



DEPARTMENT OF TRANSPORTATION

NEWS

NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION

WASHINGTON, D. C. 20590

FOR RELEASE FRIDAY
March 22, 1974

NHTSA 39-74 (PF)
Tel. 202 426-9550

The Department of Transportation today proposed a new Federal Motor Vehicle Safety Standard covering the total seating system. The new Standard would be a combination of existing Standards No. 202 and 207, which deal with head restraints and seating systems. It would be applicable to all motor vehicles, with a Gross Vehicle Weight Rating (GVWR) of 10,000 pounds or less, except trailers and motorcycles.

Dr. James B. Gregory, Administrator of the National Highway Traffic Safety Administration (NHTSA) said: "Consolidation of the two standards is a logical step forward. It reflects the relationship of the seat and its head restraint. It would also extend the head restraint requirements to multi-purpose vehicles, trucks, and bus driver seats, and would improve the possibility for dynamic testing of the entire seating system."

The new proposed standard would establish performance and labeling requirements for seats, head restraints, seat back latch mechanisms and seat anchorages. The head restraint requirement would be modified to ensure proper utilization, by preventing its misadjustment or removal. Permanent attachment to the seat, minimum height and several minor modifications would be added to guarantee the benefits of a well-designed and adjusted device.

The seat system requirement of present Standard No. 207 would remain, except for the acceleration test of the seat back latch mechanism. There would be a new test of forward facing seat backs that measures the back's

resistance to collapse under front-end impact. A new rear moving barrier crash test would be established to test the forward-facing seats in passenger cars, multipurpose vehicles and trucks with a GVWR of 10,000 lbs. or less. This test would require that seat adjusters or anchorages could withstand a rear impact crash of up to 30 miles per hour.

The rear moving barrier crash test would be conducted in the same way as that used in FMVSS No. 301, Fuel System Integrity. Similar loading, test conditions, and test procedures would permit simultaneous testing, thus lowering cost and complexity of certification programs.

Interested persons are invited to submit comments on the proposal, by writing to: Docket Section, National Highway Traffic Safety Administration, 400 Seventh Street, S.W., Washington, D.C. 20590. The comment period closes on June 17, 1974.

The proposed effective date for the standard is September 1, 1976.

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DEPARTMENT OF TRANSPORTATION
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PROPOSED RULES

view to the sides and rear and can interfere with visibility through the inside rearview mirror. Comments on the rearward visibility problem inherent in higher head restraints is solicited.

At the same time an alternative test procedure found in the present Standard 202 (the acceleration test in S4) would be eliminated. This would avoid possible enforcement problems, by ensuring that NHTSA compliance test results and manufacturer certification test results refer to the same basic requirements, and therefore are directly comparable.

The seat system requirements of present Standard 207 would remain a part of the standard except for the acceleration test, of the seat back latch mechanism. There would be a new test of forward-facing seat backs that measures the seat back's resistance to collapse under front-end impact. The proposal groups the tests together to specify clearly how many of the test requirements a particular vehicle or seating component must meet. In addition to these changes, a new moving barrier crash test would be established to test the forward-facing seats in passenger cars, and in MPV's and trucks having a gross vehicle weight rating of 10,000 pounds or less. Unlike a static test, the crash test measures the forces exerted on the seat by impact transmitted through the vehicle, permitting the different crash rates of vehicles to be utilized in the design of seats.

The rear moving barrier crash test would be conducted in the same way as that proposed for Standard 301, *Fuel system integrity*, 49 CFR 571.301. The similar loading, test conditions, and test procedures would permit simultaneous testing which lowers the cost and complexity of certification programs. This test and one other utilize manikin installation procedures proposed in an earlier NHTSA notice on the vehicle seating reference point (38 F.R. 1645, January 17, 1973) with minor modifications in response to that docket. Further comment on the installation procedure is solicited as it applies to the determination of torso line for seating systems tests.

The present requirement that components simply "withstand" an amount of force would be clarified by assigning quantifiable measures where possible to the concept.

