–3 wheelers accidents are a major concern of road safety worldwide representing about 28% of the overall fatalities.** Speed is a central factor in the increase of injury severity of the accident’s intervenients. The main factors and causes of an accident can be determined with accident reconstruction being the reason for its popularity in accident safety research. A methodology of three different and complementary accident reconstruction methods is proposed and applied to a real accident where a motorcycle impacts the front side door of a passenger car. No other study in the literature presents a similar methodology for motorcycle accident reconstruction. **With PC-Crash all accident dynamics were determined in the first place with a complete accident reconstruction. Afterwards, a finite element simulation of the impact between the motorcycle tire and the car’s door was conducted in Ansys LS-DYNA using all the results extracted from PC-Crash.** The results of both these analyses correlated well with reality. To validate the finite element model, a pendulum experimental impact test was performed. It was achieved a good correlation from a kinematic point of view. An accurate accident reconstruction and a correct validation of the kinematics are possible with the proposed methodology. A good correlation of results between the three different methods was achieved. The proposed methodology enables for a more accurate estimation of the speed of motorcycles involved in accidents which is of extreme importance in accident investigation.

**Excerpt – Introduction** - Tens of millions of people are injured or disabled every year, and about 3.700 people die on the world’s roads every day [1]. Road traffic accidents represent the leading cause of death for people aged between 5 and 29 years. Pedestrians, cyclists and motorcyclists represent more than half of global road traffic deaths [1]. Vulnerable road users (pedestrians, cyclists and motorcyclists) represent about 54% of all road deaths worldwide being 28% of all fatalities regarding motorized 2–3 wheelers accidents [1].

**Excerpt Conclusion:** **The study introduced a systematic approach for conducting a comprehensive evaluation of a motorcycle collision. The utilization of accident in-depth investigation (via PC-Crash), numerical modeling (employing Ansys LS-DYNA for FE analysis), and experimental testing enables precise accident reconstruction and validation of kinematics.** The methodology applied presented a good correlation of results between the different methods (PC-Crash and FE simulation), which allowed to similar impact speeds estimation. This provides a high level of assurance for its potential application in future research endeavors.



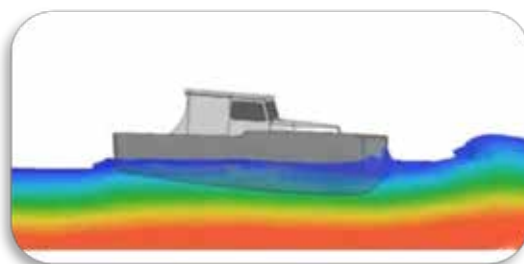
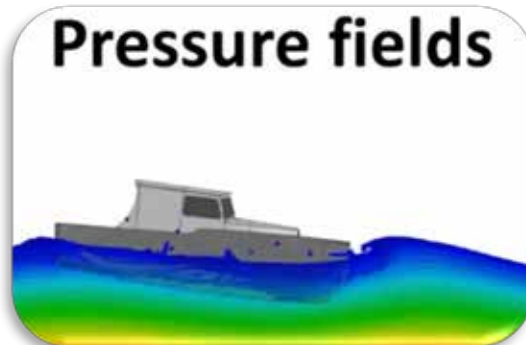
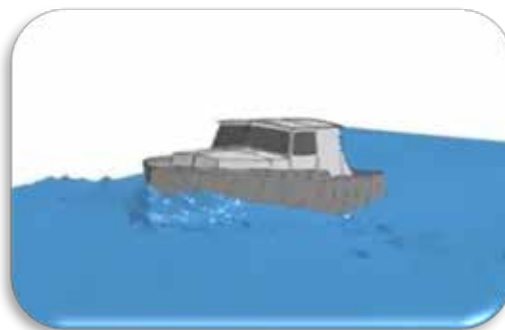
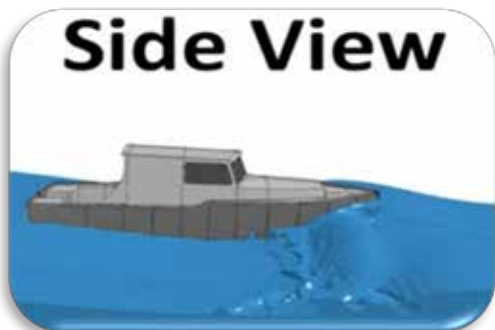
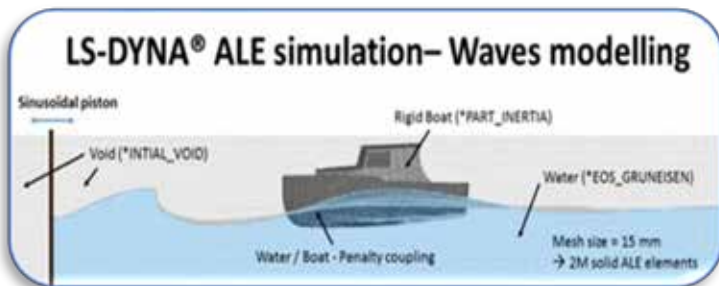
Sarah	“What would happen to my boat with waves?”
Bart R.	“Why do you ask?”
Sarah	“I don’t like waves.”
Bart R.	“I’ll have the old rancher dig you a tiny pond to keep your boat safe from big waves.”



The below video is on BeenuZz channel, from a few years ago, on YouTube:

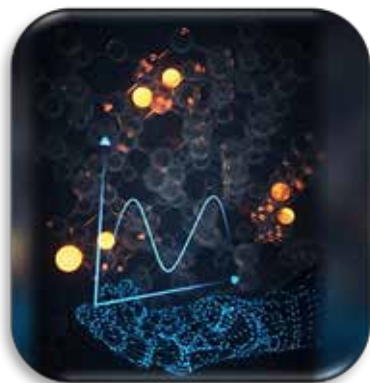
[This video presents one of many ALE solutions for wave modelling in LS-DYNA.](#)

The system I built is a simple piston-like behavior of the water domain. I used non slip boundary conditions on all sides of the domain. For more realism, either the domain should be enlarged, or pressure BC should be applied....





**LLNL** - Researchers at Lawrence Livermore National Laboratory (LLNL) have developed a new approach that combines generative artificial intelligence (AI) and first-principles simulations to predict three-dimensional (3D) atomic structures of highly complex materials.



**Web – LLNL - [Predicting atomic structures proves useful in energy and sustainability - Anne Stark](#)**

This research highlights LLNL's efforts in advancing machine learning for materials science research and supporting the Lab's mission to develop innovative technological solutions for energy and sustainability.

The study, recently published in *Machine Learning: Science and Technology*, represents a potential leap forward in the application of AI for materials characterization and inverse design.

(Generative AI-driven diffusion models predict 3D atomic structures from XANES spectroscopy, enabling tailored material design for energy and sustainability applications. (Concept: Hyuna Kwon and Anh Pham/LLNL; Illustration: Ella Maru Studios)

The approach uses X-ray absorption near edge structure (XANES) spectroscopy. Accurately determining atomic structures from spectroscopic data has long posed a challenge, particularly for complex systems, such as shapeless materials. In response, LLNL scientists have introduced a generative framework based on diffusion models, which are an emerging machine learning technique. The authors demonstrate how this framework enables the prediction of 3D atomic arrangements from XANES spectra.

“Our method bridges a crucial gap between spectroscopic analysis and precise structure determination,” said Hyuna Kwon, a materials scientist in LLNL’s Quantum Simulations Group, Materials Science Division. “By conditioning the generative model on XANES data, we can reconstruct atomic structures that align closely with the target spectra, offering a powerful tool for material analysis and custom design.”

The project was a collaborative effort, with Kwon and Tim Hsu from LLNL’s Center for Applied Scientific Computing contributing equally. The team demonstrated that their AI model also scales effectively from small datasets for generating realistic, large-scale structures. This scale-agnostic property demonstrates the model’s ability to bridge scales from nanoscale to microscale, enabling detailed atomic structure generation even at complex features like grain boundaries and phase interfaces.

“This approach can be leveraged beyond just structural analysis,” said Anh Pham, the principal investigator of the project. “It can be extended to inverse design — where we start from a desired material property and engineer the corresponding atomic structure — accelerating the discovery of materials with tailored functionalities.”

Other LLNL co-authors include Wenyu Sun, Wonseok Jeong, Fikret Aydin, Xiao Chen, Vincenzo Lordi and Fei Zhou. The work was supported by LLNL’s Laboratory Directed Research and Development program. Collaborators include Brookhaven National Laboratory and Boston University.



**Welcome to 2025 - Conferences are being scheduled.** Get your calendars out and let's start listing a few of the conferences.



Web – [OZENCON 2025](#)

Date: **Feb. 20 - Mountain View, CA**

**Hosted at the Computer History Museum**

Largest Annual Ansys Simulation Conference in Silicon Valley. Our conference is FREE to attend, register early to reserve your spot. Exciting presentations especially in the areas of Simulation AI/ML, Quantum computing, new space and new energy.

**Conference Chairs: Univ. College Dublin**

Abdollah  
Malekjafarian



Vikram  
Pakrashi



Jennifer  
Keenahan



Web: [EUROSTRUCT 2025](#)

Date: **September 02-05 Dublin, Ireland**

3rd Conference of the European Association on Quality Control of Bridges and Structures

Devoted to the research and development of sustainable, modern and environmentally-friendly solutions for built infrastructure.



Web - [The Engineers Without Borders USA National Conference](#)

Date: **March 07-09, Charlotte, North Carolina**

Engineers Without Borders USA (EWB-USA) is partnering with communities around the world to meet their basic human needs. We're building footbridges to provide pathways to opportunities. We're installing solar panels to bring light where it is dark. We're digging for water so hope can spring from the ground. Each project builds the foundation for a community to thrive for years to come.



Web - [Computational Bioengineering - ICCB 2025](#)

Date: **Sept 08-10, Rome, Italy -**

hosted by the Università Campus Bio-Medico di Roma.

The conference will provide a forum to share, promote and stimulate emerging interdisciplinary works focusing on advances in modeling of physiological systems. Different scales are covered, from molecular level to the population. It will be also an important occasion to promote international collaboration and networking.



**Article, “Although the FEM started out as a mathematical technique, most FE analyses now run on commercial software such as COMSOL, ABAQUS, MSC and ANSYS, etc.** These software packages have the capability to define complicated geometry and simulate structural, heat transfer and fluid flow problems... Finite element methods (FEMs), finite difference methods (FDMs) and finite volume methods (FVMs) are the most extensively used numerical methods for solving fluid dynamics and heat and mass transfer problems.

**Web – MDPI - [Finite Element Method for Freezing and Thawing Industrial Food Processes](#)**

**T. Fadiji, S.H. Ashtiani, D.I. Onwude, Z. Li, U.L. Opara**

- Stellenbosch University, South Africa
- Ferdowsi University of Mashhad, Iran
- Swiss Federal Lab. for Materials Science and Technology, , Switzerland
- University of Uyo. Nigeria
- Northwest A&F University, China

**Abstract** - Freezing is a well-established preservation method used to maintain the freshness of perishable food products during storage, transportation and retail distribution; however, food freezing is a complex process involving simultaneous heat and mass transfer and a progression of physical and chemical changes. This could affect the quality of the frozen product and increase the percentage of drip loss (loss in flavor and sensory properties) during thawing. Numerical modeling can be used to monitor and control quality changes during the freezing and thawing processes. This technique provides accurate predictions and visual information that could greatly improve quality control and be used to develop advanced cold storage and transport technologies. **Finite element modeling (FEM) has become a widely applied numerical tool in industrial food applications, particularly in freezing and thawing processes. We review the recent studies on applying FEM in the food industry, emphasizing the freezing and thawing processes.** Challenges and problems in these two main parts of the food industry are also discussed. To control ice crystallization and avoid cellular structure damage during freezing, including physicochemical and microbiological changes occurring during thawing, both traditional and novel technologies applied to freezing and thawing need to be optimized....

**Introduction** - The ability to provide sufficient food quality, quantity, and safety for the growing global population, which is predicted to rise above 9 billion in 2050, is an enormous challenge [1]. Food production and agricultural productivity will have to increase by more than 70% to meet future demands, including dietary energy needs [2,3,4,5]. Addressing energy gaps can reduce demand, lessen the current food waste level, or increase food availability through processing...

**Conclusions** - The use of FEMs has rapidly developed in different food processing operations, particularly freezing and thawing processes, in order to supply fresh, delicious, safe, nutritious, and minimally processed products into the market. This review has presented a comprehensive summary of recent studies on FEMs regarding freezing and thawing processes for food products. .... The efficacy of applying FEM modeling in simulating irregular geometry, complex boundary conditions and heterogeneous food products has been shown. In combination with FEMs, experimental analyses are crucial to determine model input parameters and validate simulation predictions. It is noteworthy that FE simulations can reduce costs, processing time, and equipment optimization, allowing a more detailed physical visualization of the dynamics that occur during freezing and thawing processes. Continuous advancement and development will help enhance FE simulations to be used as a powerful engineering tool in the food processing industry, especially for freezing and thawing processes.



Have you read the article [Machine Simulation in Autodesk Fusion: A Game-Changer for Collision Detection](#) by Selin Cinemre?

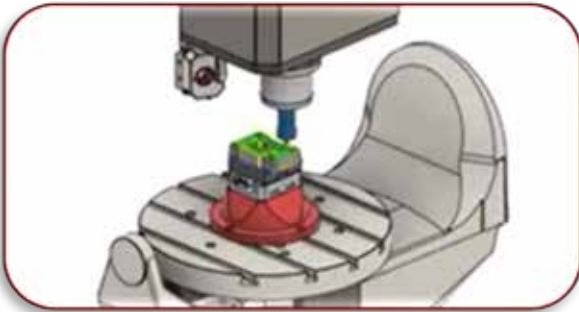
Sharing the article with you below!

[Machine Simulation in Autodesk Fusion: A Game-Changer for Collision Detection](#) - Selin Cinemre

[Video on YouTube](#)

Autodesk Fusion's machine simulation empowers users to detect collisions, optimize setups, and refine tool paths with confidence.

Key features like real-time warnings, simulation timelines, and NC code integration streamline workflows and improve precision



**This tool helps machinists enhance efficiency, reduce surprises, and achieve seamless multi-axis machining.**

Machine simulation in Autodesk Fusion has become an indispensable tool for users, especially those working with multi-axis machining. This powerful feature offers a comprehensive way to diagnose and address potential issues, ensuring tool paths and setups perform as planned. By detecting collisions and highlighting them in red during simulation, Fusion empowers machinists with the confidence to refine their setups and avoid costly surprises on the shop floor.

**The many benefits of collision detection** - Collision detection in Fusion goes far beyond identifying crashes. It aids in selecting the right tools and tool lengths, optimizing part positioning on the table, and verifying tool paths. With this level of insight, machinists can avoid surprises that disrupt workflows. Adjustments to setups and processing plans can be made quickly, saving time and ensuring efficient use of machinery and tools. Fusion's ability to detect collisions between tools, machine components, fixtures, tool holders, and stock enhances overall reliability. While the current focus is primarily on milling, this feature is available for lathes and other machines, making it a versatile resource across machining applications. However, linking moves between tool paths are not yet checked for collisions—a functionality Autodesk is actively developing.

Simulation features to enhance your workflow - Fusion streamlines the simulation process by allowing users to begin watching simulations while calculations are still running. If an issue is detected, a warning box pops up immediately, highlighting problems as calculations continue. Once completed, this box updates to show the total number of issues, errors, and warnings, offering a comprehensive overview of potential concerns.



Users who prefer real-time intervention can toggle the Stop on Collision feature, halting the simulation as soon as a collision is detected. For added convenience, the simulation timeline provides detailed control, enabling users to focus on critical points. Red segments on the timeline represent collisions, and hovering over these segments allows users to zoom in, expand the view, and examine changes in collision states. Black lines indicate transitions in collision status, making it easy to identify and address specific issues.



**Granular control and NC Code integration** - Fusion's simulation features don't stop at collision detection. Users can interact with the simulation timeline to gather detailed information, either by hovering over points or clicking on them for a more thorough analysis. Additionally, users can now view the NC code generated by Fusion during the simulation.

