§ 73.202 [Amended]

2. Section 73.202(b), the Table of FM Allotments under Kentucky, is amended by adding La Center, Channel 282A.

Federal Communications Commission.

John A. Karousos,

Chief, Allocations Branch, Policy and Rules Division, Mass Media Bureau.

[FR Doc. 99–10500 Filed 4–26–99; 8:45 am]

BILLING CODE 6712–01–P

FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 73

[MM Docket No. 98–109; RM–9282]

Radio Broadcasting Services; Superior, WY

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: The Commission, at the request of Windy Valley Broadcasting, allots Channel 293C at Superior, Wyoming, as the community's first local aural transmission service. See 63 FR 38784, July 20, 1998. Channel 2293C can be allotted to Superior in compliance with the Commission's minimum distance separation requirements with at city reference coordinates. The coordinates for Channel 293C at Superior are 41–46–12 North Latitude and 108–58–12 West Longitude. With this action, this proceeding is terminated.

EFFECTIVE DATE: June 1, 1999. The window period for filing applications for Channel 293C at Superior, Wyoming, will not be opened at this time. Instead, the issue of opening a filing window for this channel will be addressed by the Commission in a subsequent order.

FOR FURTHER INFORMATION CONTACT: Sharon P. McDonald, Mass Media Bureau, (202) 418–2180.

SUPPLEMENTARY INFORMATION: This is a synopsis of the Commission's Report and Order, MM Docket No. 98–109, adopted April 7, 1999, and released April 16, 1999. The full text of this Commission decision is available for inspection and copying during normal business hours in the FCC Reference Center (Room 239), 1919 M Street, NW., Washington, DC. The complete text of this decision may also be purchased from the Commission's copy contractors, International Transcription Service, Inc., (202) 857–3800, 1231 20th Street, NW., Washington, DC 20036.

List of Subjects in 47 CFR Part 73

Radio broadcasting.

Part 73 of Title 47 of the Code of Federal Regulations is amended as follows:

47 CFR PART 73—[AMENDED]

1. The authority citation for part 73 continues to read as follows:

Authority: 47 U.S.C. 154, 303, 334, 336.

§ 73.202 [Amended]

2. Section 73.202(b), the Table of FM Allotments under Wyoming, is amended by adding Superior, Channel 293C.

Federal Communications Commission.

John A. Karousos,

Chief, Allocations Branch, Policy and Rules Division, Mass Media Bureau.

[FR Doc. 99–10499 Filed 4–26–99; 8:45 am]

BILLING CODE 6712–01–P

DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–99–5572; Notice 3]

RIN 2127–AF40

Federal Motor Vehicle Safety Standards; Roof Crush Resistance

AGENCY: National Highway Traffic Safety Administration (NHTSA), Department of Transportation.

ACTION: Final rule.

SUMMARY: This document revises the test procedure in Standard No. 216, *Roof Crush Resistance,* to make it more suitable to testing vehicles with rounded roofs or vehicles with raised roofs. The test procedure is intended to test the strength of the roof over the front seat occupants by forcing a large flat steel test plate down onto the roof, simulating contact with the ground in rollover crashes. However, when the procedure is followed in testing certain vehicles with rounded roofs (e.g., the Ford Taurus), the test plate is positioned too far back and does not test the roof over the front occupants. In addition, that positioning creates the potential for contact between the front edge of the test plate and the roof. Such contact is undesirable because the front edge can penetrate the roof structure in a way that the ground cannot during rollover crashes. Similarly, for vehicles with raised, irregularly shaped roofs (such as some vans with roof conversions), the initial contact point on the roof may not be above the front occupants, but on the raised rear portion of the roof, behind those occupants. In both of these cases, the positioning of the plate relative to the initial contact point on the roof, instead of a fixed location on the roof, results in too much variability in the plate positioning and reduces test repeatability.

This final rule addresses the problem of rounded roofs by specifying that, for all vehicles except those with certain modified roof configurations, the test plate is to be positioned so that the front edge of the plate is 254 mm (10 inches) in front of the forwardmost point of the roof. Positioned in this way, the front edge of the plate will always project slightly forward of the roof instead of contacting it. Further, the plate will always be positioned over the front occupants. The rule addresses the problem for vehicles with raised or modified roofs by specifying that if following the normal test procedure results in an initial point of contact that is rearward of the front seats, the rear edge of the plate is positioned just to the rear of those seats. The rule also makes minor clarifications and non-substantive changes to the regulatory text.

DATES: The amendments made by this rule are effective on October 25, 1999. The mandatory compliance date is also October 25, 1999, however, voluntary compliance with this rule is allowed as of April 27, 1999. Petitions for reconsideration of this rule must be received no later than June 11, 1999.

ADDRESSES: Petitions for reconsideration should mention the docket number at the top of this final rule, and be submitted in writing to: Administrator, National Highway Traffic Safety Administration, Room 5220, 400 Seventh Street, SW, Washington DC, 20590.

FOR FURTHER INFORMATION CONTACT: For non-legal issues, you may call Maurice Hicks of the Office of Crashworthiness Standards, at telephone (202) 366–6345, facsimile (202) 366–4329, electronic mail mhicks@nhtsa.dot.gov.

For legal issues, you may call Paul Atelsek of the Office of the Chief Counsel, at (202–366–2992), facsimile (202) 366–3820, e-mail: patelsek@nhtsa.dot.gov

You may send mail to both of these officials at National Highway Traffic Safety Administration, 400 Seventh St., S.W., Washington, D.C. 20590.

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I. Background

Federal Motor Vehicle Safety Standard No. 216, *Roof Crush Resistance*, is intended to assure that passenger cars, multipurpose passenger vehicles, and trucks with gross vehicle weight ratings of less than 10,000 pounds have sufficient structural strength in the roof over the front seat occupants to resist crushing during rollover crashes. The test procedure is designed to test the A-pillar and the roof over the front occupants.

Under the test procedure, the vehicle is secured on a rigid horizontal surface and placing a 762 mm (30 inches) wide by 1,829 mm (72 inches) long test plate over the roof. The test plate is oriented with its 1,829 mm dimension parallel to the longitudinal vertical plane through the longitudinal centerline of the vehicle, and tilted forward at a five degree angle. Its 762 mm dimension is tilted outward on its longitudinal axis at a 25 degree angle so that its outboard side is lower than its inboard side. So oriented, the test plate is lowered until it initially contacts the roof. After the initial contact point on the roof is determined, the test plate is moved, maintaining its angles and its orientation parallel to the vehicle's longitudinal centerline, so that the initial contact point touches the underside of the test plate along the test plate's longitudinal centerline, 254 mm (10 inches) rearward of the centerline's forwardmost point. The test plate is then pushed downward in the direction perpendicular to its lower surface until a load of 1.5 times the unloaded vehicle weight (up to a maximum of 22,240 N, or 5,000 pounds, for a passenger car) has been applied. The vehicle complies if its roof prevents the test plate from moving downward more than 127 mm (5 inches).

Although, as noted above, the intent underlying this test procedure is to load the area at the top of the A-pillar and the roof over the front seat area, positioning the test plate according to the procedures on certain roof configurations may result in testing areas of the roof to the rear of the front seat area. Ford and the Recreation Vehicle Industry Association petitioned the agency to modify the test procedure to solve this problem.

II. Petitions for Rulemaking To Amend Standard No. 216

A. Recreation Vehicle Industry Association (RVIA) Petition

RVIA, a national trade association that reportedly represents more than 95 percent of the conversion vehicle manufacturers who modify vans, pickup trucks, and sport utility vehicles, is concerned that contoured or raised roof structures on certain second stage van conversions cannot be tested using the current test procedure. The initial contact point, which for conventional roof structures is generally near the front edge of the roof at the top of the A-pillar, is supposed to result in the forward edge of the test plate being positioned approximately 254 mm (10 inches) in front of the roof. However, with only a five degree incline of the test plate, the plate initially contacts some vehicles with raised roofs on the portion of the raised roof well behind the A-pillar and the front seat area. This results in testing the raised roof structure instead of the A-pillar over the front seats.

To address this situation, RVIA petitioned NHTSA to allow vans, motor homes and other multipurpose passenger vehicles, trucks, and buses that have raised roofs, to be tested in accordance with the test procedures in Standard No. 220, *School Bus Rollover Protection*. Standard No. 220 specifies the use of a test plate that is larger and horizontal, and thus distributes the same load evenly over the entire surface of the roof and all its supporting pillars, rather than concentrating the load on either side of the roof over the front seats.

In making this request, RVIA reasoned first that, since the raised roof vehicles would have met Standard No. 216 requirements prior to modification of their roofs, the A-Pillar strength has already been demonstrated. Second, RVIA claimed that the modifications usually do not affect the roof strength near the A-pillar. RVIA believes that the Standard No. 220 test procedure could be used to test the strength of the entire modified vehicle roof, without repeating the Standard No. 216 certification test.

