American Iron and Steel Institute

Steel Industry Comments on 2017-2025 CAFE and Emissions Rules

Ronald P. Krupitzer – American Iron and Steel Institute

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AISI thanks the EPA and NHTSA for holding this hearing today and for allowing me to address this public forum and comment on the impact of the proposed regulations in two important areas. My name is Ron Krupitzer, vice president - automotive market, for the American Iron and Steel Institute (or AISI). I will address how the proposed regulations will affect

- First, the use of steel in future vehicles
- And secondly, life cycle greenhouse gas emissions

On the first subject, AISI recognizes that the new regulations will influence car companies to consider **mass reduction** as a high priority. I would like to state for the record that steel has a history of providing mass reduction solutions for light-duty vehicles by developing a portfolio of advanced high-strength steel (AHSS) grades for this purpose for over a decade. These steels have tremendously improved strength over conventional mild steel and enable parts to be made thinner and lighter while still carrying the required loads. At the May 18, 2011, Great Designs in Steel Seminar, Ducker Worldwide[1] reported that AHSS is now the fastest growing automotive material in today's new cars and trucks. So, you can see that AHSS grades have proven to provide affordable mass reduction for carmakers. Ducker[2] also forecasted the acceleration in the growth of AHSS between now and

2025 because the new regulations will demand further mass reduction. AHSS in new vehicles averages around 17% of the body mass today and can possibly triple by 2025.

Much work was necessary to grow the content from essentially zero to the 17% level reported above. It was first made possible because of the global steel industry ultra-light steel studies, called ***ULSAB*** (Ultra Light Steel Auto Body) which were completed in 2002 with the release of the final project, ULSAB-AVC (advanced vehicle concepts)[3].

This transition from mild steel to AHSS since 2002 in vehicle structures was also facilitated by collaboration with the Auto/Steel Partnership through support by the U. S. Department of Energy (DOE) and the U. S. Advanced Materials Partnership (USAMP). Important projects including Lightweight Front-end Structure[4] and Future Generation Passenger Compartment[5] helped to accelerate use of AHSS. Also, many North American steel mills invested in the technical development of their facilities by updating or building new process lines to manufacture these AHSS grades.

To prepare for the future 2017-2025 time period, AISI together with global steel producers under WorldAutoSteel has again conducted a major engineering project, called ***FutureSteelVehicle***[6]. This study examined the most efficient structures for electrified powertrain vehicles like battery electric vehicles and plug-in hybrids. Twenty new grades of AHSS were included in the study, dramatically increasing steel's portfolio in the 10 years since the ULSAB studies concluded. Many of the newest AHSS grades in this study have strengths in the gigapascal range, over 1000 MPa. That's at least 5 times stronger than mild conventional steels.

FutureSteelVehicle (FSV) results were published in May 2011 and showed mass reduction levels of about 35% in body/structural applications. Such high mass reductions with steel are now possible because of new extremely high-strength grades, new manufacturing processes like tailor rolling or hot stamping, and new design optimization CAE (computer-aided engineering) tools. The FSV results reinforce the forecast by Ducker that AHSS growth in vehicles should continue well past 2020.

The results of the FSV study have been shared with North American carmakers. Importantly, it shows that significantly more mass reduction through use of these steels remains for the future. Equally important, this study also evaluates the cost and the carbon emissions consequences of mass reduction solutions. It is significant that AHSS mass reduction solutions are often both the least expensive and the lowest carbon solutions, based on a calculation of life-cycle greenhouse gas emissions.

On this **<u>second subject</u>**, **<u>the effect of the proposed regulation on life-cycle greenhouse gas emissions</u>**, studies at many universities including UC Santa Barbara[7] and the University of Michigan[8] have pointed out the value of life-cycle assessment in determining the true impact of vehicles on total greenhouse gas emissions. Additionally, recent studies at UC Davis[9] have examined the consequences of continuing to apply tailpipe-only (that is, driving cycle only) regulations and, therefore, ignoring some of the critical upstream sources of GHG emissions.

For example, recent LCA case studies compiled by Geyer at UC Santa Barbara (Sun to Wheels Study[10]) and Ricardo (Preparing for a Life Cycle CO_2 Measure[11]) show that such materials and manufacturing related emissions are likely to grow from 15% of total emissions (today) to 50% or more by 2020 as vehicles become more fuel efficient. A tailpipe-only rule which ignores 15% of total emissions [today's situation] is a much different case than one that ignores 50%. LCA methods are the most straightforward way to account for total emissions from vehicles. Life cycle emission data exist today for automotive materials, as do models for calculating life cycle emissions of vehicles. The study above by UC-Davis offers a bill-of-materials approach to simplify the process of calculating LCA emissions for vehicles. This is important since LCA methodology has been sometimes considered difficult or complicated to implement.

A specific example given in the UC Davis studies shows the potential consequences of continuing tailpipe-only regulations – namely, that actual vehicle emissions may increase. Kendall's evaluation of a hypothetical Toyota Venza (the HD vehicle[12] as studied by Lotus Engineering) showed how emissions from the production of low density materials the vehicle can account for 40% or more of total emissions. In this case, differences in materials emissions outweighed differences in emissions from driving.

While AISI case studies and UC Davis research have been clear in these analyses, it is important to note that other organizations, such as the Ricardo study mentioned above, Toyota[13], (and others) have released analyses in support of LCA as an important tool to manage all aspects of vehicle-related emissions.

In summary, I would like to leave you with the following points:

1. New steels and automotive manufacturing techniques continue to be developed by our industry enabling significant vehicle mass savings.
2. As vehicles become more and more fuel efficient, materials manufacturing emissions will become the dominant part of total life cycle emissions to the point they cannot be ignored—many studies indicate this will begin to occur around 2020.
3. LCA principles and materials life cycle data are well-known and should allow regulators to deal with life cycle emissions by the time such regulations are needed, about 2020.

Considerable collaboration is necessary among car companies, regulators, and suppliers to establish the methodology for fairly accounting for life cycle emissions in vehicle regulations. The steel industry stands ready to participate in a multi-functional working group with EPA, NHTSA and automakers to address this important challenge. We believe it is possible to develop and test such methods in time for the mid-term review established for this regulatory period.

Thank you very much for your attention.

References

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