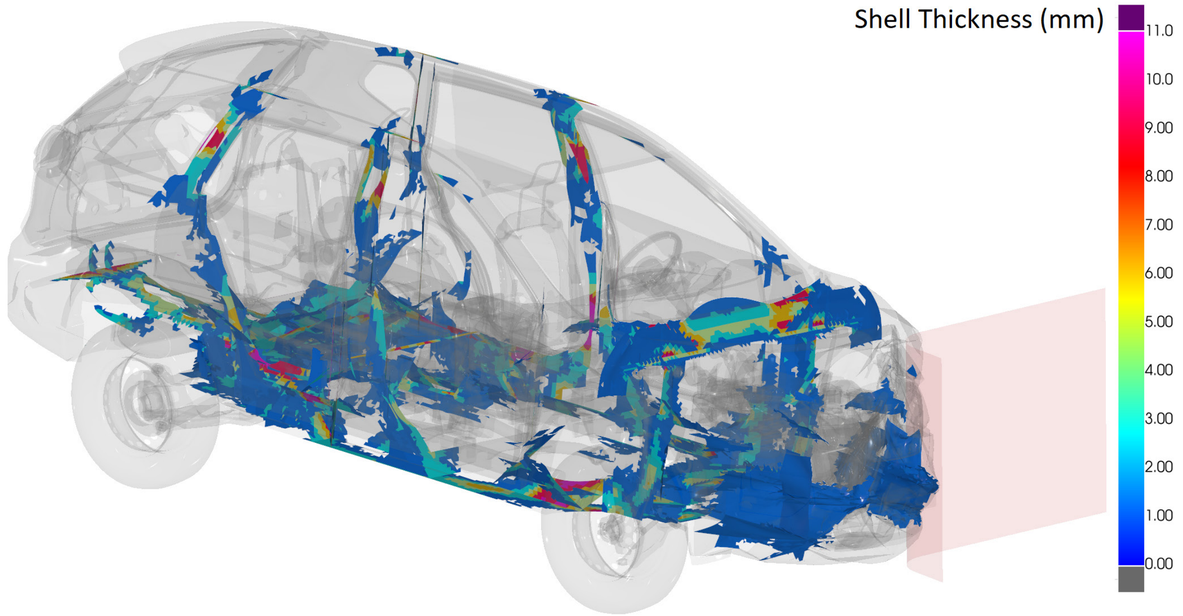
THE ALTAIR ENLIGHTEN AWARD

2025 WINNERS

ALTAIR



VORTEX CAE

2025 WINNER
FUTURE OF LIGHTWEIGHTING

Enlighten™: A Novel Holistic Topometry Based Optimizer for the Design of Lightweight Crash Structures

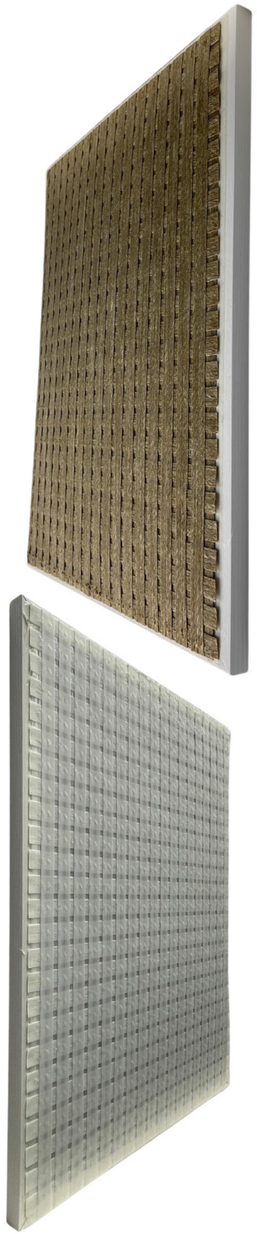
Vortex CAE's new solver offers direct crash and impact optimizations using full fidelity models. The outputs produce holistic and pre-validated CAE solutions. Additionally, they developed a computationally efficient 3D generative-design methodology to identify and size fundamental structural features early on. A generative design case study cut 77% from the body-in-white mass while meeting or exceeding structural performance in 13 primary crash load cases. Assuming a 50% mass-retention loss, they estimate that $500 million in raw material costs for this vehicle could have been saved, along with 1.35 million tons of C02 from manufacturing alone.

MAGNA

2025 RUNNER-UP
FUTURE OF LIGHTWEIGHTING

Hemp-PA6 Composite Roof Rack Inner

Magna successfully demonstrated the use of Hemp Nylon (PA6) in automotive exteriors, enhancing sustainability. The new sustainable material replaces talc in traditional nylon resin and was developed in collaboration with BASF and Heartland. The lightweight, renewable material absorbs CO_2 during growth, supports decarbonization, and delivers performance and processing equivalent to the original resin, marking a major advancement in the use of natural fibers for automotive applications.

