DAIMLERCHRYSLER

EA99-013

JUNE 1, 2000 DAIMLERCHRYSLER PRESENTATION TO NHTSA

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DAIMLERCHRYSLER

DaimlerChrysler Corporation
Matthew C. Reynolds
Director
Vehicle Compliance & Safety Affairs

Thomas Z. Cooper, Chief
Vehicle Integrity Division
Office of Defect Investigations
National Highway Traffic Safety Administration
400 Seventh Street, S.W. (NSA-12; Room 5326)
Washington, D.C. 20590
June 23, 2000

Re: NSA-122jlq; EA99-013

Dear Mr. Cooper:

On June 1, 2000, DaimlerChrysler Corporation met with NHTSA to discuss EA 99-013. The attached materials were part of that discussion and were intended to illustrate why the crash energy inflicted in NHTSA's laboratory tests differs from that which occurs in the real world. This difference, while perhaps not significant for occupant injury analysis, is significant when attempting (without the benefit of rulemaking) to apply the laboratory tests beyond their intended purpose. As the evidence has shown, DaimlerChrysler Corporation minivans have an exemplary real world performance record.

We look forward to discussing this material with you further.

Sincerely,

Matt C. Reynolds

Attachments and Enclosures

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ATTACHMENT

Enclosure #1 contains the slides that were discussed. DaimlerChrysler presented the attached slides to show that the FMVSS 214-style barrier test produces a different intrusion profile that would occur in a typical vehicle crash. DaimlerChrysler minivans have an exemplary real world track record. The laboratory test artifact at issue has never occurred in over 80 billion vehicle miles traveled. The real world performance evidences the minivans' real world safety, and compliance with FMVSS 301 evidences that the minivans meet the need for motor vehicle safety as defined in the Safety Act.

A typical vehicle has more front-end sweep than does the FMVSS 214 barrier. The intrusion caused by the vehicle is typically greater at the more rigid center than at the softer corners. By comparison, the barrier face has no sweep and will show uniform load distribution across its entire face. This is shown in the load distribution curves for vehicle and barrier testing (see pages 1 - 14). The vehicle is much softer at the outside and does not pick up significant loads at the edges. The FMVSS 214 barrier, on the other hand, picks up consistent load across its entire face. It is this rigid edge of the barrier that creates the intrusion that created the NS fuel filler hose separation in the laboratory tests.

To further illustrate the difference between the side barrier tests and real world impacts, NHTSA's test data of the Honda Accord was used (see page 15). NHTSA tests were run using various bullet vehicles and the moving deformable barrier in a FMVSS 214-type impact into the side of the Accord. The intrusion pattern shown on page 15 is data taken at sill height that represents the height of the intrusion in the laboratory tests. . The intrusion pattern of the FMVSS 214 barrier is not comparable to any of the bullet vehicle intrusion patterns. This data indicates that the FMVSS 214 barrier is not a good predictor of structural performance in this area of an actual vehicle to vehicle impact.

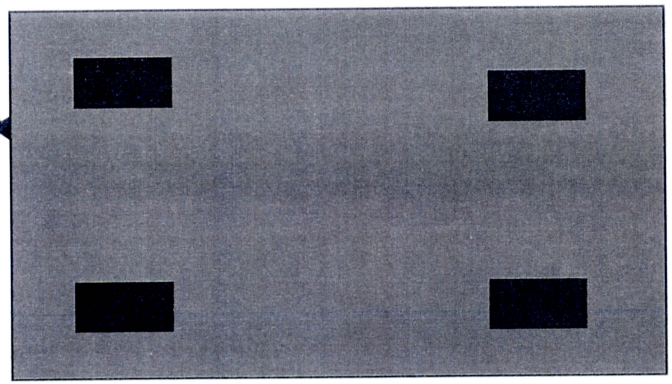
As the bullet vehicle strikes closer to the fuel filler system the center of impact moves rearward away from the longitudinal center of gravity of the vehicle. As the impact moves away from the center of gravity, the struck vehicle will experience greater rotational forces and more of the energy of the event will be absorbed by rotational energy and less on deformation and intrusion. A simple model was evaluated to demonstrate this principle. (See pages 16 - 19) The model was evaluated with the FMVSS 214 barrier impacting the vehicle in three locations: at the normal FMVSS 214 position, centered at the rear axle, and half way between the first two positions. As seen on the slides, pages 20 – 22, the angular velocity increases as the barrier moves rearward, away from the longitudinal center of gravity. As angular velocity increases less energy from the event is dissipated in deformational energy. Approximately 37% less energy goes into the intrusion of the vehicle in the rearmost impact when compared to the FMVSS 214 position.

ATTACHMENT

As evidenced through compliance with FMVSS 301, no unreasonable risk to motor vehicle safety can possibly be suggested here. FMVSS 301 is the fuel integrity standard that defines what constitutes an appropriate level of fuel integrity risk. There is no question here of compliance with that standard. The laboratory test artifact at issue is a product of the FMVSS 214 barrier, which differs for this purpose from what would be expected in the field. That expectation is confirmed through the real world performance of DaimlerChrysler minivans.

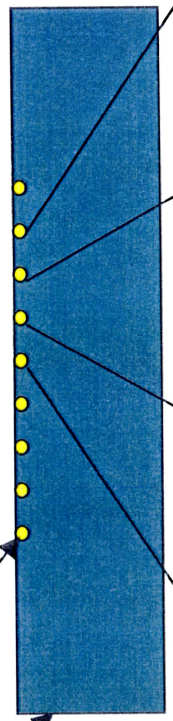
30 MPH IMPACT SIMULATION WITH MOVEABLE DEFORMING BARRIER

MOVEABLE DEFORMING BARRIER

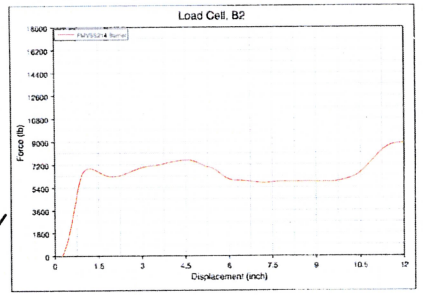


9 LOAD CELLS EQUALLY SPACED

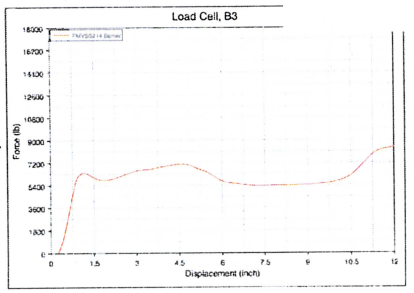
CONCRETE WALL



30 MPH Impact with Rigid Barrier Simulation, l



30 MPH Impact with Rigid Barrier Simulation, l



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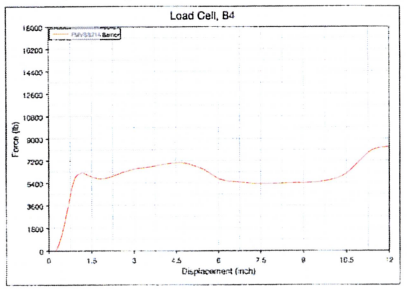

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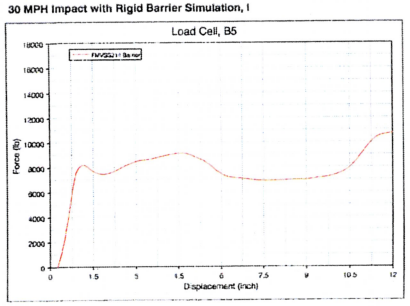

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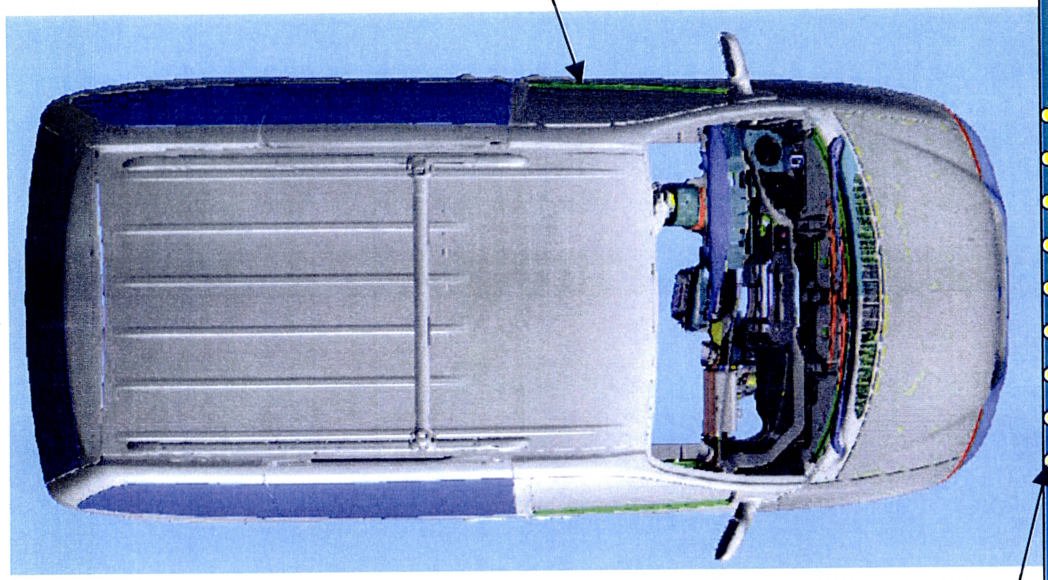
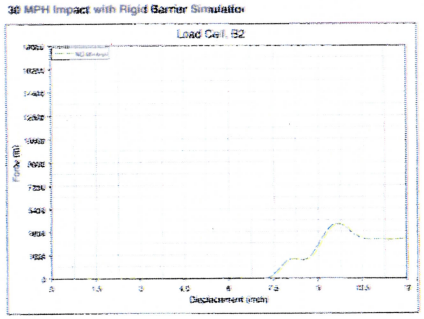
30 MPH IMPACT SIMULATION WITH NS MINIVAN