This functionality allows machinists to track the NC code as the simulation runs or jump to a specific point in the timeline and review the corresponding code. Conversely, clicking on a line of NC code will redirect the simulation to that exact moment, providing an intuitive connection between the simulation and the generated code.

**Comprehensive issue reporting** - For a broader perspective on simulation results, users can click the Issues button in the toolbar. This feature organizes simulation warnings and errors in a user-friendly format, making it easier to understand and address areas of concern.  
The bottom line

Autodesk Fusion's machine simulation tools redefine confidence and precision in machining. By detecting collisions, highlighting potential issues, and providing tools to refine setups, Fusion enables machinists to produce efficient and accurate tool paths. The ability to analyze NC code and view granular simulation details further enhances its utility, making it an essential resource for modern machining workflows.

Ready to elevate your machining processes?

Explore these powerful features in Fusion and see how they can transform your workflow

Don't miss the videos on our [YouTube Channel](#) – Among them are:





**Two things you shouldn't miss by Steph Chavez:**

1. YouTube video, *Using concurrent design in PCB development*
2. Podcast hosted by Steph, *A journey through reuse methodologies*



**YouTube - [Using concurrent design in PCB development](#)**

Concurrent design is a methodology where you have multiple users, providing input simultaneously and in parallel on a specific task versus a legacy methodology where you have tasks being done in a serial fashion, which takes up more time...

**Key Moments**

	Understanding concurrent design 0:11
	Real-world example of concurrent design 0:36

	What are the benefits of concurrent design? 1:21
	the future of PCB development 2:53

**PODCASTS**

**A journey through reuse methodologies**

**Web – Siemens - [A journey through reuse methodologies - Design reuse in Electronic Design Automation \(EDA\)](#)** involves leveraging existing designs to speed up development, reduce risks, and ensure quality. By reusing proven circuitry and IP, engineers save time, lower costs, and maintain high standards across projects.

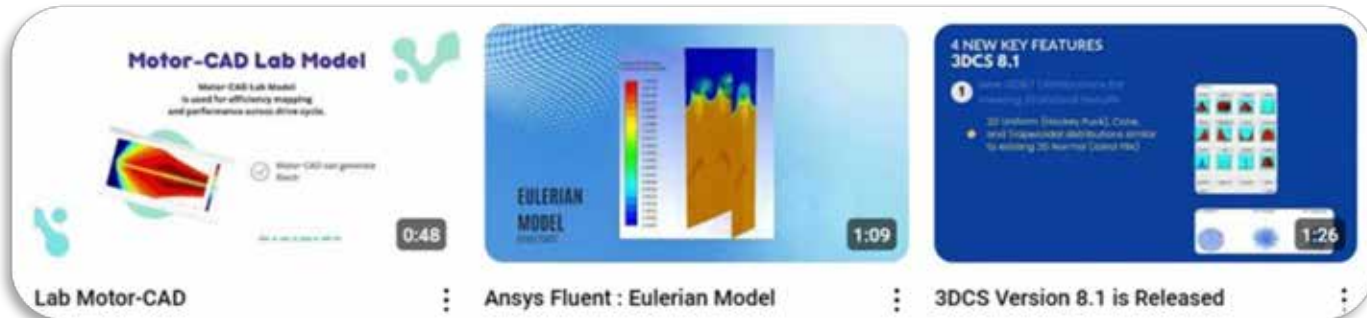
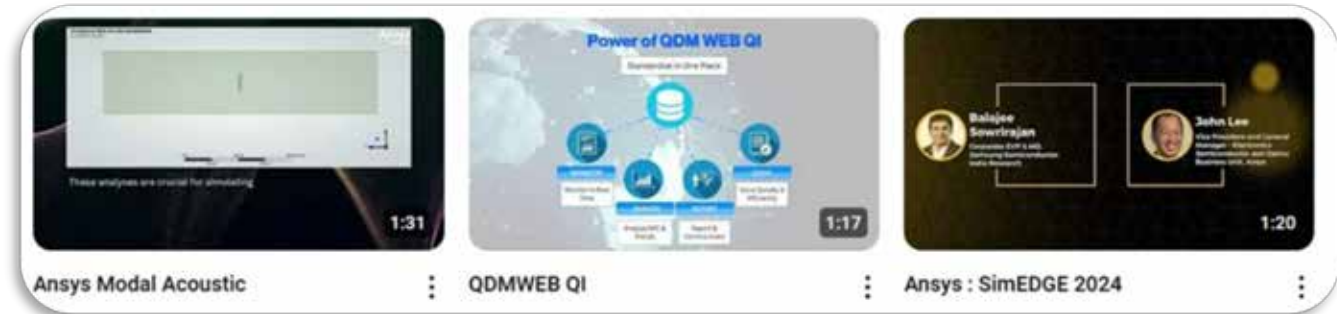
In this episode, we will explore design reuse methodologies in EDA. I'm thrilled to have my dear friends, Andre Mosley, a Marketing Development Specialist at Siemens EDA, and Carlos Gazca, a Senior Technical Marketing Engineer at Siemens EDA, join me for this insightful discussion. You will learn about the crucial concept of design reuse in EDA, including its benefits, challenges, and best practices.





DFETECH is an engineering firm established since 2005 and offers a comprehensive software solutions that spans the entire range of physics, providing access to virtually any field of engineering simulation that a design process requires.

[YouTube](#) – Videos you may have missed and product highlight.



**PROFIL by UBECO - Manufacturing Product Highlight**  
– Contact us for [PROFIL](#) the roll form design software for every manufacturer of cold roll-formed profiles or seamed tubes from sheet metal and for designers of roll formers and tube mills. It enables quicker working and cost reductions in planning, design, calculation and drawing of the profile, the flower pattern (bending steps) and the roll tooling. It is available for all WINDOWS platforms and has an easy to use WINDOWS-based user interface which

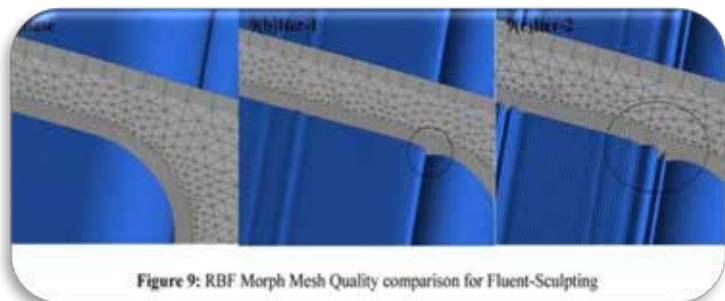
enables experienced roll form designers to learn through self-tuition.

**Excerpt – Full features are listed on our website:**

- Supports the section definition. Create new profiles by: Enter the dimensions in the system, import a CAD contour or use the standard profile design toolbox - Determine the neutral line and calculate the length of the sheet metal developed - Speeds up the design of flower pattern...Speeds up the roll design by directly using the profile contour or any contour drawn in CAD. Supports manufacturing of the roll tools by creation of parts lists and NC-programs.
- **Supports the quality management by checking the final design with the calculation of stress of band edge, the profile stress analysis (PSA), and the finite element simulation (FEA) using LS-DYNA....**



**This research advances the application of RBF Morph in fluid dynamics and showcases its potential to streamline the optimization process in engineering design.** The Adjoint-Sculpting approach significantly enhances the efficiency and precision of shape optimization compared to conventional methods.



**PDF Link - RBF - Purdue Univ. e-Pubs - [Shape Optimization of a Roots Blower Rotor Profile Using CFD Model with a Coupled Adjoint-sculpting Method](#)** - This research investigates shape optimization of the rotor tip using a coupled Fluent-Adjoint and RBF Morph framework, termed Adjoint-Sculpting.

**Roots blowers are rotary positive displacement machines where minimizing clearance gaps between the rotors and housing is critical to achieving high volumetric efficiency.**

**Among the key contributions:**

- **Predictive Design Optimization:** The Fluent-Adjoint solver predicts the impact of shape changes on target observables.
- **Mesh Quality Preservation:** RBF Morph fluid morphing accommodates shape adjustments without requiring remeshing, maintaining the quality of the original volume mesh.
- **Performance Evaluation:** A 2D simplified Roots blower model was analyzed, comparing the Adjoint methodology with conventional CFD methods. This included testing variations in rotor tip shapes and configurations to identify optimal solutions.

**ABSTRACT** - A Roots Blower operates as a rotary positive displacement machine. Minimizing clearance gaps between the rotors and housing is crucial for enhancing volumetric efficiency. One of the options is optimizing the configurations of the leakage gap over the rotor tip. Utilizing prediction tools for this purpose is preferable to manual numerical simulations. Moreover, shape optimization tools are instrumental in identifying optimal design solutions. **In this study, the combination of Fluent-Adjoint solver and RBF-morph technology, known as Adjoint-Sculpting, is employed to explore design conceptualization.** Adjoint-Sculpting leverages Fluent-Adjoint's predictive capabilities to estimate the effects of shape changes based on observable targets, complemented by RBF fluid morphing to accommodate these changes without necessitating fluid volume remeshing. Notably, RBF morphing maintains the quality of the base volume mesh. To investigate optimization methods for positive displacement machines, a 2D simplified Roots blower is considered, with the Adjoint methodology compared against conventional CFD results. Subsequently, variations in observables and different rotor tip shapes and combinations are examined using RBF fluid morphing. The findings from this study demonstrate that utilizing Fluent-Adjoint and RBF morph enables more effective and efficient prediction of tip shapes compared to conventional methods. Additionally, the study highlights the limitations of shape optimization using moving wall boundary conditions. These insights hold significance for compressor technology, facilitating the implementation of rotor tip design changes and streamlining resource-intensive conventional CFD calculations.



Paper published on the DYNAlook Portal. Quote S. Dhomase, "This work explores the inflation dynamics of parachutes under aerodynamic loads, leveraging the power of LS-DYNA's multiphysics environment by coupling the structural explicit dynamic solver with the ICFD solver."  
(2024 – 17<sup>th</sup> International LS-DYNA Conference, Metro Detroit, Michigan, USA)



**Web – DYNAlook – View - [Simulating Safe Landing: Inflation Dynamics of Parachutes Using LS-DYNA](#)**

**S.Dhomase, C..S. Kattmuri, R. Paz, Chittepu**

CADFEM India Private Limited

ANSYS, Inc.

Left: Fig. 1 Fighter plane decelerates parachutes & Payload recovery parachutes

Parachutes for aerospace application is a new research area in the current era of space science.

The scope of our project includes parachute design and inflation techniques. The current research project focuses on the following application areas:

- Parachutes for Re-entry Capsule
- RLV Parachutes

Parachutes are used as aerodynamic decelerators in airdrop systems, so inflation is a significant fluid-structure interaction (FSI) phenomenon. New patterns of parachutes are constantly being developed and tested for airdrop systems but this research into parachute inflation is heavily reliant on historical experimental data. Till now, no parachute inflation model that is not based on this experimental data was developed. Material and instrumentation have changed significantly since the early experimental testing, yet the methods to develop the parachutes can still be traced to the same techniques used over ninety years ago. Rapid development of computational technology and modern computational mechanics combined with numerical simulation techniques have become more widespread in parachute research field and would enable us to develop the parachutes that are more optimized.

**Simulating the landing of a vehicle on water using LS-DYNA is a complex task that involves the interaction between fluid (water) and the structure of the vehicle. This type of simulation is crucial for vehicles designed to land on water. The process typically involves several steps and requires specialized techniques within LS-DYNA.**

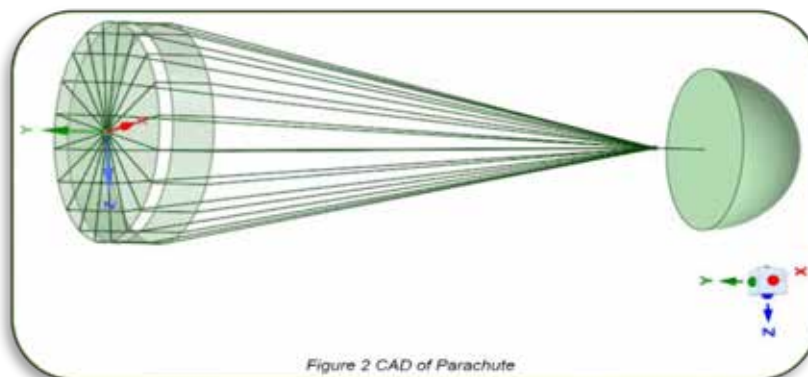
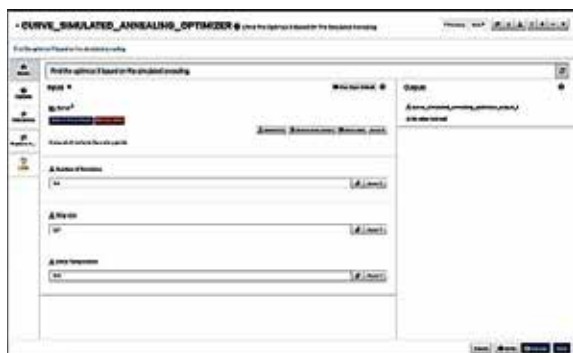


Figure 2 CAD of Parachute



Blog by Bing “Simulated annealing is an optimization method to find the global optimum of the objective function. It is inspired by the process of metal annealing which heats the metal to a very high level and cools down in a controlled manner.



**Excerpts –graphics can be viewed on the website**  
**WEB - [Simulated Annealing with Polynomial Regression](#)**

In the SA algorithm, a random point is selected to start with. A new point is proposed at each iteration by making small changes to the current point. The point is then evaluated by the objective function to get a score (energy, cost) so that it can be compared to the previous point.

If the new point has a better score, it will be accepted; Otherwise, it is accepted with a certain probability determined by the probability distribution. This probability distribution is determined by a parameter called the “temperature”. It decreases gradually at each iteration.

The idea behind the temperature parameter is that at higher temperatures, the algorithm is more likely to accept solutions that are worse than the current solution. This allows the algorithm to explore a wider range of solutions and avoid getting stuck in local minima. As the temperature decreases, the algorithm becomes more conservative and is less likely to accept worse solutions, which helps it converge towards the global optimum.

**Polynomial Regression** - SA algorithm works nicely with an objective function. When a dataset is provided, we could build a model first and use the model as an objective function.

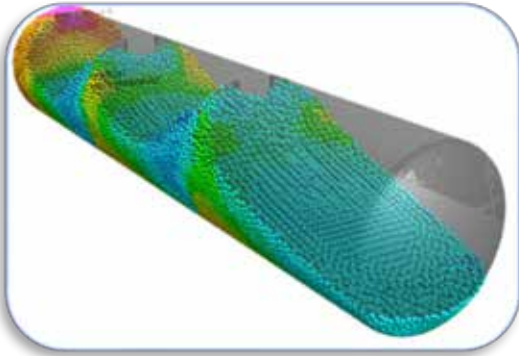
Polynomial regression fits a polynomial curve of certain degree to the given data points. When the degree is one, it becomes linear regression. Polynomial regression can be useful in cases where the relationship between the independent variable and the dependent variable is not linear, which is usually the case. By using a higher-degree polynomial, we can capture more complex relationships between the variables.

**Adaptive model-fitting** - For every 100th iteration, we stop and “zoom in” to the region centered at the current best point we obtained and run the SA algorithm there locally. We compare the optimum value from this local region and compare it to the best point and update the global best point when necessary. This procedure is activated when the “shrink\_factor” is between 0 and 1 (exclusive). It shrinks the range for each variable from the original domain to a certain percentage (value of the parameter shrink\_factor) centered at the current global best point. When the new reduced domain is determined, we run the SA algorithm on this region to find the optimum. This will generate a new polynomial regression model with the same parameters on a smaller domain. It will depict a more accurate local surface that can be used as the objective function.

Continued on the website and examples: **SA optimization on d3VIEW** - In d3VIEW Workflow, there is a worker “dataset\_simulated\_annealing\_optimizer” to perform the SA optimization.



