COST-EFFECTIVENESS OF FMVSS NO. 139 PROPOSED PERFORMANCE REQUIREMENTS:

A LEAGUE TABLE APPROACH

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I. Introduction: League Tables and Cost-effectiveness

A. *Background*

League tables, an analytic device first used to rank English football teams, have been used periodically by OMB since 1992 to rank the cost-effectiveness of regulations. A league table is a ranking of comparable items, such as football teams or regulations, based on a common key criteria, such a points scored or lives saved. The use of league tables enables the ready comparison of the ranked items. In addition to being used to rank the best through worst, league tables can also be used to identify outliers, those items that have a value significantly different from the other items being ranked.

OMB, as part of the President's FY 2003 Budget, developed a league table ranking 10 health and safety regulations promulgated by DOT, OSHA and EPA between 1995 and 2000. One of the insights OMB gained from constructing the league table was that safety regulations tend to be more cost-effective than regulations intended to protect human health.

B. *Future OMB Usage of League Tables*

In the FY '03 Budget, OMB noted that league tables are not only valuable for evaluating past performance but "are most useful if based on information about potential or proposed rules, since the decision makers can consider reallocating resources to those rulemaking opportunities that rank highest in cost-effectiveness."

The Budget goes on to state that OMB is in the process of taking "modest steps" to increase usage of league tables in decision-making. One of the key steps in the process to increase usage of league tables was, according to OMB, the issuance of government-wide Data Quality guidelines. The guidelines are important to constructing league tables since the usefulness and accuracy of the tables depends on analytic consistency in evaluating the costs and benefits of the underlying regulations. OMB also noted that they will be updating their regulatory analysis guidelines to facilitate analytic measures of effectiveness and performance used by agencies. The OMB discussion goes on to encourage agencies to develop objective means of measuring program effectiveness to support cost-effectiveness analysis.

II.   Proposed FMVSS No. 139 Performance Requirements

A.   *Overview*

NHTSA has proposed to establish a new Federal Vehicle Motor Safety Standard concerning tires, FMVSS No. 139.   NHTSA has also proposed (Docket No. NHTSA-00-8011) new performance requirements, which are intended to improve the safety of automobile tires, to be incorporated into FMVSS 139.   These proposed performance requirements were developed pursuant to the Transportation Recall Enhancement, Accountability and Documentation (TREAD) Act. As NHTSA notes, the TREAD Act gave the agency "substantial discretion over the substance of the final rule."

B.   *NHTSA Cost Estimates*

NHTSA, in their March 5, 2002 NPRM, stated that they were "concerned" about the cost of the proposed rule and its cost-effectiveness. The agency went on to say that they were "particularly concerned" about the cost per life saved relative to other NHTSA rulemakings. NHTSA also noted that they had only been able to provide preliminary cost and benefit estimates for two of the six proposed tests (High Speed and Endurance Tests).   Thus, even though NHTSA was concerned about the cost of the proposed rule, their estimated cost reflects only two of six proposed tests. NHTSA did state they do not believe that there would be an increased cost from two of the tests (Road Hazard Impact and Bead Unseating).   Of greater concern, from an analytic perspective, is that the agency has not conducted sufficient testing of the proposed Aging test to even determine its potential cost, although they consider that it would be minimal. Depending on the alternative selected, NHTSA estimated that the Low Inflation Pressure Performance test would either add no cost or would have costs that "cannot be characterized by the agency at this point."

Given the uncertainty of the costs of at least some of the proposed tests and that the costs of only two of six tests are factored into NHTSA cost-effectiveness analysis, it is reasonable to conclude that NHTSA's estimate is a "low" case.

With regard to the benefits of the proposed performance standards, there are two issues of note: The first benefits issue is that NHTSA's quantified benefit estimates are based on "equivalent" fatalities prevented.   The equivalency approach converts non-fatal injuries into "fatality equivalents," based on the severity of the injuries on a standardized scale, and a "willingness to pay" approach, which considers individuals' willingness to pay to avoid the risk of death and injuries. The use of fatality equivalents instead of fatalities is significant when estimating cost-effectiveness.

The OMB is league table is based on "net costs" which are described in a footnote to the table as compliance costs minus an estimate of non-fatality benefits, such as a reduction in injuries. CRE does not have the data or methodology to allocate the share of costs attributable to injury reduction. However, by utilizing NHTSA's estimate of equivalent lives saved, the CRE analysis

is comparing all of the compliance costs with all of the quantified benefits, i.e an apples to apples comparison. Thus, CRE's estimate of the cost per equivalent life-year saved based on total compliance costs should be directly comparable with OMB's estimates of cost per life-year saved based on "net costs".