B. Ford Petition

Ford is concerned that following the current test procedures in testing certain vehicles with rounded roof designs (e.g., Ford Taurus, Dodge Neon) results in initial plate contact so far back on the roof that the front edge of the test plate is several inches behind the A-pillar when it is positioned as specified in the Standard. This occurs because the roofs slope longitudinally at an angle greater than 5 degrees at their front edge. Consequently, the roofs are loaded somewhere far behind the A-pillar, and roof penetration by the front edge of the plate can occur.

In addition, Ford states that the current test procedure makes repeatable testing difficult on these vehicles. The initial contact point is highly variable and dependent on the specific roof design. The initial contact point can move several inches forward or rearward if the plate angle or the level of the floor on which the test vehicle is placed are off by as little as one degree. This could lead to substantial differences in test results.

Ford believes that the test procedures as applied to some vehicles are contradictory. S6.2 of the standard says to ''[o]rient the test device as shown in Figure 1 * * *'', which shows the test plate in contact with the front corner of the roof, inclined longitudinally at an angle of 5 degrees. At the same time, S6.2(d) of the rule specifies that the initial contact point be 254 mm (10 inches) from the front edge of the test plate. Since the initial contact point will not be located at the front corner of the roof for certain vehicles with rounded roofs, there is a conflict between the specifications in S6.2(d) and Figure 1 in the regulatory text.

Ford petitioned NHTSA to amend Standard No. 216 to specify that the front edge of the test plate should always be one inch forward of the front edge of the roof, measured from the rearmost point of the windshield. To accomplish this, Ford suggested the following language to replace S6.2(d):

The initial contact point, or center of the initial contact area, is on the longitudinal

centerline of the device. A plane perpendicular to the lower surface of the test device and 25 mm rearward of the front edge of the lower surface passes through the rearmost point of the opening in the body structure for the windshield.

Ford also petitioned NHTSA to amend the test procedure to specify that all vehicles be tested with the body sills, rather than the chassis, mounted on the rigid surface, and that all roof rack components that could interfere with initial contact between the test plate and the roof be removed prior to testing.

NHTSA granted the two petitions and published a Request for Comments on December 27, 1994. The responses to the requests for comments are not discussed here, because they were summarized and addressed in the subsequent Notice of Proposed Rulemaking (NPRM). This NPRM is discussed below.

III. Notice of Proposed Rulemaking (NPRM)

On February 27, 1997, NHTSA published an NPRM to amend Standard No. 216 in response to the petitions from Ford and RVIA (62 FR 8906). In the NPRM, NHTSA proposed to modify the test plate size and placement to ensure that vehicles with raised and sloped roofs could be tested in accordance with the intent of the standard.

In response to Ford's petition, the agency proposed modifying the test plate location to resolve test complications for those vehicles with highly rounded roofs (e.g., Ford Taurus). It proposed to modify S6.2(d) to position the forwardmost edge of the test plate flush with the forwardmost point of the roof structure including the windshield trim. This, it was thought, would provide for the consistent placement of the plate and in most cases would properly stress the roof over the A-pillar junction, while providing a technique that could be used to test all vehicles. This position was thought to be preferable to Ford's alternative (25 mm in front of the rearmost point of the windshield opening), because a vehicle whose window openings are more than 25 mm farther forward in the center than they are near the A-pillars could have resulted in the front edge of the plate penetrating the sheet metal of the roof. In addition, a vehicle whose window openings are more than 25 mm farther rearward in the center than they are near the A-pillars can result in a plate forward edge penetration of the sheet metal behind the A-pillar. This condition, known as ''edge loading,'' is undesirable because it concentrates the load in a very small area and does not simulate contact with the ground in most rollover crashes.

For vehicles with raised or altered roofs, such as van conversions, NHTSA denied the portion of RVIA's petition that requested using the requirements of Standard No. 220 instead of the requirements of Standard No. 216. Agency testing using both procedures on vehicles with similar modified/raised roofs showed that the Standard No. 220 test procedure was less stringent in testing the roof over the front occupants. Also, since Standard No. 216 specifies that the load is applied over a smaller contact area (one side of the roof), it would likely result in roof designs that could withstand a higher load on that portion of the roof structure.

NHTSA also rejected RVIA's contention that, since roofs of the original vehicles prior to conversion had already been certified to Standard No. 216 requirements, the front of the converted roof structure would have met the requirements of that standard. While the roofs of original pre-conversion vans are certified, it is unknown how much the roof strength would have changed when a portion of the roof is cut out for roof conversions. Therefore, the agency proposed to continue applying requirements of Standard No. 216.

The NPRM proposed to address RVIA's concerns by decreasing the size of the test plate in certain situations, depending upon the position of the initial contact point relative to the front seat area. The size of the plate would have been determined by positioning the current large test plate with its lower surface on the roof structure. If the initial contact point were on any portion of the raised/altered roof section rearward of the front seat area, then NHTSA proposed to substitute a small test plate (610 mm by 610 mm, or 24 inches by 24 inches) to be used for testing instead. The rear of the front seat area was defined as ''the transverse vertical plane passing through a point 162 mm rearward of the SgRP of the designated left front outboard seating position.'' (SgRP stands for seating reference point, as defined in 49 CFR 571.3). The transverse vertical plane 162 mm behind the seating reference point is where the head of a 50th percentile male Hybrid III dummy is closest to the roof when the dummy is positioned as specified in the test procedures for Standard No. 201, *Occupant Protection in Interior Impact.* The performance requirements when using the small plate would be the same as when tested with large plate, i.e., a roof crush deformation of 127 mm (or 5 inches) at a load of 1.5 times the unloaded weight of the vehicle.

NHTSA also proposed to make certain minor changes to the regulatory text, renumbering paragraphs and making minor clarifying changes. In particular, the NPRM proposed to add to the regulatory language of the standard the substance of an already issued interpretation, explicitly stating that the agency would test vehicles with their roof racks and non-structural components removed. In addition, NHTSA posed a number of questions to commenters regarding the appropriateness of the standard, as modified by the proposal.

IV. Comments in Response to the NPRM

In response to the NPRM the agency received a total of 10 comments, 6 comments from manufacturers (GM, RVIA, Volkswagen, BMW and 2 submissions from Ford), one from a safety group (Advocates for Highway and Auto Safety, or Advocates), one from a state organization (Minnesota Department of Transportation), one from a research group (Liability Research Group, or LRG), and one from a law firm (Ricci, Hubbard, Leopold and Franklin, or RHLF).

A. Change in the Location of the Test Plate To Accommodate Rounded Roofs (e.g., Ford Taurus)

In response to the proposal to align the front edge of the test plate with the front edge of the roof, the agency received comments from GM, Volkswagen, BMW, Ford, and Advocates. GM, Volkswagen, and Ford supported adopting a fixed location for the test plate near the front edge of the roof, while BMW supported allowing the position of the test plate to vary by up to 254 mm relative to a fixed location on the roof. There was no clear agreement on plate positioning, but most of the commenters shared concerns about edge loading of the roof or the A-pillar when testing according to the proposed procedure.

The manufacturers each favored a different position for the front edge of the plate. GM recommended that the test plate be located 50 mm (2 inches) forward from the forwardmost point on the ''top edge of the windshield.'' Volkswagen suggested the front edge of the plate be placed 25 mm (1 inch) forward of the forwardmost point on the ''leading edge of the roof.'' Volkswagen also recommended setting a tolerance on the 25 mm forward placement of the plate, to avoid problems of test procedure implementation and interpretation. Ford recommended that the NPRM's plate placement be adopted

as proposed, even though this represented a change from its petition request. BMW suggested that the agency vary the position of the front edge of the test plate within a range ''tangent to or up to a maximum of 254 mm forward of the transverse vertical plane passing through the forwardmost point on the exterior surface of the roof,'' depending upon the distance that will ensure that the test plate avoids contacting the length of the A-pillar during the test. GM, Volkswagen and BMW supported their approaches by suggesting that the proposed test plate location could possibly create complications in testing or possibly produce unrealistic edge loading on the A-pillar.

GM commented that both the current and proposed positions of the test plate will result in the front edge of the plate penetrating the roof and the A-pillar for vehicles with a sharp transition between the slope of the windshield and the roof structure, such as some pickup trucks, based upon observations made on agency compliance testing for Standard No. 216. It supported the 50 mm distance recommended by the American Automobile Manufacturers Association (AAMA) because it believed that will provide the necessary, consistent orientation of the test plate over the front part of the roof and avoid plate edge contact with the A-pillar.

GM suggested that the agency needs further data. It stated that it knows of no data or analysis which would allow a determination of whether the agency's proposed longitudinal positioning of the test plate would be an improved test for all vehicles with uncommon roof shapes or whether it would reduce the stringency of the current test procedure. GM also recommended that if the agency's intent is to load vehicle roof structures in a manner which simulates loading commonly noted in rollover crashes, the agency should initiate a study to determine the appropriateness of modifying the current test plate angles to accommodate the range of vehicle designs and to determine the appropriateness of changing the test plate application angles as well as the test plate dimensions. It suggested such a study might involve an analysis of real world crashes and roof geometry, followed by a determination of the most representative orientation of vehicle to impact surface for each vehicle type.