A proposed effective date of September 1, 1976, allows 18 months of lead time following issuance of the final rule.

In consideration of the foregoing, it is proposed that Part 571 of Title 49, Code of Federal Regulations, be amended by revising Standard 202, *Head restraints*, 49 CFR 571.202, and Standard 207, *Seating systems*, 49 CFR 571.207, as a consolidated standard to read as set forth below.

Interested persons are invited to submit comments on the proposal. Comments should refer to the docket number and be submitted to: Docket Section, National Highway Traffic Safety Administration, Room 5221, 400 Seventh Street SW., Washington, D.C. 20590. It is re-

quested but not required that 10 copies be submitted.

All comments received before the close of business on the comment closing date indicated below will be considered, and will be available for examination in the docket at the above address both before and after that date. To the extent possible, comments filed after the closing date will also be considered. However, the rulemaking action may proceed at any time after that date, and comments received after the closing date and too late for consideration in regard to the action will be treated as suggestions for future rulemaking. The NHTSA will continue to file relevant material as it becomes available in the docket after the closing date, and it is recommended that interested persons continue to examine the docket for new material.

Comment closing date: June 17, 1974.

Proposed effective date: September 1, 1976.

(Secs. 108, 119, Pub. L. 89-563, 80 Stat. 718, 15 U.S.C. 1392, 1407; delegations of authority at 49 CFR 1.51 and 49 CFR 501.6.)

Issued on March 14, 1974.

ROBERT L. CARTER,
Associate Administrator,
Motor Vehicle Programs.

§ 571.207 Standard 207-76; seating systems.

S1. *Scope.* This standard establishes performance and labeling requirements for seats, head restraints, seat back latch mechanisms and seat anchorages.

S2. *Purpose.* The purpose of this standard is to reduce the number of deaths and the severity of injuries that result from the failure of seats and seat components to withstand crash forces.

S3. *Applicability.* This standard applies to passenger cars, multipurpose passenger vehicles, trucks, and buses.

S4. *Definitions.*
"Occupant seat" means a seat that provides at least one designated seating position.

"Head restraint" means a device that limits rearward displacement of the occupant's head relative to his torso line.

S5. *Requirements.* Each vehicle shall be capable of meeting any of the requirements set forth under this heading, when tested in accordance with the procedures of S6, and the conditions of S7, except that any vehicle which is capable of meeting the requirements of S5.3(e) is not required to be capable of meeting S5.3(b), S5.5.1(b), or S5.3(c) as applied to forward-facing seats. However, a particular vehicle (i.e., a test specimen) need not meet further requirements after having been subjected to any one of the following groups of requirements:

Group I: S5.2, S5.3(a), S5.3(b), S5.3(d), S5.5.1(b), and S5.5.1(a).

Group II: S5.2, S5.3(c), and S5.3(e).

Group III: S5.2 and all S5.4 requirements.

S5.1 *Driver's seat.* Each vehicle shall be equipped with an occupant seat for the driver.

S5.2 *Seat adjustment requirements.* Each occupant seat shall remain in the position to which it was adjusted prior

National Highway Traffic Safety
Administration

[49 CFR Part 571]

[Docket No. 74-18; Notice 1]

PART 571—FEDERAL MOTOR VEHICLE
SAFETY STANDARDS

Seating Systems

This notice proposes the amendment of Standard 207, *Seating systems*, 49 CFR 571.207, to establish barrier crash testing for passenger car, multipurpose passenger vehicle (MPV), and light truck seating systems manufactured after September 1, 1976, and to extend the applicability of Standard 202, *Head restraints*, 49 CFR 571.202, to MPV's, light trucks, and bus driver seats by incorporation of that standard, with several changes, in Standard 207.

Consolidation of Standards 202 and 207 logically reflects the relationship of the seat and its head restraint and would improve the possibilities of eventually testing the whole seating system with dynamic test procedures. It also has the beneficial effect of extending the head restraint standard to MPV's, trucks, and buses whose broad and increasing use as passenger vehicles on the highway requires that they be well-equipped with passenger-car-type safety systems.

