

## DOT'S DOUBLE STANDARD FOR BUMPERS

The Department of Transportation has issued an exterior protection standard that essentially meets auto industry demands. It will provide protection against damage to a limited range of "safety related equipment" in five mile per hour crashes of the front ends of vehicles, beginning with 1973 model year production (effective Sept. 1, 1972), but only in 2.5 mile per hour crashes of the rear ends.

The DOT's National Highway Traffic Safety Administration also delayed until the start of the 1974 model year (Sept. 1, 1973) additional requirements for pendulum impact tests — at five miles per hour for front bumpers and four miles per hour for rear bumpers — which, it contends, will tend to reduce bumper override and underride.

At a press conference announcing the new standard (FMVSS 215), NHTSA Administrator Douglas Toms offered his agency's rationale for requiring front and rear end protection systems of different strengths on the same car: "The front end is the more vulnerable end of the vehicle, and so obviously, on a cost benefit sense, we want to try to put our money where there is a better payoff . . . There are fewer hits on the rear."

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### Inside

DOTS' bumper standard is likely to have a wide range of ripple effects. It still permits substantial vehicle damage (page 2), and fails to heed warnings against stiff and spring-like bumper designs (page 4). Meanwhile, DOT is being challenged on its claims that the standard preempts state laws (page 5). Other stories in this issue:

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## GM CLAIMS:

Newsmen asked Toms whether or not his agency had based its decision on contentions by General Motors on the frequency of front and rear end collision damage or had also examined conflicting data recently presented to Congress by the

### PERMITTED DAMAGE

The newly issued bumper standard, although ostensibly aimed at protecting "safety related equipment," does not prohibit damage to safety related items including windshields, windshield wipers, and side and rear windows; frame and power train; battery and battery mounts; hood, trunk and door hinges; tires, brakes and wheels; electrical system, and steering and transmission mechanisms.

"Refinements" of the provisions that will become effective on 1974 model cars will be issued in the "near future," says the safety administration. Those, according to a safety administration official, will clarify whether the standard applies to, among other things, air conditioners, engine mounts, battery mounts and vehicle turning radii.

Since the safety administration has no authority to regulate property damage, there are no provisions regulating the dollar cost of damage, such as to quarter panels and other sheet metal, grilles and other trim, or to the bumpers themselves. Conceivably, following low speed crashes, automobiles could be so heavily damaged as to be incapable of being driven away.

Insurance Institute for Highway Safety. Toms answered, "We think the evidence that we reviewed in the docket and the work that we have done suggests that the back bumpers do not have to be as strong as the front bumpers."

General Motors contended that statistics from its wholly-owned insurance company "indicate" that bumpers capable of withstanding 2.5 mile per hour rear end crashes "will offer the consumer more potential savings than a system that would have to meet more stringent performance requirements." The company has said this is so because "front end collisions occur two and a half times as frequently as rear end collisions."

In testimony before the Senate Commerce Committee on March 10, the text of which was filed with the safety administration, William Haddon, Jr., M. D., president of the Insurance Institute for Highway Safety, pointed out that GM's data, based "on collision coverage only, are limited almost entirely to damage to cars that struck something else," and therefore

do not reflect an accurate picture of the frequency of rear end damage suffered by struck vehicles.

Haddon, citing claims from "one of the country's largest insurance companies," showed that crashes involving rear end damage may occur almost as frequently as crashes involving front end damage — a ratio of 1:1.26.

## **COST BENEFITS:**

Toms told the press conference his agency has estimated that the average cost of providing the 1973 model required protection could be about \$40. He said auto makers had told the safety administration it would cost about \$100 per car, but "we don't think that's true."

The average motorist who has two or three minor parking lot-type collisions a year "could probably save himself in the vicinity of \$40 or \$50 or more" in repair bills as a result of the two-level standard, Toms told the press.

"If you start talking about stronger (test) hits on the rear," Toms said, "they got very weak structures on the rear, so you are talking about quite a substantial change in the vehicle, which is an added cost." Earlier in the press conference, however, Toms said he had no way of estimating how much it would cost auto makers to meet the standard's requirements.