Volkswagen also stated that the placement proposed in the NPRM may result in the edge of the plate contacting the roof and windshield during the test and producing results which the proposal was intended to avoid. Volkswagen commented that placing the plate one inch forward of the front edge of the roof more positively assures loading to the A-pillar and supporting roof structures.

BMW experienced complications during developmental testing, using the current Standard No. 216, of future production vehicles with A-pillar designs that slope at less than 31.5 degrees from the horizontal. It believed that similar problems would also occur when testing as proposed in the NPRM. BMW indicated that both procedures resulted in the plate being positioned directly over the A-pillar, so it expected the proposed placement to result also in contact between the plate edge and the pillar during the test, producing variable and unrealistic load-deflections and a lack of test repeatability.

To avoid edge loading of the A-pillar, BMW recommended that the agency allow manufacturers to variably align the test device to achieve the desired location. BMW suggested that the front edge be placed ''tangent to or up to a maximum of 10 inches in front of the transverse vertical plane passing through the forwardmost point on the exterior surface of the roof * * *.''

Ford stated ''the procedure proposed in the NPRM provides for a repeatable method of test platen positioning for current vehicles being manufactured with aerodynamic roof lines.'' Ford, however, stated that it does not believe that the tests which were conducted by the agency, using the current and NPRM's proposed roof crush test procedures, on the Ford Taurus and the Dodge Neon provide a valid comparison between the roof crush results obtained with both procedures because the agency tested the vehicles twice, one side with the current procedure and the other side with the proposed procedure.

Ford also stated that NHTSA should not assume that the forwardmost point on the roof will always be at the vehicle's longitudinal centerline. This assumption is implied because the agency's objective of avoiding front plate edge penetration is only served using the proposed language if the forwardmost point on the roof is in the center. If the forwardmost point is along the sides near the A-pillars then plate edge penetration could occur. Although Ford believed this is a valid assumption for current production vehicles, to account for possible future aerodynamic styling themes on which the forwardmost point might be located outboard of the vehicle's longitudinal centerline, Ford recommended that NHTSA revise the platen positioning procedure to state ''[t]he midpoint of the forward edge of the lower surface of the test device is tangent to the transverse vertical plane passing through the forwardmost point on the exterior surface of the roof, including trim, that lies in the longitudinal vertical plane taken at any lateral position between a point 25 mm inboard of the left and right A-pillar surface.''

Advocates took no position on the NPRM's proposed test plate positioning, stating that the agency should first address the differences in the real world load conditions for vehicles with increasingly common highly sloped A-pillar or aerodynamic roof structures, typified by ''cab forward'' occupant compartment designs. Advocates stated that the roof structure of these vehicles make it probable that B-pillars and the adjacent portions of the roof would experience proportionally greater crash forces than in designs with A-pillar/roof interfaces more closely approaching 90 degrees. Advocates believes that the agency should explore this potential difference in real world force loading for these vehicles so that it can make substantial changes in rollover safety.

B. Altered or Raised Roofs (e.g., Van Conversions)

GM, Ford, RVIA, and the Minnesota DOT provided comments on the agency's proposal to use a small test plate when the large plate would result in initial contact rearward of the front seat area. Most opposed the use of the small test plate, due to the belief that it would result in *rear* edge loading.

GM and Ford were the only vehicle manufacturers that commented on the agency's proposal to modify the size of the test plate for vehicles with raised roofs. Both manufacturers disagreed with the proposed change in certain circumstances of the test plate size from 30″ x 72″ to 24″ x 24″. However, each manufacturer had slightly different reasons for opposing the small plate.

GM was concerned that the smaller test plate may not properly load the B-pillar, which is also a significant roof structural member. GM was also concerned that the smaller plate may still possibly make rear edge contact with the modified roof section even when testing with the proposed procedure and that if the agency were to accept the smaller plate, additional cost would be incurred by manufacturers in either revising or making new test fixtures to accommodate the different plate sizes.

Ford concluded that the small plate is too small to be used and can result in rear plate edge contact in some instances. Ford based this contention on NHTSA's 1985 Buick Riviera roof crush data showing the area crushed exceeded the surface area of the small plate by 12 percent. In addition, Ford calculated

that on a vehicle with a flat roof, the rear edge of the test plate would contact the original roof surface after only 54 mm of displacement, or 43 percent of the allowable travel. Ford stated that testing with a smaller plate will increase the burden of demonstrating compliance by final stage manufacturers of raised roof vehicles.

GM and Ford both recommended that the large plate be retained as the only test device. GM suggested solving the testing problem posed by raised roof vehicles by allowing the larger test plate to be located ''as far forward as necessary to achieve the desired loading condition.''

RVIA stated that the smaller test plate will not resolve the testing difficulties with raised roofs, but rather it will result in edge contact between the modified roof and the edge of the test plate. RVIA enclosed four photographs which it believed show a ''simulated smaller test device roughly positioned at the test angle and position'' in minivan and sport utility vehicles with raised roofs. It suggested the photos demonstrate that the rear edge of the proposed smaller test plate contacts the raised section of the vehicle either before loading, or would contact it following a small amount of displacement after loading. It also commented that, even when using the larger test plate (i.e., when the initial contact point of the test device is located at the front portion of the roof over the front seat area) the rear edge of the plate can contact the raised roof during the test if the roof contour is raised behind the B-pillar. RVIA supported, however, NHTSA's proposed definition of the rearward plane of the front seat area.

Minnesota DOT supported RVIA's recommendation to replace Standard No. 216 with Standard No. 220 for modified roofs. To support its recommendations, Minnesota DOT referenced two agency tests. The first test was performed on a 1994 GM Safari according to the Standard No. 220 test procedure and the second test was on a 1992 Chevy Astro Van according to the Standard No. 216 test procedure, modified as proposed in the NPRM. Minnesota DOT concluded that the two procedures were comparable due to equal amounts of roof deformation (or travel of the test plates), and due to the fact that the Astro's modified roof structure passed Standard No. 216 without loading the A-pillar directly. Minnesota DOT further concluded that common alterations made for modified roofs will not diminish the strength of the original front roof structure. Therefore, Minnesota DOT disagreed with the agency's determination that the Standard No. 220 test procedure is a less stringent test, concluding instead that the two tests are comparable.

In addition, Minnesota DOT stated that it believes NHTSA is too focused on A-pillar strength. It contends that the initial point of contact with the roof in rollover crashes may not always be at the A-pillar for vehicles with modified roofs forward of the driver's seat back. It speculated that it is more likely that initial contact would be with the raised roof area behind the driver that first contacts the ground. The Standard No. 220 procedure is more likely to test the raised roof portion. In any case, Minnesota DOT suggests that the real issue should not be which components contribute to roof crush resistance, but whether occupants are being protected. Crush resistance provided by the A-pillar alone or by the A-pillar in combination with other support structures should be irrelevant as long as the crush requirements of the standard are met. Based upon these assumptions, Minnesota DOT concluded that ensuring the integrity of the front roof structure should not be of importance for vehicles with raised roofs, especially for raised or modified roofs located behind the front seat backs.

Advocates commented that the agency's proposed modification to Standard No. 216 would not improve the extent to which the standard addresses real world rollover crashes. Advocates stated that the agency has no correlating data which shows relationships between the real world roof crush, roof crush deformation for Standard No. 216 testing, and the severity of injuries in rollover crashes. As a result, Advocates offered no comments on the matter of revising the size of the test plate.

C. Other Issues

1. Real World Rollover Crashes Versus Standard No. 216

Three commenters did not address their comments directly to the NPRM proposal to clarify the test procedure of Standard No. 216 and to remove complications in testing vehicles with modified or aerodynamically sloped roofs. Instead, these commenters questioned the appropriateness of the test procedure, in either its current or modified form, as a proxy for real world rollover performance. In each of the responses, commenters raised objections to the NPRM proposals, as well as the current standard, as having no real relationship to the causation of injuries and fatalities in rollover crashes.

Advocates and Liability Research Group (LRG), an independent engineering research company, stated that the Standard No. 216 procedure was not sufficiently closely related to the real world rollover environment. Advocates stated it could not support the NPRM proposals due to the lack of a demonstrated relationship between compliance with the current Standard No. 216 and the dynamic loads and risk exposure of vehicle occupants during full rollover crashes. LRG included a report titled, ''Rollover Crash Study—Vehicle Design and Occupant Injuries,'' and concluded that the changes proposed in the NPRM would not bring the standard any closer to its intent of reducing deaths and injuries due to roof crush over the front seat area in rollover crashes, but only refine the standard's test procedures.

