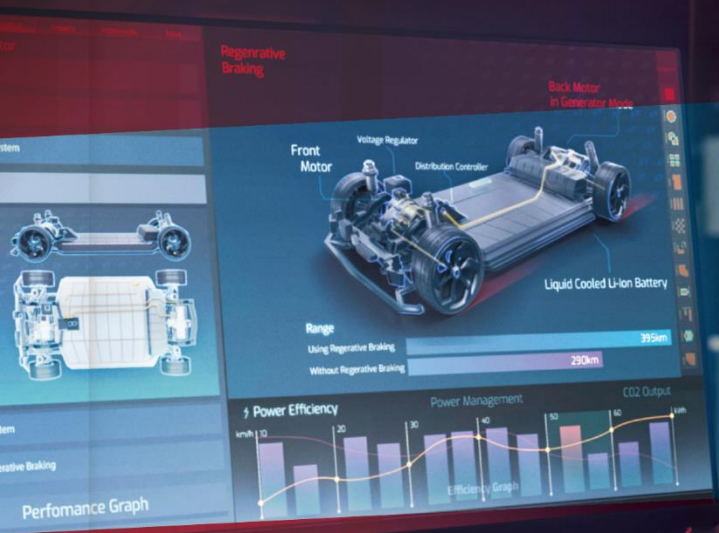




Tech
Mahindra



AUTOMOTIVE CHASSIS SYSTEMS EXPERIENCE





- Started in year **2,000** ■ **50 +** active customers
- **4,300+** engineers ■ **10+** Global engineering centers ■ **50%** Passenger OEMs
- **15%** Commercial OEMs ■ **35%** Auto Suppliers
- **\$200+** Mn investments in future technologies and expanding global footprint

Investments on Future Technologies



Autonomous
driving and
connectivity
technologies



Personalized
mobility and
connected car
platforms



EV/ HEV
technology



Future
Interiors and
seating



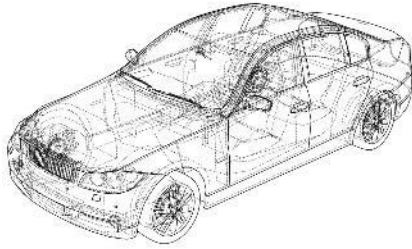
Vehicle weight
reduction
technologies

Platform based solutions for **Connected Car and Personalized Mobility & Connected Factories**



Key Differentiators

- Ownership of Derivative Programs with Global Execution Models bringing in Cost Arbitrage to the tune of 25%
- Simulation Driven Product Development, 15-20% reduction in Product Development Time
- 20+ years of experience in Safety Critical Automotive Electronics
- AI Enabled Cost Optimization & Supply Chain Management Platforms, 10-12% Product Cost Savings for 100+ programs
- Industry 4.0 Solutions, IoT Based Asset Tracking, AR/VR Solutions
- Engineering Automation, Up to 50% Cost & Time Savings Achieved for 300+ Projects
- Innovative and Flexible Business Models. Willing to Co-invest/Risk Share on New Technology Programs



Chassis Systems: Key Offerings



Chassis structures design & development



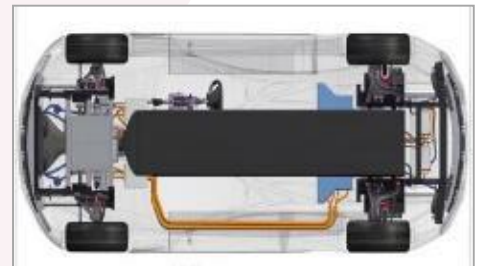
Chassis subsystems/modules integration



E-axles integration onto Chassis frame



Weight & Cost optimizations



Suspension geometry finalization



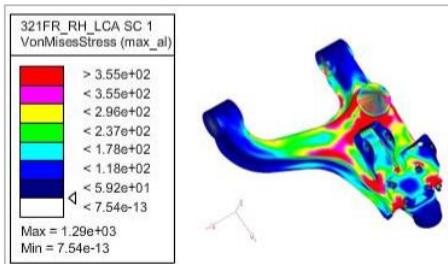
Ride performance and handling enhancement



Structural stiffness optimizations & crashworthiness checks



Dynamic FE simulation studies (Modal analysis, frequency response studies)