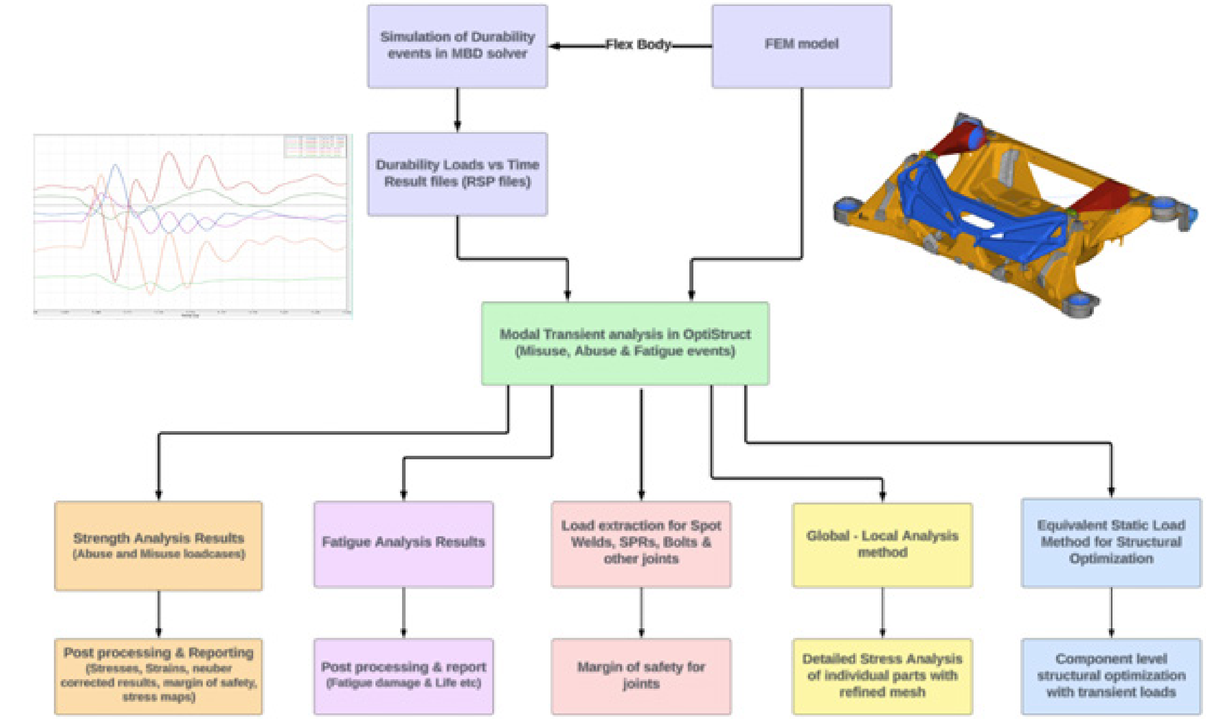


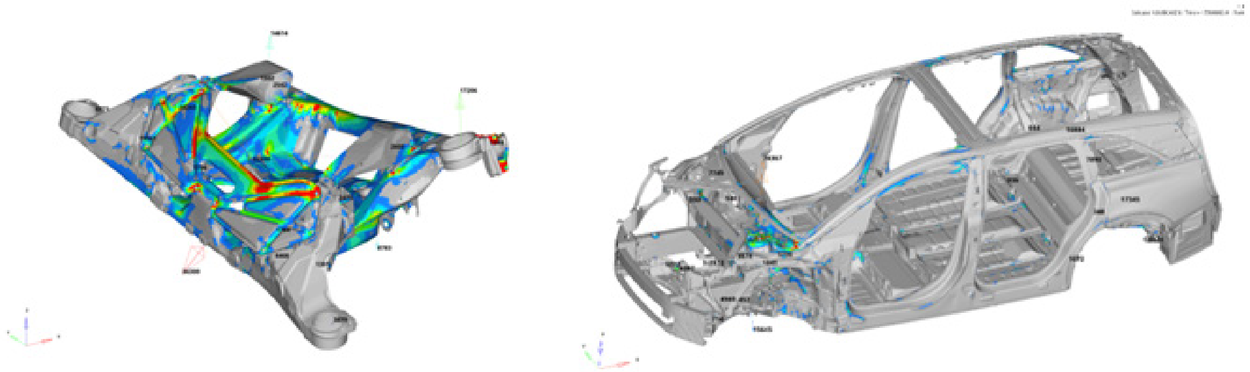
COMPOSITEEDGE GMBH AND ATA MUTE B.V.

2025 WINNER
ENABLING TECHNOLOGY

Adaptive Ultra-Thin Noise Solution

CompositeEdge GmbH and ATA Mute B.V. have developed an acoustic element under 1 mm thick that offers up to 97% sound absorption, particularly at low frequencies where conventional materials are less effective. It is waterproof, fire-resistant, and fully recyclable, produced without adhesives from natural, carbon, or glass fibers combined with thermoplastics. The material maintains its performance in humid and high-temperature environments and is suitable for a wide range of applications such as cars, heat pumps, and interior facades.





LUCID MOTORS

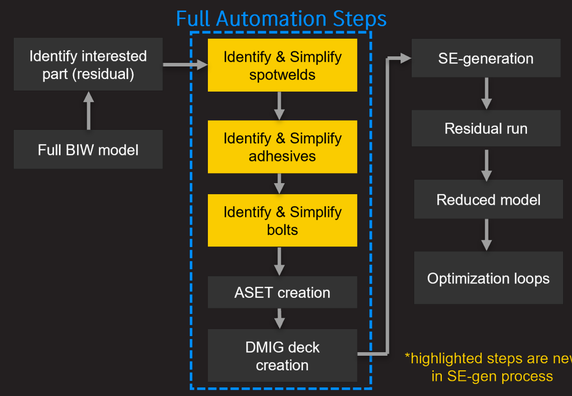
2025 RUNNER-UP ENABLING TECHNOLOGY

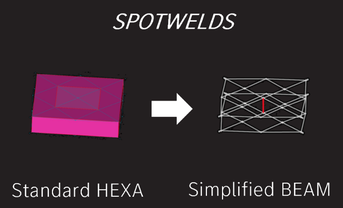
Modal Transient Analysis Based Durability CAE Workflow

Lucid, in collaboration with the Altair® OptiStruct® development team, developed and implemented a seamless durability CAE workflow that progressed from MBD-based vehicle dynamics simulation to FEM-based strength, stiffness, and fatigue analysis, and ultimately to structural optimization. The workflow could be applied to a wide range of components, including the body-in-white, subframes, battery pack, suspension components, powertrain, and closures, using a Global-Local Analysis approach for detailed local assessments with refined meshing.

