

Put Your Money Where Your Mouth is

**So That's Exactly
What Was Done**

**Todd Tracy
Dallas, Texas**



Aftermarket Parts



- 1) CAPA certified Hood
- 2) CAPA certified left and right fenders
- 3) Aftermarket left and right hood hinges (CAPA N/A)
- 4) Aftermarket bumper reinforcement bar (CAPA N/A)
- 5) Aftermarket radiator support (CAPA N/A)
- 6) Aftermarket left front wheel (CAPA N/A)
- 7) Aftermarket front windshield



Test #2 (Blue Test)



Roof Removed and Reapplied with Adhesive



Test #1 (Red Test)



No Modifications from Original Factory Condition



Test #3 (Black Test)



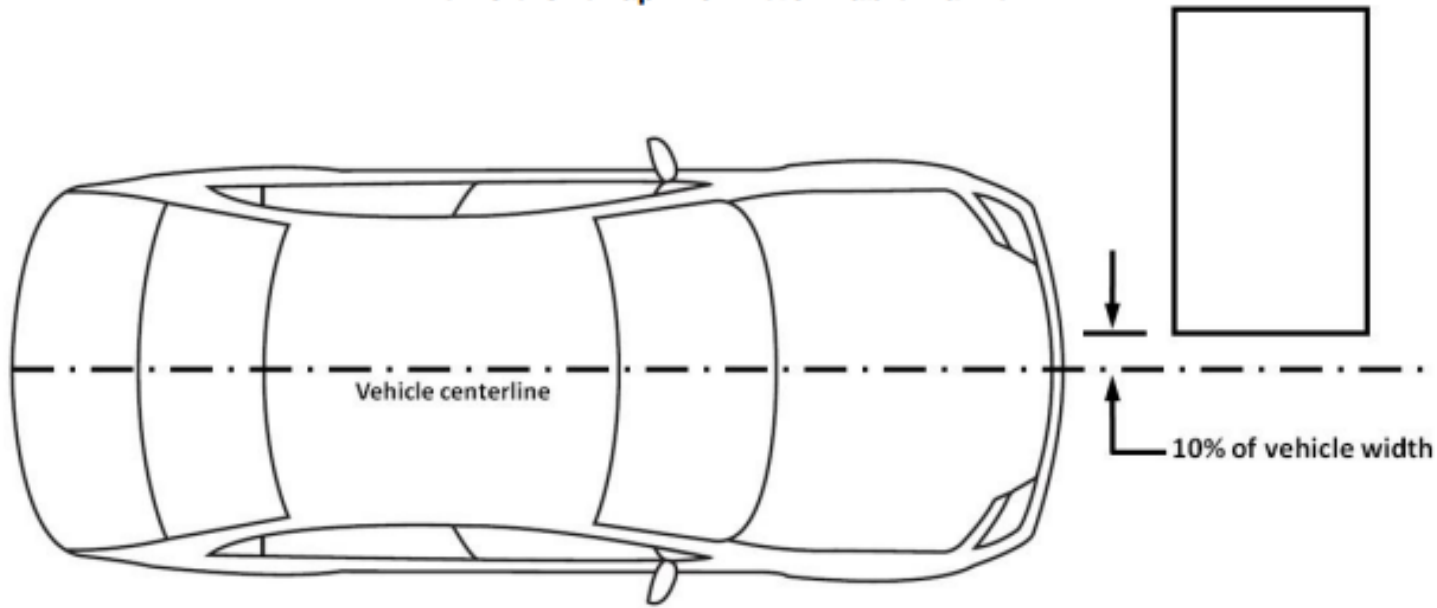


**Moderate Overlap Frontal Crashworthiness Evaluation
Crash Test Protocol (Version XVIII)**

July 2017

**IIHS
Moderate
Overlap Test
Protocol
Followed to
the Letter**

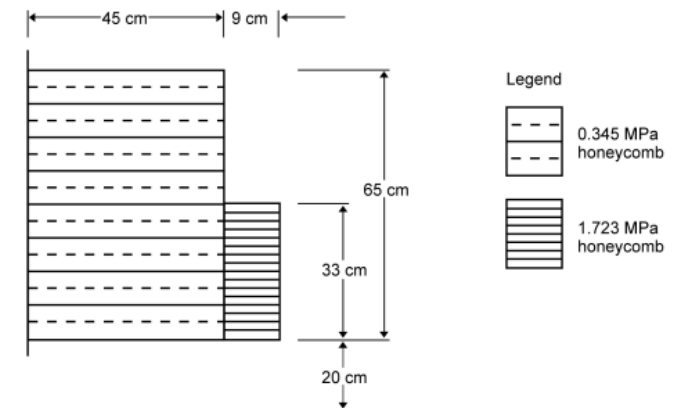
Figure 1
Vehicle Overlap with Deformable Barrier



Tests Conducted at KARCO Testing Facility in Adelanto, CA

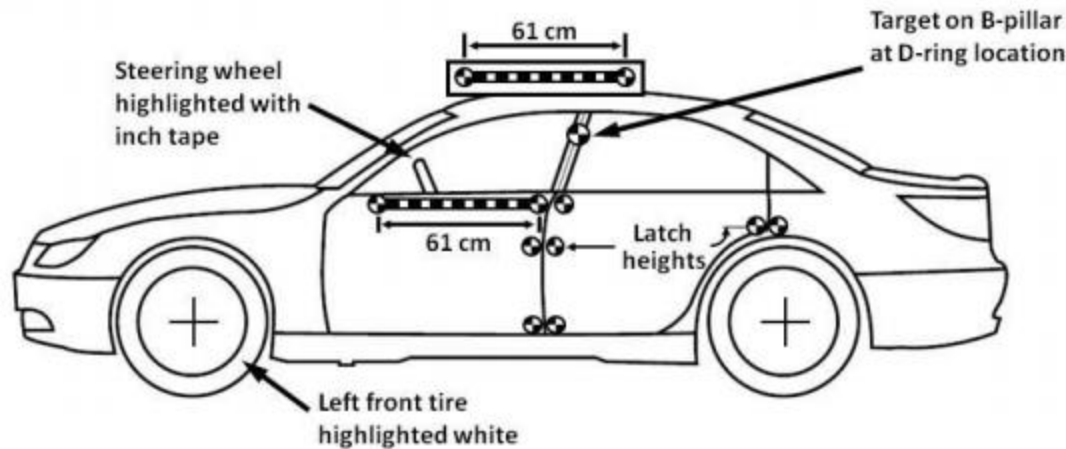
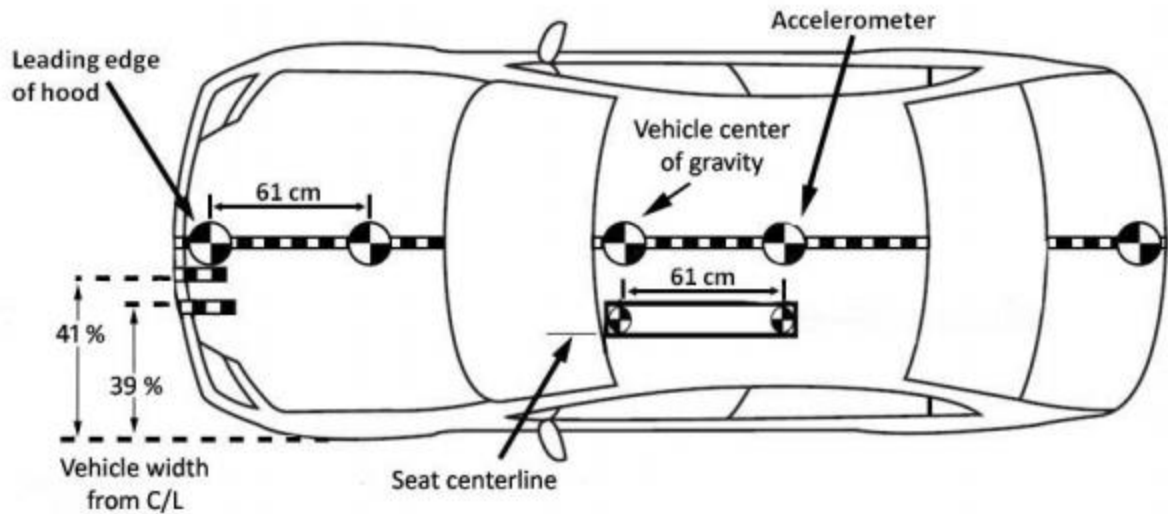


Figure 3
Deformable Barrier Face Profile and Dimensions
 Single Stage with Bumper Element



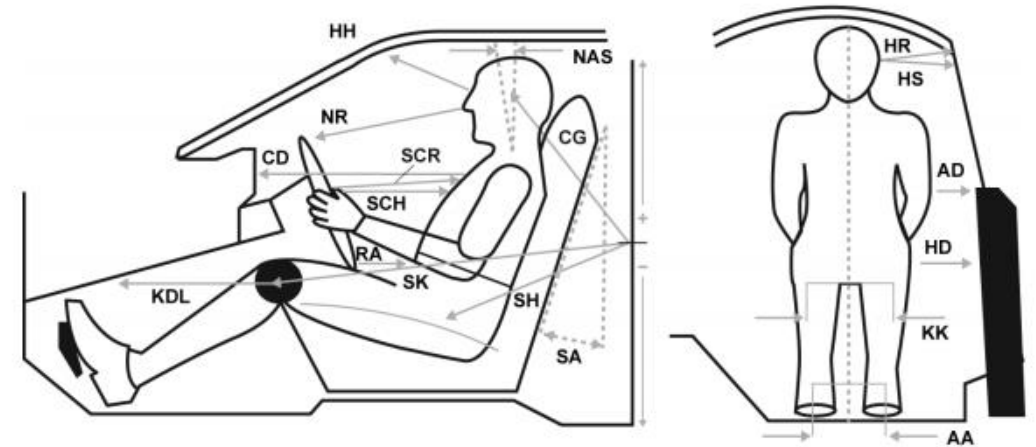
A Vehicle will pass this test if the injury criteria thresholds are not exceeded.

