accident drivers more often traveled below 43 MPH than did non-accident drivers. This is equivalent of saying that the likelihood of an accident was greater at speeds below 43 MPH than it was for the average speed. The figure also showed that the lower the speed, the more accident drivers were represented.

It appears that the major basis for the conclusion was not associated with undisrupted traffic flow but with other short term activities. This may bode poorly for larger trucks which accelerate and decelerate more slowly than cars and therefore spend more time in these short term, low speed, maneuvers.

Another source of information pertaining to speeds is "The Toll Road Study" (Campbell, et al). This was a comparative analysis of exposure and accidents before and after the on-set of the energy crisis. Data were obtained from toll roads in five states.

They attempted to analyze the effect of the energy crisis in terms of two major components, viz: exposure and vehicle interactions associated with passing (the latter being responsive to both amount of exposure and differences in travel speed among vehicles.) Their data show a 14.7 percent reduction in miles traveled by cars and 1.2 percent increase for large trucks. They also found an overall speed reduction of 7.1 MPH: 8.2 MPH for cars and 4.3 MPH for trucks. Since the trucks

previously had a lower mean speed, the effect was a reduction in car - truck speed differentials.

There was a 45 percent reduction in cars in accidents and 17 percent for trucks; for single vehicle accidents, the reductions were 44 and 3 percent, and for multivehicle accidents, 47 and 28 percent respectively. Accident involvement rates dropped 35.6 percent for cars and 17.6 percent for trucks. In car - truck accidents involving sideswipes in passing and rear end collisions, the proportion of "truck into car" accidents (where the truck was apparently approaching from the rear) increased from 45.7 percent to 54.1 percent. This was thought to be the result of an increased number of trucks passing cars due to the reduced speed differential. Thus, one could expect a reduction in trucks hitting cars in rear end accidents, if they travel more slowly; on the other hand, one would predict an increase in cars "rear ending" trucks.

The foregoing suggests (a) the lower acceleration and deceleration potential of large trucks may create extended exposure in short term maneuvers, and (b) modified speed differentials may influence how trucks are involved in accidents. That trucks may be more conducive to multivehicle accidents due to lower speeds in normal traffic flow seems reasonable, but no empirical evidence was found to support this.

2. Southwest Research Institute Comments

Available data indicate that a decrease in speed differentials may partially account for decreases in risk of crash. However, the degree of association between the two has not been determined.

A review of Texas data indicates there is not enough information to assess what effect the decrease in speed differential had on the risk of crash but the data indicate it may have partially accounted for the decrease in accidents.

3. MVMA Comments

MVMA believes that more accident data research is needed to assess the validity of this hypothesis.

Hypothesis: "Deaths/injuries per ton mile is an acceptable comparison criteria by mode of transportation."

1. Calspan Comments

This is not an empirical hypothesis. That is, its validity cannot be determined through the use of actual data. Rather, the question is whether the expression is a useful measure. Calspan discusses ton miles as a unit of exposure, and then the ratio as a whole and comes to the following conclusion.

Ton miles, then, would appear to be an unacceptable measure of exposure for traffic safety purposes. It is a better measure of service than risk. It will introduce distortions into accident rates. It has important qualitative as well as quantitative components.

Ton miles, then, is an unsatisfactory measure of exposure.

There remains the possibility that ton miles is a valid measure of service, and that death per ton miles is a useful ratio of safety costs to amount of service. This might be fruitful but only under certain circumstances. Again, the problem resides in the denominator. Ton miles can be considered an appropriate measure of service only if the cargo for the various transportation modes is of similar value. To compare airplanes to trains in terms of ton miles, we must assume that

transporting a ton of people 1000 miles is equal in the amount of service performed to transporting a ton of beef the same distance. Without stating which service is the greater, it can be said that there is not reason to believe they are equal.

Secondly, it is only useful to compare modes of transportation when one can replace the other. For example, the comparison of ship-miles to train-miles serves little function in selecting transportation to Hawaii. Indeed, one wonders if the comparison of truck accident rates to car accident rates is a useful persuit when one cannot replace the other.

2. Southwest Research Institute Comments

This criterion was originally proposed by the Bureau of Surface Transportation Safety of the National Transportation Safety Board in 1971. Ton-miles is a widely used measure of transportation and has been for many years.

The above rate appears acceptable given the available accident data. It is obvious that mode comparisons must consider the total miles traveled and the amount of cargo transported. If safety is the prime concern there is no doubt that trucks will be at a disadvantage since this mode of transportation requires exposure to many accident situations. If it were possible to adjust for this type of exposure then the death rates would be more comparable.

3. MVMA Comments

The ratio of deaths/injuries per ton miles has serious draw backs as a comparison criteria by mode of transportation. As pointed out by Calspan "one wonders if the comparison of truck accident rates to car accident rates is a useful pursuit when one cannot replace the other."

Hypothesis: "Trucks are inherently more unsafe because they are driven many more miles than other vehicles."

1. Calspan Comments

The hypothesis raises the question of how a group of vehicles should be judged in terms of "safety".

Either of two general meanings of "safe" seems appropriate: (a) A group of vehicles is unsafe if remedial action is required. (b) A group of vehicles is unsafe if, in terms of accident-related considerations, another vehicle type is preferred.