Our goal is to minimize the simulation runtime for SE-models used in structural optimization loops

Therefore, we simplify the standard connectors by reducing the ASETs @ interface grids





Sustainable Computation

Fully automated SE-generation with simplified connectors

- → Setup time 15 min for complex part
- → No potential user mistakes
- → No manual intervention

Reduced computational requirements

- → More than 90% reduction in runtime
- → Reduced hardware utilization
- → Efficient use of resources

Enabler for agile optimizations

- → Experiments with different optimization
- → Looped optimizations possible
- → Fast and detailed feedback to design

MERCEDES-BENZ AG AND MERCEDES-BENZ RESEARCH AND DEVELOPMENT INDIA PRIVATE LIMITED

2025 HONORABLE MENTION ENABLING TECHNOLOGY

An Automated Sustainable Process for Generating Superelements

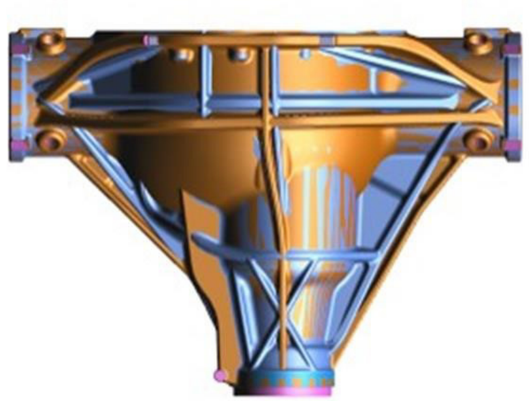
This fully automated process streamlines setup to just 15 minutes for complex parts, eliminates user errors, and requires no manual intervention. This innovation enables agile, iterative optimizations with fast design feedback, while cutting computational demands, achieving over 90% runtime reduction, lower hardware utilization, and more efficient resource use.

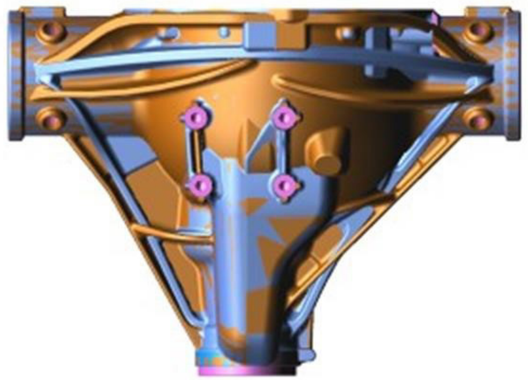
SYENSQO AND GEELY

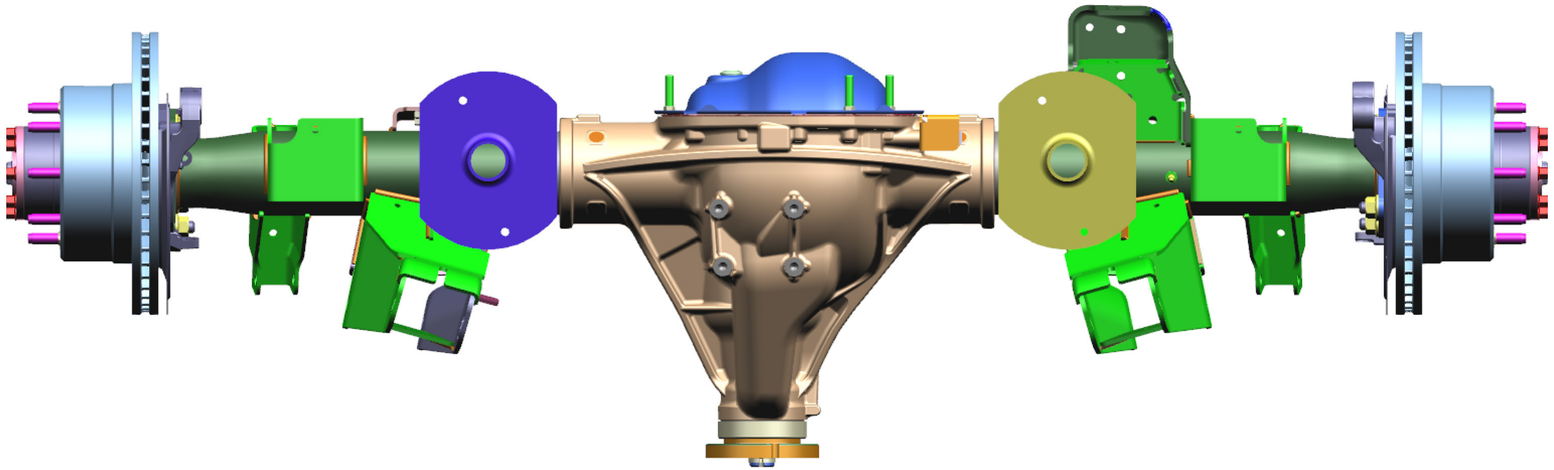
2025 WINNER MODULE LIGHTWEIGHTING

Amodel® PPA Stator Cooling System

Geely improved e-motor efficiency with an innovative stator cooling design using Syensqo's Amodel® PPA, achieving 47% weight and 36% cost savings versus metal. The metal-to-plastic conversion reduces weight, enables part integration, and streamlines high-volume assembly through injection molding, laser welding, and snap fits. Highly resistant to automotive fluids, Amodel® PPA retains nearly 70% burst pressure resistance after 2,000 hours of aging at 150° ATF, ensuring safety, and reliability. This innovative design achieves precise lubrication with lower oil pump power consumption, effectively reducing the risk of overheating spots.





