



# Ford Analysis of Selected Aftermarket Copy Parts

VS.

# Genuine Ford OE Replacement Parts

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Marketing Manager



# Other Ford Attendees

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Collision Product Marketing Manager

Steve Nantau

FCSD Project Strategy Manager



# Why Am I Here?

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- A lone man and his reciprocating saw demonstrated suspected product differences between Aftermarket and OEM structural collision parts
- Ford Motor Company employees were in the audience during demonstrations held at the November and January CIC meetings
  - ◆ These demonstrations have been reported in:
    - ◆ Television news
    - ◆ Industry websites
    - ◆ Industry press releases
  - ◆ California Congresswoman Speier duplicated this saw cutting demonstration



# The Industry Responded

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- Aftermarket suppliers froze sales on some of their parts until further investigations could be completed
- Some insurers proactively and publicly advised body shops not to use these suspect aftermarket copy parts
- The body shop industry called for a recall of these suspect parts
- Some refuted the part cutting demo stating they could cut the OEM part
- Keystone Automotive completed vehicle crash tests to evaluate the effect an aftermarket copy bumper reinforcement bar might have at 35 mph

# Collision Parts Distributors Call For Structural Parts Testing



While we applaud them for this commitment:

- Will they test the impact on the entire vehicle safety system at multiple high- and low-speed intervals as do the OEMs?
- Will they use a qualified testing entity?
  - ◆ What standards will be used to evaluate the performance of their parts?
  - ◆ Will independent third parties (e.g. IIHS) subject these parts to crash testing that measures impact on the entire vehicle safety system?

# Ford Felt Its Customers' Safety Could Be at Risk



- We launched our own investigation of selected aftermarket copy structural parts
- Ford will show how poorly constructed these aftermarket copy parts are
- We'll share with you results that describe in detail the differences between “like,” “kind” and “quality” of the tested OEM and Aftermarket parts
- We found tested aftermarket copy parts are inferior and could compromise a vehicle's performance and occupant safety in a crash



# Ford Ordered Aftermarket Copy Parts to Compare to Our OEM Parts

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- 05-09 Mustang front and rear bumper beams
- 08-09 Focus front and rear bumper beams
- 05-09 Mustang bumper isolators
- 06-08 F-150 bumper brackets
- 04-07 F-150 radiator core support

*These parts were chosen as they were similar to the parts Toby used for his demonstrations for either Ford or other OEM vehicles*

# Ford Analysis Raises Red Flags About Aftermarket Copy Collision Parts



- Ford reproduced the reciprocating saw cross-cut test with similar results as demonstrated at previous venues
- Using an air chisel Ford cut apart aftermarket spot welds which did not meet Ford spot welding specifications  
*(1mm + 1mm thickness requires minimum 5mm nugget size)*
- Aftermarket copy parts' metal gauge thickness and weight were less than the OEM with only one exception found
- Aftermarket copy parts' material usage varied significantly from OEM
- There were significant structural differences between the aftermarket copy parts and the OEM parts





# Ford Destructive Comparison



7/18/2010

Ford Motor Company



# Based on the Previous Observations Ford Felt it Necessary to Conduct Computer Aided Engineering (CAE) Modeling

## Parts Chosen for CAE

- 05-09 Mustang Front Bumper Beam
- 05-09 Mustang Rear Bumper Beam
- 04-07 F-150 Radiator Support



# Ford Engineers Used CAE Models to Compare Aftermarket Parts to OEM

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- “Coupons” were cut from both OE and Aftermarket parts and sent to Ford Central Labs to determine material composition
- Aftermarket parts were electronically scanned so their dimensions could be determined and compared to Ford OE parts using CAE Testing
- CAE models of the aftermarket performance were built by substituting the aftermarket copy parts’ material composition and dimensional measurements for the Ford parts



# Ford Engineers Used CAE Models to Compare Aftermarket Parts to OEM

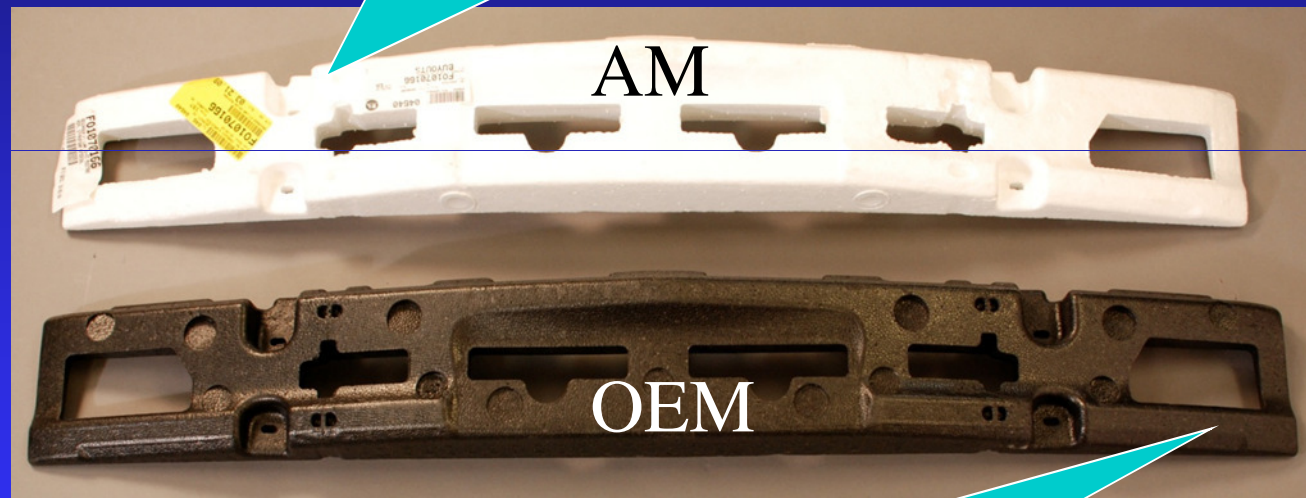
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- This is like a simulated crash test used to predict how both parts will perform
- Aftermarket copy parts' CAE performance was compared to genuine Ford original equipment parts' CAE performance
- Performance differences between the aftermarket copy parts and genuine Ford original equipment replacement parts were found



# Mustang Bumper Isolator (Absorber)

Polystyrene  
Component is lighter and cells  
are not as dense



Polypropylene #4  
Component is much more sturdy,  
heavy and dense



# Mustang Bumper Isolator Assy.

	Ford OEM	Keystone
<b>Vehicle Application</b>	05-09 Mustang	
<b>Part Name</b>	Bumper Isolator Assy.	
<b>Part Number</b>	4R3Z-17C882-AA	F01070166
<b>OE List Price/AM Invoice*</b>	\$52.63	\$39.00
<b>Estimated Annual AM Sales**</b>		2,507
<b>Material Composition</b>	Polypropylene #4	Polystyrene
<b>Cost per pound***</b>	\$2.50	\$0.70
<b>Production Process</b>	Molded	Molded
<b>Weight</b>	0.55 lbs.	0.30 lbs.
<b>Thickness</b>	n/a	n/a
<b>Manufacturer</b>	Available Upon Request	??
<b>Country of Manufacture</b>	USA	Taiwan
<b>AM Like Kind as OE?</b>	-	No
<b>AM Like Quality as OE?</b>	-	No

\* As of 3/26/2010 (upon completion of parts purchases)  
 \*\* Estimated 12-months rolling sales found in estimating equipment volumes  
 \*\*\* As of 07/02/2010

# F-Series Bumper Bracket Weights



OEM = 6.20 lbs.



AM = 2.85 lbs.



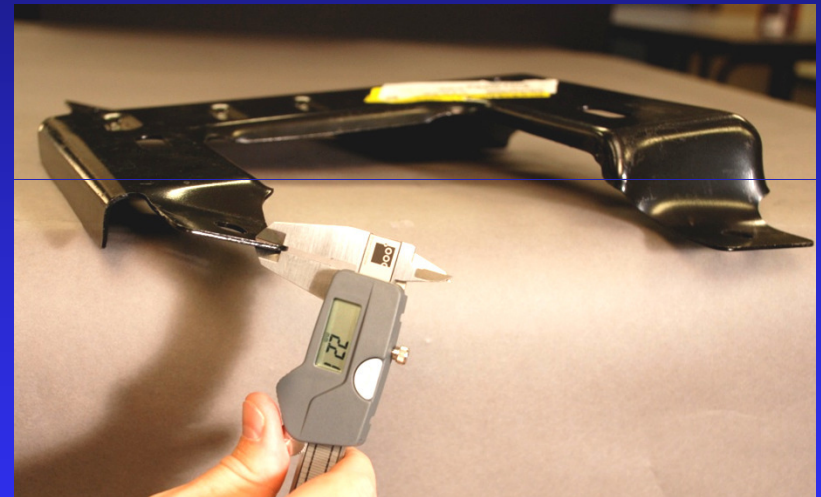
# F-Series Bumper Bracket Thickness



OEM = 4.68mm



AM = 2.21mm







# Without The OEM Part to Compare to...

## How Are Body Shops to Know a Good Aftermarket Copy Part From a Bad One

???





# F-Series Left Bumper Bracket

	Ford OEM	Keystone
<b>Vehicle Application</b>	06-08 F-150	
<b>Part Name</b>	Left Bumper Bracket	
<b>Part Number</b>	4L3Z-17B985-AA	F01066159V
<b>OE List Price/AM Invoice*</b>	\$41.32	\$27.00
<b>Estimated Annual AM Sales**</b>		2,503
<b>Material Composition</b>	High Strenth - Low Alloy Steel	Not Tested
<b>Cost per pound***</b>	\$44.60	
<b>Production Process</b>	Stamped	Stamped
<b>Weight</b>	6.20 lbs.	2.85 lbs.
<b>Thickness</b>	4.68 mm	2.21 mm
<b>Manufacturer</b>	Available Upon Request	San Tai Industrial
<b>Country of Manufacture</b>	USA	Taiwan
<b>AM Like Kind as OE?</b>	-	??
<b>AM Like Quality as OE?</b>	-	No
<small>* As of 3/26/2010 (upon completion of parts purchases)  ** Estimated 12-months rolling sales found in estimating equipment volumes  *** As of 07/02/2010</small>		



# F-Series Right Bumper Bracket

	Ford OEM	Keystone	Keystone	Keystone
<b>Vehicle Application</b>	06-08 F-150			
<b>Part Name</b>	Right Bumper Bracket			
<b>Part Number</b>	4L3Z-17B984-AA	F01067159	F01067159	F01067159PP
<b>OE List Price/AM Invoice*</b>	\$41.32	\$35.28	\$35.28	\$35.28
<b>Estimated Annual AM Sales**</b>		2,493		
<b>Material Composition</b>	High Strength - Low Alloy Steel	Not Tested	Not Tested	Not Tested
<b>Cost per pound***</b>	\$44.60			
<b>Production Process</b>	Stamped	Stamped	Stamped	Stamped
<b>Weight</b>	6.15 lbs.	4.65 lbs.	6.10 lbs.	6.15 lbs.
<b>Thickness</b>	4.65 mm	3.62 mm	4.67 mm	4.58 mm
<b>Manufacturer</b>	Available Upon Request	AP	Not Identified	Gordon
<b>Country of Manufacture</b>	USA	Taiwan	Not Identified	Taiwan
<b>AM Like Kind as OE?</b>	-	??	??	??
<b>AM Like Quality as OE?</b>	-	No	??	??
<small>* As of 4/1/2010 (upon completion of parts purchases)  ** Estimated 12-months rolling sales found in estimating equipment volumes  *** As of 07/02/2010</small>				

