



BLUE BIRD

TEST DATE: 12-13-93
TECHNICIAN: Lee Southern
REQUESTOR: Jim Swift
CARD NUMBER: BOP 2181

TEST SUBJECT: FMVSS 222 Ortho Safe Wheelchair Anchorages

TEST RESULTS: The Ortho Safe wheelchair system met the wheelchair occupant restraint anchorage and the wheelchair securement anchorage requirements plus a 10 percent safety margin per FMVSS 222 effective January 1, 1994.

TEST SETUP: The Ortho Safe wheelchair anchorages were installed in a mock-up of an actual bus. The Ortho Safe system used short sections of L-track on the floor installed perpendicular to the wall. The rearward tracks were determined to be the worst case test of the standard due to the wheelchair securement and the occupant restraint systems sharing common anchorage points, requiring a doubling of the load requirement. The upper occupant restraint connection uses either L-track or a static system ("D"-ring). See prints 1726397 and 17264421 for installation diagrams.

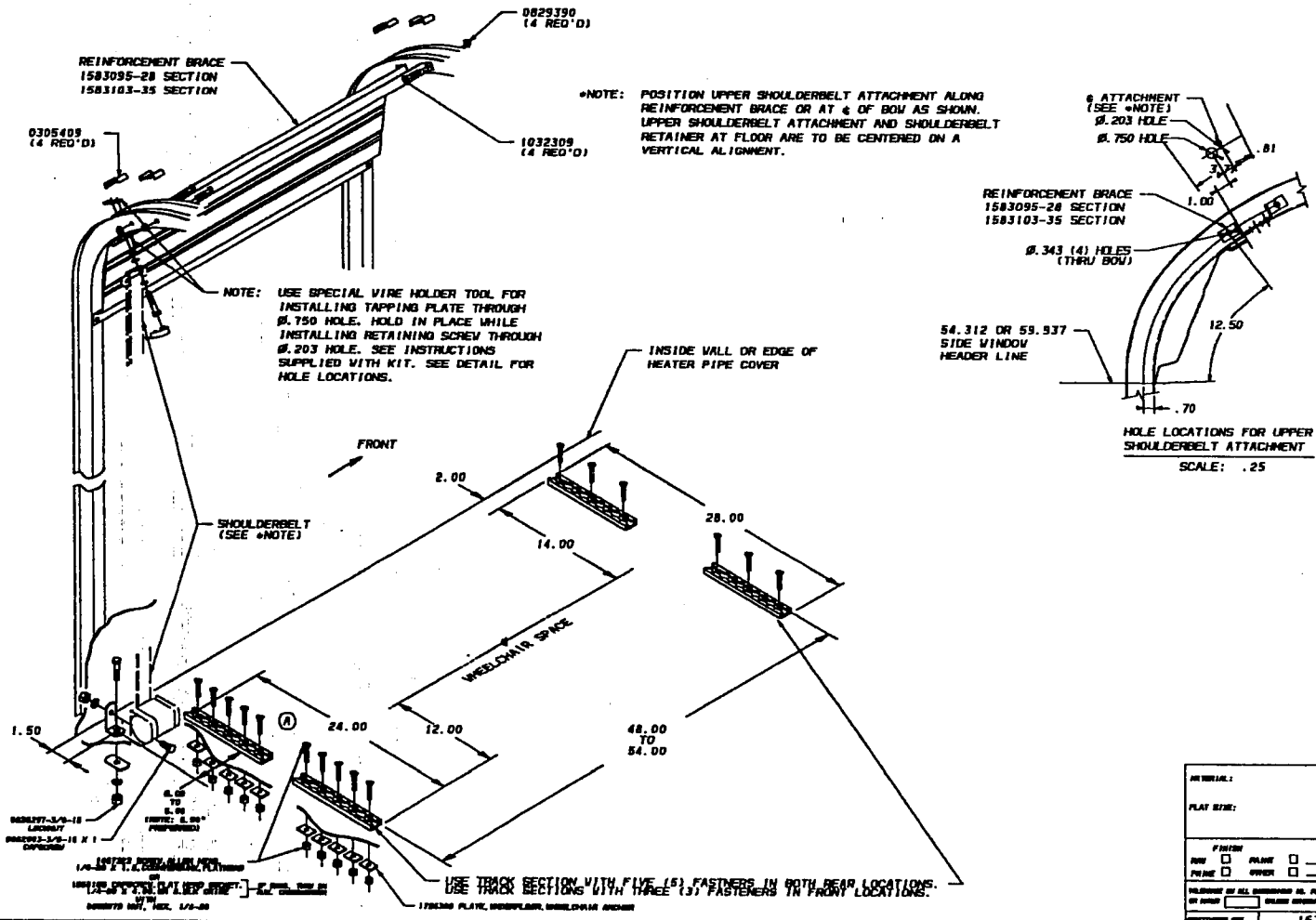
TEST PROCEDURE: All anchorages were pulled per FMVSS 222 plus an added 10 percent safety margin, and lines of action of the applied loads were those which provided the most severe test of the anchorage systems. The floor track pulls were made as close to the ends as possible which localized the load over a fastener which only had help from another fastener on one side. The loading was applied at two different angles: a horizontal angle of 0 degrees and a vertical angle of 45 degrees, and a horizontal angle of 0 degrees and a vertical angle of 80 degrees. The upper restraint system using track was pulled halfway between fasteners. The static system was pulled through the "D" ring. In both cases, the load was applied at a horizontal angle of 45 degrees and a vertical angle of 40 degrees down. When the "D" ring was loaded to 1650 lbs., the floor anchorage was holding approximately 1986 lbs. due to its special relationship to the "D"-ring and its mounting bolt.

BLUE BIRD BODY COMPANY

P.O. Box 937 • Fort Valley, Georgia 31030 • (912) 825-2021

<u>DATA:</u>	<u>Angle</u>	<u>Lbs. Pulled</u>	<u>Held For</u>
Wheelchair Securement And Occupant Restraint	Horizontal 0 Degrees	6600 Lbs.	10 Seconds
	Vertical 45 Degrees		
Upper Occupant Restraint Track	Horizontal 0 Degrees	6600 Lbs.	10 Seconds
	Vertical 80 Degrees		
Upper Occupant Restraint Static	Horizontal 45 Degrees	1650 Lbs.	10 Seconds
	Vertical 40 Degrees		

1726397A CDIAGRAM, INSTAL, W/C TIEDOWN W/STAT SHLDR BLT10478B#00TBJS (03/29/94) TSTGRP.



REVISED:					
PLAT SIZE:					
P. 10/10 <input type="checkbox"/> P. 10/10 <input type="checkbox"/> P. 10/10 <input type="checkbox"/> P. 10/10	COLOR OR TYPE <input type="checkbox"/> POLAR <input type="checkbox"/> OTHER	BLUE BIRD CORPORATION FORT WALKER, MINNAPOLIS, U.S.A.	1673631	1726397	25
DIAGRAM, INSTAL, W/C TIE DOWN			PHASE 222 STATIC ORTHO SAFE		
1673631			C 1726397		

RELBRT FRAME 1 DECEMBER 02, 1993 17.46.15

submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

Rulemaking Analyses and Notices

Executive Order 12291 (Federal Regulation) and DOT Regulatory Policies and Procedures

NHTSA has examined the cost impacts of this rulemaking action and determined that the final rule is not major within the meaning of E.O. 12291. However, it is "significant" within the meaning of the Department of Transportation's regulatory policies and procedures because of the public interest associated with this rulemaking action. The agency has prepared a Final Regulatory Evaluation (FRE) for this final rule, and placed a copy of the FRE in the public docket for this rulemaking action. A copy of the FRE may be obtained by writing to: Docket Section, NHTSA, room-5109; 400 Seventh Street, SW., Washington, DC 20590.

NHTSA has determined that the primary consumer cost for this final rule is the cost associated with lost capacity due to the forward-facing wheelchair requirement. Many states have already mandated the forward-facing orientation, therefore, only 24 states will be affected by this requirement. NHTSA has estimated that 2,545-2,561 new school buses will be affected by this requirement, at a cost of \$822-\$1,035 per vehicle, for a total annual consumer cost of \$2,104,820-\$2,633,670.

Regulatory Flexibility Act

NHTSA has also considered the impacts of this rulemaking action under the Regulatory Flexibility Act. This analysis appears in the FRE. Based on this evaluation, I certify that the proposed amendments will not have a significant economic impact on a substantial number of small entities.

The cost of a new school bus is expected to increase only nominally because of this final rule. The anticipated cost of \$822-\$1,035 represents 2-3% of the weighted cost (\$36,100) of a new school bus. Therefore, NHTSA does not anticipate either a negative impact on sales from this final rule, or a significant increase on the amount states currently spend on transporting students.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1980 (Pub. L. No. 96-511), there are no requirements for information collection associated with this amendment.

National Environmental Policy Act

NHTSA also has analyzed this rulemaking action for the purpose of the National Environmental Policy Act. The agency has determined that implementation of this action will not have any significant impact on the quality of the human environment.

Executive Order 12612 (Federalism)

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

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

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

1. The authority citation for part 571 of title 49 continues to read as follows:

Authority: 15 U.S.C. 1392; 1401; 1403; 1407, delegation of authority at 49 CFR 1.50.

§ 571.222 [Amended]

2. S4 of § 571.222 is amended by revising the definition of *school bus passenger seat* and adding new definitions of *wheelchair*; *wheelchair occupant restraint anchorage*; *wheelchair securement anchorage*; and *wheelchair securement device*, in alphabetical order to read as follows:

School bus passenger seat means a seat in a school bus, other than the driver's seat.