What are the bases for judging the safety of a type of vehicle? There seem to be three relevant measures: (a) The portion of the total accident picture accounted for by that type of vehicle; (b) the average number of accident involvements per vehicle; and (c) the accident involvement rate.

Thus, using three classes of operational meaning for the term "unsafe", each of them requires a different criterion measure. For the allocation of safety efforts by the government, the proportion of total loss is appropriate. For selecting vehicles, the accident rate is a meaningful measure; however, this is useful only when interchangeable vehicles are compared. For insurance purposes, accidents per vehicle is the proper measure.

Since, therefore, a vehicle can be "unsafe" in one sense, but not another, a more discriminating use of the term would be advantageous.

2. Southwest Research Institute Comments

This statement implies that trucks are inherently more unsafe, in the sense that they are more heavily involved in all accidents and in all fatal accidents because trucks have such high exposure, i.e., they are driven so many more miles per vehicle than other types of vehicles. Stated differently, trucks are over-involved in accidents because of the over-involvement in total miles driven.

There is no doubt of the validity of the statement that trucks are over-involved in accidents and in miles traveled. This follows from many studies, but that the latter causes the former has not been proven. Other factors include the speed differentials, the greater mass of the tractor trailer, the lack of easy manueverability of the larger truck, vehicle defects, driver culpability and braking ability. Hence, the hypothesis is too encompassing of a statement and should be modified to reflect that tractor-trailers are overinvolved in fatal crashes partially, not totally, because they are driven many more miles than other vehicles.

3. MVMA Comments

As a basis for action, the above hypothesis is much too broad. The need for countermeasures, we believe, should be related to the magnitude of the truck safety problem compared with other vehicles, as pointed out by Calspan.

D - MISCELLANEOUS

Hypothesis: "With the energy crisis have come two distinct movements: more smaller economical cars and larger heavier trucks on the roads. With this increasingly adverse vehicle mix, the safety problem cannot get better."

1. Calspan Comments

In a discussion of accident rates, a consensus showed no difference in accident rates for cars and trucks. No definitive conclusion is available regarding the effects of an increased truck to car weight ratio on the likelihood of a fatality in the car.

2. Southwest Research Institute Comments

This is a general conclusion and is not based on accurate data. It is apparent that smaller cars do not pose many more problems than larger cars in car-truck accidents. The data indicate that, if a truck collides with a car, the car size matters little. There is no doubt that a safety problem exists in car-truck crashes, but it does not appear to have become worse due to an increase of smaller cars on the road.

3. MVMA Comments

Research needs to be conducted to determine the real world effect of larger heavier trucks. The Federal Highway Administration has one such study already being conducted entitled, "Project I-U -- Safety Aspects of Increased Size and Weight of Heavy Vehicles." The objective of this project is to

determine the possible effects on safety of increased truck sizes and weights and to develop and evaluate countermeasures for any identified safety problem. It is our understanding that data on about 3,500 large truck accidents are being collected from 80 sites in six states and that cab type (cab-over versus conventional) will be identified.

Recommendations for "countermeasures" should await the conclusion of this FHWA study.

Hypothesis: "The better safety performance of smaller trucks (pickups, vans, etc.), which constitute about 96 per cent of the total number of trucks, completely obscures the safety performance of combination trucks."

Hypothesis: "Comparatively little information has been developed on the unique safety performance of truck combinations."

1. Calspan Comments

It is undeniable that, if large and small trucks are lumped together for analysis, the smaller vehicle will obscure the performance of the larger ones. There appears to be no sample of truck accident data which is reasonably representative of the country and contains a specification of truck type.

2. Southwest Research Institute Comments

It is not evident that the safety performance of small trucks completely obscures that of combination trucks, but, if the two groups are combined, the accident results are biased toward the smaller trucks due to their preponderance in the truck population. This second hypothesis is true in the sense that few recent studies exist that evaluate overall large truck performance in accidents. However, much information is being accumulated and in the near future more representative data, including adequate exposure data, should be available.

3. MVMA Comments

When completed, the Federal Highway Administration Project I-U discussed above and other research studies now underway will provide a substantial accident data bank on large trucks that will be representative of the entire country.

Hypothesis: "Trucks are more likely to be reported as having safety defects than cars. The Department of Transportation's Bureau of Motor Carrier Safety inspects about 30,000 trucks each year, and has listed the most numerous safety violations as follows (in descending jorder): 1) lighting, 2) brakes, 3) tires, 4) exhaust, and 5) safety appliances."

1. Calspan Comments

The report (BMCS-1972) cautions the reader that the vehicles chosen for inspection were selected from passing traffic because of their apparent lack of maintenance. As such, they do not comprise a representative sample of commercial vehicles; that is, the samples contain an over-representation of defects.

Information from three different studies was tabulated. These accident data suggest that among accident vehicles trucks are more likely to have defects than are cars; however, the variability of the data and the fact that they were collected by police accident investigations imply a requirement for caution in using these data. Generally speaking, then, vehicle defect data and conclusions must be viewed with caution. The BMCS roadside data are undoubtedly the most sensitive to defects, but generalization is not justified because of the selection process.

