NEBRASKA TRACTOR TEST LABORATORY
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OECD APPROVAL NUMBER: 4/1 239
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REPORT OF TEST IN ACCORDANCE WITH OECD STANDARD CODE 4
CASE IH AND NEW HOLLAND CCHPS-CAB-I
NEBRASKA TEST # 1017
STATIC TEST

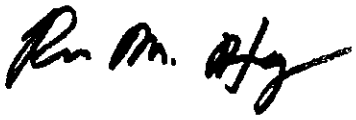
FOR TRACTOR MODELS:
CASE IH MAGNUM 235, MAGNUM 260, MAGNUM 290, MAGNUM 315 and MAGNUM 340 SERIES MODELS
NEW HOLLAND T8.275, T8.300, T8.330, T8.360 and T8.390 SERIES MODELS

Manufactured by:	CNH America LLC, 700 State St., Racine, WI 53404, USA
Submitted for Test by:	CNH America LLC
Make of the Protective Structure:	Case IH and New Holland
Model of Protective Structure:	CCHPS-CAB-I
Type of Protective Structure:	Cab with integrated frame
Date, Location of tests and Code	May 25, 2010 CNH America LLC, 6900 Veterans Blvd, Burr Ridge, IL 60527, USA OECD Code 4, version 2010

This test report provides the results of tests conducted in accordance with the OECD Standard Test Codes for the Official Testing of Roll-Over Protective Structures mounted on Agricultural Tractors (Static Test) - Code 4, version 2010.

Test Location: CNH America LLC, Burr Ridge, IL 60521, USA
Supervised by: Dr. Roger M. Hoy, Nebraska Tractor Test Laboratory
Lincoln, NE, USA

This report has been approved by the OECD Coordinating Centre in Italy on 15 December 2010 with the OECD Approval No. 4/1 239.



Dr. Roger M. Hoy
Director, Nebraska Tractor Test Lab

Date: January 21, 2011

NEBRASKA TRACTOR TEST LABORATORY
UNIVERSITY OF NEBRASKA, LINCOLN, NEBRASKA USA

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1. SPECIFICATIONS OF TRACTOR (CHASSIS)

1.1 Identification of tractor to which the protective structure is fitted for the test

1.1.1 - Case IH
- Magnum with Isolated Cab
- 4WD

1.1.2 Numbers
- Prototype

1.1.3 Other Specifications:
- Full Powershift Transmission 18F x 4R, 19F x 4R, 23F x 4R
- Speed Versions: 40 kph and 50 kph
- Isolated Cab

1.2 Mass of heaviest unballasted tractor with structure and without driver

Front	4590 kg
Rear	6880 kg
Total	11470 kg

- Mass used for calculating crushing forces and energies: 11500 kg

1.3 Minimum track and tyre sizes

	Minimum Track	Tyre Sizes
Front	1525 mm	480/70R30
Rear	1702 mm	620/70R42

1.4 Tractor seat

- Tractor with a reversible driver's position (reversible seat and steering wheel): No
- Make/Model/Type of Seat:
(1) Sears SST Seat Top with Air 2000 Suspension (Approval Number e11-1296)
(2) Sears SST Seat Top with Air 2000 Semi-Active Suspension (Approval Number e11-2051)

Both seats have the same SIP position that was used in the test for this report.

- Position of the Seat Index Point (SIP): On the center plane of the tractor. (See Appendix A-1 & A-6)
- Seat Belt Anchorage: M12x1.75 Class 10.9 Bolt each side
- Seat Anchorage:
4 M8x1.25 Projection Weld Studs Class 8.8. Seat to HVAC Box
8 M8x1.25 Flange Head Tapping Screws killed steel wire per ANSI B18.6.5M. HVAC Box to Cab Floor
8x1.25 Weld Nuts SAE/C1010 Low Carbon Steel. HVAC Box to Cab Floor
(See Appendix, A-2 & A-3 *Details of Seat Anchorage*)
-Seat mounting on the tractor: Seat Bolts to HVAC Box. HVAC Box bolts to steel cab floor. The HVAC Box consists of a welded steel structure(438 x529 x 166mm) manufactured from 3 mm fully killed low carbon sheet steel equivalent to ASTM A1008 CS Type B.

-Other seat components: RH Control Console
-Seat operating position for the test: Test performed in fully rearward and upward positions with the suspension blocked in the mid-travel position.

a_v = 77.5 mm
a_h = 100. mm

Masses used for calculating the loads

Seat	Sears SST Seat Top with Air 2000 Suspension (Heaviest seat configuration)
Components	Mass (kg)
Driver seat:	55
Seat belt assembly:	13
Other seat components:	28
Total:	96

2. SPECIFICATIONS OF PROTECTIVE STRUCTURE

2.1 Photographs from side and rear showing mounting details including mudguards

(see Appendix A-4 & A-5)

2.2 General arrangement drawing of the side and the rear of the structure including position of the seat index points (SIP) and details of mountings. The main dimensions must figure on the drawings, including external dimensions of tractor with protective structure fitted and main interior dimensions.

(see Appendix A-6, A-7, and A-8)

2.3 Brief description of the protective structure comprising:

The protective structure is made of fine-grained steel. Structural tubing made of CNH MAT1145 is welded to other structural tubing or sheet metal constructed of CNH MAT1145. The structure is bolted to ductile castings at each of the four corners using rubber isolators. The castings bolt directly to the transmission. Details of the mountings can be seen in Appendix A-6. Photographs of the Isolator Mounting Details are included Appendices A-9 & A-10.

The front glass surrounds three sides of the steering column and instrument console and provides an unobstructed view forward. There is one access door on the left side. The rear window can be opened, and is a means of escape. Each cab is equipped with an emergency hammer for breaking the side glass as a third means of escape.

The interior of the cab has plastic trim padded with sound absorbent materials that covers the left hand and right hand rear wheel wells and rear cab wall. Injection molded trim pieces cover the four corner posts and the left hand B-post. The roof is made of molded poly-urethane and the headliner is constructed of compressed cotton. The cab is provided with heating and air conditioning systems.

Additional frame: No

2.4 Tiltable or not tiltable / Folding or not folding structure

The CCHPS-CAB-I is not tiltable nor does it fold.

2.5	**DIMENSIONS**	**[mm]**
2.5.1	Height of roof members above seat index point	884
2.5.2	Height of roof members above tractor footplate	1418
2.5.3	Interior width of protective structure 810 + a_v mm above the SIP	1359
2.5.4	Interior width of protective structure vertically above the SIP at the level of the center of the steering wheel	1615
2.5.5	Distance from the centre of the steering wheel to the right side of the protective structure	560
2.5.6	Distance from the centre of the steering wheel to the left side of the protective structure	638
2.5.7	Minimum distance from the steering wheel rim to the protective structure	435
2.5.8	Width of doorways	
	-at the top:	665
	-in the middle:	909
	-at the bottom:	482
2.5.9	Height of doorways	
	- above foot platform	1404
	- above the highest mounting step	1677
	- above the lowest mounting step	2686
2.5.10	Overall height of tractor with protective structure fitted	3365
2.5.11	Overall width of protective structure	1720
	- with mud guards	2550
2.5.12	Horizontal distance from the SIP to the rear of the protective structure at a height of 810 + a_v mm above the SIP	492

2.6 DETAILS OF MATERIALS USED IN THE CONSTRUCTION OF THE PROTECTIVE STRUCTURE AND SPECIFICATIONS OF STEELS USED

Steel specifications shall be in conformity with ISO 630:1995; Amd: 2003.

2.6.1 Cab Structure: (parts - material - sizes)

Part Description	Material Thickness (mm)	Section Size (mm)	Material	Material Specification
Corner Vertical Posts	4	99 X 99 "Arrowhead"	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Four Upper Tubes	6	60 X 60 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Front Lower Cross Tube	6	60 X 60 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Rear Lower Cross Tube	4	60 X 60 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Left and Right Mounting Rails	4	60 X 60 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Rear Cross Tube Supports	4	60 X 60 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Diagonal Floor Tubes	4	60 X 40 rectangular	Structural Steel Tubing with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Side Channels	2.4	Variable X 40 mm flanges	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Four Top Corner Gussets	4	N/A	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Front Lower Gussets	4	N/A	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Rear Cross Tube Gussets	9	N/A	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Wheel well Panels	2.2	N/A	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Two Side Channel Gussets	3	N/A	High Strength Low Allow Steel with Low Temperature Controlled Toughness	CNH MAT1145 Grade A
Left Hand B-post	2	65 X 40 mm flanges	Low Carbon Sheet Steel (fully killed)	CNH MAT1010 or MAT1011
Two Floor side Channels	2	15 mm flange X 60 X 40 mm flange	Low Carbon Sheet Steel (fully killed)	CNH MAT1010 or MAT1011
Floor Panels	3	N/A	Low Carbon Sheet Steel (fully killed)	CNH MAT1010 or MAT1011

*CNH MAT1145 Grade A is a CNH material specification that covers the CNH requirements for steel products produced with controlled toughness properties for low temperature impact performance suitable for the manufacture of roll over protective structures (ROPS) and falling objects protective structures (FOPS). Products covered are high strength sheet, strip, bar, plate and welded or seamless structural tubing.
*CNH MAT1010 Grade A and MAT1011 Grade A are material specifications for fully killed low carbon cold rolled and hot rolled sheet steel, respectively. MAT1010 is equivalent to ASTM A1008 CS Type B. MAT1011 is equivalent to ASTM A1011 CS Type B.