The head restraint requirement would be modified to ensure proper utilization, by preventing its misadjustment and removal. Permanent attachment to the seat, minimum height and several minor modifications would be added to guarantee the benefits of a well-designed and adjusted device. The NHTSA recognizes the need to maintain a balance between head restraint height and driver visibility by permitting an adjustable head restraint on the right outboard seat. Docket No. 70-7, *Fields of Direct View*, addressed the effect of head restraint design on driver visibility, noting that some current designs of bulky head restraints can adversely affect the driver's

to testing during the application of forces specified in S5.3, S5.4, and S5.5, except for vertical movement of non-locking suspension-type occupant seat components in trucks and buses.

S5.3 Seat performance requirements. Each occupant seat other than a side-facing seat and a passenger seat in a bus shall be capable of withstanding the following forces, applied in accordance with the procedures noted in parentheses:

(a) 20 times the weight of the seat applied in a forward longitudinal direction, plus, in the case of forward-facing seats to which seat belt assemblies are attached, the additional force specified for testing seat belt assemblies by S4.2 of Standard No. 210 (49 CFR 571.210), applied simultaneously at the belt anchorage points, without release or failure of the seat adjusters or anchorages (S6.1.1, S6.1.2, S6.1.3);

(b) 20 times the weight of the seat applied in a rearward longitudinal direction, plus, in the case of rearward-facing seats to which seat belt assemblies are attached, the additional force specified for testing seat belt assemblies by S4.2 of Standard No. 210 (49 CFR 571.210), applied simultaneously at the belt anchorage points, without release or failure of the seat adjusters or anchorages (S6.1.1, S6.1.2, S6.1.3);

(c) A force that produces a 3,300-inch-pound moment about the seating reference point for each designated seating position that the seat provides, applied to the upper seat back or to the upper cross-member of the seat back in a rearward longitudinal direction for forward-facing seats and in a forward longitudinal direction for rearward facing seats, with not more than 40° displacement of the seat back line (B-B) rearward of the vertical established in accordance with S6.1.5.2 (S6.2.1).

(d) In the case of front forward-facing seats, 20 times the weight of the seat back applied in a forward longitudinal direction to the seat back with not more than 10° displacement of the seat back line (B-B) forward of the vertical established in accordance with S6.1.5.2 (S6.1.5); and

(e) In the case of forward-facing seats in passenger cars, and in multipurpose passenger vehicles and trucks having a gross vehicle weight rating of 10,000 pounds or less, a force exerted on the occupied seat by the impact of a moving barrier perpendicularly against the rear of the vehicle at any speed up to 30 mph without release or failure of the seat adjusters or anchorages and with not more than 40° displacement of the seat back line (B-B) rearward of the vertical established in accordance with S6.1.5.2 (S6.2.2).

S5.4 Head restraint requirements. Except in vehicles whose gross vehicle weight rating exceeds 10,000 pounds, the front outboard designated seating positions of each vehicle shall be equipped with a head restraint.

S5.4.1 Head restraint performance requirements.

S5.4.1.1 When a force that produces a moment about the seating reference point in accordance with S6.3 is applied through a head form to a head restraint adjusted to its fully-extended design position, the rearmost portion of the head form shall not move more than 4 inches perpendicularly rearward of the extended torso line before—

- (a) The seat or seat back fails; or
- (b) 200 pounds is applied (S6.3).

S5.4.1.2 Each head restraint shall withstand any force up to 50 pounds applied in a horizontal rearward longitudinal direction by a 6½ inch diameter sphere at any point more than 2½ inches below the top of the head restraint in its fully-extended design position, and within 3 inches of its vertical centerline.

S5.4.1.3 Each adjustable head restraint shall be equipped with a latch mechanism and latch release control that restrains movement of the head restraint without operation of the latch release control. The latch mechanism shall not release or fail when any force up to 10 times the movable weight of the head restraint is applied to the head restraint in any direction in which it is adjustable.