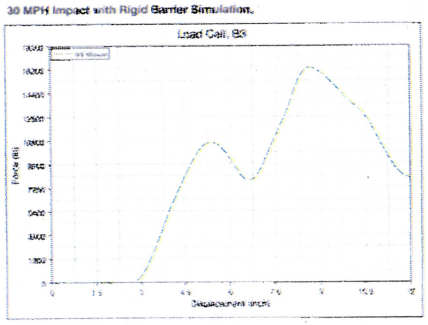
NS MINIVAN

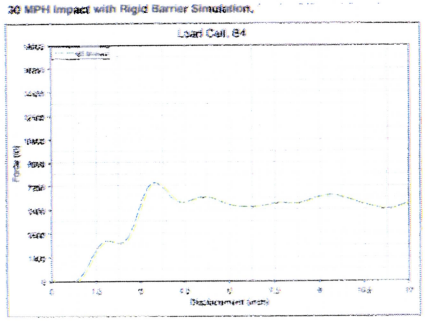


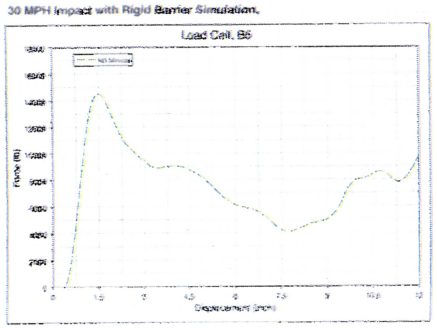
9 LOAD CELLS EQUALLY SPACED

CONCRETE WALL









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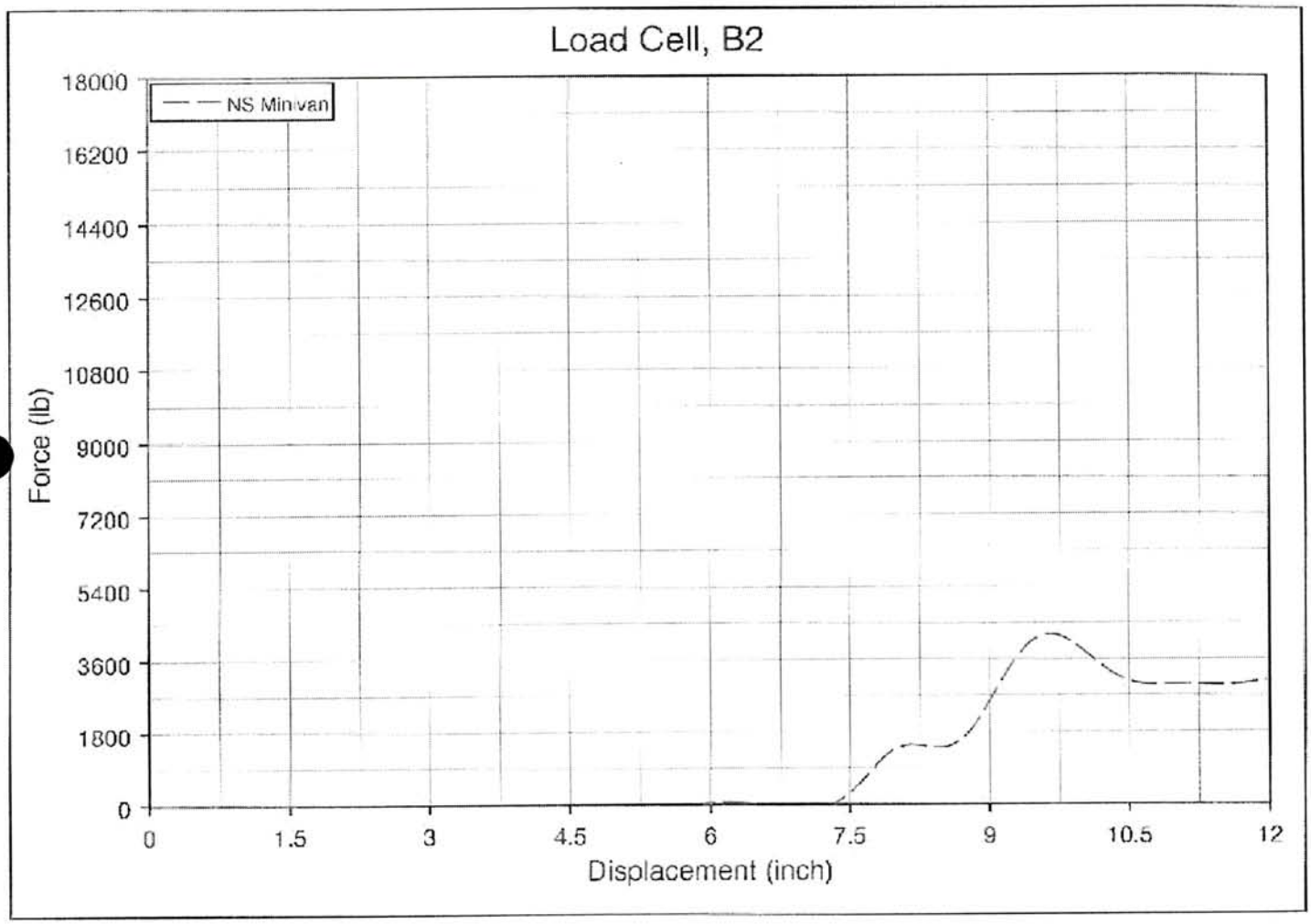
30 MPH Impact with Rigid Barrier Simulation



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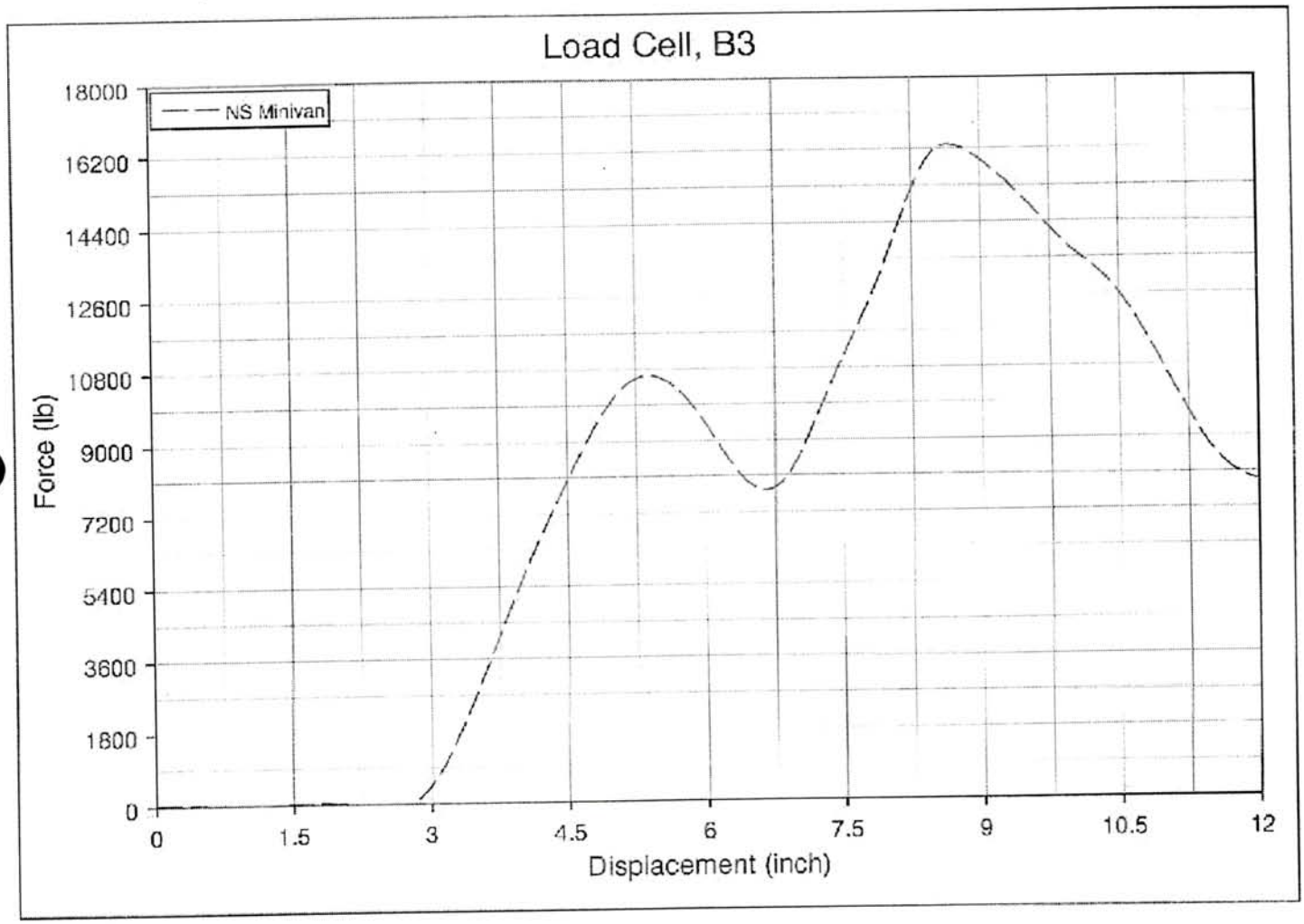

