INSURANCE INSTITUTE
FOR HIGHWAY SAFETY

July 13, 2004

The Honorable Jeffrey W. Runge, M.D.
Administrator
National Highway Traffic Safety Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

Reforming the Automobile Fuel Economy Standards Program
Docket No. NHTSA 2003-16128, Notice 1

Dear Dr. Runge:

The Insurance Institute for Highway Safety appreciates this opportunity to comment on the National Highway Traffic Safety Administration's (NHTSA) advance notice of proposed rulemaking (ANPRM) on reforming the automobile fuel economy standards program. The Institute's comments will be brief because many of our safety concerns about the current structure of the corporate average fuel economy (CAFE) system are well represented in the National Academy of Science's (2002) report referenced in the ANPRM and because the Institute (2002) already has elaborated on these concerns in a previous letter to the agency.

However, the ANPRM shows that the agency's thinking about possible reform has advanced a considerable amount. In this comment, the Institute would like to address three main issues related to NHTSA's latest analysis of CAFE reform: the need to specify any fuel economy requirement in terms of fleet average miles per gallon (mpg), the potential safety and fuel consumption effects of weight-indexed versus size-indexed fuel economy requirements, and the need for a more rational definition of cars versus trucks.

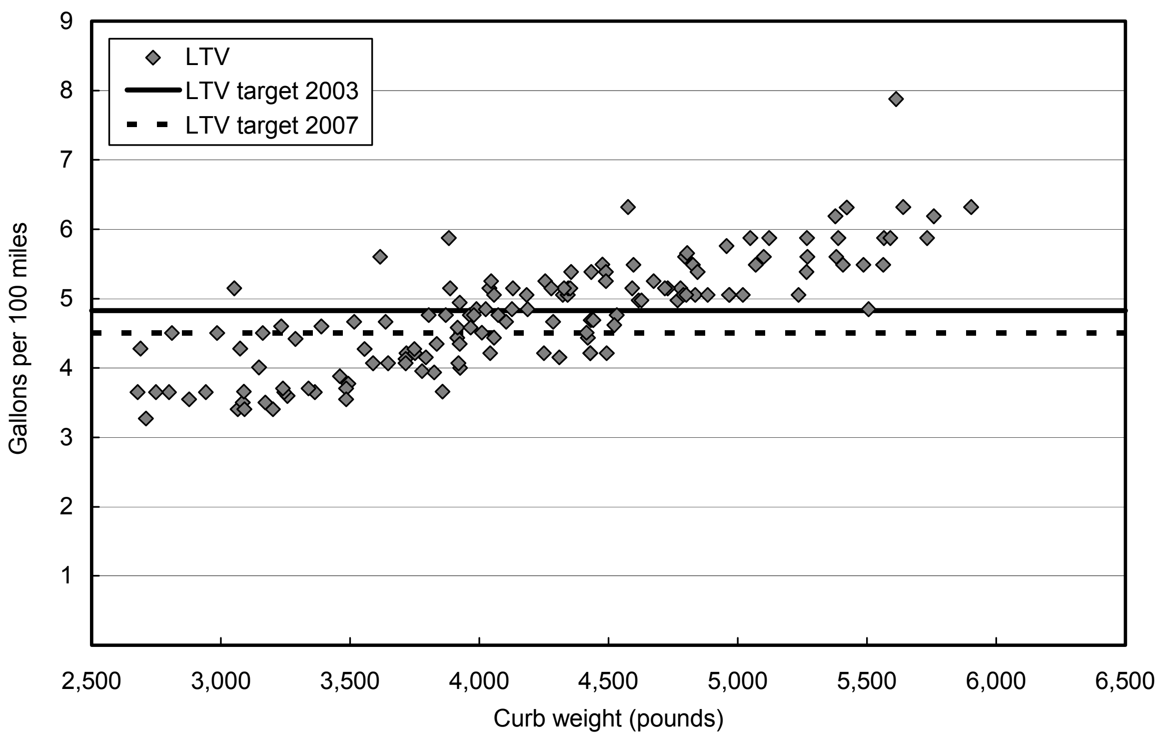
Fuel Economy Requirements as Fleet Average MPG

