



Safety & Crash Testing

From full-vehicle crashes to quasi-static component testing, explore our safety solutions.

www.mgaresearch.com/capabilities

Comprehensive Vehicle Safety Testing Solutions

MGA Research Corporation is a trusted leader in vehicle safety testing, offering over 35 years of industry expertise to support automotive engineers from early prototype development through final regulatory compliance and consumer ratings. Our comprehensive services span crash testing, rollover evaluations, sled testing, and pedestrian protection assessments, all conducted at our state-of-the-art facilities equipped with advanced high-speed camera technology. We specialize in FMVSS and ECE Type Approval testing, including the FMVSS 100 Series focused on crash avoidance features, and the FMVSS 200 Series focused on crashworthiness. Both series ensure accurate, reliable results that meet global safety standards. Additionally, our extensive proving grounds and specialized labs support sensor development and airbag algorithm refinement, helping automakers enhance vehicle safety across a wide range of real-world scenarios.

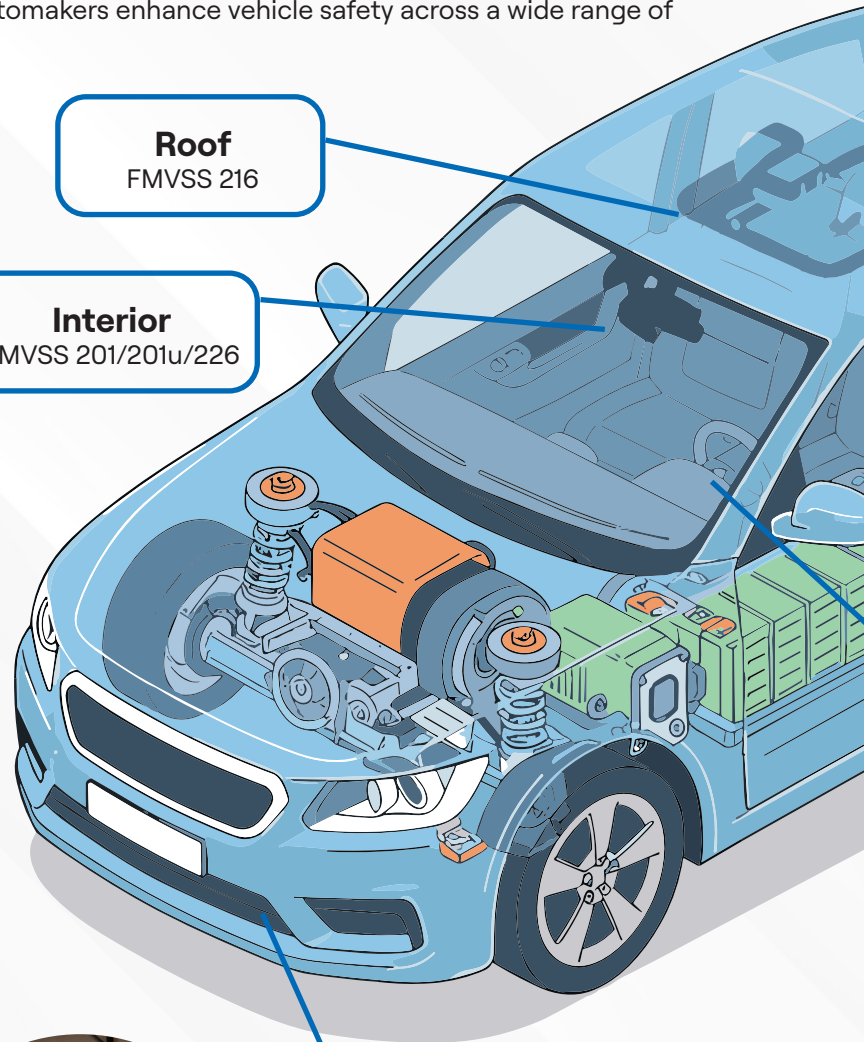
400-Acre Proving Grounds

The Wisconsin operations, established in 1988, is a 400-acre proving grounds with a Vehicle Safety Center consisting of three indoor crash lanes (two frontal barrier sites), two accelerator sleds, as well as a 4th outdoor crash lane for multi-car and high-risk impacts.

MGA is the only independent test provider in the USA providing virtually all testing services for Crash, FMVSS 200 Series, FMVSS 100 Series, and Rollover Sensor Development.

