

ALUMINUM: THE SAFETY ADVANTAGE



The old myth that the weight of a vehicle determines its safety is finally losing steam as automakers and policymakers alike learn that size, not weight, is a better determinant of vehicle safety. Aluminum can make a vehicle safer by extending crush space for crash protection, while also reducing weight to boost fuel economy. The safety benefits also extend to the other driver in an accident because aluminum-intensive vehicles carry less mass and deliver less crash energy.

Here are the important safety advantages that aluminum provides:

- ▶ Injuries in crashes involving SUVs and smaller vehicles can be reduced up to 26 percent by using aluminum to extend the SUVs front/rear crush zone while cutting overall weight.
- ▶ Pound for pound, aluminum absorbs two times the energy in a crash compared to steel, and can be up to two and half times stronger.
- ▶ Aluminum can be designed to fold predictably during a crash, allowing the vehicle – not its passengers – to absorb maximum energy to protect passengers from destructive crash forces.
- ▶ The high strength-to-weight ratio of aluminum allows a vehicle to maintain, or even increase, the size and strength of its critical front- and back-end crumple zones without increasing overall weight or sacrificing occupant safety.
- ▶ Aluminum can replace iron and steel components in automobiles for a weight saving of 45 to 50 percent while increasing performance and fuel efficiency without a loss in safety.
- ▶ It is estimated that in two vehicles of equal weight – one aluminum and one steel – the aluminum vehicle can be built up to 20 percent larger. This allows designers to maximize overall vehicle size – and therefore safety – without weight penalties.
- ▶ Vehicles made lighter and with higher structural stiffness with aluminum accelerate more quickly, provide better stability and response, and require shorter stopping distances than heavier vehicles.

“There is no fundamental scientific reason why decreasing the mass of all vehicles must result in more injuries and fatalities.”

-David Greene and Maryann Keller,
research fellows, Oak Ridge
National Laboratory
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