To hear today's event:

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OR

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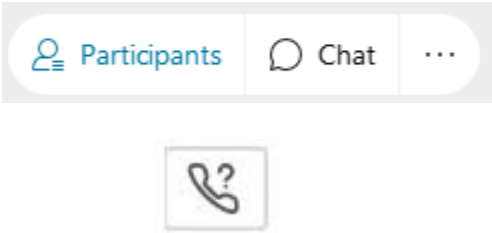

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The recording will be available in about one week on the Ansys resource center:

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Materials Automotive Series - Webinar 2

Practical Solutions for Connecting Materials Data Across Engineering Systems

Agenda

- **Materials Intelligence & Engineering Advantage**
- **On-Demand Material Models**
- **Connecting *your* Engineering Tools**
- **Transferring Assignments – Eliminating Wasted Time**
- **Non-standard integration support?**
- **Real World Successes**
- **Summary**
- **Q&A**

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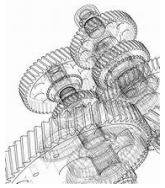
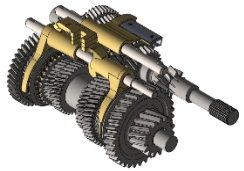
Materials Intelligence & Engineering Advantage

Material Intelligence across product development

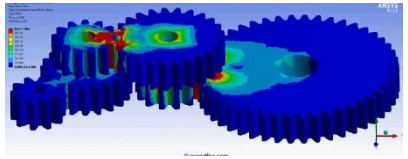
Concept & Design



Preliminary Design



Detailed Design & Optimization



Prototype & Test

Production & Launch

Integrate with CAD, PLM, Simulation…

All engineering materials

1. Alloy A
2. Alloy B
3. Polymer A

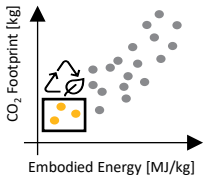
Alloy B Type 1
Alloy B Type 2
Alloy B Type 3

Alloy B Type 2

Alloy B Type 2 approved

Materials Selection

Trade-off
Cost
Structural
Environmental
Thermal



ECO Assessment

Strategy
Reduce
Reuse
Recycle

Materials Testing + simulation

Deformation
Durability
Toughness

Compliance

Check
Substance
SDS
Up-to-date

REACH COMPLIANT
RoHS

Materials Information Management

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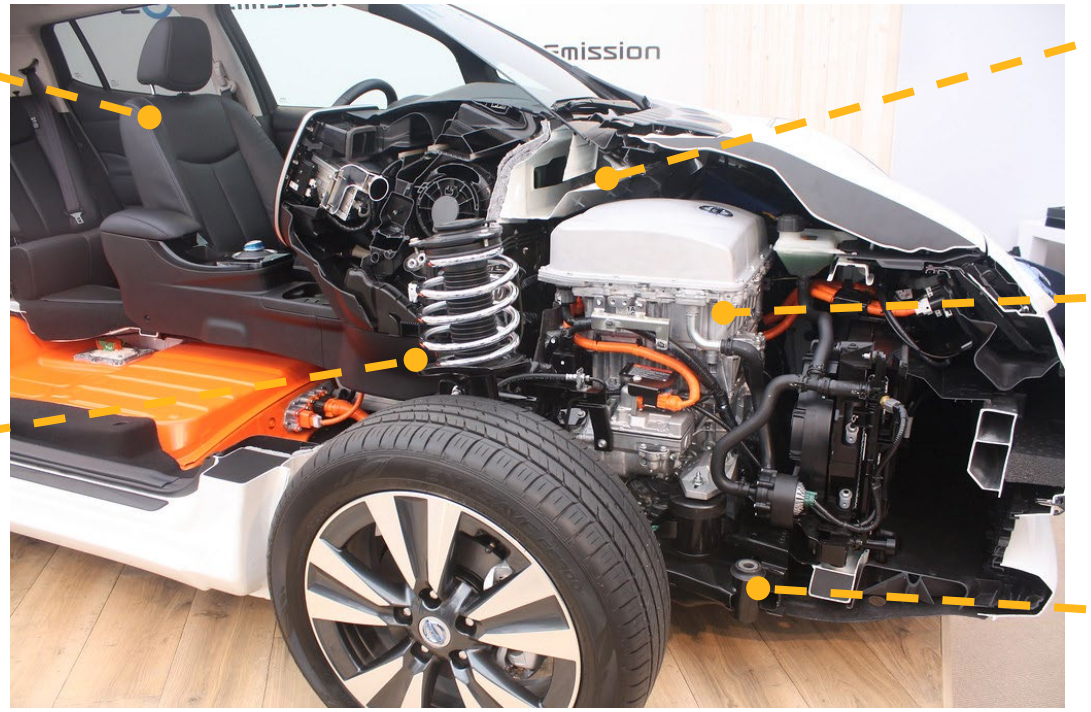
Categories of materials & properties needed across automotive

Polymers

- ✓ Property, processing and supplier info for plastics + additives
- ✓ Mechanical, thermal and electrical property data
- ✓ Linear & non-linear & hyperelastic
- ✓ Test data: ASTM, ISO, IEC, DIN

Metals

- ✓ Mechanical, thermal and electrical properties
- ✓ Temperature-dependency
- ✓ Creep & fatigue behaviour



Acoustics

- ✓ Noise reduction & absorbency

Electromagnetic

- ✓ Low and high frequency properties for PCB, magnetic and EM-absorbing materials
- ✓ Df and Dk vs frequency, B-H curves etc