Figure 4
Exterior Surface Marking



APPENDIX A

Dummy Clearance Measurement Definitions



Location	Code	Definition of Measurement
Ankle to ankle	AA	Taken between the center points of both ankles, after the feet are placed per Institute protocol.
Arm to door	AD	Taken from the center point of the elbow to the first contact point of the door panel.
Chest to dash	CD	Taken from the clavicle adjustment holes in the chest to the point on the dash at level of chest landmark.
Head to A-pillar	HA	Horizontal measurement taken from the center of the outboard target to the A-pillar.

Text Box



Frame # -49



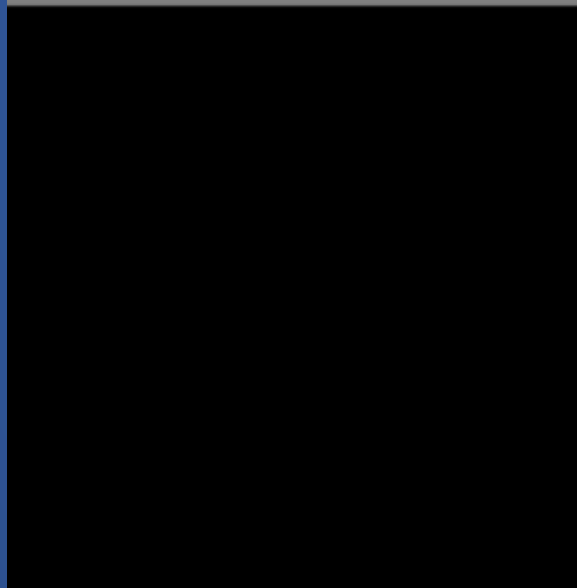
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Frame # -49



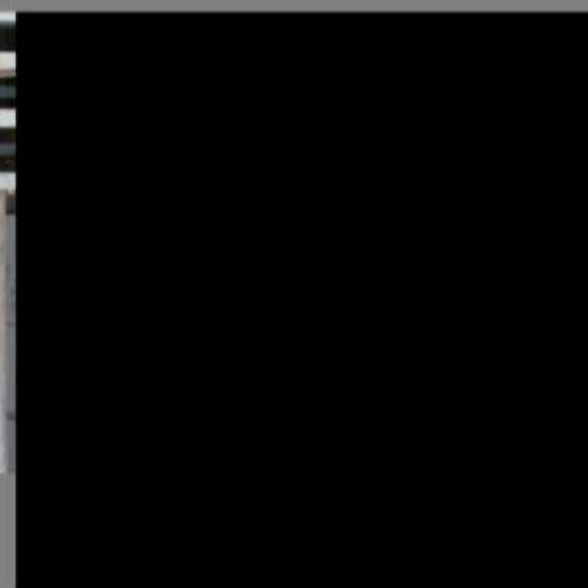
Time -0.049



Frame # -49



Time -0.049



T H E R E S T O F T H E

STORY

Vehicle Design

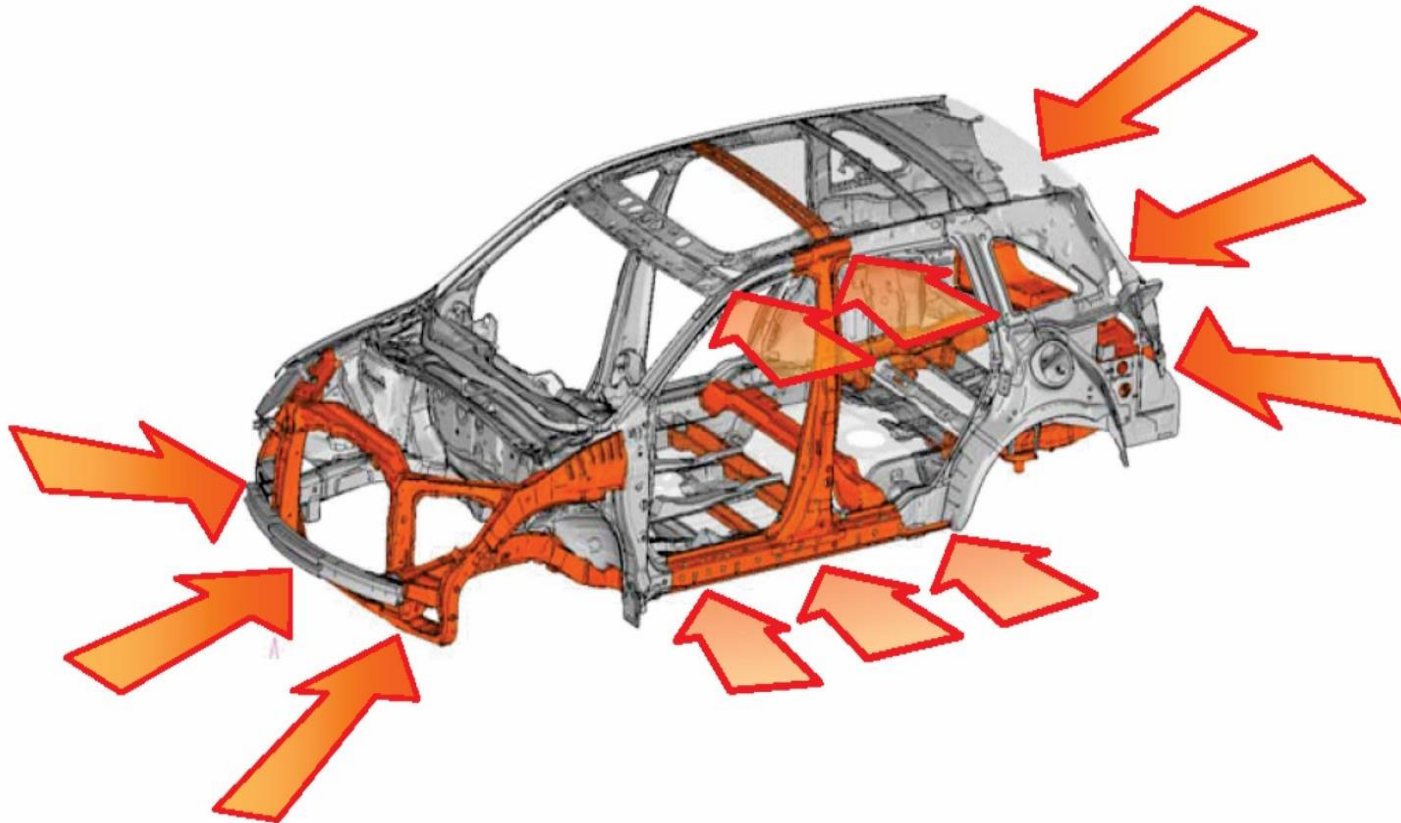
Safety is designed from the drawing board. Vehicles are tuned to meet specific performance and safety goals. Vehicle tuning is the foundation of safety. Improper assembly and inadequate replacement parts WILL affect tuning which alters vehicle safety.