The second benefits issue of relevance is that NHTSA estimates live saved per year (premature deaths averted) and equivalent lives saved per year but does not estimate life-years saved, which is the benefit metric used in OMB's league table analysis. Life-years saved reflects a cumulative estimate of life-years not lost to premature death over time as a result of the rule, adjusted by a discount rate. The life-years methodology thus provides more weight to rules which avoid the premature death of the relatively young. OMB states that, when agencies did not provide an estimate of life-years saved, they "calculated life-years using standard assumptions about age and life expectancies."

CRE does not have the life expectancy assumptions that would needed to convert NHTSA's benefits estimates into life-years using OMB's methodology of analyzing the discounted life-years saved for each individual who's premature death would be averted by the rule. Therefore, CRE developed a simplified methodology to emulate OMB's life-year calculations. The CRE methodology is intended to estimate the present value of the life-years that would be saved by the proposed rule as well as the present value of the costs associated with the life-year savings. The CRE methodology is based on a 30 year time frame and a 7% discount rate, the same discount rate used by NHTSA when calculating fatalities equivalents in Section VII of their Preliminary Economic Assessment and that OMB uses in the league table for DOT and OSHA rules. The methodology is designed to capture both the long-term quantified benefits of the proposed rule and the compliance costs need to achieve those benefits.

CRE's methodology calculates the number of fatality equivalent life-years saved in any given year as the fatality equivalents saved in that year plus the sum of all fatality-equivalents saved in previous years using a constant 95% annual survival factor. Thus, in the second year, the number of life-years saved would be 76 = (39 + (39*0.95)). In the third year, the number of life-years saved would be a little over 111 = (39+ (39*0.95) + (39*0.95*0.95)). This stream of life-years saved over 30 years was discounted at 7% to produce a Present Value of 3,678 fatality equivalent life-years saved. Compliance costs over 30 years were assumed to rise at a modest annual rate of 3% before being discounted at 7%. The present value of compliance costs, using NHTSA cost estimates, was $4.8 billion. Thus, the present value cost per life-year was $1.3 million.

C.   *Third-Party Cost Estimates*

The Rubber Manufacturers Association (RMA) comments on the proposed rule provided cost estimates for all of the proposed tests and test alternatives. The RMA estimates were significantly in excess of NHTSA's estimated costs. RMA noted that their cost estimates only reflected the cost to their members, not the costs to non-RMA-member tire manufacturers.

However, in that RMA's estimation reflects the industry's perspective, they should be considered as a "high" case.

In addition to providing estimates for NHTSA's proposed set of FMVSS 139 performance requirements, RMA also estimated the costs, to their members, of its own new tire testing standard that they offer as alternative to the NHTSA proposal. CRE utilized the same methodology for calculating the present value of fatality equivalent life-years saved using RMA's cost estimates as was done for NHTSA's cost estimates.

III.   League Tables

A.   *Analytic Overview*

Given both OMB's increased use of cost-effectiveness analysis and league tables as well as NHTSA's concern regarding the costs associated with rule, MBS has developed a set of league tables combining the rules examined by OMB in the FY '03 Budget and with the cost-effectiveness of the FMVSS 139 proposed performance requirements. The league tables graphically demonstrate the relative cost-effectiveness of the proposed requirements.

B.   *NHTSA Proposal and Cost Estimates*

The following league table is based on Table 24-1 in the *Analytical Perspectives* section of the President's FY 2003 Budget and NHTSA's March 5, 2002 NPRM.

Table 1. COST PER LIFE-YEAR SAVED FOR ELEVEN SELECTED REGULATIONS
FMVSS No. 139: NHTSA Proposal and NHTSA Cost Estimates

Regulation	Health or Safety	Net Costs	Life-years saved	Cost per life-year saved
Petroleum Refining NESHAP (EPA)	Health	<0	<0	<0
Power Industrial Truck Operating Training (OSHA)	Safety	<0	146 per year	<0
Head Impact Protection (DOT)	Safety	$390 to $516 million per year	8,360 to 10,007 per year	$50,000 to $53,000
Reflective Devices for Heavy Trucks (DOT)	Safety	$65 million (PV)	946 (PV)	$69,000
Child Restraints (DOT)	Safety	$54 million to $112 million per year	370 to 515 per year	$105,000 to $331,000
Rail Roadway Workers (DOT)	Safety	$227 million (PV)	434 (PV)	$523,000
Interim Enhanced Surface Water Treatment (EPA)	Health	<0 to $ 95 million per year	140 to 640 per year	<0 to $679,000
NOx SIP Call (EPA)	Health	$1265 million in 2007	1590 to 3390 per year	$373,000 to $714,000
Methylene Chloride (OSHA)	Health	$112 million per year	96 per year	$1.16 million

Stage I Disinfection By-Products (EPA)	Health	<0 to $764 million per year	0 to 5130 per year	< 0 to infinite
FMVSS 139 Performance Requirements (DOT)	Safety	$4.8 billion (PV)	3,678 (PV)*	$1.3 million