Composites

- ✓ CFRP composition, processing, mechanical and thermal properties

Complete and comparable data on all standard engineering materials – technical, economic, and environmental

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The challenge: for every material…

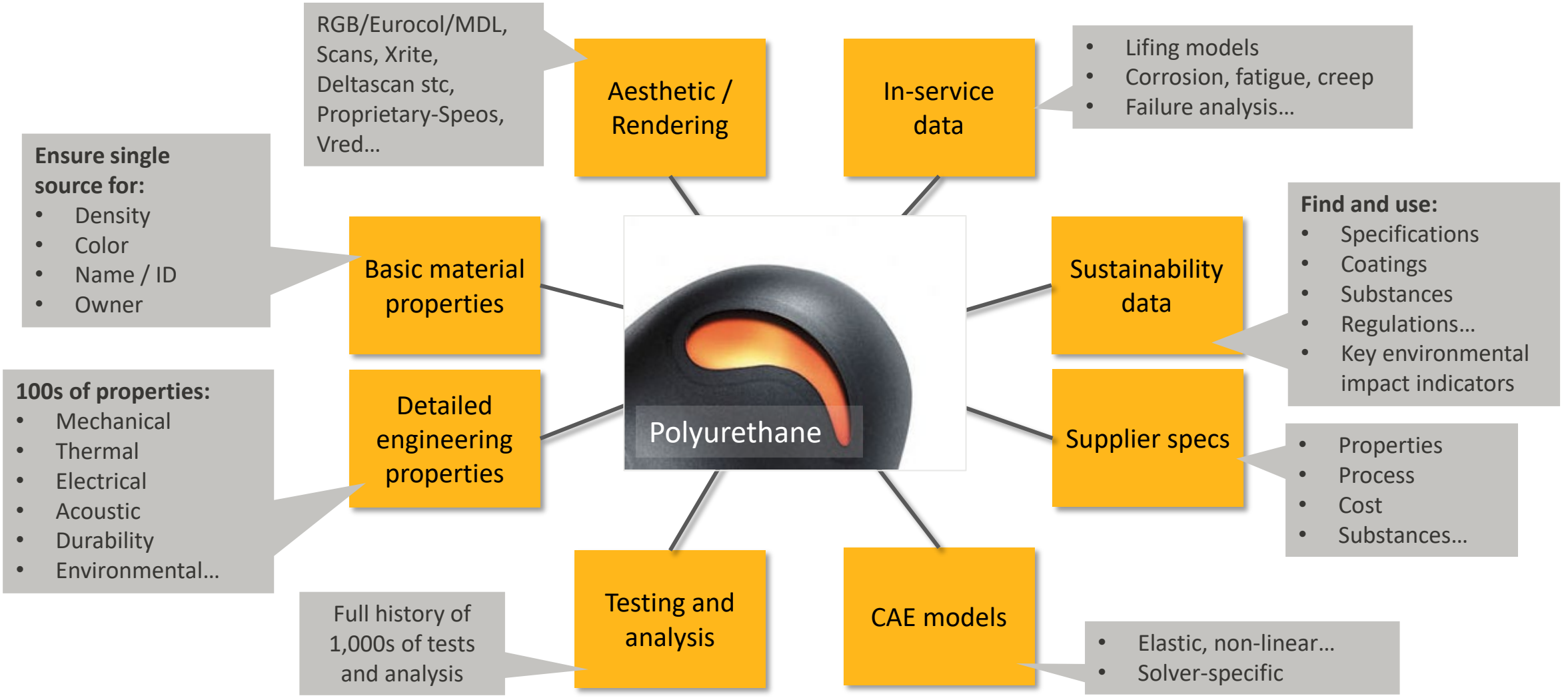

Image Chris Lefteri

Spotting enterprise materials information challenges

Regulatory Non-Compliance
High corporate liability risk if a restricted substance is used.

Unsustainable Design
Corporate goals on recyclability and carbon neutrality are difficult to measure without the right material data.

Wrong Material
Impacts product performance and quality resulting in a recall or high warranty cost

Unreliable Simulation
Inconsistent materials data leads to repeat simulations - resulting in products late to market.

High Material Cost
Raw material is typically the #1 or #2 cost for a manufacturer – eroding product margin.

Duplicate Testing
High spend on repeat testing because material testing data is not captured.

Siloed Teams
Poor visibility of data used across engineering teams with different naming conventions.

Dispersed Data
Vital materials IP is being lost because of poor information management and storage