S5.4.2 Head restraint height. The top of the head restraint in its fully-depressed design position shall not be less than—

(a) In the case of the left front outboard designated seating position (driver's seat), 31 inches above the seating reference point measured parallel to the torso line;

(b) In the case of the right front outboard designated seating position, 27.5 inches above the seating reference point measured parallel to the torso line. The head restraint shall be capable of adjustment to a height of not less than 31 inches above the seating reference point measured parallel to the torso line.

S5.4.3 Head restraint width. The lateral width of each head restraint, when measured 2.5 inches below the top of the head restraint shall be—

- (a) Not less than 10 inches in the case of bench-type occupant seats; and
- (b) Not less than 8 inches in the case of occupant seats other than bench-type seats.

S5.4.4 Head restraint attachment. Each head restraint shall be attached to the seat so that it can be removed only by disassembly of the seat back, or shearing of metal.

S5.5 Seat back restraint requirements. Each occupant seat with a hinged or folding seat back other than a side-facing seat or a seat back adjustable only for the comfort of its occupants shall be equipped with a latch mechanism and latch release control that restrains movement of the seat back without operation of the latch release control.

S5.5.1 The latch mechanism shall not release or fail when—

- (a) In the case of a forward facing seat, 20 times the weight of the hinged or folding seat back is applied in a forward longitudinal direction (S6.1.5); or
- (b) In the case of a rearward facing seat, 8 times the weight of the hinged or

folding seat back is applied in a rearward longitudinal direction relative to the vehicle longitudinal centerline (S6.1.4).

S5.5.2 The latch release control shall be accessible to the occupant of the seat equipped with the latch mechanism and to the occupant of the designated seating position immediately behind the seat if operation of the control is required for that occupant's exit from the vehicle. The release control shall be located on the side of the seat, facing and next to the exit door within 2 inches of a horizontal plane passing through the H point of a seated SAE manikin. The latch release control shall protrude at least one-half inch from the surrounding surface and be operable by a force of not more than 20 pounds applied in an upward or inward direction.

S5.6 Labeling of non-designated seating. Any vehicle seating other than an occupant seat shall be conspicuously marked with the following in letters three-eighths of an inch high:

NOT FOR OCCUPANCY WHILE VEHICLE IS IN MOTION

S6. Test procedures. Each vehicle shall be capable of meeting the requirements of S5, when tested in accordance with the procedures and in the sequence set forth below.

S6.1 Group 1. With the occupant seat in the vehicle and only as much padding, cushions, and upholstery removed as is necessary to secure struts and cross-members used in testing, apply in sequence the forces specified in S5.3(a), S5.3(b), S5.3(d), and S5.5.1(a) and S5.5.1(b) as follows:

S6.1.1 If the seat back and the seat bench are attached to the vehicle by the same attachments, secure a strut on each side of the seat from a point on the outside of the seat frame in the horizontal plane of the seat's center of gravity to a point on the frame as far forward as possible of the seat anchorages. Between the upper ends of the struts place a rigid cross-member, in front of the seat back frame for the application of rearward force and behind the seat back frame for the application of forward force. Apply the force specified by S5.3(a) and S5.3(b) horizontally through the rigid cross-member as shown in Figure 1. In the case of seats to which seat belt assemblies are attached, apply simultaneously at the belt anchorage points the additional force specified by S4.2 of Standard No. 210 (49 CFR 571.210).

S6.1.2 If the seat back and the seat bench are attached to the vehicle by different attachments, attach to each component a fixture capable of transmitting a force to that component. Apply force equal to 20 times the weight of the seat back horizontally through the center of gravity of the seat back, as shown in Figure 2, and apply force equal to 20 times the weight of the seat bench horizontally through the center of gravity of the seat bench, as shown in Figure 3. In the case of seats to which seat belt assemblies are attached, apply simultaneously, at the belt anchorage points, the additional force specified by

S4.2 of Standard No. 210 (49 CFR 571-210).