Attorney Ralph Nader later asked Toms to provide "factual substantiation" for his estimate, which Nader called "a presumption against the consumer." In a letter to Toms, Nader asked whether Toms had sought and evaluated cost information on bumpers from auto makers. Nader also said, "It would be more appropriate for (the safety administration) to estimate production cost to the manufacturers and leave the markups to the different companies."

## **PROTECTION REQUIREMENTS:**

The standard requires that after the prescribed crash tests "each lamp or reflective device shall be free of cracks" and be adjustable to the point of compliance with the safety administration's standard on lamps and reflective devices (FMVSS 108); hood, trunk and door latches will have to be "operable in the normal manner;" fuel systems, cooling systems and sealing devices will have to be free of "leaks or constricted fluid passages," and the exhaust system will have to be free of "constrictions or open joints."

The wording of the standard does not prohibit other holes in the exhaust system, and damage to doors, trunks and hoods that prevents them from opening even though latches operate "in the normal manner."

The standard also lacks provisions forbidding front and rear end designs that could prove hazardous to pedestrians; nor does it prohibit designs — such as rigid, non energy-absorbing bumper systems — which, though they may pass the very low speed tests, may at the same time greatly increase damage at higher speeds.

## **ANTI-MISMATCH TESTS:**

In the second stage of the standard, effective on 1974 model cars, front and rear ends of cars are to be impacted by a test pendulum traveling at four miles per hour, the equivalent of a barrier test at about 2.75 miles per hour, according to the NHTSA.

The test pendulum is to weigh the same as the empty car being tested. The car is to be in neutral and free to roll when impacted, thereby lessening the force actually experienced by the car.

The test is aimed at reducing "the frequency of override or underide in higher speed collisions," the NHTSA said. However, it contains no specific provisions dealing with override or underide in low speed crashes.

#### **BUMPER WIDTHS:**

An earlier proposal (see Status Report, Vol. 5, No. 21, Dec. 1, 1970) would have required, in effect, that all bumper faces be at least six inches wide and of uniform height above the ground since the bumper would have been tested with pendulum impacts at heights between 14 and 20 inches above the ground. The final rule requires that the pendulum impacts be between 16 and 20 inches above the ground, thereby allowing bumpers only slightly more than four inches wide — considerably less than is commonly found on present vehicles.

(cont'd. on page 5)

#### **ENERGY MANAGING BUMPER REQUESTS IGNORED**

Pleas filed in the NHTSA docket by a highly regarded engineering professor and an anonymous automotive engineer, asking that bumpers not be allowed to be either too rigid or too spring-like, apparently went unheeded by the safety administration in writing its final bumper rule.

Dr. Arthur A. Ezra, chairman of the University of Denver's Mechanical Sciences and Environmental Engineering Department, urged the safety administration to require energy absorbing bumpers rather than to allow rigid bumpers that protect certain safety devices but "would maximize the energy delivered to the impacted car" and its occupants in two-car, front-to-rear crashes. (See Status Report, Vol. 6, No. 4, March 1, 1971.)

A person who signed his letter "A Concerned Automotive Engineer" told the safety administration that automobile companies are considering bumpers that employ "spring systems that store the energy of collision and fire the vehicle back at nearly the velocity of collision." This, he says, could create a "dangerous situation" by forcing the vehicle to recoil into traffic after a crash.

Both of the complained-of designs would be allowed by the new DOT standard.

The standard also fails to address specifically the problem of "nose dive" that occurs during braking and contributes to bumper override in a crash.

The 1974-model year standard requires that the bumpers be impacted with the pendulum 16 times (eight front and eight rear impacts). Four of the 16 pendulum impacts are to be at a 30 degree angle — one at each corner of the car. An earlier proposal would have required 45 degree corner impacts.

### DOT RULE'S IMPACT ON STATES: DISPUTE BREWING

DOT has run into sharp disagreement with a state legislative leader and an insurance association over its claim that the new safety standard for bumpers might preempt existing and future state laws that regulate the adequacy of front and rear end car design from a property loss standpoint.

The federal agency contends that, once its standard takes effect, the state laws will become null. At the press conference announcing the standard, DOT attorney Richard Dyson said that although "we haven't studied intensively the state laws . . . it is our understanding that they do cover essentially the same aspects of performance of the vehicle . . ." He added that, "of course, nothing is preempted until the federal standard goes into effect."