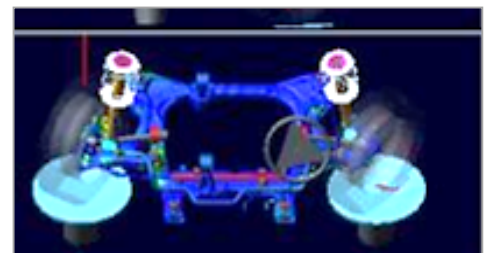
Kinematic & Compliance analysis

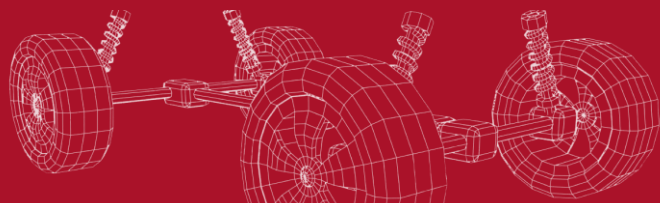


Topology optimizations



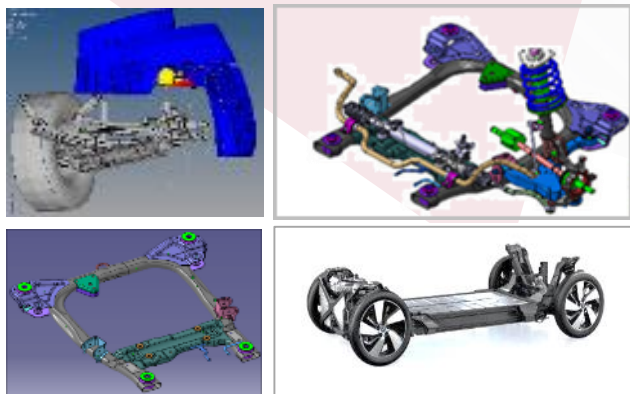
Road Load Data Acquisition (RLDA) & Real World Usage Profile (RWUP) mapping