Cab Structure Steel Conformity with ISO 630

CNH Steel Designation	Corresponding ISO630 Designation	Yield Stress / ISO630 Value (in MPA)	Tensile Strength / ISO630 Value (in MPA)	% Elongation / ISO630 Value	-20°C V-Notch Impact Test / ISO630 Value
CNH MAT1145 Grade A	E 355 Grade D	345 / 355	485 / 490	20 / 22	27.5 / 27
CNH Mat 1010 or 1011 fully killed	E 185	170 / 185	290 / 300	24 / 18	- / -

2.6.2 Mountings: (parts - material - sizes)

Part Description	Material Thickness (mm)	Material	Material Specification
Front Mounts	Variable	Ductile Iron	SAE J434, Grade D5506
Rear Mounts	Variable	Ductile Iron	SAE J434, Grade D5506

2.6.3 Assembly and mounting bolts: (parts - sizes)

Bolt	Description	Grade	Quantity/Tractor
Rear Mount to Axle Carriers	M16 X 50	Grade 10.9	8
Cab to Rear Mounts	M20 X 170	Grade 10.9	2
Front Mounts to Transmission	M16 X 55	Grade 10.9	10
Cab to Front Mounts	M20 X 170	Grade 10.9	2

2.6.4 Roof: (parts - material - sizes)

Structural foam polyurethane , variable thickness

2.6.5 Cladding: (parts - material - sizes)

Fenders and rear cab panel are nonstructural, made of urethane plastic, 3-9 mm thick
Cab skirts are nonstructural, and made of fiberglass reinforced plastic, 3 mm thick

2.6.6 Glass: (type - grade - sizes)

Door and Rear Window Glass Tempered safety glass – 6 mm thick
Front and Sides Glass is Tempered safety glass – 5 mm thick

3. TEST RESULTS

3.1 Static loading and crushing tests

3.1.1 Condition of Tests

Loading tests were made:

1. to the rear on the right side
2. to the left side

Mass used for calculating impact energies and crushing forces 11500 kg

Energies and forces applied

	Required	Applied
Rear	16100 J	16134 J
Side	20125 J	20235 J
Crushing Force -Rear	230 kN	231.8 kN
Crushing Force -Front	230 kN	232.4 kN

3.1.2 Permanent deflections measured after the tests

3.1.2.1 Permanent deflections of the extremities of the protective structure measured after the tests were:

Rear Forward	Left Side	29	mm
	Right Side	98	mm
Front Forward	Left Side	35	mm
	Right Side	88	mm
Sideways to the Right	Front	140	mm
	Rear	152	mm
Top	Rear Left Side-Down	17	mm
	Rear Right Side-Down	57	mm
	Front Left Side-Down	7	mm
	Front Right Side-Down	57	mm

3.1.2.2 Difference between total instantaneous deflection and residual deflection during sideways loading test (elastic deflection): 198 mm

3.1.3 Curves- Force and Force/Deflection curves derived during the tests are included in Appendix A-11& A-12)

Statement:

The acceptance conditions of these tests relative to the protection of the zone of clearance are fulfilled. The structure is a roll-over protective structure in accordance with the code.

3.2 Cold weather performance (resistance to brittle fracture)

Method used to identify resistance to brittle fracture at reduced temperature:

-All structural ROPS members thicker than 3.0 mm are composed of CNH MAT1145, Grade A. This material specification requires cold temperature performance testing). All ROPS members less than 3.0 mm are composed of fully killed CNH MAT1010 or MAT1011 steel. See Section 2.6 for steel specifications.

Statement:

Examination of material properties, which are listed in section 2.6, shows that the protective structure meets the requirements for cold weather operation.

3.3 Anchorage Performance

3.3.1 Loading in the forward and upward direction

Driver Seat	Seat #1		
GRAVITY FORCE (Fg = seat mass x 9.81) N	REQUIRED FORCE (4450N+4Fg) N	APPLIED FORCE (Mid-Position) N	APPLIED FORCE (Rear-Position) N
942	8218	8344	8335

3.3.2 Loading in the rearward and upward direction

Driver Seat	Seat #1		
GRAVITY FORCE (Fg = seat mass x 9.81) N	REQUIRED FORCE (2225N+2Fg) N	APPLIED FORCE (Mid-Position) N	APPLIED FORCE (Rear-Position) N
942	4109	4155	4717

3.3.3 Curves, drawings and photos

Drawings and/or photos of the seat mounting and anchorages. (See Appendix A-2, A-3)

A copy of the force/deflection curves derived during the tests. (See Appendix B-1, B-2, B-3, B-4)

Statement: During the test, no structural failure or release of seat, seat adjuster mechanism or other locking service occurred. The seat and safety belt anchorage tested fulfill the requirement of the OECD procedure. The testing station certifies that the tested seat is the worst variant among the seats listed below that are identical regarding the make, range and fixing on the protective structure.

(1) Sears SST Seat Top with Air 2000 Suspension (Approval Number e11-1296)
(2) Sears SST Seat Top with Air 2000 Semi-Active Suspension (Approval Number e11-2051)

3.4 Tractor(s) to which the protective structure is fitted

Make	Model	Type	Mass			Tiltable	Wheelbase	Minimum track	
		2/4WD, etc.	Front	Rear	Total			Front	Rear
			kg	kg	kg	Yes/No	mm	mm	mm
Case IH	Magnum 235	4WD	4540	6790	11330	No	3055	1525	1702
Case IH	Magnum 260	4WD	4540	6790	11330	No	3055	1525	1702
Case IH	Magnum 290	4WD	4560	6810	11370	No	3055	1525	1702
Case IH	Magnum 315	4WD	4590	6880	11470	No	3055	1525	1702
Case IH	Magnum 340	4WD	4590	6880	11470	No	3055	1525	1702
New Holland	T8.275	4WD	3970	7360	11330	No	3450	1525	1702
New Holland	T8.300	4WD	3970	7360	11330	No	3450	1525	1702
New Holland	T8.330	4WD	3990	7380	11370	No	3450	1525	1702
New Holland	T8.360	4WD	4020	7450	11470	No	3450	1525	1702
New Holland	T8.390	4WD	4020	7450	11470	No	3450	1525	1702

APPENDIX

PAGE NUMBER	SUBJECT OR DRAWING
A-1	Position of Seat Index Point
A-2	Drawing of Seat installed in tractor
A-3	Details of Seat Anchorage
A-4	New Holland Front/Side View Photo of Protective Structure mounted on tractor
A-5	Case IH Front/Side View Photo of Protective Structure mounted on tractor
A-6	Arrangement Drawing Viewed from the Side and Rear
A-7	Main Cab Dimensions Side View
A-8	Main Cab Dimensions Top and Front View
A-9	Cab Mount Details
A-10	Photograph of Left/Rear Isolator Mounting Detail
A-11	Photograph of Right/Front Isolator Mounting Detail
A-12	Longitudinal load force-deflection diagram
A-13	Lateral load Force-Deflection diagram
B-1	Forward Seat Belt load – seat in mid position
B-2	Rearward Seat Belt load –seat in mid position
B-3	Forward Seat Belt load – seat in worst case position
B-4	Rearward Seat Belt load – seat in worst case position

Figure A-1: Seat Index Point (SIP)