2. Southwest Research Institute Comment

Safety defects are more likely to be reported on trucks rather than cars, but these are noted in less than 25% of accidents. Such reports may result from over-eagerness by

truckers to report defects rather than admit negligence, or the added alertness of the investigating officer in reporting truck accidents as compared to routine car accidents.

3. MVMA Comments

Before any meaningful comparisons on safety violations of trucks and cars can be made, car data similar to the BMCS truck data must be developed and summarized. Then, the question of whether or not safety violations play a significant role in accident causation for both trucks and cars must be addressed.

Hypothesis: "The crashworthiness of tractors has decreased since the hood and extra distance between the driver and the front bumper are now gone."

1. Calspan Comment

Only one empirical study of this hypothesis could be found (Stern, 1966). This involved the comparison of 108 cabs with a "conventional" configuration to 96 cab-over engine power units. The results were not statistically significant, and a comparison of the injury proportions failed to show any kind of meaningful trend. This should not be taken to mean there is no difference between the two types of cabs. The sample was not large and no controls were provided for impact characteristics. Nonetheless, given 204 accidents, as they occurred in the real world, no differences were found.

2. Southwest Research Institute Comment

No representative data is available to effectively evaluate this statement.

3. MVMA Comments

It is our understanding that the Federal Highway Administration Project I-U discussed above will include identification of the cab type of the large trucks(e.g., cab-over versus conventional). This study, when completed, will provide valuable data on the relative crashworthiness of various large truck configurations.

Hypothesis: "Trucking is the most costly in terms of lives of all the freight modes; four times more costly than railroads, which are the next most costly."

1. Calspan Comment

We could find no single reference to verify this hypothesis.

2. Southwest Research Institute Comment

Caution is necessary in interpreting this statement since the comparative data comes from different sources describing different types of fatalities. Also, the differing environment exposures among the modes make comparisons meaningless unless adequate adjustments are considered.

3. MVMA Comments

Trucking may be the most costly in terms of lives, but until consistent data is collected on all freight modes and that data adjusted for exposure, such comparisons are meaningless. MVMA agrees with Calspan's observation that it should not be argued on the basis of the data here that traveling by truck is more dangerous than by any other mode. This kind of a view is simplistic and requires normalization by exposure data.

E - CONCLUSIONS & RECOMMENDATIONS

Following is a summary of the major conclusions and recommendations resulting from the analysis of tractor-trailer accident data by the two independent contractors. We caution, however, that some of these summary statements may be misleading unless the reports themselves are read.

Calspan Corporation

1. "The presence of a truck in a multivehicle accident substantially increases the likelihood of a fatality.

2. "By virtue of their greater exposure, trucks are likely to have more accident involvements than cars, but it has not been demonstrated that accident involvement rates are greater for trucks than for cars.

3. "No definitive conclusion is available regarding the effects of an increased truck to car weight ratio on the likelihood of a fatality in the car.

4. "It is recommended that the need for remedial activity be defined in terms of the magnitude of actual losses, and that statements establishing the need be scrutinized to insure that they properly reflect those losses."

Southwest Research Institute

1. "In general, there is a need for more in-depth large truck accident studies including collecting better exposure information, more data on the effects of speed differentials and better data on the effects of different cab designs. Also

needed are studies on methods of improving the investigating officer's collection techniques in large truck crashes.

2. "Large trucks are overinvolved in accidents, particularly in fatal crashes, as compared to small trucks and passenger cars. Thus there is a definite need for accident researchers to separately report large and small truck involvements since the overwhelming number of small trucks mask the true effects of large trucks in crashes.

3. "In single vehicle incidents truck and car occupant injury severity are almost the same. However, large trucks are more involved (20% of their accidents) in such collisions than are small trucks or passenger cars.

4. "It is much more dangerous to be in the car in a car-large truck collision than in the truck. The death rate for persons in the car in such collisions is at least 10 times higher than the rate for truck occupants. Truck driver deaths in such cases are rare. Also, the truckers are more at fault mainly due to speeding, improper turns, and unsafe lane changes.

5. "Rear-end collisions of trucks into cars are more frequent than cars into trucks. Also underride is a problem in 5-6 percent of car-truck collisions. The majority of pre-crash maneuvers by trucks involve braking.

6. "Collecting comparative data on cars is needed to effectively compare car and truck defects. Safety defects are more frequently reported on trucks as compared to cars. Major /violations/ include brakes, lighting, and tires. More attention should be given to truck and car inspection procedures. Trucks are more unstable than cars, particularly with respect to rollovers. Thus, better design changes may be needed.

7. "It is difficult to compare different modes of transportation. More consistent and uniform data and better data collection systems are needed from all freight modes. Particularly important would be a better measure of exposure than deaths per ton-mile. While this criterion is presently used, it lacks in accounting for the various exposures of the different modes of transportation."

III - COMMENTS ON THE RECOMMENDATIONS FOR IMPROVING TRUCK SAFETY

Mr. Gustafson's letter to the Council of January 28, 1976 contained eleven recommendations as a starting point for the Council to "consider exploring the issues surrounding heavy trucks (tractor-trailer) safety in greater depth." He concedes that these recommendations are not complete and are proposed to initiate thorough exploratory discussions. Nevertheless, they are proposals for specific action, and warrant comment by vehicle manufacturers addressed specifically to each item.