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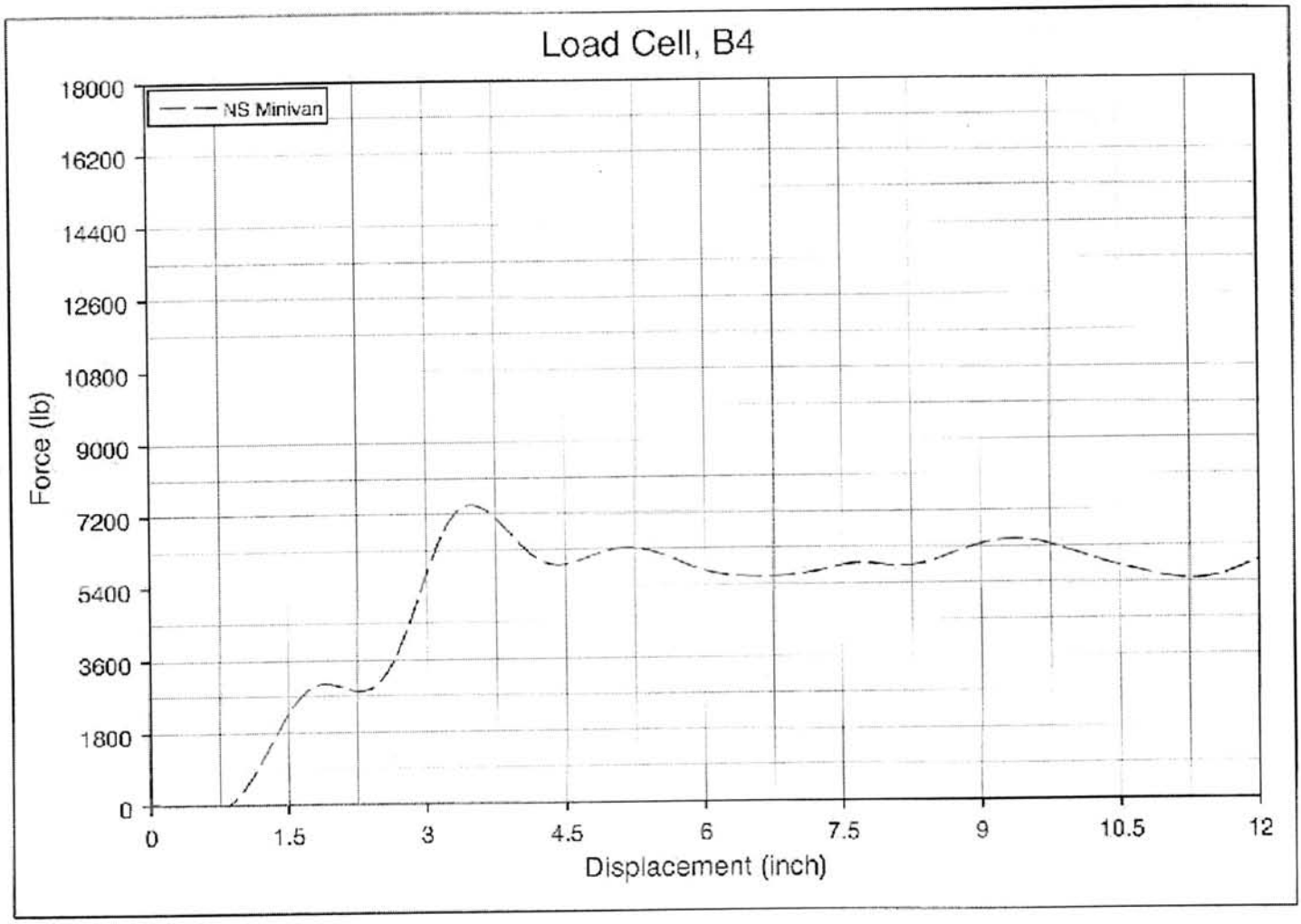

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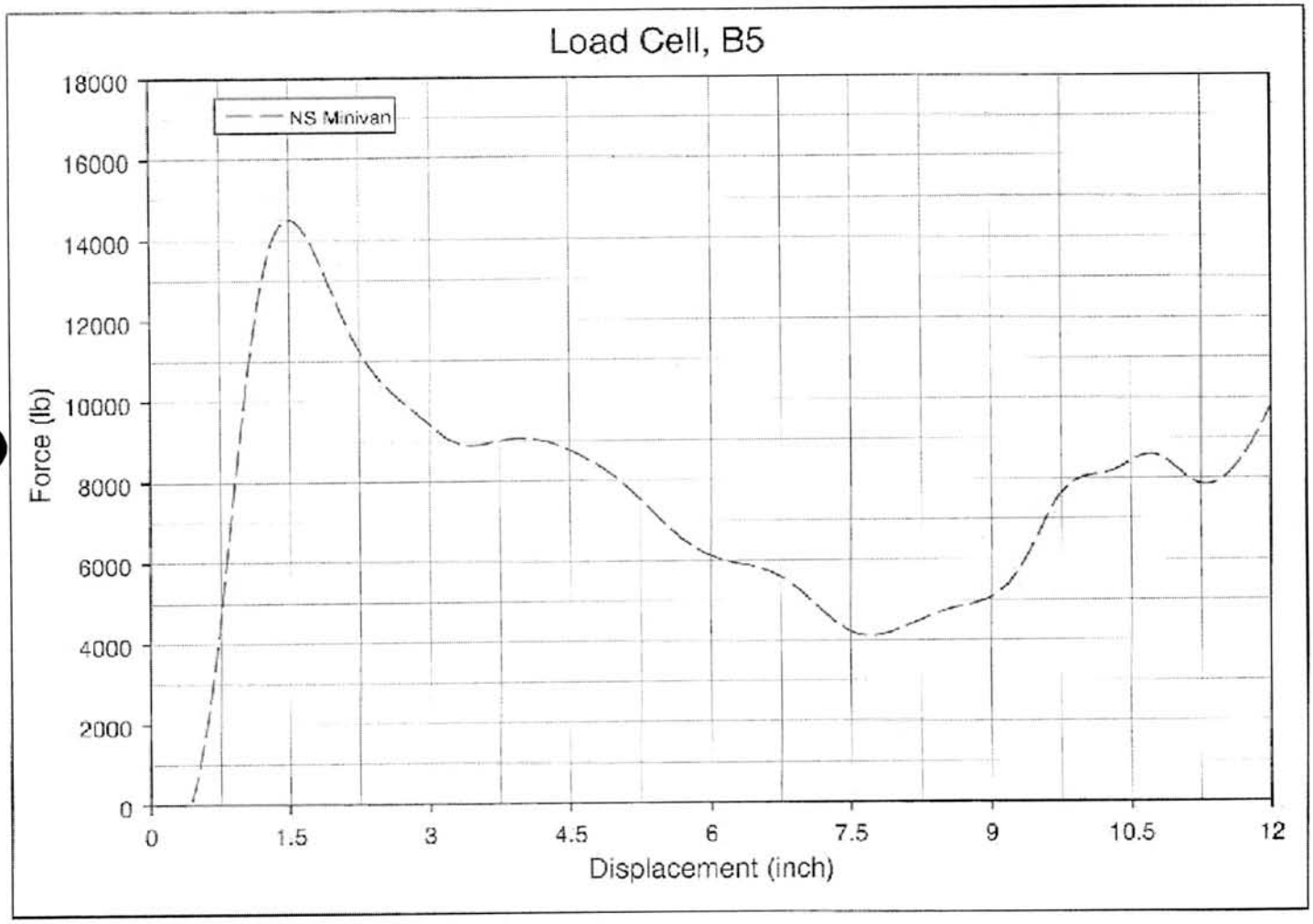

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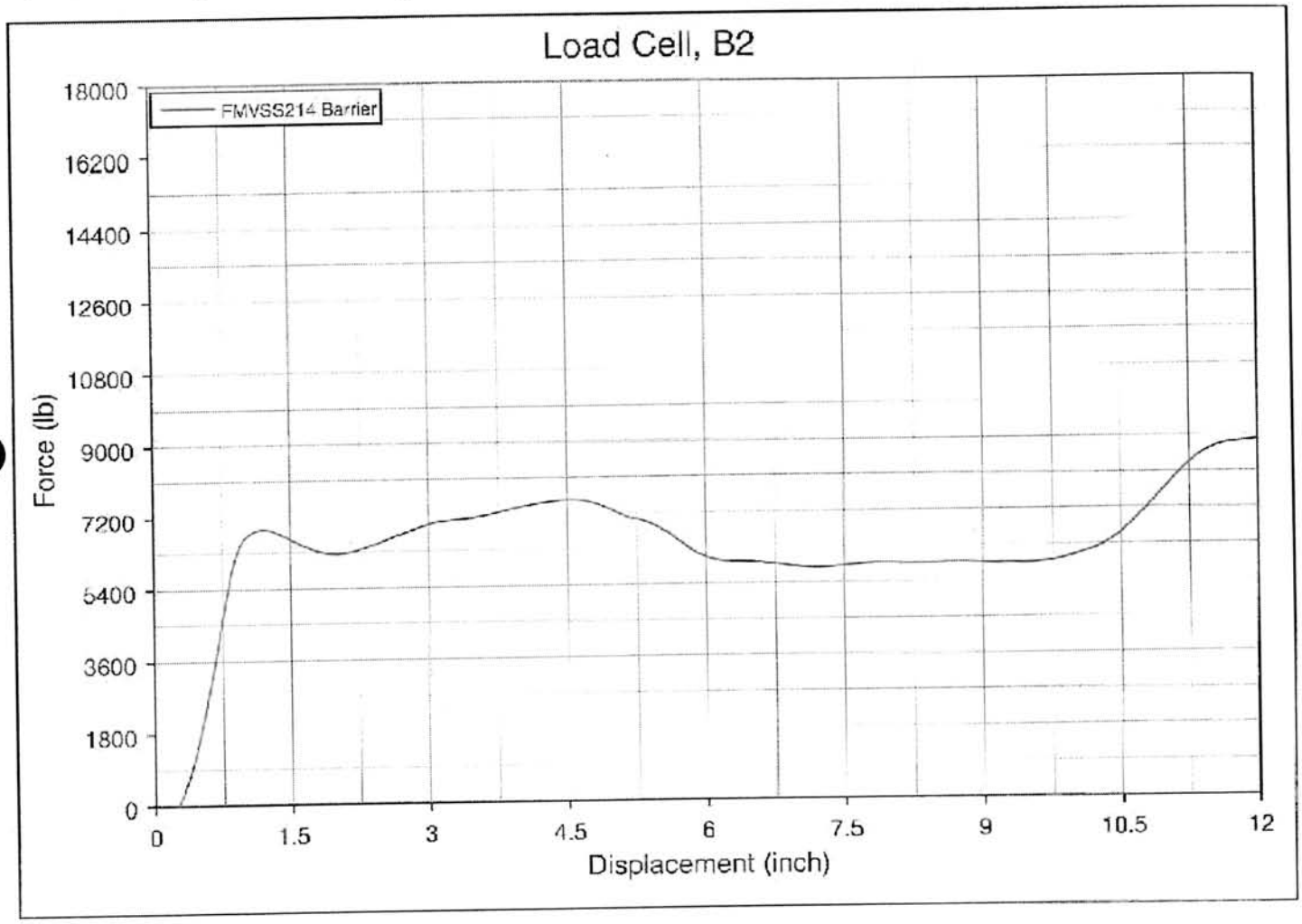

