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Life Cycle Assessment

About Life Cycle Assessment:

Automakers are working diligently to meet mid-term targets for the 2025 fuel economy regulations. It is clear vehicle lightweighting will play a critical role in meeting these requirements. Life cycle assessment (LCA) shows making advanced high-strength steel (AHSS) generates at least 80 percent fewer emissions than manufacturing other materials.

LCA is an established methodology of measuring the carbon footprint of a product over its entire life, including manufacturing, usage and end-of-life disposal.

For vehicles, regulating usage (driving) emissions alone may have the unintended consequence of increasing greenhouse gases (GHGs) over the vehicle's life.

Environmental Benefits of AHSS:

- LCA documents production of AHSS generates much lower emissions than other automotive body materials and provides significant reduction in driving and end-of-life emissions;
- GHG emissions from manufacturing alternative materials are significant and are five (aluminum) to 20 (magnesium) times greater than when producing steel;
- While steel can achieve nearly the same mass reduction as aluminum at a higher value, the powertrain and aerodynamics have the most significant impact on the vehicle's emissions during the use phase;
- Steel is continuously recycled, saving vital resources for future generations. Nearly all automotive steel is collected and recycled;
- Steel's physical properties allow products to be recycled into any steel product without loss of quality. Competing materials must be recycled to the same grade or a lower-quality product (down-cycling); and
- There are more than 80 million tons of recycled steel available per year that can be manufactured into new steel products.

Life Cycle Case Studies:

[WorldAutoSteel](#) studied the effects automotive materials have on life cycle GHG emissions for light-duty truck and sport utility vehicles. In all cases, AHSS-intensive vehicles had lower life cycle emissions than aluminum-intensive vehicles. For an annual fleet of 700,000 trucks, this means an AHSS-intensive design saves approximately 1 million metric tons of carbon dioxide equivalent (CO_{2e}) emissions over the aluminum-intensive vehicle.