The recommendations are quoted below, followed by our comments.

1. "Better brakes for trucks (this is manifested in FMVSS 121 which has recently been proposed to extend the stopping distance from 60 mph from the current 277 to 293 feet."

Comment

The heavy-truck industry, including both manufacturers and users, has in the past several years devoted intensive attention to the question of truck braking. The most recent involvement was, of course, in connection with Motor Vehicle Safety Standard No. 121.

On March 1 of this year, the NHTSA published amendments to Standard 121 which included the extension of the stopping distance requirement, from 60 mph, to 293 feet. The Administrator reviewed the development of that aspect of the Standard in a detailed preamble. (41 F.R. 8783). He pointed out that, in the course

of designing and manufacturing to meet the requirements of the Standard, truck manufacturers had encountered handling problems with some types of trucks, arising from the "aggressivity" of larger, more powerful front-axle brakes. On the basis of information given to the Administrator, and the discussion of those problems at a public meeting in October 1975, the Administrator agreed that "the 293-foot stopping distance would accomplish the NHTSA's goal to permit depowering front axle brakes enough to eliminate handling problems ... . This agency (NHTSA) has determined that the 293-foot minimum requirement, along with the many other requirements of the Standard, will, nevertheless, substantially increase the braking capability of air-brake vehicles, compared to that prevailing before the Standard went into effect."

On March 12, 1976, Dr. Gregory and members of his staff discussed the status of Standard 121 with the Consumer Protection Subcommittee of the House Interstate and Foreign Commerce Committee. NHTSA's Associate Administrator for Planning and Evaluation, Howard Dugoff, explained to the Subcommittee members that in order to certify performance of all vehicles in accordance with the maximum stopping distance permitted by the Standard, manufacturers must in fact design to considerably shorter distance requirements, to accommodate the inevitable "spread" among production vehicles. As a result, it is reasonable to anticipate that most trucks

produced to meet the 293-foot stopping distance requirement will exceed that requirement, so that the actual stopping capability of most new vehicles on the highway will not be appreciably reduced from the earlier and more onerous requirement.

MVMA, further, is skeptical of the assertion cited by Mr. Gustafson in his letter that "63% of truck collisions with other vehicles involved the truck's braking ability." Without doubt, brakes are applied by most dirvers--in all sorts of vehicles--in efforts to avoid collisions. Southwest Research Institute points out, in its analysis of the hypotheses advanced in Mr. Gustafson's letter that "there is no representative evidence that 63% of such crashes are traceable to poor brakes" and then goes on to say that "Braking ... is a definite pre-crash maneuver by trucks in the majority of accidents." Neither the Southwest nor the Calspan report, however, agrees that evidence indicates that 63% of truck collisions are caused by poor brakes.

Finally, however, it is clear that the subject of truck braking, with all of the attendant considerations of vehicle stability, control, and stopping ability, could hardly have received more attention than it has from government and industry, in recent years.

2. "Improve speed maintainability of trucks to reduce disparate speed differences between trucks and cars on upgrades (speed differentials lead to increased risk of crash)."

Comment

The difference in speed capability between light and heavy vehicles, and the alleged potential hazards related to that difference, have been recognized in the past by traffic and motor vehicle safety authorities. The NHTSA published an Advanced Notice of Proposed Rulemaking on this subject in 1969, and a proposed Motor Vehicle Safety Standard in August, 1970 (35 F.R. 13469, August 22, 1970; 35 F.R. 13798, August 29, 1970). The Standard would have imposed vehicle power requirements on trucks and buses with Gross Vehicle Weight ratings of more than 10,000 pounds.

The Administrator has not proceeded further with that proposal since December, 1970, when comments were filed to the Docket. The issue is complex. Steps taken to increase acceleration and speed capability of large vehicles, whether or not by governmental direction, obviously involve judgements and trade-offs among fuel economy, efficiency and other considerations. Forces at work in the competitive marketplace, entirely apart from governmental requlation, have brought about evolutionary horsepower increases in truck diesel engines of approximately 21% in the last eight years, with resulting improvement in acceleration and cruising speed maintainability. Obviously, considerable time must elapse before the results of such changes become measureable or even

evident on the nation's highways; but the trend, particularly when matched against recent developments in the reduction of horsepower of passenger cars, as a fuel economy measure, is toward a reduction of the speed differential.

The nationwide 55 mph speed limit has further reduced the disparity by bringing passenger car speeds closer to those of heavier vehicles.

Although Mr. Gustafson addresses the need to reduce speed differences on upgrades, the issue of the difference in accelerative capability between light and heavy duty vehicles extends to other driving environments as well. A Highway Safety Research Institute (University of Michigan) study indicated that in 1974 passenger car speeds on selected toll roads were reduced from the previous year by 8 mph. Passenger car traffic was reduced 14 percent. Truck traffic and speed showed no significant change, but the accident rate was sharply reduced. The draft of the Interagency Commercial Vehicle Post-1980 Goals Study (May 1976) reached a similar conclusion: "Although truck speeds have not dropped as much as cars (they were much slower to begin with) we find all traffic traveling at relatively equal speeds, a distinct plus for safety."