*CRE Estimate

C. NHTSA Proposal and RMA Cost Estimates

RMA's cost estimates, unlike NHTSA's, include a one-time cost component as well as annual costs to its members. According to RMA, the one-time costs include: additional machines; upgrades to machines; upgraded test environmental controls; new test equipment for impact and wedge tests; development expenses; revisions to mold drawings; and, modifications to molds. RMA also cited costs associated with additional equipment to recover lost capacity. The one-time costs were provided for each possible combination of the various testing options under consideration by NHTSA. RMA's annual costs are also presented for each possible package of tests options. Benefit estimates in the league table are the same as those calculated by NHTSA, adjusted to estimate the present value of fatality equivalent life-years saved.

Since NHTSA's estimates of costs and benefits are on an annual basis, it would not be appropriate to simply sum RMA's one-time and annual costs. Instead, the following analysis amortized the one-time costs evenly over a ten-year period. The ten-year time frame was selected to ensure a conservative analysis. Thus, this analysis uses an annual cost estimate, for each possible set tests, which combines RMA's estimate of annual costs of each given set of tests with 10% of their estimate of one-time costs associated with the same set of tests. For example, for the set of tests RMA designates in their comments as "A-1" (Low Pressure test Alternative 1 and Aging Alternative 1), this analysis uses an annual cost which adds RMA's estimate of the annual costs of this set of tests ($391 million) to 10% of their estimate of the one-time costs associated with this set of tests ($113 million) for a total annual cost of $504 million for the first ten years.

As was the case with NHTSA's cost estimates, annual costs were assumed to increase by 3% annually, before discounting. After ten years, the one-time costs have all been expensed so only the annual cost component is considered in the analysis. The following table illustrates the first 12 years of costs associated with RMA's estimate of the costs of the NHTSA's "A-1" proposal.

Year	Annual Cost (adjusted for inflation)	One-Time Costs (amoritized)	Total Annual Costs
1	$390,972,000	$113,050,900	$504,022,900
2	$402,701,160	$113,050,900	$515,752,060
3	$414,782,195	$113,050,900	$527,833,095
4	$427,225,661	$113,050,900	$540,276,561
5	$440,042,430	$113,050,900	$553,093,330
6	$453,243,703	$113,050,900	$566,294,603

7	$466,841,014	$113,050,900	$579,891,914
8	$480,846,245	$113,050,900	$593,897,145
9	$495,271,632	$113,050,900	$608,322,532
10	$510,129,781	$113,050,900	$623,180,681
11	$525,433,675	$0	$525,433,675
12	$541,196,685	$0	$541,196,685

The amortization approach used in the CRE analysis was not used by RMA nor has it been endorsed by the organization.

Table 2. COST PER LIFE-YEAR SAVED FOR ELEVEN SELECTED REGULATIONS

FMVSS No. 139: NHTSA Proposal and RMA Cost Estimates

Regulation	Health or Safety	Net Costs	Life-years saved	Cost per life-year saved
Petroleum Refining NESHAP (EPA)	Health	<0	<0	<0
Power Industrial Truck Operating Training (OSHA)	Safety	<0	146 per year	<0
Head Impact Protection (DOT)	Safety	$390 to $516 million per year	8,360 to 10,007 per year	$50,000 to $53,000
Reflective Devices for Heavy Trucks (DOT)	Safety	$65 million (PV)	946 (PV)	$69,000
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Interim Enhanced Surface Water Treatment (EPA)	Health	<0 to $ 95 million per year	140 to 640 per year	<0 to $679,000
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Methylene Chloride (OSHA)	Health	$112 million per year	96 per year	$1.16 million
Stage I Disinfection By-Products (EPA)	Health	<0 to $764 million per year	0 to 5130 per year	< 0 to infinite
FMVSS 139 Performance Requirements (DOT)	Safety	$7.4 billion - $7.7 billion (PV)	3,678 (PV)*	$2.0 million to $2.1 million

*CRE Estimate

D.   *RMA Proposal and RMA Cost Estimates*

In addition to providing cost estimates based on NHTSA's proposed performance requirements tests, RMA also provided cost estimates for a comparable FMVSS 139 performance requirements test standard that they developed. This analysis treats one-time and annual costs the same as the case above. NHTSA does not provide different estimated benefit levels benefits for their various testing options. Therefore, particularly given RMA's engineering expertise, there is no reason to assume that their proposal would result in benefits that would differ from

any benefits associated with NHTSA's testing proposals. Thus, the benefit estimates in this analysis are those used by NHTSA, adjusted for fatality equivalent life-years saved.