Wheelchair means a wheeled seat frame for the support and conveyance of a physically disabled person, comprised of at least a frame, seat, and wheels.

Wheelchair occupant restraint anchorage means the provision for transferring wheelchair occupant restraint system loads to the vehicle structure.

Wheelchair securement anchorage means the provision for transferring wheelchair securement device loads to the vehicle structure.

Wheelchair securement device means a strap, webbing or other device used for securing a wheelchair to the school bus, including all necessary buckles and other fasteners.

3. New sections 5.4 through S5.4.4(b) are added to § 571.222 to read as follows:

S5.4 Each school bus having one or more locations designed for carrying a person seated in a wheelchair shall comply with S5.4.1 through S5.4.4 at each such wheelchair location.

S5.4.1 *Wheelchair securement anchorages.* Each wheelchair location shall have not less than four wheelchair securement anchorages complying with S5.4.1.1 through S5.4.1.3.

S5.4.1.1 Each wheelchair securement anchorage shall have a wheelchair securement device complying with S5.4.2 attached to it.

S5.4.1.2 The wheelchair securement anchorages at each wheelchair location shall be situated so that—

(a) A wheelchair can be secured in a forward-facing position.

(b) The wheelchair can be secured by wheelchair securement devices at two locations in the front and two locations in the rear.

(c) The front wheel of a three-wheeled wheelchair can be secured.

S5.4.1.3 Each wheelchair securement anchorage shall be capable of withstanding a force of 13,344 Newtons applied as specified in paragraphs (a) through (d) of this section. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding a force of 13,344 Newtons multiplied by the number of securement devices sharing that anchorage.

(a) The initial application force shall be applied at an angle of not less than 30 degrees, but not more than 60 degrees, measured from the horizontal. (See Figure 4.)

(b) The horizontal projection of the force direction shall be within a horizontal arc of ±45 degrees relative to a longitudinal line which has its origin at the anchorage location and projects rearward for an anchorage whose wheelchair securement device is intended to secure the front of the wheelchair and forward for an anchorage whose wheelchair securement device is intended to secure the rear of the wheelchair. (See Figure 4.)

(c) The force shall be applied at the onset rate of not more than 133,440 Newtons per second.

(d) The 13,344 Newton force shall be attained in not more than 30 seconds, and shall be maintained for 10 seconds.

S5.4.2 *Wheelchair securement devices.* Each wheelchair securement device shall—

(a) If incorporating webbing or a strap—
(1) Comply with the requirements for Type 1 safety belt systems in S4.2, S4.3,

2997.6

and S4.4(a) of FMVSS No. 209, *Seat Belt Assemblies*; and

(2) Provide a means of adjustment to remove slack from the device.

(b) If not incorporating webbing or a strap, limit movement of the wheelchair through either the equipment design or a means of adjustment.

S5.4.3 Wheelchair occupant restraint anchorages.

S5.4.3.1 Each wheelchair location shall have:

(a) Not less than one anchorage for the upper end of the upper torso restraint; and

(b) Not less than two floor anchorages for wheelchair occupant pelvic and upper torso restraint.

S5.4.3.2 Each wheelchair occupant restraint floor anchorage shall be capable of withstanding a force of 13,344 Newtons applied as specified in paragraphs (a) through (d). When more than one wheelchair occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a force of 13,344 Newtons multiplied by the number of occupant restraints sharing that anchorage.

(a) The initial application force shall be applied at an angle of not less than 45 degrees, but not more than 80 degrees,

measured from the horizontal. (See Figure 5.)

(b) The horizontal projection of the force direction shall be within a horizontal arc of ± 45 degrees relative to a longitudinal line which has its origin at the anchorage and projects forward. (See Figure 5.)

(c) The force shall be applied at an onset rate of not more than 133,440 Newtons per second.

(d) The 13,344 Newton force shall be attained in not more than 30 seconds, and shall be maintained for 10 seconds.

(e) When a wheelchair securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair, the loads specified by S5.4.1.3 and S5.4.3.2 shall be applied simultaneously, under the conditions specified in S5.4.3.2 (a) and (b). (See Figure 6.)

S5.4.3.3 Each anchorage for a wheelchair occupant upper torso restraint shall be capable of withstanding a force of 6,672 Newtons applied as specified in paragraphs (a) through (d).

(a) The initial application force shall be applied at a vertical angle of not less

than zero degrees, but not more than 40 degrees, below a horizontal plane which passes through the anchorage. (See Figure 7.)

(b) The projection of the force direction onto the horizontal plane shall be within zero degrees and 45 degrees as measured from a longitudinal line with its origin at the anchorage and projecting forward. (See Figure 7.)

(c) The force shall be applied at the onset rate of not more than 66,720 Newtons per second.

(d) The 6,672 Newton force shall be attained in not more than 30 seconds, and shall be maintained for 10 seconds.

S5.4.4 Wheelchair occupant restraints.

(a) Each wheelchair location shall have wheelchair occupant pelvic and upper torso restraints attached to the anchorages required by S5.4.3.

(b) Each wheelchair occupant restraint shall comply with the requirements for Type 2 safety belt systems in S4.2, S4.3, and S4.4(b) of FMVSS No. 209, *Seat Belt Assemblies*.

4. New Figures 4 through 7 are added, to appear at the end of the text of § 571.222, as follows:

BILLING CODE 4910-59-M

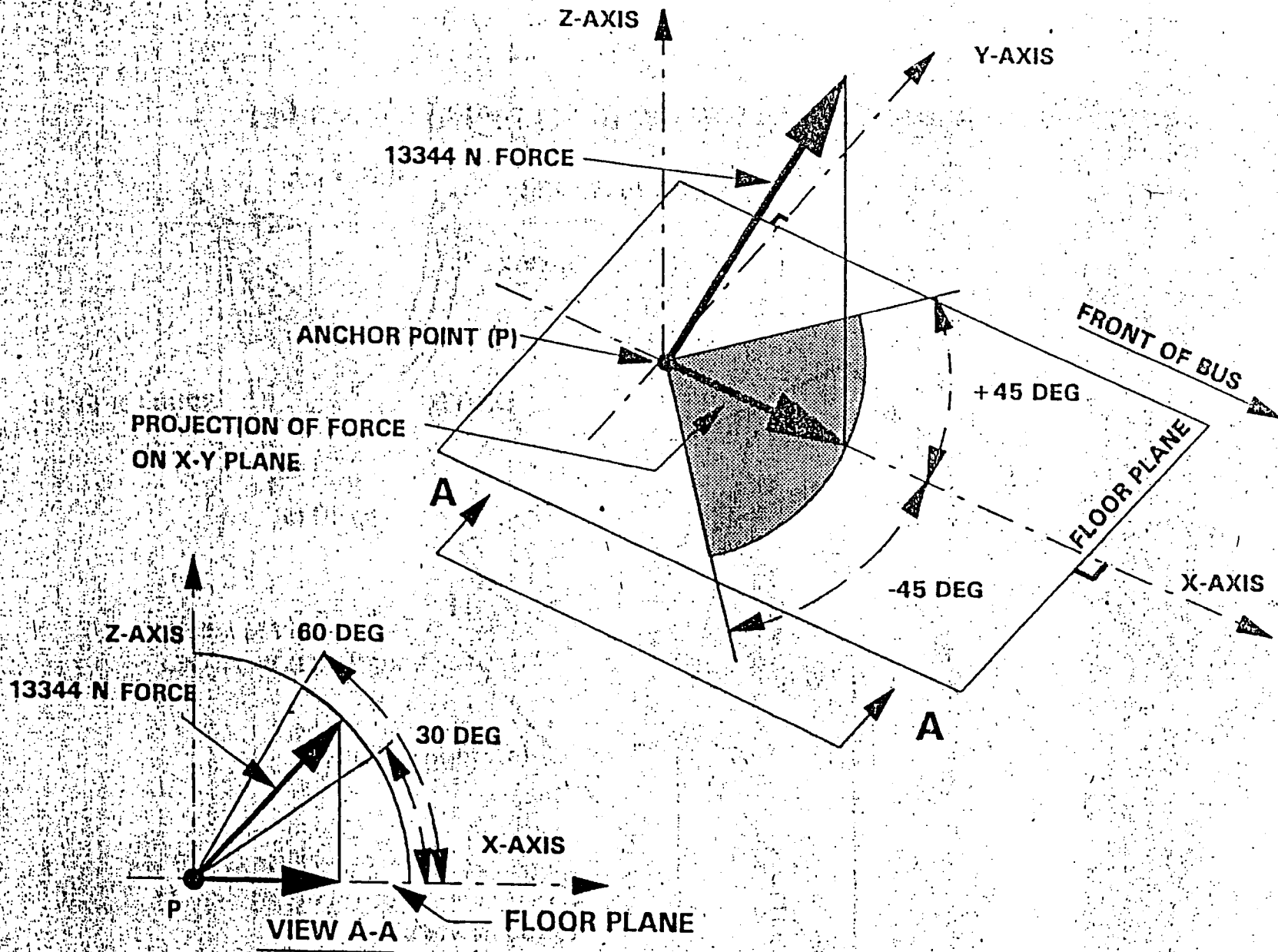


Figure 4. Wheelchair Securement Anchorage Loading Direction (Rear Anchorage Shown).