Image source: https://infotron.com.tr/

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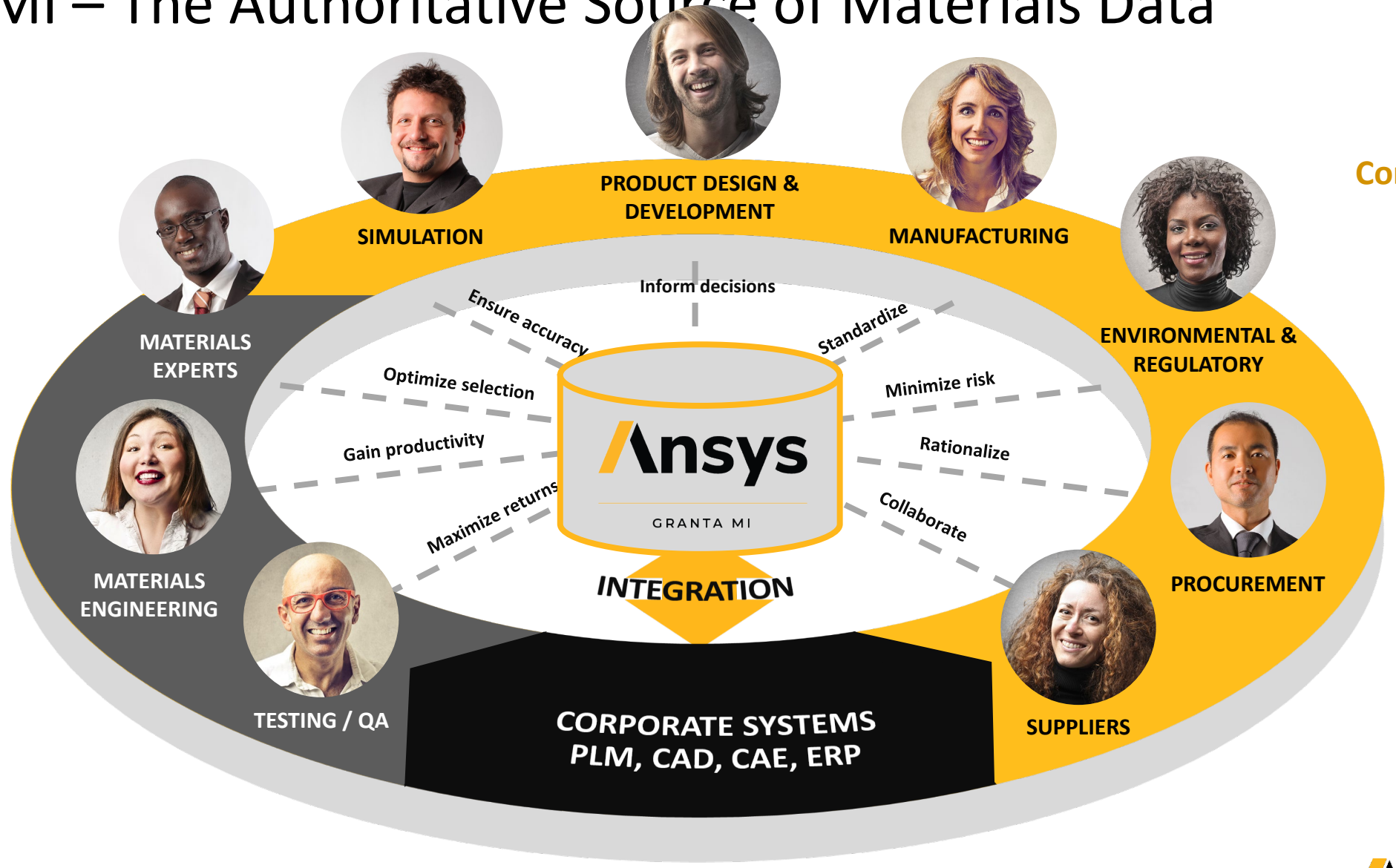
Granta MI – The Authoritative Source of Materials Data



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On-demand Material Models

Live Demonstration

Connecting *your* Engineering Tools

Integrate with CAD, PLM, Simulation

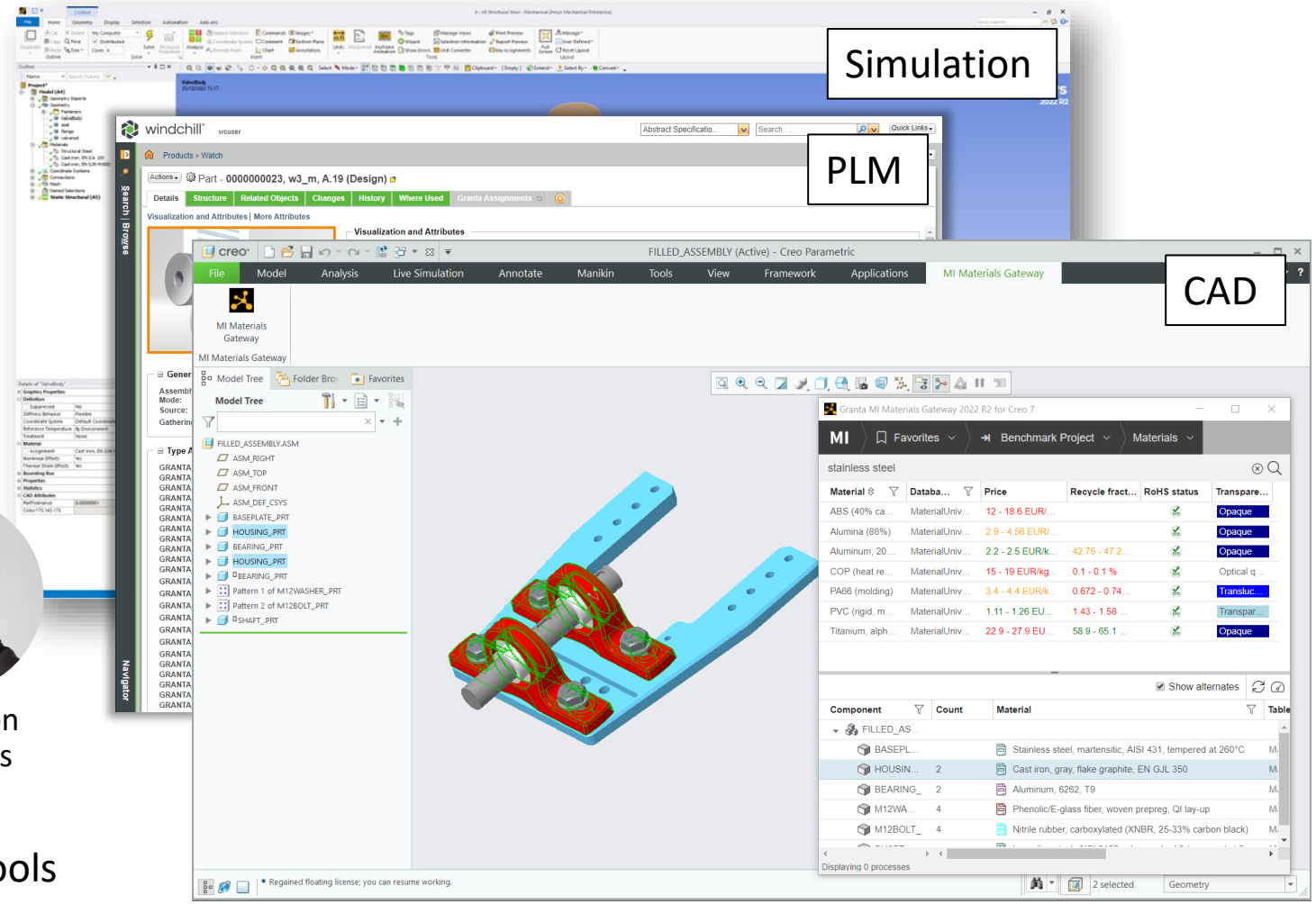
ABS (extrusion)