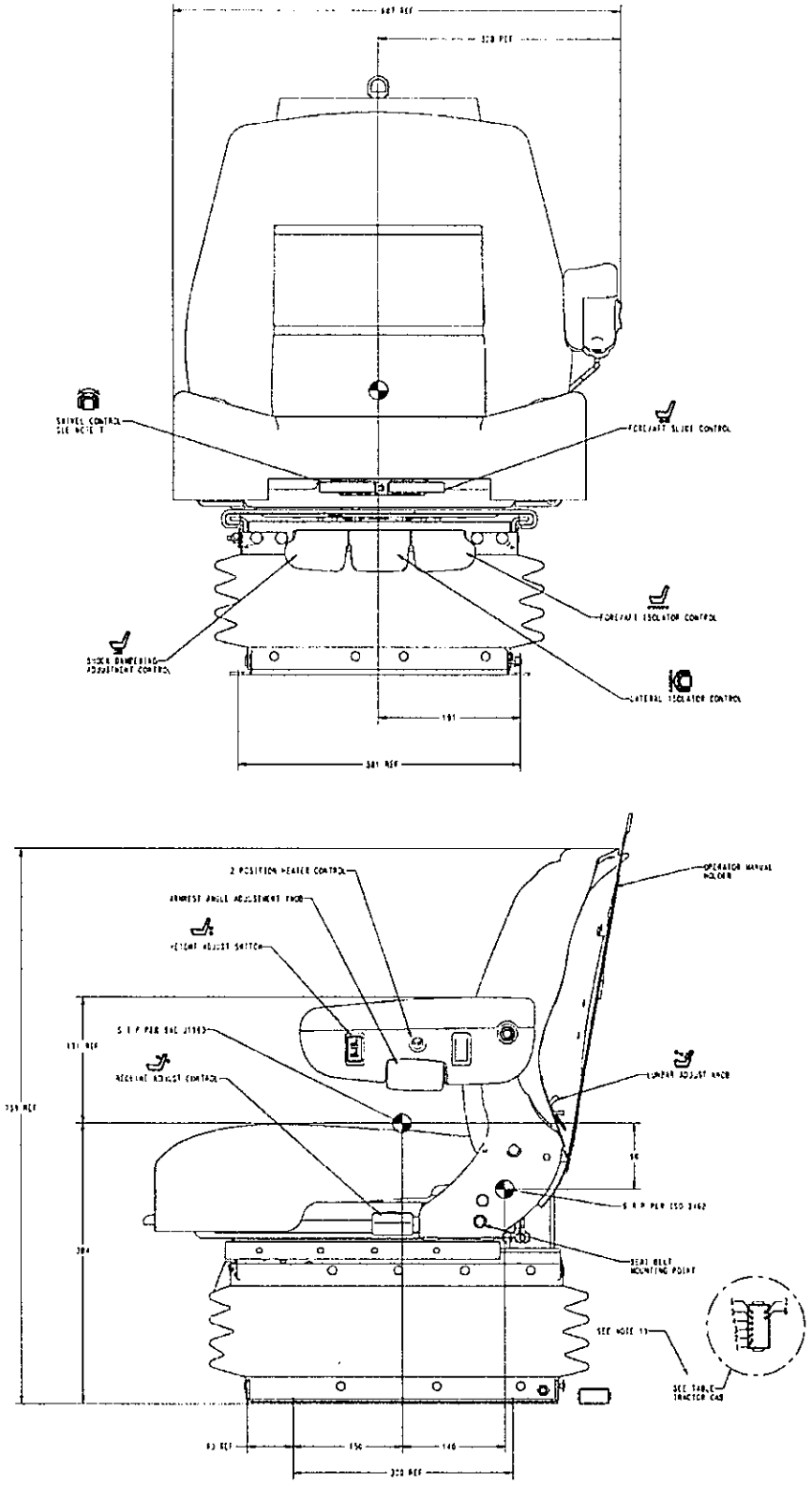


Figure A-2: Seat Installed on Tractor

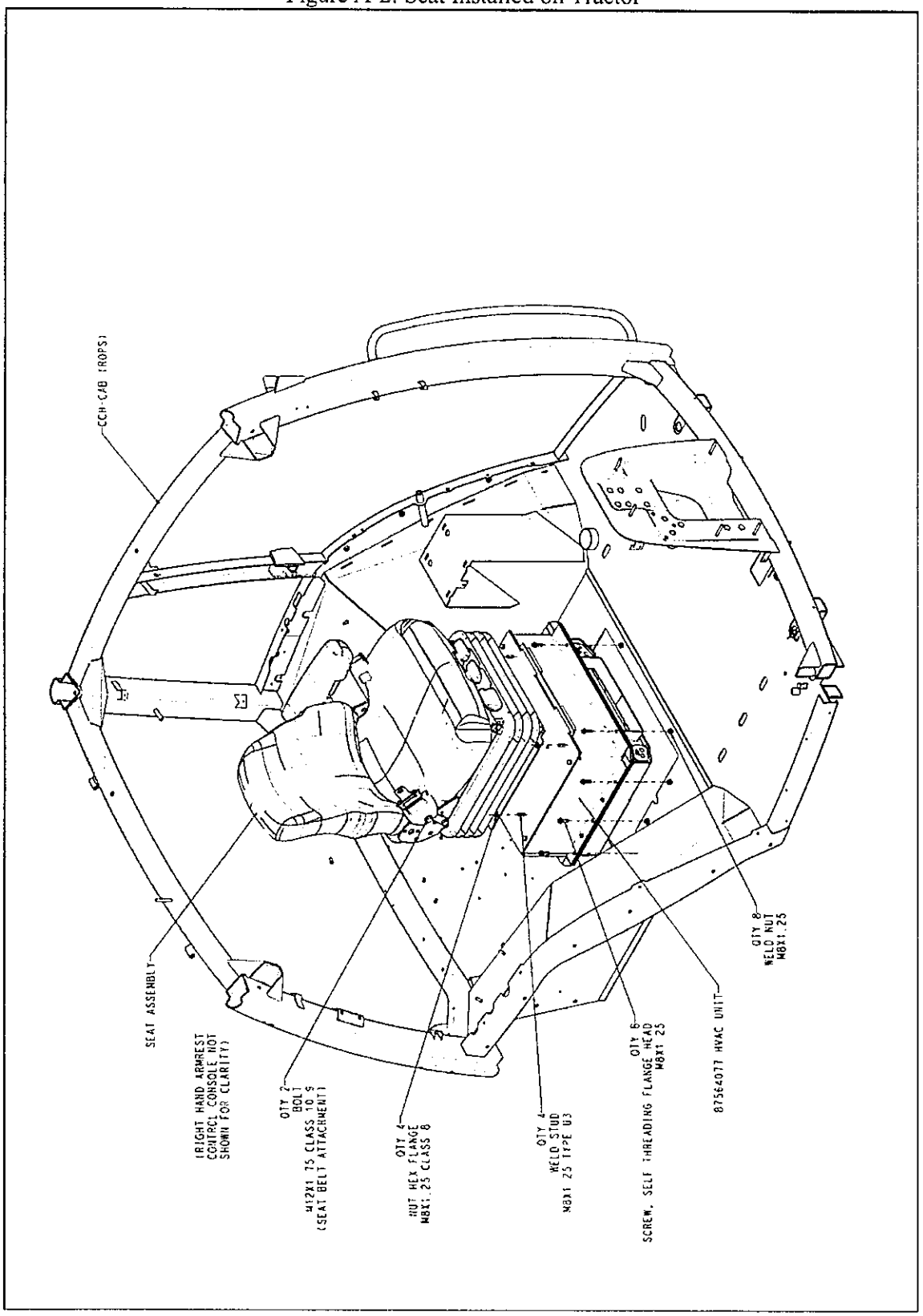


Figure A-3: Details of Seat Anchorage

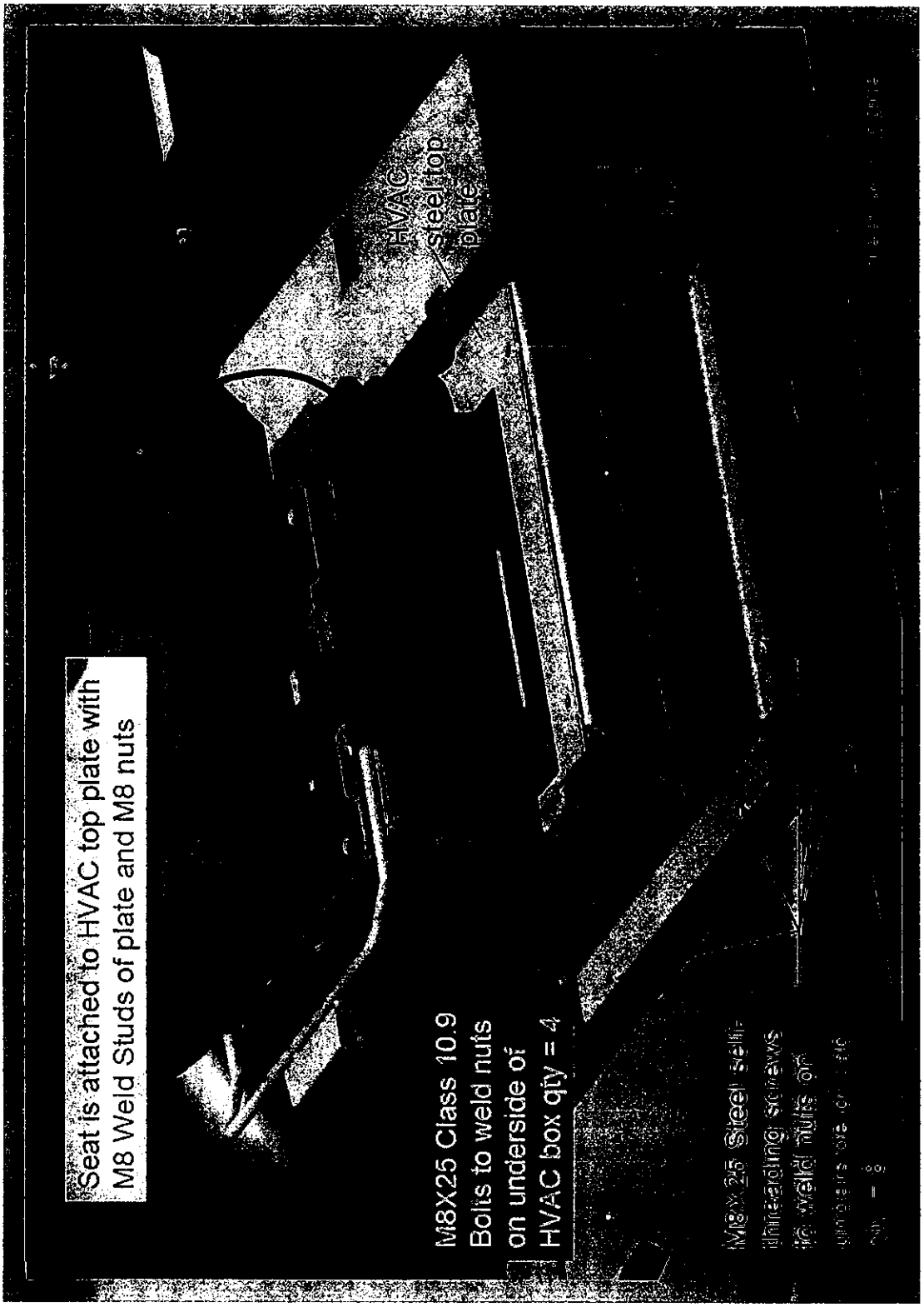


Figure A-4: New Holland Front/Side View showing mudguards