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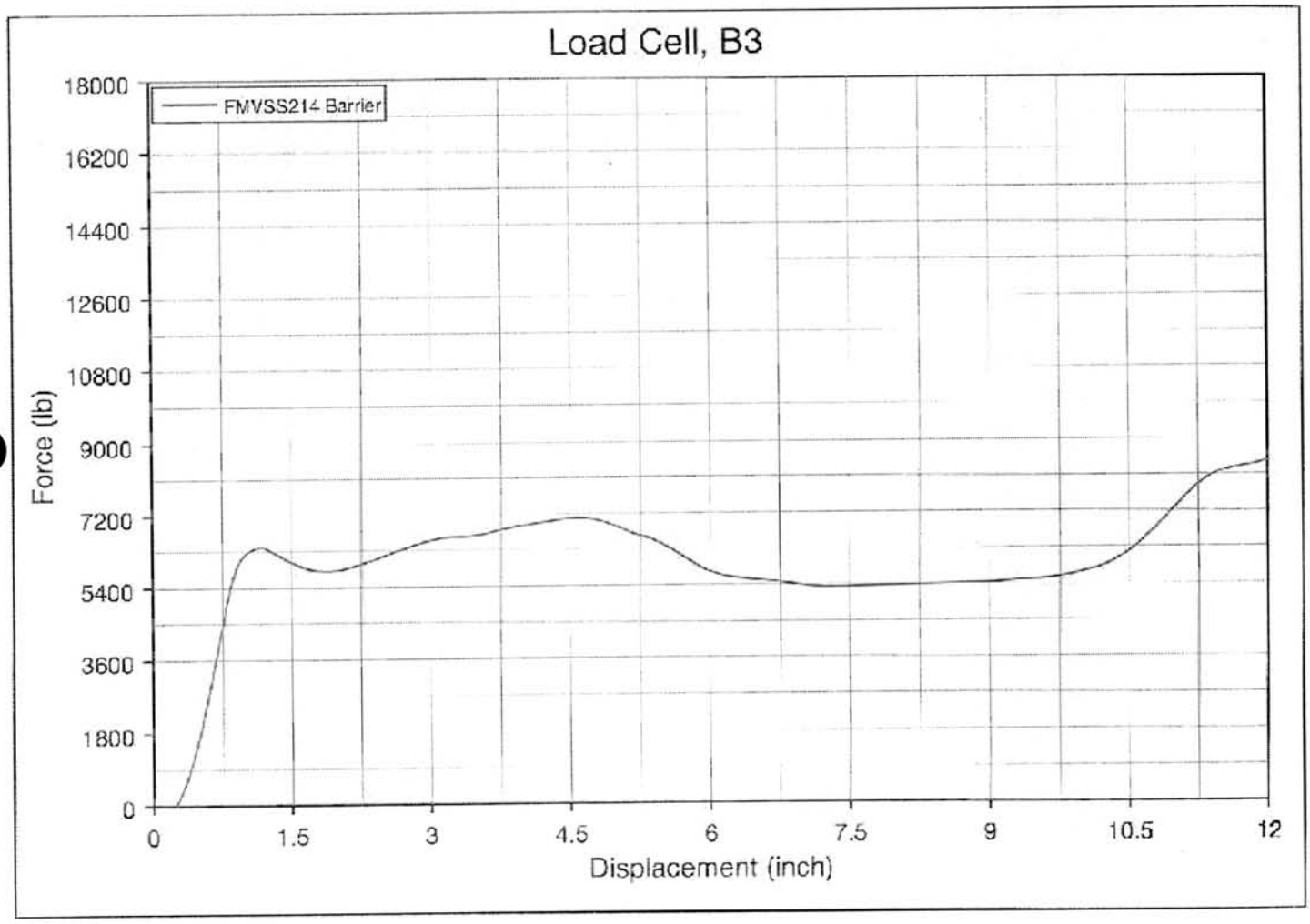

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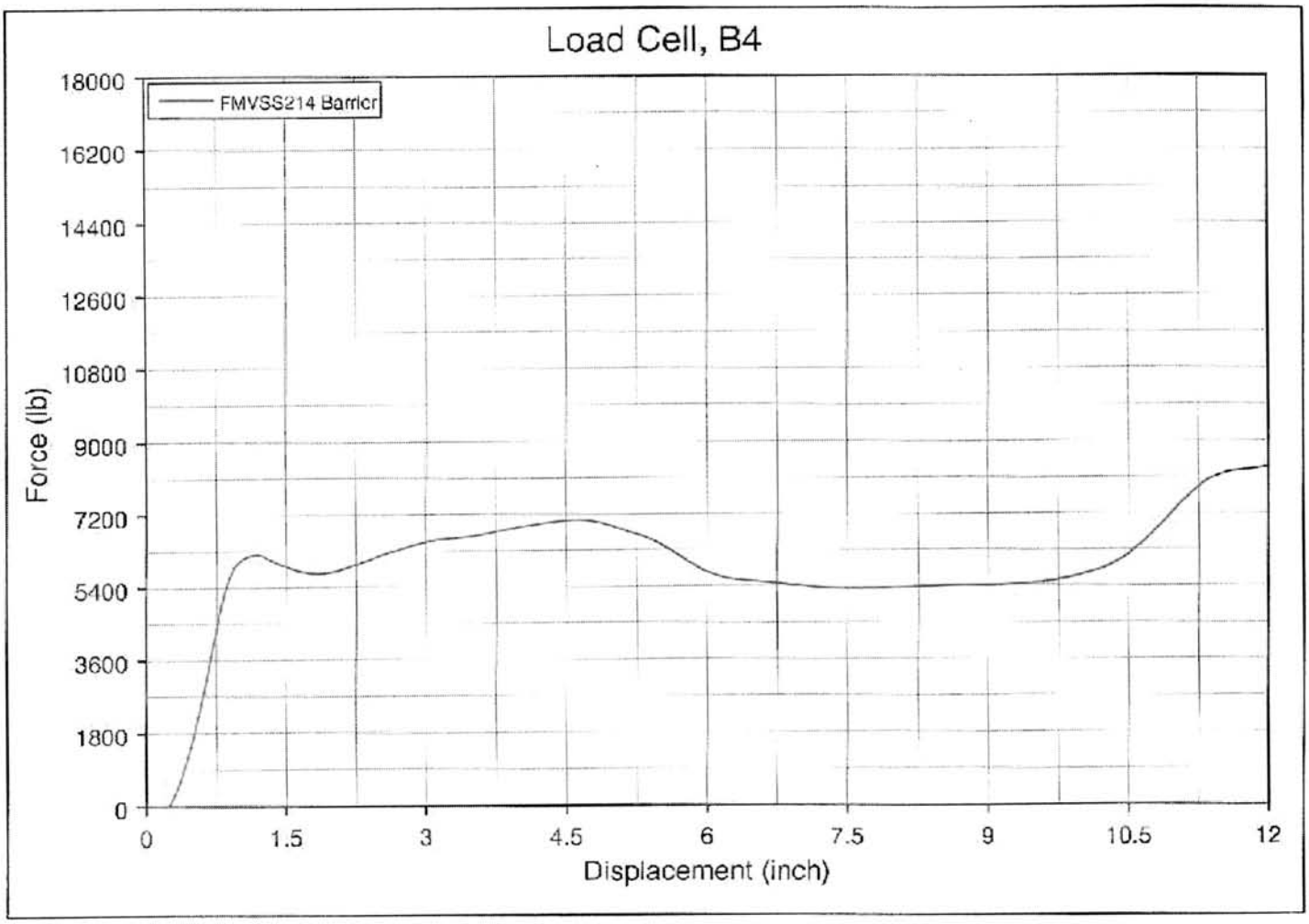