Structural Performance

HONDA Technical Challenge

Create 360° Safety Cage

By optimizing Materials and Design



Underbody

Roof Adhesive

Aftermarket Parts

Camera
View-05



Frame #
-49

Time
-0.049



Camera
View-05



Frame #
-49

Time
-0.049



OEM

Camera
View-05



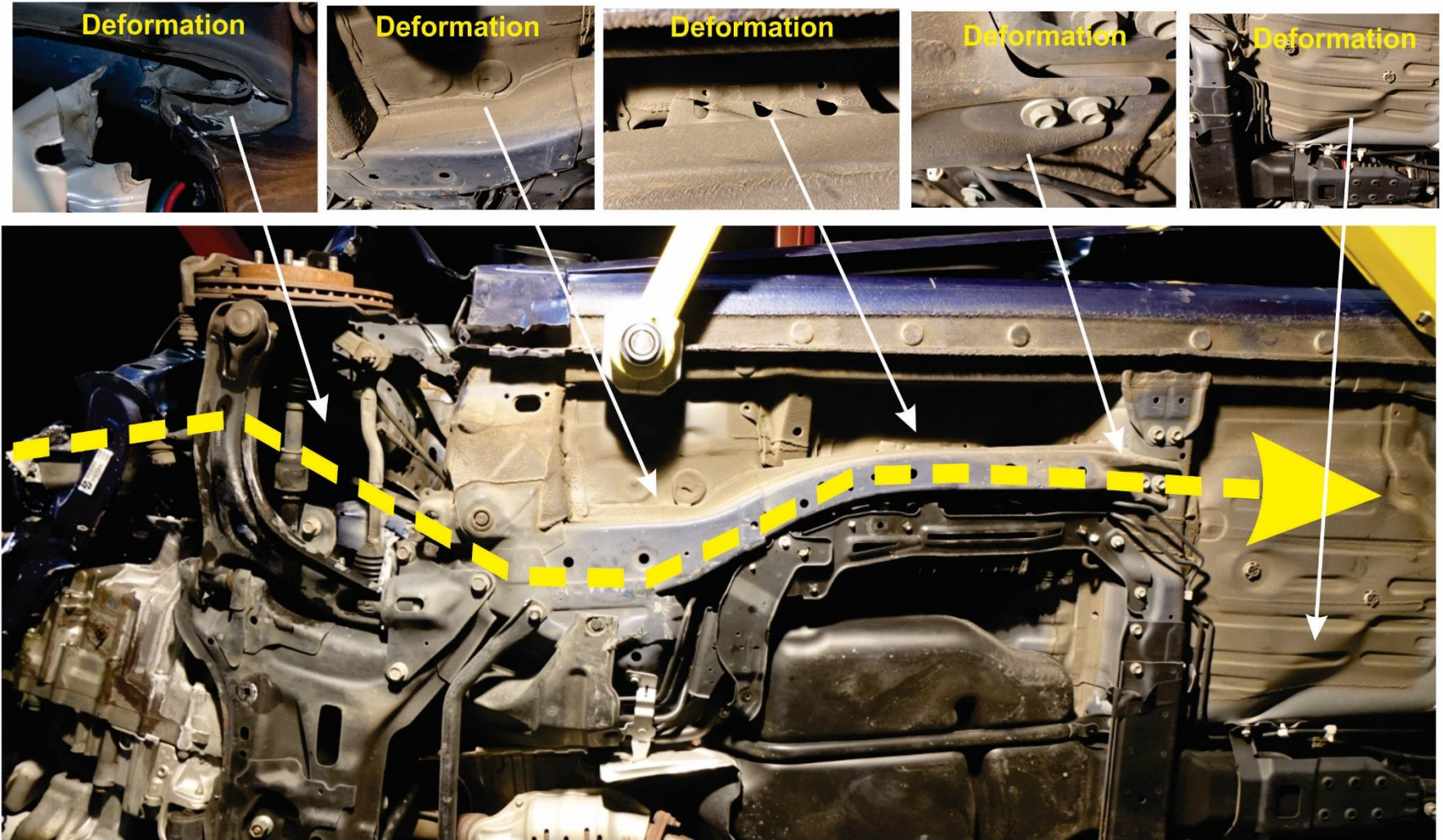
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Time
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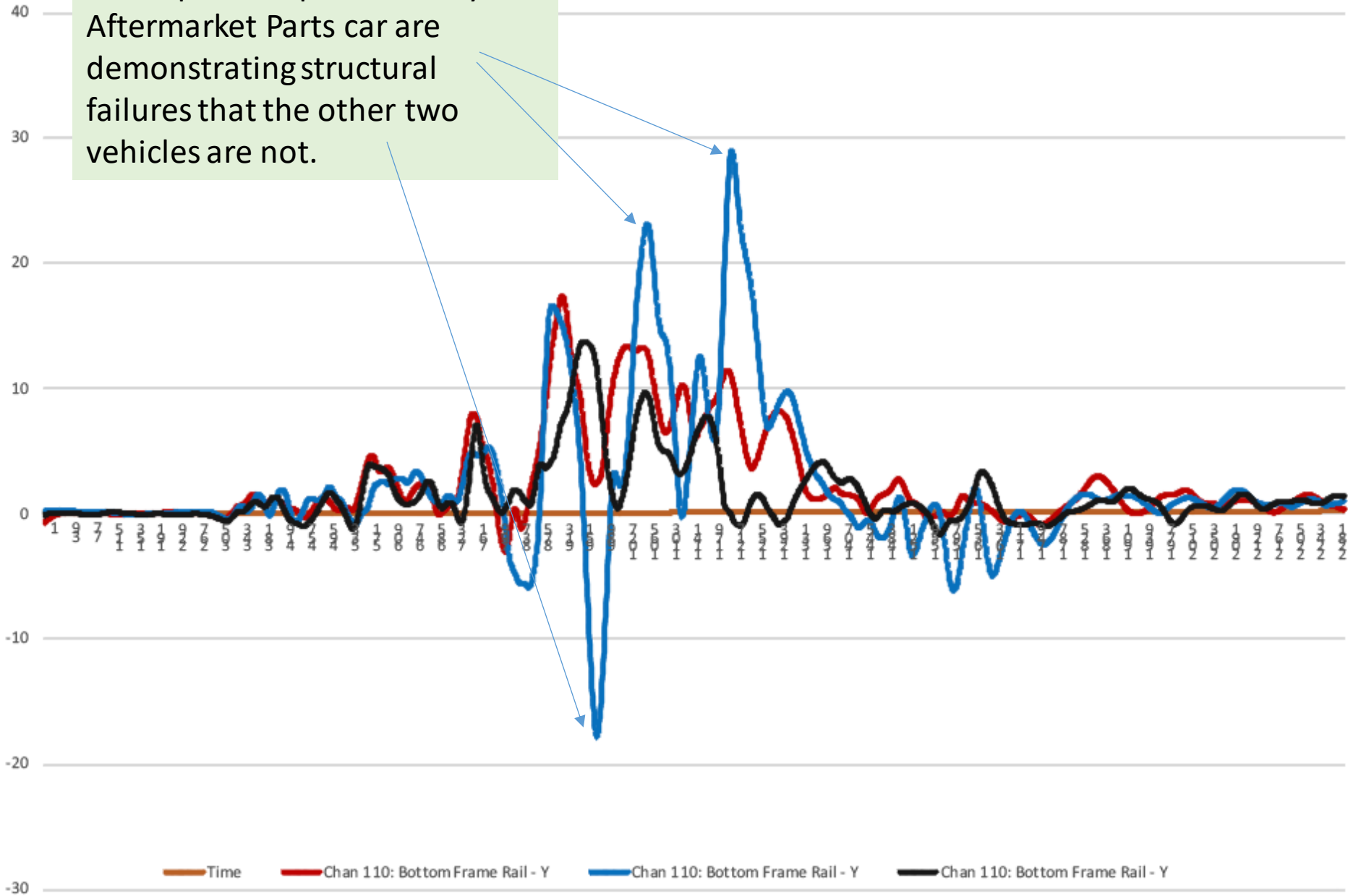
Structure
Underneath
the
occupants
caused
injurious
vertical
loads

Aftermarket Parts



Bottom Frame Rail Sensor - Y

These peaks experienced by the Aftermarket Parts car are demonstrating structural failures that the other two vehicles are not.