Datasheet | Material card exporters

Flammability	Highly flammable
Primary production energy, CO2 and water	
Embodied energy, primary production (virgin grade)	91.5 ≤ x ≤ 101 MJ/kg
Embodied energy, primary production (typical grade)	88.9 ≤ x ≤ 98.3 MJ/kg
CO2 footprint, primary production (virgin grade)	3.51 ≤ x ≤ 3.87 kg/kg
CO2 footprint, primary production (typical grade)	3.41 ≤ x ≤ 3.77 kg/kg
Water usage	167 ≤ x ≤ 185 l/kg
Processing energy, CO2 footprint & water	
Recycling and end of life	
Recycle	Yes
Embodied energy, recycling	31 ≤ x ≤ 34.3 MJ/kg
CO2 footprint, recycling	1.19 ≤ x ≤ 1.32 kg/kg
Recycle fraction in current supply	3.8 ≤ x ≤ 4.2 %
Downcycle	Yes
Combust for energy recovery	Yes
Heat of combustion (net)	37.6 ≤ x ≤ 39.5 MJ/kg

CAD Engineers

Simulation Engineers



- **Single centralized source of input materials data**
- Access all materials directly in native CAD/PLM tools
- Publish preferred materials and processes
- Flag sustainability metrics directly in design tools

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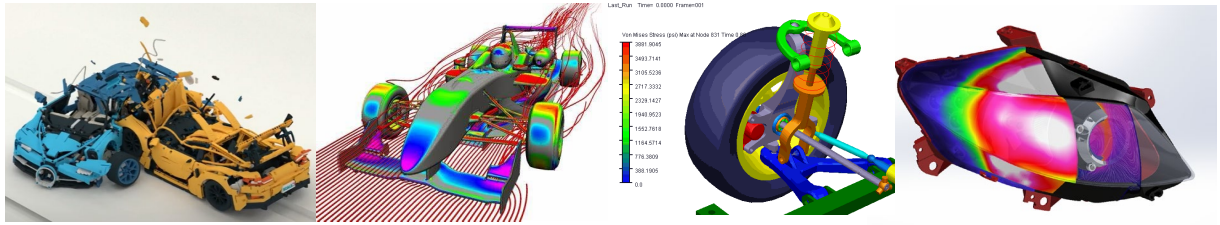
An authoritative source of materials for every simulation

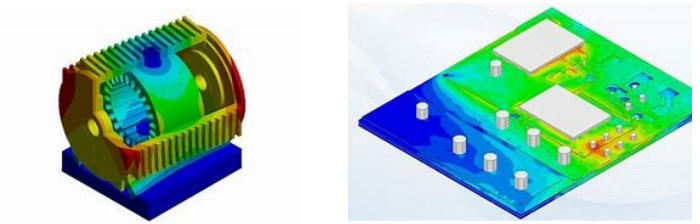
SIMULATION

Typical Automotive Simulation Teams



Crash Simulation | Aero Simulation | Durability Simulation | Thermal Simulation

…Relative newcomers



E-Motor Simulation | Power Electronics Simulation

LS-Dyna cards | Density | Elastic or Shear Modulus | Thermal conductivity | Magnetic saturation | BH curves

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Granta MI Integration

- MI Materials Gateway
- Ansys platform integrations
- Python Scripting Toolkit
- MI Material Card Connect
- MI Enterprise Connect
- File exporter

Design, Simulation, and PLM		Granta MI Enterprise
Altair	HyperMesh	GWY
BetaCAE	ANSA	GWY
Dassault	3DX	MI MCC
	Abaqus/CAE	GWY
	CATIA	MI MCC
	SOLIDWORKS	MI MCC
PTC	Creo	GWY
	Windchill	GWY
Siemens	NX / Simcenter 3D	GWY
	Teamcenter	GWY ECT
Other Software		MI MCC
Developer Tools	Python Scripting Toolkit / PyGranta MI Server API	STK

Transferring Assignments

Eliminating Wasted Time

Why is this important?

- Disparate Engineering Ecosystems
- Larger assemblies take more time
  - 100 parts
  - 1,000 parts
  - 100,000 parts

One more time

NX and ANSA

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Non-standard Integration Support?