NHTSA voiced a concern in the ANPRM that "the language and structure of the EPCA requires that we state any CAFE standard in terms of 'miles per gallon'." Given this concern, it is important to note that the fuel economy requirement of any system, including weight- or size-indexed systems, can be represented in this manner. The only difference from the current CAFE standard is that, for a size- or weight-indexed system, the target for the entire U.S. vehicle fleet (or all automobiles or all light trucks) is not necessarily the same as the target for an individual manufacturer because the manufacturer's target depends on the mix of vehicles it makes.

This can be illustrated by comparing how current CAFE requirements, and any strengthening of these requirements, relate to the fuel economy of the U.S. fleet and how weight- and size-indexed systems would relate to the fleet. To simplify this exercise, the illustration will ignore the distinction in CAFE rules between domestic and imported vehicles as well as special credits given for such things as alternative fuel vehicles. To further simplify the illustration, only light truck vehicles (LTVs) will be considered, but the argument could be extended to the car fleet, independently, or to a combined fleet of cars and trucks. The original data for the illustration are the unadjusted combined fuel economy ratings reported by the Environmental Protection Agency (Hellman and Heavenrich, 2003). As the agency has noted, these laboratory data overstate the actual fuel economy of the fleet, but these numbers are readily available and are sufficient to illustrate different fuel economy concepts.

Figure 1 shows the current LTV standard plotted against the background of the fuel economy actually achieved by light trucks of different weights in the fleet in the 2003 model year. Note that for this discussion, the mathematical inverse of fuel economy (fuel consumption in gallons per 100 miles (gal/100 mi)) has been plotted.

Figure 1
Combined Fuel Consumption in Model Year 2003



As vehicle weight increases, a vehicle’s fuel consumption increases for the same miles driven (i.e., fuel economy decreases). The 2003 requirement for all light trucks was that the fleet average fuel economy must be no lower than 20.7 mpg. Taking the inverse of this number gives 0.0483 gallons per mile as the targeted light truck fleet average fuel consumption (4.83 gal/100 mi, shown as a horizontal line in Figure 1).