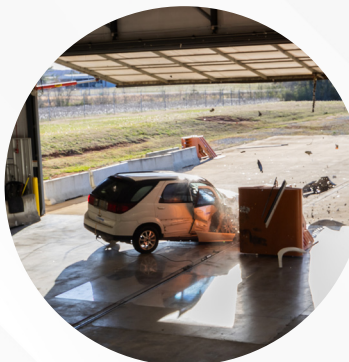
Crash in the Southeast

The Alabama test facility was established in 2014, with two separate crash halls connected by a single track. This facility has over 75,000 square feet of testing area and room to expand in order to support our global customer base in the area and is strategically located in the middle of automotive manufacturing activities in the Southeastern United States. The facility has a modular design, allowing the crash facility to be completely isolated from the component safety and durability lab. It is the first facility of its kind in the southeast to combine component level durability, safety, and full vehicle crash testing in one location.



Roof
FMVSS 216

Interior
FMVSS 201/201u/226

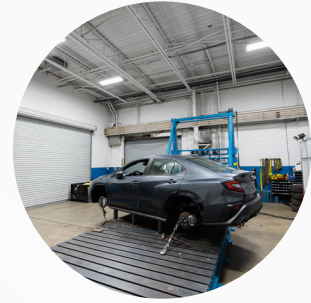


Full Vehicle
OEM
Inadvertent Airbag, Roll Over Testing, Crash Testing, Door Slam, Pedestrian Protection, Active Safety

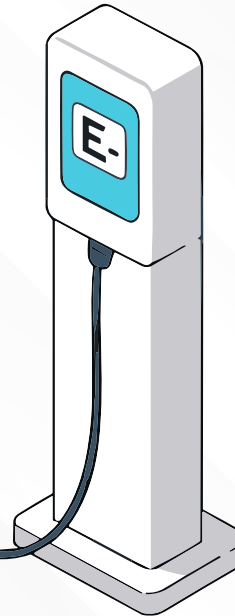
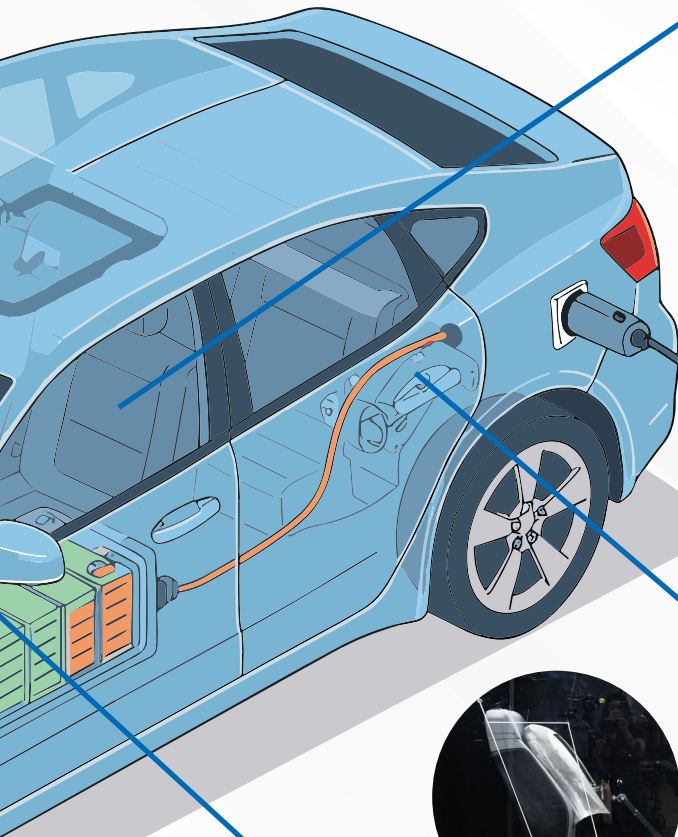


Seats

Multiple **TIER 1** and **TIER 2**
All Seating Rows - Frontal,
Rear, Whiplash (IIHS), FMVSS
202a/207/210/225

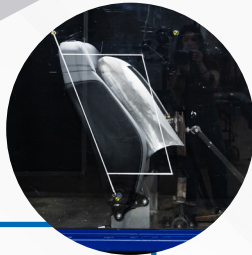


The anchorage system includes nine cylinders, each capable of applying loads in excess of 5,000 pounds. It is designed to run FMVSS 207/210 and FMVSS 225 compliance tests.



Doors

FMVSS 206/214



Airbag

Environmental, Deployment
(Curtain, Front, Side, Knee)



Meeting Industry Demands

MGA continues to support the industry with innovative tools that meet evolving compliance needs. Our newly developed FMVSS 225 Tool Set, featuring a Clearance Angle Tool and Anchorage Depth Tool, provides accurate, reliable measurement for child seat anchorage evaluations. Additionally, our new Force Application Devices (FAD1 and FAD2) for FMVSS 210 testing deliver precise, NHTSA-compliant solutions for both standard and narrow seating positions. Designed and built by MGA's Fabrication team, these tools reflect our commitment to advancing safety testing with practical, validated solutions.