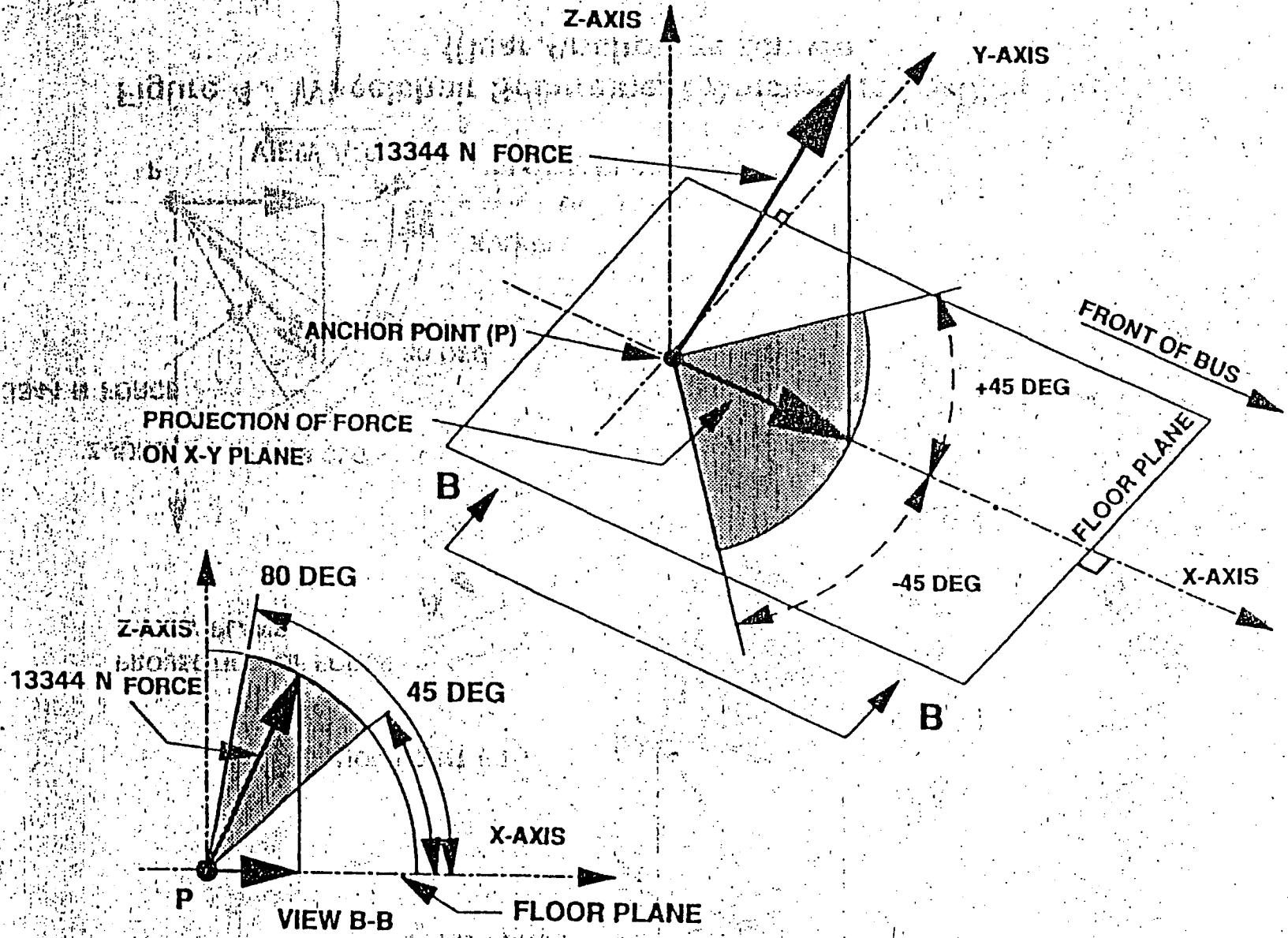


Figure 5. Pelvic Restraint Anchorage Loading Direction

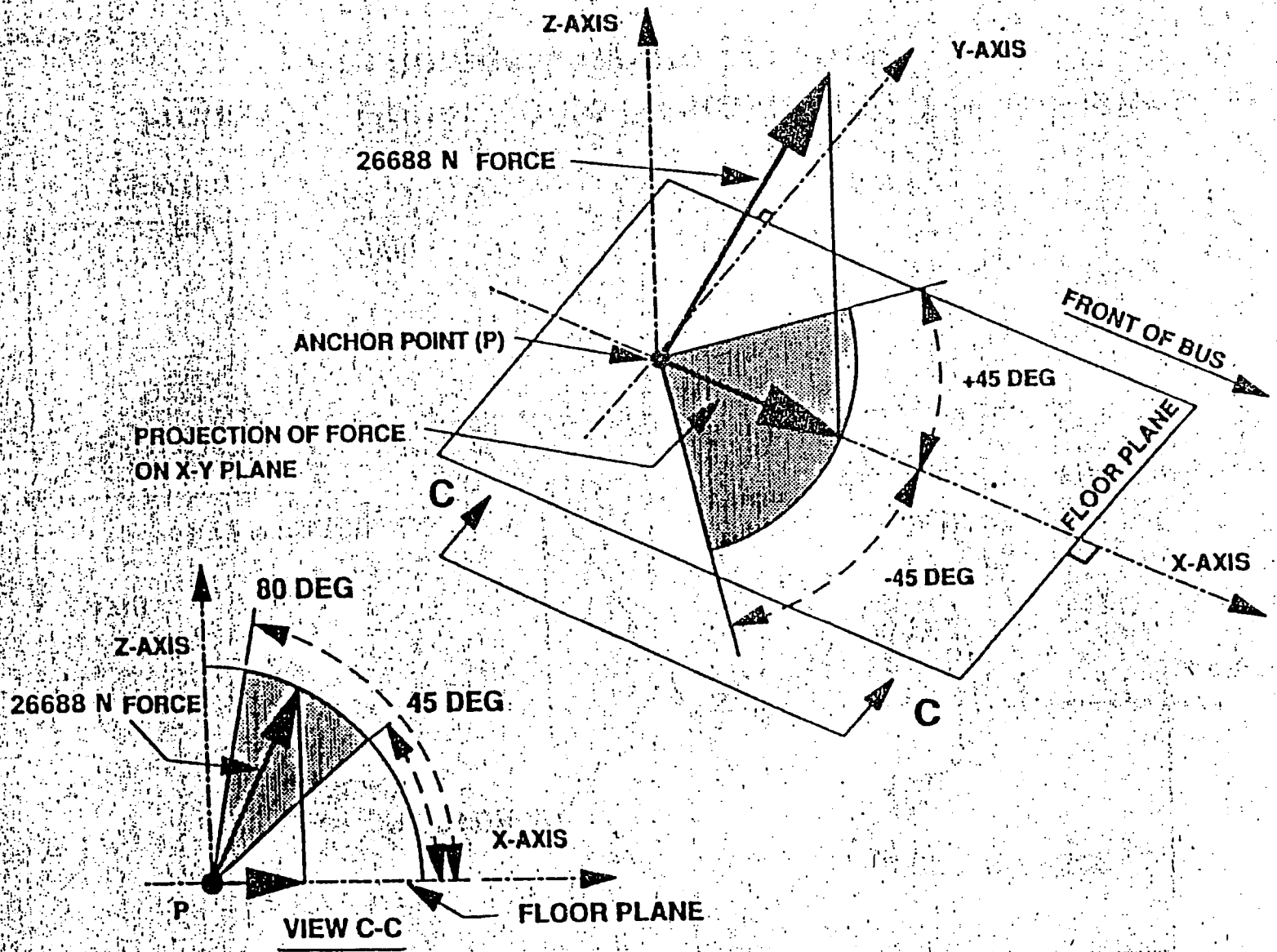


Figure 6. Pelvic Restraint and Wheelchair Securement
Common Anchorage Loading Direction
(Rear Direction Only)