# Visual Comparison of Aftermarket and OEM Parts



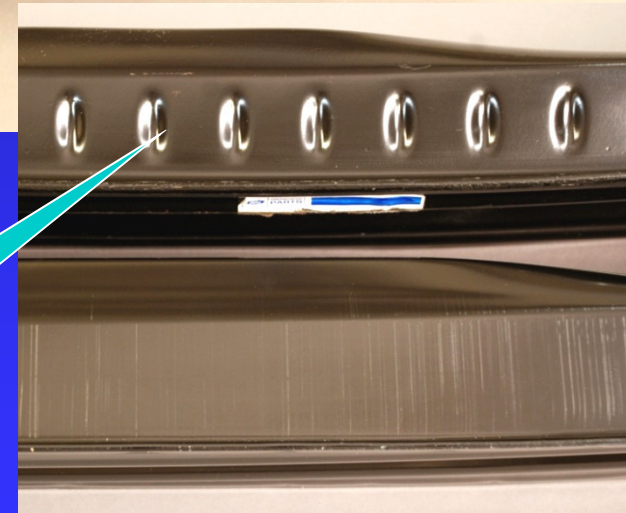
OEM

OEM = Ultra-High-Strength Steel (Boron/Martensite)  
One piece with full seam tig-weld down the center with stiffening beads along both edges

AM

Aftermarket = mild steel  
Two-piece spot-welded together with no stiffening beads