A number of methods of reducing the threat of collision between high and low speed vehicles have been and are being explored. These include better highway lighting; separate lanes for slow-moving vehicles; making slow-moving vehicles more conspicuous; and training

drivers to remain alert. One practical example is the requirement in some states that slow-moving vehicles use their hazard light flashers when driving at less than specified minimum speeds.

Analysis of available accident data does not make clear whether the most significant factor in rear-end collision causation is related to different speed capabilities of vehicles, or to driver training and alertness. Is the most effective solution revised vehicle capability or improved driver training and traffic control?

3. "Establish uniform national weight and size limits commensurate with safety, and specifically omit the tractor from the overall length limits."

Comment

MVMA agrees that tractor length should be omitted from statutory or regulatory length limits. Aside from any safety effect (which, MVMA notes, is apparently assumed by Mr. Gustafson on an intuitive basis, without substantiation -- both Calspan and Southwest comment, in the reports attached, that accident data do not indicate any safety disadvantage accruing to the cab-over-engine) it would facilitate trailer interchange and thus increase overall efficiency.

Such an amendment would also afford greater design flexibility, thus allowing manufacturers to meet new problems of safety, fuel economy, noise and emission controls by a variety of methods, without extraneous limitation of overall combination length. Furthermore, a longer tractor distributes total vehicle weight over a greater distance, with the potential of reducing road surface damage and resultant highway maintenance cost.

On the other hand, it should be noted that the cab-over-engine configuration has many advantages in addition to increasing cargo capacity. It is maneuverable in narrow streets, provides good close-up visibility and has other unique advantages in particular applications.

Mr. Gustafson calls for "uniform national weight and size limits". Generally, nationwide uniformity on any regulatory matter has a powerful appeal; on the other hand, we should keep in mind that topographical conditions vary greatly in different areas of the United States. It is apparent that a great deal more study of this subject is needed, with the fundamental question being, is there any real correlation between uniform regulation of size and weight and safety.

In this regard, MVMA supports the Federal Highway Administration's research project 1U, entitled "Safety Aspects of Increased Size and Weight of Heavy Vehicles." This research is concerned with the safety effects of increasing the size and weight limits of trucks, and the minimization of any undesirable effect by cost-effective improvements.

4. "Since other vehicles underride trucks in about 10 percent of car-truck crashes, design trucks to reduce height or otherwise prevent vehicles underriding trucks."

Comment

Several years ago, NHTSA proposed an underride guard regulation. MVMA and its member companies submitted a great deal of experimental data to the docket, exploring various alternatives to achieve effective underride prevention. After months of investigation and research by industry and government, the proposal was withdrawn because the Administration determined that imposition of the proposed standard would have added substantially to the cost and weight of the vehicle and would have necessitated rebuilding of millions of loading facilities and ramps throughout the nation. The projected safety benefits would have been, in the opinion of the agency, out-weighed by the economic and technical impact. "Based upon the information received in response to the Notices and evaluations of cost and accident data, the Administration has concluded that, at the present time, the safety benefits achievable in terms of lives and injuries saved would not be commensurate with the cost of implementing the proposed requirements." (36 F.R. 11750, June 18, 1971.)

One notes, of course, that underride prevention would not prevent the passenger car or other vehicle from colliding with the truck. Its purpose is only to alleviate or minimize potential

injury by changing the point of vertical contact between the vehicles. We cannot be certain that the overall effect in the long run might not even be increased incidence of collision and serious injury.

In addressing this same issue of underride protection, Association Administrator Robert L. Carter, recently pointed out* that NHTSA's "analysis of all available data indicates that the frequency of appearance of passenger cars underriding large trucks does not justify rulemaking on heavy-truck underride guards at this time. Federal motor vehicle safety standards must be directed towards areas which provide societal benefits that reasonably justify related costs."

The Southwest Research Institute's review refers to a report on data in Michigan, Denver, Los Angeles, and the BMCS file which shows "that the frequency of car-into-truck rear-end fatal collisions is on the order of one per million population per year."

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* Letters to Representative Archer and Mr. Wells, April 15, 1976.

5. "Beef-up the Federal safety inspection capability for heavy trucks. (We need more than BMCS's 123 inspectors nationwide to cover the nearly 1,000,000 tractors and 2,000,000 trailers, and even more drivers under BMCS jurisdiction."

Comment

MVMA endorses this proposal whole-heartedly. We have supported and promoted periodic motor vehicle inspection by Federal and state agencies for many years. The University of Michigan Highway Safety Research Institute report on "Effective Commercial Vehicle Systematic Preventive Maintenance on Specific Causes of Accidents" concluded that an effective inspection system can reduce the interstate motor carrier accident rate. That report recommended that present regulations be amended to require more regular and detailed inspection of vehicles by their operators--before and after trips--and more complete record-keeping of those inspections.

MVMA publishes an inspection handbook for use by state motor vehicle administrators and fleet managers. We have sponsored development of a training course for motor vehicle inspectors, and we host an annual meeting of state and provincial motor vehicle inspection officials, who are members of the Inspection Committee of the American Association of Motor Vehicle Administrators.

Those programs contribute to better maintenance and repair of all vehicles on the highway; but we agree with HSRI that periodic motor vehicle inspection under state regulation cannot

be expected to meet the problems involved in maintaining large commercial vehicles, because of the severe use to which they are often subjected. We, therefore, wish to express our support for whatever increased budget and authority the BMCS projects required to accomplish its defined objective.