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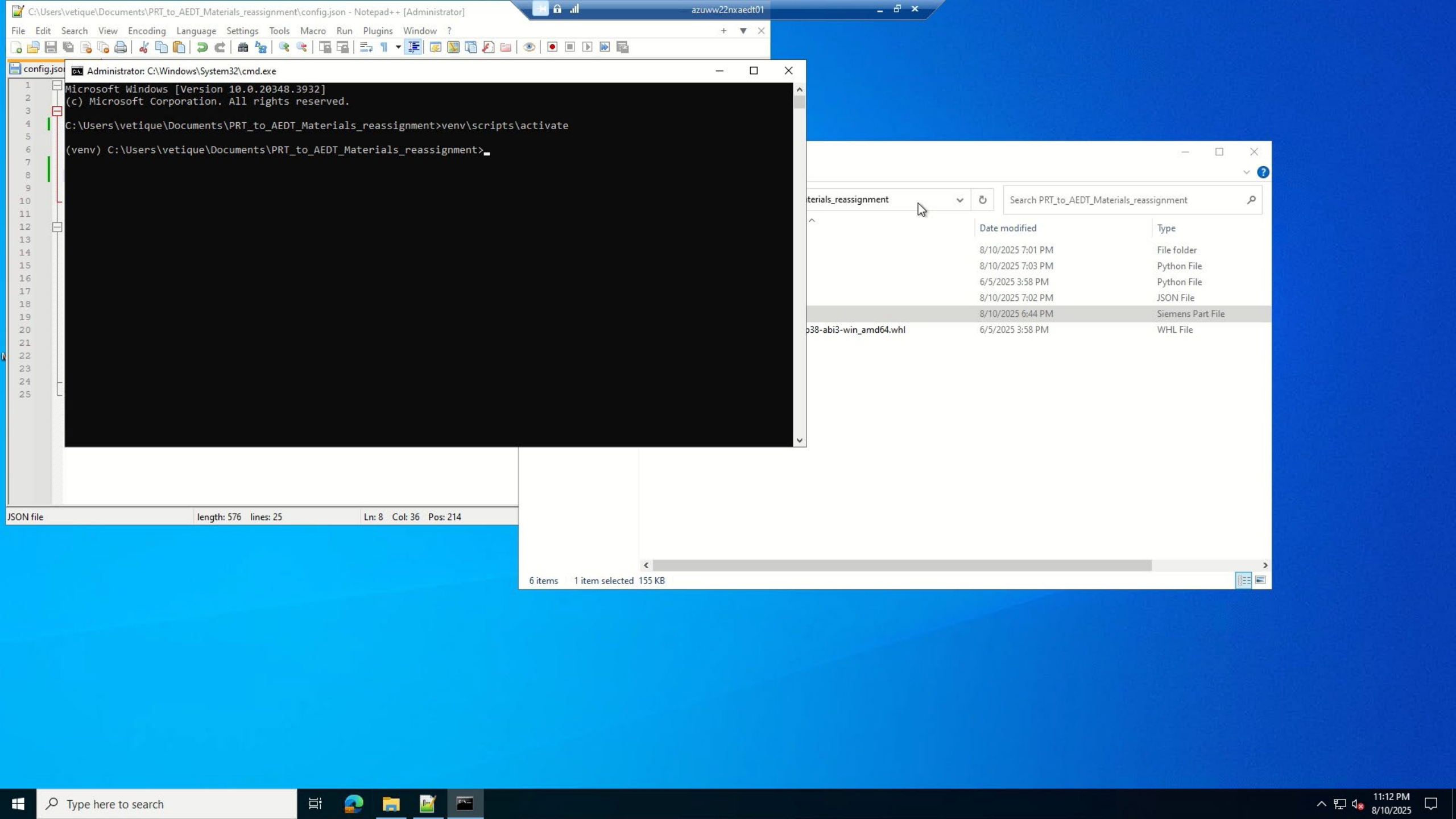
C:\Users\vetique\Documents\PRT_to_AEDT_Materials_reassignment\config.json - Notepad++ [Administrator]
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
azuww22nxaedt01
Administrator: C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.20348.3932]
(c) Microsoft Corporation. All rights reserved.
C:\Users\vetique\Documents\PRT_to_AEDT_Materials_reassignment>venv\scripts\activate