DOT is working from an in-house legal opinion saying that individual state "safety" standards affected by the federal preemptive provision — Section 103(d) of the National Traffic and Motor Vehicle Safety Act of 1966 — "should be considered to be any state laws or regulations that have an effect on the safety of the vehicle regardless of what their stated purpose might be, or in other words, any state laws or regulations that concern the same aspects of vehicle performance as a federal standard."

The opinion does not mention the legislative history of the act, which discourages DOT from setting vehicle performance standards to reduce property damage. Nor does it make reference to a 1969 court decision holding that states are not prohibited by section 103(d) from setting laws or rules governing aspects of vehicle safety other than those specifically covered in federal standards. (See Status Reports, Vol. 5, No. 1, Jan. 15, 1970; Vol. 5, No. 21, Dec. 1, 1970, and Vol. 5, No. 22, Dec. 15, 1970.)

### **IN MARYLAND: 'NOT PREEMPTED'**

An immediate reaction to DOT's position came from Maryland State Sen. Margaret Schweinhaut, author of Maryland's recently passed law requiring that cars made on or after Jan. 1, 1974, and sold in Maryland be able to withstand a five mile per hour barrier crash, rear as well as front, without damage of any kind.

In a letter to Maryland's attorney general, Sen. Schweinhaut noted that the governor has not yet signed the bill (SB 59). Despite DOT's preemption claim, she said, he should do so right away. "I deliberately included legislative intent in

SB 59 speaking to property damage since the federal law concerns itself only with safety features. So as to property damage we are not preempted," she said.

"Maryland," she added, "refused to capitulate to Detroit" by downgrading the rear-end requirement to 2.5 miles per hour. "The federal government has capitulated and in a cynical and tricky fashion, seeming to act on behalf of the public welfare when, in fact, the automobile manufacturers were taking the action they announce and would even if the DOT people did nothing. I cannot help but wonder whether we have returned to the position that 'what is good for General Motors is good for this country'."

Florida passed a law similar to Maryland's last year, and many other states are considering such legislation.

### **AMIA WARNING: AUTO LOBBY**

Stating that the DOT standard does "not go far enough in reducing auto repair bills and insurance costs," a national insurance trade association has warned that auto makers will use it "in their strenuous lobbying campaign to defeat the more realistic and effective bumper legislation already enacted in Florida and Maryland" and now pending in many other states.

In a press statement, the American Mutual Insurance Alliance pointed out that "nothing" in the standard "requires manufacturers to produce bumpers that will protect delicate grilles, fenders and the bumpers themselves from expensive damage in minor crashes — and these low-speed crashes are now the major contributor to rising auto insurance rates.

"The alliance is strongly supporting legislation now pending in Congress which would give the DOT a mandate to issue standards protecting both the car and its occupants," but meanwhile, "the states will have to do the job that the DOT cannot now do under present (statutory) limitations."

### **UNIT PRICES FOR CAR CRASH PARTS FOUND TO VARY GREATLY**

Wide variation has been found in prices-per-pound for typical crash replacement parts on a selected group of 24 domestic and foreign cars.

An analysis funded by the Insurance Institute for Highway Safety was carried out by Value Engineering Co. of Alexandria, Va. In it, the prices of four crash parts — hood, right front fender, right front door and right rear quarter panel — were evaluated on a per-pound basis for 11 domestic and 13 foreign automobiles:

Chevrolet Impala 4-door sedan, Chevrolet Nova 4-door sedan, Chevrolet Vega 2-door sedan, Ford Galaxie 4-door sedan, Ford Maverick 2-door sedan, Ford Pinto 2-door sedan, Plymouth Fury 4-door sedan, Plymouth Valiant 4-door sedan, AMC Ambassador 4-door sedan, AMC Hornet 4-door sedan, AMC Gremlin 2-door sedan, Austin American 1300 4-door sedan, Ford Cortina 4-door sedan, Ford Capri 2-door sedan, VW Beetle 2-door sedan, VW Squareback variant 2-door, Toyota Corona RT43L 4-door sedan, Datsun 1600 FTL311 Sport 2-door, Opel Kadett

2-door sedan, Renault R-10 4-door sedan, Volvo 140 Series 4-door sedan, Fiat 850 Spyder 2-door, Saab 96 2-door sedan and Volvo 164 Series 4-door sedan.