Ricci, Hubbard, Leopold and Frankel (RHLF) responded to the NPRM by stating that the agency should address more important crashworthiness issues relevant to raised roofs instead of focusing solely on roof crush resistance. It stated that it believes that raised fiberglass roof conversions have a lack of ductility and are inadequately attached to the frame of the vehicle by sheet metal screws. As a result, RHLF contended that the raised roof section almost always fractures and/or becomes detached during rollover crashes, creating a means for the occurrence of ejection injuries and fatalities. Therefore, RHLF believed that NHTSA's attention should be re-focused on this problem and on the development of an adequate performance criteria for raised roofs in the dynamic setting of the crash characteristics they experience.

2. Variability in Standard No. 216 Testing

Ford initially petitioned the agency to clarify ambiguous test procedures for vehicles with modified and sloped roofs. In its petition, Ford also stated that it knew of other problems with the test procedure that it would address with the agency at a later date. Following the petition, Ford initiated a study to observe common test practices by different test facilities and to assess the repeatability of the load plate positioning during Standard No. 216 testing. Partial results were submitted to the agency in response to the Request for Comments. Ford submitted the rest of the information in a supplemental report in response to the NPRM (Docket 94–097–N02–010). Ford's analysis identified several issues related to test variability in roof crush testing, test plate positioning, vehicle tie-down procedures, and component definitions.

The supplemental report contained the test results of a reproducibility study of three NHTSA contracted test facilities and the Ford (Dearborn) test facility to observe the various laboratories' test procedures and to assess the repeatability of load plate positioning during Roof Crush Resistance testing. The non-Ford test facilities included: MGA Research Corp. (MGA), General Testing Laboratories Inc. (GTL), and Mobility Systems and Equipment Co. (MSE). Testing was performed on 16 identical Ford Taurus vehicles, generally in accordance with the Laboratory Test Procedure used for Standard No. 216 (TP–216–04). The only notable differences from the test procedure were that the vehicle windows were in the open/down position during the test, and the test device continued to load the roof until 140 mm (5.5 in) of travel was achieved rather than stopping if the minimum roof crush resistance was met before the test device had traveled 127 mm (5 inches). Summaries of the findings noted in each part of the testing are provided below:

Roof Crush. In comparisons to Ford's testing, the average peak roof crush loads from each of the non-Ford test labs were considerably higher, except for MSE which had similar results. Based upon its engineering judgment, Ford attributed the difference in the average peak loads to differences in the design and operation of lab equipment, differences in the accuracy and verification methods of each of the labs, and variations in test vehicle-set up and procedural differences including vehicle tie-down methods.

Plate Positioning. Based upon the results of the Ford analysis, positioning the plate in accordance to Standard No. 216 produced a range of 456 mm for the longitudinal plate placement measurements for all the test labs surveyed. Independently, each lab also had large test variations in longitudinal plate placement. A maximum range of 98 mm was measured for one of the test sites. However, Ford expressed confidence that the NPRM proposal regarding the test plate position will serve to improve the longitudinal plate positioning repeatability among all test facilities.

Vehicle Tie-Down Procedure. Ford stated that inconsistent use of jackstands and the accompanying vehicle distortion may be a partial source of the total roof crush variability found between the test sites. Ford suggested that elimination of vehicle distortion as a source of contact point movement and potential roof crush load variability could be achieved by requiring consistent use of jackstands to support the test vehicle's front and rear overhangs. Ford recommended that the Laboratory Test Procedure be revised to state:

> Jackstands *must* be located under the front and rear overhangs to prevent distortion of the structure'' in order to support the vehicle overhangs and minimize contact point movement as a potential source of test variability.

Windshield Trim Definition. Ford recommended that the section S7.2(e) proposed in the NPRM, which defines the proposed test plate positioning procedure, be revised to clarify that the term ''trim'' pertains to the ''windshield trim.'' Ford also recommended that the definition for windshield trim be included in Section S4. Ford recommended that the definition for windshield trim should be consistent with the definition recently established in the final rule amending Standard No. 201, *Occupant Protection in Interior Impact,* final rule (See, 62 FR 16718, at 16725):

> *Windshield Trim* means molding of any material between the windshield glazing and the exterior roof surface, including material that covers a part of either the windshield glazing or exterior roof surface.

3. Responses to Agency Questions in the NPRM

In response to questions asked or statements made by the agency in the preamble of the NPRM, the following comments were provided.

Is the integrity of a roof structure on one side of a vehicle altered by a test on the other side? GM and Ford both offered comments on this issue. GM stated that, depending upon the level of damage incurred in the first test, there may be an overlapping of structural damage which could affect the test results of the test on the opposite side, reducing the load bearing capacity considerably. Ford also stated that it believes the roof structure integrity on the opposite side can be compromised during the first test. Ford cited the agency testing on the Dodge Neon and the Ford Taurus as an example of an invalid comparison due to testing both sides of the roof structure.

The proposed positioning of the test load plate resulted in 17% additional ''crush'' to a Dodge Neon during the test. NHTSA deems this to be insignificant because it represents a displacement of only 8 mm. GM agreed that the proposed modification to the procedure for positioning the load plate could be adopted without an appreciable, if any, reduction in test stringency. However, it did not agree with the agency's dismissal of the differences in test results between the current and modified procedures as insignificant. GM considers a l7 percent increase in crush to be a significant increase.

Is NHTSA's definition of ''roof over the front occupant compartment'' appropriate? Ford agreed with the intent of defining the rear boundary of the roof over the front seat area, but questioned how NHTSA derived a distance of 162 mm rearward of the SgRP. Ford did not agree with the definition because of the lack of supporting information, and suggested that NHTSA perform further analysis of the appropriate boundary.

GM and RVIA both stated that NHTSA's definition is satisfactory in defining a rearward limit of the location of the front seat area. However, GM stated that the location of the SgRP should not be based upon the left front outboard seating position. GM recommended that the SgRP be referenced from either the driver's seating position or the rearmost of the front outboard seating positions, to ensure the proper location for certain classes of vehicles where the driver's side can be on the right side of the vehicle (e.g., postal and international vehicles) or which have asymmetric design configurations where one outboard SgRP may be different from the other.

If NHTSA increased the amount of allowable ''crush'' for vehicles with raised roofs, what method should be used to take into account the increased headroom resulting from such roofs? GM did not know of a single method which could be applied to all raised roof vehicles. Some raised roof conversions offer no increase in headroom (and in some designs headroom is reduced) because they retain the original overhead roof structure and then add interior roof consoles, trim, moldings, etc. in the raised section. In some instances, the raised portion of the roof over the front occupants is used for storage rather than providing additional headroom.

RVIA also stated that it does not know of a method for determining the differences between the raised roof surfaces and the original roof surfaces of raised roof vehicles. However, it noted that in some raised roof applications, the differences are such that roof crush of 127 millimeters or more would not approach the contour of the original roof surface.

Advocates objected to the NHTSA's amenability to increasing the amount of allowable roof crush for vehicle with raised roofs to compensate for the increased headroom, if a suitable

method for measuring the additional headroom could be determined. Although NHTSA agreed in principle with this manufacturer request, the agency did not propose to adopt the requested action. Advocates also asserted that not every vehicle modified with a raised roof actually increases the amount of headroom in the front seat area due to the installation of leisure equipment in these areas.

Should the proposed test procedure address glass panels or sunroofs located over the front occupant compartment, and if so, how? The test procedure currently requires that, prior to testing, windows and doors are closed and removable or movable roof panels are in their closed and latched positions. GM stated that it knows of no reason to change this practice. RVIA commented that this glazing should be considered to be part of the roof structure but that NHTSA's procedures should allow testing ''with the glazing installed and any moveable glazing tested in either the open or closed position as determined by the vehicle manufacturer or converter.''

While this proposal does not involve changes to test load plate angles, the NHTSA requests any available data on the subject. GM stated that it has no applicable data but, as noted above, it suggested NHTSA needs to further study the matter. Although they did not address themselves specifically to the question, the comments of RHLF, Advocates, and LRG indicate these organizations also believed that more testing is needed.

Should the load plate be reduced in size from the current 30″ x 72″ to 24″ x 24″ for testing of vehicles with a raised or altered roof structure located rearward of the front occupant compartment? GM stated that if the agency's stated purpose for Standard No. 216 is ''to reduce the likelihood of roof collapse over the front occupant compartment in a rollover crash,'' it should abandon the small test plate. GM stated that the smaller (24″ x 24″) test plate is inappropriate because it is too small to produce crush loading representative of the actual loading experienced by a vehicle during a crash event.

V. Agency Discussion of Issues

A. Summary of Changes From the NPRM

In response to the comments, the agency is modifying the approach it proposed in the NPRM. In particular, the agency was persuaded, for the reasons explained below, that there were technical difficulties associated with the use of a smaller test plate. Instead, it is addressing the problems raised in the petitions by changing only the test plate position. The major changes to the standard (or deviations from the proposal) are summarized below.

(1) The size of the test plate for all testing will not change. It will remain 762 mm (30 inches) x 1829 (72 inches) because the proposed small test plate did not have enough surface area to crush a minimally compliant vehicle without edge contact.