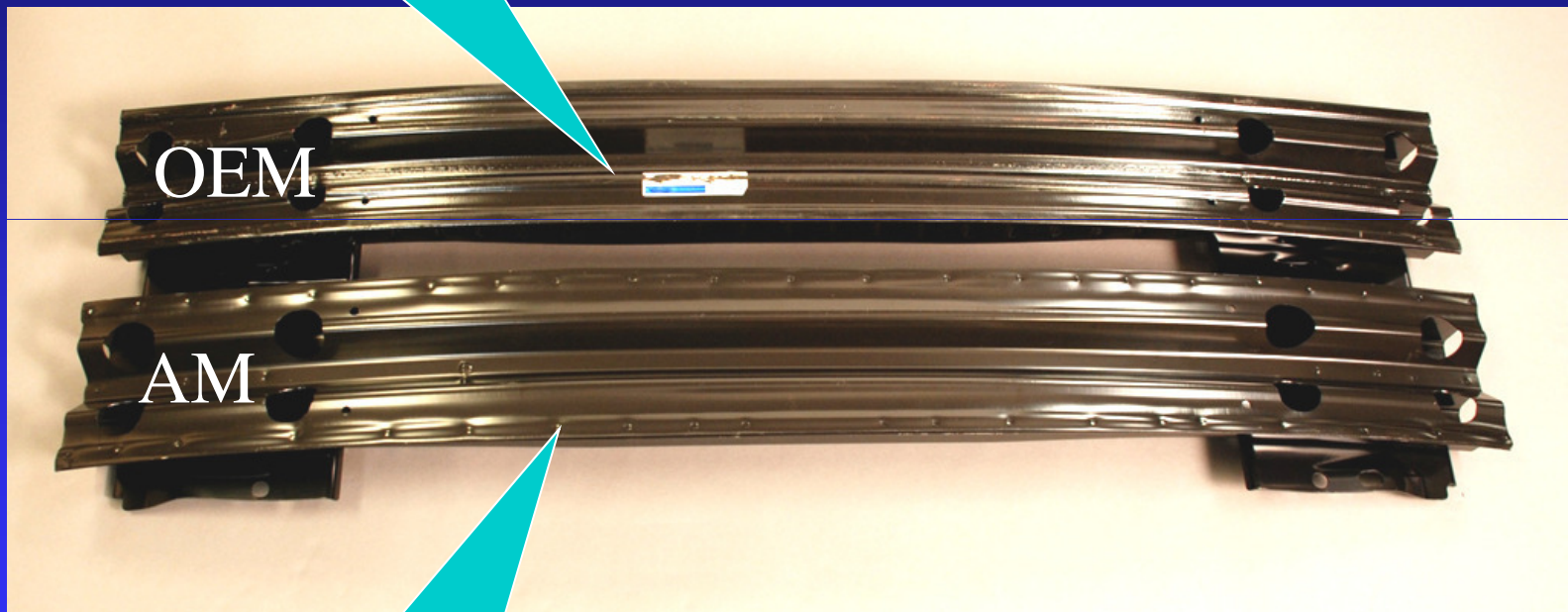
OEM  
Stiffening beads



# Visual Comparison of Aftermarket and OEM Parts



One piece with full seam tig-weld



OEM

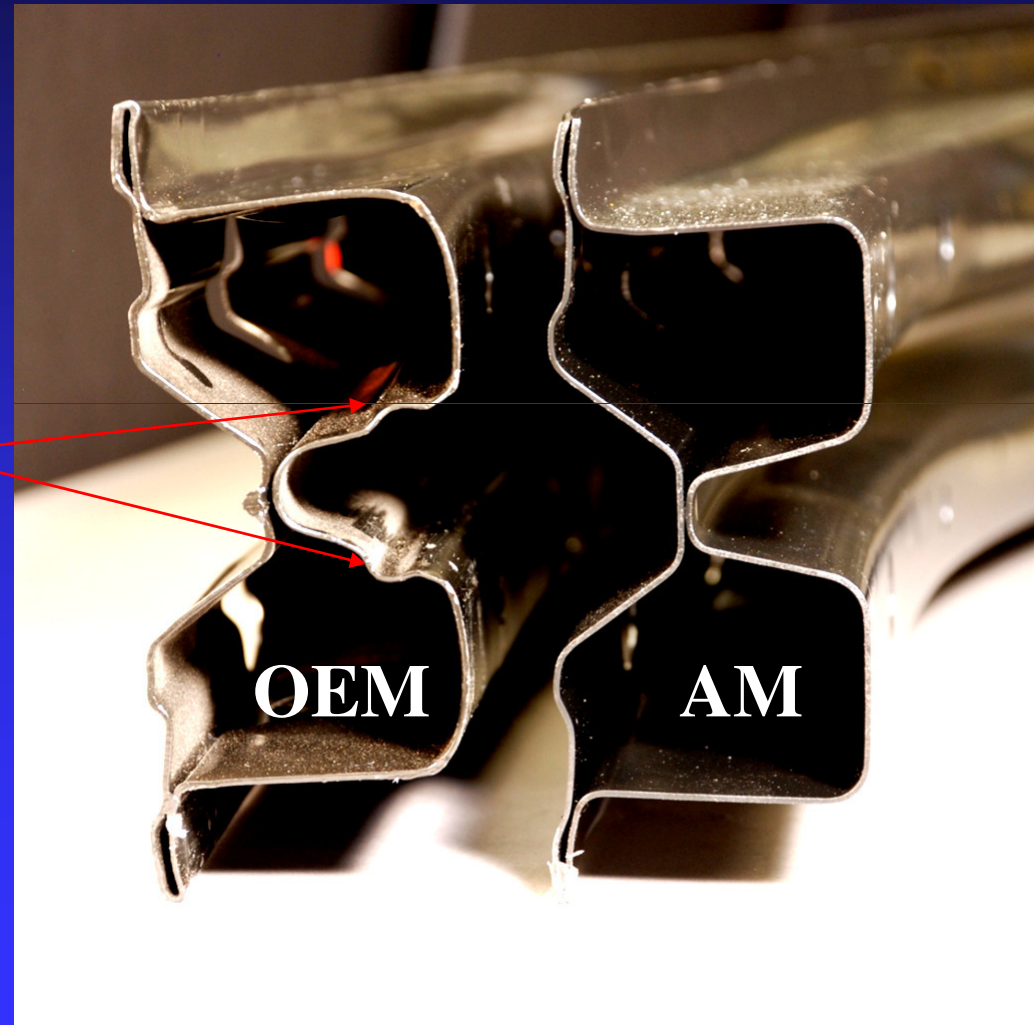
AM

Two pieces spot-welded together

# Visual Comparison of Aftermarket and OEM Parts



Bumper  
beam  
longitudinal  
stiffening  
beads



# Front Bumper Beam Weight

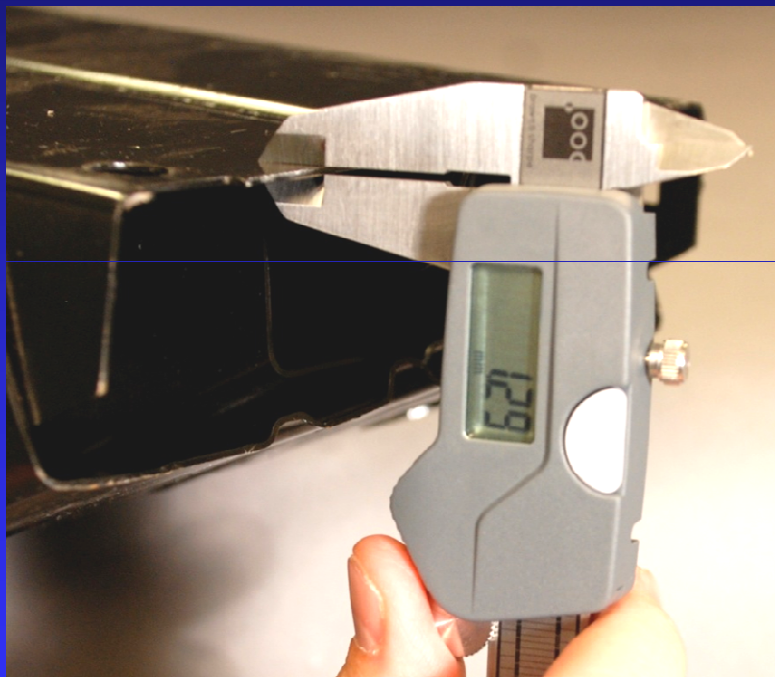
Aftermarket is 25 % less than OEM



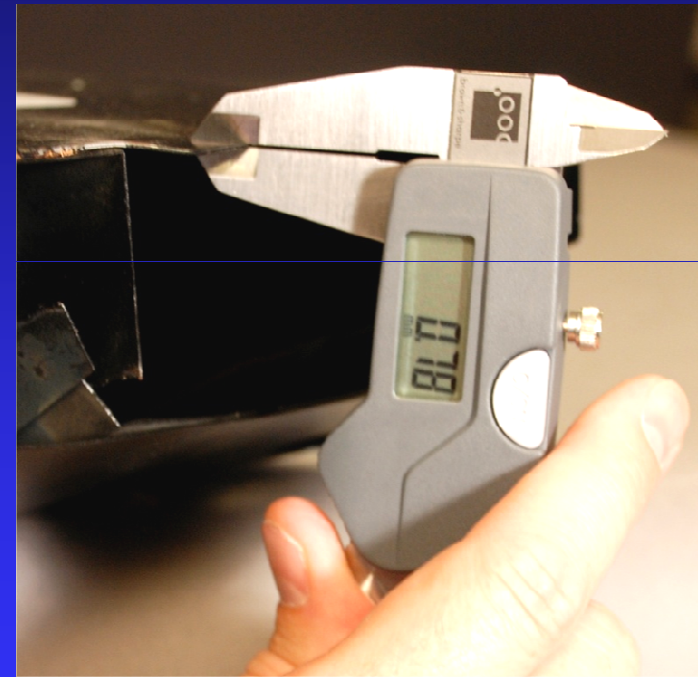


# Front Bumper Beam Thickness

**OEM = 1.29mm**



**AM = 0.78mm**







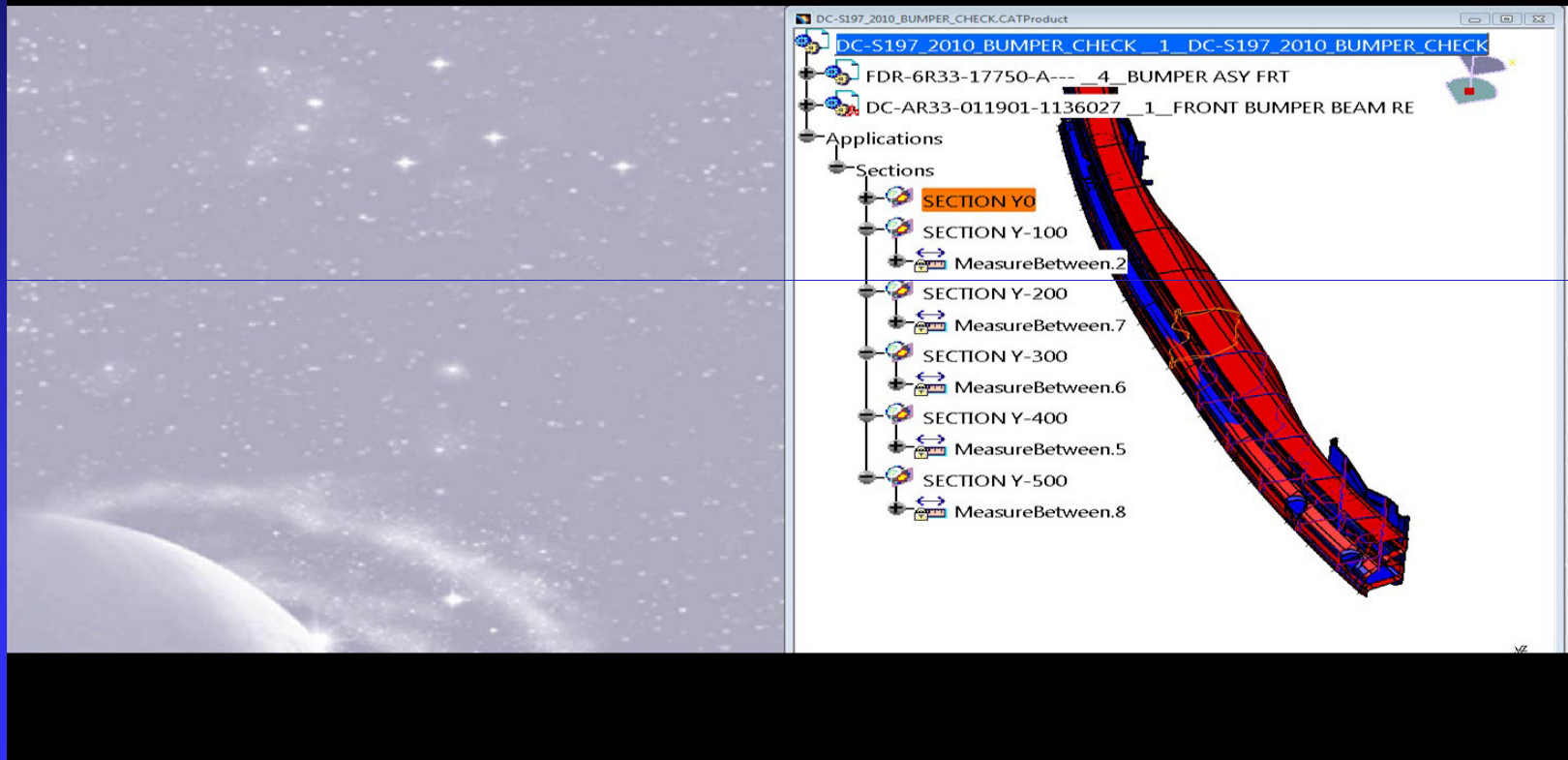
# Ford Safety Engineering

## Aftermarket Mustang Bumper Beam Analysis

### Parts Scanning

# Mustang Aftermarket Bumper Beam Analysis

## Dimensional Check



Blue = OEM

Red = Aftermarket

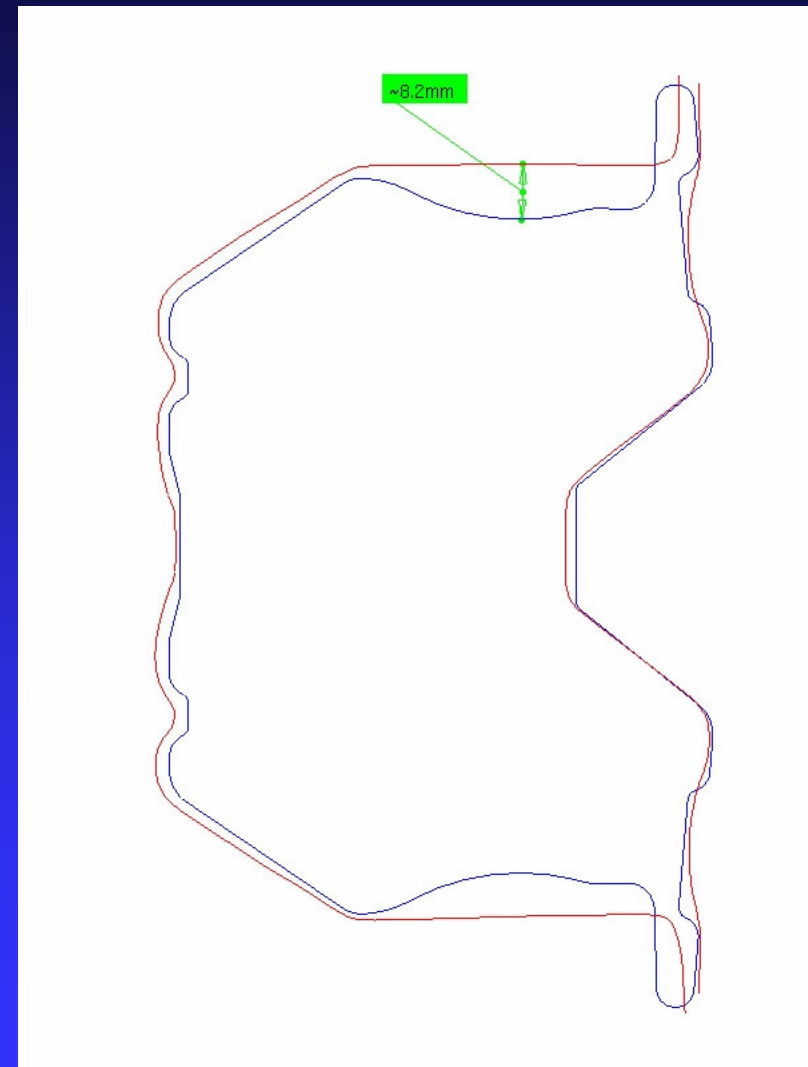
# Mustang Aftermarket Bumper Beam Analysis

## Section Y = 0



Blue = OEM

Red = Aftermarket



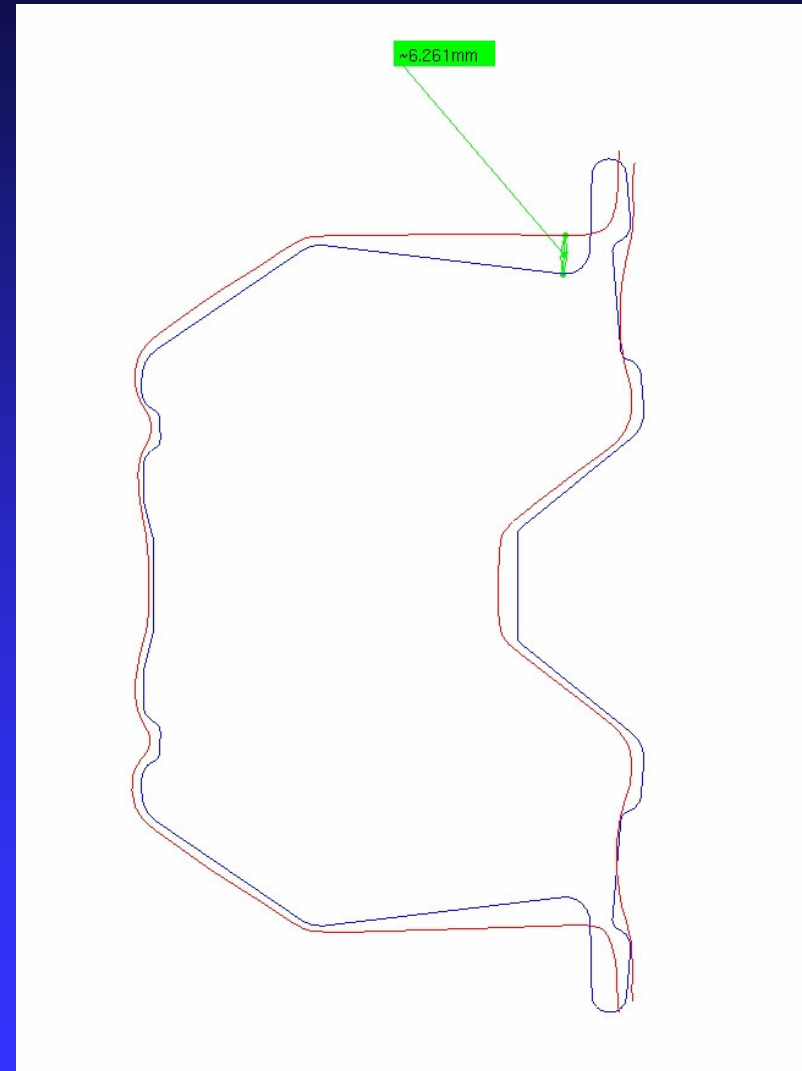
# Mustang Aftermarket Bumper Beam Analysis