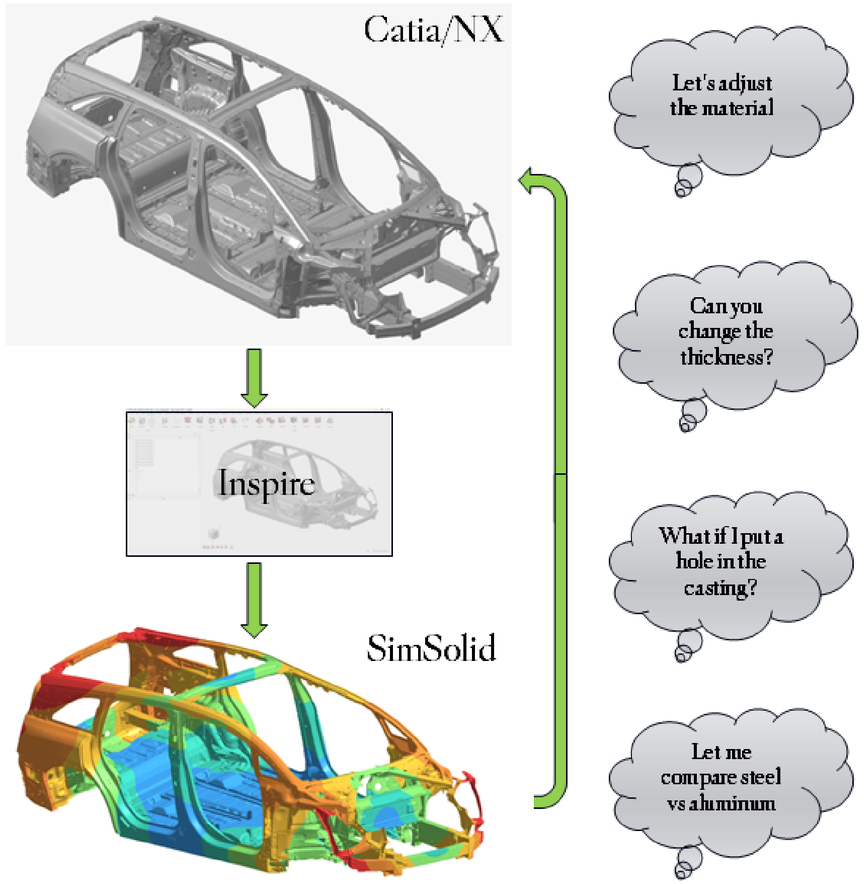


AMERICAN AXLE & MANUFACTURING (AAM)

2025 RUNNER-UP
MODULE LIGHTWEIGHTING

Modular Lightweight Axle Housing Innovation

AAM's modular lightweight axle housing innovation replaced two axle configurations with a single, modular design, cutting complexity and cost. Delivering up to 10% mass reduction, around 1.3 million pounds annually across 145,000 units, the design was optimized using Altair's Multi-Model Optimization to balance weight and strength. Fully compatible with existing assembly lines and preserving back-serviceability, the solution reduces fuel consumption and emissions through material efficiency and streamlined logistics.



LUCID MOTORS

2025 WINNER
SUSTAINABLE COMPUTING

Design-Driven Structural Assessment To Enable Accelerated Product Development

Lucid's Design-Driven Structural Assessment approach accelerates product development using Altair SimSolid®'s meshless solver. Engineers can run rapid design iterations directly within their CAD environment, eliminating the need for complex meshing or switching tools. The highly customizable workflow streamlines setup and empowers teams to optimize designs with greater speed and ease.

Our goal is to minimize the simulation runtime for SE-models used in structural optimization loops

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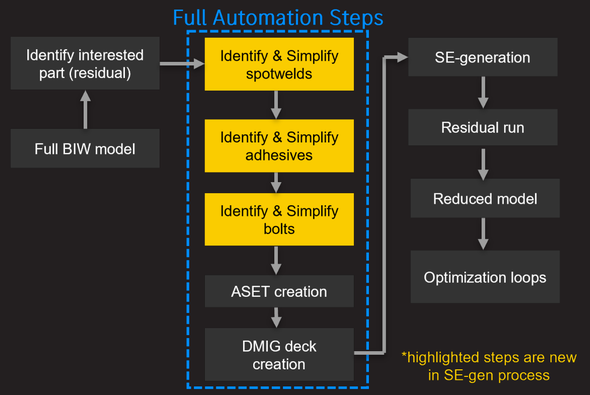
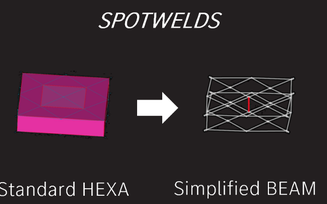
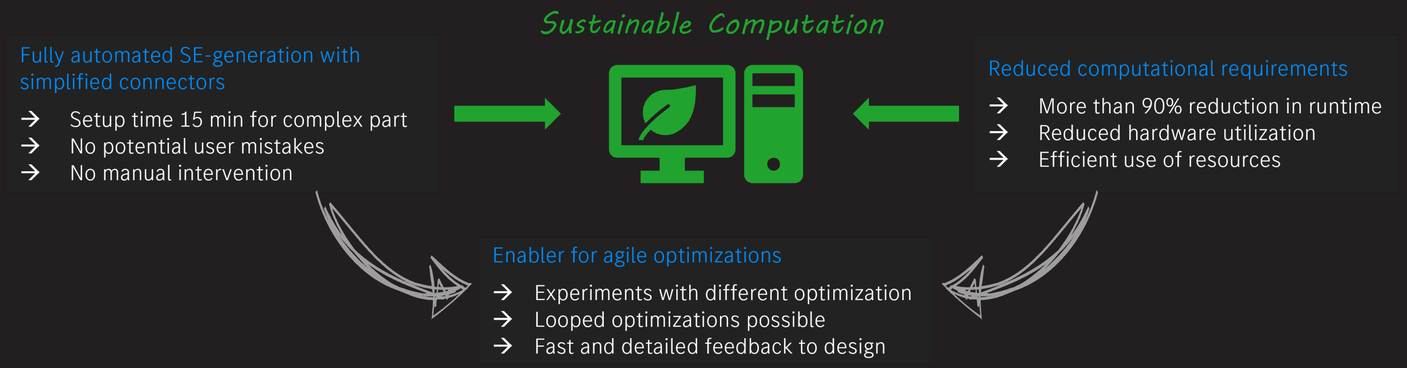