(venv) C:\Users\vetique\Documents\PRT_to_AEDT_Materials_reassignment>
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8/10/2025 7:03 PM Python File
6/5/2025 3:58 PM Python File
8/10/2025 7:02 PM JSON File
8/10/2025 6:44 PM Siemens Part File
6/5/2025 3:58 PM WHL File
6 items
1 item selected 155 KB
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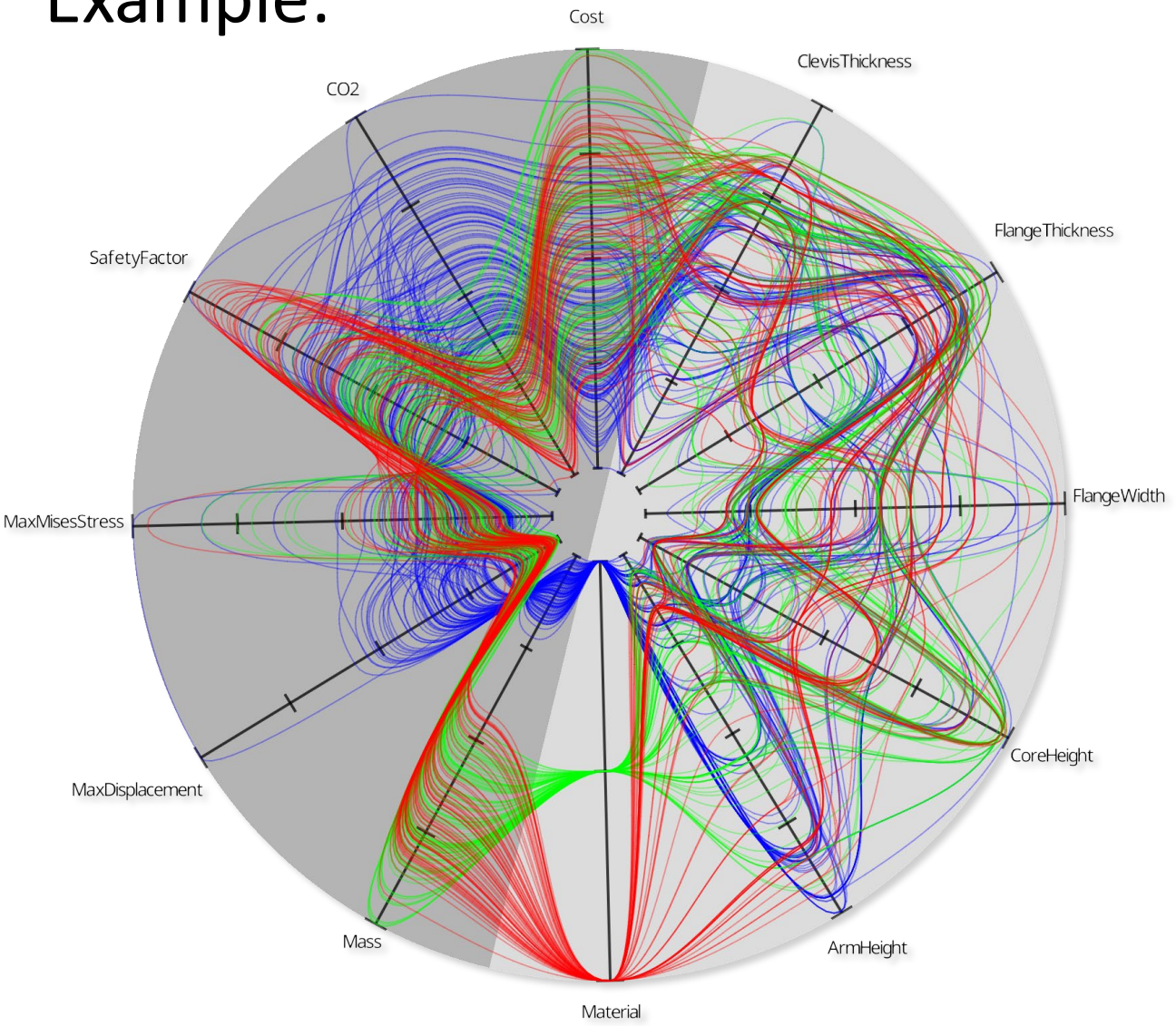
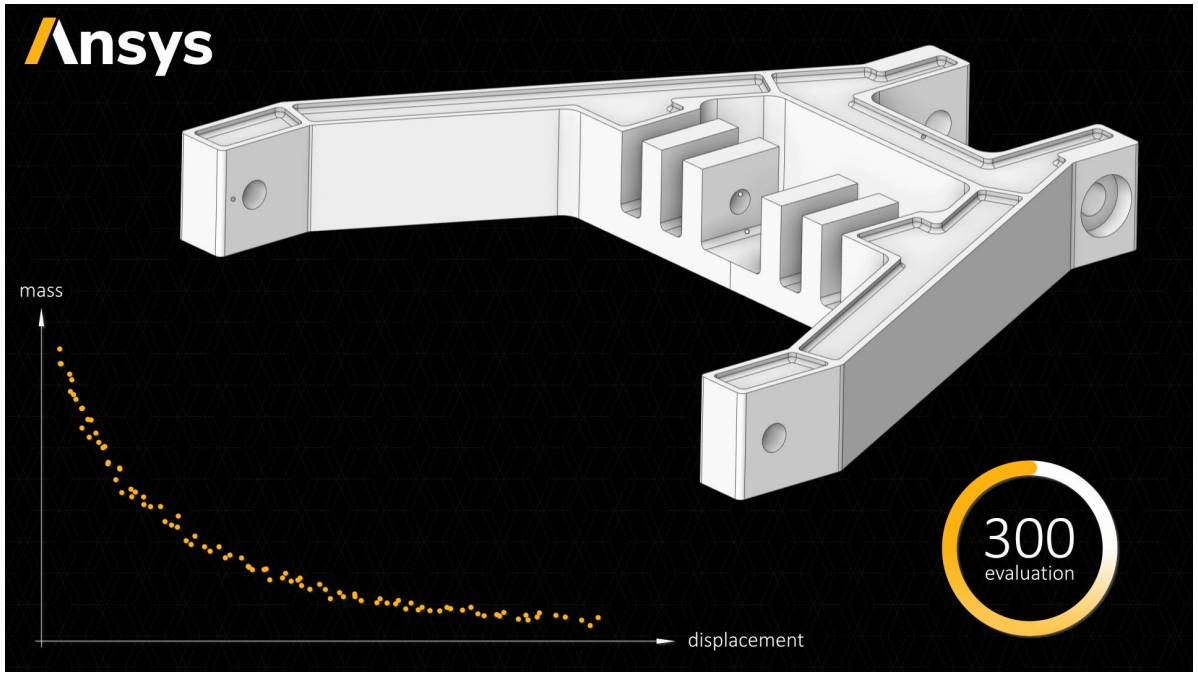
8/10/2025