## Section Y = -100



Blue = OEM

Red = Aftermarket



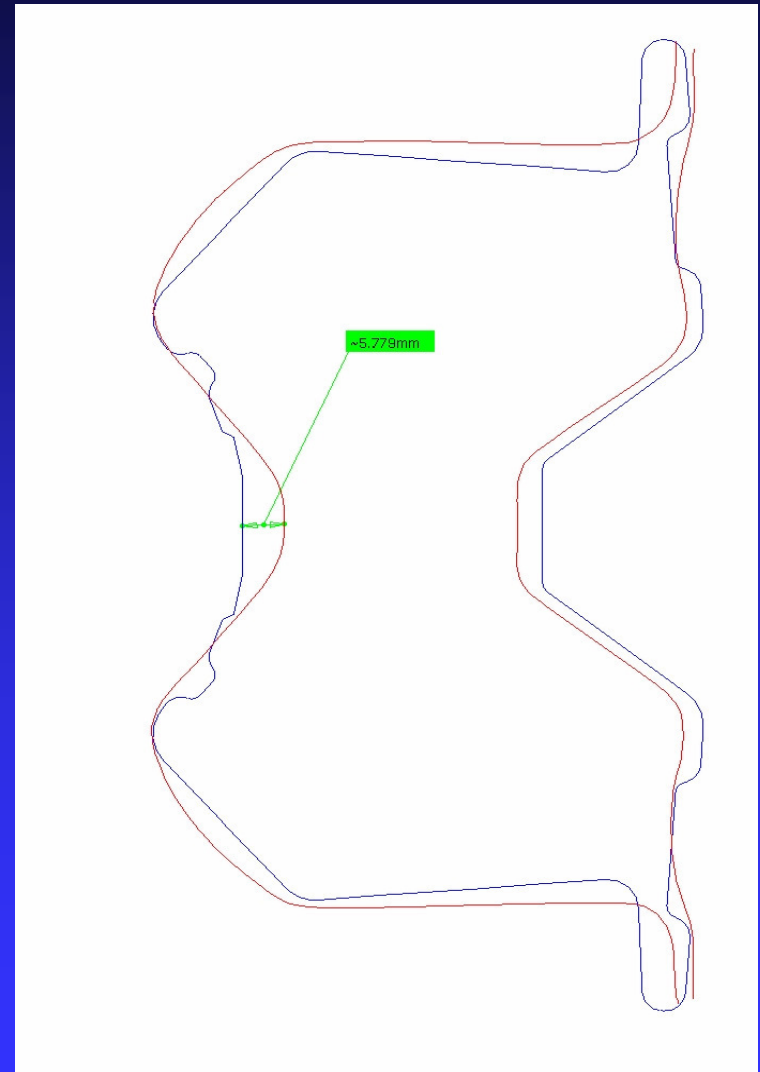
# Mustang Aftermarket Bumper Beam Analysis

## Section Y = -200



Blue = OEM

Red = Aftermarket



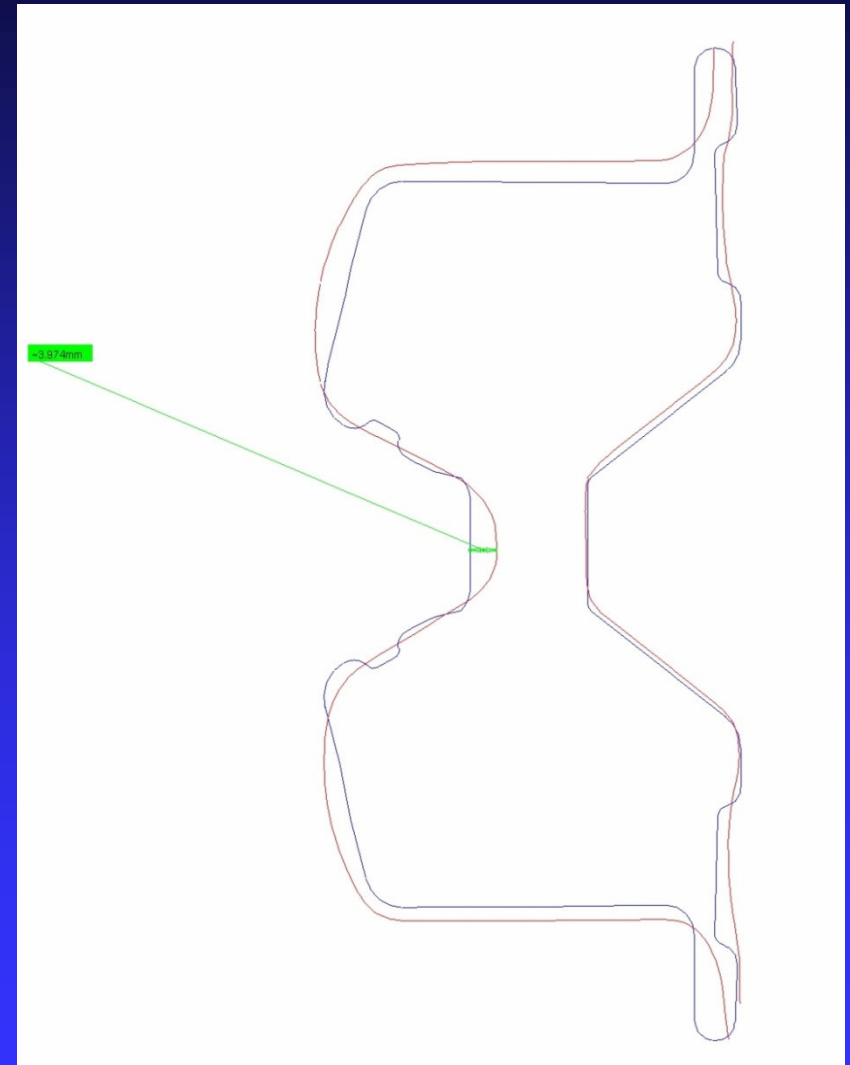
# Mustang Aftermarket Bumper Beam Analysis

## Section Y = -300



Blue = OEM

Red = Aftermarket



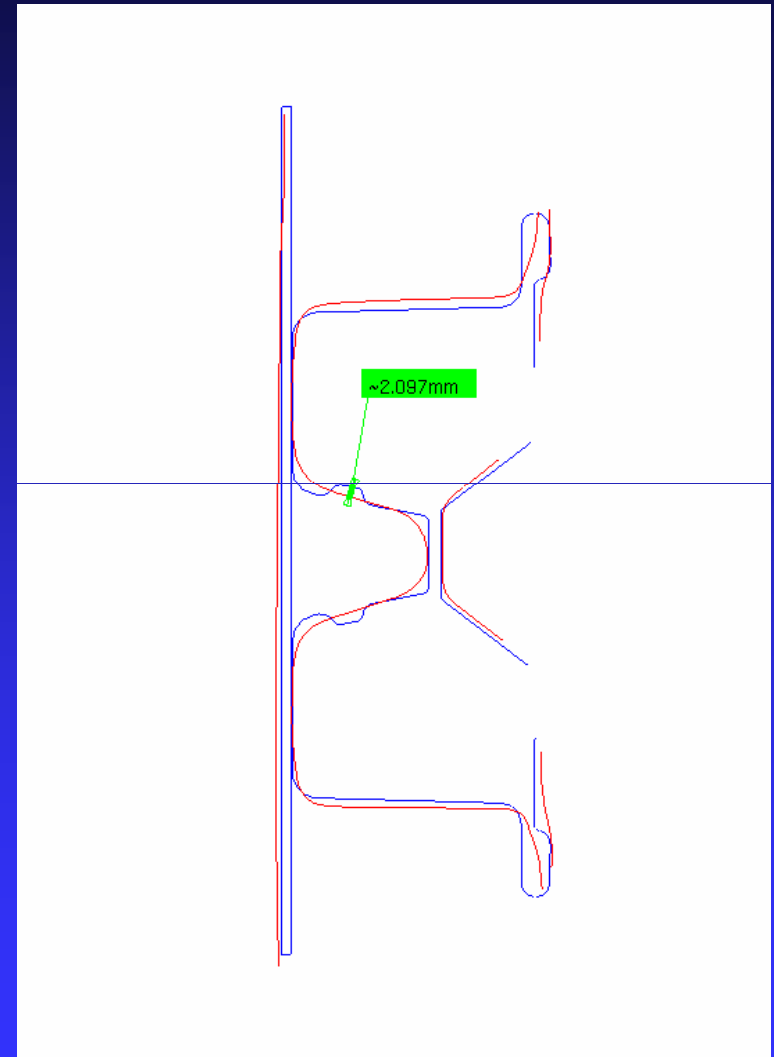
# Mustang Aftermarket Bumper Beam Analysis