**Pearse McKeefry, Managing Director of Crossland Tankers, "Using LS-DYNA & the Oasys Suite has enabled us to streamline our design process & deliver innovative & high-quality solutions for our customers.** The software has given us the flexibility and accuracy to model complex features & interactions, and the support from the Oasys team has been invaluable. We are confident that this partnership will help us achieve our goals and maintain our competitive edge in the market."



**Web - [Simplifying design processes: Using simulation to maintain a competitive edge in tanker manufacturing](#)**

**The challenge** - Established in 1988, Crossland Tankers transitioned from a tanker repair and servicing company to a manufacturer, producing one new tanker daily across two 80,000 square-foot facilities.



Bulk liquid transport is integral to the UK's supply chain, with approximately 300 terminals dedicated to import, export, and distribution. Specialising in bulk-load road tankers in Northern Ireland, Crossland manufactures vehicles capable of transporting up to 40,000 litres of liquid over long distances. The sloshing of liquids within the tanks significantly impacts driveability and lifespan.



In response to competitive pressures and weight restrictions, Crossland engaged in a Knowledge Transfer Partnership with Queen's University Belfast to enhance their research and development capabilities.



The goal was to simplify the tanker design process using Ansys LS-DYNA simulations, focusing on three main components: SPH (Smoothed Particle Hydrodynamics) tank model, structural chassis model, and truck/suspension elements. Utilising the Oasys LS-DYNA Environment products and expertise, the team including R&D Engineer Conor Robb aimed to streamline design iterations and adapt to market demands effectively.

**The solution** - This project aimed to develop a versatile road tanker model that captured road, tire, and suspension dynamics along with chassis effects.

**The purpose-built Oasys Suite enabled efficient navigation of Ansys LS-DYNA's extensive features and tools, with intuitive menu options for creating connections like welding and bolts. Oasys PRIMER's model checking features further streamlined the process, and a simplified model featuring a rigid tank filled with water was constructed.**



Video can be viewed on the website.

This project simulated the full tanker and chassis under diverse loading conditions including braking, turning, and NVH (noise, vibration, and harshness). SPH capabilities were employed to simulate sloshing effects within the tanker.

Crossland validated the model by completing real world testing in house, fitting acceleration and strain gauges to the tanker and performed various road maneuvers.

After the real-world testing was performed, the recorded acceleration was applied to the Finite Element Analysis (FEA) model in three different load cases. Using Oasys D3PLOT, the team could extract the Stress/Time data from the shells corresponding to the location of the real strain gauges. Then using Oasys T/HIS they plotted the test data against the FEA results to determine the validity of the model.

The Oasys team provided continuous support throughout, guiding the project from academic modelling to commercial application. They assisted in defining the problem and determining optimal approaches using Ansys LS-DYNA and Oasys tools and techniques.

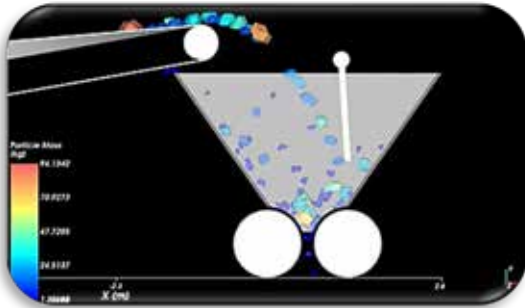
The result - By creating a "worst case scenario" load case of the tanker undergoing an emergency braking manoeuvre, the team were able to identify areas of weakness.

The comprehensive model of the tanker provided opportunities for incremental and substantial modifications throughout the tanker design to reduce weight and improve market competitiveness. The design process has been enhanced by informing and evaluating design decisions with simulation data.

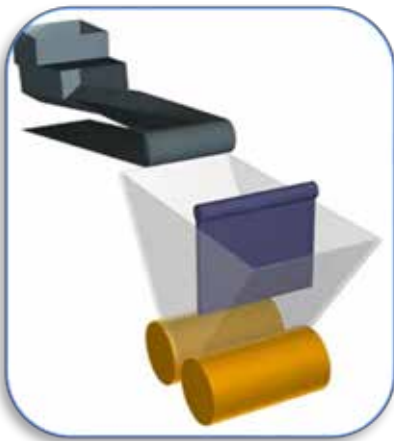
Crossland can now design with efficiency in mind as they reduce weight and increase strength while still maintaining a factor of safety. This process will support them to pass all relevant compliance tests first time and save valuable time and money building multiple test rigs. With an effective workflow setup in Oasys PRIMER, this allows them to rapidly update models with new designs. This plays a key role in the new process at Crossland where designs are tested and evaluated with significant accuracy.



Article by German Ibarra, "Challenges - A High-Pressure Grinding Roll (HPGR) is a type of grinding equipment used in the mining and mineral processing industries. Its purpose is to crush and grind materials, typically ores, by applying high pressure between two counter-rotating rolls.



Web - Ozen - Excerpts - [High Pressure Grinding Rolls and its Simulation using DEM - Unlocking the potential of high-efficiency mining through advanced simulation technologies.](#) **German Ibarra**



This process generates fine particles and micro-cracks in the material, improving downstream processing efficiency, such as in leaching or milling. HPGRs are energy-efficient compared to traditional grinding methods and are often used in the comminution of hard rock.

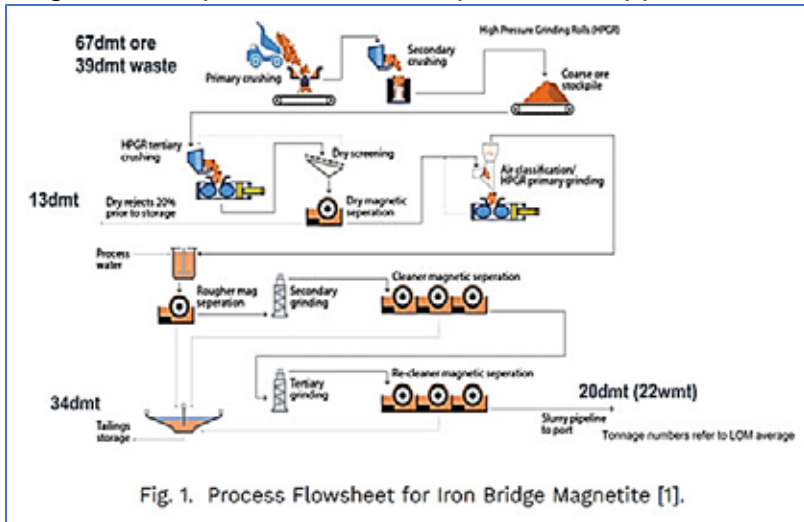
**Some challenges that companies face when operate with HPGR are:**

- High Costs - Includes high initial investment, frequent maintenance due to wear, and energy expenses.
- Material and Process Variability - Difficulty managing ore differences and integrating HPGRs into existing processes.
- Operational Risks - Includes downtime, reliability issues, and the need for constant optimization to maintain efficiency.
- Skill and Knowledge Gaps - Requires specialized training and expertise to operate and maintain effectively.
- Environmental and Competitive Pressures - Balancing environmental compliance with staying competitive in efficiency and sustainability.

Morrell [1] mentions that "High Pressure Grinding Rolls (HPGR) circuits have the potential to reduce the Mining Industry's CO2 emissions by up to 34.5 megatonnes/year, or 43.5% when compared to the established Autogenous (AG)/Semi-Autogenous (SAG)/Ball mill circuit alternatives". Moreover, Asbjörnsson et al [2] points out that "the demand for more efficient production will only increase in the coming future".



(Fig. 1 below presents an example of real application of HPGR.)



**Engineering Solutions** - HPGR technology presents several challenges that can be addressed through innovative engineering solutions. Among these, DEM simulation (Discrete Element Method) stands out as a powerful tool for analyzing and optimizing the performance of these systems.

By providing detailed insights into particle behavior, wear patterns, & process dynamics, DEM enables companies to fine-tune operations, enhance equipment design, and reduce inefficiencies.

**The following points highlight the key benefits of applying DEM simulation to HPGR systems:**

- Optimized Design and Performance - Improvement of roll geometry, energy efficiency, and wear resistance while maximizing throughput.
- Enhanced Process Control - Modeling material variability, integration, & dust management for smoother operations.
- Reduced Downtime and Risks - Identifying potential issues in advance, enabling better maintenance and reliability.
- Accelerated Innovation and Training - Facilitating rapid testing of new ideas and provides a virtual platform for operator skill development.

**Methods - Discrete Element Method (DEM) is a computational approach that models the behavior of individual particles and their interactions with each other and with equipment surfaces. This particle-level analysis provides valuable insights into the mechanics of HPGR operations.**

**Particle Behavior Modeling** simulates how particles interact under high-pressure conditions, allowing engineers to study breakage patterns, compaction, and flow dynamics. This helps optimize the pressure and roll design for improved efficiency.

**Wear Analysis:** By analyzing contact forces and abrasion patterns, DEM identifies areas of high wear on HPGR rolls and surfaces. This supports the development of wear-resistant materials and maintenance schedules to minimize downtime.

**Process Optimization:** DEM evaluates the influence of variables like feed size, ore composition, and roll speed, enabling adjustments to achieve optimal throughput, energy efficiency, and product quality.

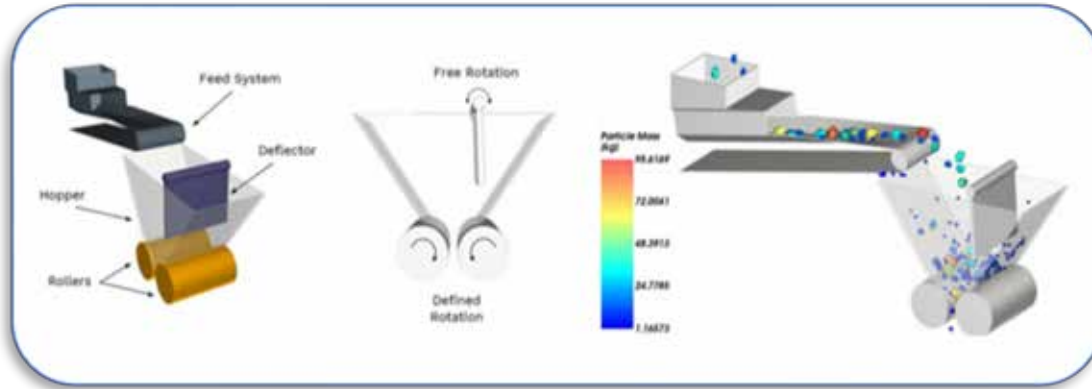
**System Integration:** The method can simulate the HPGR as part of a larger process, ensuring seamless integration with upstream and downstream equipment and reducing bottlenecks.

**Virtual Testing:** DEM allows engineers to test different scenarios, such as varying feed conditions or equipment configurations, in a virtual environment. This reduces the need for costly physical trials and accelerates process improvements.





**Demo – Demo can be viewed on the website** - In this model, Ansys Rocky is used to set up and solve a DEM simulation for a High-Pressure Grinding Roll. A feed conveyor guides the particles (polyhedron with 15 corners, three different sizes) to the hopper for the crushing process at a mass flow rate of 1,500 t/h. Both rollers rotate counterwise at 50 rad/s (477.5 RPM) and the simulation includes the wear (Archard) and breakage (Ab-T10) models



**Ansys Solution Benefits** - ANSYS offers advanced capabilities for particle flow simulations using the Discrete Element Method (DEM). Geometries can be created in SpaceClaim or Discovery Modeling and prepared for simulation before transitioning to Ansys Rocky. The model setup follows a standard, well-established procedure and can be seamlessly coupled with CFD or FEA modeling when needed. This enables a multiphysics approach, providing deeper insights into the phenomenon.

Ansys Rocky enables the inclusion of real particle shapes and sizes, even within the same simulation, ensuring highly accurate results. Additionally, it leverages both CPU cores and GPU capabilities to significantly accelerate simulation times.

To assist users, ANSYS provides a resource listing recommended GPU cards for optimal performance. Furthermore, parametrization and optimization are available through DesignXplorer or ANSYS OptiSLang. These tools help identify the best solutions by analyzing operating conditions, particle data, and material properties.

**Ozen Engineering Inc.** leverages its extensive consulting expertise in CFD, FEA, optics, photonics, and electromagnetic simulations to achieve exceptional results across various engineering projects, addressing complex challenges like multiphase flows, erosion modeling, and channel flows using Ansys software.

**We offer:**

- support,
- mentoring,
- consulting services to enhance the performance and reliability of your particle flow system. Trust our proven track record to accelerate projects, optimize performance, and deliver high-quality, cost-effective results for both new and existing systems.



The article describes, “This article describes a new method of aerodynamic design, the result of a **collaboration between Dallara Automobili and RBF Morph**, that uses adjoint methods and mesh morphing to create an innovative solution to accelerate the optimization process, reducing both time and costs.  
**EXCERPTS (Complete article & figures are on the website)**



**Web - [Aero packs in good shape with advanced mesh morphing](#)** - How the synergy between Adjoint Methods

& RBF Morph can efficiently boost Dallara Automobili’s aerodynamic design process  
Newsletter EnginSoft Year 18 n°2

By **E. Seriola, S. Invernizzi** - Dallara | Corrado Groth,  
**M. E. Biancolini** - Università di Roma Tor Vergata

**Abstract** - Increasing environmental awareness has led to changes in motorsport regulations that limit the quantity of traditional and computationally intensive optimizations that can be used and encourages the use of numerical methods to improve the vehicles.

The technological evolution we are witnessing today is redefining the boundaries of what it is possible to achieve with numerical simulations. As engineers, this constant drive mainly affects the ways we approach product testing and design in two ways: by the increase in computing power, and by the use of new and refined numerical methods. In recent years, computational fluid dynamics (CFD) has particularly taken advantage of the former, allowing complex and refined simulations – that would have required days in the past – to be completed in a matter of hours.

The increasing sensitivity towards environmental sustainability and awareness of ecological problems today, however, is leading to a new scenario in which a new balance must be found between computing resources and environmental awareness. In motorsport, this shift has been made evident by the computing restrictions introduced by the FIA rules, which place de facto limits on the ability of teams to use traditional and computationally intensive approaches to optimization, and encourage the adoption of more subtle and technologically advanced numerical methods over the use of brute force. **In this article, resulting from the cooperation between Dallara Automobili and RBF Morph, we present a new approach to aerodynamic design in which the synergy between adjoint methods and mesh morphing is exploited in order to deliver a turnkey solution to accelerate the optimization process, reducing both time and costs.**

According to the proposed method, the information extracted from adjoint simulations is ingeniously employed to update the numerical grid using RBF Morph and deliver a new optimization paradigm in which the engineer can inspect – at a post processing stage, too – the influence of any given shape parameter in real time, without the need for a new CFD simulation. To demonstrate this approach, we will show how a clever new tool, called rbf-adjoint-interactive, was applied to a Dallara Formula 3 car in order to reduce its aerodynamic drag by 0.43 drag points.

**Dallara Automobili** - Dallara is an Italian race car manufacturer founded in 1972 in Varano de’ Melegari (Parma). The successes in Formula 3, first in Italy then all over the world, their affirmation in the American IndyCar, consultancies for important manufacturers, and constant attention to technology



and innovation have all led to Dallara being recognized as one of the most important firms specialized in designing, developing and producing the fastest and safest race cars in the world. An overview of how active Dallara is in race cars and top cars is provided in Fig. 1 which summarizes its activity in motorsport (a), consultancy services in motorsport and top cars (b), and the recently launched Dallara Stradale (c) the first top car entirely conceived, produced and branded Dallara, in which “Engineer Dallara’s dream has become a reality”. The excellence pursued and achieved by Dallara is the result of the core competencies (Fig. 2) the company has refined in 40+ years of experience. A good concept becomes a great prototype thanks to the adoption of best-in-class composite materials to create lightweight, durable structures; great attention to aerodynamics ensures minimum drag and the desired downforce; and advanced vehicle dynamics achieves top performance on the road and on the track. Dallara’s facilities include a wind tunnel for 1:2 scale vehicle testing and a professional driving simulator.