(2) The front edge of the test plate will be positioned tangent to a vertical plane 254 mm (10 inches) horizontally in front of the forwardmost point of the roof for all vehicles, except vehicles with raised or modified roofs for which the initial point of contact with the plate is rearward of the front seat area. This will consistently position the plate over the front seat area. The amendments specify that the roof includes the windshield trim. Further, the amendments define windshield trim. In addition, the longitudinal placement of the plate includes a tolerance of ± 10 mm. This increases the enforceability of the standard.

(3) If a vehicle has a raised or modified roof structure and if the initial point of contact is rearward of the front seat area, the rearward edge of the plate will be positioned tangent to a vertical plane passing through the rearmost point of the front seat area. This will avoid testing the modified roof to the rear of the front seat area. The longitudinal placement of the plate includes a tolerance of ± 10 mm.

(4) The definition for the roof over the front seat area has been revised to account for vehicles with asymmetrical roofs and non-aligned driver and passenger seating positions.

(5) To address the problem raised by Ford of mounting a vehicle's sills or chassis frame, the agency notes that the problem of interference between a vehicle's underbody and a single horizontal surface can be solved by using two separate surfaces (e.g., I-beams) located at the same height. Those two surfaces are the equivalent of a single surface. The use of two separate surfaces allows the underbody components to hang down without interference. As to Ford's concerns about pre-stressing and rocking, the agency will address those matters outside this rulemaking.

B. Plate Position for Sloped and Contoured Roofs

All commenters who addressed the issue, except Ford, opposed positioning the front edge of the test plate tangent to the forwardmost point on the roof, based mostly on concerns about the possibility that the plate's front edge might penetrate the roof.

The agency based its proposal on the results of its compliance testing and on the Vehicle Research and Testing Center's testing of current production vehicles for research purposes. In the testing, current production vehicles typically experienced between 1–3 inches of maximum roof crush, occurring several inches rearward of the A-pillar. Testing using the current and modified roof crush tests produced comparable amounts of crush at exactly the same location on the roof. Consequently, use of the modified procedure on conventional roof structures should very rarely result in the front edge of the plate contacting the A-pillar during testing.

Nevertheless, the arguments of these commenters have merit. Especially for vehicles with a sharp transition between the slope of the windshield and a relatively flat roof structure, such as light trucks and vans, the agency agrees that front edge loading could occur if the initial point of contact were close to the A-pillar or exactly at the A-pillar joint. Front edge loading could also occur on future production vehicles such as those mentioned by BMW with A-pillar angles less than 31.5 degrees.

More important, front edge loading could also occur if the proposed procedure were used in testing those vehicles which allow more than the 1–3 inches of crush experienced by most vehicles during compliance testing. As noted above, the standard allows up to 5 inches of roof crush. The test procedures must not be based on an assumption that there will not be any vehicles who performance approaches that limit. If five inches of roof crush were to occur when the plate had been positioned according to the proposal, the front edge of the plate would likely penetrate the roof or the A-pillar, even in the case of vehicles with conventionally sloped roof structures.

Some of the recommendations by the manufacturers for pre-test positioning of the front edge of the plate would also be unacceptable for the same reason. A test plate positioned according to GM and VW's recommendations (i.e., with the plate's front edge positioned 2 inches and 1 inch, respectively, forward of the forward most point on the roof) would also result in front edge contact with the A-pillar for a minimally compliant vehicle with a current roof design.

NHTSA disagrees with part of BMW's comment that the test procedure should allow the position of the front edge of the test plate to vary at the discretion of

the manufacturer or final stage manufacturer. Although, theoretically, varying the plate's front edge position by up to a range of 254 mm (10 inches) forward of the forwardmost point of the roof should make little difference in the force application, the agency remains concerned that variable test placement may increase the variability of the test results. By not ensuring a fixed location point for the test plate, variations in the test results as a result of test setup variability, such as those noted by Ford in its variability study, might occur. It is also rare for NHTSA to allow manufacturers to specify test conditions during the agency's compliance testing. Such an allowance would give the manufacturers some influence over the stringency of the requirements and could result in differences in the stringency of the requirements for different manufacturers. Further, the allowance seems unwarranted when the problem (potential front edge loading) could be addressed without introducing such a variable. In addition, NHTSA notes that manufacturers already have this flexibility with respect to their own testing. The test procedures in the Federal Motor Vehicle Safety Standards specify how the agency will conduct compliance testing. Manufacturers and converters may, at their risk, deviate from these procedures so long as they are confident that the modified test still provides an adequate basis for certification that their vehicles will comply when tested by the agency in accordance with the standard.

The agency thinks there is merit in the portion of BMW's recommendation to specify that the front edge of the test plate is to be placed 254 mm (10 inches) forward of the forwardmost point on the roof. NHTSA believes that if the plate were so positioned, its front edge would not contact the roof or A-pillar of any current or future vehicles. The agency is not aware of any vehicles, even minimally compliant ones, with A-pillars so inclined that the plate's front edge could contact the roof or the A-pillar. The agency does not foresee any complications in the test procedure or change in the stringency of the requirements as a result of shifting the plate 254 mm (10 inches) forward, since the plate is so long that rear edge contact is highly unlikely.

By moving the test plate sufficiently forward of the forwardmost point of the roof, edge loading associated with the current procedure will be eliminated for present and future production vehicles. Locating the plate edge relative to a fixed point on the roof instead of the initial contact point also addresses BMW's concern that future vehicles with very inclined A-pillars might have roofs on which the initial contact point is hard to determine. It is also suitable for vehicles whose forwardmost point of the roof does not lie on the vehicle's longitudinal centerline, because the roof at the top of the A-pillar will not be more than 254 mm (10 inches) longitudinally forward of the roof on the vehicle's centerline. Therefore, the agency is modifying the rule to specify placement of the plate's front edge 254 mm ± 10 mm (10 inches ± .39 inches) forward of the forwardmost point on the roof. This will limit the test variability, while ensuring enforceability of the crush resistance requirement.

NHTSA agrees with Advocates that the low angle of inclination of the A-pillar for vehicles with aerodynamic roof structures will likely cause the B-pillar and the adjacent portions of the roof to bear proportionally greater crash forces in rollover crashes, compared with vehicles with more upright A-pillars. However, ensuring the structural integrity of the A-pillar is of even greater importance in vehicles with aerodynamic roof structures because the low slope of the A-pillar may result in a shorter minimum distance from the A-pillar to the front seat occupant's head. Therefore, this rule's emphasis on the A-pillar is appropriate.

NHTSA agrees with those commenters that the agency should not limit its efforts to refining the current test procedure, but should also explore other, arguably more realistic, methods of testing for roof crush strength that might lead to the possibility of greater improvements in rollover safety. The purpose of this rulemaking is to address only the issues of difficulty of testing raised in the petitions. Other issues, such as the possibility of using a dynamic test procedure or research into exploring differences between the rollover crash forces in the roof structures of various roof/pillar designs will be considered separately. The successful resolution of those issues may enable the agency to consider rulemaking for upgrading Standard No. 216.

C. Use of a Small Test Plate for Vehicles With Raised or Modified Roofs

All commenters that addressed the issue opposed the small test plate and recommended continued use of only a large plate, mostly due to concerns over the likelihood of rear edge loading. Other reasons cited for opposing the small plate included failure to load the B-pillar, additional cost of making new test fixtures and higher test costs, and the possibility that the area crushed by the large test plate would exceed the surface area of the small plate, resulting in edge loading.

NHTSA agrees that the smaller test plate could result in rear edge contacts with certain raised roof vehicles, especially if the roof were minimally compliant. This would be particularly undesirable since the rear edge loading would likely occur on the roof over the front seat area. GM is correct in its statement that the small test plate would ineffectively stress the B-pillar, but, as explained above, loading the A-pillar and the roof section over the front seat area is the primary concern of the agency. In addition, the Standard No. 216 test procedure with the large plate in compliance testing results in little or no roof crush at the B-pillar.

Primarily because of the likelihood of rear edge contact over the front seat area of some vehicles, NHTSA agrees with these commenters that a small test plate should not be adopted. This addresses manufacturer concerns about additional costs of making new test fixtures and higher test costs, and about the current plate crushing an area greater than the surface area of the smaller plate. However, retaining the large plate means that the problem with testing raised or modified roofs needs to be addressed in another way.

The question becomes how to conduct testing with the large test plate in a manner that addresses the concerns raised by RVIA in its petition. The agency believes GM's recommendation to move the large test plate forward far enough to ''achieve the desired loading condition'' is not feasible. Allowing the position of the test plate to vary by an amount thought to be necessary to avoid contacting the raised section introduces a variable that would add to the test variability cited by Ford in its study. It would make the standard less objective, thus making compliance testing more difficult and reducing the standard's enforceability. In addition, with certain modified roof structures, the shape of the raised section might dictate moving the plate so far forward that the rear edge is near the front of the front seat area, resulting in very little of the plate contacting the roof. Rear edge loading is especially likely in this situation.