## Section Y = -400



Blue = OEM

Red = Aftermarket





# Ford Safety Engineering

## Aftermarket Mustang Bumper Beam Analysis

### Material Coupon Testing



# All Steels are Not the Same and are Not “*Like Kind*”

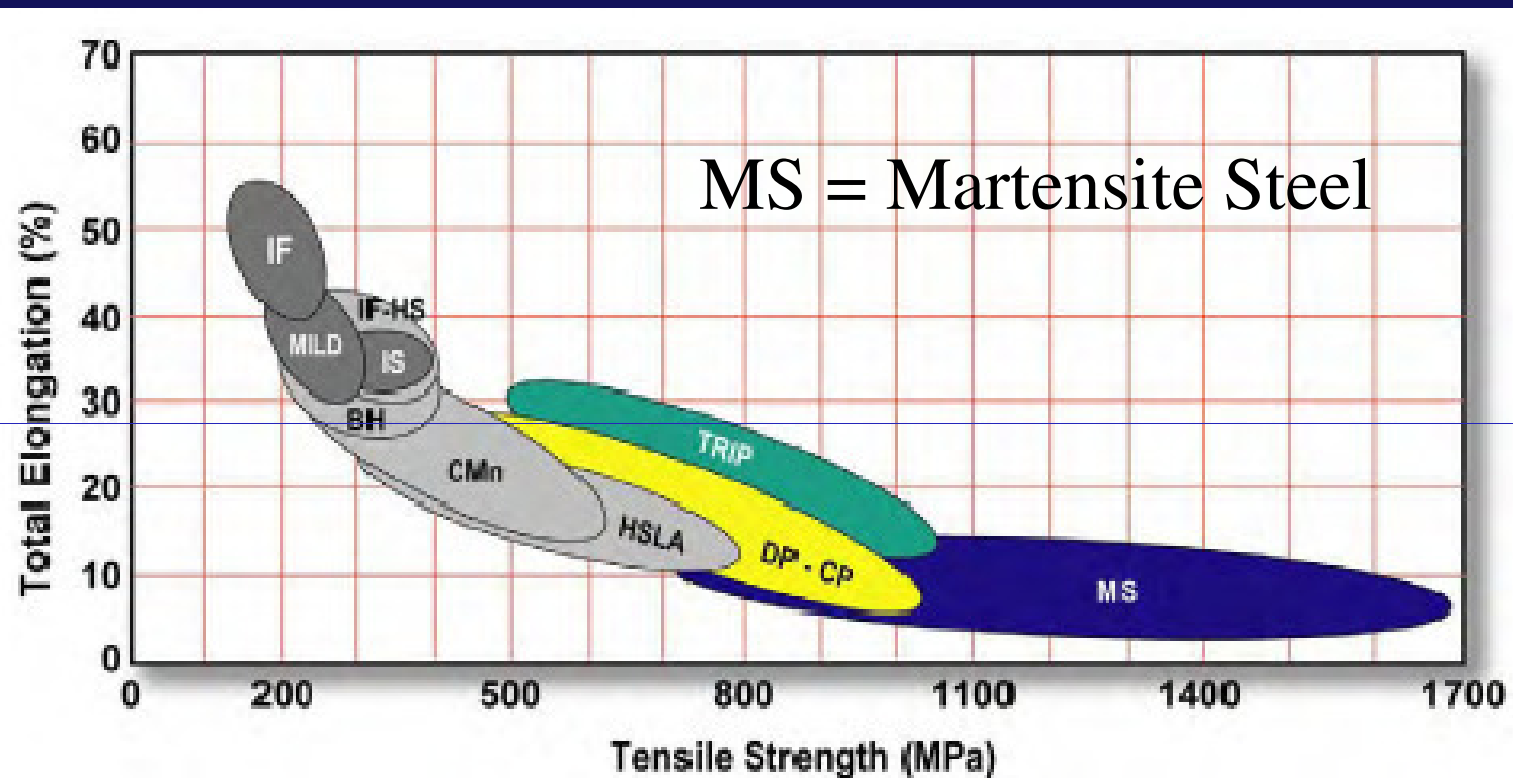


Figure 1-1A - Schematic of AHSS steels (shown in colour) compared to low strength steels (dark grey) and traditional HSS (light grey).<sup>W-1</sup>

Source : WorldAutoSteel “Advanced High Strength Steel (AHSS) Application Guidelines”, Version 4.1, June 2009

# All Steels are Not the Same and are Not “*Like Kind*”



Table 1-2 – Steel grades available for Future Steel Vehicle.<sup>W-2</sup>  
sorted by yield strength

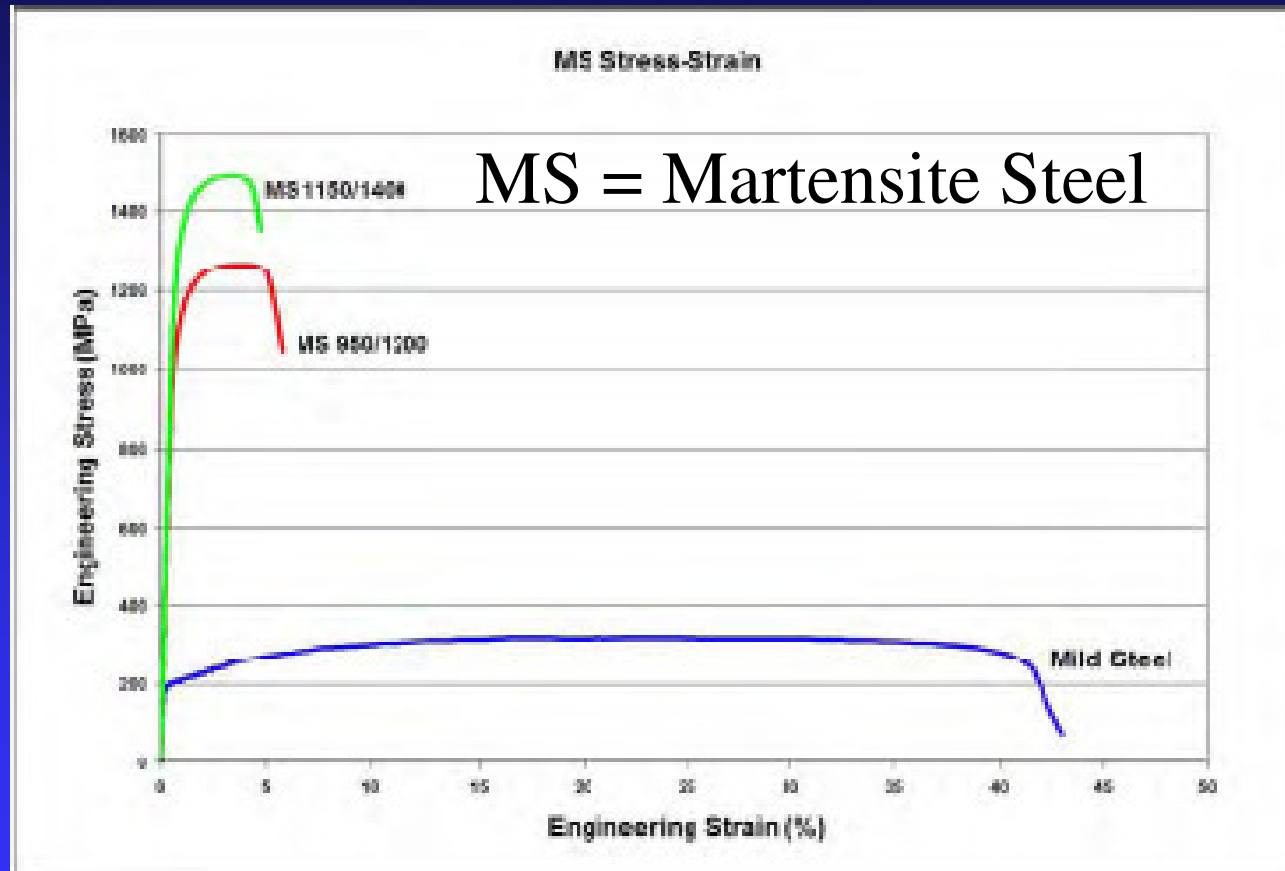
Steel Grade	YS (MPa)	UTS (MPa)	Tot. EL (%)
Mild 140/270	140	270	42-48
BH 210/340	210	340	35-41
BH 260/370	260	370	32-36
IF 260/410	260	410	34-48
BH 280/400	280	400	30-34
IF 300/420	300	420	29-36
DP300/500	300	500	30-34
FB 330/450	330	450	29-33
HSLA 350/450	350	450	23-27
DP 350/600	350	600	24-30
TRIP 350/600	350	600	29-33
DP 400/700	400	700	18-25
TRIP 400/700	400	700	24-28
HSLA 420/500	420	500	22-26
FB 450/600	450	600	18-26
TRIP 450/800	450	800	26-32
TWIP 450/1000	450	1000	50-54
HSLA 490/600	490	600	20-25
CP 500/800	500	800	10-14
DP 500/800	500	800	14-20
HSLA 550/650	550	650	18-23
DP 700/1000	700	1000	12-17
CP 800/1000	800	1000	8-13
MS 950/1200	950	1200	5-7
CP 1000/1200	1000	1200	8-10
HF 1050/1500 (22MnB5)			
- Conventional Forming	340	480	23-27
- Heat Treated Post Forming	1050	1500	5-7
MS 1150/1400	1150	1400	4-7
MS 1250/1520	1250	1520	3-6

YS and UTS are minimum values

Tot. EL (Total Elongation) range shows typical values for a broad range of sheet thicknesses and gauge lengths.

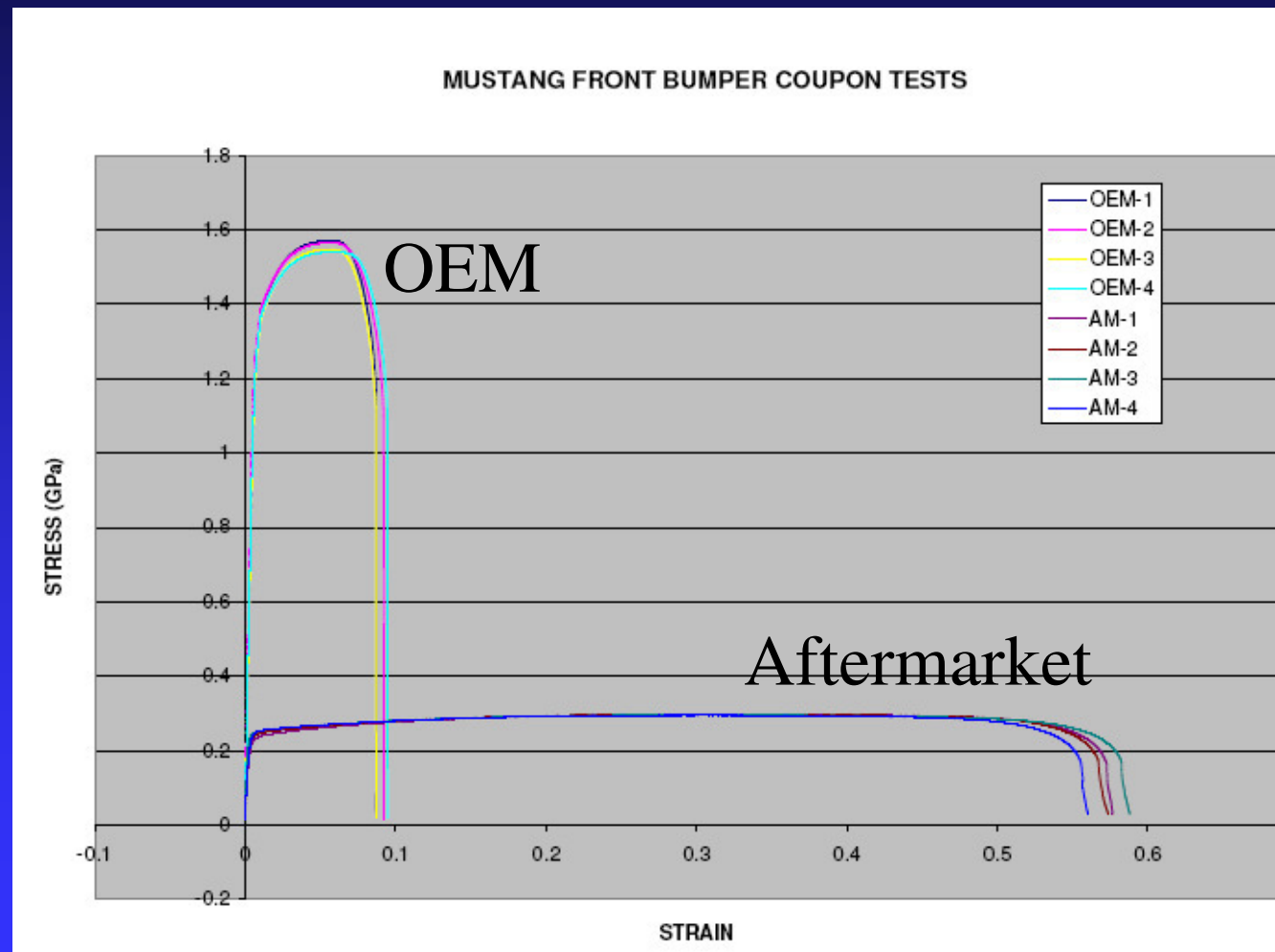


# Stress vs. Strain Signatures



Source : WorldAutoSteel “Advanced High Strength Steel (AHSS) Application Guidelines”, Version 4.1, June 2009