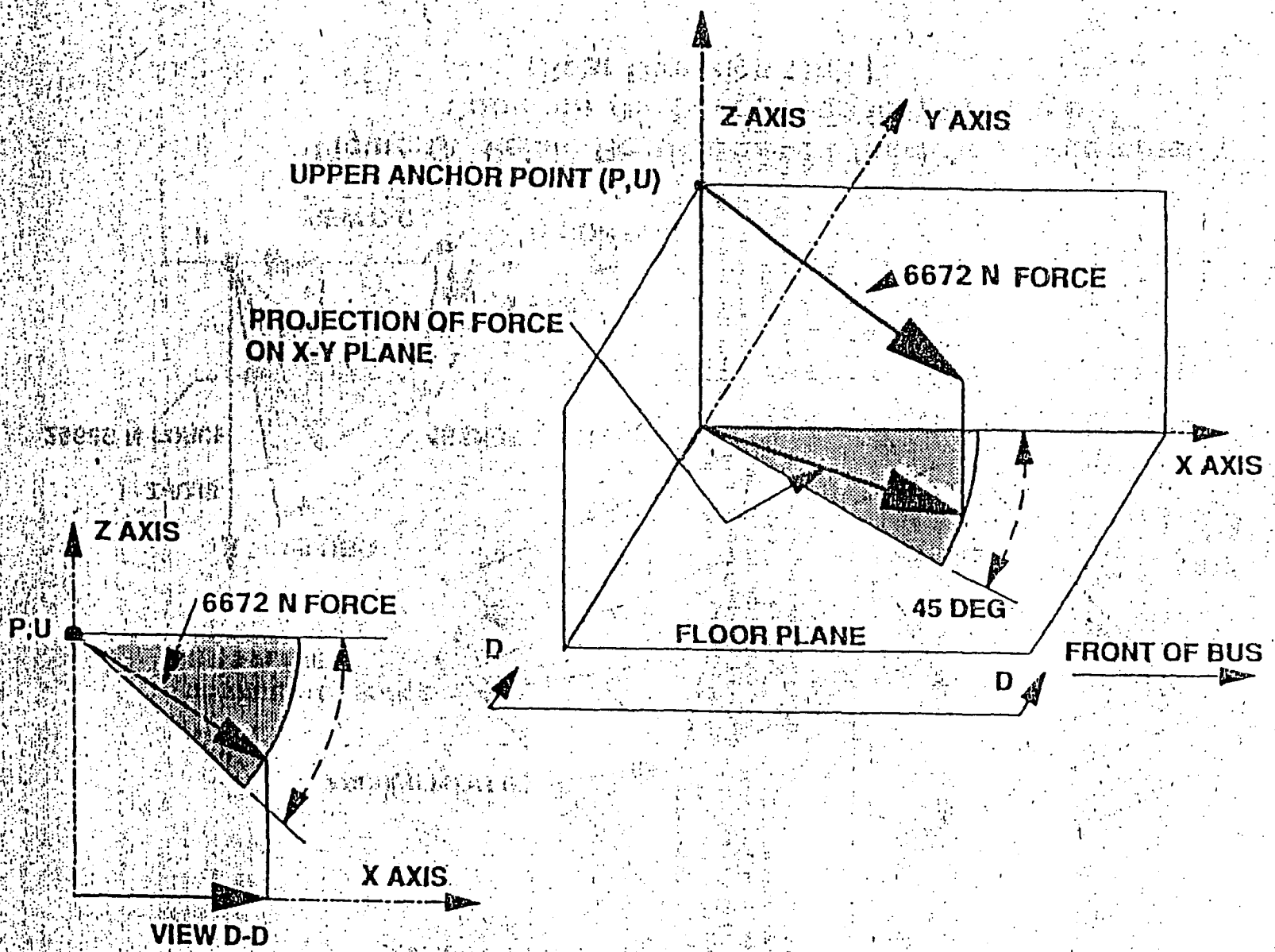


Figure 7. Upper Torso Restraint and Torso Harness Anchorage Loading Location

BILLING CODE 4010-60-C



BLUE BIRD

DATE: 9-13-93
REQUISITIONER: JWS
REQ'D COMPLETION DATE: 9-30-93
CARD NO: BOP 2181
EST. HOURS: _____

ENGINEERING SERVICES TEST REQUEST

TEST SUBJECT: CGN 10478 FMUSS 222 wheelchair

PURPOSE OF TEST: tie down - Test existing options to FMUSS 222 requirements. See JWS for opt inst. and parts

PART DESCRIPTION: _____

MOCK-UP/BODY/CHASSIS NO.: _____ OPTION NO.: _____

DIAGRAM NUMBER: _____

TEST PROCEDURE

TYPE OF TEST- FMVSS CERTIFICATION: _____
DEVELOPMENT TEST: _____
FATIGUE/LIFE TEST: _____
SPECIAL: _____
NO. SAMPLES TO TEST: _____
REQUESTOR OBSERVATION REQ'D: _____
SPECIAL EQUIPMENT REQ'D: _____

PART DISPOSAL

RETURN TO REQUESTOR: _____
RETURN TO PRODUCTION: _____
STORE UNTIL: _____
SCRAP: _____
OTHER: _____

PART #'S OF COMPONENTS NECESSARY FOR TEST:

DESCRIPTION	P/N	DESCRIPTION	P/N
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SPECIAL INSTRUCTIONS: _____



BLUE BIRD

TEST DATE: 12-13-93
TECHNICIAN: Lee Southern
REQUESTOR: Jim Swift
CARD NUMBER: BOP 2181D

TEST SUBJECT: FMVSS 222 L-Track Wheelchair Anchorages (Temporary Option
----- Parallel To Wall)

TEST RESULTS: The L-track installed parallel to the wall met the wheelchair occupant restraint anchorage and the wheelchair securement anchorage requirements plus a 10 percent safety margin per FMVSS 222 effective January 1, 1994.

TEST SETUP: The L-track was installed in a mock-up of an actual bus. This system uses long sections of track installed parallel to the wall. The rearward pulls were determined to be the worst case test of the standard due to the wheelchair securement and the occupant restraint systems sharing common anchorage points, requiring a doubling of the load requirement. The upper occupant restraint connection also uses L-track. As of now there is no standard option using this configuration and is only available as a temporary option.

TEST PROCEDURE: All anchorages were pulled per FMVSS 222 plus an added 10 percent safety margin, and the lines of action of the applied loads were those which provided the most severe test of the anchorage systems. The loading was applied at two different angles: a horizontal angle of 0 degrees and a vertical angle of 45 degrees, and with a horizontal angle of 0 degrees and a vertical angle of 80 degrees. The upper restraint system was pulled with a horizontal angle of 45 degrees and a vertical angle of 40 degrees down.

<u>DATA:</u>	<u>Angle</u>	<u>Lbs. Pulled</u>	<u>Held For</u>
Wheelchair Securement And Occupant Restraint	Horizontal 0 Degrees	6600 Lbs.	10 Seconds
	Vertical 45 Degrees		
Upper Occupant Restraint	Horizontal 0 Degrees	6600 Lbs.	10 Seconds
	Vertical 80 Degrees		
Upper Occupant Restraint	Horizontal 45 Degrees	1650 Lbs.	10 Seconds
	Vertical 40 Degrees		

submission of a petition for reconsideration or other administrative proceedings before parties may file suit in court.

Rulemaking Analyses and Notices

Executive Order 12291 (Federal Regulation) and DOT Regulatory Policies and Procedures

NHTSA has examined the cost impacts of this rulemaking action and determined that the final rule is not major within the meaning of E.O. 12291. However, it is "significant" within the meaning of the Department of Transportation's regulatory policies and procedures because of the public interest associated with this rulemaking action. The agency has prepared a Final Regulatory Evaluation (FRE) for this final rule, and placed a copy of the FRE in the public docket for this rulemaking action. A copy of the FRE may be obtained by writing to: Docket Section, NHTSA, room-5109, 400 Seventh Street, SW., Washington, DC 20590.

NHTSA has determined that the primary consumer cost for this final rule is the cost associated with lost capacity due to the forward-facing wheelchair requirement. Many states have already mandated the forward-facing orientation, therefore, only 24 states will be affected by this requirement. NHTSA has estimated that 2,545-2,561 new school buses will be affected by this requirement, at a cost of \$822-\$1,035 per vehicle, for a total annual consumer cost of \$2,104,820-\$2,633,670.

Regulatory Flexibility Act

NHTSA has also considered the impacts of this rulemaking action under the Regulatory Flexibility Act. This analysis appears in the FRE. Based on this evaluation, I certify that the proposed amendments will not have a significant economic impact on a substantial number of small entities.

The cost of a new school bus is expected to increase only nominally because of this final rule. The anticipated cost of \$822-\$1,035 represents 2-3% of the weighted cost (\$36,100) of a new school bus. Therefore, NHTSA does not anticipate either a negative impact on sales from this final rule, or a significant increase on the amount states currently spend on transporting students.

Paperwork Reduction Act

In accordance with the Paperwork Reduction Act of 1980 (Pub. L. No. 96-511), there are no requirements for information collection associated with this amendment.

National Environmental Policy Act

NHTSA also has analyzed this rulemaking action for the purpose of the National Environmental Policy Act. The agency has determined that implementation of this action will not have any significant impact on the quality of the human environment.

Executive Order 12612 (Federalism)

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

List of Subjects in 49 CFR Part 571

Imports, Motor vehicle safety, Motor vehicles.

PART 571—FEDERAL MOTOR VEHICLE SAFETY STANDARDS

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

1. The authority citation for part 571 of title 49 continues to read as follows:

Authority: 15 U.S.C. 1392; 1407, 1403, 1407, delegation of authority at 49 CFR 1.50.

§ 571.222 [Amended]

2. S4 of § 571.222 is amended by revising the definition of *school bus passenger seat* and adding new definitions of *wheelchair*, *wheelchair occupant restraint anchorage*, *wheelchair securement anchorage*, and *wheelchair securement device*, in alphabetical order to read as follows:

School bus passenger seat means a seat in a school bus, other than the driver's seat.

Wheelchair means a wheeled seat frame for the support and conveyance of a physically disabled person, comprised of at least a frame, seat, and wheels.

Wheelchair occupant restraint anchorage means the provision for transferring wheelchair occupant restraint system loads to the vehicle structure.

Wheelchair securement anchorage means the provision for transferring wheelchair securement device loads to the vehicle structure.

Wheelchair securement device means a strap, webbing or other device used for securing a wheelchair to the school bus, including all necessary buckles and other fasteners.

3. New sections 5.4 through S5.4.4(b) are added to § 571.222 to read as follows:

S5.4 Each school bus having one or more locations designed for carrying a person seated in a wheelchair shall comply with S5.4.1 through S5.4.4 at each such wheelchair location.

S5.4.1 *Wheelchair securement anchorages*. Each wheelchair location shall have not less than four wheelchair securement anchorages complying with S5.4.1.1 through S5.4.1.3.