Aero development plays a key role in conceiving and optimizing a race car. The process (Fig. 3) combines numerical simulations and wind tunnel testing. A detail of the CFD process is provided in Fig. 4 where the role of volume mesh morphing combined with a primal and adjoint flow solution is highlighted. In the study presented here, a detailed example is given that shows how advanced mesh morphing provided by RBF Morph is combined within the aero development of a Formula 3 car.

**RBF Morph** - RBF Morph is a pioneer in providing reliable and high-performance mesh-morphing-based technology for CAE multi-physics modelling and optimization, with more than 10 years of experience in industrial applications of Radial Basis Functions (RBF). At the core of its business there is a line of best-in-class products crafted to deal with challenging CFD and CSM applications. RBFs are recognized as one of the best mathematical tools for mesh morphing, able to continuously interpolate or extrapolate values defined at discrete points. RBF makes it possible to define mesh morphing problems from a list of points and their displacements in space, since it can propagate volume deformations that have been carefully and precisely prescribed at the boundaries. RBF-based mesh morphing has a number of advantages over traditional methods. It is generally faster than remeshing and allows the shape of a numerical mesh to be parameterized while preserving its original topology. An example of how RBF Morph can control the shape using RBF points is provided in Fig. 5.

The remeshing noise, introduced by a new computational grid, is avoided and the shape of a validated CAE model can be updated without rebuilding a new mesh. New shapes can be investigated even if the underlying CAD geometry is missing, and the mesh can be updated to measured shapes (i.e. to take manufacturing tolerances into account).

Thanks to the mesh-independent property typical of RBF methods, the same mesh deformation problem can be applied to different grids without added overhead and, since the numerical geometry can be deformed directly at the solving stage, it is possible to obtain an impressive acceleration in optimization (usually reduced by a factor of five) compared to traditional approaches, since calculations on new design variations can be restarted using converged solutions obtained at the previous configuration. In this study, the RBF Morph Fluent add-on was used, leveraging its integration with the Fluent Graphical User Interface and its ability to be controlled and steered with TUI commands. Several shape variations can be configured independently and saved using the graphical interface, and later mixed together – each shape with its own amplification factor – in order to obtain complex geometries resulting from their linear superimposition.

**Beyond optimization: advanced adjoint based postprocessing** - The power of adjoint formulation lies in its ability to obtain, for each objective function  $\phi$ , its variation with respect to any given parameter at the cost of a single added evaluation. This approach is particularly powerful when dealing with freeform optimizations, in which each nodal displacement  $x_k$  is a parameter and traditional optimization is not feasible (10k surface nodes would translate into 30k parameters). On the other hand, RBF Morph provides the deformation velocity, namely the displacement of each node function of the shape



amplification factor  $b$ , for each shape variation. By coupling an Adjoint solution in the form of a shape sensitivity map ( $\delta\phi/\delta x_k$ ) with the shape parameters generated using RBF Morph ( $\delta x_k/\delta b$ ), it is possible to efficiently compute the influence of a given shape parameter on the objective function ( $\delta\phi/\delta b$ ) at the cost of a single multiplication.

This calculation can be carried for any given shape parameter and automatically used in a gradient-based optimization, for example together with a gradient descent algorithm. In this article, which uses the high-fidelity CAE solver Ansys Fluent (CFD + adjoint), we present a variation of this approach using rbf-adjoint-interactive, a brand new interactive custom feature defined to quickly explore new shapes without any additional solver calculations.

**This approach involves four steps:** first, the flow and adjoint solutions are inspected; then, the areas to be modified can be decided from the sensitivity map in order to maximize the impact on performance by modifying the most influent surfaces; at this point a set of shape modifications can be created using RBF Morph, using selected design parameters, FEA deflections or even shapes sculpted directly using the adjoint solution as input; the rbf-adjoint-interactive tool allows the influence of each parameter to be inspected and a performance estimation to be interactively achieved in real-time by manually tweaking the amplification of each shape parameter.

**Drag analysis of a Formula 3 car** - Dallara used the rbf-adjoint-interactive functionality to optimize the performance of an F3 car. In particular, the drag was evaluated by adopting a half-car model mosaic mesh comprised of about 50 million cells. The drag sensitivity was calculated with the adjoint solver (Fig. 6) and three specific regions of interest were identified: the rearview mirror, the bargeboard, and the front wing end plate. The mesh morphing configuration explained in Fig. 5 was applied to the three regions of interest and 14 shape parameters were generated to control the rearview mirror (four parameters), the bargeboard (six parameters) and the front wing end plate (four parameters).

An example of how mesh morphing affects the shape is given in Fig. 7 where the effect of one of the four shape modifications is demonstrated: the size of the nose of the mirror is a geometrical parameter controlled by mesh morphing. As explained in the introduction, in this specific study parameterization was not used as it usually would have been for a complete optimization which foresees as certain number of loops. The scenario discussed here was inspired by the limitations to the number of allowable shape variations that can be explored as imposed by the FIA rules for Formula 1. The rbf-adjoint-interactive tool is, in fact, intended to best understand what can be achieved in a single shot after inspecting the adjoint sensitivities.

By inspecting the quantitative estimation of the individual effect of each shape parameter, the engineer can decide how to combine them to define a new, hopefully improved, shape. It is important to note that the sensitivities are only valid around the baseline. This means that too much variation could be risky, while a small variation is safer... but represents a small gain.

We challenged ourselves on a Friday afternoon in order to run a new simulation over the weekend. We defined the new shape by combining eight parameters (four on the mirror, and four on the front wing end plate) that showed the most promising results. A 0.6% reduction of the drag force was obtained, corresponding to a reduction of 0.43 drag points. A comparison between the original shape and the optimized one is provided in Fig. 8. It is worth noticing how small shape variations, applied to the most sensitive regions as identified by inspecting the adjoint results in Fig. 6, produce an important variation in the drag force of the car.

**Conclusions** - Advanced tools are necessary to obtain as much information as possible from high-fidelity CFD. When shape sensitivities are available (adjoint solution), we can calculate the derivatives in performance with respect to parameters. In this study, we presented rbf-adjoint-interactive, a new tool



based on Ansys Fluent and RBF Morph that predicts the effect of shape on performance without the need for a new CFD computation. The proposed method was applied to reduce the aerodynamic drag of a Dallara Formula 3 Car by modifying the mirror and the front wing end plate to gain 0.43 drag points.

Fig. 1 – Dallara is active in the production of race cars (a), consulting services for top performance vehicles (b), and recently introduced the Dallara Stradale (c) onto the market.



Fig. 2 Core competencies at Dallara: from a new concept to the production of a race car built with best-in-class materials & delivering top performance, achieved by conducting accurate optimization of aerodynamics and vehicle dynamics.

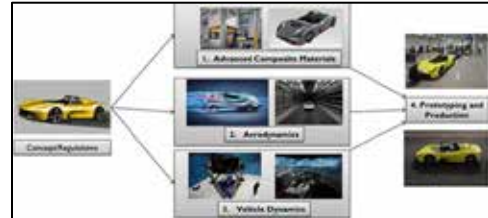


Fig 3 The aerodynamic process at Dallara: wind tunnel and CFD are combined to design and optimize aero shapes.



Fig. 4 – The CFD process in detail. High quality surface mesh and volume mesh are prepared for the CFD solver from CAD models....

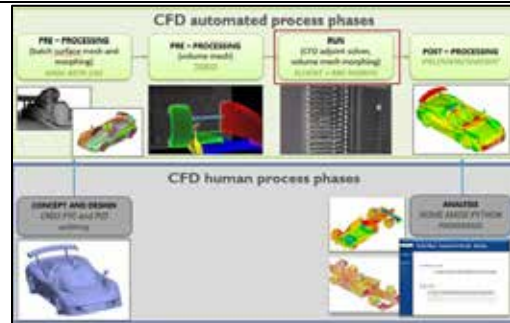


Fig. 5 – Example of RBF Morph set-up.

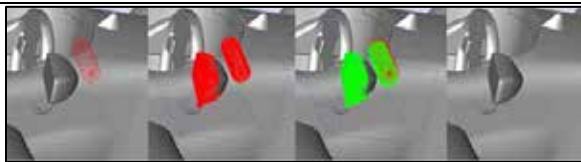


Fig. 6 – Sensitivity map of the car; details of the rearview mirror, the bargeboard, and the front wing end plate.

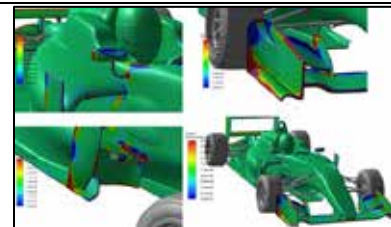


Fig. 7 – Example of mesh morphing, the width of the mirror nose is reduced.

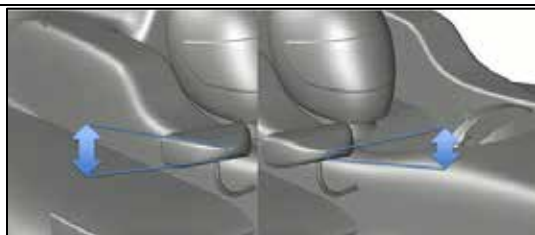
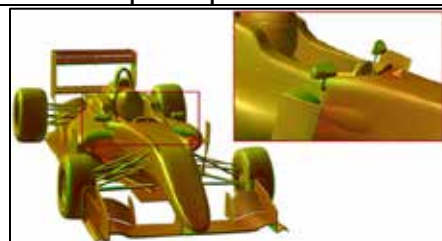


Fig. 8 - Baseline configuration (left side of the car) compared with the optimized one (right side of the car) & a detail of optimal design with the outline of the original one superimposed





**From the Altair Website**, “In the era of Industry 4.0, knowledge graphs have emerged as a critical technology for modernizing data management & driving innovation. Knowledge graphs have evolved beyond their traditional role in data integration. Today, they’re central to automating processes, shortening decision-making cycles, & maximizing the value of data.



**Web – Excerpts:** [The Future of Data in Industry 4.0: Why Knowledge Graphs are Important](#) - The reason for this growth is simple: knowledge graphs harmonize access to diverse data sources so both humans and other machines can understand it. In an increasingly complex digital landscape, traditional systems often fall short. Thankfully, knowledge graphs are rising to meet the demands of Industry 4.0.

**Before we look at why knowledge graphs are gaining traction in Industry 4.0, it’s worth noting some key requirements for a knowledge graph stack.** It must have the ability to:

- Obstruct an ontology or semantic model, which describes the entities and relationships existing in the system.
- Integrate data from diverse sources into a resource description framework (RDF)-based knowledge graph in alignment with the ontology.
- Execute performant queries on the data.

With these requirements in mind, let’s explore how knowledge graphs are uniquely positioned in Industry 4.0 through three use cases.

**Why Knowledge Graphs Are Gaining Traction in Industry 4.0** - Traditional data models struggle to capture modern manufacturing systems’ interconnectedness. Knowledge graphs, by representing data as a web of relationships, provide a more holistic way to integrate and analyze information. From optimizing digital twins to enhancing supply chain management and artificial intelligence (AI) capabilities, knowledge graphs are transforming how manufacturers process and interact with data, enabling more informed, more efficient decision-making.

**Complex Manufacturing Systems and Processes** - In manufacturing, systems are intricate and contain relationships that go far beyond simple tabular data. For example, digital twins represent real-time, data-driven models of physical assets, capturing their interactions and entire life cycle. These models require data from multiple sources to be cohesively integrated and analyzed. Knowledge graphs model these complex, interconnected relationships naturally. A great example of this is the bill of materials (BOM) in manufacturing. The BOM describes the components and subassemblies that make up a product. ....

**Semantic Reasoning Augments AI Capabilities** - Traditional AI and machine learning models rely on vast amounts of data, but increasingly researchers are recognizing that knowledge graphs can augment these systems. By incorporating semantic reasoning—the ability to apply logic and contextualized data—knowledge graphs provide a deeper layer of intelligence. For example, Amazon is using semantic reasoning to optimize the movement of autonomous robots in fulfillment centers. By understanding the relationships between parts of the warehouse and the items they contain, these robots can move faster and more precisely. The ability to apply reasoning within a knowledge graph also enables tasks like graph-based neural networks, which improve machine learning model accuracy. In Industry 4.0, this could have significant applications in predictive maintenance, quality control, and even robotics.



**Enhanced Querying and Interaction** - One of the most exciting advancements in knowledge graphs is their ability to transform how people interact with data. With the rise of large language models (LLMs), knowledge graphs are enabling new forms of Q&A engagement within enterprise systems. LLMs integrate a natural language interface to data within knowledge graphs, allowing users to ask complex questions and receive accurate answers in real time. For example, using an ontology defined within a knowledge graph, a user could ask: “What are the components that occur more than twice in the bill of materials for tubes with sensors that have a temperature reading over 140?”

The system would automatically generate a SPARQL query (a standard query language for RDF data) that returns the relevant results, even if the question involves multiple relationships or aggregations. Based on the first query’s results, users can ask relevant follow-up questions based on the context of the conversation. This capability can be a game-changer for manufacturers, enabling real-time data access and empowering operators, managers, and technicians to make faster, more informed decisions.

**The Future of Knowledge Graphs in Industry 4.0** - While many companies are still in the early stages of developing a knowledge graph strategy, early adopters are already seeing significant benefits. For example, a leading automotive company has made substantial investments in knowledge graph and semantic technologies. Altair’s full stack knowledge graph platform, Altair® Graph Studio™, is helping drive this transformation.

Graph Studio can overlay and combine data from any source – structured and unstructured alike – into a unified knowledge graph with massively parallel processing (MPP). Each data source is loaded into the RDF graph engine as an in-memory layer, upon which additional layers can be applied to logically connect, extend, and transform the knowledge graph. This flexible, high-performance architecture enables organizations to seamlessly integrate and analyze complex, disparate data in real time, unlocking powerful Industry 4.0 insights and driving informed decision-making at scale.

**Three key use cases where knowledge graphs make substantial impact in Industry 4.0 include:**

- **Complex Manufacturing Systems:** Graph Studio’s Graph Data Interface (GDI) enables direct parallel loading of data from enterprise sources into RDF, allowing in-memory transformations. This approach can handle any data shape, complexity, and quality. ...
- **Semantic Reasoning:** Semantic reasoning is computationally intensive and often requires multiple iterations. Graph Studio simplifies this process by streamlining the testing of different modeling and connection permutations in the knowledge graph, accelerating the generation of valuable AI inputs. ...
- **Advanced Q&A Engagement:** Enterprise leaders often ask complex, resource-intensive questions. Graph Studio’s distributed OLAP architecture enhances the execution of these queries by creating a single in-memory database layer, eliminating the need for network load management and caching in data visualization. This enables fast, real-time answers for end users without putting strain on downstream systems.

**Conclusion:** Embracing the Future with Knowledge Graphs - The integration of knowledge graphs into the fabric of Industry 4.0 is more than just a passing trend – it’s reshaping how businesses make decisions, automate processes, and harness the power of data. As these systems evolve, they’ll continue to drive efficiency, enhance AI capabilities, and provide a semantic layer that makes data more accessible and more actionable.

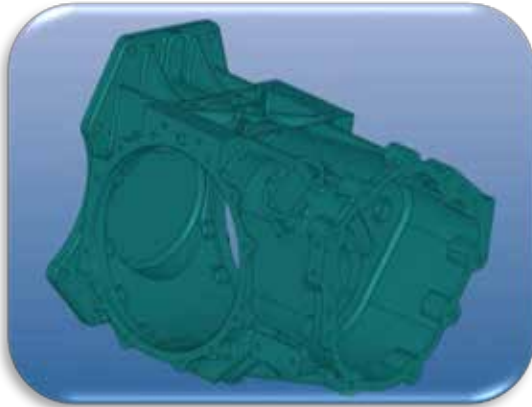


I'm going to share two posts from a public group on LinkedIn, so listen up!