What else to consider

- The types of analysis
  - Corresponding default material models
- Material assignments and BOM structure need to me maintained
  - Step 242 and JT?
  - Separate BOM/Drawing and CAD file(s)?
- Automating analysis with planned alternative materials

Example:





Response	Objective
MaxDisplacement	minimize
MaxMisesStress	minimize
SafetyFactor	≥ 1.2
Cost	minimize
CO2	minimize

Complete mapping of the design space, finding optimal designs for each competing material.

All done in 3 hours

compared to a single 3-hour running simulation with standard solvers.

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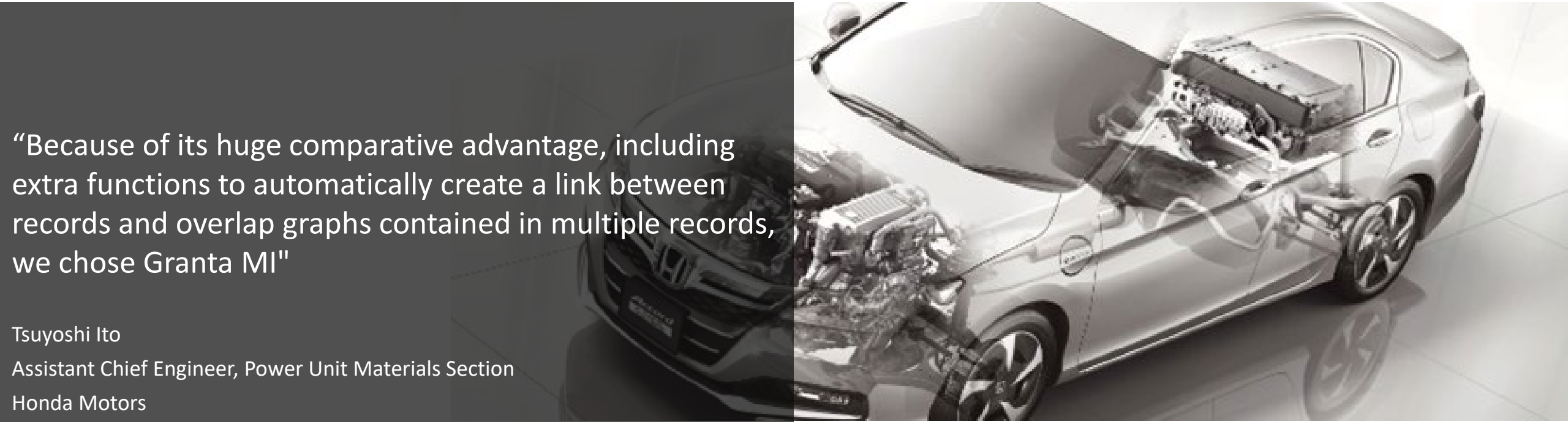
Real World Successes

Halving prototype materials and tests at Honda



“Because of its huge comparative advantage, including extra functions to automatically create a link between records and overlap graphs contained in multiple records, we chose Granta MI"

Tsuyoshi Ito
Assistant Chief Engineer, Power Unit Materials Section
Honda Motors

Project results:

- Instant access to shared material properties by engineering teams led to higher design quality and reduced development rework.
- Reduction in prototype materials and tests by about 50%
- Cost savings with material property acquisition costs were reduced by 41% for simulation models

World-class composite materials information management

"Using Granta MI, we have automated many tools and processes enabling us to reduce material testing cost and time by up to 20%."

Gianpiero Cerrone
Composites Engineer
Automobili Lamborghini S.p.A

Project results:

- 20% cost/time reduction from tool and procedure automations
- Increased speed of execution through composite testing with structured and reproduceable data capture
- Improved quality of operation with full traceability and the creation of complex test activity reports
- Capturing and securing material and manufacturing process IP through role-based data security

Bringing consistent materials across a large US automotive OEM

"We want them all [engineering] to be using the same version of the steel, so we have less rework, better products, no product recalls, and fewer warranty issues."

Quote from Global Process Lead for Materials Lifecycle Management from large US OEM – post Granta MI implementation

Project results:

- Creation of 'gold source' for corporate materials data
- Integrated with PLM tool (Teamcenter)
- Ensure consistent, traceable materials data is available

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Material Digital Transformation at Ferrari

"By using Ansys Granta MI to achieve a digital transformation of its materials data, Ferrari Competizioni GT is putting in place the foundations to leverage the latest materials in an efficient and internally transparent way."

Ferdinando Cannizzo
Head of GT Racing Car Design and Development
Attività Sportive GT

Project results:

- Greater design agility for car designers & simulation engineers
- Enhanced vehicle performance by innovating with materials
- Standardized materials data captured in a structured and traceable way
- Duplicate testing avoided

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Summary

Agenda

- **Materials knowledge remains a key advantage in industry**
- **On-demand model creation is an essential first-step**
- **Integration with engineering tools enhances efficiency and quality***
- **Automating reassignment in CAE can save an *enormous* amount of time**
- **Automation is further enhanced with specialized rules and scenarios**
- **Customers are realizing profound benefits *today***