Defining ''the desired loading condition'' may involve trade-offs. For certain roof shapes, the agency sees no way to avoid both loading the rear edge of the plate in the area over the front seat area and loading the raised roof to the rear of the front seat area. If the plate is far forward enough so that it misses the modified roof to the rear of the front seat area, rear edge loading even with the larger test plate can occur. This is because raised or modified roofs may

step up or slope up toward the rear of the front seat area, and the shorter length of plate over the roof (i.e., the distance between the front of the roof and the rear of the front seat area instead of the full length of the plate) provides less distance for even the large plate inclined toward the rear at a shallow angle to ramp up above the roof surface. If the large plate is allowed to extend past the rear of the front seat area, then portions of such a roof that are not over the front seat area may support load, and may experience rear edge loading anyway.

The agency concludes that the best way to test vehicles with raised and modified roofs in accordance with the intent of the standard is to align the rear edge of the test plate so that it is tangent to the vertical plane passing through the rearmost point of the front seat area. This essentially constitutes the agency's adoption of GM's recommendation, specifying a fixed longitudinal position instead of a variable position. Allowing the large test plate to be moved forward will avoid rear edge contact with the majority of raised roofs with the rear edge positioned as specified. It should not matter how far the front of the plate projects in front of the roof.

This solution minimizes problems. Rear edge loading might occur in testing a small number of vehicles with modified or raised roof structures that slope or step upward at more than a five degree angle between the front of the roof and the rear of the front seat area. However, this is unavoidable without varying the plate angles and position according to the roof geometry. The plate might never contact the A-pillar if the raised or modified roof is more than five inches above that structure, but this may be unavoidable regardless of the plate size and angle. The agency's primary concern is that the test plate loads the roof of the front seat area using a procedure that is more objective and repeatable. This solution accomplishes that goal.

Retention of the larger plate also largely addresses GM's concern regarding the potential increase in cost for designing test fixtures. However, the requirement that the rearward edge of the long plate be aligned with the rear of the front seat area when testing certain raised roof vehicles, could necessitate some retooling for the fixtures. There should not be any additional cost for those test facilities which use two hydraulic cylinders to apply the loads to the test plate. Test facilities that use a single hydraulic cylinder may or may not be able to produce uniform loading upon the roof structure, because of the torsion that would be applied to the connection between the plate and the cylinder if only the rear half of the plate is in contact with the vehicle. If upgrading single cylinder equipment is necessary to compensate for this effect, the agency anticipates only a minor, one time only, fixture cost.

The initial point of plate contact determines whether the rear edge of the plate needs to be aligned with the rear of the front seat area. If the initial contact point is above the front seat area, then the normal plate positioning procedure is used. If the initial contact point is to the rear of the front seat area, then the plate is realigned.

NHTSA realizes that, after the plate has been realigned, if the initial point of contact is only slightly forward of the rear of the front seat area, then a small amount of the roof to the rear of the front seat area might be crushed by the rear edge of the plate as it moves downward and slightly rearward, perpendicular to its 5 degree rearward inclination. This is only likely to happen if the roof is minimally compliant. NHTSA's past compliance testing indicates this would be a very rare occurrence. In any case, crushing a small amount of roof to the rear of the front seat area is preferable to the rear edge loading that would occur otherwise. If the initial point of contact is to the rear of the front seat area, then rear edge loading at the rear of the front seat area is preferable to the possibility that the roof over the front seat area would never be tested by the plate at all.

NHTSA disagrees with Minnesota DOT's analysis that ensuring the integrity of the front roof structure should not be of primary importance for vehicles with raised or modified roofs. Standard No. 216 stresses the area of the roof most likely to have occupants under it. Standard No. 220 was adopted for vehicles which typically carry more occupants in the rearward seating positions (i.e., school buses), which is why the integrity over the entire roof structure is the primary concern. Conversely, Standard No. 216 was adopted for vehicles which typically carry front seat occupants (i.e., most light duty vehicles). Thus, it is more important to ensure the integrity of the roof structure over the front seat area. In addition, failure of the A-pillar in these vehicles is more likely to cause harm than other parts of the roof. Light duty vehicles, particularly mini-vans, are commonly the type of vehicle whose roof structures are modified. Since 1990, these vehicles have commonly been designed with more aerodynamic roof structures. The design of aerodynamic roof structures effectively places the A-pillar/roof joints in closer proximity to the heads of the front seat occupants. Therefore, regardless of the initial point of contact, it is more important to ensure roof integrity at the A-pillar and adjoining roof structure.

The agency also disagrees with the portion of RVIA's analysis that concludes Standard No. 220 is comparable to Standard No. 216 and is preferable for testing vehicles with raised or modified roofs. NHTSA stands by its tentative conclusion stated in the NPRM that the Standard No. 220 test is less stringent than Standard No. 216 for testing the appropriate roof area. Agency tests on a raised roof van using the Standard No. 220 procedure resulted in the initial point of contact and the maximum amount of deformation near the *rear* of the roof structure. The proposed Standard No. 216 procedure, as well as the procedure adopted in this final rule, has an initial point of contact and maximum roof crush over the front seat area and near the A-pillar for conventionally flat roof structures. Even though the maximum amounts of roof crush in the two tests were comparable, the deformation at the A-pillar junction was far less in the Standard No. 220 test. There are no hard data on the issue of where initial contact with the ground typically occurs in real world rollover crashes, so RVIA's conclusion that the initial point of contact would be farther to the rear is speculative. However, NHTSA's engineering judgement, based on an analysis of NASS data conducted in the 1980s, is that real world rollovers typically involve a component of forward velocity along with the roll, which should generally result in the front occupant area (e.g., the A-pillar and front edge of the roof) contacting the ground first. Therefore, Standard No. 216 is a more appropriate test.

D. Other Issues and Concerns

1. Real World Rollover Crashes Versus Standard No. 216

Advocates and other commenters stated that agency's proposed modification to Standard No. 216 would not improve the extent to which the standard addresses real world rollover crashes. As stated earlier, the purpose of this rulemaking is to address conflicts and ambiguities in the existing test procedure. Major changes, such as changing from a quasi-static to a dynamic roof crush test, are outside the scope of this rulemaking and therefore must be considered separately.

The agency is taking steps to address the issue of substantive changes to Standard No. 216. As part of NHTSA's Strategic Plan, which details goals for

improving occupant protection in rollover crashes, the agency is conducting research to explore the potential for reducing injuries and fatalities resulting from harmful contact due to roof crush. The agency is focusing on developing alternative test procedures for improving roof crush resistance. A cumulative report that details the results of NHTSA's research and compares quasi-static testing to dynamic testing is currently available on NHTSA's Research and Development web page at www.-nrd.nhtsa.dot.gov/vrtc/cw/roofcrsh.pdf. The report is also available through the DOT docket, under docket number NHTSA–1996–1742. NHTSA is also exploring a possible correlation between real world rollover roof crush/injury data and the headroom reduction resulting from the roof crush in these crashes. Following the completion of this research, NHTSA will determine the next steps in upgrading rollover occupant protection crashworthiness. Depending on the results of its research, NHTSA may initiate a rulemaking to address whether Standard No. 216 should be upgraded as a modified quasi-static test or whether the adoption of a dynamic test should be considered.

RHLF commented that the raised roof section of some van conversions detaches in rollover crashes due to the fiberglass material's reduction in the ductility or energy absorption and inadequate attachment with sheet metal screws by final stage manufacturers. NHTSA is not aware of any industry-wide problem. Any problem found that is not common to a substantial portion of the second/final stage manufacturers would be addressed by NHTSA's defects program. NHTSA's Office of Defects Investigation will continue to monitor this situation through its complaint files and, if an apparent safety problem arises, the appropriate action will be taken.

2. Test Variability in Standard No. 216 Testing

Ford expressed concerns regarding the variability in roof crush testing and attributed that variability to differences in the design of each test facility's lab equipment, the operation of the equipment, the accuracy and verification methods of each test lab, and the test vehicle setup including the tie-down procedures. The agency plans to address these issues separately.

NHTSA agrees with Ford that the term ''trim'' in S7.2(e) describing the proposed orientation of the test device, should be revised to say ''windshield trim'' because it is more specific. NHTSA also agrees that the term ''windshield trim'' should be defined consistently with the definition in Standard No. 201. Therefore, the same definition used in Standard No. 201 has been incorporated in this final rule.

3. Analysis of Responses to Agency Questions in the NPRM

Is the integrity of a roof structure on one side of a vehicle altered by a test on the other side? The agency agrees with GM and Ford that if deformation as a result of a test on one side of a vehicle were sufficiently extensive, it *could* cause overlapping damage that would affect a second test. NHTSA asked the question in the NPRM mainly to evaluate the effect of dual testing in previous research. The agency conducts only one Standard No. 216 compliance test per vehicle.