**Blue-
Aftermarket**

**Red-
Adhesive**

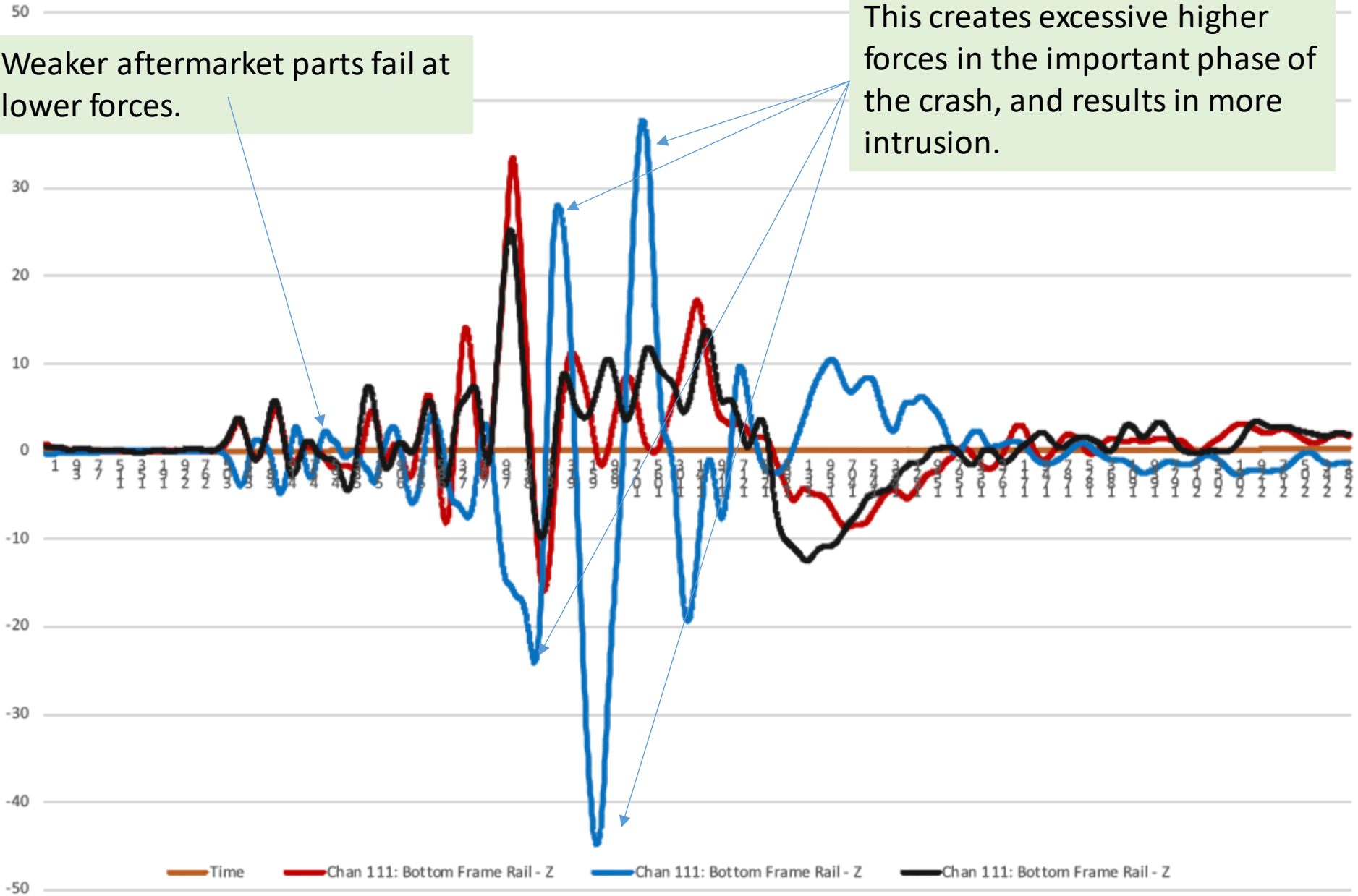
**Black-
OEM**

Time Chan 110: Bottom Frame Rail - Y Chan 110: Bottom Frame Rail - Y Chan 110: Bottom Frame Rail - Y

Bottom Frame Rail Sensor - Z

Weaker aftermarket parts fail at lower forces.

This creates excessive higher forces in the important phase of the crash, and results in more intrusion.



**Blue-
Aftermarket**

**Red-
Adhesive**

**Black-
OEM**

Frame buckled underneath the driver

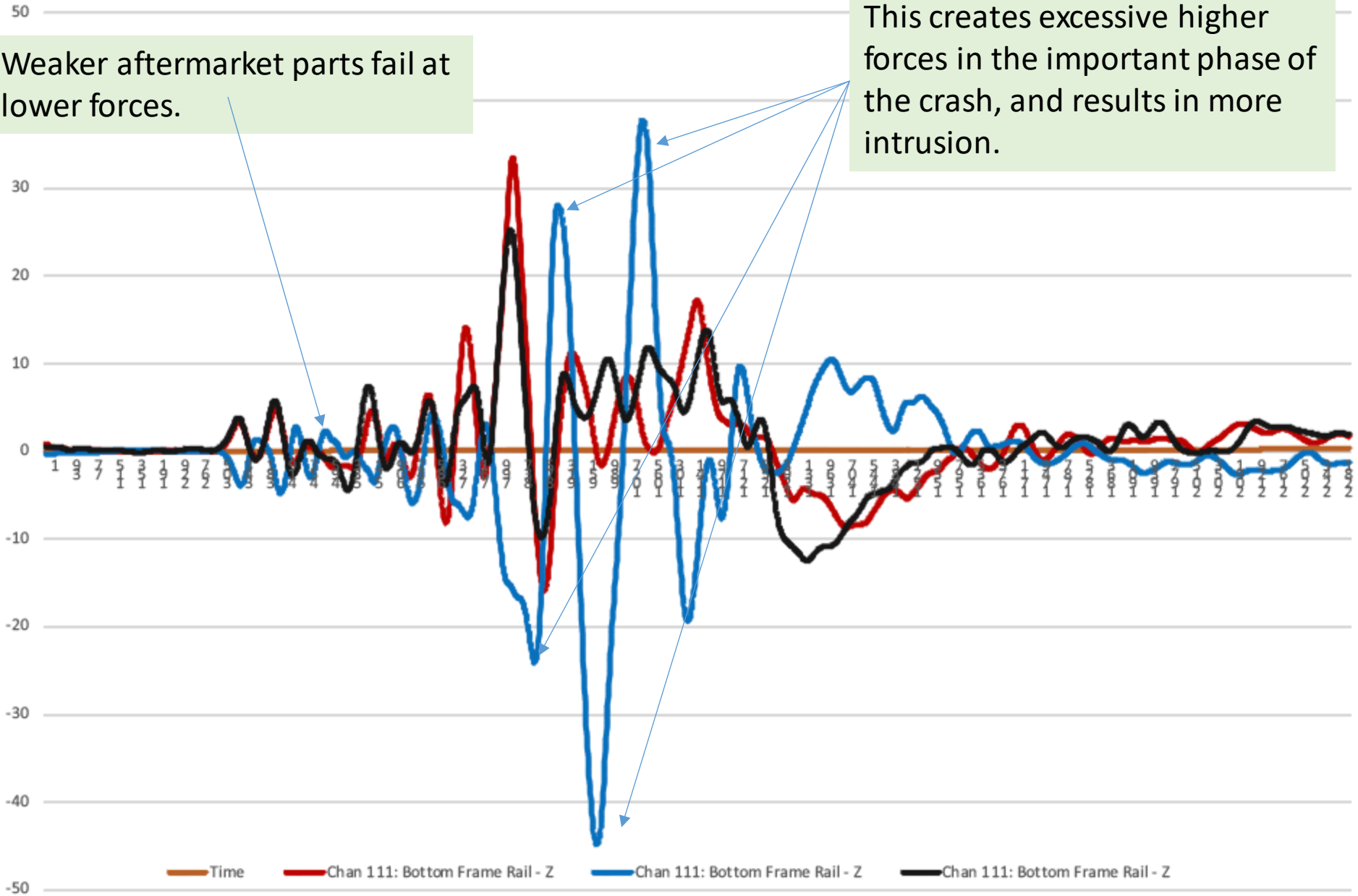
Roof Adhesive



Bottom Frame Rail Sensor - Z

Weaker aftermarket parts fail at lower forces.