6. "Consider means for separating as much as possible the heavy trucks and smaller cars from each other on the highways (special truck lanes)."

Comment

This proposal deserves consideration, particularly in conjunction with Mr. Gustafson's second recommendation that speed parity be improved among heavy and light vehicles. As with so many other proposals for improving safety, of course, the cost of a widespread construction program for segregation of heavy-duty vehicle lanes would appear to be tremendous. Extensive studies should be undertaken to determine where available resources should be allocated so that only those projects with the highest return in enhanced safety are initiated.

There are grounds for belief that on most highways today, the heavy truck, once up to speed, does not interfere with the flow of traffic. "Slow lanes" may be needed only at key points such as up-hill slopes and freeway entrance ramps to allow all vehicles additional distance to achieve merging speed.

As we mentioned above, this entire subject should be comprehensively analyzed in conjunction with the subject of speed and acceleration disparities between heavy and light vehicles.

7. "Improve truck crashworthiness by extending safety standards to trucks. (Include post-crash emergency exits.)

Comment

Acting under the authority of the National Traffic and Motor Vehicle Safety Act of 1966*, the NHTSA has promulgated 50 motor vehicle safety standards, with which motor vehicles and motor vehicle equipment to which they apply must comply at the time of first sale for use. Each standard applies to one or more of the following categories of vehicle: passenger cars, multipurpose passenger vehicles, trucks, buses (school buses are sometimes treated separately), trailers, and motorcycles. Obviously, not all standards have a logical application to all types of vehicles.

Of the 50 standards presently promulgated, 27 apply in whole or in part to trucks. Appendix E lists each standard and its application. Thus, Mr. Gustafson's statement, on page 5 of his letter, that "very few motor vehicle safety standards apply to truck tractors" is somewhat misleading.

A number of the standards which apply only to passenger cars are realistically not appropriate for application to trucks. In the case of each standard, the NHTSA's decision on application was based on the determination that the requirements of the standard would or would not enhance safety in each vehicle application.

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* P.L. 89-563, 15 USC Section 1391.

For instance, Standard 201 requires that passenger car interiors provide impact protection to occupants by means of energy absorbing material on defined surfaces; but in most collisions the greater mass of the truck or truck-tractor minimizes the transmittal of high decelerative forces to the occupants so that such protection is not cost effective.

There are, obviously, collisions involving heavy-duty trucks, either with other equally or nealy-equally massive vehicles or with immobile obstacles such as bridge abutments, in which the mass of the truck will not offer protection to the occupants. But in those cases the energy dissipated is often so great that no device or armor could practicably be added to a truck cab to maintain its integrity and protect the occupant.

Some standards were initially promulgated with application to passenger cars and subsequently made applicable to trucks, in recognition of the practicalities of truck manufacture. Trucks are not generally redesigned on an annual basis. Model changes are phased in over a longer time than is the case with passenger cars, and this longer lead time requirement has been recognized and accepted by the NHTSA.

It should be noted that commercial vehicles are required to meet other standards, in addition to those promulgated by the NHTSA under the National Traffic and Motor Vehicle Safety Act of 1966. The Bureau of Motor Carrier Safety issues regulations which affect all commercial vehicles and drivers in interstate commerce.

These include regulations which apply to lighting, fuel tanks, brakes and other equipment. Appendix F lists those BMCS requirements which apply to the vehicle.

Furthermore, each state, through a public service commission or a similar entity, issues and enforces regulations applicable to common carriers within its jurisdiction.

Mr. Gustafson suggests a need for crashworthiness standards -- i.e., in the "200" series within the scheme adopted by the NHTSA -- for particular application to heavy-duty vehicles. The accident data cited, however, in his letter as well as in the Southwest and Calspan reports, indicate that in single-vehicle and off-the-road collisions, the truck driver fares about as well as occupants of other types of vehicles; and in collisions with others the truck driver's chances of avoiding injury are considerably better. MVMA questions whether this is evidence that more regulation is required to increase occupant protection in those vehicles.

In particular, Mr. Gustafson cites the cab-over-engine ("c-o-e") configuration as hazardous to the driver; but, as we point out above in our discussion of Recommendation Number 3, the evidence cited by Southwest and by Calspan indicates no difference in safety performance between "c-o-e" and conventional tractor-truck.

8. "Establish an experimental safety vehicle program for trucks. (Why not design a truck that is low--to prevent underride and tipping over--rather than high?)"

Comment

A research program centering about an experimental safety truck may have some merit. Certainly, such experimentation, involving presumably the trial of design features for safety performance in actual vehicles, would be far preferable to promulgation of standards entirely without physical demonstration. In view of the experience of governments and manufacturers in the United States, European countries, and Japan, with experimental safety vehicles, however, we are not optimistic about the end results of such a program in the development of practicable standards for production vehicles.

The Experimental Safety Vehicle and the Research Safety Vehicle projects carried out by the Department of Transportation have not resulted, so far as we know, in any new safety standards for vehicles or equipment. The experimental vehicles which were produced in connection with those programs were simply too remote in design and purpose from production vehicles.