S6.1.3 In the case of pedestal-type seats with a center of gravity below the level of the seat bench—

(a) If the seat is non-adjustable or only vertically adjustable, apply the forces specified by S5.3(a) or S5.3(b) at the entire seat's center of gravity without the attachment of struts;

(b) If the seat is horizontally adjustable above its center of gravity, apply the forces specified by S5.3(a) and S5.3(b) at the entire seat's center of gravity without attachment of struts and apply 20 times the weight of the horizontally adjustable portion at its center of gravity in the manner specified in S6.1.1.

S6.1.4 In the case of rearward-facing hinged or folding seats, remove the struts and cross members used in S6.1.1 through S6.1.3, secure a rigid cross-member behind the seat back frame in the horizontal plane of the seat back's center of gravity as shown in Figure 4, and apply the forces specified in S5.5.1 (b) in a rearward longitudinal direction.

S6.1.5 In the case of forward-facing front seats, remove the struts and cross members used in S6.1.1 through S6.1.3 and secure a rigid cross-member behind the seat back frame in the horizontal plane of the seat back's center of gravity as shown in Figure 4.

S6.1.5.1 Establish the H point and the torso line of a weighted SAE manikin installed in any front outboard designated seating position as follows:

(a) Place the vehicle on a level surface at unloaded vehicle weight with the tires at the vehicle manufacturer's specified cold tire pressure.

(b) Place the driver's seat in the manufacturer's rearmost and lowest design riding position. If the seat has an adjustable back, place the seat back in the manufacturer's nominal design riding position. If the seat has independently adjustable bottom pad angle and vertical positioning, place the bottom pad at the lowest angle and elevation.

(c) Place two pieces of 20-gauge stainless steel plate on the floor carpet in front of the driver's seat to permit the manikin's heels to slide on them throughout the remainder of the procedure.

(d) Place manin cloth over the seat area and seat back directly behind the steering wheel.

(e) Adjust the thigh and leg segments of the manikin to the length of the 50th percentile. Adjust the foot angle of the manikin's feet to 83 degrees.

(f) Attach the right foot and lower leg assembly to the manikin's T-bar. Place the manikin in the driver's seating position and center the assembly laterally on the longitudinal centerline of the seating position. If the steering wheel has more than one operating position, place the steering wheel in the locked position nearest the middle of its adjustment range. Attach the left foot and lower leg assembly to the manikin's T-bar.

(g) Elevate the leg segment to release friction on the floor, and lower the

leg segments until the manikin's heels make contact with the stainless steel plates. No attempt should be made to prevent the manikin's feet from depressing the accelerator and/or brake pedal throughout S6.

(h) Pull the manikin's back and pan assembly away from the seat back, using the T-bar, and tilt the back pan forward. Maintain the rearmost portion of the manikin at approximately 1 inch from the seat back through step (1).

(i) Attach the lower leg and thigh weights.

(j) Adjust the knee separations so that the manikin's right foot is laterally midway between the centers of the accelerator and brake pedal, and the right edge of the left foot is one-half inch outboard of the outermost extremity of the brake pedal, or the clutch pedal if so equipped. Adjust the stainless steel plates as needed.

(k) Place the forward lateral portion of the T-bar parallel to the ground and perpendicular to the vehicle's vertical longitudinal plane to assure that the H point buttons on the seat pan assembly are properly aligned.

(l) Repeat the procedure specified in step (g) to release friction on the floor.

(m) Reposition the manikin assembly by sliding the seat pan rearward, gradually applying a force of 50 pounds in the direction of the thigh bar longitudinal centerline, then gradually removing the force.

(n) Move the back pan rearward so that the upper portion of the back pan contacts the seat.

(o) Repeat the procedure specified in step (c).

(p) Move the head probe forward and behind the right and left buttock weights. Place the right torso weights, one by one on alternate sides.

(q) While maintaining the seat pan level in a lateral direction, tilt the back pan forward until the torso weights are over the H point to release any seat back friction. Without changing the position of the manikin, tilt the back pan forward and hold the thigh bar to prevent the manikin from sliding forward. Reposition the back pan and the head probe to their original positions.