Putting Advanced Safety Systems to the Test

Effective pedestrian protection requires a two-fold approach: preventing collisions wherever possible and reducing injury severity when collisions occur. Vehicle technologies address this through two categories of safety systems: passive and active.

PASSIVE PEDESTRIAN PROTECTION

Focuses on minimizing injuries once contact with the vehicle has been made.

Headform Impacts (Adult & Child): Measures head injury risk.

Upper Legform: Simulates thigh, pelvis, and hip to assess femur injury.

Lower Legform: *Flex-PLI:* Evaluates knee and lower leg injury; *aPLI:* More biofidelic, assessing knee, upper, and lower leg injury.



Head injury is the leading cause of pedestrian injury and fatalities worldwide. Most regulatory and development testing aims to reduce the risk of head/neck injury of pedestrians by assessing head injury criteria (HIC) when struck in the hood/bonnet and windshield area of a vehicle. A headform impactor is used to simulate the size, mass, and response of human heads, both adult and children. The headforms are launched at specified velocities to simulate real world conditions, and the response is recorded.

MGA focuses our passive pedestrian protection efforts in California and provides the following advantages to our customer base:

- Dedicated pedestrian protection testing staff armed with some of the most advanced equipment in the industry.
- Active involvement in the global conversation surrounding pedestrian protection efforts.
- Multiple impact frames and impact forms, providing unmatched test capacity .
- 3-Axis Impact Frames internally designed with position memory and validated launchers.
- Pedestrian Protection equipment implemented at dozens of test facilities worldwide.
- Capability for pedestrian impact tests at extreme temperatures.
- aPLI catching mechanism built into our equipment, reducing potential for equipment damage and increased safety for our team and customers.

A trusted leader in automotive safety testing, MGA brings five decades of crash, sled, and component testing expertise—now extended to the fast-evolving world of active safety and advanced driver assistance systems (ADAS).

ACTIVE PEDESTRIAN PROTECTION

Aims to prevent or mitigate the collision before it happens.

Autonomous Emergency Braking (AEB) : Evaluates detection and automatic braking to avoid or lessen collisions.

Collision Avoidance: Tests steering assist and evasive maneuvers to prevent pedestrian impact.

Sensor Validation: Confirms radar, lidar, camera, and sensor fusion performance across speeds and conditions.

Why ADAS Testing is Essential

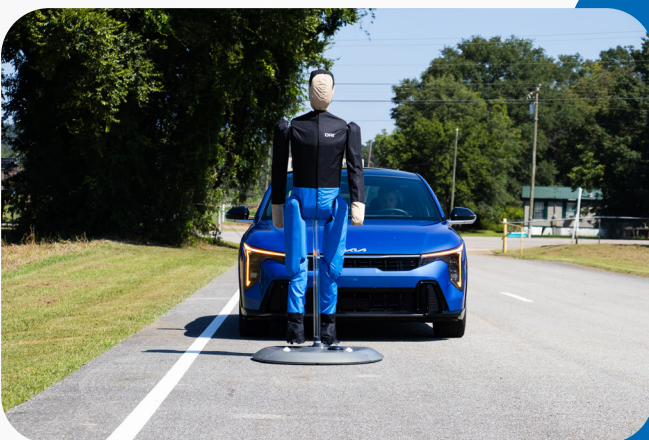
- Saving Lives: Pedestrian deaths have increased 78% since 2009 and now account for ~18% of U.S. traffic fatalities: a trend in the wrong direction
- High-impact safety potential: ADAS technologies—including Automatic Emergency Braking (AEB), Forward Collision Warning (FCW), Adaptive Cruise Control (ACC), Lane Departure Warning (LDW), and Lane Keeping Assist (LKA)—are projected to prevent over 37 million crashes, 14 million injuries, and approximately 250,000 deaths in the U.S. from 2021 to 2050 (AAA Foundation).



In the US, the Insurance Institute for Highway Safety (IIHS) and the National Highway Traffic Safety Administration (NHTSA) are driving forces propelling the advancement of ADAS technology through consumers rating and regulatory initiatives.

MGA Research has invested in state-of-the-art equipment to support ADAS validation, including soft-mount ADAS targets, GPS-guided robotic platforms, and high-resolution data collection systems. Testing is now available at key partner proving grounds across the US, supporting IIHS and custom test scenarios in a phased approach:

- **Phase 1** – IIHS Development & Self-Submission: Immediate support for IIHS Forward Collision & Pedestrian AEB protocols (available now)
- **Phase 2** – U.S. NCAP and FMVSS Readiness: Positioning for upcoming government protocols and potential star-rating influence (coming soon!)



Several global trends are pushing pedestrian safety to the forefront:

- *Urbanization: More people are living and working in cities, where walking and micromobility are a part of daily life.*
- *Electrification: Electric and hybrid vehicles are quieter, making it harder for pedestrians to hear them approaching.*
- *The use of cell phones or other distracted driving*

Together, these factors mean that vehicles must account for a wider range of interactions beyond the inside of the vehicle.