Experimental vehicles have been built to conform to some predetermined criteria; in the case of trucks -- whose primary purpose is the transportation of goods -- how would the safety criteria be selected? Trucks -- commercial vehicles -- are of necessity functionally designed to a greater extent than are passenger cars. They are machine tools designed to perform a great variety of tasks. Passenger cars are, in contrast, quite homogeneous. An experimental safety vehicle can be designed to match a "typical" passenger car; but there is no "typical" truck.

For example, designing a "low" truck -- i.e., reducing ground clearance -- involves serious practical considerations. Clearance is primarily a function of tire size. Large capacity tires are required to transport heavy loads. One obvious method of lowering the profile is to provide more axles, with smaller wheels; but increasing the number of wheels and axles, in order to distribute the load, makes turning and maneuvering more difficult, and also reduces the net payload, and low-slung vehicles can have only limited access to docking facilities. Similar practical difficulties arise in connection with other proposed design changes.

9. "The Department of Transportation should review its current scattered responsibilities and authorities already available for regulating truck safety with regard to the following:

"A. The research and data collection activities of FHWA, BMCS and NHTSA should be better coordinated to eliminate duplication, incompatibility and gaps and improve accuracy and timeliness.

"B. The organizational placement of these scattered responsibilities in DOT should be explored; should there be a single organization; is DOT responsible for all aspects of heavy truck safety?

"C. Evaluation should be made of the contributions and use by the Department of recommendations on truck safety made in the past by the National Transportation Safety Board."

Comment

MVMA encourages administrative reform or change aimed at improved efficiency on the part of any governmental agency. We are vitally concerned that research on the actual safety need for new standards or amended standards be conducted prior to promulgation of such standards or amendments, rather than after the fact, in an effort to justify steps already taken.

We regard the policy statement published by Secretary Coleman in the Federal Register of April 16, 1976 (41 F.R. 16200) as an important step in the direction of greater efficiency on the part of agencies within the Department of Transportation in identifying need for and defining appropriate limits of regulation.

We would, furthermore, applaud any step to improve inter-agency communication and assignment of responsibility. We defer to the department and the staffs of the agencies for determination of the most effective methods of achieving those goals.

Mr. Gustafson specifically recommends more consideration by the Department of Transportation of the recommendations on truck safety made by the National Transportation Safety Board. That Board, which is now independent of the Department, conducts in-depth investigations of specific selected accidents in every field of transportation -- air, maritime, pipeline, as well as the highway -- and files reports and recommendations based on its findings from those particular events, which often involve unusually large numbers of injuries and fatalities.

With all respect for the conscientious work performed by the Board, with whom MVMA and its member companies have frequently cooperated in the past, we recognize that the NHTSA must direct its attention to those areas of accident and injury avoidance which are proved to be statistically significant in considering formulation of standards. This is not by any means to discount the lessons to be learned from a detailed and thorough study of specific accidents; but in aiming at the achievement of long-range goals, NHTSA should not be <u>distracted</u> by relatively isolated and unusual, albeit catastrophic events.

10. "Specific studies into truck handling should be undertaken, including the possible adverse effect of high cg's (especially for tankers) and tires (especially front tire overloads) and the movable fifth wheels (to compensate for varying weights and weight limits)."

Comments

MVMA endorses this recommendation. In mid-1971 we initiated a program of research in heavy-duty vehicle braking and handling at the Highway Safety Research Institute of the University of Michigan. The purpose of the program was to establish a digital computer-based mathematical method for predicting the longitudinal and directional response of trucks and trailers to measured steering and braking input. The results of that research effort are and have been available to NHTSA and to other safety researchers.

It must be recognized, however, that quantification or objective measurement of vehicle handling is at this time still an embryonic science. To our knowledge, research results have not led to specific recommendations for vehicle design.

In at least three instances in the past several years, NHTSA has proposed rulemaking in regard to vehicle handling. In 1969, an advance notice of proposed rulemaking was published, proposing a standard to establish performance requirements to improve the stability and control of coupled vehicles; i.e., trucks, truck tractors, semi-trailers and trailers (34 F.R. 1055, Jan. 23, 1969). In 1973, ANPRM's were published for a standard on directional control during braking in a turn (38 F.R. 16241, June 21, 1973) and on resistance to rollover (38 F.R. 9599, April 18, 1973).

In none of these has the Administration been able to arrive at an objective method of specifying or measuring performance by a vehicle. As recently as April 28 of this year, in a report to the National Motor Vehicle Safety Advisory Council, NHTSA explained the difficulties and problems encountered in efforts to quantify handling capabilities in vehicles.

Finally, as we have pointed out earlier, functional imperatives inherent in vehicles which are intended to perform specific tasks impose design limitations.

11. "Make the public realize the cost it is already paying (in terms of lives and injuries) by favoring truck transport--do this by having DOT issue periodic data on "deaths/injuries per ton mile" by mode of transportation, such as DOT does now for passenger-miles by mode."

Comment

MVMA endorses publication of any information which sheds more light on the safety performance of any mode of transportation. Such data and information should, of course, be collected and presented objectively and free of bias. For example, the differences in the statistical procedures followed by various modes of transportation--air, rail and motor vehicle--in collecting and presenting accident statistics should be compared and correlated in a consistent manner.