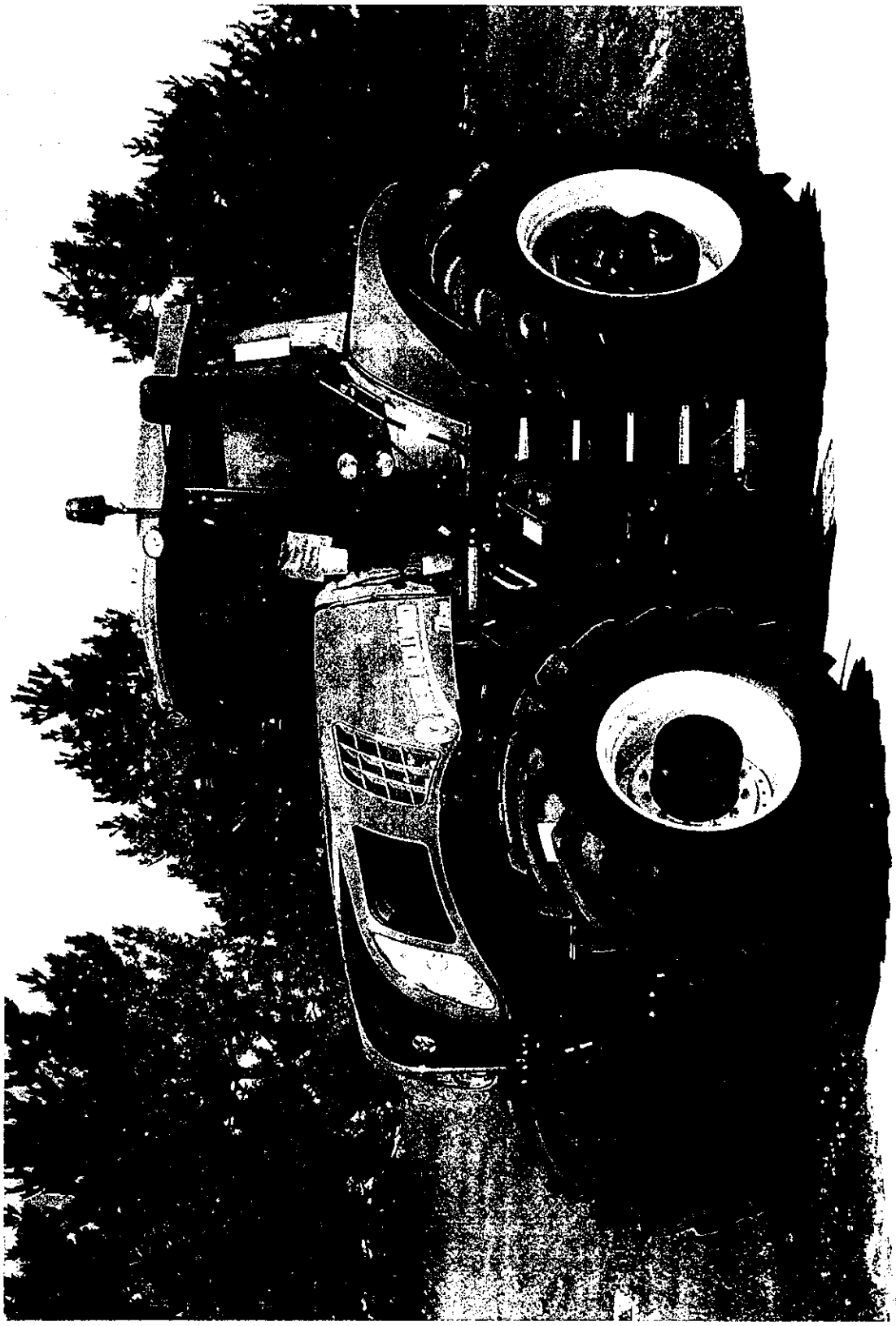


Figure A-5: Case IH Front/Side View showing mudguards

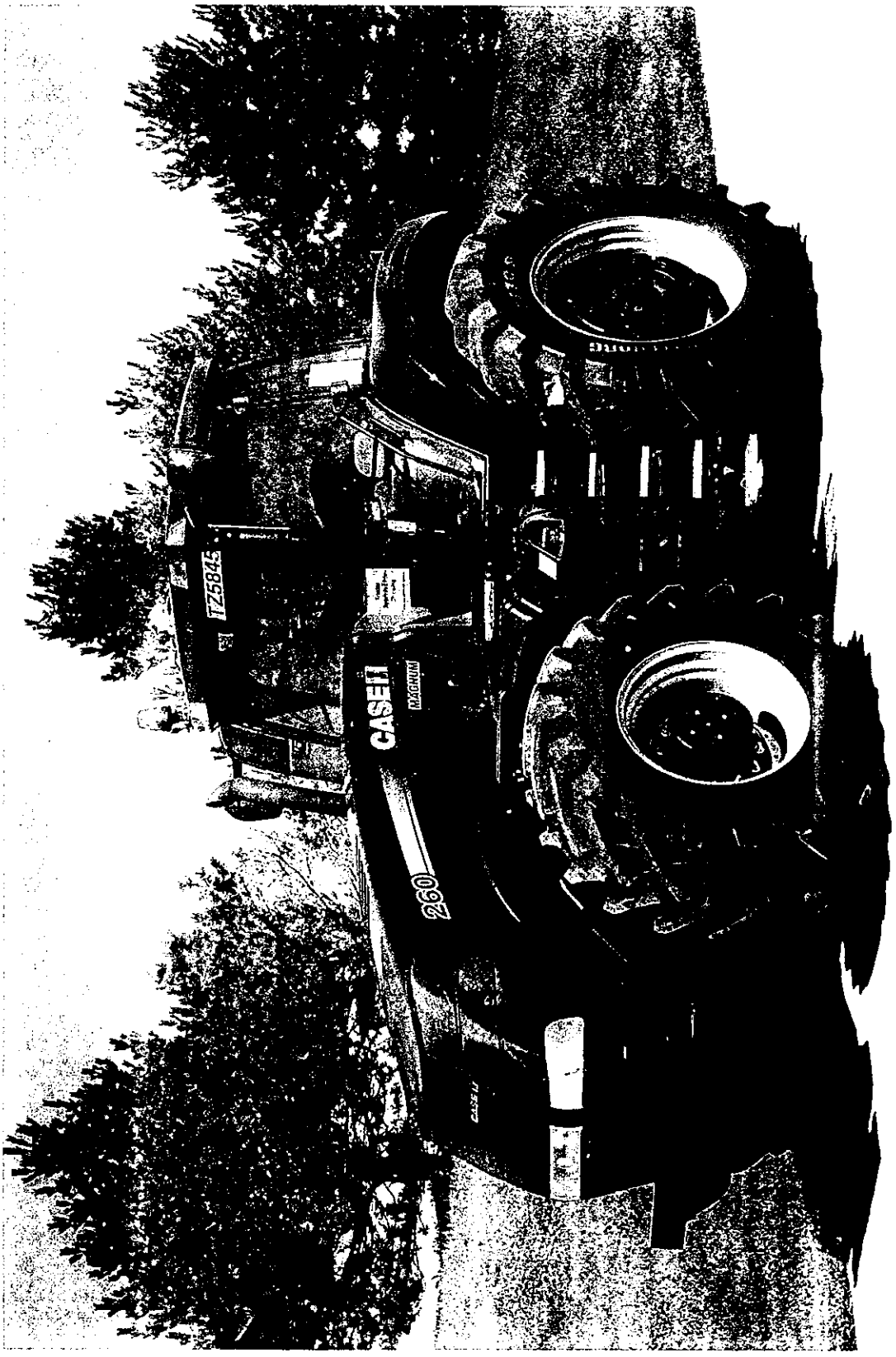


Figure A-6: Arrangement Drawing from the Side and Rear

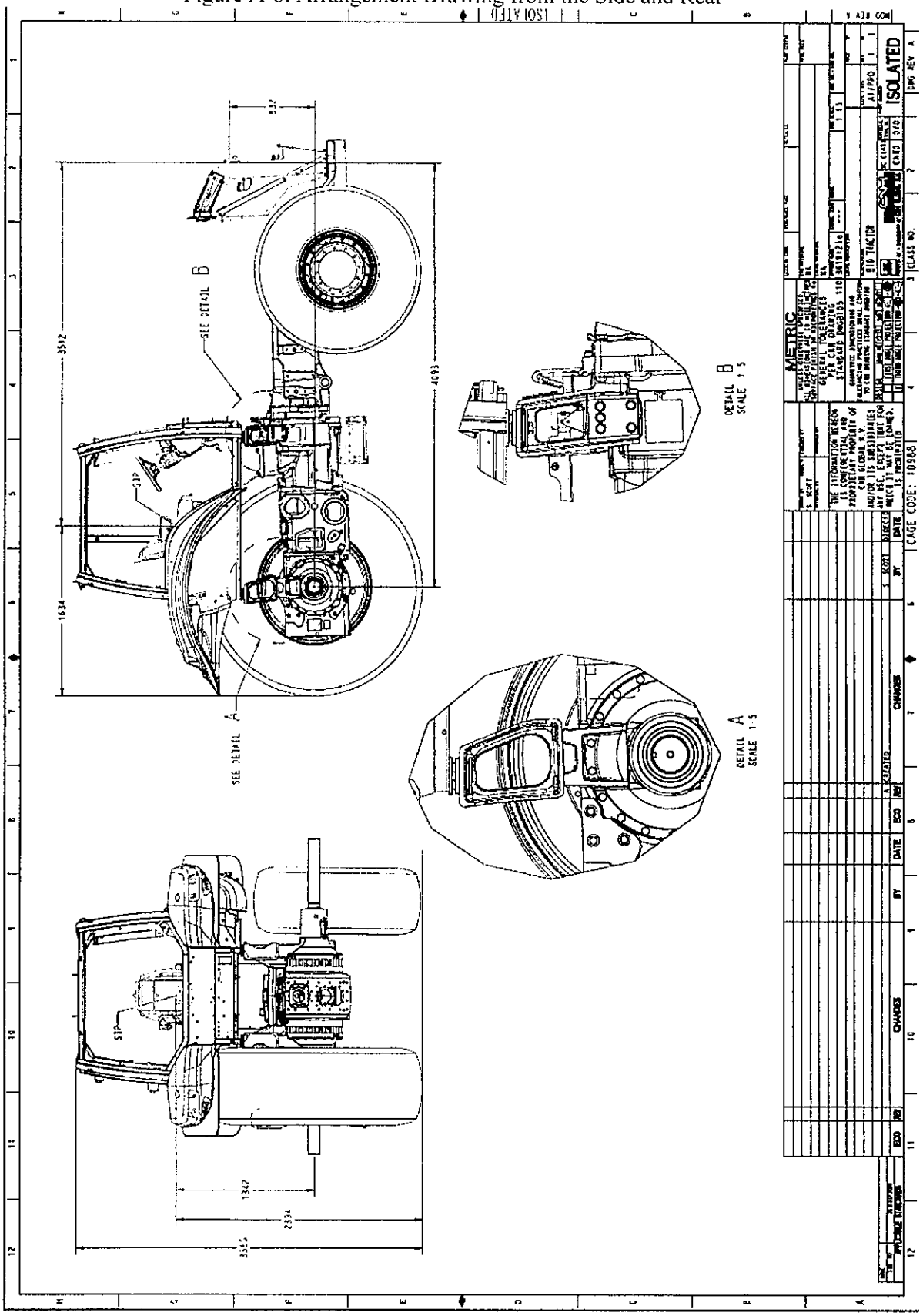


Figure A-7: Main Cab Dimensions Side View