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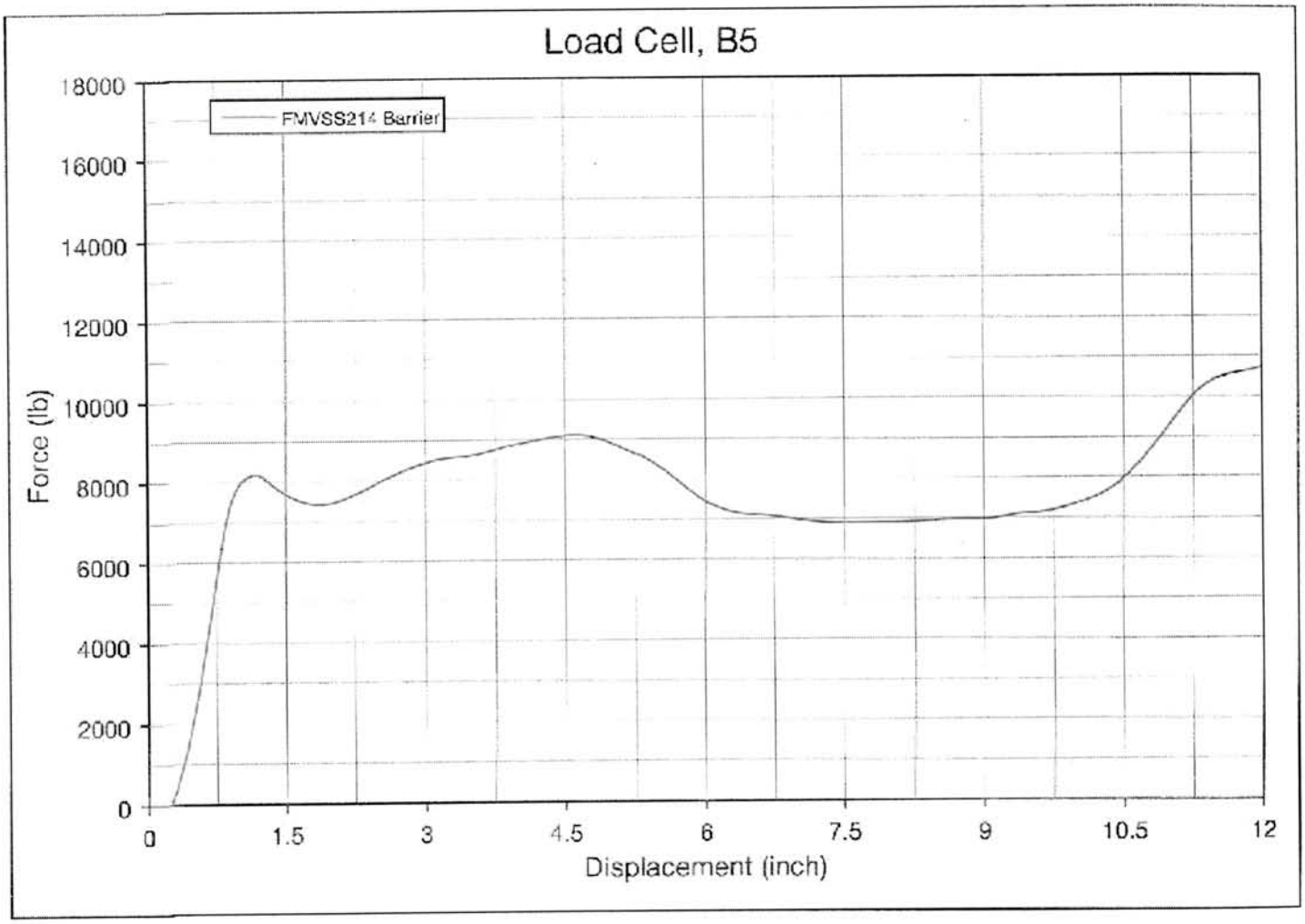

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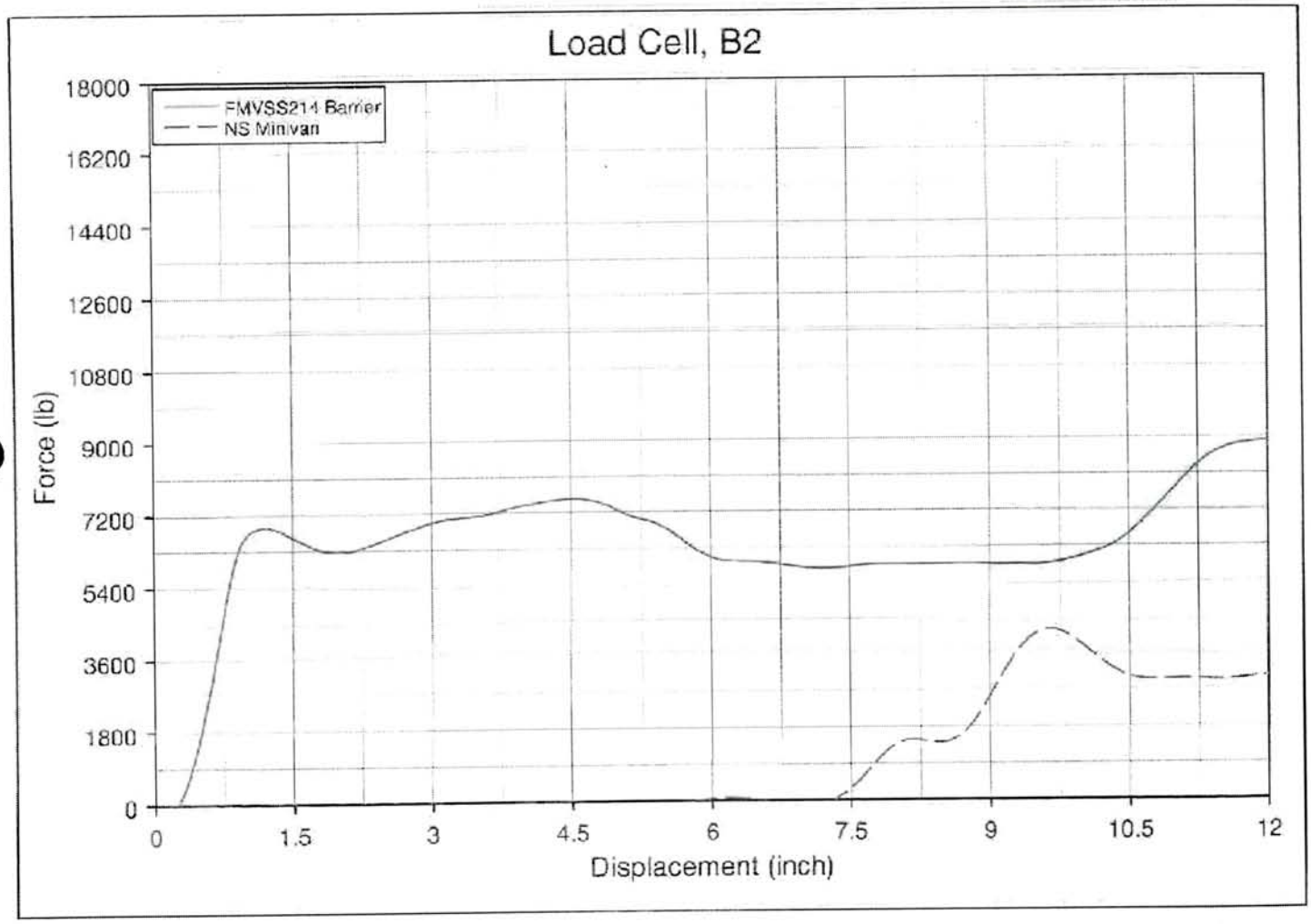

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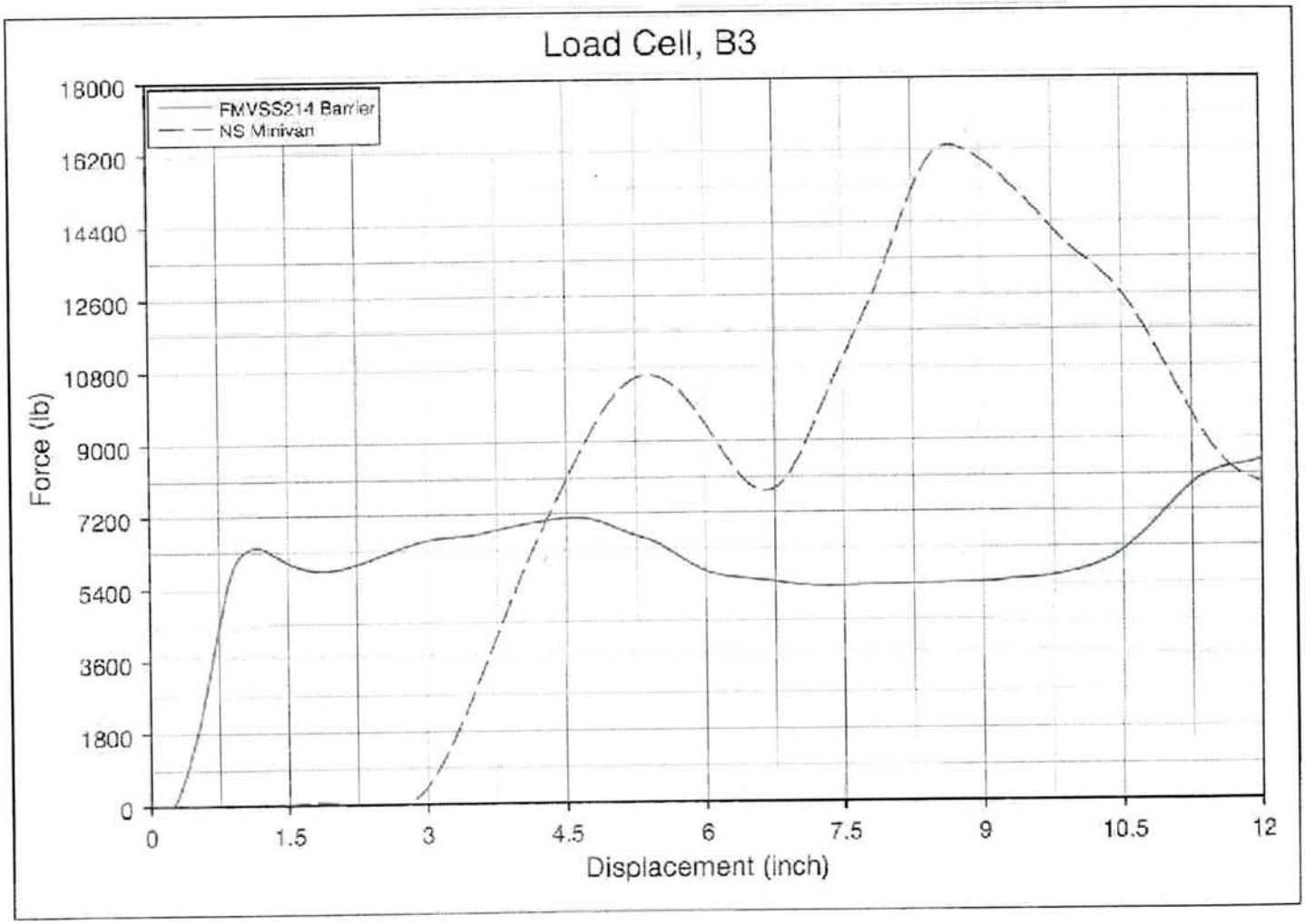