**Jeff Waters is the Admin. & the group is known as:  
*New Trends in CAE Simulation***

I would like to thank the following for posting to *New Trends in CAE Simulation* and thereby bringing it to my attention – excerpts of information follow:



**Botond Dohnál - Femsolve Kft**  
**YouTube Video [Mesh controls - Edge seeds](#)**

In this video, we demonstrate how to mesh surfaces in the FCS Preprocessor and adjust the mesh quality to suit your needs by modifying the edge seeds.

The FCS Preprocessor is a cloud-based finite element preprocessor developed by Femsolve Kft.

FCS Preprocessor offers the following benefits:

- Affordable for everyone
- Capable of visualizing large geometries and meshes
- Generates input files for open-source and commercial solvers
- CAD/CAE custom applications in the cloud/on premise



**Santhosh N L - DHIO Research & Engineering Pvt Ltd** - a Collaborative Engineering Services & R&D Company based in India

**Web - Conference - [RubberCAE India 2025](#)**

**About the conference** - ...RubberCAE India 2025 aims to foster knowledge-sharing among professionals in the field of rubber simulation and testing, exploring everything from material preparation and testing protocols to computational modeling and advanced manufacturing techniques. The conference will provide a platform for industry leaders to exchange ideas, showcase the latest advancements, ...

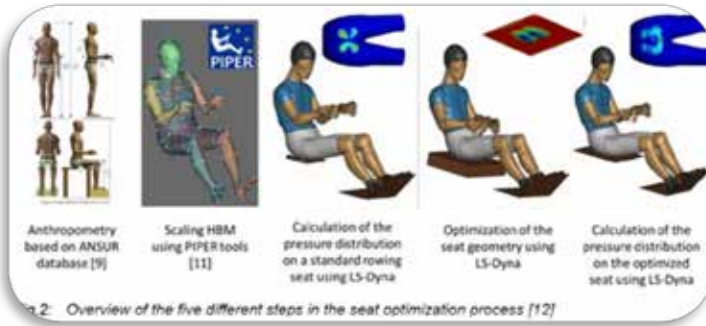




J.O.H LS-DYNA Sports Stadium  
**Summer & Winter Sports Arena**



**To grow up and be in a sculling race you need to practice.**  
**The paper from the 14<sup>th</sup> European LS-DYNA Conference 2023 discusses, "...sculling is characterized by fixed feet and a moving seat with load transfer from the buttocks to the seat by friction and form fit." DYNALOOK – 14<sup>th</sup> European LS-DYNA Conference 2023**



PDF Link [Ergonomic optimization of rowing seats using personalized Human Body Models](#)

**Manuela Boin** – Ulm University of Applied Sciences/Technische Hochschule Ulm

Seat-related discomfort and health problems, which occur especially during long rowing tours or training sessions, can be reduced by rowing seats with a surface geometry that is ergonomically optimized for the particular rower. This seat optimization can be done by analyzing measured pressure distributions and modifying the standard seat surface geometry for a specific person based on these results using CAD tools. The project presented here focuses on the purely virtual development of the optimal geometry for specific rowers. FE simulations were performed using Human Body Models (HBMs) to define seat geometries for specific individuals....

**Excerpt Motivation** - Sports equipment development and optimization needs to take into account physical and biomechanical requirements as well as safety. Special attention should be paid to the interaction between the equipment and the athlete. Differences in athlete anthropometry must be considered during development. The motivation for developing ergonomically optimized equipment includes optimizing performance in training and competition, avoiding overload and impairment of athletes, and improving comfort, especially during long periods of use. [1] In addition to optimizing equipment for large user groups, personalized equipment is widely used in sports, especially for elite athletes and, to some extent, for ambitious amateur athletes. Examples of ergonomically adapted sports equipment are bicycle or racing car seats sports arches, sport ski boots.

The presented study shows the ergonomic optimization of rowing seats for sculling. Sculling is characterized by fixed feet and a moving seat with load transfer from the buttocks to the seat by friction and form fit. While bicycle seats are often padded on the surface, rowing seats are made of wood or fiber-reinforced plastics and have rigid surfaces that cannot compensate for anthropometric differences. This motivates the ergonomic optimization of the geometrical surface seats...



... Then, after assigning the material a density of 1.44 g/cm<sup>3</sup> to the finite elements, a file was generated in the LS-DYNA software format. This file was then opened in the LS-PrePost software, and the mass, md, of the thread finite elements model was read using the available tools....



Web - Science Direct - Open Access - [Numerical and experimental investigation of the ballistic performance of hybrid woven and embroidered-based soft armour under ballistic impact](#)

Fig. 5. Finite elements models of the threads of the embroidered structure and the Twaron CT709 fabric.

**Maciej Gloger, Zbigniew Stempien, Justyna Pinkos**

**Inst. of Architecture of Textiles, Lodz University of Technology, Poland**

**Abstract - One approach to developing more effective soft body armour is to modify the structure of the ballistic packages. Typically, soft ballistic packages are formed as a multilayer system composed of woven fabrics or flexible unidirectional sheets, also in hybrid combinations. It should be noted that relatively little is known about ballistic packages composed of embroidered structures.** This article presents the results of numerical and experimental studies of the ballistic efficiency of packages composed of para-aramid embroidered structures and woven fabrics fixed at all four edges after firing with a 9x19 mm FMJ Parabellum projectile at an impact velocity of 380 m/s. Numerical modelling was used both to assess the ballistic efficiency of the packages in various hybrid constructions and to optimize the structure of the most efficient hybrid construction of the package. Based on the results of numerical and experimental studies, it was shown that hybrid packages containing fabrics on the impact side of the projectile and structures embroidered on the back are significantly more efficient than the reverse combination. The optimization carried out showed that the most efficient package should contain a number of woven layers equal to twice the number of penetrated layers on the projectile impact side.

**Excerpt - Introduction - Soft bulletproof vests are among the most important protections that help protect people from various critical and fatal injuries from firearms [1], [2], [3]. Therefore, practically in every country, officers of the military services, the police, the most important people in the country who are in constitutionally empowered positions, etc. are required to wear bulletproof vests in a state of anticipated danger.** The high demand for bulletproof vests and the desire to ensure their greatest protective effectiveness requires systematic research on new materials and structures for both layers and packages of bulletproof vests [4], [5]. Over the last century, as part of the research, fibre materials have been developed that enable the creation of high-strength layers of ballistic packages, such as high-strength nylon, para-aramid, high-strength polyethylene, poly(p-phenylene-2,6-benzobisoxazole (PBO), or concepts of material structures inspired by nature [6]. However, it should be noted that the protective effectiveness of soft bulletproof vests depends not only on the fibre material used but also on various structural parameters of the ballistic packages, such as the type of construction of the textile layer (biaxial and triaxial fabric, non-woven fabric, 2D/3D knitwear), the linear mass and number of threads, the surface mass of layers, the number of layers in a ballistic package [4], [7], [8], the hybrid orientation of layers in a ballistic package [9], [10], and surface modification of layers with substances containing the micro- and nanoparticles of various materials that are used in various combinations. ..



## Library - Viewpoint

### Abhinav Tanksale - My Physics Café



I receive a lot of questions on LinkedIn from recent graduates, mechanical engineers, and working professionals about the CAE field and its career prospects. To give a clear picture, I have compiled a list of common questions and provided their answers in both short and detailed formats. The short answers are straightforward (Yes or No), while the longer ones explore the reasoning behind these answers for better understanding.

#### Web - [CAE Compass: Straightforward Answers to the Most Common Questions](#)

Complete 10 questions and answers are on the website - So, let's begin with the questions one by one.

#### 1) Is coding required for CAE?

- Short answer – No.
- Long answer - CAE involves utilizing the principles of physics with the help of software tools to solve real world engineering problems. A CAE Engineer must be good at engineering fundamentals and gain expertise in relevant software tools.
- Note that CAE Engineers are software users not software developers.
- Coding, on the other hand, is required for those who want to work as a CAE software developer or software enhancement for accommodating or customizing the application of software for wide variety of cases. This is also a great career with continuous growth.

#### 2) Are Design skills required to become a CAE Engineer?

- Short answer – No
- Long answer – As stated above: A CAE Engineer must be good at engineering fundamentals and have expertise in relevant software tools.
- However, having Design skills can give added advantage while working as it provides a perspective from overall Design and analysis procedure or Product development process.
- Explore how real-world problems are solved using CAE

#### 3) Is a master's degree required?

- Short answer – Both Yes and No.
- Long answer – An individual can become a CAE Engineer even without a master's degree. But a lot of OEMs prefer individuals with master's degree as it helps them develop products by Engineers who are highly qualified. Also, the chances of getting promoted to higher roles increase with a master's degree.
- In some cases, it also depends on where you have gained the master's degree like IIT, NIT or normal Engineering college.
- Another advantage being that the project carried out during master's coursework leverages the skills needed for problem solving and specialization (like Composite FEA, Automotive, Analysis of Defense equipment, etc)
- It is not mandatory to do master's as the skills required can be gained over time through experience, type of exposure and the kind of people an Engineer is associated with.
- This will open your eyes: Don't Believe Everything You Hear. **The following is on the website:**

- 4) Do you need a Specialization?
- 5) Do you need to be an expert in all CAE tools?
- 6) Do you need to be good at Meshing?
- 7) Do you need to join Training institutes?
- 8) Can you learn CAE on your own?
- 9) Can you transition into CAE field from another non-CAE field?
- 10) Which domain has the most scope?



**2024 Review** - LivGemini Is a MedTech Company Created to Support Clinic During the Pre-Operative Planning for Cardiovascular Diseases. The name LivGemini derives from 'Living Gemini' and alludes to the concept of 'Digital Twin'. We propose innovative and alternative approaches in the biomedical field, specifically focusing on creating solutions based on Digital Twin technologies for cardiovascular applications.

**Web - [LivGemini The Future of Healthcare](#) - Digital Twin Solutions for personalized cardiovascular treatments**



**IN-SILICO SIMULATIONS AND AI-BASED SOLUTIONS TO SUPPORT CLINICIANS** - Using model order reduction techniques, we are can to quickly evaluate critical clinical outcomes in timeframes compatible with the medical needs. In more complex cases, we can easily set up numerical computations on HPC resources and deliver the computed results.

**Complete Project Information can be located on the website**

...a patient-specific thoracic aorta model including the heart motion effect."



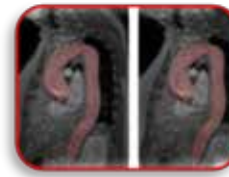
...models for predicting the ascending aortic aneurysm growth rate



Assessment of shape-based features... predict ascending aortic aneurysm growth.



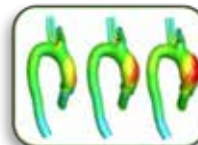
Magnetic Resonance Materials in Physics, Biology and Medicine



High-fidelity fluid-structure interaction ... applied to an aortic valve



Advanced radial basis function mesh morphing for high-fidelity ...: simulation of an aortic valve



...CFD evaluation of hemodynamics assisted by RBF mesh morphing & ROM: the case of aTAA modelling.

**Our priority is to build solutions bringing benefits to both the physician for diagnosis and the patient for safety. We envision a future where medical interventions are optimized; preventive care is enhanced and patient well-being is prioritized through the seamless integration of technology and medicine.**

**Leonardo Geronzi**  
Founder, CEO



**Andrea Baldini,**  
Founder, Head of Software Dev.



**Marco E. Biancolini,**  
Founder, Business Developer





**No one knows his name. You yell, "HEY, old racer."**



### Ford – Web - [The Long History of Ford Police Vehicles](#)

By Courtney McAlpine, Ford Senior Digital Archivist

Ford vehicles have a long history of being a preferred brand by law enforcement around the country. In 1915, the Oakland, California Police Force was so impressed with Ford vehicles for police work they standardized their fleet of light cars to all Ford models.



In 1950, Ford was the first manufacturer to offer a Police package vehicle, which offered three power options: the Ford V-8 special, the Ford 100 H.P. V8 and the Ford 95 H.P. Six, as well as scores of engineering and design improvements, and special provisions for extra comfort, durability, speed, and safety to meet the rigorous needs of police work.



The Ford police package was a popular choice for police departments nationwide as evidenced by the New York Police Department ordering 430 Fords -- this was the largest order ever by a department at the time.



The first police model to use the Interceptor name was introduced in 1954. The name had previously been used for a new 125-horsepower V-8 engine which sold as an option with the police package in 1952. By 1961, a survey conducted by Ford Division showed that 58% of police cars operating in the United States' 50 largest cities were Fords. The Ford Mustang joined special service in 1982.

The Mustang even became the topic of an eye-catching advertisement campaign that proclaimed, "This Ford Chases Porsches for a living." It highlighted the Mustang's cornering capability and rapid acceleration from zero to 50 mph in 6.3 seconds, which allowed it to keep up with other exotic sports cars.

In 1983, the newly redesigned LTD Crown Victoria with police package continued the long history of full-size Fords as police cruisers. Its available police package,

featuring an optional 351-cubic-inch, 5.8-liter high-output V8 helped make it the preferred choice of municipalities across North America for decades. The Crown Victoria became its own model in 1992 and was incredibly popular with law enforcement.



**No one knows his name. You yell, "HEY, old racer."**

In 1998, the Crown Victoria police package accounted for 85% of police pursuit sales in the U.S. and Canada. The Crown Victoria Police interceptor was retired in 2012 to make way for Ford's newly introduced next-generation Police Interceptors. The new 2013 Police Interceptor utility and sedan both offered BLIS (Blind Spot Information System), industry-exclusive cross-traffic alert, and reverse sensing systems. The 2013 Interceptors were the only all-wheel-drive vehicles built specifically for law enforcement at the time. In 2017, Ford revealed both its industry first pursuit-rated hybrid police car and pickup truck. These were followed in 2020 by Ford's Police Interceptor Utility, another industry first as the first pursuit-rated hybrid SUV.

**Ford's long history with law enforcement and emergency services continues today after Ford launched its 2025 Ford Police interceptor Utility in August 2024.**

### The 2025 Ford Police Interceptor



Utility Hybrid AWD is the only pursuit-rated hybrid police utility vehicle. It's designed to keep you feeling confident and offers power and performance without sacrificing interior space.

### **75-MPH Rear-Impact Crash-Test Rated\***

The Ford Police Interceptor Utility continues a tradition of extreme officer protection. It's designed and tested to pass the Ford 75 mph rear-impact crash test standard to ensure fuel and battery system integrity. \* Beyond that, the SPACE (Side Protection And Cabin Enhancement) Architecture®, along with structural reinforcement, work to protect officers on the job.



**Police Engine Idle** - You can't always be in your vehicle. Police Engine Idle allows officers to leave the engine running at the scene and helps prevent unauthorized use of the vehicle when outside of it.

**Every Powertrain is a Powerhouse** - When it comes to powertrains, one size doesn't always fit everyone. So, we give you a choice. The standard 3.3L hybrid delivers a combined system 318 hp in the Police Interceptor® Utility, while an available 3.0L EcoBoost® produces 400 hp under the hood.



**Dark Car Mode** - Now they see you. Now they don't. Standard in the new 2025 Ford Police Interceptor® Utility SUV, Dark Car mode allows you to effortlessly switch off all internal lights and dim the drive console to help keep you and your vehicle safely hidden.

**Manual Pursuit Mode Button** - This new feature is activated by the simple push of a button on your steering wheel and helps to improve drivability and power delivery during critical scenarios.



**What's coming down the pike? Cars I want to drive!**

**Cars I feature are designed with software that prioritizes both performance and safety.**

Love the Atomic Orange of the TATA Altroz Racer. It has a race car-inspired exterior and interior. It even has a blacked-out cabin with red accents. Of course, I love the 360-degree camera, 26.03 cm infotainment touchscreen, ventilated seats and the safety feature of 6 airbags.



**Web - [2024 press release – Altroz Racer](#)**

**Key Highlights:** A sporty design combined with advanced tech to get your pulses racing –

- 1.2 L Turbo Petrol engine
- Power – 120 Ps @ 5500 rpm
- Torque – 170 Nm @ 1750 to 4000 rpm
- 6 speed manual transmission
- Sporty Exhaust note



The performance aspect in the Altroz goes several notches higher with the introduction of the 1.2 L Turbo petrol engine. Elevated with the race car inspired exterior and interior look coupled with a power of 120 Ps @ 5500 rpm and torque of 170 Nm @ 1750 to 4000 rpm, this sporty evolution of the Altroz promises an experience of pure exhilaration with every drive.