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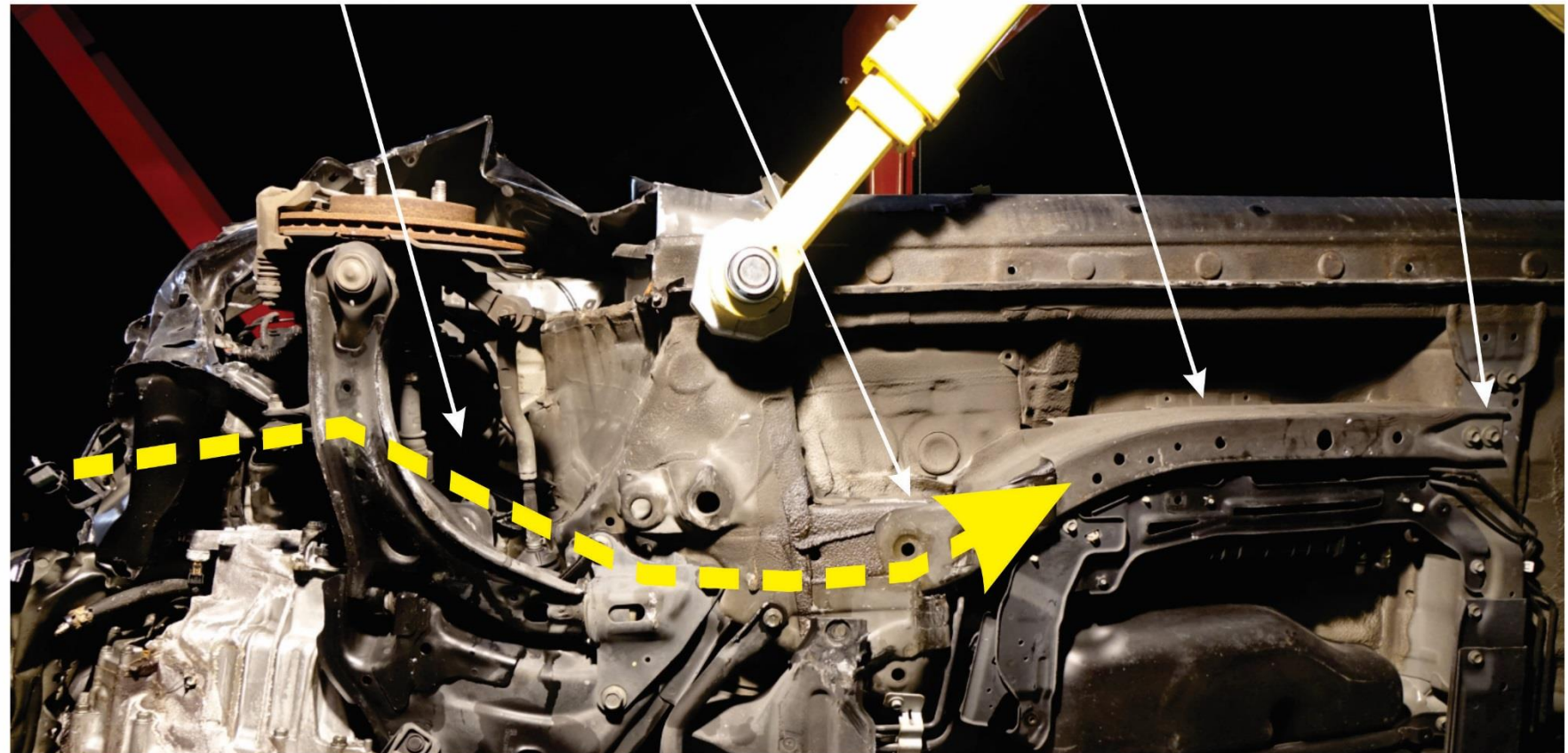
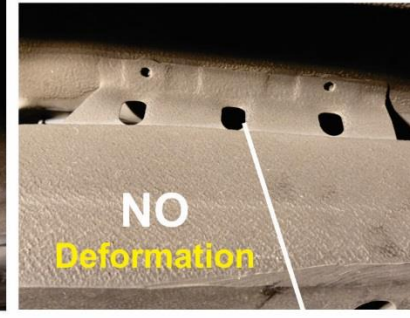
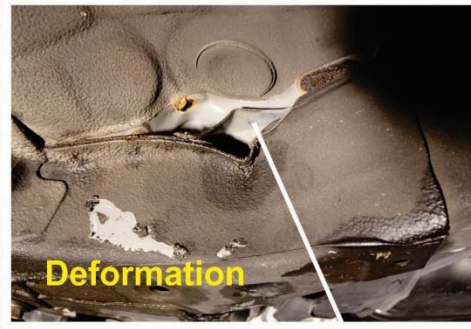
**Blue-
Aftermarket**

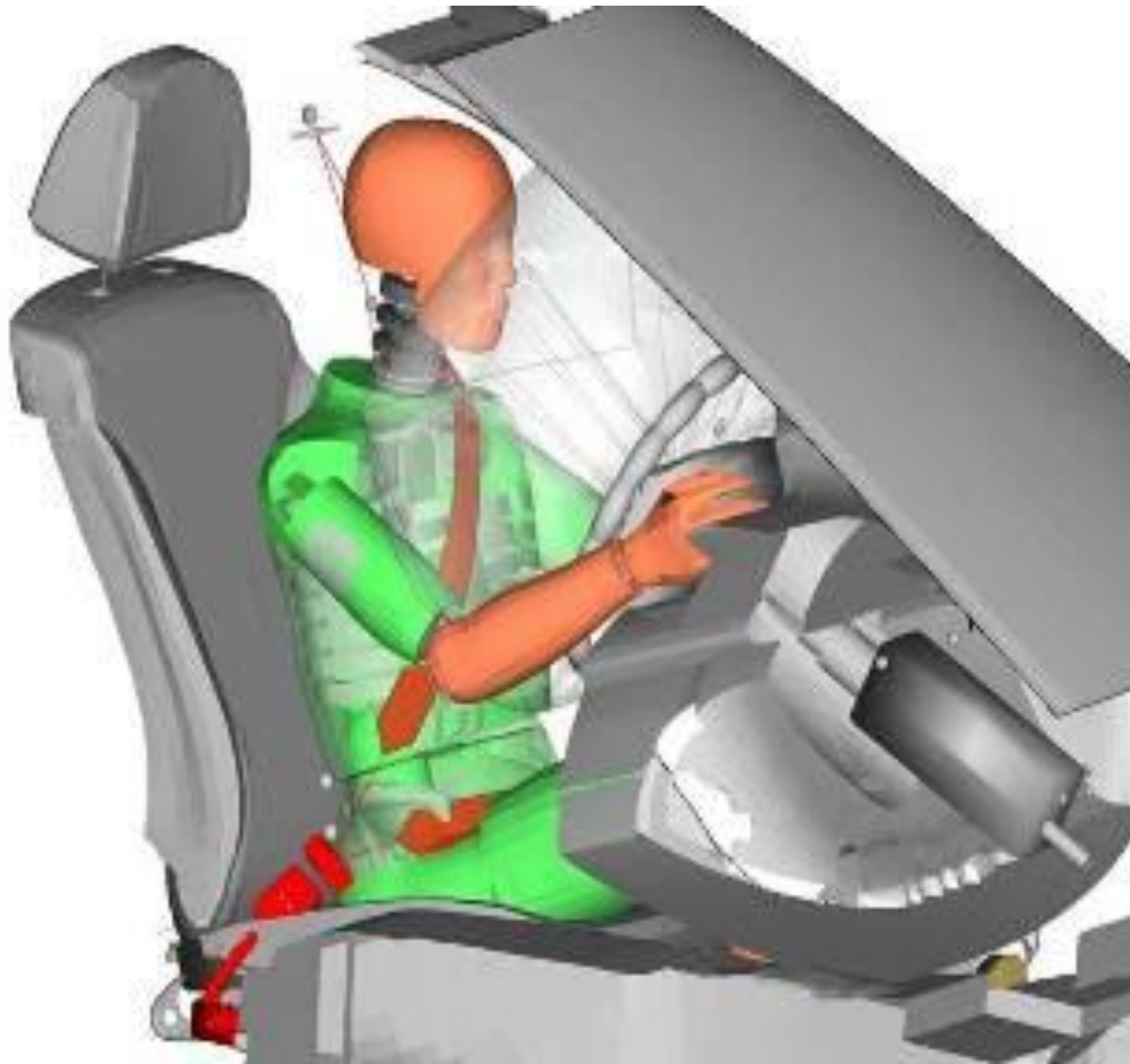
**Red-
Adhesive**

**Black-
OEM**

No frame damage underneath the driver

Honda OEM





**Restraint System
Performance
Affected By
Improper Parts
and Repair**

Safety Systems Are Tied Together and Must Work In Harmony With Other Safety Systems