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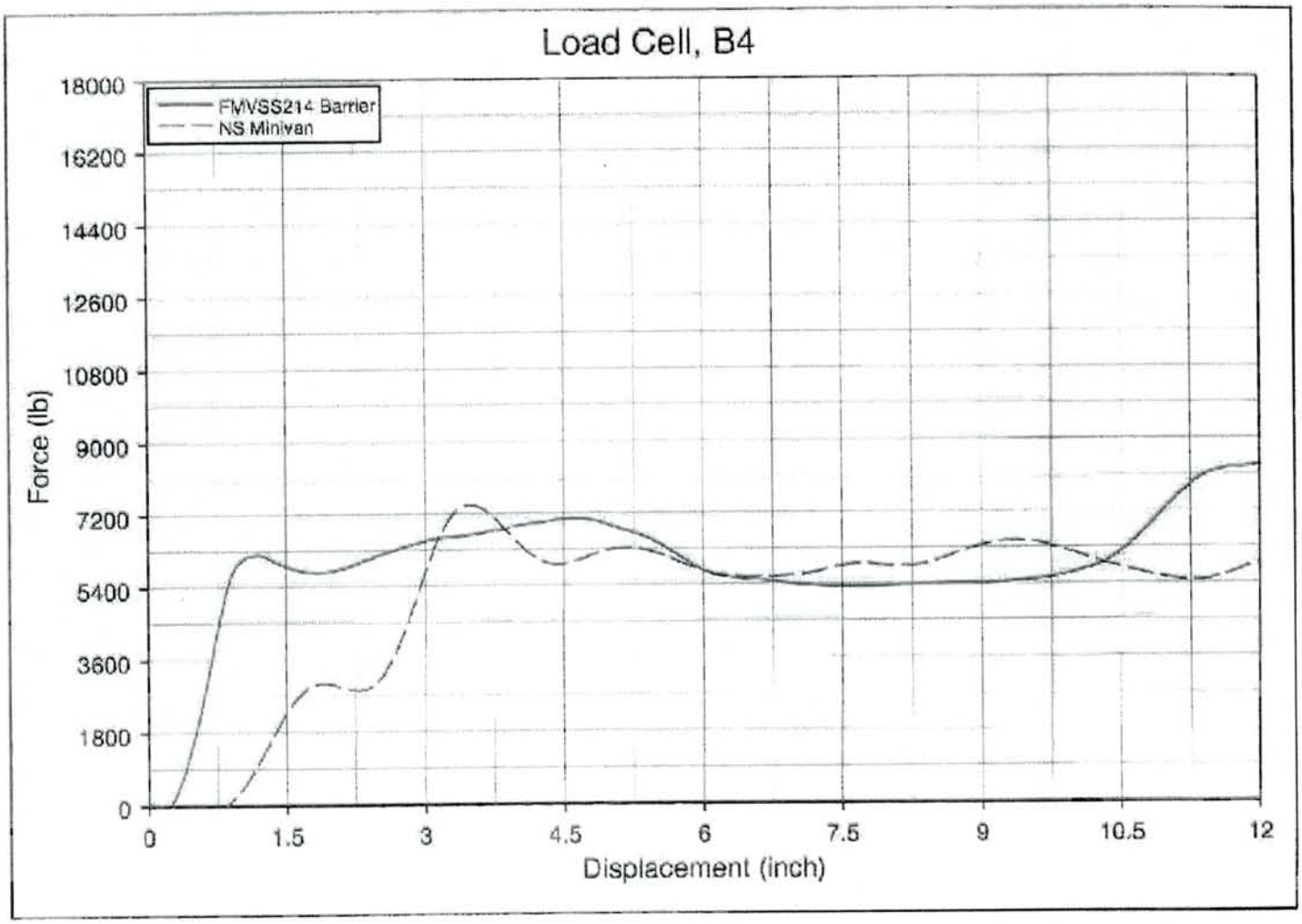

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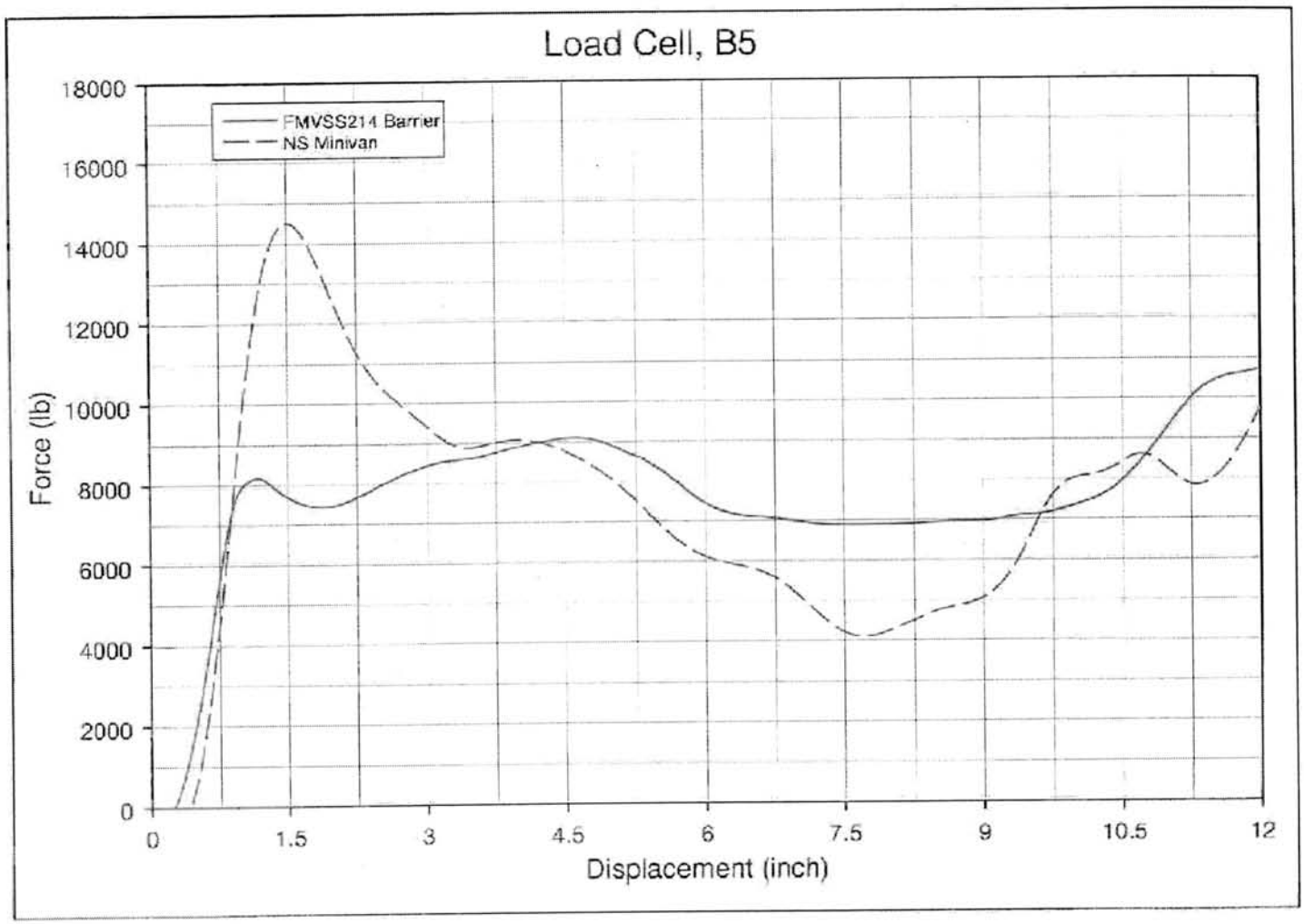