The proposed positioning of the test load plate resulted in 17% additional ''crush'' to a Dodge Neon during the test. NHTSA deems this to be insignificant because it represents a displacement of only 8 mm. NHTSA disagrees that the 17 percent increase in crush when using the proposed procedure in the comparison test was a significant increase. The test of the 1995 Dodge Neon was conducted first using the proposed test plate position on one side of the vehicle, and then using Standard No. 216's requirement on the other. The testing resulted in the proposed test procedure producing 53.5 mm of crush and 45.8 mm for the current procedure. The absolute difference in roof crush between the two procedures was only 7.7 mm (0.3 inches). This amount of variation in the test results between similar Standard No. 216 compliance tests should be expected when using the current Standard No. 216 procedure. Compliance testing (conducted at MGA Research Corporation) on two similar 1985 Buick Rivieras and two 1984 Ford Crown Victorias (agency compliance tests 624784, 624786, 627293, and 627488, respectively) resulted in a difference of 0.2 inches in roof crush for the Ford models and 1.09 inches for the GM models. Therefore, it is not reasonable to assume that the revised procedure will always result in significantly more crush.

In Ford's supplemental response to the NPRM, it stated that the setup procedure for Standard No. 216 can cause considerable variations in repeatability. Ford stated that, based upon its engineering judgement, potential differences in the loading could result from the unique design or operational characteristics of the lab equipment, the equipment accuracy, the verification methods, and the test vehicle set-up (i.e., vehicle tie-down methods). Theoretically, the revised procedure would make no difference at all in the amount of crush, since the plate orientation and size, and its initial point of contact with the roof structure have not changed. The agency will consider setup procedure issues.

Is NHTSA's definition of ''roof over the front occupant compartment'' appropriate? In response to Ford's questioning how NHTSA derived a distance of 162 mm rearward of the SgRP, the agency derived that number from S8.11(a)(1) of Standard No. 201, *Occupant Protection in Interior Impact.* It represents the distance from the SgRP to the center of gravity of the 50th percentile male Hybrid III dummy.

NHTSA agrees with GM's recommendation that the definition of the rear of the front seat area be revised to account for certain classes of vehicles where the driver's side can be on the right side of the vehicle (e.g., postal and international vehicles) or which have asymmetric design configurations in which one outboard SgRP may be different from the other. Therefore, the agency has revised the definition of ''roof over the occupant compartment'' to reference ''a transverse vertical plane passing through a point 162 mm rearward of the SgRP of the rearmost front outboard seating position * * *''

If NHTSA increased the amount of allowable ''crush'' for vehicles with raised roofs, what method should be used to take into account the increased headroom resulting from such roofs? NHTSA shares Advocates' concerns about the idea of allowing increased amounts of roof crush for vehicles with modified/raised roofs. The agency agrees that there are no existing data that will justify relaxing roof crush limits. The agency is also aware that not all vehicles with a modified or raised roof will have increased head room. Storage space added above the occupants' heads may eliminate the headroom added by raising the roof. In addition, the agency's concern expressed in the NPRM with practicability of testing was not addressed by any commenter. Due to these valid concerns, NHTSA is not increasing the allowable amount of crush for these vehicles, but will maintain uniform requirements with all types of roof structures.

Should the proposed test procedure address glass panels or sunroofs located over the front occupant compartment, and if so, how? The test procedure currently requires that, prior to testing, windows and doors are closed and removable or movable roof panels are in their closed and latched positions. GM

stated that it knows of no reason to change this practice. Neither does the agency. NHTSA rejects RVIA's suggestion that the roof should be tested in either the open or closed position, at the discretion of the manufacturer, because that would make the standard less objective.

While this proposal does not involve changes to test load plate angles, the NHTSA requests any available data on the subject. No data were known to the commenters. However, NHTSA's Vehicle Research and Testing Center has generated a limited amount of data on this subject. These results are incorporated in the agency's report on static versus dynamic testing which is available in the docket and on the agency's web site (*www.nhtsa.dot.gov*).

Should the load plate be reduced in size from the current 30'' x 72'' to 24'' x 24'' for testing of vehicles with a raised or altered roof structure located rearward of the front occupant compartment? As discussed above, due to concerns about rear edge plate loading over the front seat area, the agency will retain the larger test plate for all Standard No. 216 testing.

VI. Changes to the Regulatory Text

Substantial changes to the regulatory text are being adopted, although the substance of the regulation remains largely the same. To accommodate the insertion of a definitions paragraph (customarily located at the beginning of NHTSA's standards), all subsequent paragraphs, i.e., those beginning with S4, are being renumbered. Essentially the same requirements were repeated three times in the NPRM and twice in the existing standard, with the only difference being an absolute limit on the amount of force for passenger cars and, in the NPRM, the location of the initial contact point of the test plate on raised roof vehicles. To eliminate that redundancy, these paragraphs of the requirements section have been consolidated, with the differences in the requirements clearly described.

Paragraph S7.2 has been rewritten to clarify, but not change, the process of orienting the test plate and lowering so that it makes initial contact with the vehicle being tested. In addition, the agency is making a number of clarifying minor changes to the regulatory text. In particular, a sentence was added to the test procedures to explicitly specify that non-structural components such as roof racks are removed prior to testing. This was already the agency's interpretation of the current test procedure. The word ''accidents'' in S2 is replaced with the word ''crashes.'' Figure 1 is revised to reflect the new plate positioning procedure.

VII. Lead Time

The agency proposed a lead time of 180 days and requested comments on that issue. In its two comments in response to the NPRM, Ford did not renew its earlier request for a five year lead time, but instead stated that 180 days was reasonable. VW commented that 180 days was reasonable, and no other commenter addressed the issue. This action is being taken at the manufacturers' request. To the extent that test plate placement differs from the current procedures, it should make compliance with the standard easier for all vehicles, since engagement of the A-pillars is assured. No changes in vehicle design will be necessary. Likewise, no changes in equipment will be necessary, except for the possibility that some test facilities might have to add an additional hydraulic cylinder to the existing large plate. In NHTSA's judgement, this can be accomplished within 180 days. Consequently, the changes to Standard No. 216 will become effective, and compliance will be required, 180 days following the publication of the final rule. However, manufacturers may voluntarily comply with this rule earlier.

VIII. Rulemaking Analyses and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

This rulemaking document was not reviewed under E.O. 12866, ''Regulatory Planning and Review.'' This action has been determined to be ''non-significant'' under the Department of Transportation's regulatory policies and procedures. The changes made by this rule will not impose any new requirements, but simply clarify existing test procedures and allow them to be applied consistently to the intended area of the roof on all vehicles. Thus, this rule will not require any design changes and will not cause any increase in compliance costs, except as noted below in the discussion of test equipment under the Regulatory Flexibility Act. The impacts of the rule are so minor that a full regulatory evaluation is not required.

B. Regulatory Flexibility Act

NHTSA has also considered the impacts of this rule under the Regulatory Flexibility Act (beginning at 5 U.S.C. 601). I certify that this rule will not have a significant economic impact on a substantial number of small entities.

The following is NHTSA's statement providing the factual basis for the certification (5 U.S.C. 605(b)). The final rule primarily affects passenger car, light truck, and multipurpose passenger vehicle manufacturers. It also affects a substantial number of van conversion shops and a small number of independent test facilities that perform Standard No. 216 testing. The Small Business Administration's size standards (13 CFR part 121) are organized according to the Standard Industrial Classification Codes (SIC). SIC Code 3711 ''Motor Vehicles and Passenger Car Bodies'' has a small business size standard of 1,000 employees or fewer. Virtually none of the vehicle manufacturers are small entities under that standard. NHTSA does not know the number of employees at a typical test facility, but there are not a substantial number of these businesses. NHTSA also does not know the number of employees typically employed by the van conversion shops (i.e., the final stage manufacturers and alterers), but it assumes that they are few in number, and that a substantial number of these businesses would qualify as small entities.

However, there will be no significant economic impact on any entity. As explained above, the rule does not impose any new requirements but instead clarifies the test procedures and allows them to be applied to the areas of the roof to which they were originally intended. There is a possibility that some vehicles with raised roofs to the rear of the front seat area will now have to be tested with much of the test plate projecting forward from the roof, such that a single hydraulic cylinder centered on the plate may not be sufficient to stabilize the plate during testing. In this case, a few test facilities might have to modify their test equipment by adding a second hydraulic cylinder, but NHTSA does not consider the changes to be a significant economic impact. The conversion shops are already responsible under the current test procedures for recertifying compliance with Standard No. 216 if they affect the roof structure. This rule will not have any effect on the price of new vehicles purchased by small entities.

C. Paperwork Reduction Act

NHTSA has analyzed this rule in accordance with the Paperwork Reduction Act of 1980 (Public Law 96–511). There are no requirements for information collection associated with this rule.

D. Executive Order 12612 (Federalism)

NHTSA has analyzed this rule in accordance with the principles and criteria contained in E.O. 12612, and has determined that this rule will not have sufficient federalism implications to warrant the preparation of a Federalism Assessment.