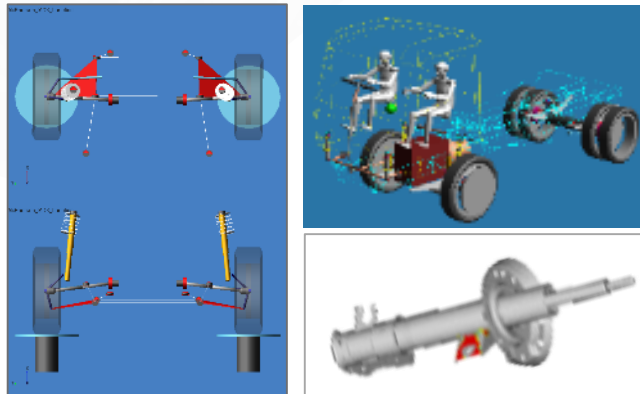


Chassis Systems End to End Experience

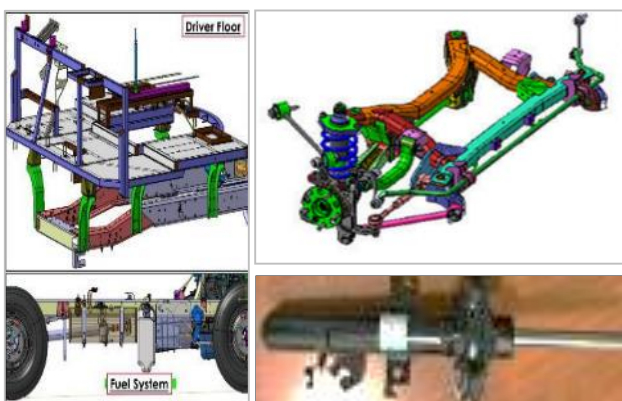
Design



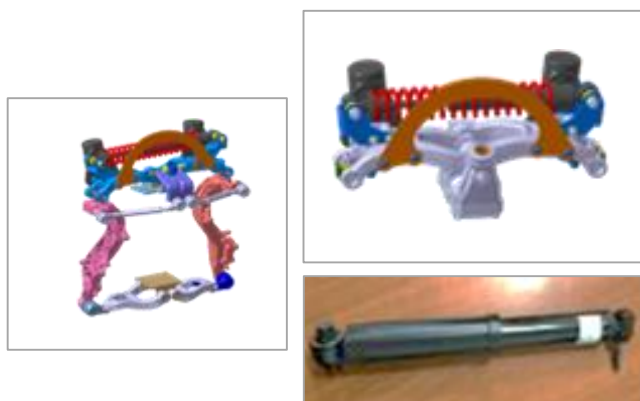
Virtual Validation



Product Cost Innovation



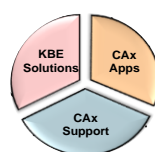
End to End Sourcing & Manufacturing



Physical Validation Support



Value Add Services

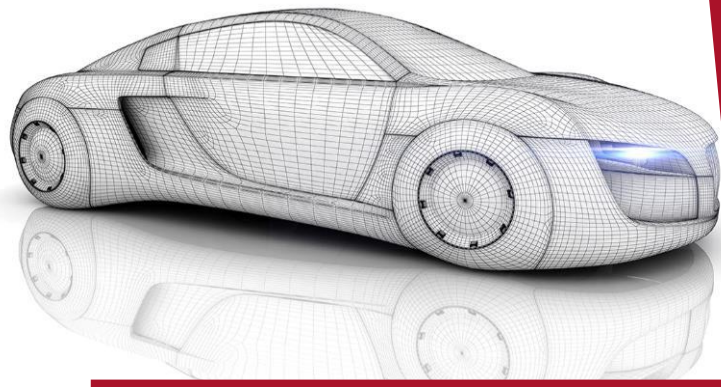


- After market support
- NTF (No Trouble Found) - Warranty issues Resolution

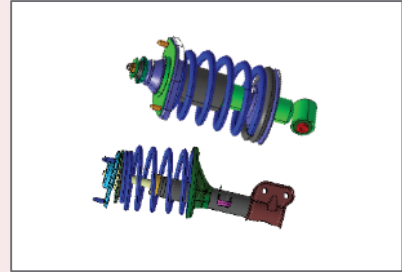
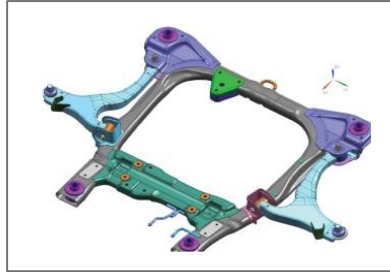
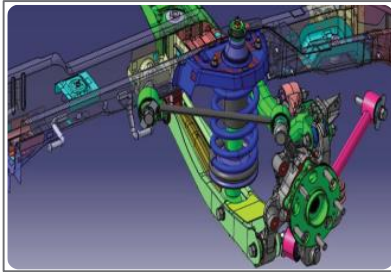


Parameter	Old	New
Handling	6.5	8.6
Ride	6.8	8.2
Steering	6.8	8





Our Value Proposition



Benchmarking and target setting. Subjective and Objective measurements to understand the ride and handling behavior of the vehicle



Light weight structures design, weight reduction by 15-20% for Chassis Frames & Modules



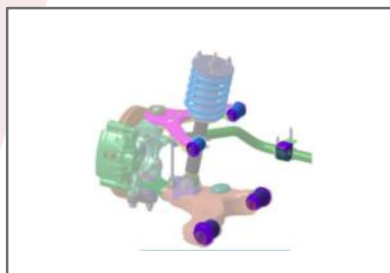
Modular Chassis design for new age EV Platforms, scalable across segments



Simulation driven design Optimization of Chassis Mounting Architecture weight reduction of Chassis & Improved factor of Safety for life

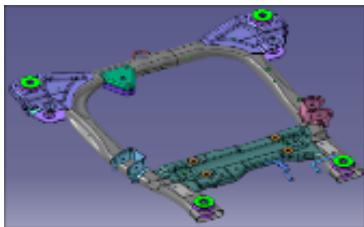


Prediction of Fatigue life of Chassis Components using proven virtual Simulation Methodology – Achieved close correlations (>90%)



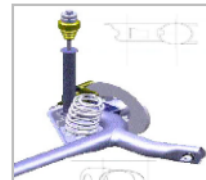
Chassis Systems: Key Success Stories

Chassis Frame



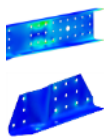
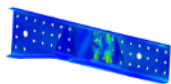
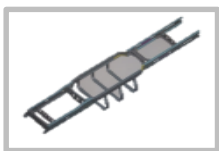
Monocoque structure design. Weight reduction, 15%. Design tested for 100 ADT cycles 160K km

Twist Beam



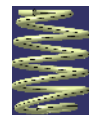
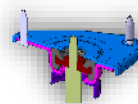
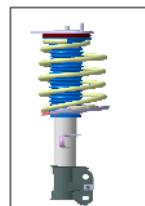
Close profile rear twist beam suspension design. 20% weight reduction with gauge optimization

Modular Frame



Modular frame for Electric vehicle. Integration of e-motor instead of conventional engine

Struts/Shock Absorbers



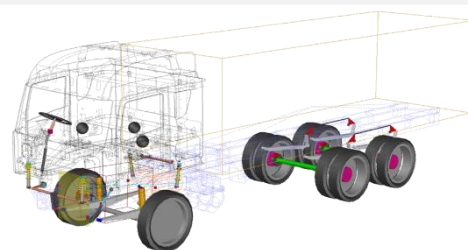
McPherson strut design for M1 vehicle with GVW of 2510 kg

Frame design & Aggregates Integration



RWUP definition & RLDA. Frame design and mounting aggregates position w.r.t vehicle load distribution

Cab Suspension



Modular Cab Suspension Design. Accelerating the design process using an integrated Front-End CAE + Hi-fidelity CAE approach



INTEGRATED ENGINEERING SOLUTIONS (IES)

Is a Connected Engineering Solutions business unit of Tech Mahindra. At Integrated Engineering Solutions, customers are at the core of every innovation. We align Technology, Businesses and Customers through innovative frameworks. We deliver future-ready digital convergence solutions across Aerospace and Defense, Automotive, Industrial Equipment, Transportation, Consumer Products, Energy and Utilities, Healthcare and Hi-Tech products. Our 'Connected' solutions are designed to be platform agnostic, scalable, flexible, modular and leverage emerging technologies like Networking, Mobility, Analytics, Cloud, Security, Social and Sensors, that enable launching of smart products and deliver unique connected consumer experiences, weaving a connected world. Coupled with this, our strong capabilities in Electronics, Mechatronics and Mechanical Engineering along with domain understanding and product knowledge, bring excellence to the entire lifecycle of these connected ecosystems.

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