S5.4.1.1 Each wheelchair securement anchorage shall have a wheelchair securement device complying with S5.4.2 attached to it.

S5.4.1.2 The wheelchair securement anchorages at each wheelchair location shall be situated so that—

(a) A wheelchair can be secured in a forward-facing position.

(b) The wheelchair can be secured by wheelchair securement devices at two locations in the front and two locations in the rear.

(c) The front wheel of a three-wheeled wheelchair can be secured.

S5.4.1.3 Each wheelchair securement anchorage shall be capable of withstanding a force of 13,344 Newtons applied as specified in paragraphs (a) through (d) of this section. When more than one securement device share a common anchorage, the anchorage shall be capable of withstanding a force of 13,344 Newtons multiplied by the number of securement devices sharing that anchorage.

(a) The initial application force shall be applied at an angle of not less than 30 degrees, but not more than 60 degrees, measured from the horizontal. (See Figure 4.)

(b) The horizontal projection of the force direction shall be within a horizontal arc of ±45 degrees relative to a longitudinal line which has its origin at the anchorage location and projects rearward for an anchorage whose wheelchair securement device is intended to secure the front of the wheelchair and forward for an anchorage whose wheelchair securement device is intended to secure the rear of the wheelchair. (See Figure 4.)

(c) The force shall be applied at the onset rate of not more than 133,440 Newtons per second.

(d) The 13,344 Newton force shall be attained in not more than 30 seconds and shall be maintained for 10 seconds.

S5.4.2 *Wheelchair securement devices*. Each wheelchair securement device shall—

(a) If incorporating webbing or a strap—

(1) Comply with the requirements for Type 1 safety belt systems in S4.2, S4.3,

2997.6

and S4.4(a) of FMVSS No. 209, *Seat Belt Assemblies*; and

(2) Provide a means of adjustment to remove slack from the device.

(b) If not incorporating webbing or a strap, limit movement of the wheelchair through either the equipment design or a means of adjustment.

S5.4.3 Wheelchair occupant restraint anchorages.

S5.4.3.1 Each wheelchair location shall have:

(a) Not less than one anchorage for the upper end of the upper torso restraint; and

(b) Not less than two floor anchorages for wheelchair occupant pelvic and upper torso restraint.

S5.4.3.2 Each wheelchair occupant restraint floor anchorage shall be capable of withstanding a force of 13,344 Newtons applied as specified in paragraphs (a) through (d). When more than one wheelchair occupant restraint share a common anchorage, the anchorage shall be capable of withstanding a force of 13,344 Newtons multiplied by the number of occupant restraints sharing that anchorage.

(a) The initial application force shall be applied at an angle of not less than 45 degrees, but not more than 80 degrees,

measured from the horizontal. (See Figure 5.)

(b) The horizontal projection of the force direction shall be within a horizontal arc of ± 45 degrees relative to a longitudinal line which has its origin at the anchorage and projects forward. (See Figure 5.)

(c) The force shall be applied at an onset rate of not more than 133,440 Newtons per second.

(d) The 13,344 Newton force shall be attained in not more than 30 seconds, and shall be maintained for 10 seconds.

(e) When a wheelchair securement device and an occupant restraint share a common anchorage, including occupant restraint designs that attach the occupant restraint to the securement device or the wheelchair, the loads specified by S5.4.1.3 and S5.4.3.2 shall be applied simultaneously, under the conditions specified in S5.4.3.2 (a) and (b). (See Figures 6.)

S5.4.3.3 Each anchorage for a wheelchair occupant upper torso restraint shall be capable of withstanding a force of 6,672 Newtons applied as specified in paragraphs (a) through (d).

(a) The initial application force shall be applied at a vertical angle of not less

than zero degrees, but not more than 40 degrees, below a horizontal plane which passes through the anchorage. (See Figure 7.)

(b) The projection of the force direction onto the horizontal plane shall be within zero degrees and 45 degrees as measured from a longitudinal line with its origin at the anchorage and projecting forward. (See Figure 7.)

(c) The force shall be applied at the onset rate of not more than 66,720 Newtons per second.

(d) The 6,672 Newton force shall be attained in not more than 30 seconds, and shall be maintained for 10 seconds.

S5.4.4 Wheelchair occupant restraints.

(a) Each wheelchair location shall have wheelchair occupant pelvic and upper torso restraints attached to the anchorages required by S5.4.3.

(b) Each wheelchair occupant restraint shall comply with the requirements for Type 2 safety belt systems in S4.2, S4.3, and S4.4(b) of FMVSS No. 209, *Seat Belt Assemblies*.

4. New Figures 4 through 7 are added, to appear at the end of the text of § 571.222, as follows:

BILLING CODE 4910-59-M

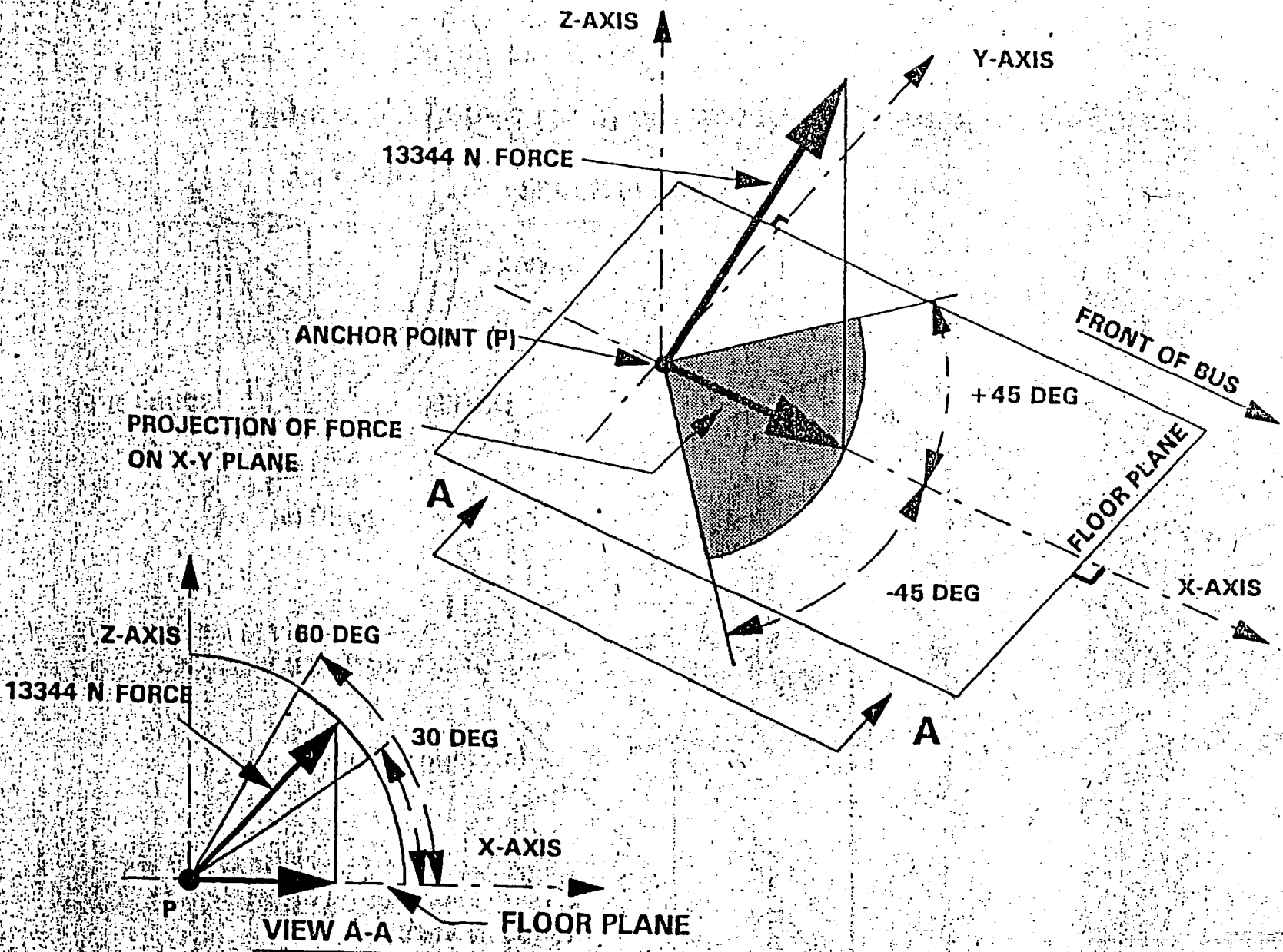


Figure 4. Wheelchair Securement Anchorage Loading Direction (Rear Anchorage Shown).