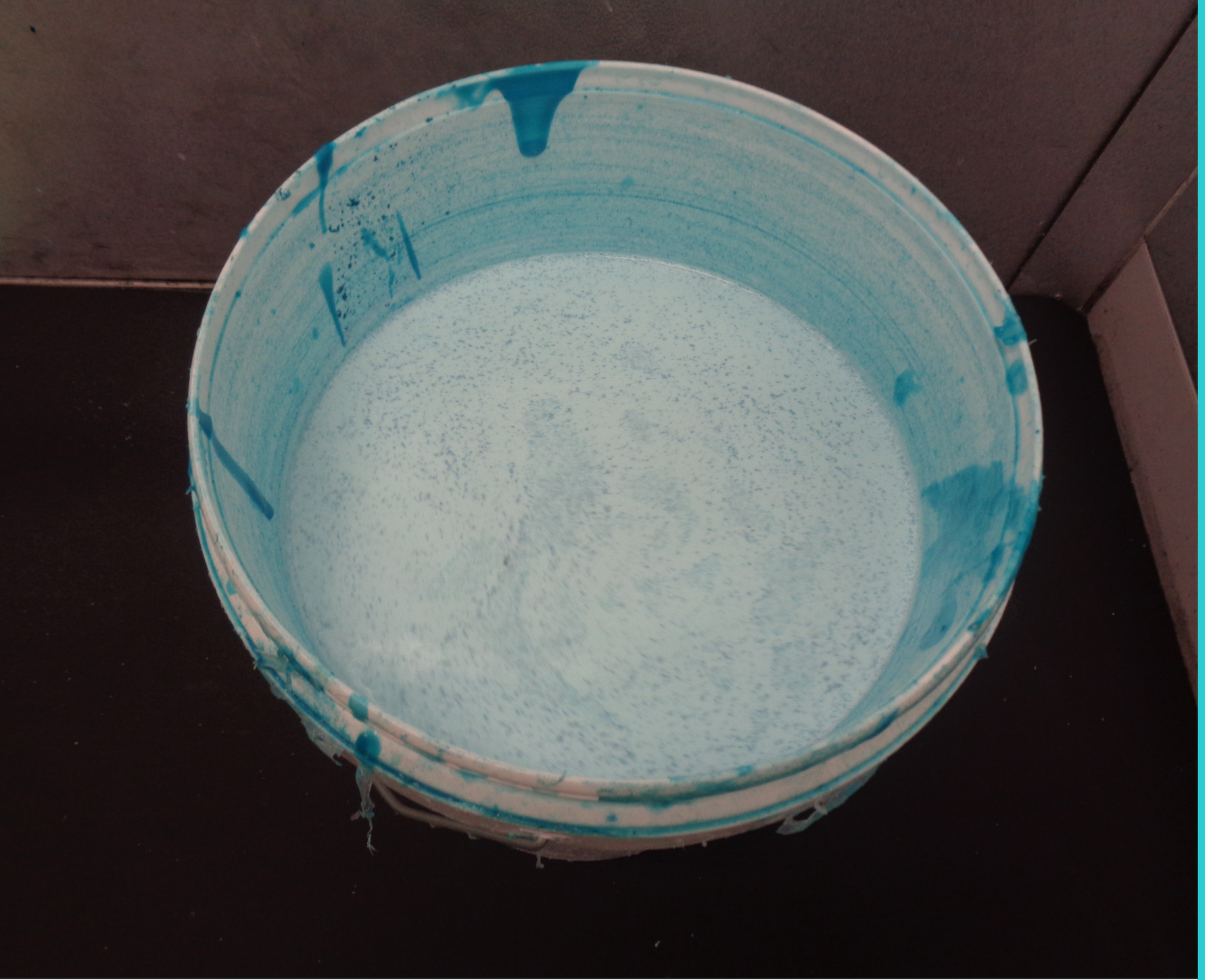


MERCEDES-BENZ AG AND MERCEDES-BENZ RESEARCH AND DEVELOPMENT INDIA PRIVATE LIMITED

2025 RUNNER-UP SUSTAINABLE COMPUTING

An Automated Sustainable Process for Generating Superelements

This fully automated process streamlines setup to just 15 minutes for complex parts, eliminates user errors, and requires no manual intervention. This innovation enables agile, iterative optimizations with fast design feedback, while cutting computational demands—achieving over 90% runtime reduction, lower hardware utilization, and more efficient resource use.