# Mustang Aftermarket Bumper Analysis



# Mustang Aftermarket Bumper Beam Analysis

## Front Bumper Coupon Tests



### After Market

Sample	.2% Yield MPa	Tensile MPa	% Elongation in 1"
AM-1	223.0	298.5	48
AM-2	225.9	298.3	47
AM-3	235.4	296.6	51
AM-4	239.3	295.8	49
Ave	230.9	297.3	49
Std Dev	7.7	1.3	2

### OEM

Sample	.2% Yield MPa	Tensile MPa	% Elongation in 1"
OEM-1	1303.9	1565.6	8
OEM-2	1278.9	1561.3	9
OEM-3	1273.3	1551.2	7
OEM-4	1280.3	1543.7	8
Ave	1284.1	1555.5	8
Std Dev	13.5	9.9	1

# Mustang Aftermarket Bumper Beam Analysis

## Rear Bumper Coupon Tests



### After Market

Sample	.2% Yield MPa	Tensile MPa	% Elongation in 1"
AM-1	216.1	286.7	54
AM-2	228.0	291.6	54
AM-3	222.5	290.1	52
AM-4	193.4	285.8	54
Ave	215.0	288.6	54
Std Dev	15.2	2.8	1

### OEM

Sample	.2% Yield MPa	Tensile MPa	% Elongation in 1"
OEM-1	1269.5	1526.7	8
OEM-2	1278.7	1539.5	7
OEM-3	1281.8	1538.5	8
OEM-4	1262.7	1524.2	8
Ave	1273.2	1532.2	8
Std Dev	8.7	7.9	1



# Ford Safety Engineering

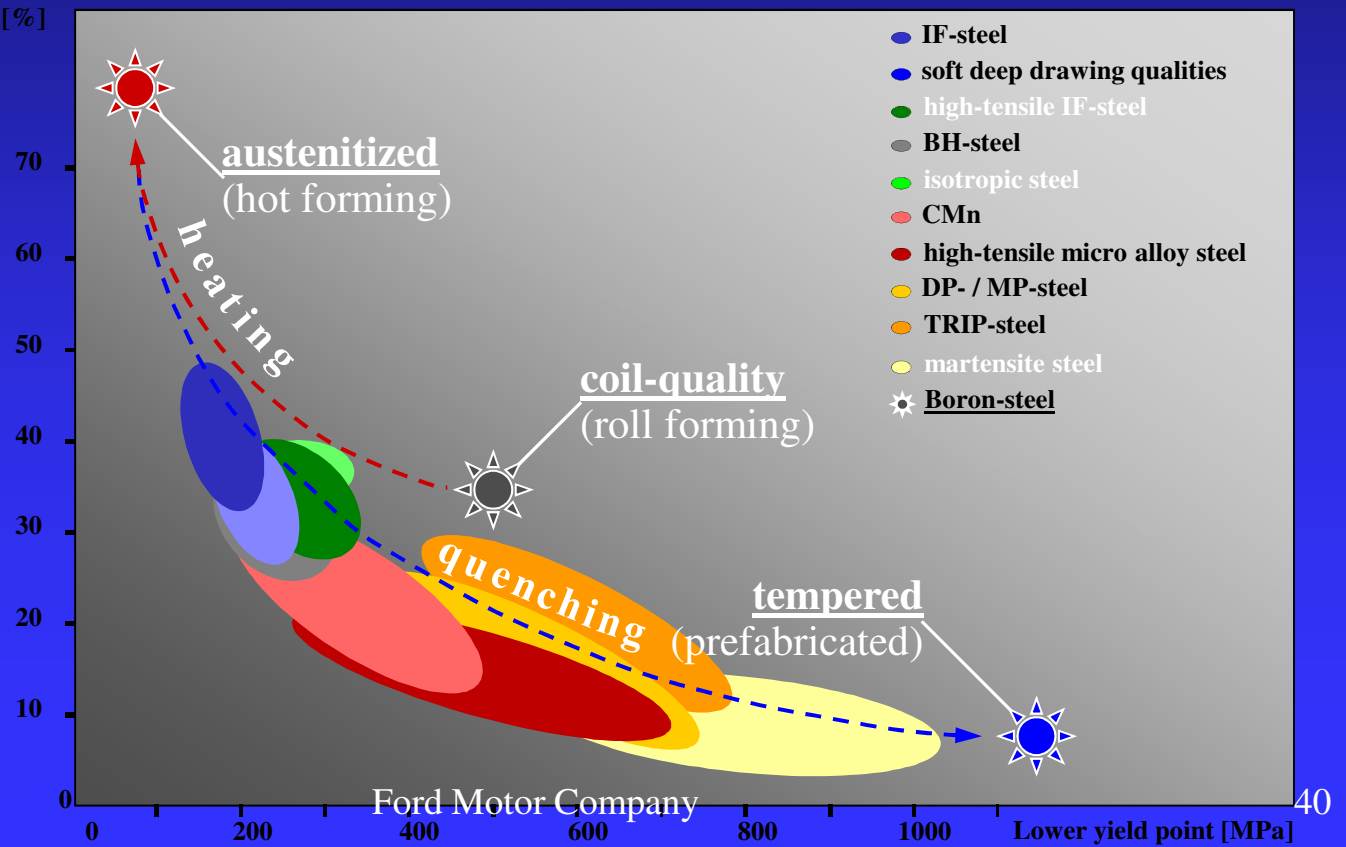
## Aftermarket Mustang Bumper Beam Analysis

### Unique OEM Parts Manufacturing Process

# Joining Roll Forming with Hot Forming



Elongation at break [%]