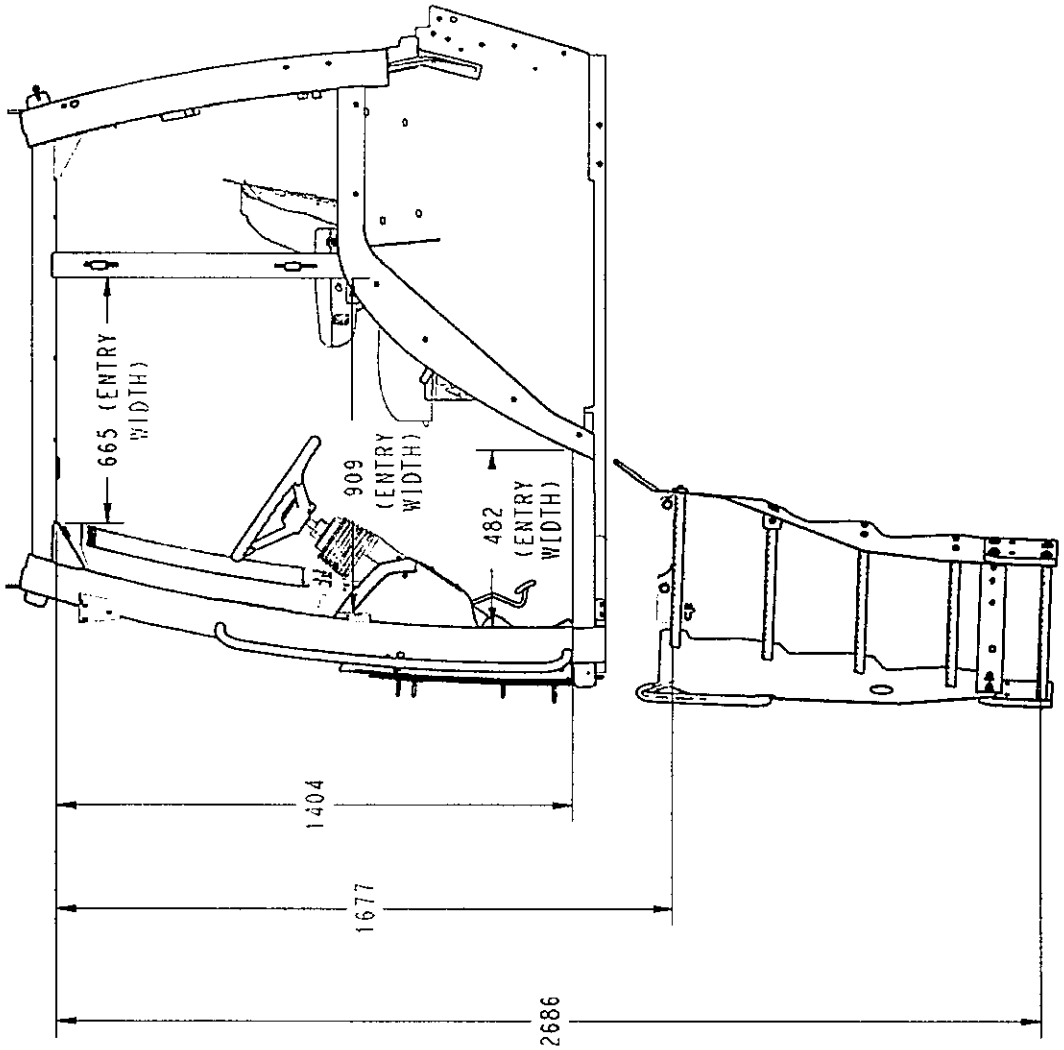


Figure A-8: Main Cab Dimensions Top and Front View

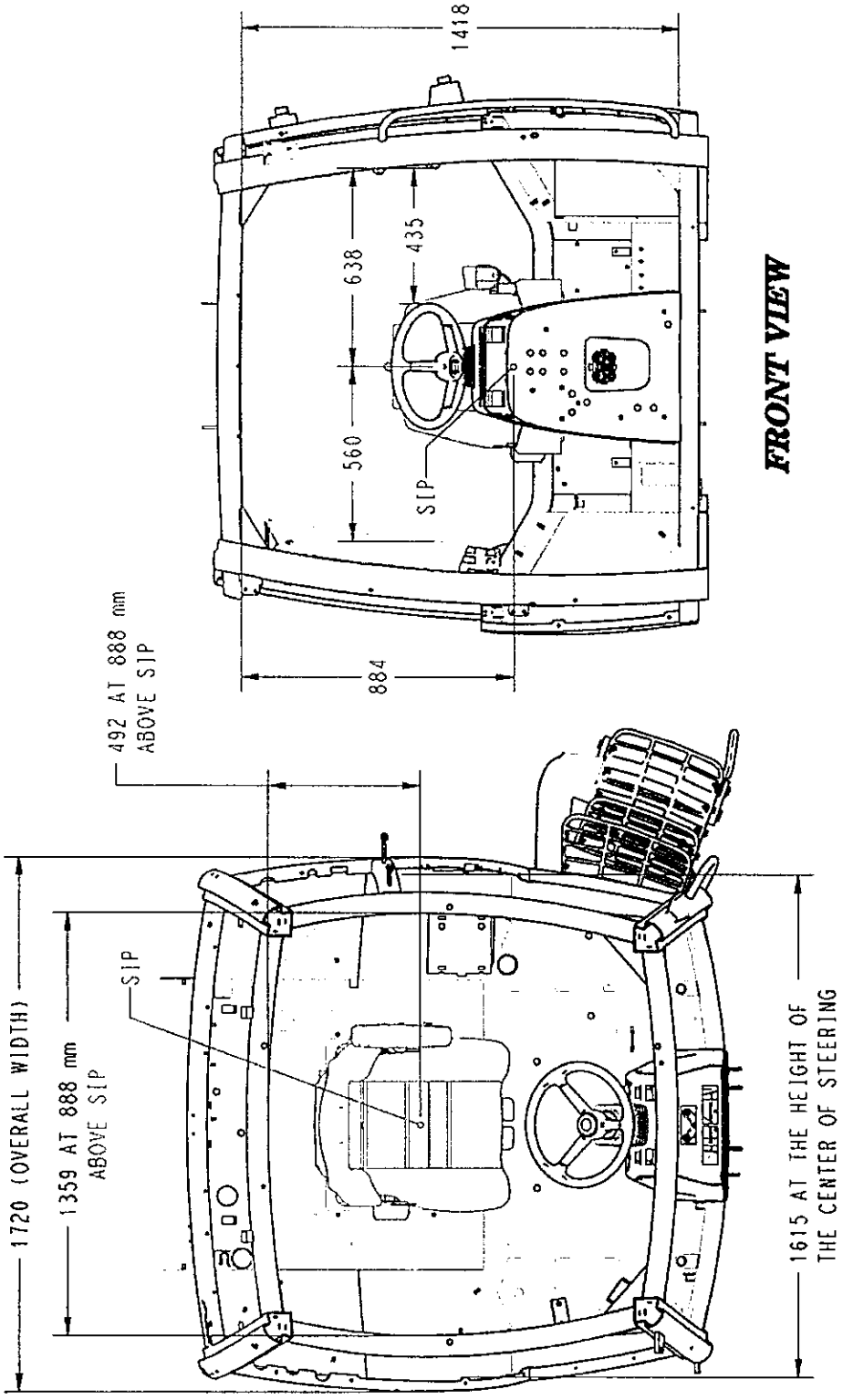


Figure A-9: Cab Mount Details

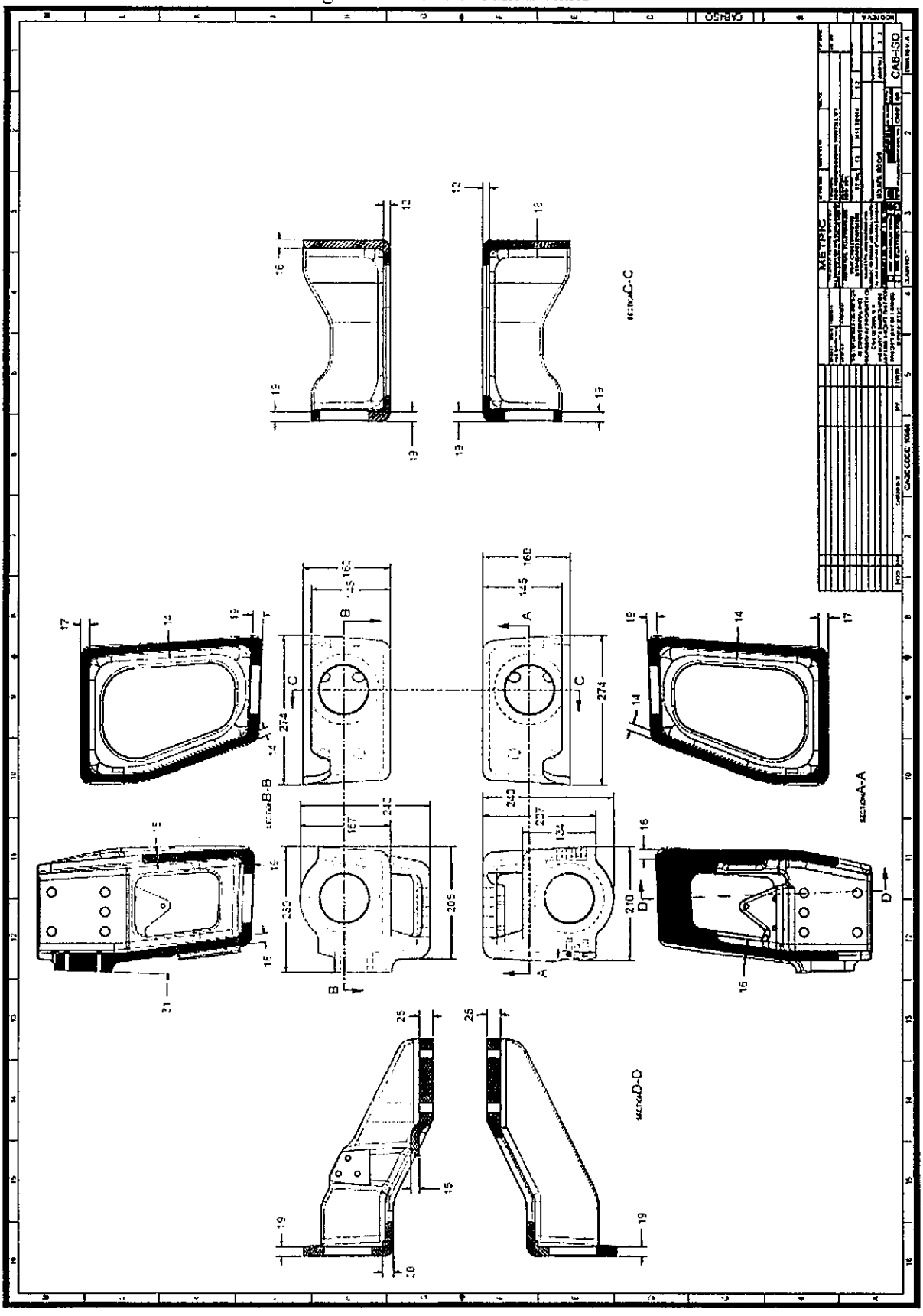


Figure A-10: Photograph of Left/Rear Isolator Mounting Detail