MARELLI

2025 WINNER
SUSTAINABLE PROCESS

Adhesive Wastewater Recovery Solution

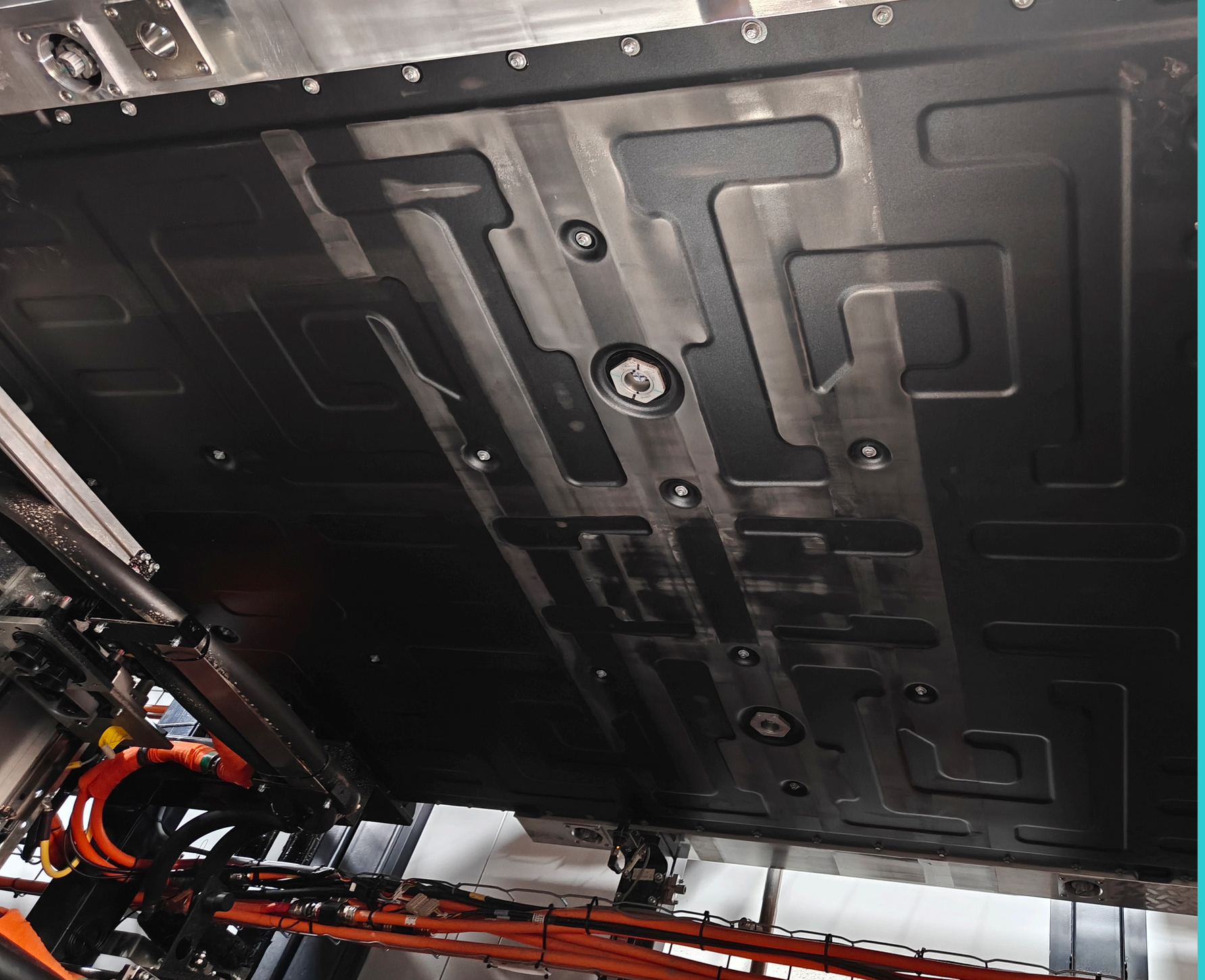
Marelli implemented a cleaning process for adhesive manufacturing equipment, such as robots and spray guns, utilized in bonding topcoat skins to substrates for cut, sew, and wrap parts. By using a three-part chemical agent, the process separates adhesive waste from the cleaning water, enabling recovery and reuse of approximately 85% of adhesive wastewater. This process reduced the plant's water consumption by 8,160 kilograms annually, with the recovered non-potable water able to be reused within manufacturing operations.

CITIC DICASTAL CO., LTD.

2025 RUNNER-UP
SUSTAINABLE PROCESS

Key Technology for Integrated Forming of Large Aluminum Alloy Structural Components

This innovation consolidates 98 parts into a single component, reducing weight by 30% and lowering both cycle time and cost. It marks the first application of a non-heat-treated Al-Mg alloy in commercial vehicle structures. A closed-loop thermal balance system ensures consistent forming quality, while rapid process simulation and C123 variable cross-section design optimize material usage and accelerate the design-to-validation cycle.