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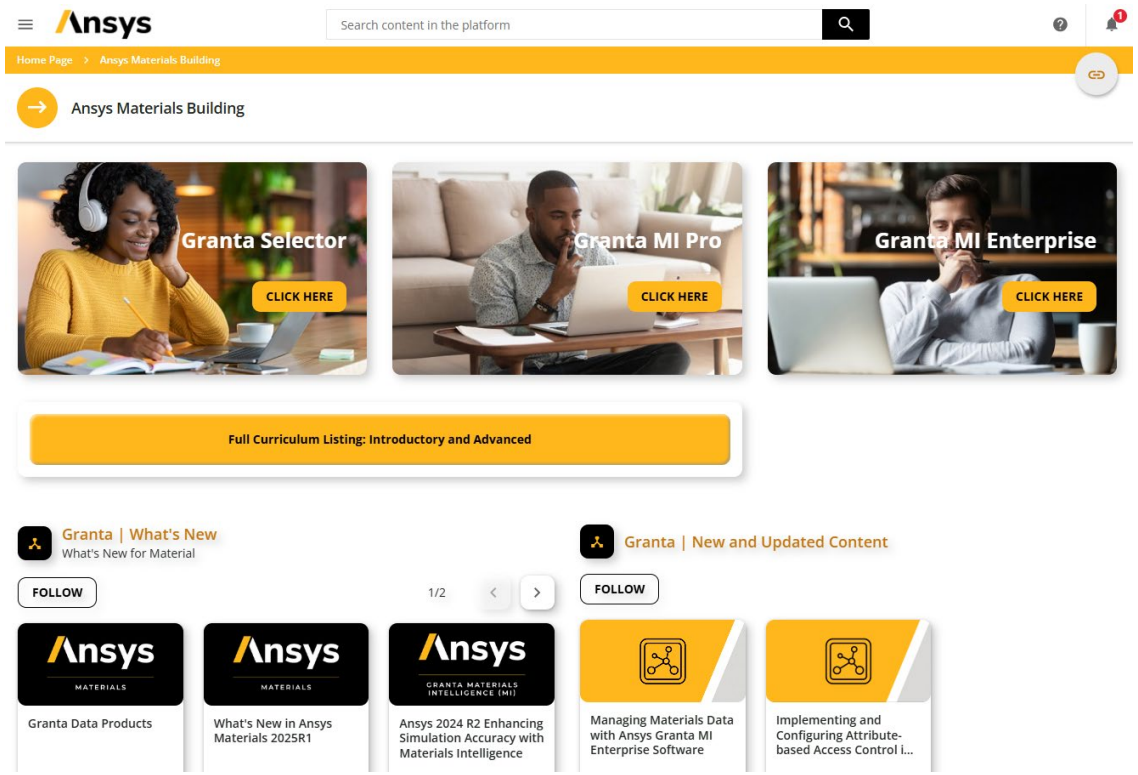
This is **THE Ansys e-learning platform***, it helps you increase your productivity and innovation when using the Ansys tools.

Your benefits:

- Learning 24-7
- Training on the entire Ansys portfolio
- A whole area dedicated to Materials



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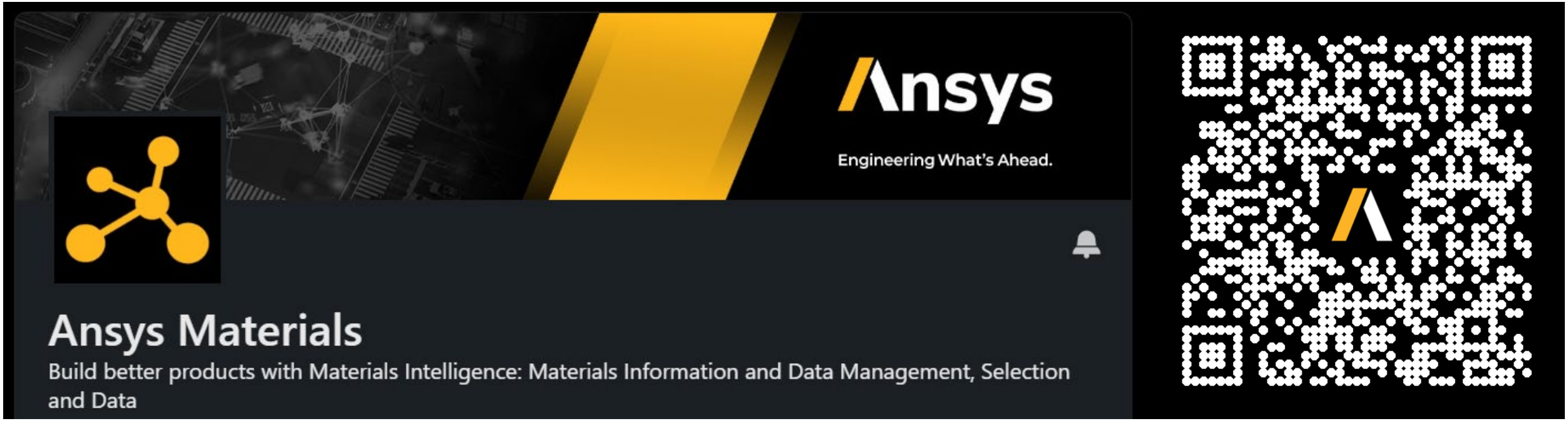

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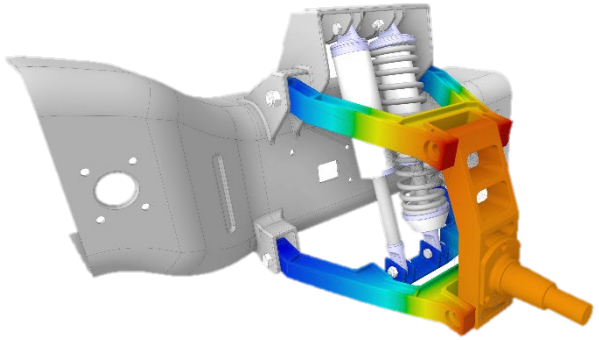
Learn more about how to connect business systems to your materials

Read the design for sustainability story



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