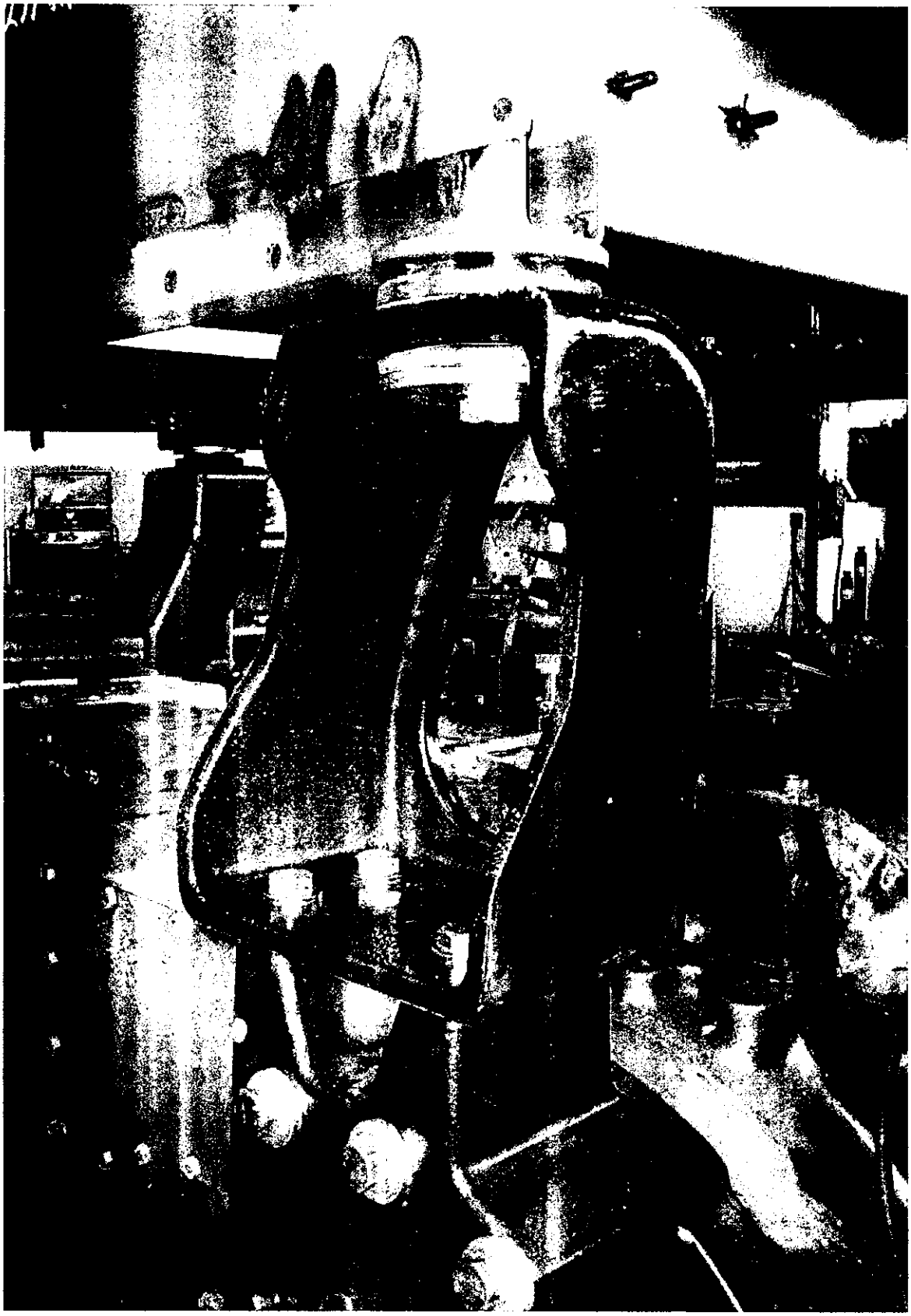


Figure A-11: Photograph of Right/Front Isolator Mounting Detail

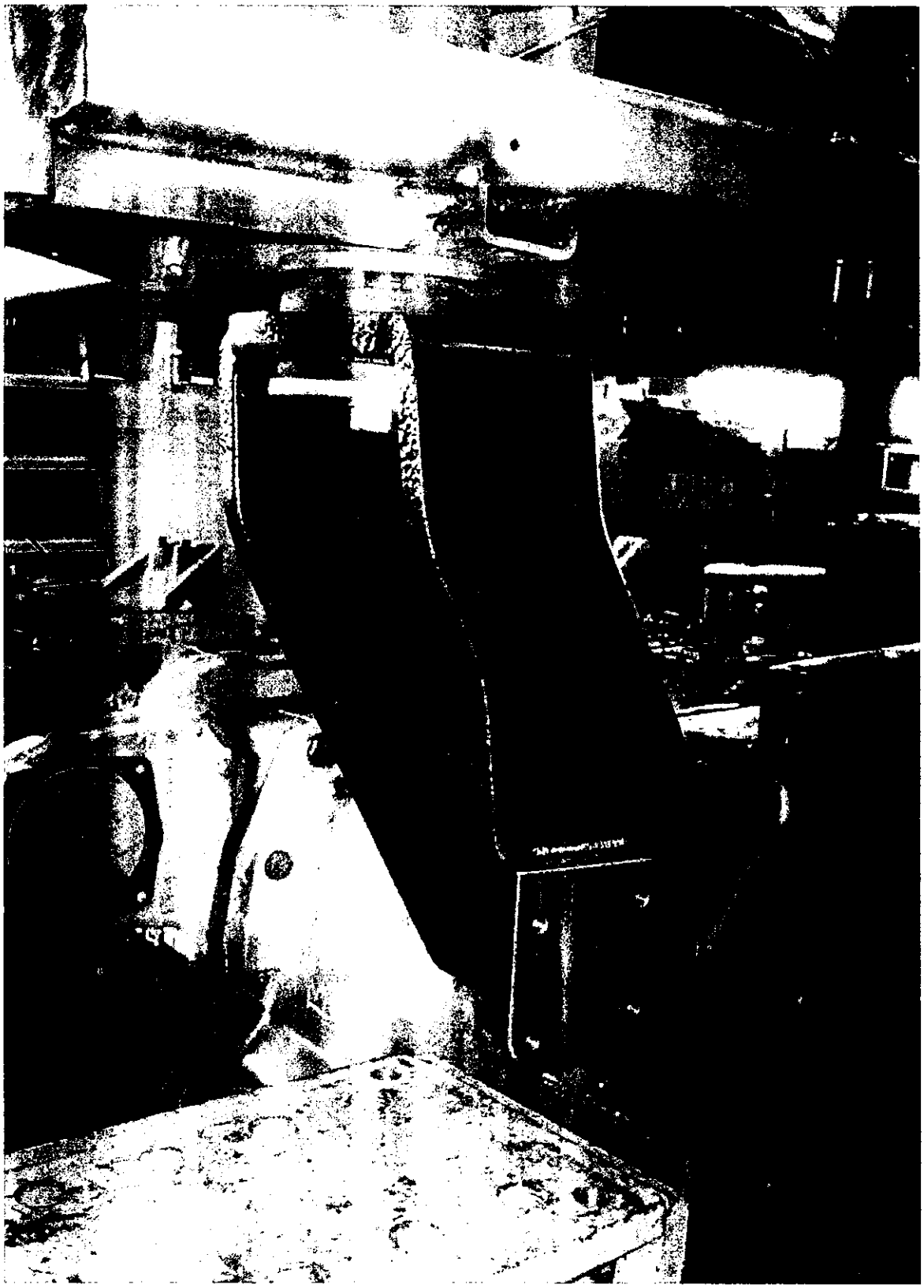
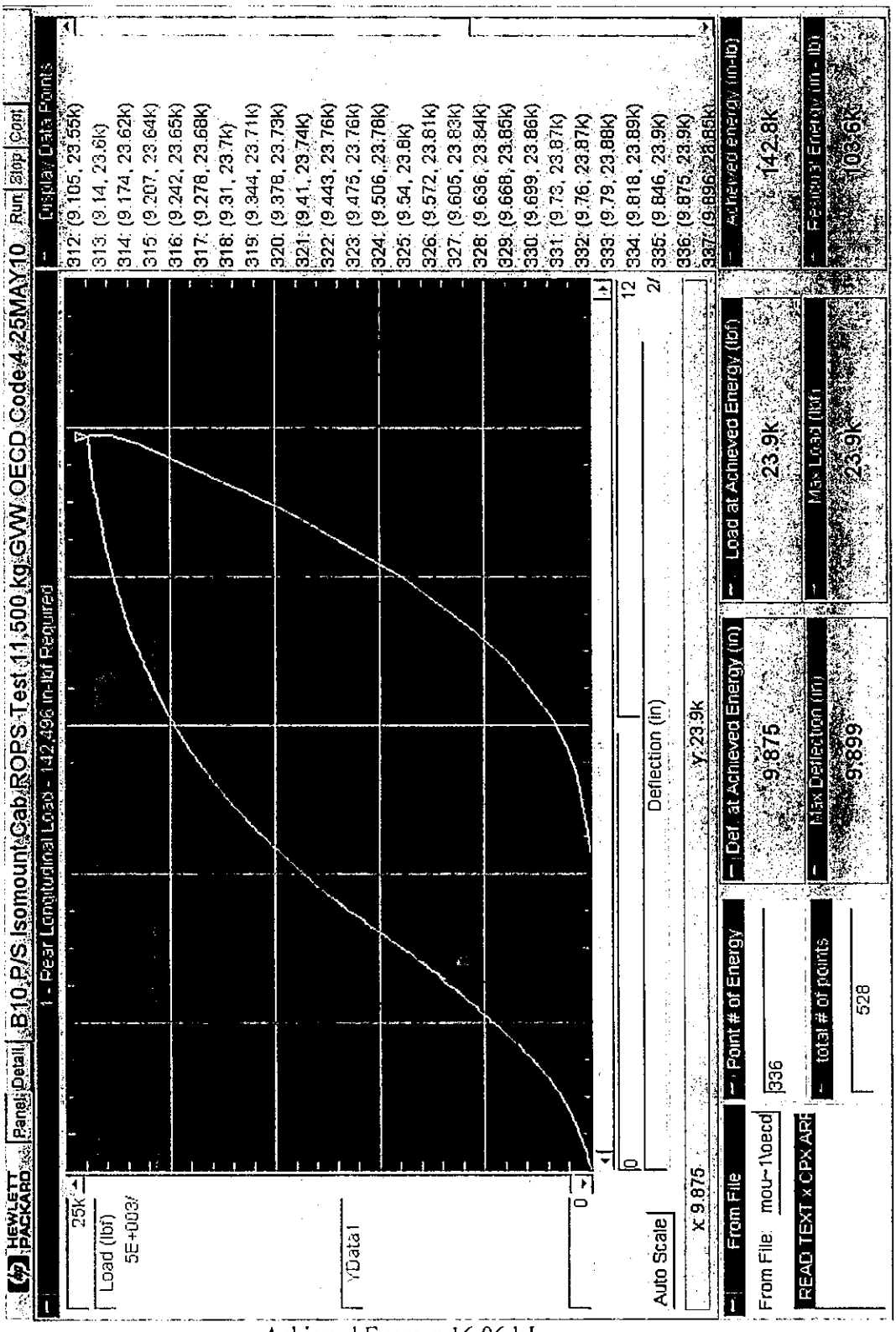
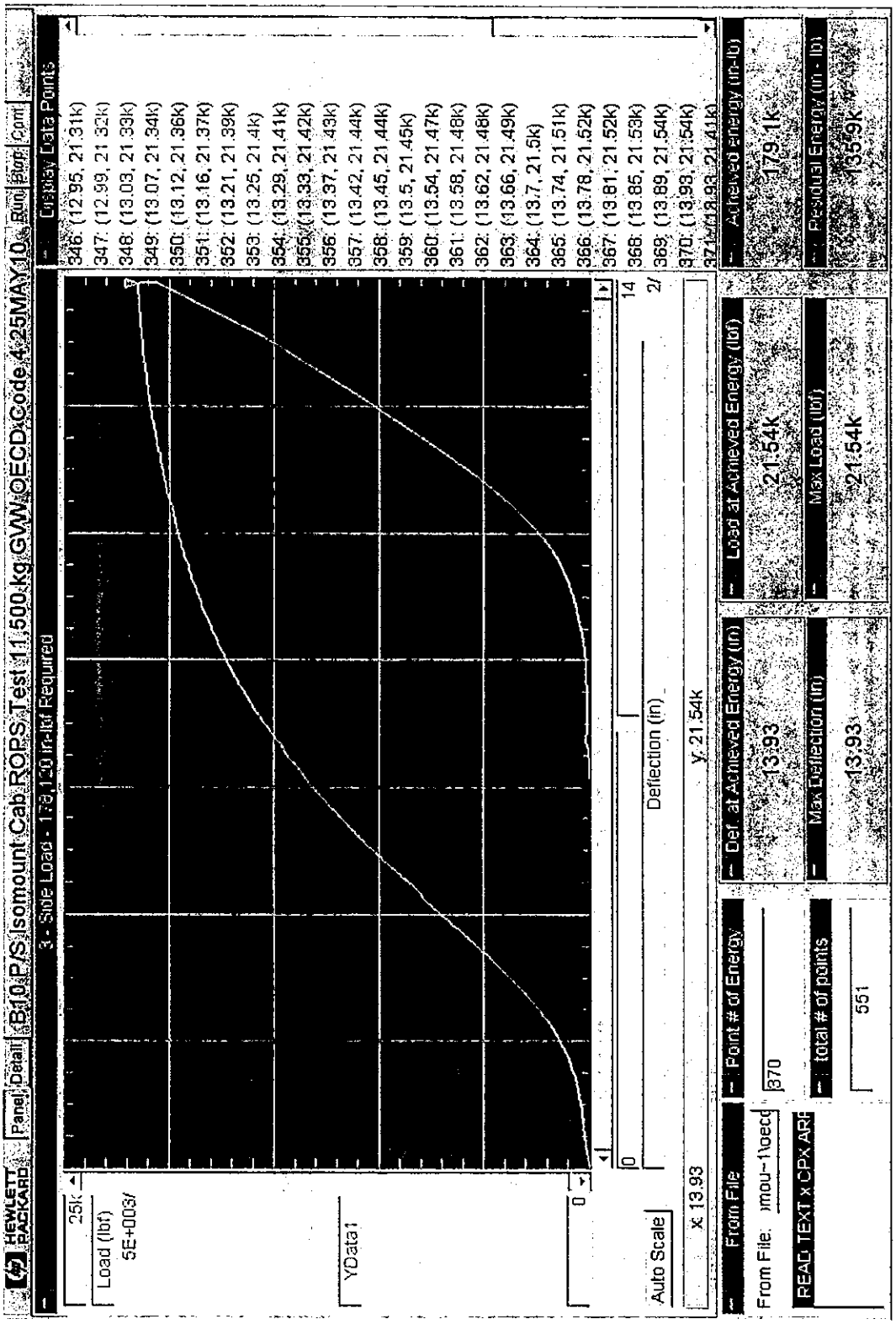