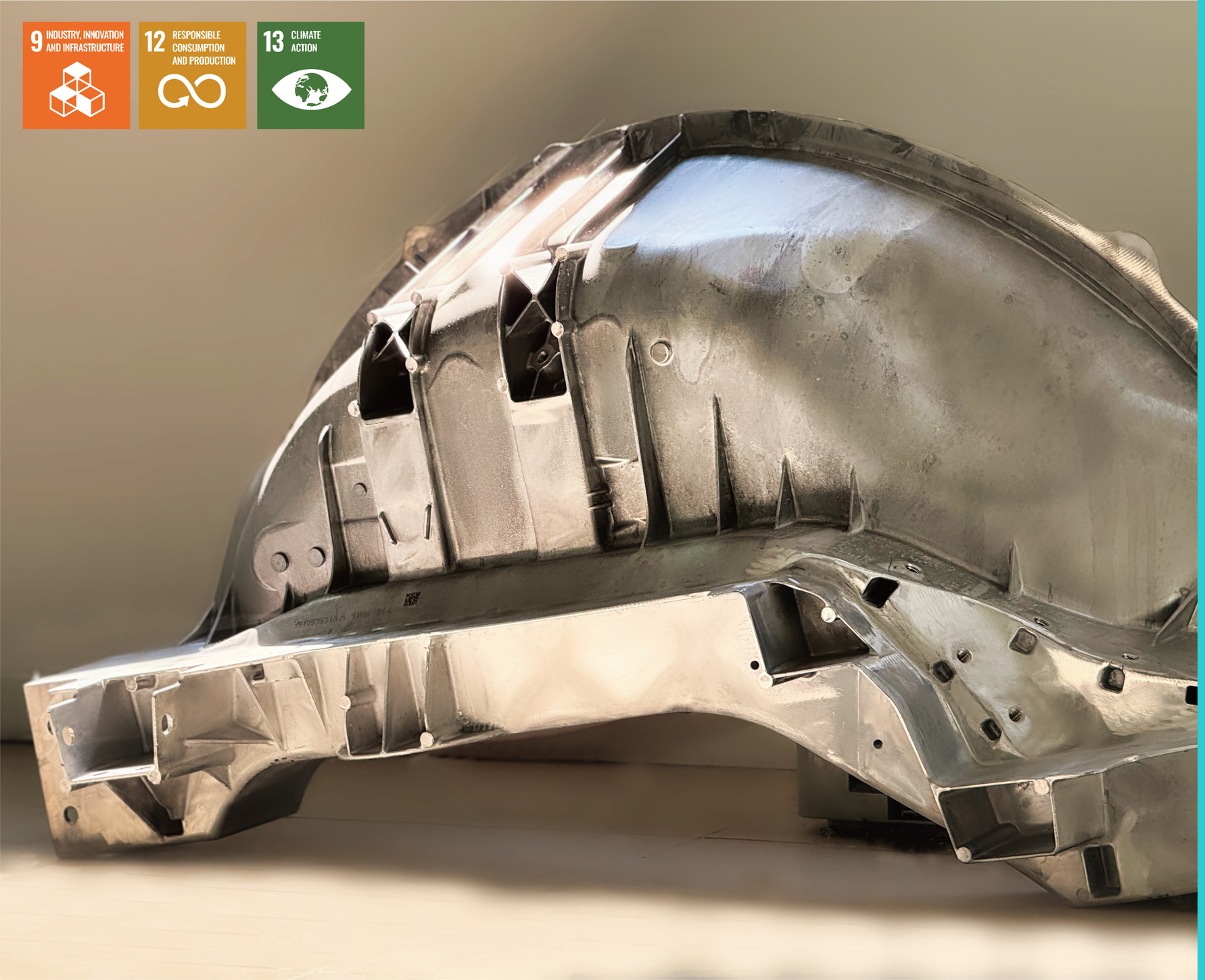


NIO AND AKZONOBEL

2025 WINNER
SUSTAINABLE PRODUCT

Bottom Plate Coating for Battery Pack to Improve Lifespan During Battery Swap for Electrical Vehicles

NIO and AkzoNobel extended the lifespan of the bottom plate coating from 5 to 15 years while reducing coating thickness by 90%, cutting vehicle weight by 2.2 kg, and pioneering powder coating technology for electric vehicles. The innovation replaced non-recyclable materials with recyclable alternatives, eliminated VOC emissions, and improved coating efficiency by 55%, delivering significant sustainability benefits. Established through a unique car maker–tier 5 partnership, this scalable solution enhanced cost and efficiency across tiers 1 to 3 and has been mass-produced since November 2024, applied widely on NIO, Onvo, and Firefly EV models.