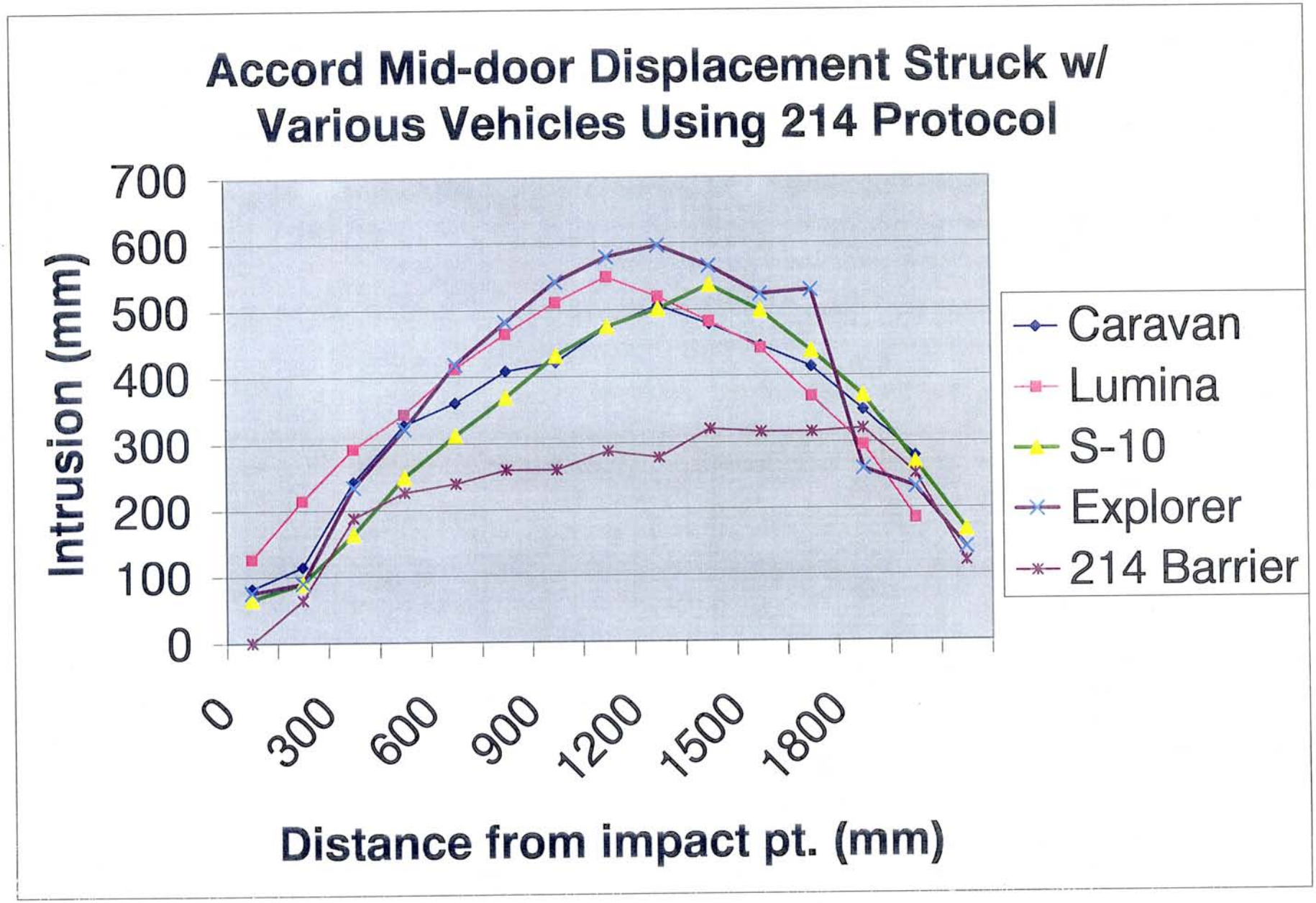
Accord Mid-door Displacement Struck w/ Various Vehicles Using 214 Protocol
Intrusion (mm)
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Distance from impact pt. (mm)
Caravan
Lumina
S-10
Explorer
214 Barrier