The prices-per-pound were computed, after individual weighing of the involved parts for each of the models, on the basis of prices quoted in Glenn Mitchell crash manuals in effect as of March 22, 1971. (Prices for two parts, the Austin American door and its quarter panel, were obtained from dealerships because they were not shown in the manuals.) All cars were of the 1971 model year.

Among other things, the analysis disclosed that:

- The average unit price of all parts for a given model ranged from a high of \$4.30 per pound for the Fiat 850 to a low of \$1.91 per pound for the Opel Kadett, and for the domestic cars only ranged from \$3.02 per pound for the Ford Maverick to \$1.59 per pound for the Chevrolet Vega.
- The highest unit price for a single domestic part was \$6.74 per pound for the Ford Pinto's right rear quarter panel, and the lowest was \$0.95 per pound for the Chevrolet Impala's hood. The highest for a single foreign part was \$7.35 per pound for the Austin American's right rear quarter panel, and the lowest was \$1.17 per pound for the Ford Capri's hood.
- The highest unit price for a hood was the Fiat 850's at \$4.39 per pound; the lowest, Chevrolet Impala's at \$0.95 per pound. The highest for a right front fender was Volvo 164's at \$6.73 per pound; the lowest, Austin American's at \$1.68 per pound. The highest for a right front door was Plymouth Fury's at \$4.29 per pound; the lowest, Ford Pinto's at \$1.45. The highest right rear quarter panel was Austin American's at \$7.35; the lowest, Opel Kadett's at \$1.68.
- Wide variations characterized the unit price of the same part for cars in like classes, such as, for the small domestics, \$6.74 per pound for Ford Pinto's right rear quarter panel as against \$1.85 for the Chevrolet Vega's right rear quarter panel, and for domestic full-size sedans, \$4.48 per pound for the AMC Ambassador's right front fender as against \$1.88 for the Plymouth Fury's right front fender.

Single copies of the full analysis may be obtained by sending a request to "Crash Parts," Insurance Institute for Highway Safety, Watergate 600, Washington, D. C. 20037.

**GM URGED TO SHARE NEW CAR DEFECT DATA** — The Center for Auto Safety has asked the General Motors Corporation to share with the National Highway Traffic Safety Administration defect information GM collects from its new "pre-delivery inspection reimbursement program."

The GM program requires that dealers supply GM division headquarters with copies of completed check lists used to inspect cars before they are delivered to purchasers.

In a letter to GM Board Chairman James M. Roche, Lowell Dodge, director of the Center for Auto Safety, and a colleague, Stephen Oesch, said the

program "will provide General Motors with an accurate source of information on safety-related defects in new automobiles." They said such information would be "invaluable" to the NHTSA.

In another action, the center has asked the NHTSA to expand its new rule on defect reporting to apply to defect notification campaigns initiated as early as February 1970. The recently issued rule requires manufacturers to supply the detailed information on defect notification campaigns beginning Aug. 16, 1971. (See Status Report, Vol. 6, No. 4, March 1, 1971.) The center says that "this information is essential to any evaluation of the effectiveness of these earlier recall campaigns."

They also ask that the rule be amended to state explicitly that all information supplied in the defect reports be "classified as public information."

### NHTSA WANTS BETTER DEFECT SPOTTING

A National Highway Traffic Safety Administration official says his agency is exploring a variety of new ways to enlarge its data base of safety related defect information — ways ranging from computerizing data that is already available from federal agencies, such as the Federal Trade Commission, to distributing defect reporting forms to service stations and garages. Defects Office chief Joseph Clark added, in an interview with Status Report, that NHTSA hopes to "improve the flow of defect information not only from consumers but insurance companies as well."

Currently the safety administration has three basic ways of discovering defects: through its limited contract program of compliance testing, through manufacturer initiative and as a result of consumer letters.

Clark said that a consumer or company having knowledge of a possible safety-related defect is encouraged to report it to the safety administration by sending a letter containing the make, model and year of the vehicle, the date purchased, vehicle identification number, vehicle mileage and a description of the defect. Letters should be sent to the National Highway Traffic Safety Administration, Office of Defects Investigation, 400 Seventh Street, S.W., Washington, D. C. 20591.