Table 3. COST PER LIFE-YEAR SAVED FOR ELEVEN SELECTED REGULATIONS
FMVSS No. 139: RMA Proposal and RMA Cost Estimates

Regulation	Health or Safety	Net Costs	Life-years saved	Cost per life-year saved
Petroleum Refining NESHAP (EPA)	Health	<0	<0	<0
Power Industrial Truck Operating Training (OSHA)	Safety	<0	146 per year	<0
Head Impact Protection (DOT)	Safety	$390 to $516 million per year	8,360 to 10,007 per year	$50,000 to $53,000
Reflective Devices for Heavy Trucks (DOT)	Safety	$65 million (PV)	946 (PV)	$69,000
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Methylene Chloride (OSHA)	Health	$112 million per year	96 per year	$1.16 million
Stage I Disinfection By-Products (EPA)	Health	<0 to $764 million per year	0 to 5130 per year	< 0 to infinite
FMVSS 139 Performance Requirements (DOT)	Safety	$4.6 billion (PV)*	3,678 (PV)*	$1.2 million

*CRE Estimate

E.   *A Comparison of Estimate*

A graphic depiction of the data in the league tables can provide a useful means of comparing the cost-effectiveness of the various rules and regulatory options. The following chart compares the cost-effectiveness of the rules in the OMB league table and each of the three FMVSS 139 performance requirements scenarios discussed in this paper. For regulations and options with a range of estimates, the mid-point of cost per life saved was used in the chart. EPA's Stage I Disinfection By-Products rule was not included in the chart since the mid-point between less than zero and infinity is difficult to graph.

CHART 1: COST PER LIFE-YEAR SAVED FOR TEN SELECTED REGULATIONS

FMVSS 139: NHTSA and RMA COST ESTIMATES
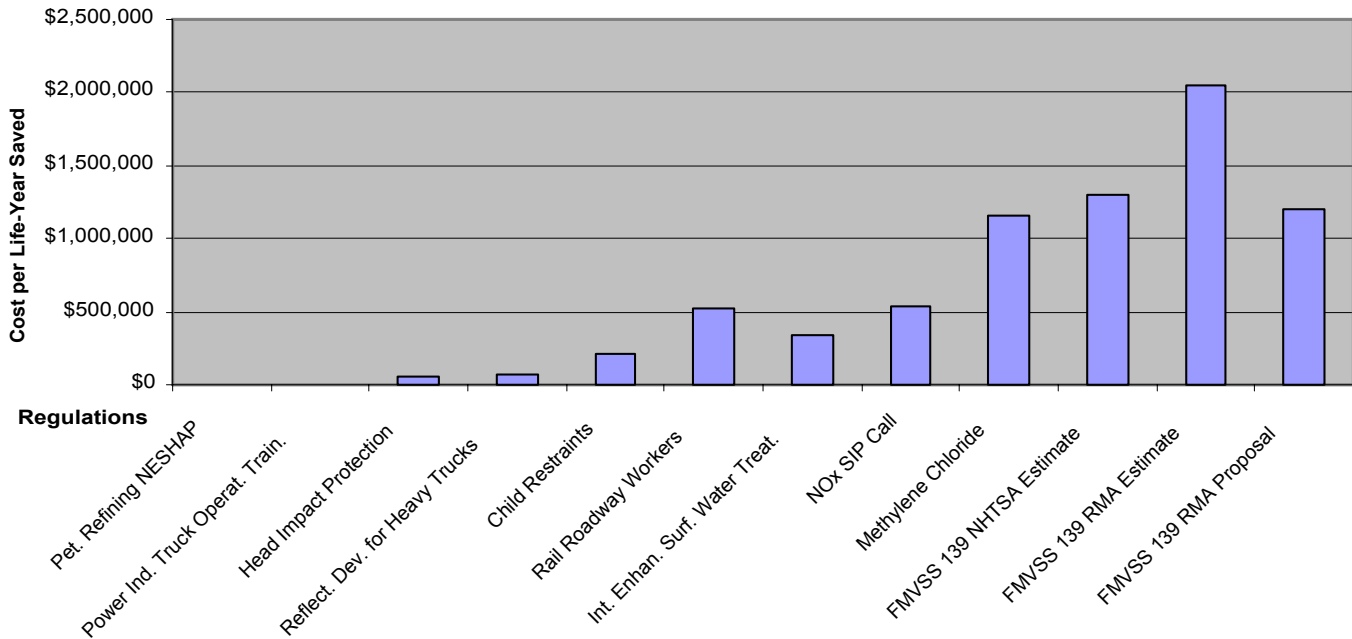
IV.   Conclusions

1.   OMB is increasing federal use of cost-effectiveness and league tables in regulatory decision-making.

2.   A league table analysis of NHTSA's proposed performance requirements for FMVSS 139 demonstrates that the cost per life-year saved is more than for any rule in OMB's league table in the President's FY 2003 Budget.

3.   RMA's proposed performance requirements standard is the most cost-effective option for FMVSS 139 under consideration.