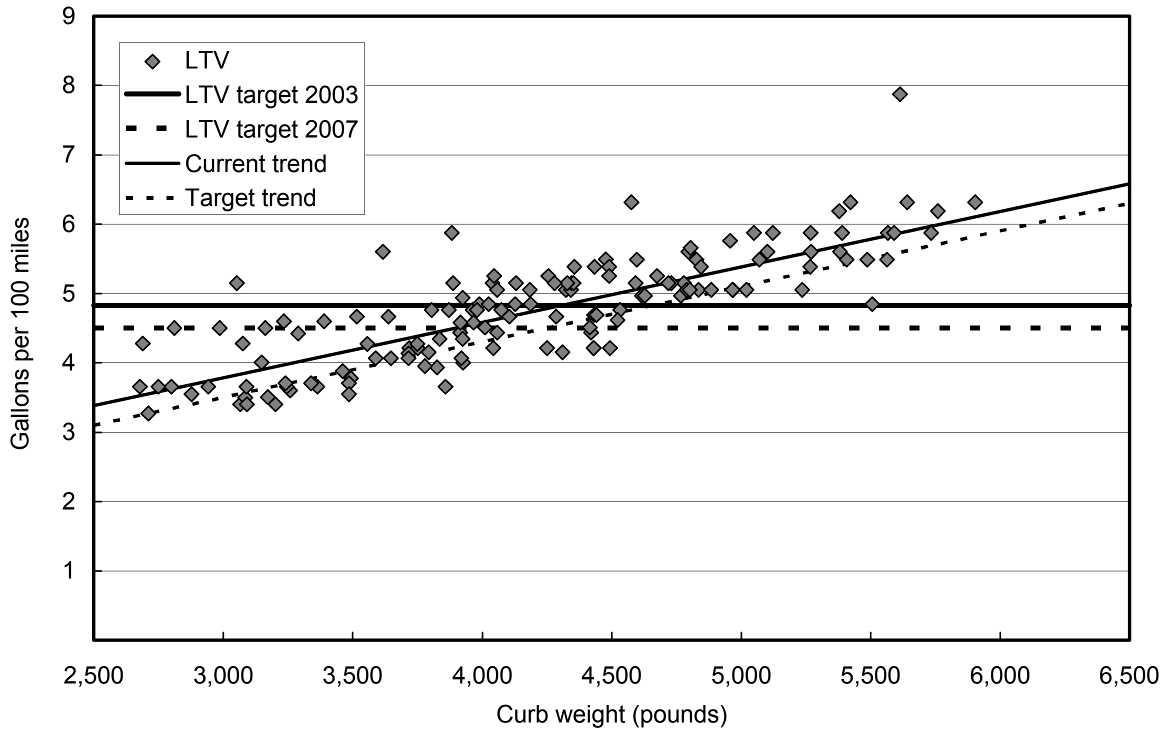
The fleet fuel consumption maximum of 4.83 gal/100 mi also was the corporate average requirement for each manufacturer, no matter what its mix of vehicle sales by weight. This means the sale of any vehicle with fuel consumption higher than the maximum allowed had to be balanced by the sale of a vehicle (or vehicles) with lower fuel consumption or else the manufacturer’s fleet would have consumed more fuel per mile than allowed. In fact, some manufacturers do not achieve the required fuel economy with their fleets, even after various adjustments that have become part of the CAFE compliance computation, and they pay fines for failing to meet the CAFE requirement. Thus, the fuel economy standard does not specify “requirements” but “targets” with financial penalties for manufacturers who do not meet the targets.

Making the current CAFE standard more stringent is equivalent to lowering the allowable fuel consumption for the same miles. For example, raising the LTV fuel economy target to an average of 22.2 mpg, as now required by NHTSA for 2007, means the maximum allowable fuel consumption falls to 4.50 gal/100 mi (the dotted horizontal line in Figure 1). Again, with the current structure of CAFE requirements, this would mean the corporate average fuel economy of every manufacturer would have to be greater than 22.2 mpg (after application of any credits and adjustments) or the manufacturer would owe a penalty to the federal government.

Figure 2 shows how a weight-indexed fuel economy requirement could set the same fleet target in terms of miles per gallon in 2007. Here, in addition to the horizontal line showing the current CAFE requirement, a diagonal regression line indicates the approximate empirical relationship between weight and fuel economy. Note that the regression line passes through the 2003 sales-weighted fleet average unadjusted combined fuel economy of 20.9 mpg (4.78 gal/100 mi) at a vehicle weight of 4,250 pounds. In other words, 4.78 gal/100 mi is the expected laboratory fuel economy rating of an LTV weighing 4,250 pounds.

One way to achieve a higher fuel economy of 22.2 mpg (4.50 gal/100 mi) is to reduce the fuel consumption of a 4,250 pound LTV to that level, with the targeted fuel economy of LTVs of other weights defined by a new regression line that passes through this new average point and is parallel to the 2003 regression line (see Figure 2).

Figure 2
Combined Fuel Consumption in Model Year 2003



In short, the new weight-indexed target says that, if the characteristics of the new fleet remain the same (no lighter and no heavier) and if manufacturers meet the specified targets for their vehicles at each weight, then the U.S. LTV fleet fuel economy will achieve an average of 22.2 mpg.

In fact, any new diagonal line that passes through the new average fuel economy at a weight of 4,250 pounds will define a weight-indexed fuel economy target that achieves the desired result -- a fleet average fuel economy of 22.2 mpg -- if manufacturers comply and if they do not change the weight characteristics of their fleets. The slope of the new target relationship between fuel consumption and weight would be determined by what NHTSA judges to be appropriate fuel consumption goals for vehicles of different weights.