Safety related defect notification campaigns of motor vehicles totalled 154 in 1970 and involved 1.2 million vehicles. Of that total, 13 campaigns were carried out at the urging of the safety administration. Defect investigations of eight of the 13 campaigns urged by NHTSA were initiated because of consumer complaints, safety administration figures show. The remaining 141 campaigns were initiated by vehicle and equipment manufacturers.

Seeking to increase its own defect identification capability, the safety administration has requested additional personnel for the Office of Defect Investigation in its fiscal year 1972 budget submission. Approval of the request would result in a 42-man defect investigation staff — 8 more people than the present level.

NHTSA's lean record of initiating defect notification campaigns would improve, no doubt, if it also had a compliance testing facility. Such a facility was mandated by the National Traffic and Motor Vehicle Safety Act of 1966; however, Congress so far has failed to authorize sufficient funds for the project.

The 1966 act also established basic guidelines for motor vehicle defect notification campaigns (Sec. 113). Earlier this year the safety administration tightened its notification campaign rules. (See Status Report, Vol. 6, No. 4, March 1, 1971.) Even with these changes, however, NHTSA has no statutory authority to require manufacturers to recall and repair defective vehicles or vehicle equipment. The safety administration's power is limited to requiring manufacturers to notify consumers when safety related defects are discovered. But, although not required to do so by law, the manufacturers usually follow up notification programs by voluntarily recalling and repairing the defective vehicles.

### HAZARD SEEN IN MIXING TRUCKS AND CARS

Mixing in the same traffic lanes of trucks and cars that are unable to brake to a stop in compatible distances has been cited as a major crash-producing factor in the November 1969 New Jersey Turnpike pile-up of 29 vehicles that resulted in seven deaths.

Following its investigation of the crash, the National Transportation Safety Board has recommended that both the National Highway Traffic Safety Administration and the Bureau of Motor Carrier Safety "set a high priority" on establishing requirements for improved braking of trucks, buses and trailers.

In another recommendation, the safety board urged the NHTSA to initiate a demonstration project which, in part, would segregate cars and trucks into separate freeway lanes during "adverse weather or visibility conditions." Overall, the project would seek to reduce "the likelihood of catastrophic chain-reaction collisions on high-speed, multilaned highways" such as occurred on the New Jersey Turnpike, the safety board said.

The board said that federally required safety features on cars and the highway helped reduce injuries in the 1969 crash but their effectiveness was substantially reduced by the fact that trucks, heavier and larger than passenger cars and requiring greater distances to stop, collided into lighter vehicles capable of quicker stops. The board pointed out that this tended to "invalidate the occupant protection characteristics of the passenger cars."

Also, the safety board noted that had two of the vehicles in the crash "been equipped with the telescoping steering column, now required, and had both drivers been using seat restraints, their chances for survival would have been greatly enhanced."

It also noted that a heavy fog was a major factor in causing the crash, largely due to the inadequacy of warning devices to alert motorists of hazardous driving conditions in time to take pre-crash precautions.

In other recommendations, the safety board urged that:

- NHTSA and the Automobile Manufacturers' Association "initiate programs leading to the development of automotive fuel-tank systems which will minimize the escape of fuel in collisions . . . ." In its investigation, the board found that eight of the 29 vehicles involved in the pile-up experienced serious fuel system damage. The chain crash resulted in multiple fires as a result.
- NHTSA establish "minimum limits on stability factors for loaded vehicles," aimed at preventing cargo carriers from becoming top-heavy and thus more likely to overturn, as did a propane fuel tank carrier truck at the initiation of the multiple crash.
- NHTSA require the use of "energy-absorbing underride and override barriers" on trucks, buses and trailers to reduce "impact decelerations" in rear and front end collisions with automobiles.
- The New Jersey Turnpike Authority and the New Jersey State Police increase patrol activity during weather conditions that cause decreased visibility.

### YOUTHS, NTSB BACK SPEED CONTROL MEASURES

The Department of Transportation's YOUTHS Advisory Committee (Youth Organizations United Toward Highway Safety) has voiced official support for the DOT's proposal to limit the top speeds of cars.