Both Calspan and Southwest Research Institute commented, in relation to this proposal, that the "ton-mile" criterion is not valid for safety record comparisons, because it does not take into account the environmental exposure of the commercial highway vehicle, which is far greater than that of other modes of transporting goods. We believe, therefore, that such reporting by a Federal agency would be misleading and not conducive to public understanding or support for effective progress toward improved highway safety.

IV - SUGGESTED PRODUCTIVE COURSES TO PURSUE

Because the role of tractor-trailer combinations in highway accidents has not yet been fully or effectively determined, MVMA will continue to pursue its review and analysis of truck accident causation and safety issues. We are convinced that remedial action, when called for, depends on a better understanding of the issues and knowledge of potential countermeasures. This, in turn, requires better data and better research. We will support and work with others in developing the research necessary for adequate and comprehensive analysis and reporting mechanisms of truck accident causation data. The Association will continue to support a balanced approach to highway safety -- one that encompasses the quality of the highways, environment, drivers and motor vehicles.

A - RESEARCH SUGGESTIONS

Our analyses and investigations suggest that future research be concentrated in the following areas:

1. The development of a separate reporting and evaluating procedure that segregates large and small truck involvements.
2. The development and maintenance of in-depth large truck accident studies, including the collection of better exposure information, data on the effects of speed differentials, and data on the effects of various vehicle designs.

3. Studies and analyses on methods for improving police reporting and collection techniques on large truck accident involvements.

4. The development of more effective motor truck inspection procedures.

5. The development of comprehensive training, registration and licensing procedures for truck drivers.

As to the kind of research effort which might be productive for various governmental agencies to undertake in the truck safety field, we would suggest a two-fold approach:

1. That it be directed toward determining the need of regulatory action as it relates to truck highway safety problems.

2. That the required levels of driver, highway and vehicle safety performance realistically match real world circumstances and needs.

Efforts to achieve these -- needs and levels -- are appropriate concerns of both the truck manufacturing industry and government. It is logical, therefore, that the government's truck safety research program should benefit from -- (1) prerulemaking conferences which assist in identifying needs and levels and (2) an exchange of information in the planning stage of the research program among those who need the research -- they are the government standards writers on the one hand, and the vehicle designers on the other. Involving both groups in the communications process of identifying

"needs and levels" before the research program parameters are firmly established can only have beneficial results -- a better plan aimed at developing knowledge for improving truck safety on the highways and implementing that knowledge.

B - TRUCK SAFETY STANDARDS -- A REALISTIC APPROACH

In the promulgation of future truck safety standards, the need for the standard should first be established, and then the feasibility for design and production of a particular system determined. We believe it would be counter-productive to promulgate a standard across the board for all new trucks manufactured until there is assurance that the requirement is cost effective and adequately field tested.

We urge that when new and unproven safety standards are proposed, each stage of rulemaking leading to promulgation be within realistic time frames, especially when a new technology is involved. It is important that adequate development and manufacturing lead time be provided.

Today's motor trucks and buses are complicated and sophisticated products and with continued improvements in safety and emission features, they will probably become more complicated. This highlights the necessity of assuring that whenever safety standards are suggested for promulgation they be given adequate field testing before being universally applied. This also suggests the merit of using Government

vehicles (General Services Administration) in a program of planned research and testing of such proposed requirements for which such field testing would be appropriate. This could demonstrate the kind of safety advance that should be sought and would allow the rulemakers to study and evaluate the results before proposing new mandatory standards.

This is not a new concept. In fact, the National Transportation Safety Board's Bureau of Surface Transportation Safety offered such a recommendation to GSA and DOT in a special study made in 1970.

This procedure would be desirable because:

1. The use of Government vehicles in a coordinated and planned program would allow DOT opportunity to study and evaluate the results before proposing new mandatory standards. This would enable technical advances to be considered in an orderly fashion.

2. Truck manufacturers would have an opportunity to evaluate the reliability of the standard in practical day-to-day operations before making commitments to assembly line production.

3. Manufacturers would gain in-service experience, and at the same time have the necessary leeway for training mechanics who must service and repair the new equipment.

4. It would also give some assurance that the cost of safety regulation -- to the manufacturer, to the truck user, and to society in general -- is accurately identified and will not be

disproportionate to the results to be achieved. It would be helpful in determining the most appropriate and cost-beneficial degree of regulation necessary. It would serve to eliminate those proposals that are not soundly conceived and which, therefore, create needless confusion and controversy.

C - THE NEED FOR BETTER RULEMAKING

The history of the development and amendment of Standard 121 -- the Air Brake Systems Standard -- offers a vivid lesson in how not to regulate.

The standard was imposed over the protest of manufacturers that safety needs had not been demonstrated, nor were the required performance levels correlated to a gain in safety. Lastly, industry capability was not confirmed prior to the effective date of the standard. In particular, it appeared to manufacturers that many of the requirements of Standard 121, including stopping distances, were based on combinations of "ideal" design projects and "state-of-the-art" concepts, rather than actual demonstrated safety needs. A process of continuous amendment over many months, embarrassing to the NHTSA and expensive to the industry and public, was the inevitable result.

Secretary Coleman, we believe at least partly as a result of the 121 experience, published a notice in the Federal Register for April 16, 1976 (41 FR 16200), promulgating three internal departmental