For example, drawing the new target fuel consumption line parallel to the 2003 regression line as shown in Figure 2 means that smaller, lighter vehicles must reduce their fuel consumption by a greater percentage than heavier ones. The slope of the new target could be reduced to make the percentage reduction required at each weight more similar or to require progressively larger percentage reductions at higher weights. However, regardless of the slope of the line defining a weight-indexed target fuel economy, the ultimate goal can be expressed in terms of the desired average fuel economy of the U.S. LTV fleet in miles per gallon (22.2 mpg).

The weight-indexed requirements for each manufacturer still can be expressed as an average, as well, but the requirements depend on the weight mix of that manufacturer’s vehicles; it is the sales-weighted average of the target fuel economy for the vehicles that the manufacturer sells. A manufacturer that sells only small, lightweight vehicles will have a higher fuel economy target (will be restricted to less fuel per mile) than a manufacturer specializing in larger, heavier vehicles. This is the only difference between setting new fuel economy targets under the current system versus a weight-based system; the fuel economy target for a specific manufacturer is not the same as the fleet-wide target. Rather, it reflects the mix of vehicles a manufacturer sells. Fleet fuel economy targets can be set in an similar way under a system of size-indexing, with parallel effects on fleet fuel economy and individual manufacturer targets.

Safety and Fuel Economy Effects of Weight- and Size-Indexed Standards
The Institute strongly supports fuel economy requirements that are indexed to either vehicle weight or vehicle size. As noted in our earlier comment and in the NAS report, if fuel economy targets (miles per gallon) are lower for heavier or larger vehicles and more stringent for lighter and/or smaller vehicles, then the potential safety costs of increasing the overall fleet fuel economy requirement can be negated. The potential effect of weight-indexing or size-indexing on car design, fuel economy, and safety are likely to be the same in the short run, given that there is a high correlation between vehicle size (no matter how measured) and vehicle weight. However, over the long run weight-indexing and size-indexing could have different effects.

Weight-indexing forces automakers to adopt new technology that improves fuel efficiency and/or to use new fuel efficiency technology to improve fuel economy instead of to increase horsepower. Reducing vehicle mass or selling more lightweight, less safe but fuel economical vehicles is not an attractive alternative because it increases the fuel economy target that must be met; thus the trade-off of reduced safety for improved fuel economy through downweighting or downsizing of vehicles is avoided. Increasing vehicle mass also is not an attractive alternative because, although it reduces the fuel economy target, it is more mass that the manufacturer has to move, again emphasizing the need to increase fuel efficiency.

Over the long run, a weight-indexed system can result in improved fuel economy without the reduction in safety associated with downweighting and downsizing of vehicles. And, as argued by NAS and in the Institute’s 2002 comment, such a system could even enhance the safety of the fleet if the weight-indexing were to level off at some point above 4,000 pounds. By not continuing to reduce the fuel economy requirements for such heavy vehicles, manufacturers would have an incentive to downweight them, and this would have a net safety benefit to society (although these vehicles would offer somewhat less protection to their own occupants, their lighter weight would make them much less aggressive in collisions with other road users).

Size-indexing fuel economy targets is largely equivalent to weight-indexing those targets, as far as the safety effects of increasing fuel economy requirements. In the short run, manufacturers probably will find it easier and cheaper to adopt new powertrain technology than to make major changes in the structures of their vehicles. However, size-indexing does offer manufacturers an opportunity to downweight their vehicles to meet the fuel economy targets for their size classes. Although downweighting a vehicle has less harmful safety effects if the size and crush space of the vehicle are maintained, the weight loss still constitutes a safety cost; a lighter weight small vehicle offers its occupants less protection than a heavier small vehicle.