7/18/2010





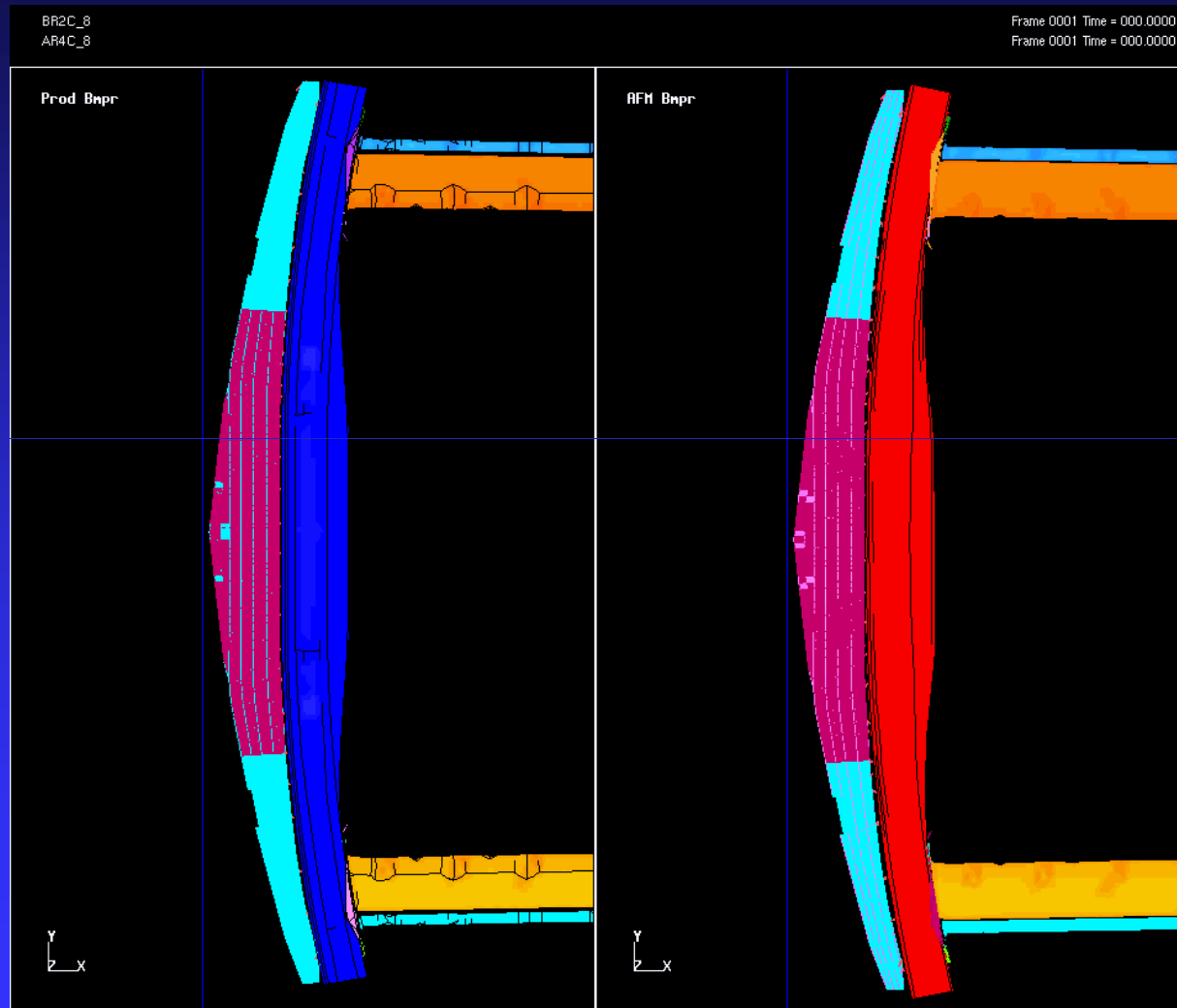
# Ford Safety Engineering

## Aftermarket Mustang Bumper Beam Analysis

### CAE Analysis

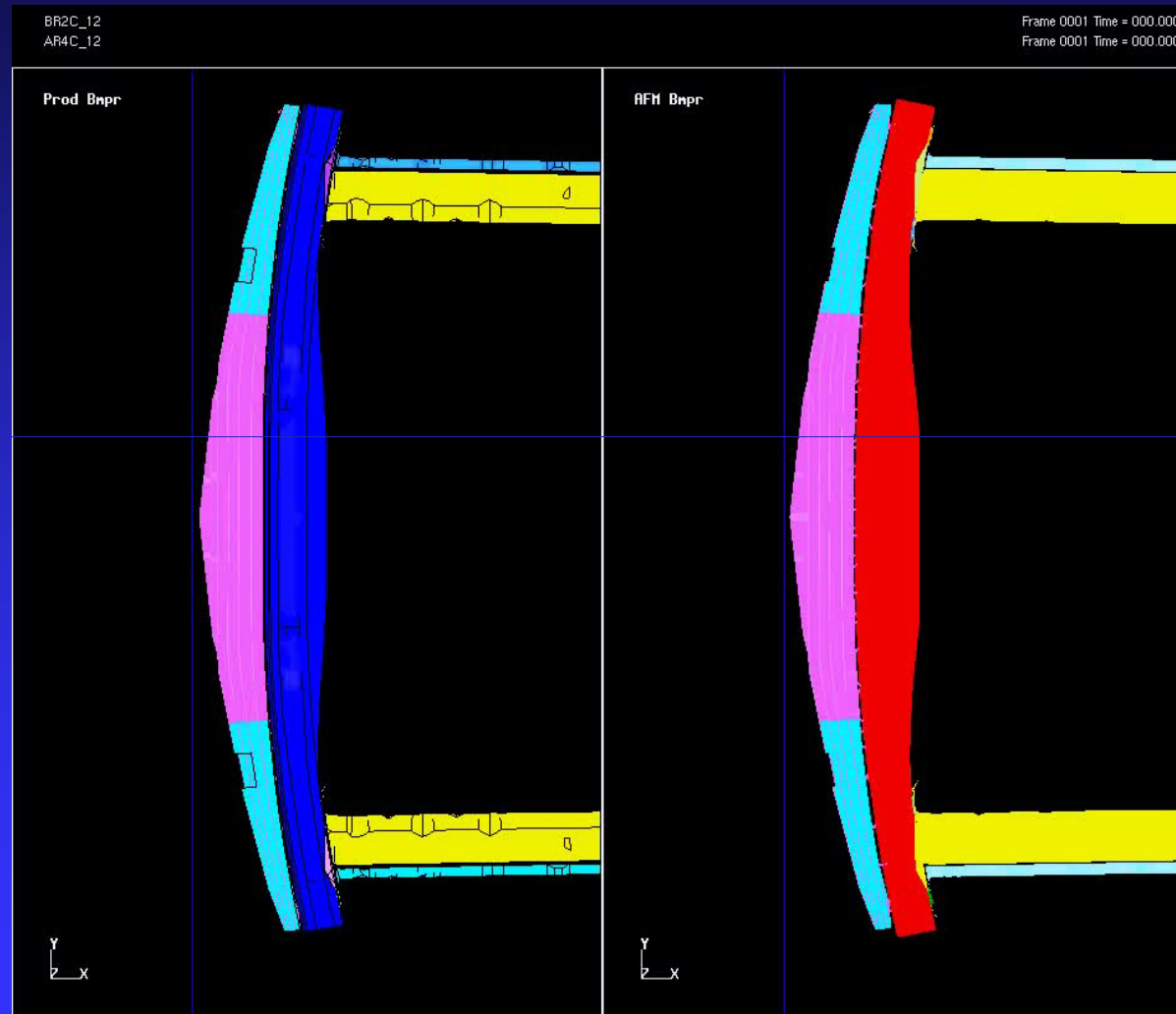
# Mustang Aftermarket Bumper Beam Analysis

## Frontal Sensor Test at 8 mph



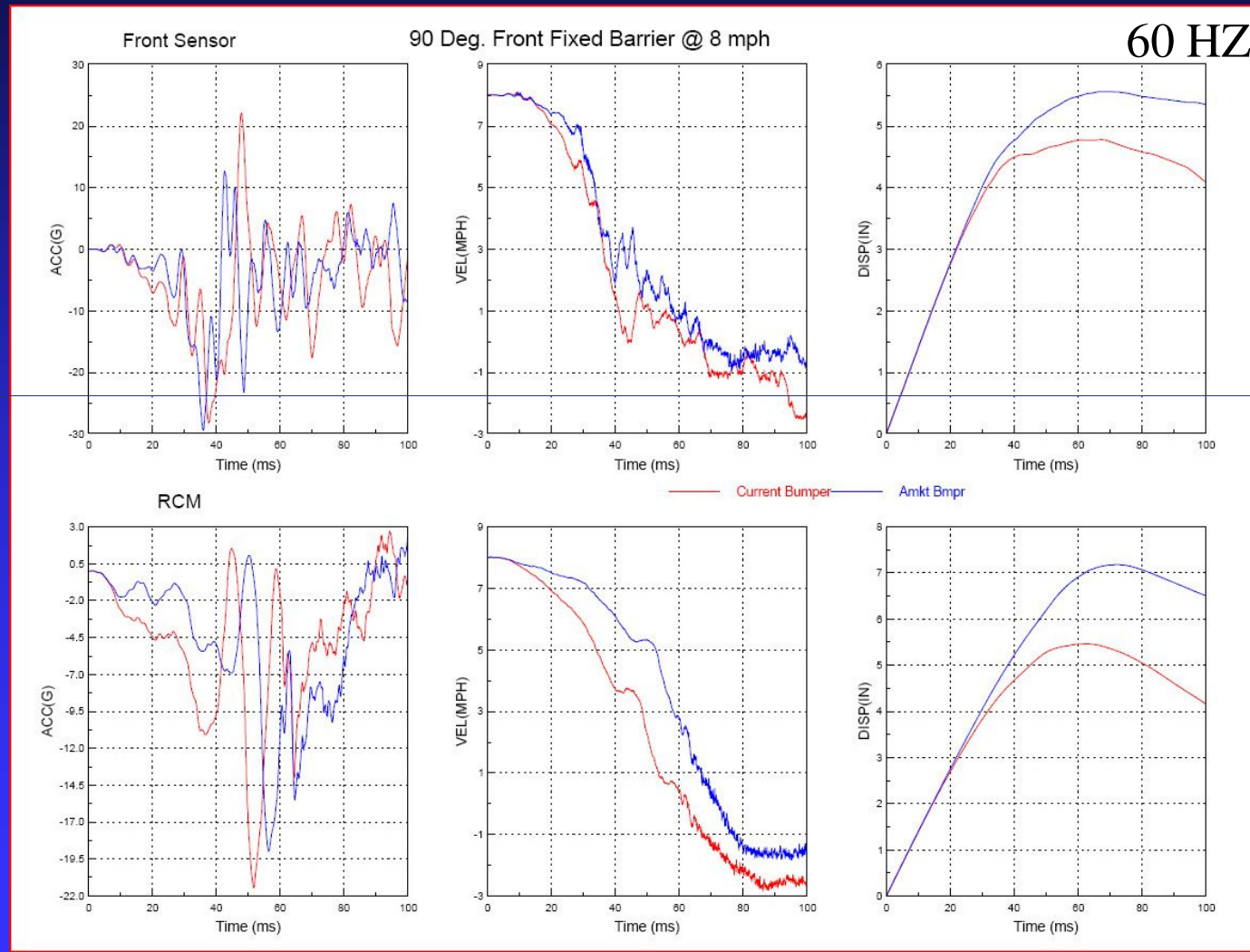
# Mustang Aftermarket Bumper Beam Analysis