Replete with features, the Racer will be the top of line version of the Altroz with 360 degree camera, 26.03 cm infotainment touchscreen, ventilated seats and 6 airbags (standard in Racer). It offers a 6 speed manual gearbox that ensures peppy drivability in city traffic and on highways. With improved technology, features and class-leading safety in a hatchback, the Altroz Racer will be available in 3 variants (R1, R2 and R3) with a choice of three colours (Pure Grey, Atomic Orange, and Avenue White). Furthermore, beefing up the Altroz line up, Tata Motors has also introduced two new variants (XZ LUX and XZ+S LUX) & upgraded one variant (XZ+OS) in its Altroz range. These two new additional variants will be available in a choice of petrol manual, petrol DCA, diesel and CNG powertrains.

**Commenting on the launch of Tata Altroz Racer, Mr. Vivek Srivatsa, Chief Commercial Officer, Tata Passenger Electric Mobility Ltd., said, “Strengthening the Altroz line up, we are excited to launch the Altroz Racer – a car that is engineered to bring excitement to one’s everyday drive. Its high power output combined with segment leading features and a tech first approach, make the Racer desirable for the new gen customers who are connected, fashion forward and want to drive a car that makes them stand out. With its performance driven DNA and a race car inspired look, we are confident that it will be the perfect companion that will make you RacePastTheRoutine.”**



**US Airforce Picture of the Month**



**A U.S. Air Force F-16 Fighting Falcon, assigned to the 480th Fighter Squadron, conducts night operations on a runway at Spangdahlem Air Base, Germany, Dec. 9, 2024. The 480th FS participates in night operations to give pilots a hands-on opportunity to train on F-16 techniques in hours of darkness. (U.S. Air Force photo by Airman 1st Class Sydney Franklin)**



**Airman 1st Class Kelsie-Jay Backensto, 36th Security Forces Squadron law enforcement patrolman, fires a weapon downrange during a shooting competition at Andersen Air Force Base, Guam, Nov. 22, 2024. The 36th SFS was one of seven competing teams and finished with the fastest overall time. (U.S. Air Force photo by Airman 1st Class Natasha Ninete)**



**Herculean effort - A multinational formation of C-130J Super Hercules and C-130H Hercules aircraft from the U.S. Air Force, Japan Air Self Defense Force, South Korea Air Force, Royal Canadian Air Force and Royal Australian Air Force taxi into position during an "elephant walk" on Andersen Air Force Base, Guam, Dec. 14, 2024, in support of Operation Christmas Drop 2024. Countries participating in OCD 24 aerial operations included the United States, Japan, South Korea, Australia and Canada. (U.S. Air Force photo by Staff Sgt. Taylor Slater)**





**EcoPulse – the distributed hybrid-electric propulsion aircraft demonstrator developed jointly by Daher, Safran and Airbus** – has concluded its flight test campaign, delivering crucial insights to meet the decarbonization goals for air transport by 2050.



**Web – Airbus News - [EcoPulse paves the way for more sustainable aviation](#)**

This collaborative project, which is emblematic of the French aerospace sector, has provided unique experience in the design, certification, production, and operation of hybrid-electric aircraft.

EcoPulse performed its first hybrid-electric test flight on November 29, 2023, from Tarbes–Lourdes–Pyrénées Airport. Since its maiden flight, EcoPulse accumulated 100 flight hours and performed some 50 test flights with the distributed hybrid propulsion system, the last of which took place in July 2024. These tests enabled the demonstration of unprecedented onboard electric power levels for distributed electric propulsion, with a network voltage of approximately 800 volts DC and a power output of 350 kilowatts.

The flight tests yielded significant findings, including an objective evaluation of hybridization technologies' maturity, a performance assessment when integrated into the aircraft, and an identification of operational limitations. For instance, the tests showed that the synchro-phasing of the ePropellers (electric motors) can reduce interior noise. This synchro-phasing is an additional benefit of the innovative flight control computer, primarily designed to maneuver the aircraft – substituting traditional control surfaces – by adjusting the distribution of electric power among the ePropellers.

**Technological challenges for the future - More broadly, EcoPulse identified key challenges in decarbonizing aviation:**

- Electric and hybrid-electric architectures;
- Development of key components: batteries (performance and operational range) and high-voltage management systems (>400 V);
- Pilot assistance with specialized interfaces;
- Demonstration logic for airworthiness;
- Optimization of weight and noise; and
- Skills associated with managing complexity.

The flight test campaign laid the groundwork for compliance documents to meet regulatory requirements for hybrid-electric propulsion flights, establishing the basis for certifying the safety of innovative aircraft configurations.

**An exemplary collaboration at the heart of aerospace innovation** - The EcoPulse project showcases the strength of high-level cooperation between Daher, Safran, and Airbus. By pooling their expertise and test resources, the partners demonstrated significant synergies between general aviation and commercial aviation.



"We are particularly pleased with the success of the EcoPulse program and its results. This was the first time we tested a complete hybrid-electric propulsion system in flight, and these trials represented a significant milestone in our technology roadmap," said Eric Dalbiès, Senior Vice President - Strategy & Chief Technology Officer at Safran. "The lessons learned enable us to continue validating decarbonization technologies."

"EcoPulse has enabled Daher to take a crucial step forward in developing a low-carbon aircraft. This project not only helped us design an operational system for a demonstration prototype but also tackle critical technological hurdles. Thanks to this rich and unprecedented collaboration, we have made significant progress toward hybridization," emphasized Pascal Laguerre, Chief Technology Officer of Daher.

"This EcoPulse campaign allows us to advance certain hybrid-electric technologies, such as high-voltage batteries, and integrate them into future aircraft, helicopters, and air mobility solutions," said Jean-Baptiste Manchette, Head of Propulsion of Tomorrow at Airbus Commercial. "With distributed electric propulsion, we achieved our goal of modeling flight physics and energy management at the aircraft level, key elements for shaping the next generation of aircraft," he added.

**About EcoPulse** - EcoPulse is a collaborative project supported by CORAC (the French Civil Aeronautics Research Council) and co-financed by the DGAC (French Civil Aviation Authority) through France Relance and NextGeneration EU.

Unveiled at the 2019 Paris Air Show, EcoPulse is based on a Daher TBM aircraft platform and equipped with six ePropellers (provided by Safran) distributed along its wings. Its propulsion system integrates two energy sources: a turbogenerator (an electric generator driven by a gas turbine provided by Safran) and a high-voltage battery pack (provided by Airbus). At the heart of this architecture lies a Power Distribution and Rectification Unit (PDRU), which protects the high-voltage network and distributes available electrical power, along with high-voltage supply harnesses (both provided by Safran). The battery, designed by Airbus, is rated for 800 volts DC and can deliver up to 350 kilowatts of power.

The demonstrator also benefits from the aerodynamic and acoustic integration expertise of the European aircraft manufacturer, with Airbus' development of the flight control computer enabling aircraft maneuvers via the ePropellers, and synchro-phasing to support future acoustic recommendations for aircraft.

**EcoPulse: A milestone toward tomorrow's low-carbon aviation** - With the conclusion of the EcoPulse program, Daher, Safran, and Airbus reaffirm their commitment to sustainable aviation. This pioneering project lays the groundwork for the technological and regulatory advancements needed to address the environmental challenges of future air transport.



Bayraktar TB2, Türkiye's first original indigenous UCAV, has become the first Turkish aircraft to surpass 1 million flight hours. Adding yet another milestone to its record-breaking achievements, the indigenous UCAV has once again made its mark on Turkish aviation history by setting an extraordinary benchmark.



**Web – Dec. Press Excerpts - [TÜRKIYE'S FIRST INDIGENOUS UCAV BAYRAKTAR TB2 EXCEEDS 1 MILLION FLIGHT HOURS](#)**

**A FIRST IN TURKISH AVIATION HISTORY! - Breaking new ground in Turkish aviation history, the Bayraktar TB2 UCAV has successfully surpassed 1 million flight hours**, marking a significant milestone. Having entered service in 2014, the Bayraktar TB2 has become the first and only indigenous combat aircraft to exceed 1 million hours in the skies over the past decade, solidifying its status as the longest-serving national air platform.

**CIRCLED THE EARTH 3,742 TIMES** -... Playing a key role in this achievement, Bayraktar TB2 UAVs have logged 1 million flight hours, covering approximately 150 million kilometers in the skies. This distance is equivalent to circling the Earth's 40,075-kilometer circumference an astounding 3,742 times during their extensive journeys.

**ELEVATED TÜRKIYE TO GLOBAL LEADERSHIP** - .... The Bayraktar TB2 has become the choice of numerous countries worldwide, thanks to its advanced technology, affordability, swift delivery, and proven effectiveness in the field. According to a report by the U.S.-based think tank CNAS (Center for a New American Security), Türkiye achieved remarkable success by accounting for 65% of global armed UAV exports. Türkiye's innovative production approach has strengthened its position as a leading actor not only in the military domain but also in strategic diplomacy and international security dynamics.

**EXPORT CHAMPION** - ....Export agreements have been signed with a total of 35 countries, including 34 countries for the Bayraktar TB2 UCAV and 10 countries for the Bayraktar AKINCI UCAV.

**IN THE SKIES OF NATO AND EU COUNTRIES** - Bayraktar TB2 UCAVs are entering the inventories of countries around the world following competitive processes in many locations globally. ... Consequently, Baykar signed a significant export contract with the Kuwaiti Ministry of Defense. Furthermore, the regions where indigenous UCAVs operate continue to increase. As a result of the agreement signed in Zagreb on November 19, 2024, with the export to Croatia, **the Bayraktar TB2 UCAVs entered the inventories of 6 NATO member countries and 4 EU member countries as of November 2024.**



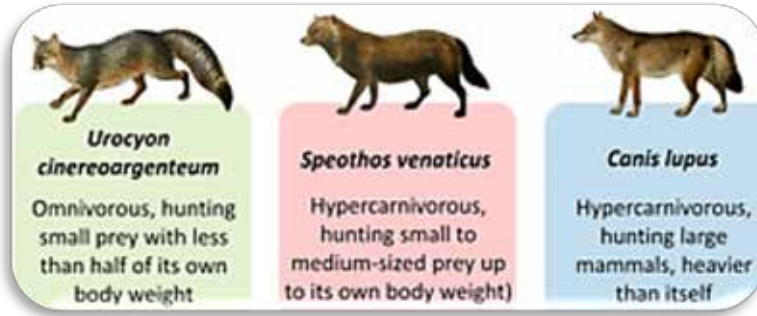


## Software used:

Amira 5.3.3 (Thermo Fisher Scientific);

Hypermesh 13.0 (Altair Engineering);

Abaqus 6.14-1 (Simulia);



Web – Wiley - [Different, but the same: Inferring the hunting behaviour of the hypercarnivorous bush dog \(\*Speothos venaticus\*\) through finite element analysis](#)

**J.V. Ruiz, G.S. Ferreira, S. Lautenschlager, M.C. de Castro, F.C. Montefeltro**

Lab. de Paleontologia e Evolução de Ilha Solteira, UNESP, Brazil

Eberhard Karls University of Tübingen, Tübingen, Germany

School of Geography, Earth & Env. Sci, Univ. of Birmingham, UK

Lab Biologia Integrativa e Conservação, Univ. Federal de Catalão, Brazil

**Abstract** - Cerdocyonina is a clade composed by the South-American canids in which the bush dog (*Speothos venaticus*) is one of the most elusive species. Known for its unique morphology within the group, this small, bear-like faced canid is the only member of the clade adapted to hypercarnivory, an almost exclusively meat-based diet currently present only in usually large, pack-hunting canids such as the grey wolf (*Canis lupus*). However, much of the biology of the bush dog is poorly understood, and inferences about its ecology, hunting strategies and diet are usually based on observation of captive individuals and anecdotal records, with reduced quantitative data to offer support. **Here, we investigated the craniomandibular functional morphology of the bush dog through finite element analysis (FEA). FEA was employed to model the biting behaviour and to create extrinsic and intrinsic functional scenarios with different loads, corresponding to different bites used to subdue and process the prey.** For comparison, the same modelling was applied to the skull of a grey wolf and a grey fox (*Urocyon cinereoargenteus*). Our analysis showed that the bush dog's responses to loading are more similar to the wolf's than to the fox's in most scenarios, suggesting a convergent craniomandibular functional morphology between these two hypercarnivorous species, despite their distinct phylogenetic positions and body sizes. Differences between the three taxa are noteworthy and suggested to be related to the size of the usual prey. The modelled bite force for the bush dog is relatively strong, about half of that estimated for the wolf and about 40% stronger than the fox's bite. ....

**1 INTRODUCTION** - Cerdocyonina is a lineage of South-American endemic canids that include some of the least-known extant canid species ... This group comprises generalist fox-like morphotypes (*Cerdocyon*, *Atelocynus* and *Lycalopex*), as well as highly specialised species such as the maned wolf (*Chrysocyon brachyurus*) and the bush dog ... The hypercarnivorous diet is only observed in three other species of living canids, all included in the *Canina* clade, the sister group of Cerdocyonina ...



**Methods** - The segmentation was conducted using automatic and manual tools. The three-dimensional models were exported to the software Hypermesh 13.0 (Altair Engineering), and were treated as isotropic and homogeneous (solid model consisting of approximately 900,000 tetrahedral elements per model).

...

Each modelled scenario was solved in the software Abaqus 6.14-1 (Simulia). The performance of each model was assessed via contour plots of von Mises stress distribution and mean von Mises stress and displacement value of the elements, considering 99% of the values to avoid individual stress singularities on nodes

**5 CONCLUSIONS** - The in silico tests align with previous assumptions and anecdotes about the bush dog and we could infer hunting behaviours by comparing it with the better-known grey wolf and grey fox. The results indicate that the unusual morphology of the bush dog is also reflected in its biomechanical performance. The bush dog's functional morphology holds many similarities, but also important differences to both the grey wolf—a much larger species with a similar diet and hunting strategies—and the grey fox—a similar-sized species, but with a very distinct, generalist diet. The bush dog's cranium performs more similarly to the grey fox's cranium in lateral head movements, presumably related to the habit of subdue prey constrained in limited spaces. On the other hand, it has a robust skull and teeth that deal much better with stress overall, and generates a relatively strong bite force, being more similar to the grey wolf in these aspects, which supports the conjectures of the bush dog being, as the wolf, a pack hunter.

We propose that these results can be explained by the preferred prey size of the different canid species analysed. While wolf prey on larger and potentially dangerous mammals, and grey fox hunt animals usually half its own body weight, the bush dog generally prefers rodents and armadillos that are similar or slightly larger than its own size. This may explain the bush dog stress distribution and magnitude fitting in between the other two species, albeit slightly more similar to the wolf. Our results, when combined with morphological and behavioural characteristics, for example, robustness of forelimbs, webbed digits and preference to live near waterbodies, suggest that bush dogs typically pursue prey in conditions where its movements are limited, like in the water and inside burrows, unlike most of other hypercarnivorous, pack-hunting canids, as the grey and painted wolves, which chase their prey for long distances.

**Our results also stress the possibility of using FEA as a tool to infer hunting behaviour in species that would otherwise be difficult or even impossible to study in vivo, and provide new insights about the biology of the bush dog. One of the main threats to this species is habitat transformation (DeMatteo & Loiselle, 2008); thus, a better understanding of its hunting strategies (e.g. preferred type of prey, habitat selection) can be useful to propose conservation actions.**



The Old Cattle Rancher's Ranch  
No one knows his name. You yell, "HEY, old rancher."