The National Transportation Safety Board has gone even further, recommending that the National Highway Traffic Safety Administration reduce its proposed maximum speed capability for passenger cars from 95 to 80 miles per hour. (See Status Report, Vol. 5, No. 22, Dec. 15, 1970.)

After hearing from federal safety officials, highway loss reduction researchers, law enforcement officials, automobile industry representatives and sports car and hot rod enthusiasts, DOT's 15-member YOUTHS Advisory Committee voted to support the safety administration's speed control proposal.

NTSB's recommendation grew out of a study of a June 1970 head-on two car crash on an approach to San Francisco's Golden Gate Bridge that resulted in the deaths of 10 persons.

The board estimated that one of the cars was traveling at "approximately 100 miles per hour when it entered the curve where the accident occurred." The other car was judged to be moving at about 45 miles per hour.

Had the speed capability of the speeding car "been limited to that of existing maximum speed limits in the United States (80 miles per hour), it is probable that this collision would have been prevented," the board concluded, because "a speed of 20 miles per hour less . . . would have greatly reduced the probability of loss of control" on the curve.

Also, the NTSB said, at a lesser speed the impact would have been "greatly reduced, thus reducing injury and loss of life."

Copies of the safety board report (NTSB-HAR-71-5) are available for \$3.00 from the U. S. Department of Commerce, National Technical Information Service, Springfield, Va. 22151.

### NTSB OFFERS NEW DANGEROUS CARGO GUIDELINES

The National Transportation Safety Board has urged the Department of Transportation to overhaul its method of regulating transportation of dangerous goods by adopting what the NTSB calls a "risk-based framework" that would allow DOT to match policy decisions to a uniform measurement of likely danger.

The board noted that near-catastrophic railroad accidents in recent years at Laurel, Miss.; Crete, Neb., and Crescent City, Ill., have shown how risk levels in transportation of dangerous goods have changed even though hazardous materials regulation has remained largely unchanged.

The NTSB said that present approaches "have resulted in apparent inequities and serious difficulties." According to the advisory board, "The regulations lack clarity and uniformity of stated purpose (and) their development was not supported by consistent analytical approaches for determining the safety value of changes."

Instead, the NTSB stated, a "risk-based framework" could permit consideration of "both the probability and consequences of undesired system failure events . . . can aid in identifying potentially catastrophic system failures . . . (and) can provide for identification of risk levels on a comparative basis."

In its simplest terms, the framework recommended by NTSB would take into consideration the type of material to be transported, gauge the probability of danger and the consequences of its occurrence and then match countermeasure steps to these.

The board said it recognized that such a conceptual framework would have to be developed and implemented gradually. This, it said, suggests that DOT give first priority to trying it for transportation of "bulk dangerous goods," since they pose the "highest transportation risk levels and involve fewer complexities than systems carrying multiple cargoes."

"Neither the cost nor benefits (of such an approach) can now be reliably ascertained; however, the difficulties with present regulations clearly justify the initial efforts," the NTSB said.

The NTSB's recommendations are contained in a special report to DOT, "Risk Concepts in Dangerous Goods Transportation Regulations," available for \$3.00 from the National Technical Information Service, U.S. Department of Commerce, Springfield, Va. 22151.

**EISWIRTH JOINS IHS RESEARCH STAFF** — Richard S. Eiswirth, a statistician with experience in computer timesharing, has joined the research department of the Insurance Institute for Highway Safety.

As a senior systems consultant with Tymshare, Inc., Eiswirth was involved in computer applications of mathematical statistics, information retrieval and graphics and was responsible for customer training. Prior to that he was an analyst in the General Electric Company's information service department and a reliability analyst for Major Appliance Laboratories, Louisville, Ky.

Eiswirth holds a mathematics degree from the University of Southwestern Louisiana and a masters in mathematical statistics from Florida State University.

**IHS OFFICIAL COMMENDED** — The retiring secretary-treasurer of the Insurance Institute for Highway Safety, Richard O. Bennett, has been commended by the Institute's Board of Governors for his 12 years of work with the Institute. At a recent meeting, the board also elected Andrew R. Hricko, who remains Institute general counsel, as new secretary-treasurer. Bennett's retirement becomes effective May 1, 1971.

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## **INSURANCE INSTITUTE for HIGHWAY SAFETY**

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