Chrysler Data Visualizer
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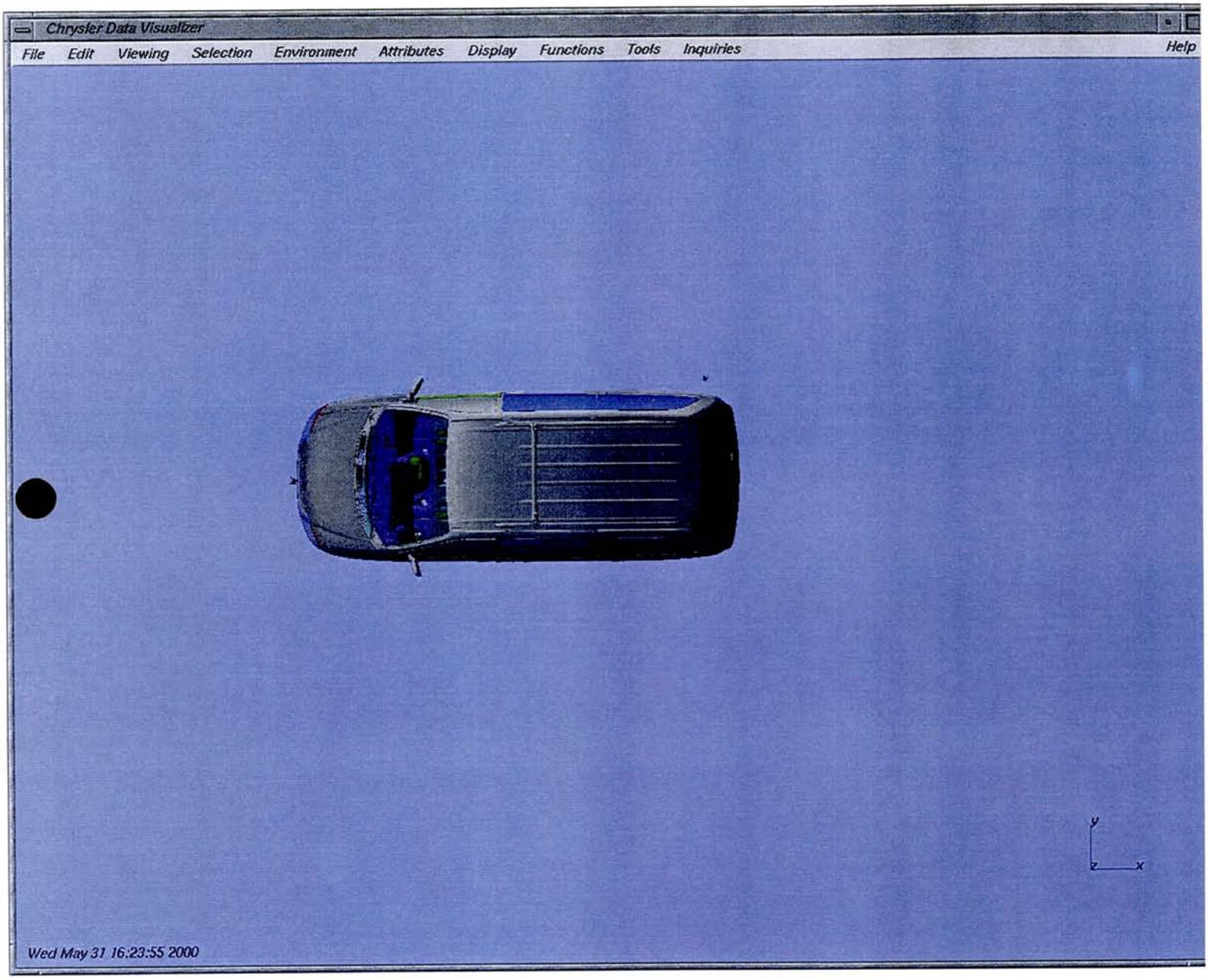
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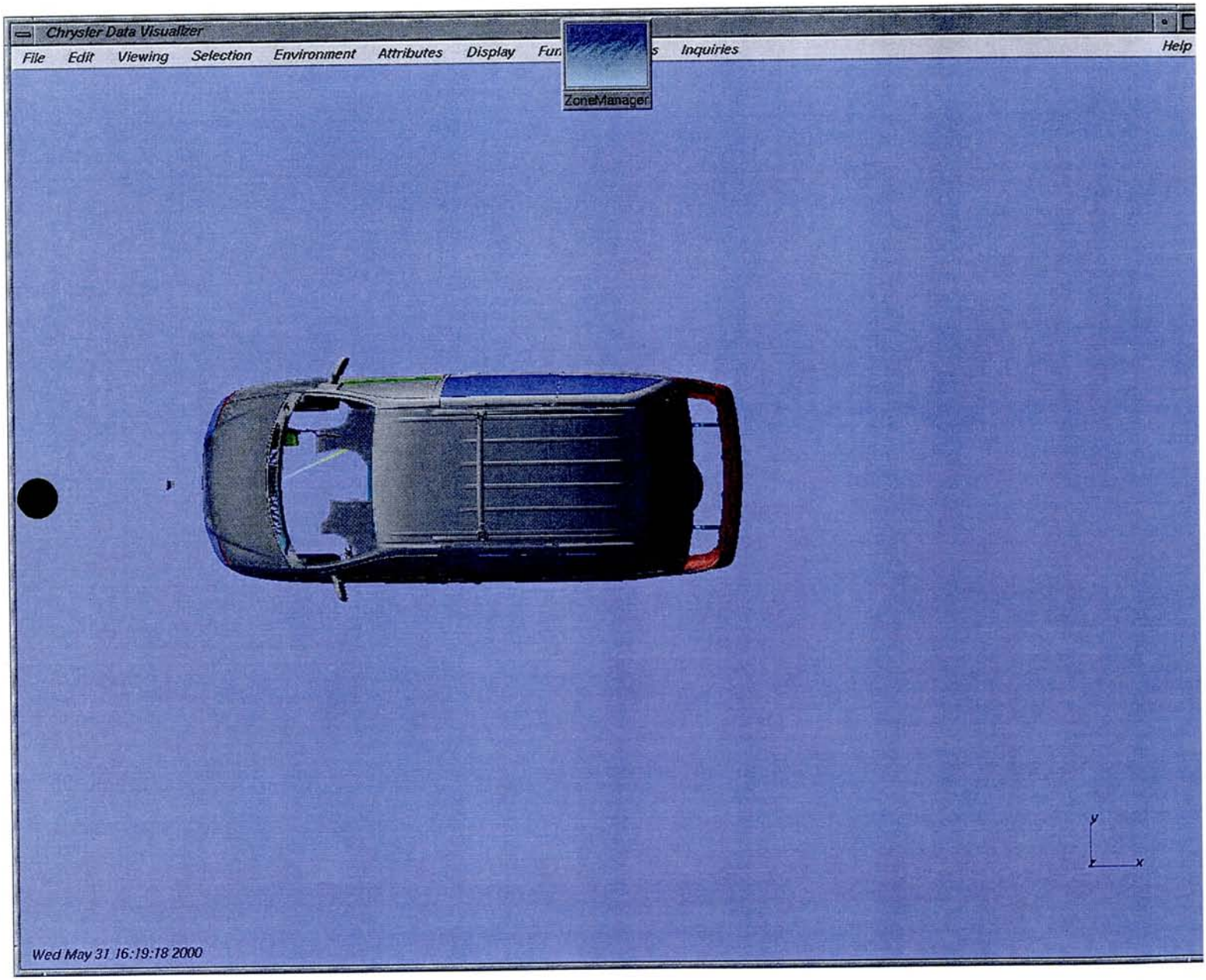
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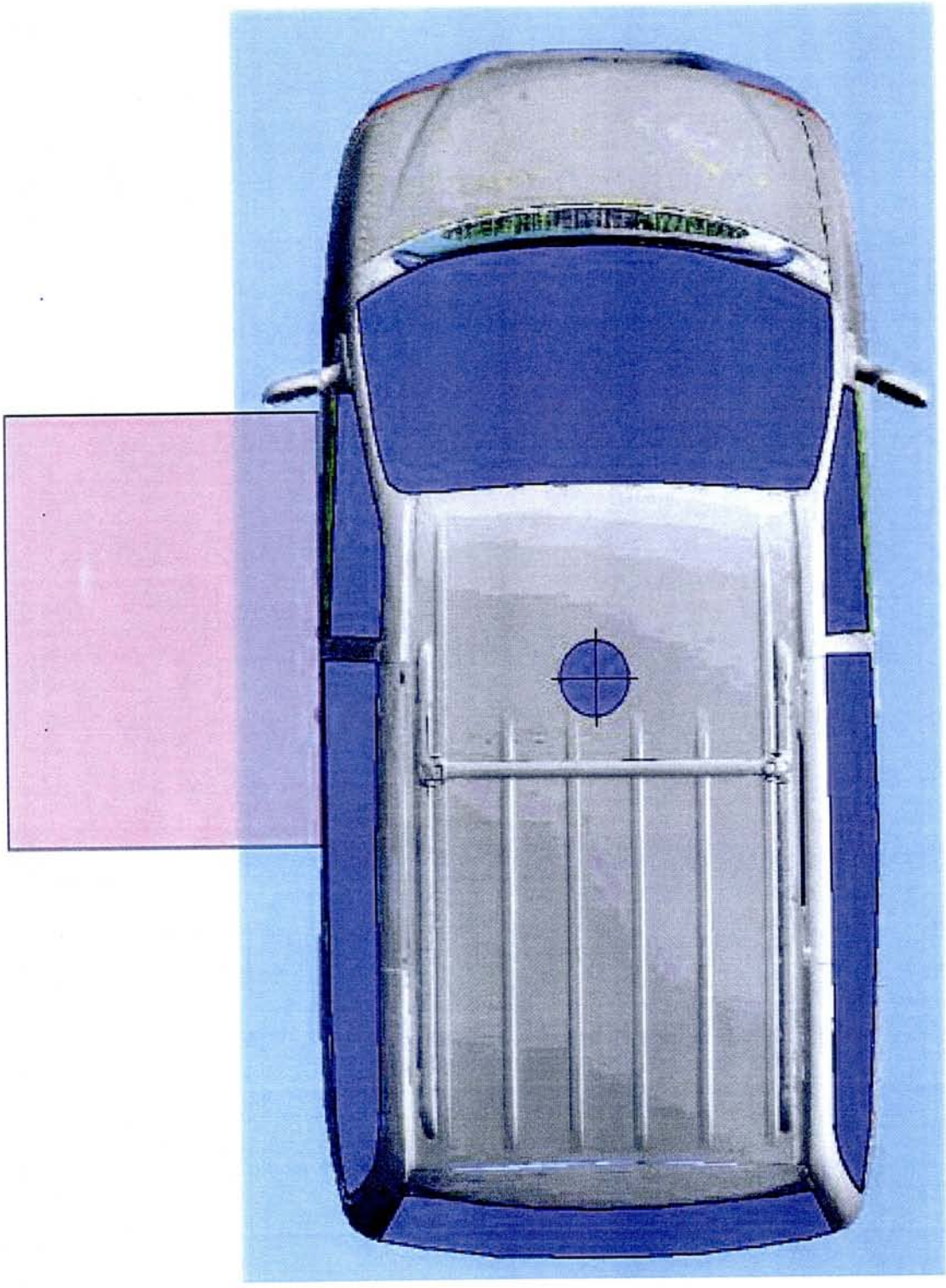
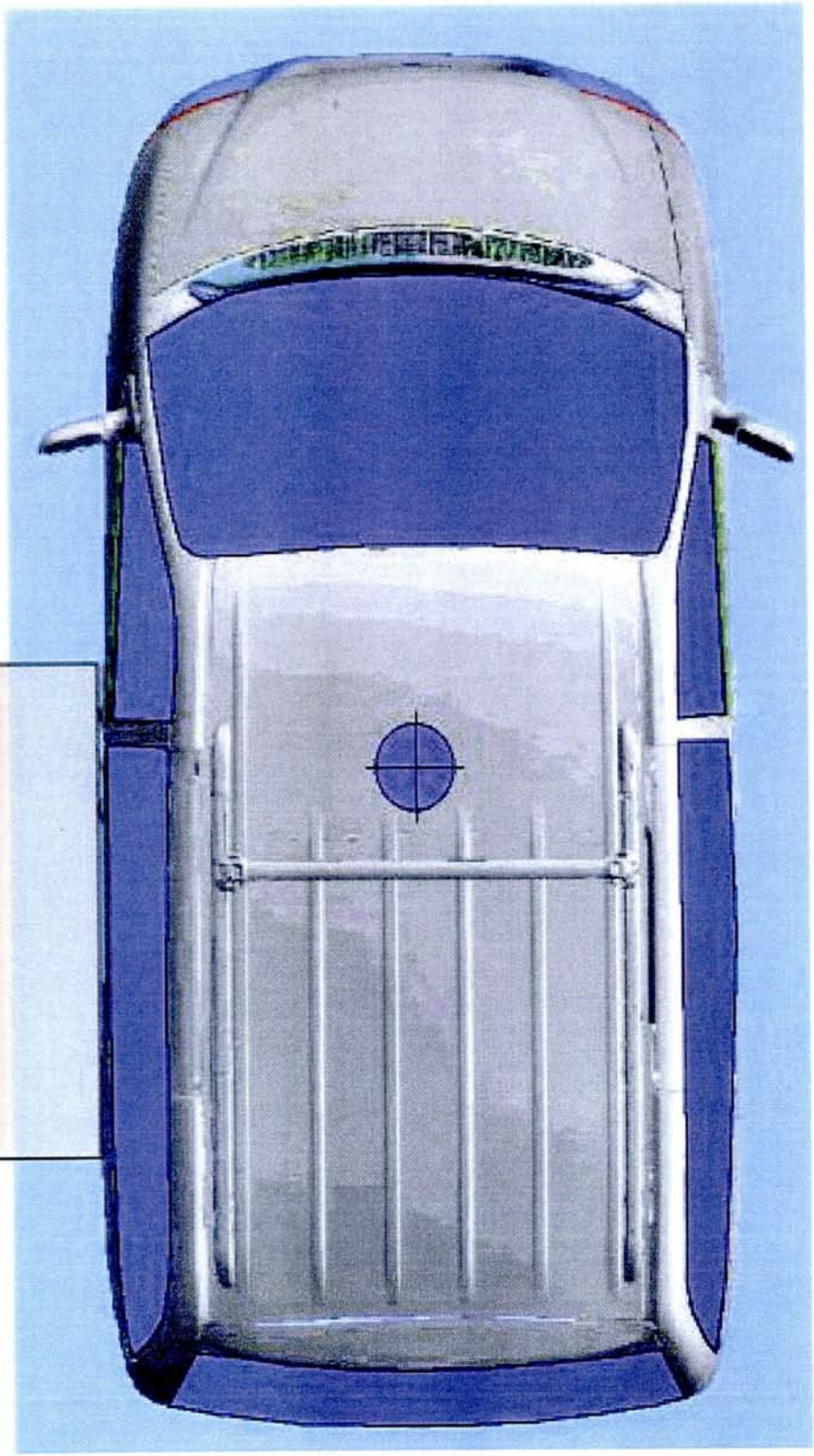
NS LWB	At FMVSS-214 Location
Angular Velocity (rad/s)	0.47
Energy Dissipated *	73,717 ft - lbf

* Energy dissipated includes the crush of the barrier and the vehicle.



NS LWB	Between 214 pos & Rear Axle
Angular Velocity (rad/s)	2.54
*Energy Dissipated	62,582 ft - lbf

*Energy dissipated includes the crush of the barrier and the vehicle.



NS LWB	Centered on Rear Axle
Angular Velocity (rad/s)	3.40
Energy Dissipated*	46,041 ft - lbf

* Energy dissipated includes the crush of the barrier and the vehicle.