Figure A-12: Longitudinal load force - deflection diagram



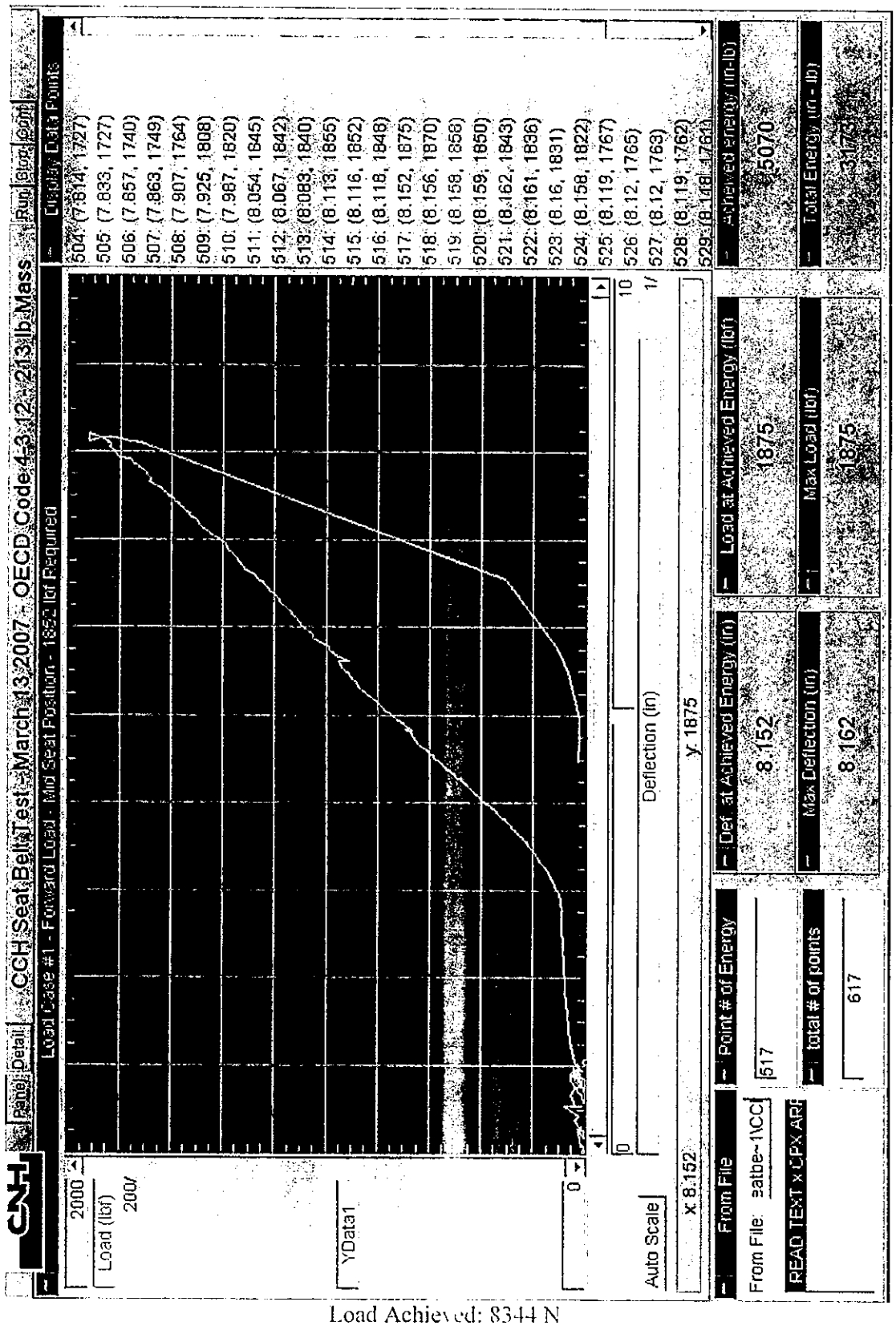
Achieved Energy: 16.06 kJ
Load at Achieved Energy: 106.36 kN
Deflection at Achieved Energy: 250.8 mm