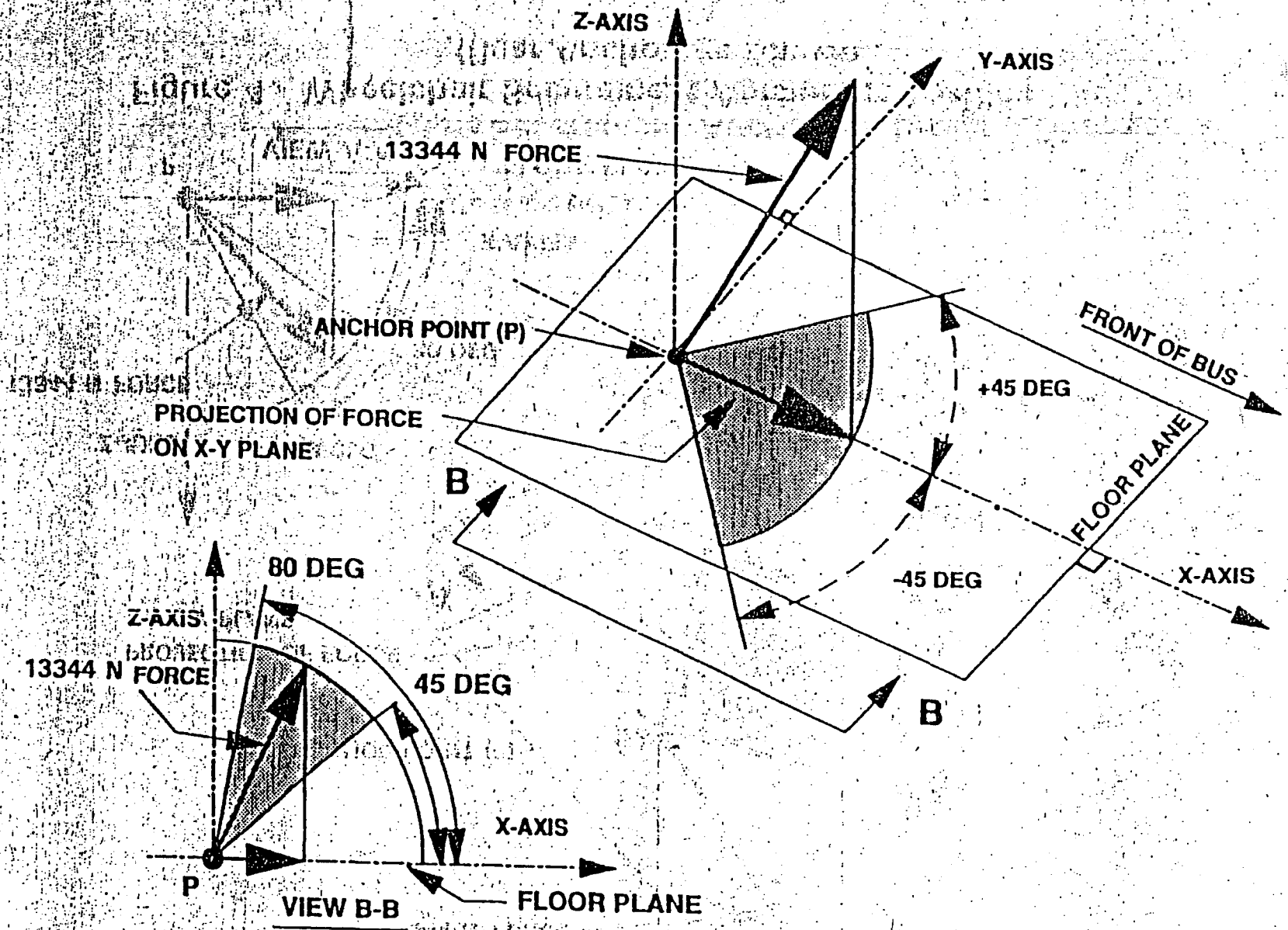


Figure 5. Pelvic Restraint Anchorage Loading Direction

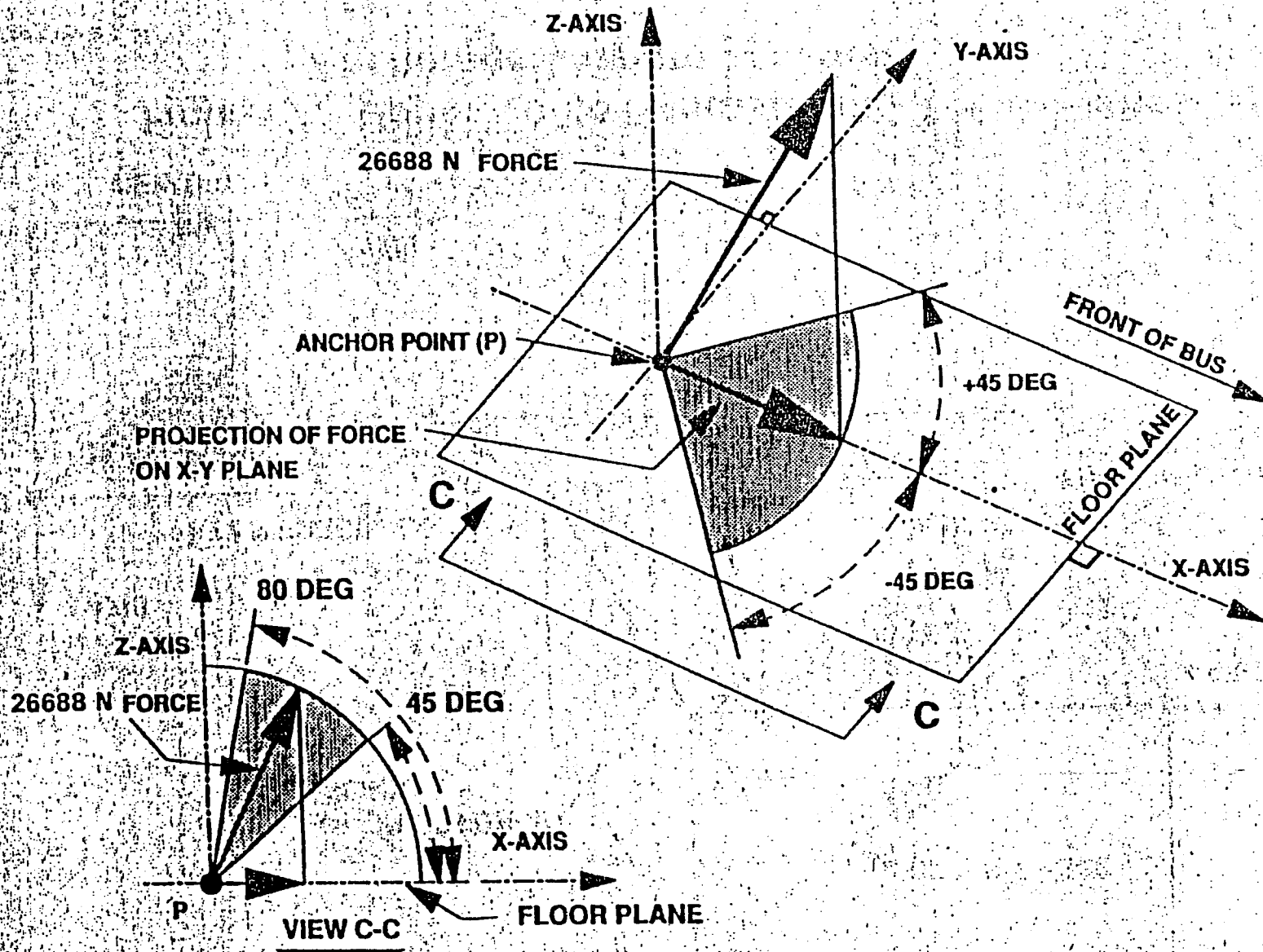


Figure 6. Pelvic Restraint and Wheelchair Securement
Common Anchorage Loading Direction
(Rear Direction Only)