Over the long run, though, the larger effect of size-indexing could be improved safety. This is because size-indexing offers manufacturers an incentive to increase the sizes of their current vehicles. If they add size using lighter weight materials such as aluminum, they achieve a lower fuel economy target without having added much more weight that they have to move. Current fuel economy requirements often conflict with safety requirements in the design of new vehicles because improved safety adds weight in the form of crush space and even countermeasures such as airbags. Weight-indexing reduces this conflict, but size-indexing changes the equation further, with safety and fuel economy compliance both being enhanced by increased vehicle size. Thus, not only does size-indexing reduce the potential safety costs associated with downweighting to improve fuel economy, it can be a long-term benefit for safety by returning crush space to the vehicle fleet that was lost in the downweighting that occurred in the 1970s and 1980s.

The difficulty with size-indexing is that, to the extent that vehicle size does increase, there is reduced incentive to improve fuel efficiency and, thus, fleet-wide fuel economy might not increase as much as targeted. Because vehicle size is not directly linked to weight, the key factor in fuel consumption, the size of the fleet can increase, as indicated above, in a way that each manufacturer achieves its target but without changing the amount of fuel consumed. To avoid this outcome, it might be necessary to limit size-indexing, perhaps at a point where the principal safety benefits of larger size have been achieved. Vehicles larger than that would need to use new powertrain technology to achieve new fuel economy targets. An alternative might be to make the new regression line specifying the target relationship between vehicle size and target fuel consumption flatter than the regression line describing the current relationship between fuel consumption and vehicle size. This is equivalent to reducing the rate at which fuel consumption is allowed to grow as vehicle size increases. This is something the agency needs to explore if it continues to consider size-indexing as an alternative structure for fuel economy standards.

Vehicle Classification

The Institute believes future CAFE requirements should not distinguish between cars and light trucks, but rather employ a single structure indexed to both a vehicle's weight and its cargo capacity. The distinction between these vehicle classes is increasingly difficult to make, either objectively or subjectively. The fact is that most vehicles now classified as light trucks are used in the same ways as the cars they have replaced in the market. The main difference is that they are bigger and heavier, on average, than cars, and a weight-indexed system that provided an incentive to reduce the size and weight of the largest of these vehicles actually would increase the safety of motor vehicle travel for society.

If there must be a distinction between car and truck fleets, as currently required by statute, the Institute recommends restricting the light truck classification to vehicles with a minimum amount of flat cargo area *before* removing or folding seats. The key issue is that the specified minimum cargo area, or any other definition for light trucks, should be sufficient to separate minivans and vehicles such as the Chrysler PT Cruiser and car-based SUVs, which are used essentially as cars or station wagons, from vehicles designed to carry cargo.

Whatever the definition of vehicles, the Institute urges the agency to move as quickly as statutorily possible to replace the current CAFE structure with one that can achieve fuel economy improvements without the safety costs almost certain to accompany any effort to make the current regulation more stringent. As described here and in our prior letter, the Institute believes this is best achieved with a new system that would index new fuel economy requirements to vehicle weights up to 4,000 pounds or so, after which the indexing would be reduced or cease. This system would not only remove the incentive for increased sales of smaller, lighter, more vulnerable vehicles but also provide an incentive to downweight the heaviest vehicles. Both would enhance the safety of motor vehicle travel.

As the NAS report concluded, technology here and on the near horizon has the capability of improving the fuel economy of the vehicle fleet without altering the size, weight, or functionality of the vehicles in the fleet. The problem is that CAFE as currently structured offers no incentive to adopt this new technology, some of which is expensive, rather than simply increase the sales of lighter, less safe vehicles in order to meet more stringent fuel economy targets. Even where this technology is adopted, it frequently is used to boost vehicle horsepower rather than fuel economy. The key for an enlightened CAFE requirement is to structure it such that new, fuel-efficient technology must be used to reduce fuel consumption and the production of greenhouse gases rather than buying fuel savings with increased deaths in small, lightweight vehicles.

Sincerely,

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Chief Operating Officer

cc: Docket Clerk, Docket No. NHTSA 2003-16128

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