Roof Adhesive



Aftermarket Parts

Frame # -49



Time -0.049

Frame # -49



Time -0.049



OEM

Frame # -49



Time -0.049

Excessive Frame Crush Affects Seatbelt Performance

Aftermarket Parts



13 Inches

Excessive Frame Crush Affects Seatbelt Performance

Roof Adhesive

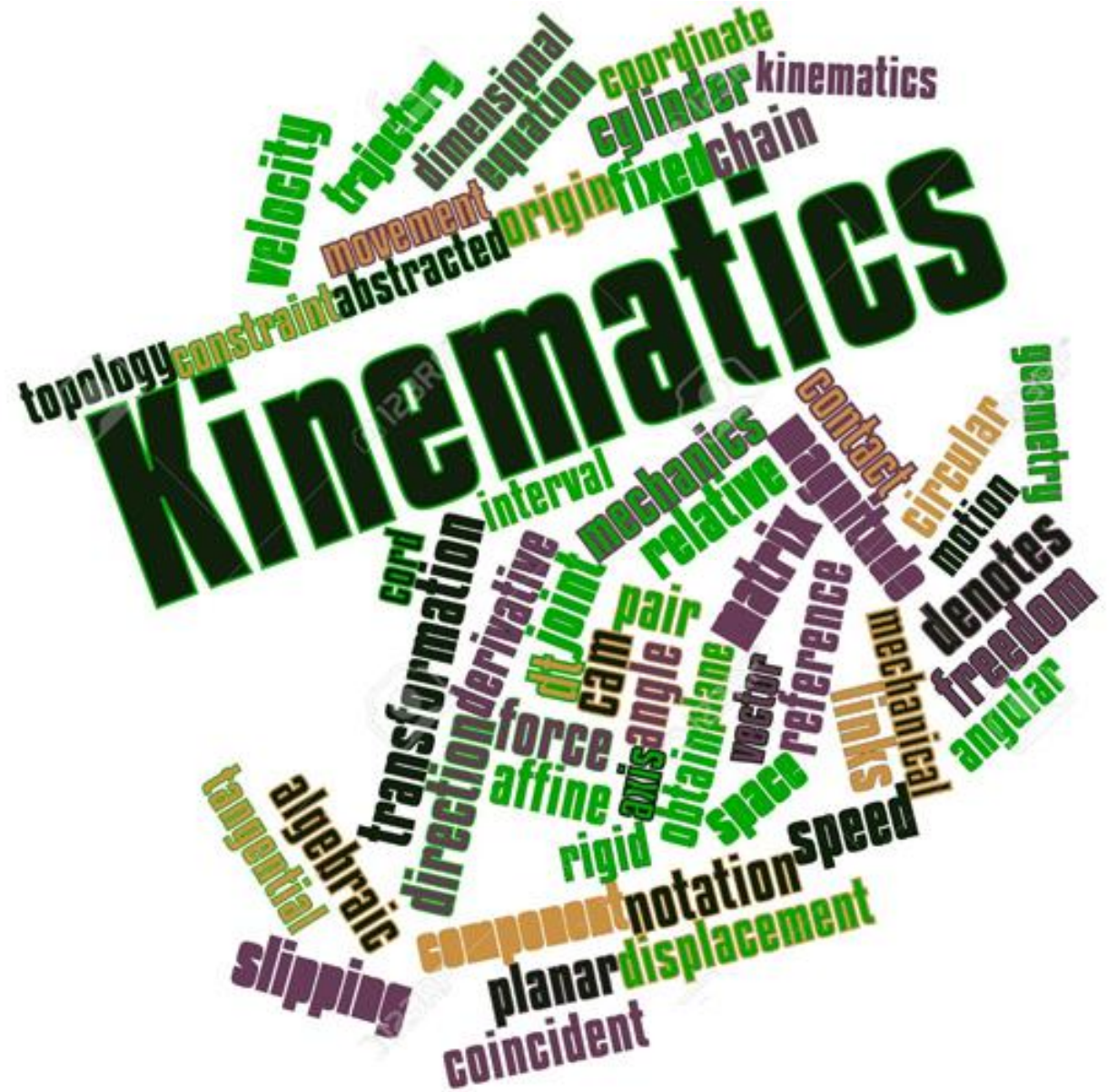


When Safety Systems Work Together, The Seatbelt System Works More Efficiently

Honda OEM



Safety Systems Have A Direct Correlation to Proper Kinematics



Excessive Structural Crush and Increased Seatbelt Payout Negatively Affects Seatbelt Performance

Camera View-07



Frame #
-49

Time
-0.049

Roof Adhesive



Camera View-07



Frame #
-49

Time
-0.049

Aftermarket Parts



Camera View-07

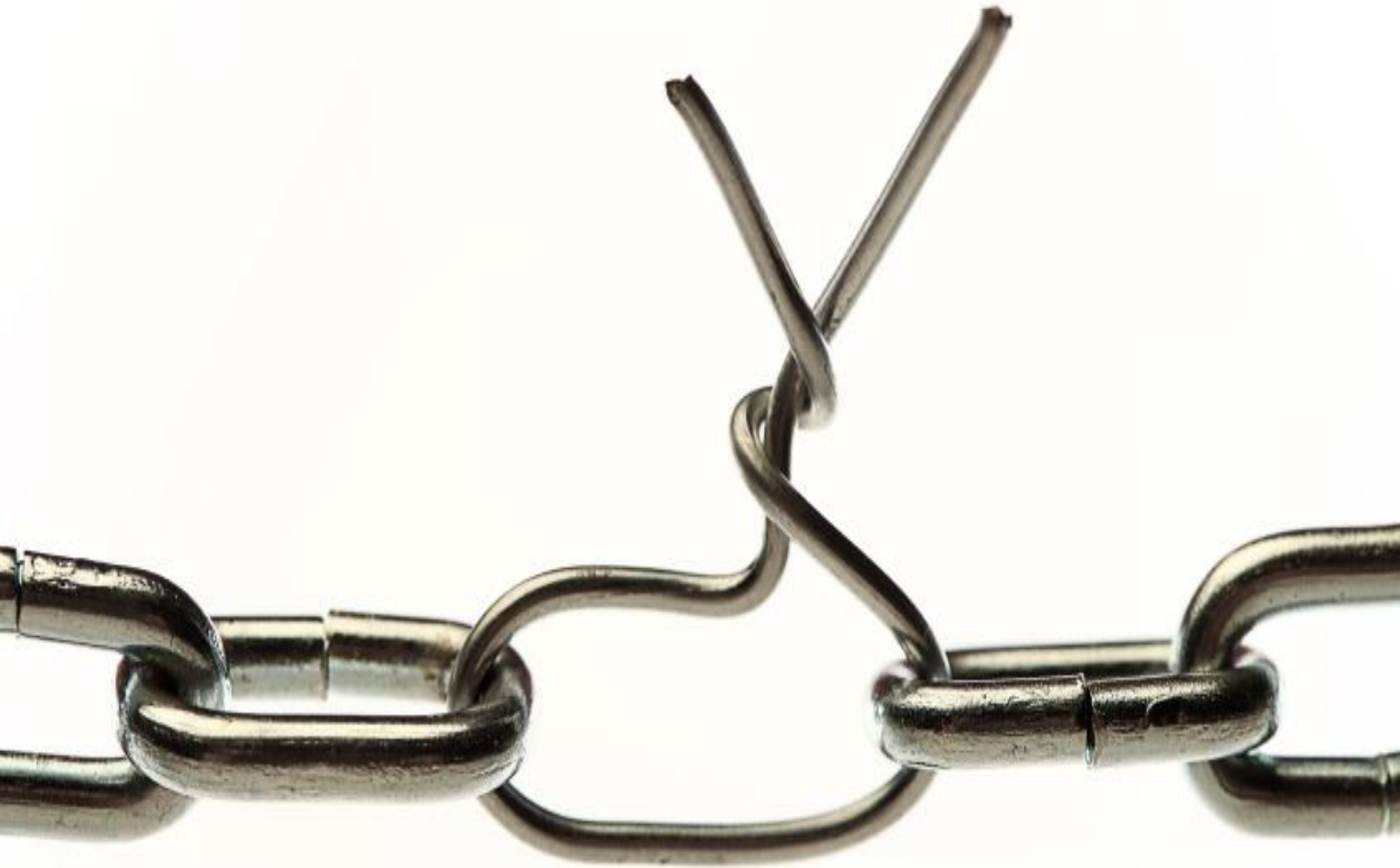


Frame #
-49

Time
-0.049

OEM





Injuries start with the weakest link, once that link is broken, subsequent failures will increase the potential for injury.

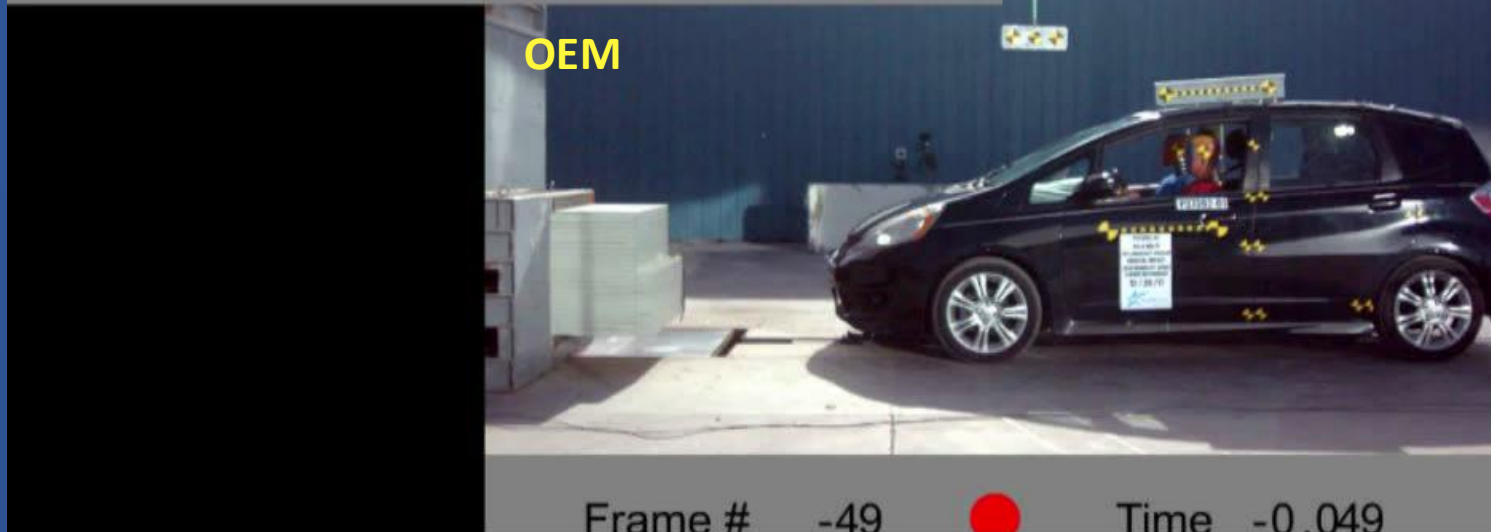
Improper Repairs and Material Increase Probability of Harm