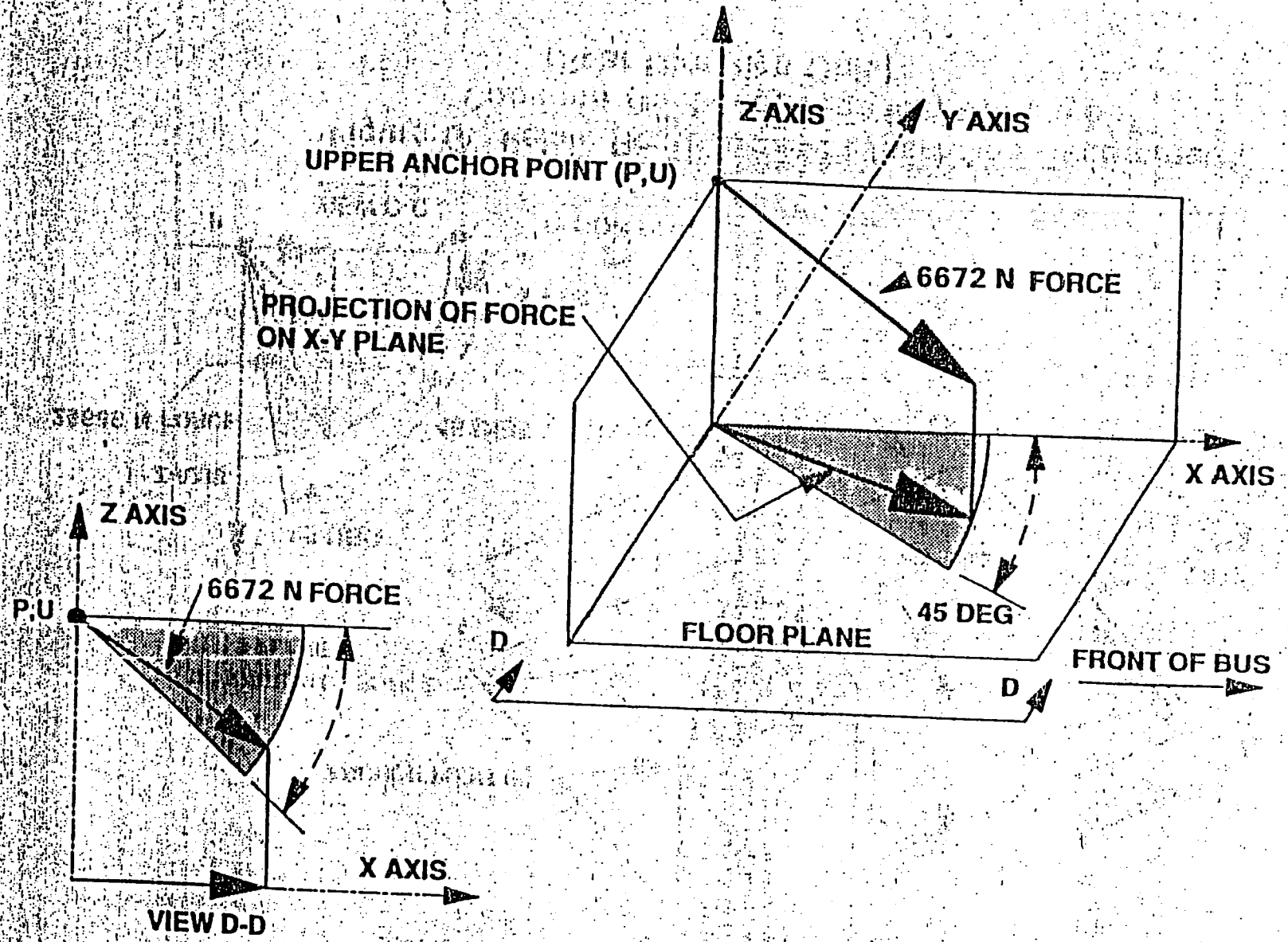


Figure 7. Upper Torso Restraint and Torso Harness Anchorage Loading Location

BILLING CODE 4910-60-C



BLUE BIRD

DATE: 4.13.73
REQUISITIONER: JWS
REQ'D COMPLETION DATE: 9.30.73
CARD NO: BB 2181
EST. HOURS: _____

ENGINEERING SERVICES TEST REQUEST

TEST SUBJECT: CGN 110478 FMVSS 228 W/airbrake

PURPOSE OF TEST: to check test exist. criteria
to FMVSS requirements
see other copy for test instr. card

PART DESCRIPTION: 100%

MOCK-UP/BODY/CHASSIS NO.: _____ OPTION NO.: _____

DIAGRAM NUMBER: _____

TEST PROCEDURE

TYPE OF TEST- FMVSS CERTIFICATION: _____

DEVELOPMENT TEST: _____

FATIGUE/LIFE TEST: _____

SPECIAL: _____

NO. SAMPLES TO TEST: _____

REQUESTOR OBSERVATION REQ'D: _____

SPECIAL EQUIPMENT REQ'D: _____

PART DISPOSAL

RETURN TO REQUESTOR: _____

RETURN TO PRODUCTION: _____

STORE UNTIL: _____

SCRAP: _____

OTHER: _____

PART #'S OF COMPONENTS NECESSARY FOR TEST:

DESCRIPTION	P/N	DESCRIPTION	P/N

SPECIAL INSTRUCTIONS: _____



BLUE BIRD

TEST DATE: 10-17-94 / 10-27-94

TECHNICIAN: Pep Newberry

REQUESTOR: Jim Swift

CARD NUMBER: FSP 2305

TEST SUBJECT: Ortho-Safe Flanged "L" Track For Wheelchair Anchorage
FMVSS 222 Compliance

TEST RESULTS: The Ortho-Safe Flanged L-Track passed FMVSS 222 wheelchair securement and occupant restraint requirements when fastened to the floor on four inch centers. Two Ancra anchorages were used, one for the occupant and one for the wheelchair. Each Ancra anchorage was pulled to 3000 lbs. plus a 10 percent safety margin.

TEST SETUP: The Ortho-Safe Flanged L-Track was installed in a mock-up of an actual bus. The track was fastened to the floor on four inch centers. Rectangular 11 gage washers (1 X 1.5 inches) were used under the floor in mounting the track down. The "L" fixture was mounted in the mock-up. Two hydraulic cylinders were attached to the "L" fixture and the other ends of the cylinders were attached to the track by means of the Ancra anchorages, which were located so as to impart the greatest stress to the track. The cylinders were mounted in such a way that one was oriented 80 degrees from the horizontal plane of the floor (occupant) and the other 60 degrees from the horizontal plane of the floor (wheelchair). These angles were determined to impart the greatest stress to the track.

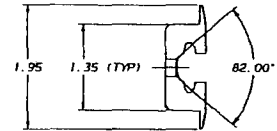
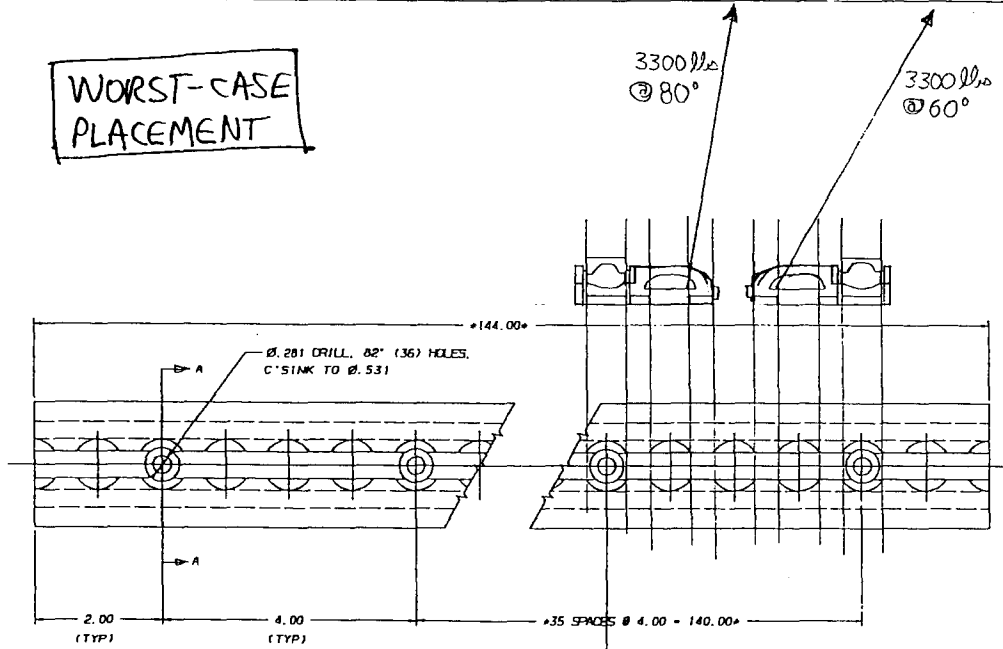
TEST PROCEDURE: The track was pulled per FMVSS plus a 10 percent safety margin. Load/cells were used to measure the load being applied to the track and the VE 20's were used to read the load. The track was pulled until the desired load was reached in under 30 seconds, and then held for a minimum of ten seconds.

BLUE BIRD BODY COMPANY

P.O. Box 937 • Fort Valley, Georgia 31030 • (912) 825-2021

1788264 TRACK, L. FLANGED, SEAT/WC, 4" CENTERS, 144.00 11275000AWJS (11/07/94) JWSWIFT.

WORST-CASE
PLACEMENT



SECTION A-A

BOLT THROUGH
AUXILIARY
CROSS MEMBER

1788264 TRACK, L. FLANGED, SEAT/WC, 4" CENTERS, 144.00
MATERIAL: 7075 ALUMINUM
CUT LENGTH: 144.00"

MATERIAL:	7075 ALUMINUM	REV.		DATE	
FLAT SIZE:		REV.	001	DATE	
FINISH:	COLOR OR TYPE	REV.	002	DATE	
PAINT	<input type="checkbox"/>	REV.	003	DATE	
OTHER	<input type="checkbox"/>	REV.	004	DATE	
TOLERANCE IN ALL DIMENSIONS IS .03 UNLESS OTHERWISE SPECIFIED.	DO NOT SCALE	REV.	005	DATE	
PROJECT NUMBER		REV.	006	DATE	
11275 BLUE BIRD CORPORATION FORT VALLEY, GEORGIA, U.S.A.		REV.	007	DATE	
TRACK, L. FLANGED, SEAT/WC, 4" CENTERS, 144.00		REV.	008	DATE	
DR.	JWS	REV.	009	DATE	
CHK.	JWS	REV.	010	DATE	
C 1788264		REV.	011	DATE	



BLUE BIRD

DATE: 9-6-94
REQUISITIONER: ctws con 11275
REQ'D COMPLETION DATE: _____
CARD NO: FSP 2305
EST. HOURS: 100

ENGINEERING SERVICES TEST REQUEST

TEST SUBJECT: L track for seat belt/wheelchair

PURPOSE OF TEST: anchorage - FMVSS 210/222
compliance

PART DESCRIPTION:

MOCK -UP/BODY/CHASSIS NO.: _____ OPTION NO.: _____

DIAGRAM NUMBER: _____

TEST PROCEDURE

TYPE OF TEST- FMVSS CERTIFICATION: _____

DEVELOPMENT TEST: _____

FATIGUE/LIFE TEST: _____

SPECIAL: _____

NO. SAMPLES TO TEST: _____

REQUESTOR OBSERVATION REQ'D: _____

SPECIAL EQUIPMENT REQ'D: _____

PART DISPOSAL

RETURN TO REQUESTOR: _____

RETURN TO PRODUCTION: _____

STORE UNTIL: _____

SCRAP: _____

OTHER: _____

PART #'S OF COMPONENTS NECESSARY FOR TEST:

DESCRIPTION	P/N	DESCRIPTION	P/N
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SPECIAL INSTRUCTIONS:



TEST DATE: 3-25-98
TECHNICIAN: Johnny Youngblood
REQUESTOR: Steve Prince
CARD NUMBER: AFC 2656

TEST SUBJECT: FMVSS 222 / 210 Compliance -- Ancra Flanged "L" Track / Threaded stud assembly.