(r) Gradually exert a horizontal force of 5 pounds in a rearward direction to the back pan at the screw located at the base of the protruded seat on the headroom probe with the probe in full down position to vertically reposition the manikin, and gradually remove the force. Repeat until the manikin assembly is level.

(s) Determine the longitudinal and vertical location of the manikin's H point.

S6.1.5.2 Determine the seat back line and the vertical H point in Figure 5 by locating a point on the H point below the top of the head restraint on seat back, constructed in a horizontal plane A-A through the H point, intersecting the seat back line B-B parallel to the manikin torso reference line and through B1, and constructing a vertical plane

through the intersection of A-A and B-B, designated B2.

S6.1.5.3 Apply the forces specified in S5.3(d) and S5.5.1(a) in a forward longitudinal direction to the rigid cross-member.

S6.2 Group II test procedure. Use one of the two following test procedures as specified in S5.3(c) and S5.3(e).

S6.2.1 3,300 inch-pound moment test procedure.

S6.2.1.1 With the seat in the vehicle, establish the H point and torso reference line of a weighted SAE manikin in accordance with the procedures of S6.1.5.1 installed in any front outboard designated seating position of the vehicle.

S6.2.1.2 Establish points B1 and B2 in accordance with S6.1.5.2.

S6.2.1.3 Remove the manikin and apply the force specified in S5.3(c) to a rigid cross-member secured to the seat back as shown in Figure 6.

S6.2.2 Rear moving barrier crash test procedures.

S6.2.2.1 Establish the H point and torso reference line of a weighted SAE manikin in accordance with the procedures of S6.1.5.1 installed in any front outboard designated seating position of a vehicle conditioned in accordance with S7.1.

S6.2.2.2 Establish points B1 and B2 in accordance with S6.1.5.2.

S6.2.2.3 Remove the manikin and load the vehicle in accordance with S8.1 of Standard 208, Occupant crash protection, including a 50th percentile anthropomorphic test device that conforms to Part 572 of this chapter positioned at each front outboard designated seating position, restrained only by means that require no action by the vehicle occupant.

S6.2.2.4 Impact the rear end of the test vehicle with the moving crash barrier at 30 mph so that the face of the moving barrier is perpendicular to the longitudinal centerline of the vehicle, and a vertical plane through the geometric center of the barrier impact surface and perpendicular to that surface coincides with the longitudinal centerline of the vehicle.

S6.3 Group III test procedures.

S6.3.1 Following the test of the seat's head restraint mechanism in accordance with the requirements of S5.4.1.3 in the case of adjustable head restraints, and the test of the head restraint's configuration by the application of a 6½-inch diameter sphere in accordance with S5.4.1.2, establish the H point and torso line of a weighted SAE manikin installed in the seat in accordance with the procedures of S6.1.5. Position the centerline of the head room probe in full back position and, in the case of an adjustable head restraint, position the head restraint in its fully extended design position.

S6.3.2 Establish the displaced torso line by applying a rearward moment of 3,300 inch-pounds about the H point to the seat back through the test device back pan.

S6.3.3 Remove the back pan and, using a cylindrical head form having a 6.5-inch diameter in plan view and a 6-

Such height in profile view, apply a rearward initial load perpendicular to the displaced torso reference line and 2.5 inches below the top of and displaced 3 inches laterally from the vertical centerline of the head restraint or upper seat back, that produces a 3,300 inch-pound moment about the seating reference point.

S5.3.4 Gradually increase the initial load to 200 pounds, or until the seat or seat back fails.

S7. Test conditions. The following conditions apply to the tests conducted in satisfaction of the requirements specified in S5.

S7.1 Test conditions for the rear moving barrier crash specified in S5.2 (e) are in accordance with S8.2 of Standard No. 208, *Occupant Crash Protection*, 49 CFR 571.208, except for the positioning of the barrier and the vehicle. The barrier and test vehicle are positioned so that at impact—

- (a) The vehicle is at rest in its normal attitude.
- (b) The barrier is traveling at 30 mph with its face perpendicular to the longitudinal centerline of the vehicle, and
- (c) A vertical plane through the geometric center of the barrier impact surface and perpendicular to the surface coincides with the longitudinal centerline of the vehicle.