Frame # -49 ● Time -0.049



Frame # -49 ● Time -0.049



Frame # -49 ● Time -0.049

The HIC numbers for the adhesive vehicle are high because the vehicle failed to properly distribute energy

Roof Adhesive

Curve Description	Units	HIC/CLP	t1	t2	Avg. G's	ms.
Driver HIC15 Primary	HIC15	427.4	91.0	106.0	60.5	15.0
Driver HIC15 Redundant	HIC15	424.5	91.2	106.2	60.3	15.0

Aftermarket Parts

Curve Description	Units	HIC/CLP	t1	t2	Avg. G's	ms.
Driver HIC15 Primary	HIC15	332.4	86.9	101.9	54.7	15.0
Driver HIC15 Redundant	HIC15	316.6	86.8	101.8	53.6	15.0

Honda OEM

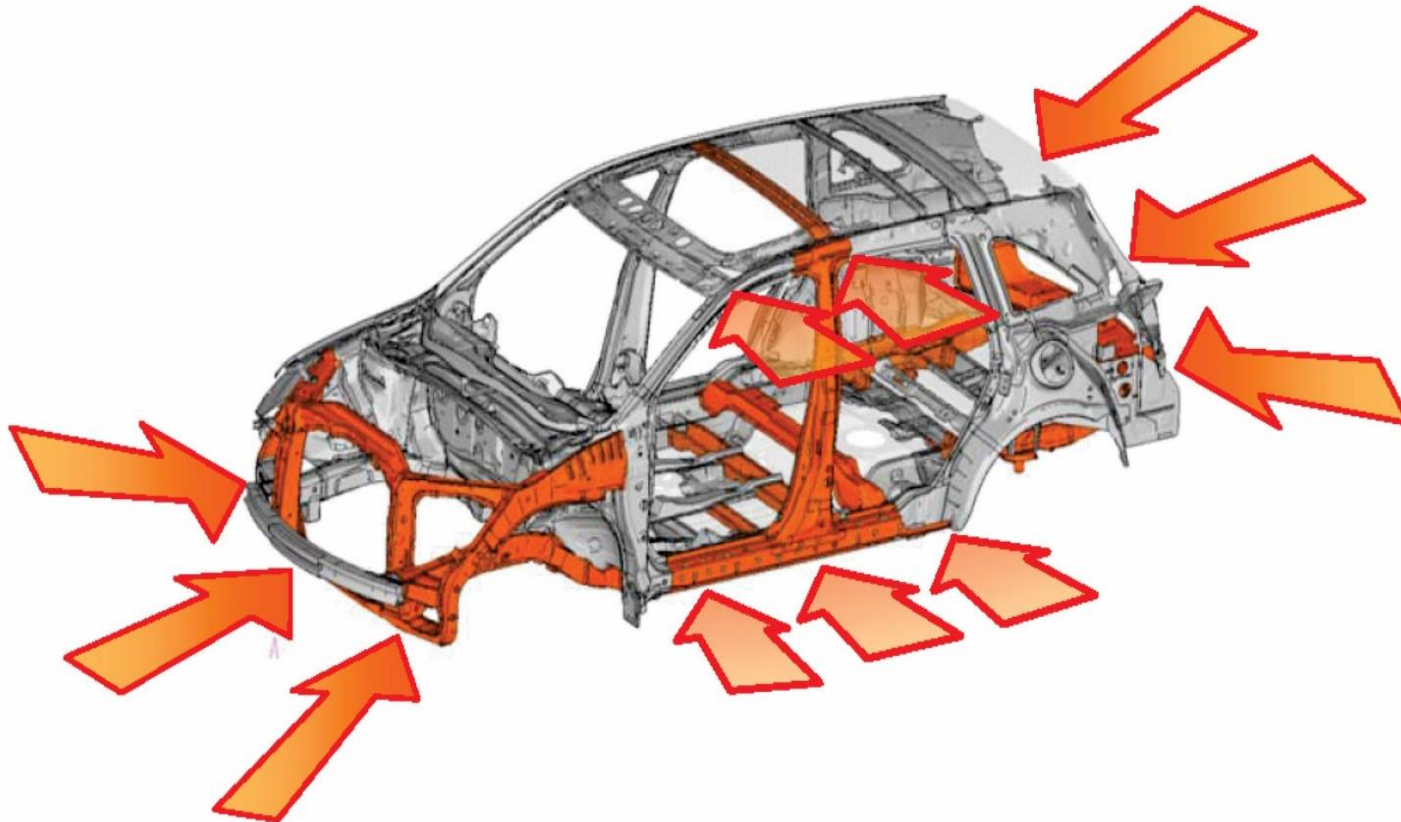
Curve Description	Units	HIC/CLP	t1	t2	Avg. G's	ms.
Driver HIC15 Primary	HIC15	282.6	91.8	106.8	51.3	15.0
Driver HIC15 Redundant	HIC15	280.7	91.9	106.9	51.1	15.0

Structural Performance

HONDA Technical Challenge

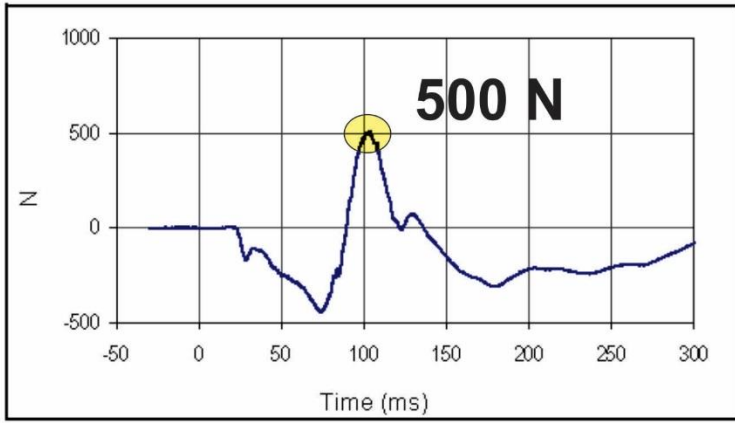
Create 360° Safety Cage

By optimizing Materials and Design



Inadequate Repairs and Material Cause Neck Injury

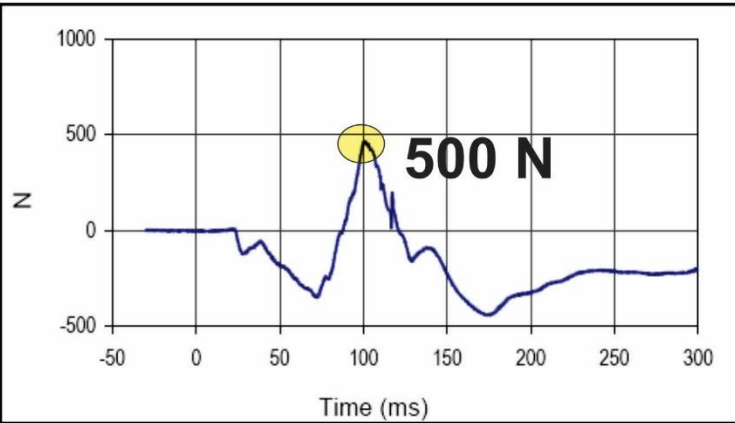
Roof Adhesive



Driver Upper Neck Force X

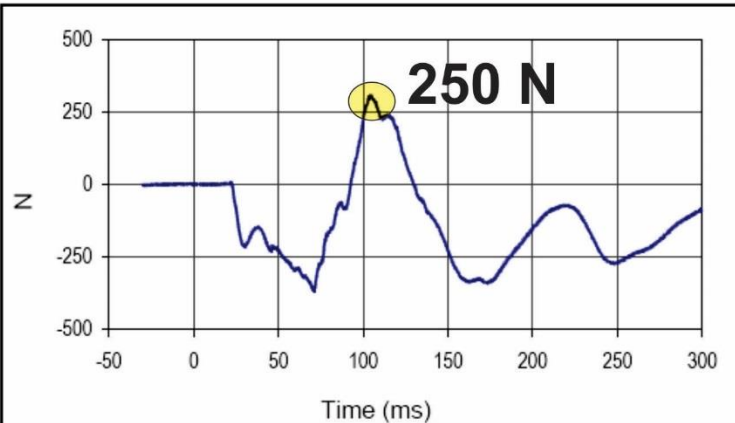
Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
009		1000	N
Max	Time	Min	Time
508.6	104.2	-444.0	74.3