TEST RESULTS: The Ancra Flanged L-Track (#48967) withstood two simultaneous adjacent 3300 lb. loads applied per FMVSS 222 wheelchair securement and occupant restraint requirements when fastened to the floor on four inch centers. The track and the Ancra threaded stud assembly (#49184) withstood 5500 lb. loads applied per FMVSS 210 requirements.

TEST SETUP: For the FMVSS 222 test the Ancra flanged L-Track was installed in a mockup of an actual bus. The track was fastened to the floor on 4 inch centers. Rectangular 11 gage washers (1 x 1.5 inches) were used under the floor when mounting the track. The "L" fixture was mounted in the mockup. Hydraulic cylinders were attached to the "L" fixture on one end and to the track on the other. Ancra anchorages were used to connect the cylinders to the track. The cylinders were mounted in such a way that one was oriented 80 degrees from the horizontal plane of the floor (occupant) and the other 60 degrees from the horizontal plane of the floor (wheelchair). These angles were determined to impart the greatest stress to the track. Two seatbelt pulls were made for the FMVSS 210 test. The 39 inch track mounted seats were installed in the mockup using the Ancra threaded stud assemblies. On the wall side pull the seat was mounted in a weak position with the rear leg located in the center of the floor panel. On the aisle side pull the seat was mounted in a strong position with the rear leg over a floor joint.

TEST PROCEDURE: The track was pulled using FMVSS 222 procedures and the seatbelt pulls were made using FMVSS 210 procedures. Load cells and VE20 digital readouts were used to monitor loads being applied.

NOTE: Photographs were taken using a digital camera.



BLUE BIRD

TEST DATE: 10-17-94 / 10-27-94

TECHNICIAN: Pep Newberry

REQUESTOR: Jim Swift

CARD NUMBER: FSP 2305A

TEST SUBJECT: Kinedyne Flanged "L" Track For Wheelchair Anchorage
FMVSS 222 Compliance

TEST RESULTS: The Kinedyne flanged L-track passed 222 wheelchair securement and occupant restraint requirements when fastened to the floor on four inch centers. One Ancra anchorage was used for both occupant and wheelchair restraint / securement and was pulled to 6000 lbs. plus a 10 percent safety margin.

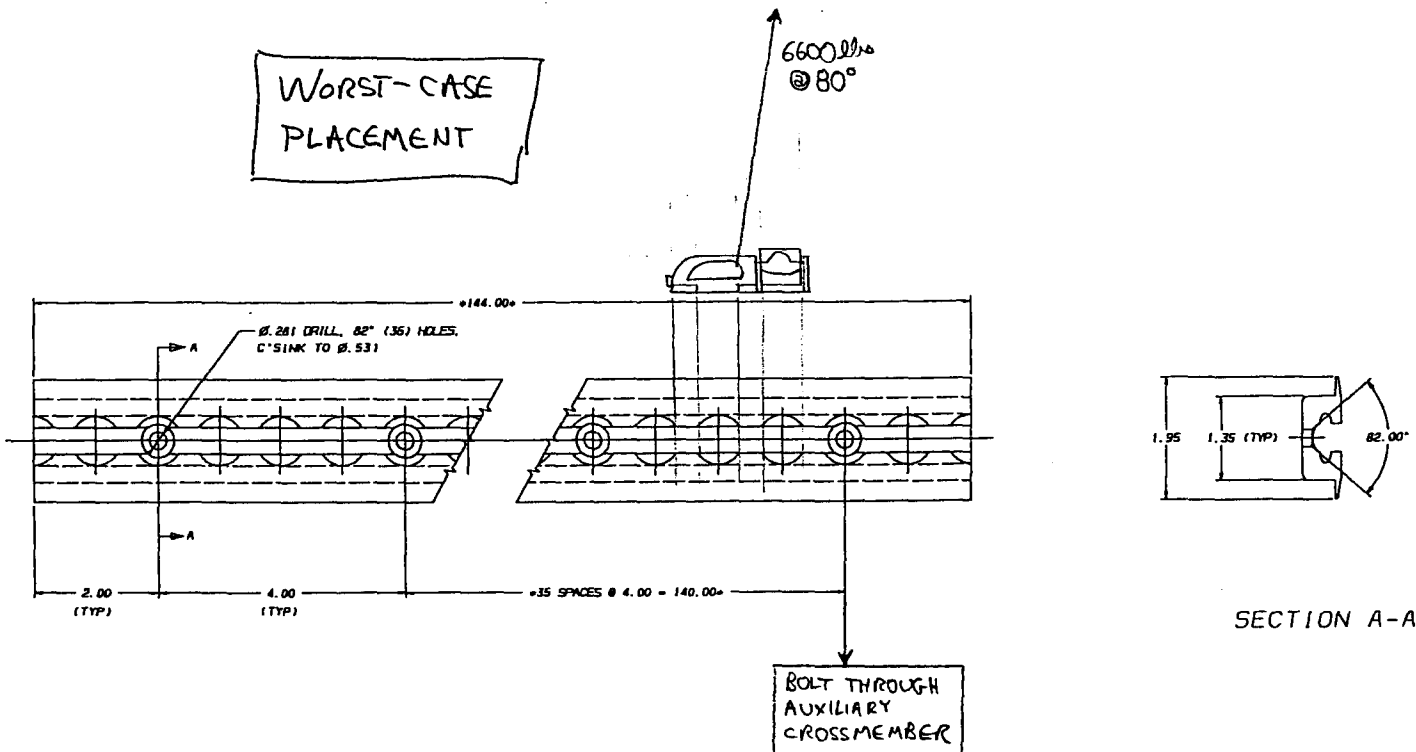
TEST SETUP: The Kinedyne flanged L-track was installed in a mock-up of an actual bus. The track was fastened to the floor on four inch centers. Rectangular 11 gage washers (1 X 1.5 inches) were used under the floor in mounting the track down. The "L" fixture was mounted in the mock-up. A hydraulic cylinder was attached to the "L" fixture and its other end was attached to the track by means of an Ancra anchorage. The cylinder was oriented 80 degrees from the horizontal plane of the floor. The cylinder mounting and orientation was such as to impart the greatest stress to the track.

TEST PROCEDURE: The track was pulled per FMVSS 222 plus a 10 percent safety margin. A load cell was used to measure the load being applied to the track and a VE 20 was used to read the load. The track was pulled until the desired load was reached in under 30 seconds and then held for a minimum of ten seconds.

BLUE BIRD BODY COMPANY

P.O. Box 937 • Fort Valley, Georgia 31030 • (912) 825-2021

1788264 TRACK, L, FLANGED, SEAT/WC, 4" CENTERS, 144.00 11275*000AWJS (11/07/94) JWSWIFT.



1788264 TRACK, L, FLANGED, SEAT/WC, 4" CENTERS, 144.00
 MATERIAL: 7075 ALUMINUM
 CUT LENGTH: 144.00"

MATERIAL:	7075 ALUMINUM	REV		DATE	
PLAT SIZE:		REV		DATE	
FINISH:	COLOR OR TYPE	REV		DATE	
DRY	<input checked="" type="checkbox"/> PAINT <input type="checkbox"/>	REV		DATE	
POW	<input type="checkbox"/> OTHER <input type="checkbox"/>	REV		DATE	
TELEPHONE OR E-MAIL ADDRESS	62	REV		DATE	
BY	62	REV		DATE	
DATE	11/2/94	REV		DATE	
SCALE		REV		DATE	
MANUFACTURER'S MARK		REV		DATE	
PART NO. 1788264		REV		DATE	
11275		BLUE BIRD CORPORATION		FULL	
PORT VALLEY, GEORGIA, U.S.A.					
TRACK, L, FLANGED, SEAT/WC, 4" CENTERS					
144.00					
C 1788264					

RELBAT FRAME 1 SEPTEMBER 01, 1994 12:00:10



BLUE BIRD

DATE: 9-6-94
REQUISITIONER: CTWS CON 11275
REQ'D COMPLETION DATE: _____
CARD NO: ESP 2305A
EST. HOURS: 100

ENGINEERING SERVICES TEST REQUEST

TEST SUBJECT: L track for seat belt/wheelchair

PURPOSE OF TEST: anchorage - FMVSS 210/222
compliance

PART DESCRIPTION:

MOCK -UP/BODY/CHASSIS NO.: _____ OPTION NO.: _____

DIAGRAM NUMBER: _____

TEST PROCEDURE

TYPE OF TEST- FMVSS CERTIFICATION: _____
DEVELOPMENT TEST: _____
FATIGUE/LIFE TEST: _____
SPECIAL: _____
NO. SAMPLES TO TEST: _____
REQUESTOR OBSERVATION REQ'D: _____
SPECIAL EQUIPMENT REQ'D: _____

PART DISPOSAL

RETURN TO REQUESTOR: _____
RETURN TO PRODUCTION: _____
STORE UNTIL: _____
SCRAP: _____
OTHER: _____

PART #'S OF COMPONENTS NECESSARY FOR TEST:

DESCRIPTION	P/N	DESCRIPTION	P/N
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SPECIAL INSTRUCTIONS: _____