Impact Sled Testing

MGA Research Corporation offers comprehensive sled testing services, leveraging over 35 years of experience to support multiple industries in evaluating the safety and performance of components and systems under simulated crash conditions. Sled testing methodology is an efficient and economical way to evaluate vehicle safety components, offering economic advantages by allowing multiple compliance and component evaluations with a single vehicle. With the switch to virtual analysis as a global trend, the impact sled system becomes critical and more valuable, as it provides physical data from components or subsystems that correlate with CAE models early in the development process.



Component and System Level Simulations

- FMVSS 208 Frontal
- NCAP Frontal
- IIHS ODB 2.0
- EuroNCAP Far Side
- FMVSS 214D
- FMVSS 301R
- Moderate and Small Overlap
- Custom Dynamic Evaluations and more!

This system features steel needle bearing rollers that help reduce friction and maintain target velocity during testing. It supports a weight capacity ranging from 500kg to 1,500kg and includes a significantly reinforced impact barrier. The current system has a maximum energy capacity of 135kJ. Additionally, it offers interchangeable load forms to accommodate various customer requirements.



Acceleration Column

- 6" diameter thrust column
- Adjustable pressure and volume to vary impact velocity

Impact Carriage

- Three primary carriages, each with different mass
- Customizable impact forms for specific test modes
- Slides on linear bearings for low-friction accuracy

The MGA Impact Sled is designed with a robust and versatile testing setup to accommodate a wide range of evaluations. At the core of the system is a dynamic barrier that is secured to a underground reaction insert. The barrier front plate measures 96 by 72 inches, is 2 inches thick, and features a 6-inch hole pattern, providing the flexibility to securely mount a variety of test samples and fixtures. Complementing the barrier are three primary impact carriages, each with varying mass, which can be fitted with custom impact forms tailored to specific test modes. This setup ensures accurate, repeatable results while supporting both single-component and system-level crash evaluations.

Impact Form

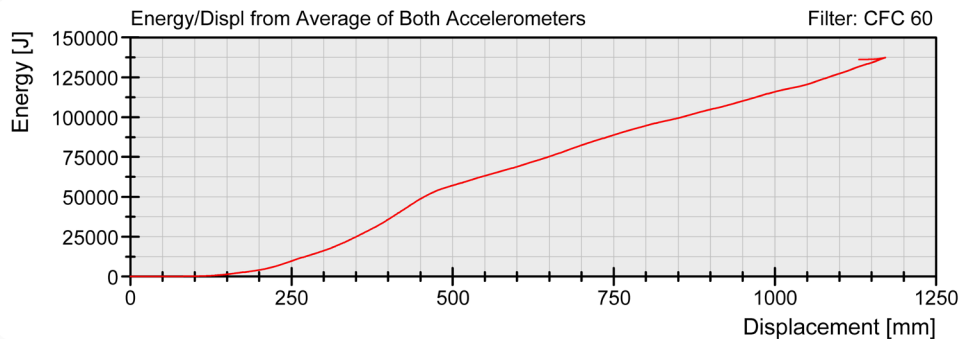
- Various impact forms available for multiple impact conditions

Reaction Insert

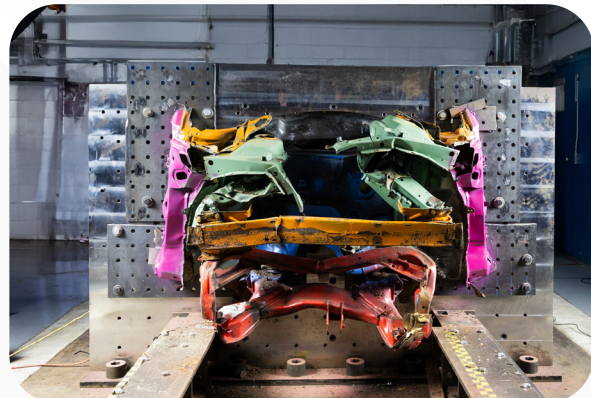
- Steel I-beams reinforced with rebar encased in high PSI concrete
- 2" thick steel top plate with fixture mounting holes between rails
- Total mass of 40,000 lbs

Rigid Barrier

- 2-inch thick steel front plate
- Reinforced I-beam structure
- Measures 5 feet tall by 8 feet wide



Using accelerometer sensor data, engineers can precisely measure crash energy management, while high-speed video captures detailed deformation patterns throughout the impact event. For projects requiring deeper analysis, post-test 3D scans can be performed to create overlays with CAE models, offering a clear and accurate correlation between physical and virtual testing.





For more information, contact us at www.mgaresearch.com/contact.

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