E. Civil Justice Reform

This rule will not have any retroactive effect. Under 49 U.S.C. 30103, whenever a Federal motor vehicle safety standard is in effect, a State may not adopt or maintain a safety standard applicable to the same aspect of performance which is not identical to the Federal standard, except to the extent that the state requirement imposes a higher level of performance and applies only to vehicles procured for the State's use. 49 U.S.C. 30161 sets forth a procedure for judicial review of final rules establishing, amending or revoking Federal motor vehicle safety standards. That section does not require submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles, Reporting and recordkeeping requirements.

In consideration of the foregoing, 49 CFR part 571 is amended as follows:

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

1. The authority citation for part 571 continues to read as follows:

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30166; delegation of authority at 49 CFR 1.50.

2. Section 571.216 is amended as follows:

a. S2 is revised.

b. S4 is revised.

c. S5 is revised.

d. S6 is revised, and S6.1, S6.2, 6.3 and S6.4 are removed.

e. S7, S7.1, S7.2, S7.3, S7.4, S7.5, and S7.6 are added.

f. A heading is added preceding Figure 1 at the end of the section and Figure 1 is revised.

The additions and revisions read as follows:

§ 571.216 Standard No. 216; Roof crush resistance.

* * * * *

S2. *Purpose.* The purpose of this standard is to reduce deaths and injuries due to the crushing of the roof into the occupant compartment in rollover crashes.

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S4. *Definitions.*

Altered roof means the replacement roof on a motor vehicle whose original roof has been removed, in part or in total, and replaced by a roof that is higher than the original roof. The replacement roof on a motor vehicle whose original roof has been replaced, in whole or in part, by a roof that consists of glazing materials, such as those in T-tops and sunroofs, and is located at the level of the original roof, is not considered to be an altered roof.

Raised roof means, with respect to a roof which includes an area that protrudes above the surrounding exterior roof structure, that protruding area of the roof.

Roof over the front seat area means the portion of the roof, including windshield trim, forward of a transverse vertical plane passing through a point 162 mm rearward of the SgRP of the rearmost front outboard seating position.

Windshield trim means any molding, other than rubber molding and bonding adhesive, that is located over either the windshield glazing, the exterior roof surface or both.

S5. *Requirements.* When the test device described in S6 is used to apply a force to either side of the forward edge of a vehicle's roof in accordance with the procedures of S7, the lower surface of the test device must not move more than 127 millimeters. The applied force in Newtons is equal to 1.5 times the unloaded vehicle weight of the vehicle, measured in kilograms and multiplied by 9.8, but does not exceed 22,240 Newtons for passenger cars. Both the left and right front portions of the vehicle's roof structure must be capable of meeting the requirements. A particular vehicle need not meet further requirements after being tested at one location.

S6. *Test device.* The test device is a rigid unyielding block whose lower surface is a flat rectangle measuring 762 millimeters by 1,829 millimeters.

S7. *Test procedure.* Each vehicle must be capable of meeting the requirements of S5 when tested in accordance with the procedure in S7.1 through 7.6.

S7.1 Place the sills or the chassis frame of the vehicle on a rigid horizontal surface, fix the vehicle rigidly in position, close all windows, close and lock all doors, and secure any convertible top or removable roof structure in place over the occupant compartment. Remove roof racks or other non-structural components.

S7.2 Orient the test device as shown in Figure 1 of this section, so that—

(a) Its longitudinal axis is at a forward angle (in side view) of 5 degrees below the horizontal, and is parallel to the vertical plane through the vehicle's longitudinal centerline;

(b) Its transverse axis is at an outboard angle, in the front view projection, of 25 degrees below the horizontal.

S7.3 Maintaining the orientation specified in S7.2—

(a) Lower the test device until it initially makes contact with the roof of the vehicle.

(b) Position the test device so that—

(1) The longitudinal centerline on its lower surface is on the initial point of contact, or on the center of the initial contact area, with the roof; and

(2) Except as specified in S7.4, the midpoint of the forward edge of the lower surface of the test device is within 10 mm of the transverse vertical plane 254 mm forward of the forwardmost point on the exterior surface of the roof, including windshield trim, that lies in the longitudinal vertical plane passing through the vehicle's longitudinal centerline.

S7.4 If the vehicle being tested is a multipurpose passenger vehicle, truck, or bus that has a raised roof or altered roof, and the initial contact point of the test device is on the raised roof or altered roof to the rear of the roof over the front seat area, the plate is positioned so that the midpoint of the rearward edge of the lower surface of the test device is within 10 mm of the transverse vertical plane located at the rear of the roof over the front seat area.

S7.5 Apply force so that the test device moves in a downward direction perpendicular to the lower surface of the test device at a rate of not more than 13 millimeters per second until reaching the force level specified in S5. Guide the test device so that throughout the test it moves, without rotation, in a straight line with its lower surface oriented as specified in S7.2(a) and S7.2(b). Complete the test within 120 seconds.

S7.6 Measure the distance that the test device moved, i.e., the distance between the original location of the lower surface of the test device and its location as the force level specified in S5 is reached.

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Figure 1 to § 571.216

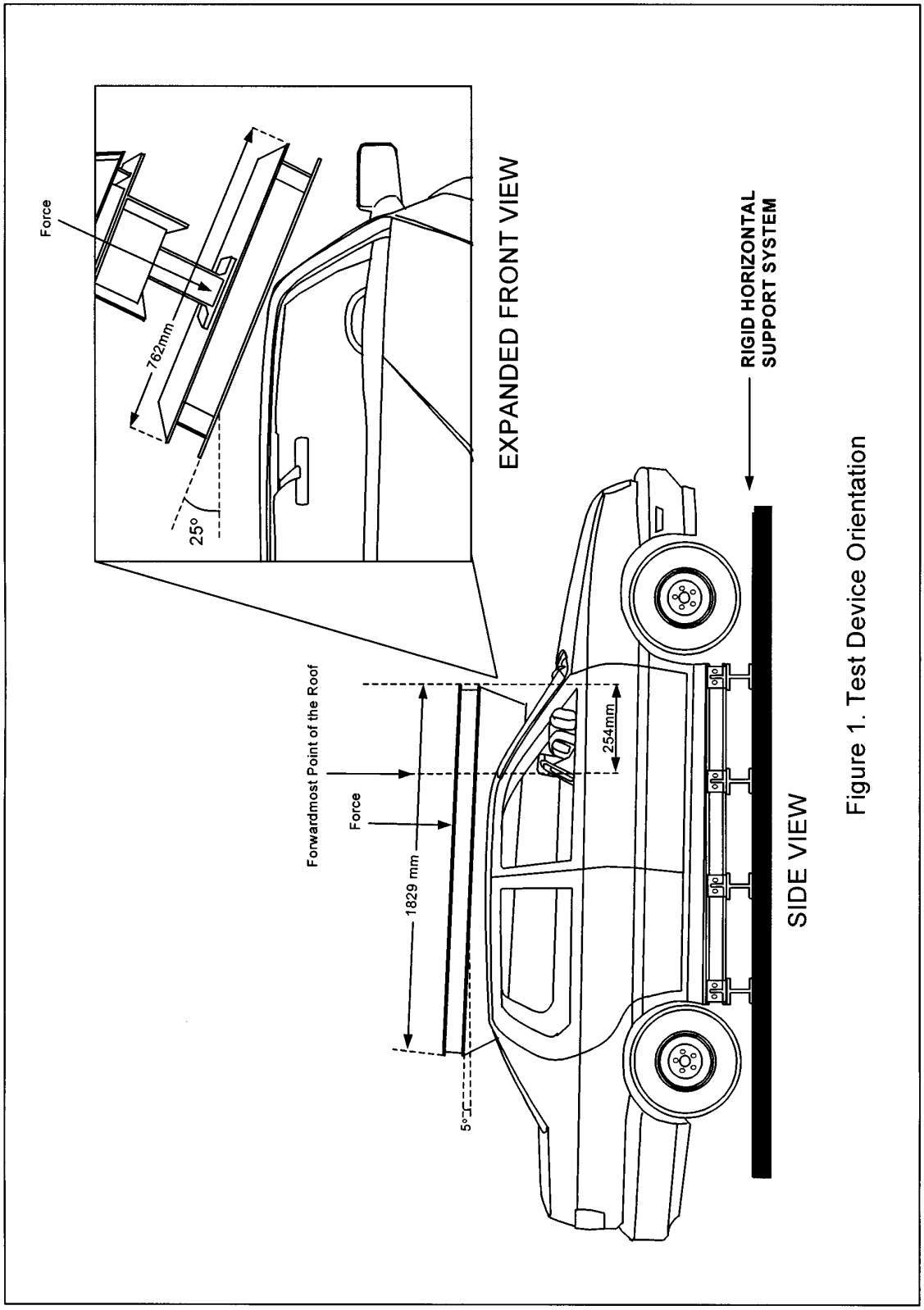

Figure 1. Test Device Orientation