Figure A-13: Side load force - deflection diagram



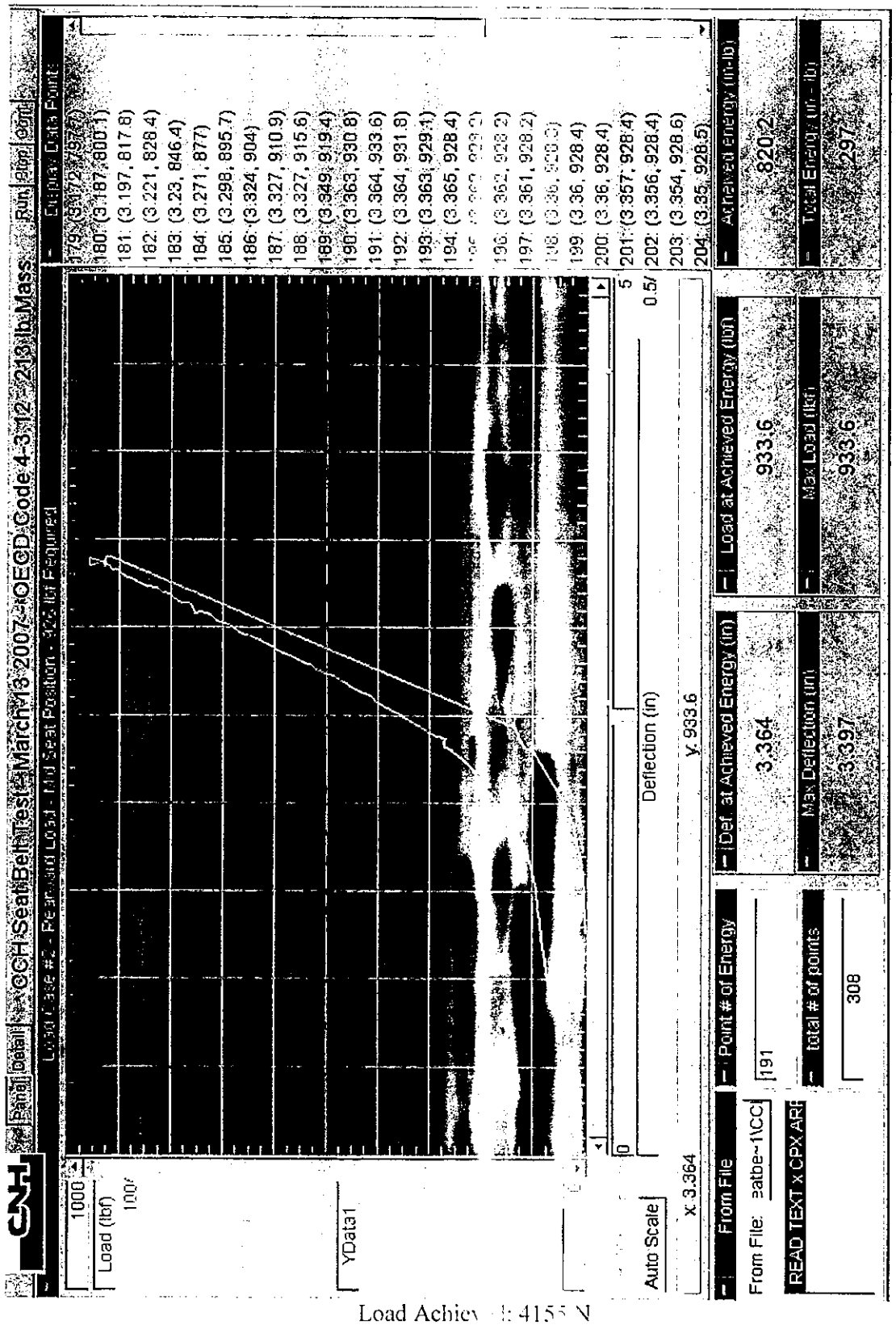
Achieved Energy: 20.15 kJ
Load at Achieved Energy: 95.85 kN
Deflection at Achieved Energy: 353.8 mm

Figure B-1: Forward Seatbelt Load – Seat at Mid-position



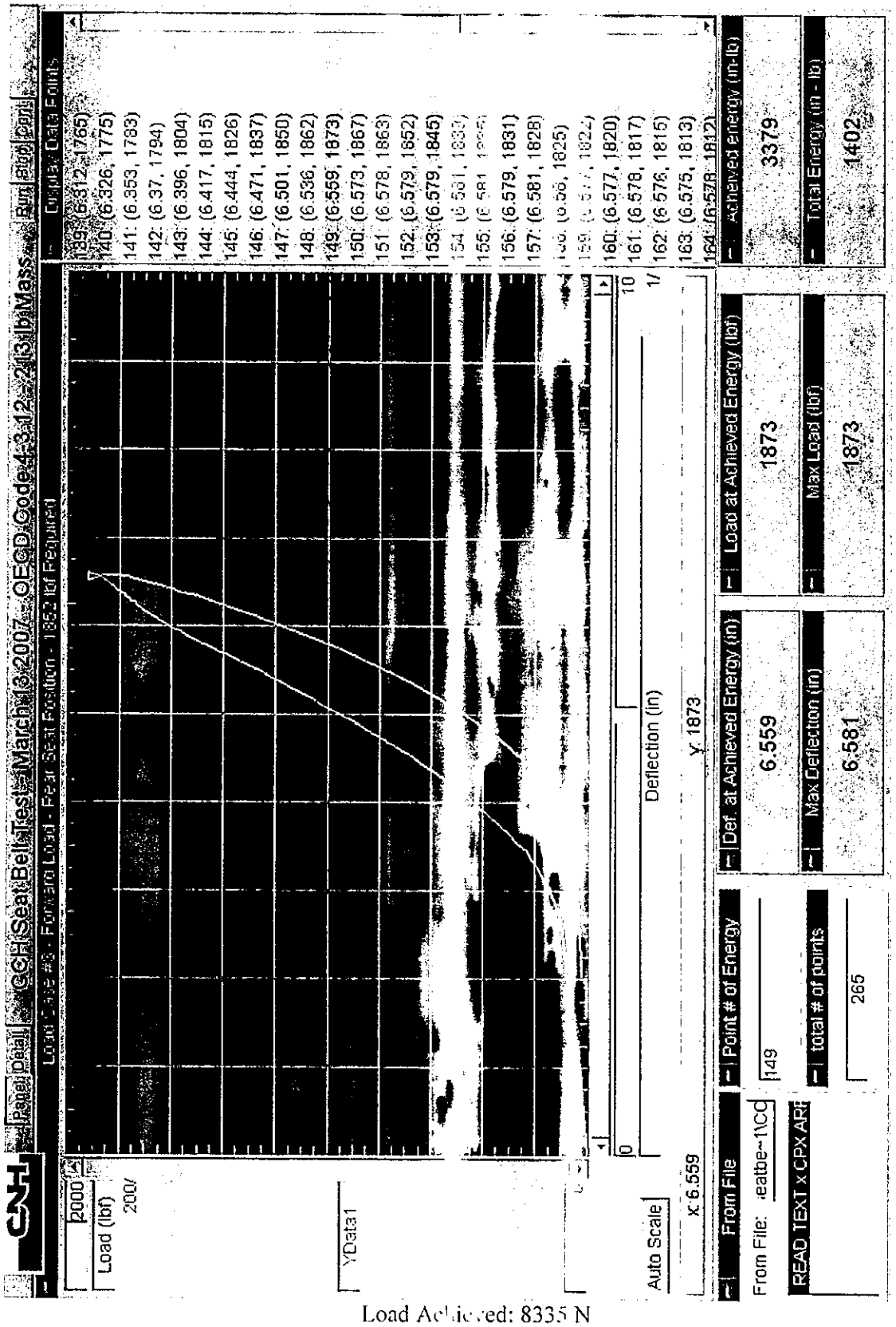
Load Achieved: 8344 N

Figure B-2: Rearward Seatbelt Load – Seat at Mid-position



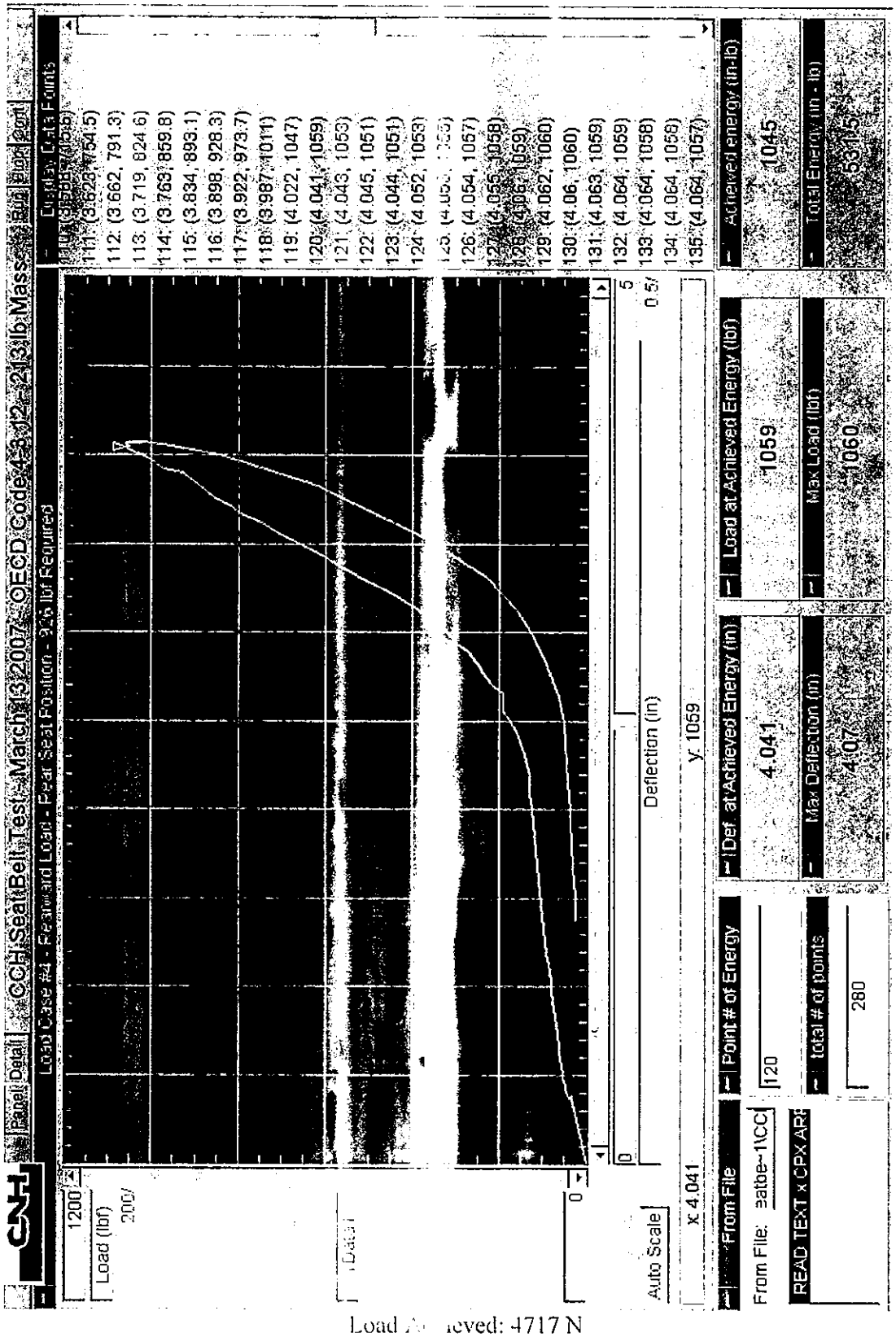
Load Achiev[illegible]: 4155 N

Figure B-3: Forward Seatbelt Load – Seat in worst case position



Load Achieved: 8335 N

Figure B-4: Rearward Seatbelt Load – Seat in worst case position



Load Achieved: 4717 N