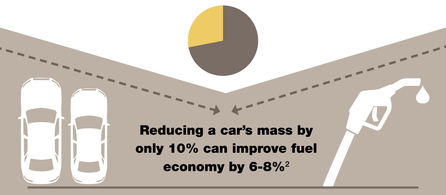
Increasing Fuel Economy through Lightweighting

Weight reduction is the key to improving the fuel efficiency of automobiles.

72% of SAE survey respondents cited lightweighting as the technology trend with the biggest impact on fuel economy.[1]



Reducing a car's mass by only 10% can improve fuel economy by 6-8%[2]

Corporate Average Fuel Economy (CAFE) Standards require **increasing fuel economy to 54.5 mpg for cars and light-duty trucks by MY 2025.**

2025

Challenges of Lightweighting

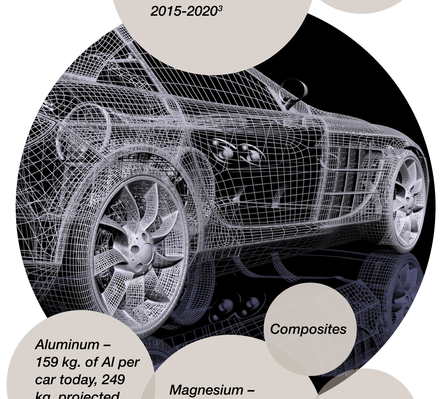
- Crashworthiness
- Vehicle repair
- Mixed materials joining
- Working with unfamiliar materials
- Cost effective manufacturing methods
- Drivability
- Corrosion prevention
- Sourcing, manufacturing, and recycling of lightweight materials
- Optimal material selection for high-volume assembly (mass production)
- Testing and validation

Lightweight Materials

High Strength Steels (HSS)

Advanced High-Strength Steels (AHSS) – 20 new grades of AHSS available in 2015-2020[3]

3rd Generation Advanced High-Strength Steels



Composites

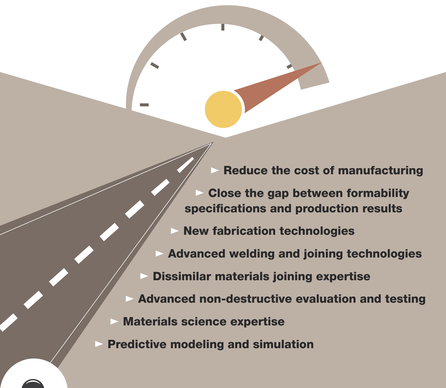
Aluminum – 159 kg. of Al per car today, 249 kg. projected by 2025[4]

Magnesium – Industry target is to use an average of 159 kg. of Mg components by 2020[5]

Sandwich structures

Carbon Fiber Reinforced Plastics

How to Overcome Lightweighting Challenges



- Reduce the cost of manufacturing
- Close the gap between formability specifications and production results
- New fabrication technologies
- Advanced welding and joining technologies
- Dissimilar materials joining expertise
- Advanced non-destructive evaluation and testing
- Materials science expertise
- Predictive modeling and simulation

EWI Can Help

EWI engineers help OEMs and automotive suppliers meet rising demands for stronger, lighter materials, increased safety, lower fuel emissions, higher productivity, and reduced costs through manufacturing technology innovation.

Contact Mark Yadach, Automotive Market Manager, at **myadach@ewi.org** or **248.921.5838**, to find out how EWI is helping auto manufacturers and suppliers use technology innovation to become more competitive.

EWI
We Manufacture Innovation

[1]http://articles.sae.org/11502/
[2]http://energy.gov/eere/vehicles/vehicle-technologies-office-lightweight-materials-cars-and-trucks
[3]http://www.steel.org/~/media/Files/Autosteel/NAIAS/AHSS%20Benefits%20and%20Applications.pd
[4]https://www.alcoa.com/car_truck/en/pdf/Randall_Scheps_Platts_2014.pdf
[5]http://wardsauto.com/vehicles-amp-technology/lower-cost-key-magnesium-s-lightweighting-uses