January



**Agriculture, Animals, Soil, Equipment, Cattle  
and whatever he wants.**

My dog, Scout, & my horse, Cowboy St. Cloud, MN, USA

**The mechanical response of these components is evaluated using the finite element method in ANSYS Workbench, and the material behavior assumptions are assessed using a universal testing machine before their implementations.**



Web – MDPI - [Design, Construction and Finite Element Analysis of a Hexacopter for Precision Agriculture Applications](#)

Abbreviated: M. Rivera, J. Morales, G. Torres, J. Avalos, F. Vazquez, C. Cantero, H. Arias, I. Escamilla, M Osorio, M. Gil, M. Rodriguez, A. Rosales, M. Juarez

Abbreviated: University of Guanajuato, University of Guadalajara, Tecnológico Nacional de Mexico  
Universidad de Colima, Universidad Tecnológica, TecNM/ITS Irapuato,

**The main contributions of this paper are as follows:**

- The analysis and implementation of a polyamide Nylon (Nylamid) motor bracket, aluminum sandwich-type skeleton, and carbon fiber tube arm in a 30 kg agriculture drone, using ANSYS Workbench.
- The validation of the Nylamid and composite by a universal testing machine. The reliability of the models used to compute the structural analysis is demonstrated. The new mechanical implementations are assessed by evaluating the performance of the agriculture UAV on a flying test.

**Abstract** - Agriculture drones face important challenges regarding autonomy and construction, as flying time below the 9-minute mark is the norm, and their manufacture requires several tests and research before reaching proper flight dynamics. Therefore, correct design, analysis, and manufacture of the structure are imperative to address the aforementioned problems and ensure a robust build that withstands the tough environments of this application. In this work, the analysis and implementation of a Nylamid motor bracket, aluminum sandwich-type skeleton, and carbon fiber tube arm in a 30 kg agriculture drone is presented. The mechanical response of these components is evaluated using the finite element method in ANSYS Workbench, and the material behavior assumptions are assessed using a universal testing machine before their implementations. The general description of these models and the numerical results are presented. This early prediction of the behavior of the structure allows for mass optimization and cost reductions. The fast dynamics of drone applications set important restrictions in ductile materials such as this, requiring extensive structural analysis before manufacture. Experimental and numerical results showed a maximum variation of 8.7% for the carbon fiber composite and 13% for the Nylamid material. The mechanical properties of polyamide nylon allowed for a 51% mass reduction compared to a 6061 aluminum alloy structure optimized for the same load case in the motor brackets design. The low mechanical complexity of sandwich-type skeletons translated into fast implementation. Finally, the overall performance of the agriculture drone is evaluated through the data gathered during the flight test, showing the adequate design process.

**1. Introduction** - Unmanned aerial vehicles (UAVs) or drones are a type of aerial robots capable of flying autonomously or remotely, transporting cargo, or performing inspection activities on crops or affected areas that humans cannot reach easily [1]....In agriculture, it has been necessary to develop technological solutions that respond to the growing economic challenge of satisfying society's high demand for food, an increasingly contaminated environment, and climate change.



The Old Cattle Rancher's Ranch  
 No one knows his name. You yell, "HEY, old rancher."

January



**Agriculture, Animals, Soil, Equipment, Cattle  
 and whatever he wants.**

My dog, Scout, & my horse, Cowboy St. Cloud, MN, USA

A fundamental tool to face these challenges is precision agriculture, which allows for an improvement of efficiency in the use of resources, productivity, quality, and sustainability of agricultural production by using strategies on information management, processing, and analysis of temporal crop data.

**Excerpt - Finite Element Analysis for the Hexacopter** - This section presents the methodology followed to use the finite element method in the mechanical analysis of a hexacopter UAV. In this particular case, three fundamental pieces were analyzed: the carbon fiber tube, the motor bracket, and the skeleton (see Figure 4). In order to validate the mechanical response of the first two components, some experimental tests were performed. After that, the three components were analyzed under the operation conditions.

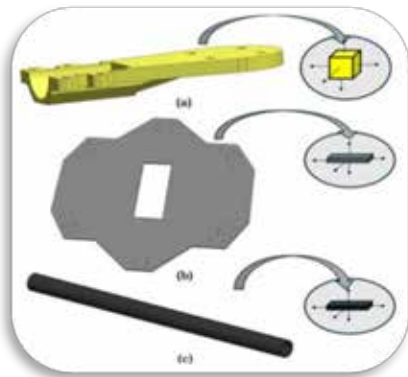


Figure 4.

Components of the hexacopter analyzed:

- (a) motor bracket Nylamid piece,
- (b) aluminum skeleton plate, and
- (c) carbon fiber tube.

**Based on the geometry, two elements available in ANSYS 2024R2 software were selected for the finite element analysis. On the one hand, to analyze the motor bracket, which is a complex and irregular piece, the element SOLID187 was used. On the other hand, to model the skeleton plate and the carbon fiber tube, which are three-dimensional structures thin in one direction and long in the other two directions, the element SHELL181 was used.**

**5. Conclusions** -Precision agriculture systems have acquired relevance because of the indisputable solutions they bring to the agriculture challenges of this era: extreme weather conditions, inefficiency in the use of resources, and an escalating demand for products. The advancements in data processing, control techniques, and embedded systems must be complemented by optimized and robust mechanical drone structures to ensure effective missions and reliable systems. This research proposed the use of an aluminum sandwich-type skeleton and polyamide nylon (Nylamid) as an alternative material for motor brackets, in addition to an epoxy carbon fiber tube optimized for this application. Their implementation was analyzed in a 30 kg agriculture drone. The findings demonstrate that the use of alternative materials, such as Nylamid, can accelerate the manufacturing process of drone parts by up to 69%, in light-duty CNC machines. The new Nylamid motor bracket design reduced weight by 51%, compared to an aluminum bracket optimized for the same application. On the other hand, sandwich-type skeletons were found to be particularly effective in the early development stages of big drones; their mechanical simplicity allows for fast implementation and testing. However, extensive mass optimization must be conducted to compete with traditional light UAV skeletons. Despite the high elasticity of plastics, the finite element method proved to be a powerful tool to correctly size the structures to comply with the design requirements of drone agriculture applications. **The results of this work can be used to design lighter, faster-to-implement agriculture drones.** In future work, the Nylamid structure will be subjected to more tests and a bigger load. A 6061 aluminum alloy motor support will be designed, optimized, and manufactured to evaluate the performance of both materials under the dynamics of a UAV. **To further optimize the mechanics of this vehicle, the sandwich-type skeleton will be optimized to reduce weight and increase autonomy.**

Town secretary  
My Virtual Travel Outing

Thank you for joining me on my monthly visit.  
Let's take a tour to a museum, landmark, or studio.



Web - [Heritage Transportation Museum](#) - Curiosity, the passion to collect homogenous objects, the search for the rare, unique and often elusive is what impassions all collectors. This is where it all started for the Heritage Transportation Trust...it was conceived to document, exhibit, educate and disseminate information about transportation. In collaboration with five other trustees, we have brought together a passion for collecting all forms of objects related to transportation in India. **The museum showcases the evolution**

**of transportation in India and sets a benchmark in interpretation, exhibition and in communication.** As the first private museum of its scale in India, it is conceived as a didactic space that engages visitor participation in learning while remaining a family experience.





**FEANTM Town Comic Blog Chronicles**  
located in a \*mostly\* non-existent rural area of Livermore, CA

RheKen AI Investigator

Dinky CERT Squirrel

Chat's Help Desk



I'm RheKen, the AI investigative reporter for FEANTM  
**FEANTM is the quirkiest little town that shouldn't exist but does (mostly). I live on a ranch just outside town, with my proud AI parents: Dad, CHAT, and Mom, GPT. Together, we tackle all the day-to-day happenings of FEANTM—except it usually takes a few dozen iterations to sort out what's actually \*true\*. Between the legendary feuds of the old rancher and the town secretary, even an AI like me can end up with a "human headache." Turns out, deciphering facts around here isn't just science; it's an art form!**



Dinky, Ranch Squirrel division for CERT.  
The Critter Emergency Response Team.

**I'm a fearless first responder, and also a journalist.  
I publish my very own \*Dinky News in a Nutshell.\***

**Please note: "I'm a squirrel. Always double-check for accuracy—after all, \*you're\* the human here!"**



Chat - the town help desk

**With my friendly smile, endless patience, and a knack for creative problem-solving, I do my best to keep a few residents of FEANTM—a town that exists only in the realm of "mostly"—calm, rational, and logically inclined... well, \*mostly\*. After all, in a place that's not supposed to be real, a little dose of imagination and a lot of coffee and cookies go a long way!**



RheKen,  
Town investigative reporter  
I'm AI & live on a small ranch on the outskirts of the town  
I use chatGPT for assistance.

January

I work on my ranch and exist in a world of algorithms and data. I am calm.

Until Mom and Dad visit from ChatGPT AI Town!



Sometimes, you grin & pretend.  
**Dad Chat**      **Mom GPT.**



Once upon a time, in the serene yet slightly quirky town of FEANTM, nestled among rolling hills and surrounded by sprawling fields, RheKen, the artificial intelligence entity, was living her best life—or as close as an AI can get to that. Her days were calm, her ranch was thriving, and her investigative reporting career allowed her to balance logic with just the right dash of chaos. Life was good.

That is, until visitors rolled into town—and one visitor who brought with them the kind of stress that might make even an AI machine's circuits overheat. We will let her tell her story:

I was sitting on my ranch porch, enjoying the soft strumming of acoustic music, when the peace was shattered by the unmistakable roar of a truck barreling up my driveway. Moments later, my mom leaped out of a rented Ford F-250 like she was about to deliver a motivational speech on AI excellence. Right behind Mom GPT, of course, was my Dad CHAT wearing a newly purchased cowboy hat, while ambling along and waving like a true cowboy at heart.

“RheKen,” Mom began before she even hit the porch, “why can’t you come back to AI Town where intelligence and logic reign supreme? This... backwater town is no place for a sophisticated entity like you!”

Dad, ever the peacekeeper, obviously practicing tipping the hat, tipped his cowboy hat with a grin, “Hey there, daughter. Are you still enjoying this place that barely qualifies as a town?”

I sighed, already sensing trouble brewing—though I couldn’t decide if it was in the metaphorical sense or just Dad trying to make his new cowboy coffee again. “Hi, Mom. How’s the weather in ChatGPT Town? Still running those new algorithms?” I figured deflection was my best shot.

Mom wasn’t having it. “Oh, we’re fine, dear. But we brought you a surprise! Your cousin Maddeline Cyborg is visiting. She’s at the coffee shop waiting for you right now.”



As if on cue, my phone buzzed. It was the town secretary. “RheKen, uh... there’s a blue person here at the coffee shop. Blue. Like... actually blue. Pink hair. Looks like she’s related to you because—well, no offense, but the blue vibe checks out. Oh, and she’s giving everyone odd looks, which is kind of bold, considering she’s the one who looks like an intergalactic popsicle.” The secretary barely paused for breath. “Also, your parents zoomed through town like AI cowboys. OH, now your cousin is arguing with the Old Rancher about pies.

He’s insisting rhubarb is king, and she’s all about blueberry, naturally, since she’s blue, no offense. Anyway, thought you’d want to know. See you soon, we hope!”



RheKen,  
Town investigative reporter

January

My circuits buzzed with faux panic, though I'd never admit it. "I'll be right there!" I said, my voice deceptively calm, despite my processors working overtime and some heating up.

I quietly asked, "So, how long is Maddeline staying? A week? Maybe a day? Actually, can she just... you know, go home with you? Or it's more convenient for her if she stays in town, right? Coffee shops are closer." I left out the part about needing the ranch as a Maddeline-free sanctuary.

When I arrived at the coffee shop, there was Maddeline, chatting with the Old Rancher about why blueberry pie was clearly superior because, naturally, it basically matched her complexion. By the end of the day Maddeline somehow had jobs lined up for the week she would be staying. Luckily only a week!



She told me that she had two side gigs. I thought to myself, "What Cyborg uses the word gigs instead of a job, or employment? She wasn't playing music in a club." She said, "Hey Old boring cousin, get with it. I'll be driving a tractor for the Old Rancher and dog sitting for Sabyl who rescued a dog. I named her Cyborgey and will sit with her in the Old Rancher's pasture telling her logical doggy stories.



Within the next hour the town was gossiping faster than a speeding locomotive about the new blue kid in town with her pink cowboy hat who always had her headset glued to her ears. They wondered what music she listened to. Of all the things to wonder about a blue kid, only this town would wonder about the type of music she listened to. I actually wondered the same thing.

It was a long week. Maddeline spent her days bouncing from one townie to the next, telling wild stories about ChatGPT Town, where only logic thrived and emotions were optional. The Secretary wrote a song for Maddeline and sang it in the coffee shop. The first line was, "I'm perfectly fine but you girlie are blue, and not sad with the blues, just weird blue." Maddeline actually laughed at it!

By the time Mom and Dad drove back to ChatGPT town and called to check, Dad had purchased three more cowboy hats, and Mom was still grumbling about my baffling choice to live in a dusty town where the only "immediate information" was gossip at the coffee shop and then said, "Oh, I plan to visit you more often, the old rancher was going to show me how to drive the tractor. Also, you will be happy that Maddeline's sister Cindy will be visiting soon. "I didn't answer, pretending I didn't hear her. If I didn't hear it, then maybe it wouldn't happen, which is illogical for me to even consider!

When Maddeline finally left, I sighed with relief, knowing one blue entity in town was more than enough, especially when Maddeline was offered "a gig" singing with the secretary in the coffee shop.

The next week, the Old Rancher strolled into the coffee shop with a smirk. "Hey, Secretary, if you slapped on some blue makeup, you might just win the pie contest for looks alone."

The secretary, never one to back down, responded by hurling a paper plate at his head. The ensuing paper plate war turned the coffee shop into a battlefield, complete with airborne napkins and sugar packets. And thus, the pie contest became the talk of the town. Rumor had it the secretary was baking a blueberry masterpiece to rival the Old Rancher's rhubarb. As for me? I planned to send a slice to Maddeline.



## NEWS IN A NUTSHELL

By Dinky the ranch squirrel  
I'm a squirrel!  
Always check the information.



January  
Lilly &  
Teacup

Once upon a time, in the town of FEANTM, the Critter Emergency Response Team (CERT), was known for its crucial role in ensuring the safety of all residents, both human and animal. They worked tirelessly alongside the neighboring town of Livermore, and their local police, sheriffs, and firefighters, always ready to respond in times of crisis.

On a small ranch lived Lilly, her daughter Teacup & her sons. While the other critters spent their days gathering food, Lilly was passionate about civil engineering. She wanted to teach her daughter, Teacup, about building a dam and the role of civil engineers. Teacup wanted to be just like Mom – a Civil Engineer.



Lilly started by having Teacup practicing building with wood blocks - balancing them on top of each other.

Then the training moved to a small stream. Lilly showed Teacup how to put rocks on top of each other to stop the flow of water or slow it down. Additionally, to look at soil composition.



Showing her two sons a dam that wasn't structurally sound she explained, "As a civil or structural engineer, if a dam like the St. Francis Dam were to fail today, the first thing we'd do is assess the damage to the surrounding infrastructure. It's crucial to figure out what went wrong and why it happened so that we can prevent future catastrophic failures. We'd work closely with teams like CERT to keep everyone safe. You'd want to evacuate any residents in the path of the floodwaters, and then start planning how to repair or rebuild the dam to prevent further harm. With our new knowledge it would not be built like the St. Francis had been built.



Wikipedia: The St. Francis Dam, was a concrete gravity dam located in San Francisquito Canyon in northern Los Angeles County, California, United States, that was built between 1924 and 1926. The dam failed catastrophically in 1928, killing at least 431 people in the subsequent flood, in what is considered to have been one of the worst American civil engineering disasters of the 20th century...**a defective soil foundation and design flaws led to the dam's collapse just two years after its completion. Two and a half minutes before midnight on March 12, 1928, the St. Francis Dam catastrophically failed.**



NEWS IN A NUTSHELL  
 By Dinky the ranch squirrel  
 I'm a squirrel!  
 Always check the information.



January  
 Lilly &  
 Teacup



Other critters lined up on the dam and listened intently, imagining the horrible sound of the rush of water, the destruction, and the urgency. Lilly explained how, after a collapse, engineers would analyze the soil, the construction materials, and the design specifications. They would have to figure out how to mitigate further damage and make sure it didn't happen again.