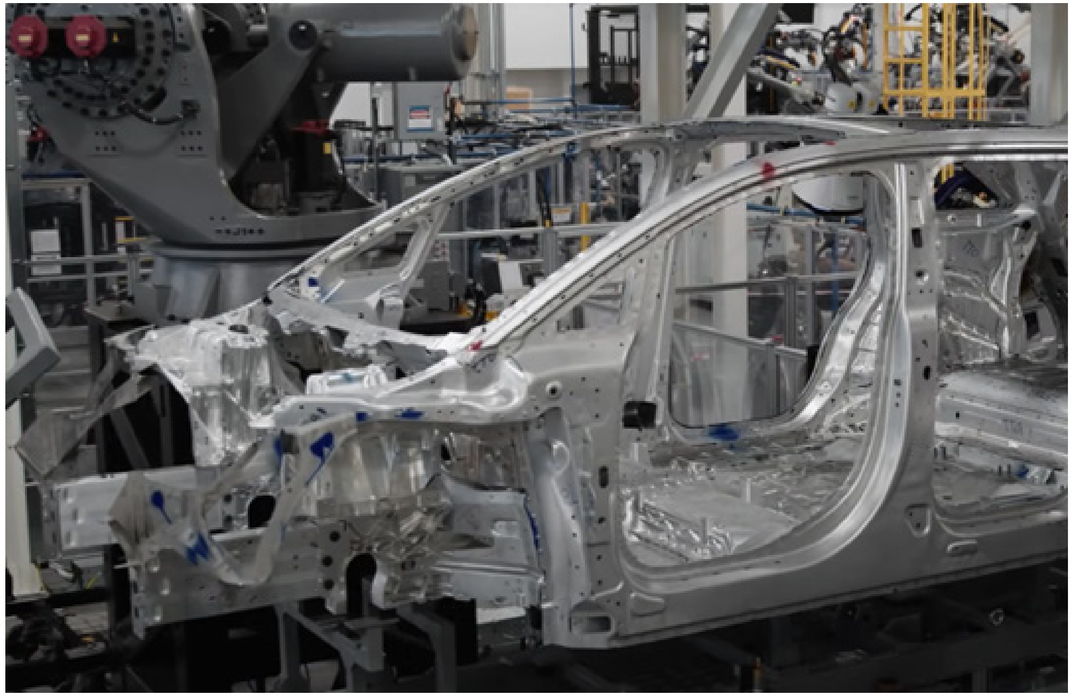


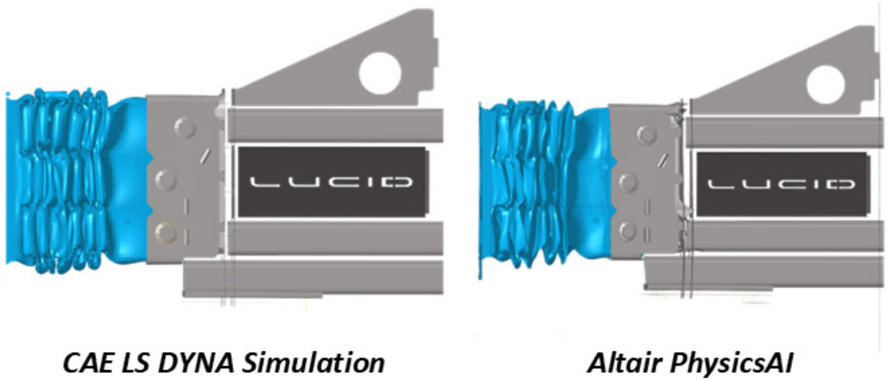
CHERY AUTOMOBILE CO., LTD.

2025 RUNNER-UP SUSTAINABLE PRODUCT

Answering Earth with Low-Carbon Recycled Aluminum

Chery Automobile's low-carbon aluminum initiative uses 100% recycled aluminum in a closed-loop system with over 99% impurity removal and employs heat-treatment-free integrated die-casting, cutting manufacturing energy by up to 95%. Achieving over 80% reduction in raw-material carbon emissions, it meets global low-carbon standards while maintaining strength and safety, and fosters collaborative ecosystems for scalable green manufacturing.





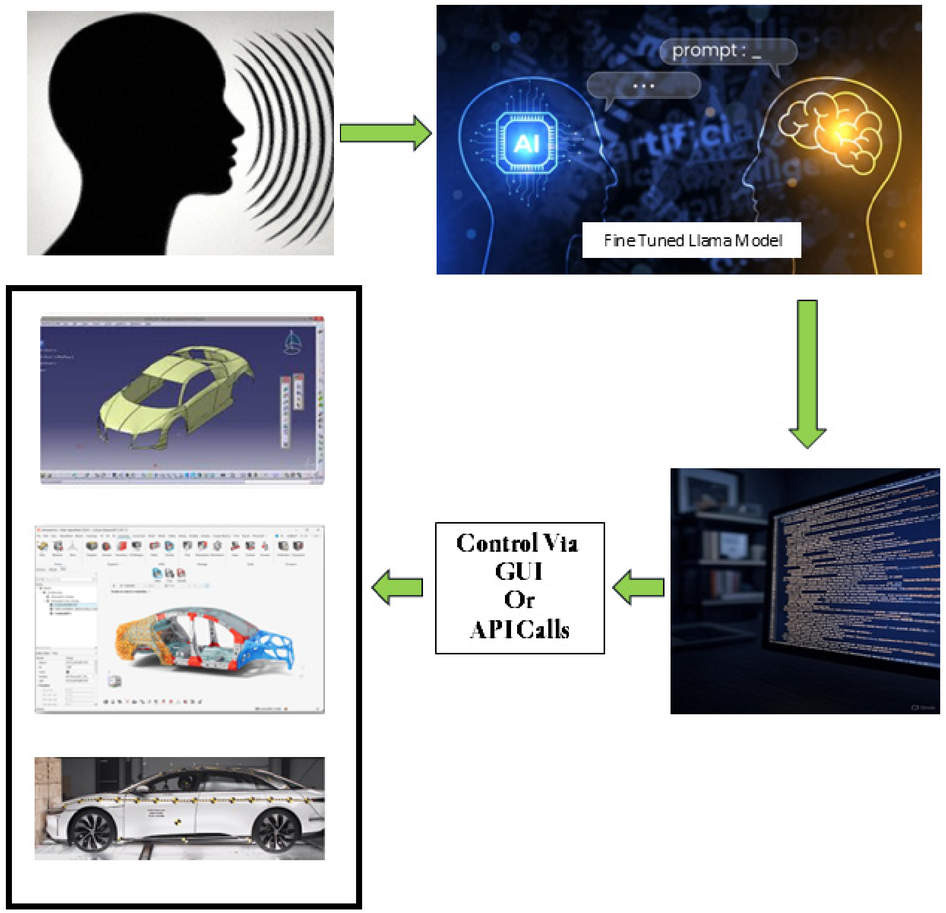
CAE LS DYNA Simulation *Altair PhysicsAI*

LUCID MOTORS

2025 WINNER
RESPONSIBLE AI

Predicting Crash Modes with Altair® PhysicsAI™

Lucid transformed crash CAE by applying AI-driven insights to predict complex, non-linear deformation behaviors under realistic off-axis and oblique impact scenarios. By integrating Altair PhysicsAI with LS-DYNA, they trained surrogate models to classify crash modes, such as axial crush and bending, well before physical testing. This approach reduced design iterations, minimizing prototype reliance, and accelerating delivery of lightweight, crash-robust structures with high safety confidence. This scalable methodology was applied across multiple crash-critical components and contributed to sustainability by minimizing material use, reducing test waste, and supporting corporate decarbonization goals.



LUCID MOTORS

2025 RUNNER-UP
RESPONSIBLE AI

Agentic AI For Engineering Automation

Lucid automated CAD data retrieval, custom script execution, analysis, and reporting by implementing AI-driven natural language support, which eliminated the need to learn each individual tool. By simply stating broad concepts, the AI handled intricate details and seamlessly chained multiple applications, allowing data to flow automatically through the workflow pipeline. This approach enabled instant execution of ideas without waiting for manual intervention and avoided complex API use by automating interactions directly through the GUI.