Aftermarket Parts



Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
009		1000	N
Max	Time	Min	Time
465.7	101.4	-439.9	175.3

Honda OEM



Curve Description			
Driver Upper Neck Force X			
Plot No.		SAE Class	Units
009		1000	N
Max	Time	Min	Time
306.5	104.4	-370.5	71.1

Camera
View-07



Frame #
-49

Time
-0.049

Roof Adhesive



Camera
View-07



Frame #
-49

Time
-0.049

Aftermarket Parts



Camera
View-07



Frame #
-49

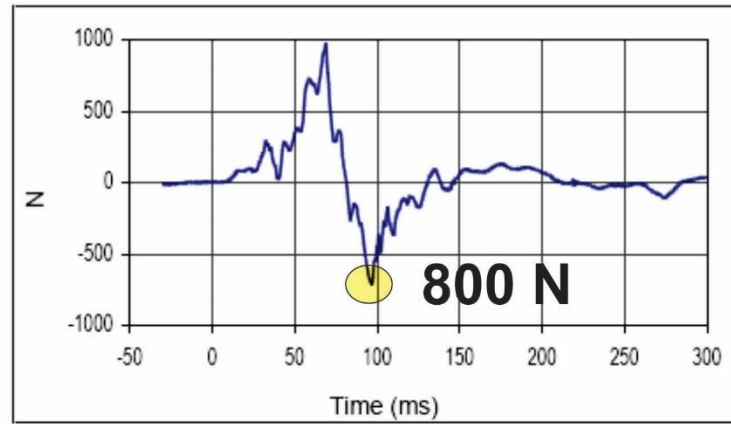
Time
-0.049

OEM



Inadequate Repairs and Material Cause Femur Fractures

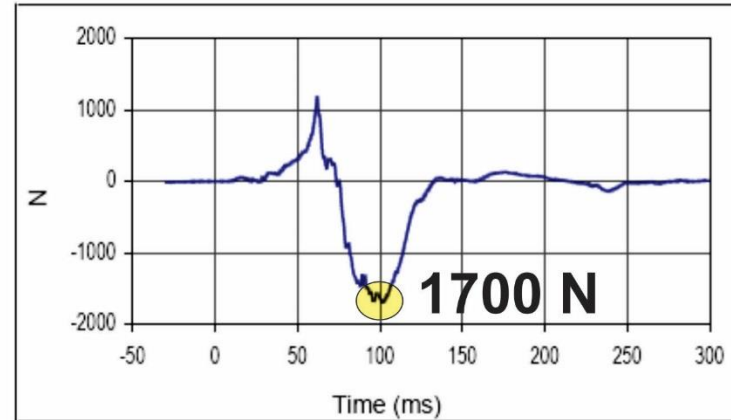
Roof Adhesive



Driver Left Femur

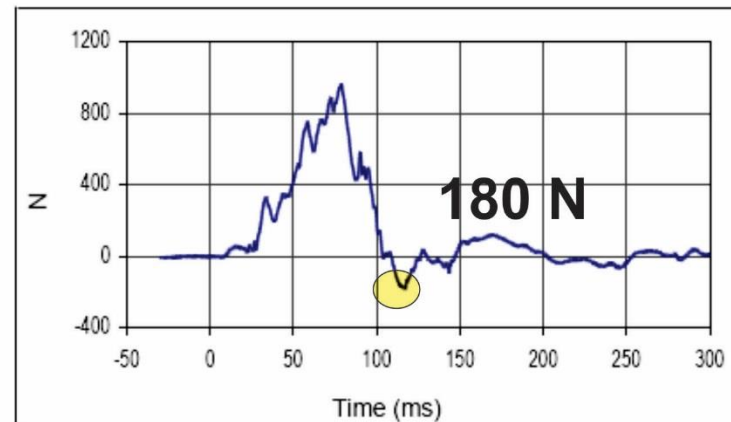
Curve Description			
Driver Left Femur Force Z			
Plot No.	SAE Class	Units	
033	600	N	
Max	Time	Min	Time
971.1	68.8	-708.9	96.6

Aftermarket Parts



Curve Description			
Driver Left Femur Force Z			
Plot No.	SAE Class	Units	
033	600	N	
Max	Time	Min	Time
1178.6	61.9	-1685.4	101.4

Honda OEM



Curve Description			
Driver Left Femur Force Z			
Plot No.	SAE Class	Units	
033	600	N	
Max	Time	Min	Time
960.8	78.8	-179.7	117.1



Roof Adhesive



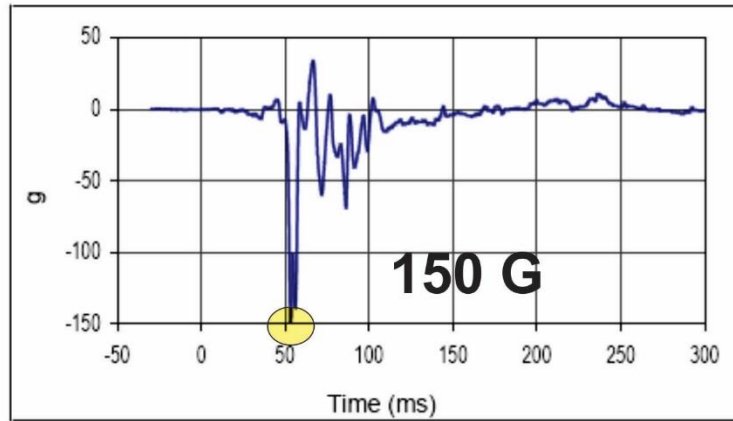
Aftermarket Parts



Honda OEM

Inadequate Repairs and Material Cause Ankle Fractures

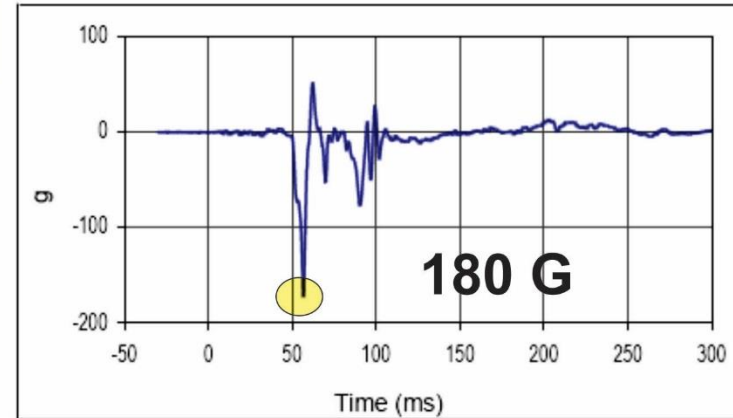
Roof Adhesive



Driver Right Toe

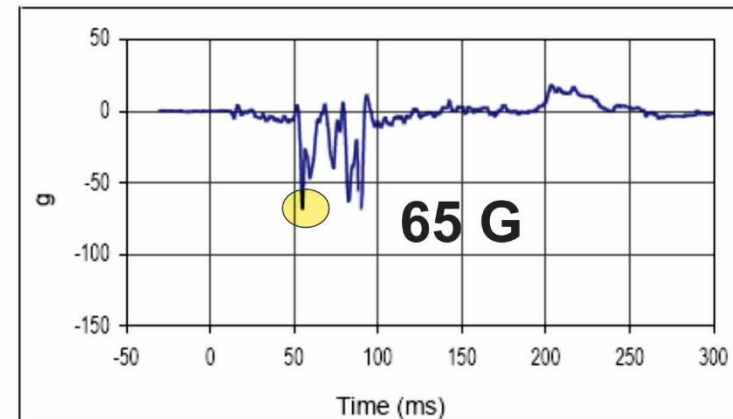
Curve Description			
Driver Right Toe Acceleration Z			
Plot No.		SAE Class	Units
056		180	g
Max	Time	Min	Time
33.9	66.6	-149.3	53.3

Aftermarket Parts



Curve Description			
Driver Right Toe Acceleration Z			
Plot No.		SAE Class	Units
056		180	g
Max	Time	Min	Time
51.1	62.1	-173.6	56.6

Honda OEM



Curve Description			
Driver Right Toe Acceleration Z			
Plot No.		SAE Class	Units
056		180	g
Max	Time	Min	Time
18.2	203.7	-102.1	89.3



Roof Adhesive



Aftermarket Parts



Honda OEM

These Tests Prove that Aftermarket Parts and Non-OEM Repair Methods Destroy Designed and Engineered Safety Systems and Increase the Likelihood of Serious Injury.