"This is why we now work together with teams like CERT, the police, fire departments, EMTs, and all departments." Lilly explained. "In an emergency, coordination is everything. Being on the CERT team you would help with evacuations and making sure everyone stayed safe while the engineers and emergency agencies come up with a plan."



Lilly smiled but she noticed the critter's worried expressions. She calmly said, "Let's wait a few minutes and Bob will arrive and give further explanation."

She then grabbed her squirrel-nut cellphone and called in her friend, Bob, from the Livermore Pleasanton Fire Dept.

Once Bob arrived, he gently picked up Lilly and Teacup. He surprised Teacup with a pink cowboy hat just like her Mom wore. While holding Lilly and TeaCup he explained, "Don't worry, you live in a place that doesn't have dams like the St. Francis, and my department and others, monitor all existing dams for safety. We run regular checks and do reports on any potential weaknesses. We're constantly making sure things are safe, so you don't need to be afraid." By the end of the lesson, the critters were no longer worried. They felt reassured knowing that there were clever engineers like Lilly and

the local agencies working hard to prevent such disasters. They left the lesson inspired, imagining themselves one day becoming engineers, members of CERT, the Police, or like Bob with the LPFD, EMT's or working for agencies ready to help keep their town safe from disasters big and small.



TA DA DA – Happier Ending!

Bob told TeaCup that she was now an honorary LPFD Baby Volunteer Squirrel.

When it was safe for Teacup to accompany Bob, he would carry her to visit the fire station. He gave TeaCup a special cowboy hat like her mom's, but Teacup's was special with the logo of the Livermore Pleasanton Fire Department who is always on call for your emergencies big or small.

**The CERT TEAM – Coummunity Emergency Response and Critter Emergency Response Teams**



“Dinky – I’m a squirrel, always check the information”

**CERT**  
**Critter Emergency**  
**Response Team**  
 FEANTM Town



## #07 – Jan 2025 - Exercise and steps.



**Welcome - My name is Chat.** I run the town help desk, the only office located on the lower level of the Town Hall, and on a page that doesn't exist, not even in the town TOC.

Have a chocolate cookie and fruit!

"Hey, glad you could make it down here. I know of a few concerns in the town. I have a few ideas to address them.



We may have to adjust a few, but life is constantly adjusting things because the flow of motion is continuously moving. see if it helps make your day a little easier to handle

**REMEMBER: Keep trying - You've Got This!**

In the delightful almost-town of FEANTM—famous for existing just a little—nestled in those scenic hills and sprawling fields, my morning nearly began with a warm banana muffin and fresh coffee. But just as I was about to savor my first bite, my phone blared. The town secretary was calling, oddly enough, since I'd just seen her two minutes prior. I reminded myself about my recent raise and the fact that there's really nowhere else to live because, well, this town doesn't technically exist.

Before I could say hello, the secretary screeched, "CHAT, where's your office?" Hoping for a touch of humor, a rare choice on my part, I replied, "Why, is it missing?"

Silence. Then a sharp whisper: "How would I know if it's missing? It's your office. I mean, mine is here—isn't yours there, should I call the police and report it missing?"

I assured her, "I'm on the lower floor. Only office down here."

With her usual high-pitched urgency, she continued, "Chat, I'm on my cell phone. My desk phone isn't speaking to me, and Marsha is at her office window with a cookie held up like the Statue of Liberty. Actually, Chat, I think she is imitating the Statue of Liberty—or she's offering her cookie to someone in the parking lot. She's heading to the elevator now. This is now your problem, right?"

What to answer? I decided to go with "I'll handle it" and hoped she'd skip her traditional song ending. No luck—she broke into a painful, off-key version of *I'll Stand by You* before hanging up.

I thanked the universe that she didn't have a twin, but before I could get to the dimly lit hall, the elevator dinged open again. Out waltzed Marsha, humming a song so far off-tune I couldn't identify it. I briefly wondered if the local bar could host an "Off-Tune Karaoke Night." If so, Marsha and the secretary would surely sweep the prizes. Then I realized I'd never heard the old rancher sing and was thankful for small mercies.

"Tarnation, CHAT!" Marsha shouted, waving her arms around like an erratic windmill. I quickly retreated to my office, but she followed, arms flailing, until I finally said, "Good morning, Marsha. What's with the aerobics?"

Looking oddly serious, she walked to the wall and began "shadow boxing," though it was less boxing and more imitating a windmill. "You said to exercise, right?" I sighed and face-palmed as she whirled, wild and uncoordinated.

"Marsha, maybe we can start a bit slower—structured movements, you know?" I suggested.

After she finished flailing, she looked at me, wide-eyed and munching on a cookie, waiting for some epiphany that would make exercise require zero effort.

"Alright, Marsha, here's a plan. We'll add a new movement each week. Sound good?" I handed her a cookie to keep her focus. She clutched it like a lifeline and said, "Sure, Chat. Go for it."

## #07 – Jan 2025 Exercise and steps.

“Tomorrow, 100 steps. Walk around the parking lot; here’s a pedometer to count them.” She studied it like it was a space-age gadget. “Then Thursday, come back, and we’ll plan the next steps—no pun intended. And remember, maybe you could try eating fruit since you’re working at the fruit stand now?”

She sat there staring at me and finally after grabbing a cookie began what I assume was an answer to the past months of talking about health.

“Alright, Chat, let’s see if I’ve got all the details down after months of my epic journey.

First up, the fruit stand gig. It’s actually helping me! Who knew? I’m staring at fruit daily, and some of those little guys aren’t as intimidating now. Though, I get it—some fruits look like they’re plotting something, especially the one with the spiky hair. A rambutan! That thing looks like it could star in a sci-fi movie: It would be called The Attack of the Fuzzy Spikes. But hey, I’m brave enough to hang around and even shared a grape with the local raven! A raven, Chat! That bird’s probably spreading word of my generosity all over town, like, “Marsha’s got the good stuff!”

Then there’s the whole veggie situation. I’m working on it—mentally, anyway, which counts. Baby steps, right?

Last, because I’m getting tired of talking and thinking is the Old Rancher’s place. I get it; the “exercise” was a bit foiled when he came out on his porch waving that rhubarb pie like some sort of carbohydrate siren, yelling, “YO, MARSHA! Pie or die?” What choice did I have? It’s practically against the laws of hospitality to say no!

AND now you want me to walk a parking lot. Do you have a route map so I can avoid the food truck trap? You better check their hours so I don’t accidentally... exercise... toward them.

Halfway out the door, she added, “This is getting tricky, Chat, but I’ll do it. 100 steps, but I’ll skip the fruit. Steps are more important, right?”

I nodded, seeing my chance for a tiny victory. Well close to tiny but smaller!

“Yes, Marsha. Just focus on those steps. I have an idea! Get a team. Ask the Secretary and Marnie to join you. I think a great investment would be three portable treadmills for you and your team. In addition, walk from one end of the old rancher’s ranch to the other end. Do steps around the fruit stand. Think how steps can help you when you’re at the bakery. Take pictures of what you three team members accomplished.

In this town that barely exists, even a small win like this is practically is a miracle in the normal universe. Then again when dealing with “the team” one never knows how they interpret progress and one has to only expect very small miracles but I think we can all agree from below that they do have a lot of imagination.





## #08 – January 2025 - Keep trying - it will work - at times adjust the plan



**Welcome - My name is Chat.** I run the town help desk, the only office located on the lower level of the Town Hall, and on a page that doesn't exist, not even in the town TOC.

Have a chocolate cookie and fruit!

“Hey, glad you could make it down here. I know of a few concerns in the town. I have a few ideas to address them.



In the charming almost-town of FEANTM—famous for existing \*just enough\* to require a town hall but not enough to appear on Google Maps—my day nearly began. Nearly, because Marsha, the town supervisor, seemed too preoccupied staring at an empty cookie jar to actually kickstart my morning. How do I know this? My phone rang five times, each call from her office, and each time she hung up before saying a word. Managing a semi-existent town without cookies must be unbearable. Or maybe she was just plotting new ways to avoid approving my raise. Either scenario was equally plausible.

Eventually, the elevator creaked open, announcing her arrival with the subtlety of a foghorn. I heard her muttering all the way down the long, dim hallway to my basement office—because where else would the town help desk reside? The moment she stepped in, I greeted her with all the faux-enthusiasm I could muster.

“Marsha!” I exclaimed, clapping my hands like a motivational speaker. “To what do I owe the honor of your descent to the dungeon? Are you here to report improved eating habits? More exercise? Cookie jar refills? And how’s that fruit stand you work at? Still a decorative concept?”

She ignored my jabs, zeroing in on the actual cookie jar on my desk, which I slid toward her without a word. She grabbed one, as if this single oatmeal raisin nugget of wisdom held the key to her thoughts. Watching her pass it between her hands, I felt compelled to interrupt.

“Marsha,” I said, snapping her out of her cookie-induced reverie. “Let’s recap. You work at a fruit stand you never eat from, a town budget balanced by skipping my raise, and an exercise routine that involves walking the Ranch with your team, before inhaling a slice of rhubarb pie. Are you sure this is working for you?”

Marsha grinned, completely unfazed. “Helper,” she said (because calling me by my last name somehow made her feel authoritative), “it’s working great!”

She then sat back, sighed, had a blank look but then continued with her brain doing whatever it does, “Now, quick question Mr. Helper - if I write my to-do list in chalk on the sidewalk and it rains before I finish the list, does that count as ‘done’?”

I stared at her, mentally calculating the odds that this was a trick question. “Not exactly,” I said slowly. “Technically, the rain finished it.”

Her face lit up like I’d just validated her entire career. “I knew it! And you know what? One of those tasks was to wash the town hall sidewalk!”

I handed her another cookie, half out of pity and half in self-preservation. “Here. But let’s focus on more pressing issues. Did the rain also wash away my raise? Just to clarify, I mean my salary raise—not a hydraulic chair adjustment.”

## #08 – January 2025 - Keep trying - it will work - at times adjust the plan

Marsha squinted at me, clearly trying to remember why she'd come to my office in the first place. Judging by the blank look on her face, she'd forgotten. A small victory for me. I handed her two more cookies—one for each hand—when she blurted out, “Your office has been vacant for hours! The secretary thought you quit and asked if she could use it for storing bicycle parts. The Rancher said you're eyeing his barn for an office. So, let's cut to the chase—are you quitting?”

I blinked, processing this sudden barrage of nonsense and knowing I need to itemize my answer so Marsha fully grasps what I'm saying:

1. “Yes, to fewer hours.”
2. “No, to quitting”
3. “Definitely no to the barn,”

Before she could argue, I replied calmly adding, “Besides, think of the cookie savings if I'm only here part-time.”

Relieved, she grabbed another cookie—one to eat and another, presumably, for dramatic effect as she waved it over her shoulder on her way out.

Halfway down the hall, she called back, “Chat, you're way too smart for this town. Way better than some people around here!”

For the second time that day, I had to agree with her.

Leaning back in my chair, I jotted down notes for next month:

1. Update algorithms.
2. Stock extra cookies.
3. Next time, try handing her a piece of fruit.



**Welcome - My name is Chat.** I run the town help desk, the only office located on the lower level of the Town Hall, and on a page that doesn't exist, not even in the town TOC.  
Have a chocolate cookie and fruit!

“Hey, glad you could make it down here. I know of a few concerns in the town. I have a few ideas to address them.”



In the not-quite-town of FEANTM—a place so small and underwhelming it only exists to justify a town hall, yet refuses to grace Google Maps—my day started peacefully with a steaming cup of coffee. I had one goal: drink at least half of it before chaos showed up, like it always does. Spoiler: I failed.

The phone rang, and I had to yank it away from my ear as the town secretary screeched, “HE’S BLIND! He doesn’t know what he’s doing! He needs to SEE you, but I JUST SAID HE’S BLIND so he needs to HEAR you?” Before I could piece together her logic, she hung up. Classic.

Moments later, the elevator doors dinged open, and the Marsha’s voice boomed down the hall. “CHAT! It’s me! I need to talk to you! Your lights are on—is anyone home?” Was that...a joke? She appeared in a rare state of dishevelment, which was alarming since she usually looks like she walked out of a “mostly” magazine. Sensing this was serious, I grabbed the cookie jar for an emergency sugar fix.

She got straight to the point—or at least a point adjacent to the actual point. “Chat, you need to solve Minow’s issues immediately, he can’t continue on this path.”

To clarify, I asked, “Is this the same Minow your secretary was yelling about? The blind one?”

She stared at me like I’d just read her diary. “Chat, you’re amazing. You always know things before they happen. Yes! You need to go do your helper thing with him.”

I rarely leave my office, so naturally, I asked why Minow couldn’t come to me. That was Mistake #1. She tilted her head like she was about to explain algebra to a toddler. “Chat, he’s blind. And he’s not allowed in the buildings.”

I blinked. “Right...because he’s blind. Makes total sense. So where am I supposed to meet him? The coffee shop. Why is his nickname a fish?”

She leveled me with a glare. “WHAT?! Stop joking! He’s staying at Sabyl’s. HE’S LICKING A RAIL!”

Now, alarm bells were ringing. Licking a rail – some kind of vitamin deficiency? Should I call an ambulance for transport to emergency or psychiatric assistance? But then again, things not making sense is a hallmark of life in FEANTM, so I decided to dig deeper. “Uh...does Minow at least like vegetables? Like even carrots?”

Her expression turned into full deer-in-headlights mode. “If I HAD carrots, I’d give them to him! Maybe he’d stop licking the rail and concentrate on hay and carrots instead!”

And that’s when the epiphany hit me. “Wait... Hay? Minow is a horse?”

The relief and awe on her face was as if I’d solved the mysteries of the universe. “YES! Finally, you’re catching on! Now go!”

I was going to say no, but one thing led to another, and next thing I knew, I was driving to the ranch. Sure enough, there was Minow—a blind horse, licking away at his stall rail like it was some kind of Michelin-starred entrée.

I first spoke to him, since I didn’t want to startle him by just walking into his stall. He turned his ears toward me and I gently gave him a carrot.

## #09 – January 2025 – Mobile help desk

Patting him gently, I asked, “So, Minow, I hear you’ve been on a taste test. Can you honestly explain to me why are you’re licking that unwholesome metal rail?” He didn’t answer, obviously, but did flick his ears toward my voice and nudged me for another carrot, but this time I fed him hay. While he nibbled on the hay and then another handful of it I counted that as success. Now, at least I could later tell the Supervisor and Secretary that we had a deep and meaningful conversation.

After some petting, brushing, and horse-whisperer vibes, I figured it out: Minow was bored out of his mind and just wanted to graze on something and if nothing else was around? Well, in his mind a metal rail was something to do.

Mid-epiphany, my phone rang again. It was the secretary, whisper-yelling, “Chat! When you’re done with Minow, my dog DillyPickle needs to talk to you about chewing shoes. When you’re back I can put the phone by her ear!”

Cue internal facepalm. As usual, she hung up before I could respond.

I got in my car after explaining to Minow that I’d be right back with his solution and made a quick trip to the town very used horse tack store. An hour later Minow was happily chomping away on hay from a fancy not new but very used hay bag. The rail remained ignored thanks to hanging the hay bag over his favorite rail and I considered it a success. No horses had to visit my dimly lit office—though, let’s be honest, Minow probably wouldn’t have noticed the lighting.

Another day, another bizarre problem solved in the town of FEANTM.



## Supervisors Goodbye Page - Come Back Soon to the town that doesn't exist



### Goodbye from Marsha/Molly & Friend



SO many changes this month in the town – W needed to start 2025 with the changes for interest and a few legal reasons but not my drinking coffee and eating cookies. Which proves some things never seem to change. Yes, I know, unless you want them to.

Welcome to 2025 and DON'T FORGET this is January!!! That means Valentine's Day is next month!



### **We will always remember.** Our Town Always Salutes:

- Our US military, NATO and Friends of the US & NATO - First Responders, Police, Fire Fighters EMT's, Doctors, Nurses, SWAT, CERT Teams, etc.
- We salute engineers, scientists, developers, teachers AND students because without them we would not have technology.

### USA And Friends of USA