S7.2 Static loading is applied as follows—

- (a) The specified load is reached in 5 seconds.
- (b) The load is held for 5 seconds.
- (c) The specified load is released to zero load in 5 seconds.

S7.3 The center of gravity of a seat or seat component is determined with all cushions and upholstery in place and with all adjustable head restraints in their fully extended design position.

S7.4 The seat back is in the manufacturer's nominal design riding position and the seat is in any horizontally adjusted position. Seats adjustable with electromechanical, vacuum or hydraulic adjusters are in the most upright position, fully down, and in any horizontal position.

S7.5 The weight of a seat or component is the weight of seat structure, cushions, adjusters, and head restraints that constitute the assembled seat or component installed in the vehicle.

S7.6 The ambient temperature is any level between 15° F. and 110° F.

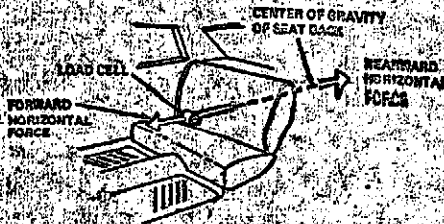


FIGURE 2

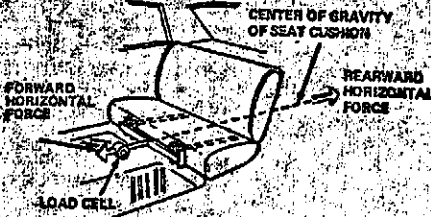


FIGURE 3

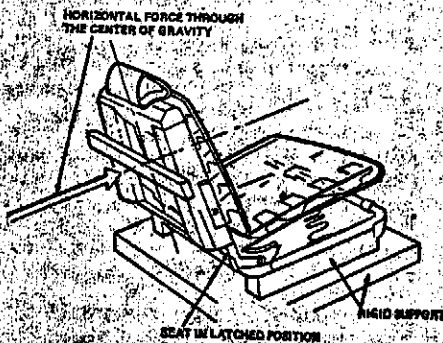


FIGURE 4

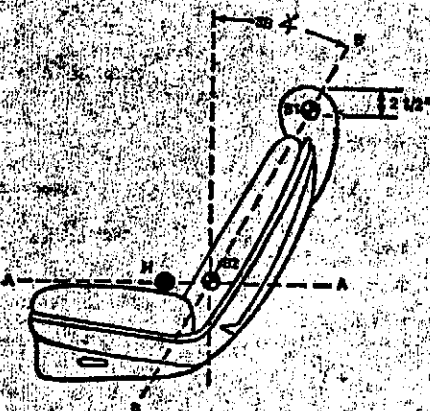


FIGURE 5

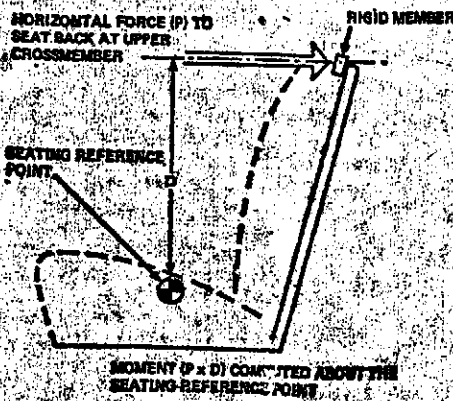


FIGURE 6

[FEB 74-5241 Filed 3-18-74; 8:45 AM]

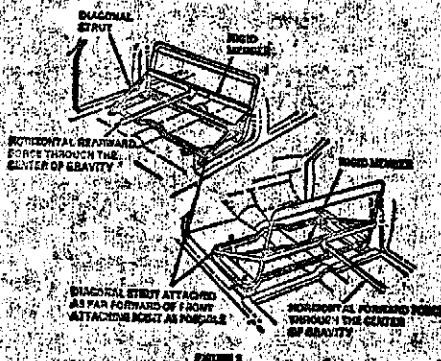


FIGURE 7