## Frontal Sensor Test at 12 mph



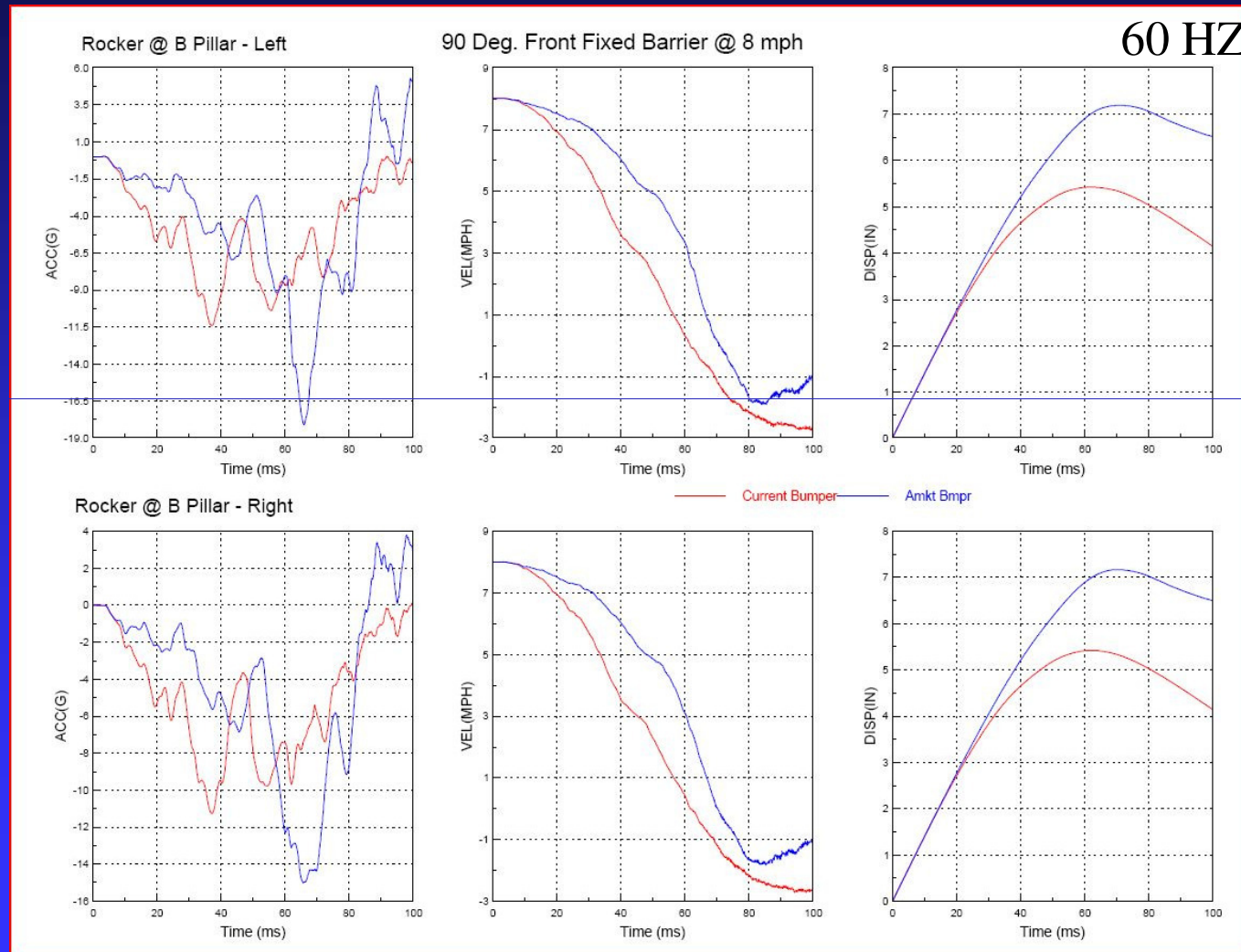


# CAE Comparison @ 8 mph



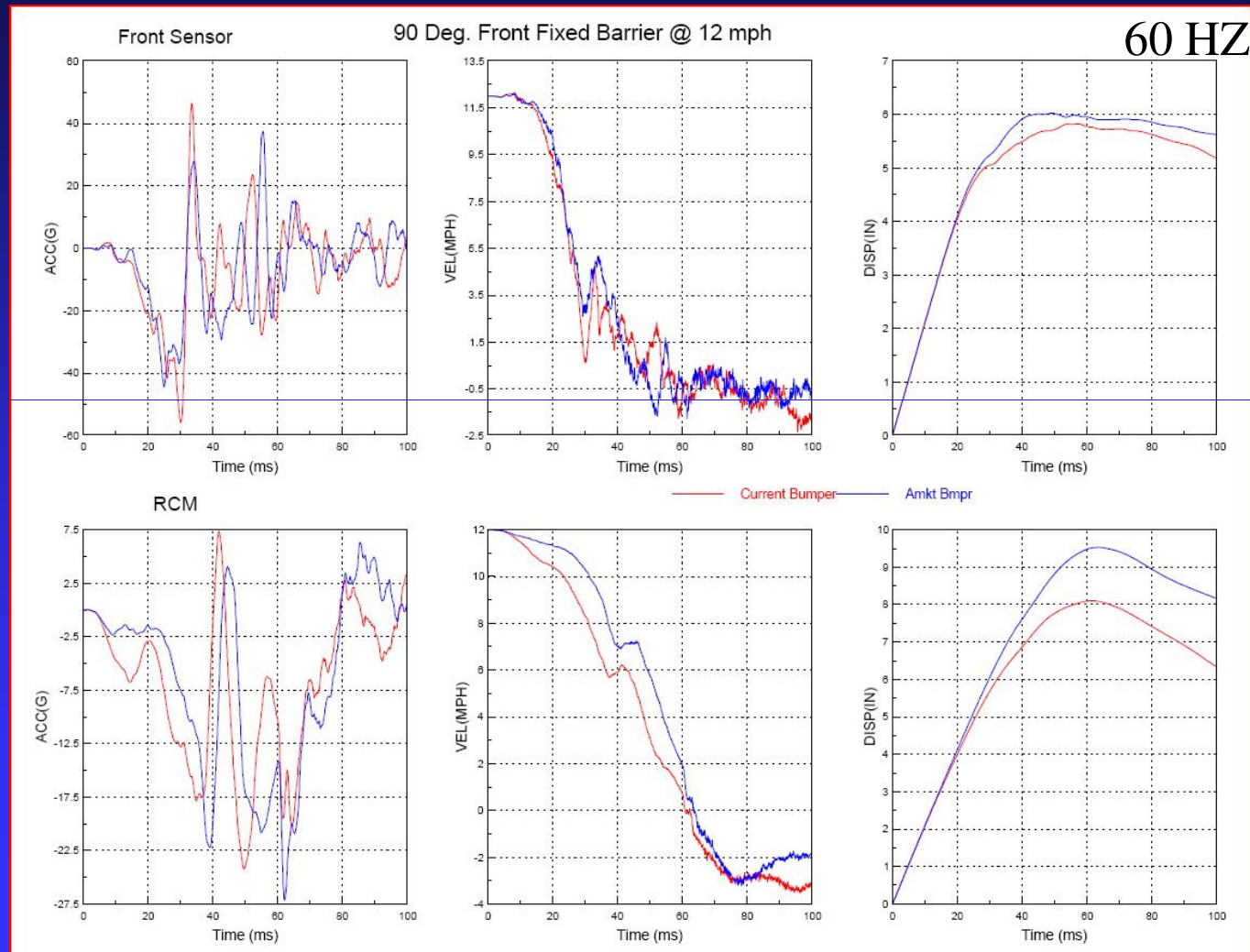


# CAE Comparison @ 8 mph



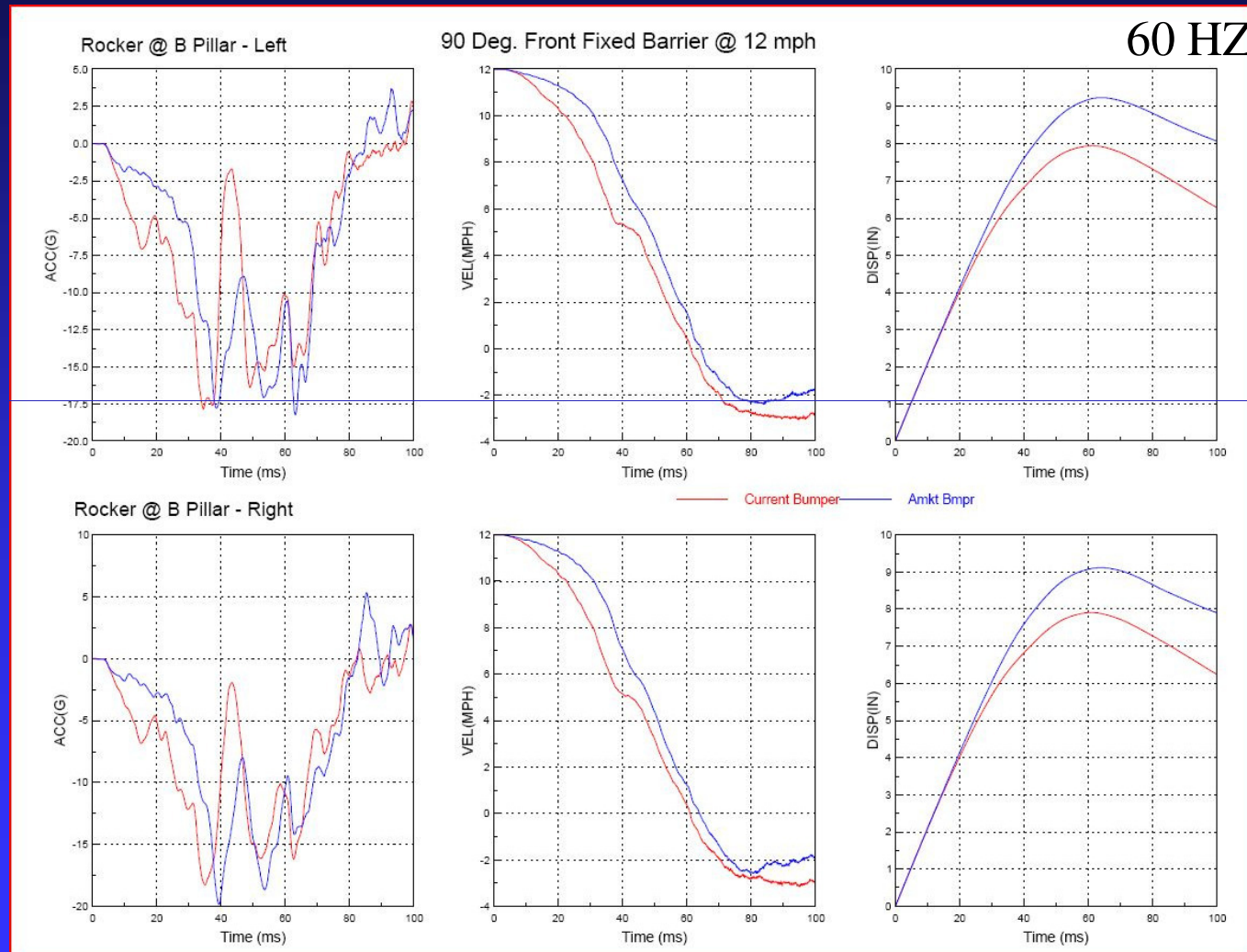


# CAE Comparison @ 12 mph





# CAE Comparison @ 12 mph



# Aftermarket Mustang Front and Rear Bumper Beam Analysis



## Ford Safety Engineering Conclusions:

- Dimensional analysis showed these aftermarket bumper beams did not meet Ford engineering specifications and would have been rejected from our suppliers based on dimensional differences alone
- Coupon testing showed these aftermarket bumper beams were made of mild steel while the Ford bumper beams were made of steel starting as Boron steel and Martenized through the construction process (Ultra-High-Strength Steel)
- Aftermarket copy bumper beam consisted of two stamped pieces spot-welded together while Ford bumper beam is one-piece roll-formed, hot stamped at elevated temperature, water quenched in die and annealed through bake oven
- CAE analysis of aftermarket bumper beam concluded that aftermarket bumper beam would not meet Ford sensor performance specification





# Focus Front Bumper Beam

	Ford OEM	RockAuto
<b>Vehicle Application</b>	08-09 Focus	
<b>Part Name</b>	Front Bumper Beam	
<b>Part Number</b>	8S4Z-17757-A	FO1006254
<b>OE List Price/AM Invoice*</b>	\$183.73	\$77.79 (purchase)
<b>Estimated Annual AM Sales**</b>		220
<b>Material Composition</b>	Martensite Steel	Not Tested
<b>Cost per pound***</b>	\$60.00	
<b>Production Process</b>	Cold rolled, high frequency induction welding	Stamped
<b>Weight</b>	13.25 lbs.	9.90 lbs.
<b>Thickness</b>	1.29 mm	0.78 mm
<b>Manufacturer</b>	Available Upon Request	San Tai Industrial
<b>Country of Manufacture</b>	USA	Taiwan
<b>AM Like Kind as OE?</b>	-	No
<b>AM Like Quality as OE?</b>	-	No
<small>* As of 4/1/2010  ** Estimated 12-months rolling sales found in estimating equipment volumes  *** As of 07/02/2010</small>		



# Focus Rear Bumper Beam

	Ford OEM	Sherman	Keystone
<b>Vehicle Application</b>	08-09 Focus		
<b>Part Name</b>	Rear Bumper Beam		
<b>Part Number</b>	8S4Z-17906-C	CCC 406-83	F01106348
<b>OE List Price/AM Invoice*</b>	\$176.15	\$139.99	\$144.00
<b>Estimated Annual AM Sales**</b>		117	
<b>Material Composition</b>	Martensite Steel	Not Tested	Not Tested
<b>Cost per pound***</b>	\$60.00		
<b>Production Process</b>	Cold rolled, laser welded	Stamped	Stamped
<b>Weight</b>	13.50 lbs.	12.80 lbs.	
<b>Thickness</b>	1.35 mm	1.15 mm	
<b>Manufacturer</b>	Available Upon Request	??	
<b>Country of Manufacture</b>	USA	Taiwan	
<b>AM Like Kind as OE?</b>	-	No	No
<b>AM Like Quality as OE?</b>	-	No	No
<small>* As of 3/26/2010 (upon completion of parts purchases)  ** Estimated 12-months rolling sales found in estimating equipment volumes  *** As of 07/02/2010</small>			



# Mustang Front Bumper Beam

	Ford OEM	RockAuto
<b>Vehicle Application</b>	05-09 Mustang	
<b>Part Name</b>	Front Bumper Beam	
<b>Part Number</b>	5R3Z-17757-AA	FO1006245
<b>OE List Price/AM Invoice*</b>	\$176.08	\$98.99
<b>Estimated Annual AM Sales**</b>		510
<b>Material Composition</b>	Boron Steel	Mild Steel
<b>Cost per pound***</b>	\$57.00	\$40.35
<b>Production Process</b>	Cold rolled, heat quenched, tig welded	Stamped, spot welded
<b>Weight</b>	11.90 lbs.	11.15 lbs.
<b>Thickness</b>	1.36 mm	1.20 mm
<b>Manufacturer</b>	Available Upon Request	??
<b>Country of Manufacture</b>	USA	Taiwan
<b>AM Like Kind as OE?</b>	-	No
<b>AM Like Quality as OE?</b>	-	No
<small>* As of 3/26/2010 (upon completion of parts purchases)  ** Estimated 12-months rolling sales found in estimating equipment volumes  *** As of 07/02/2010</small>		



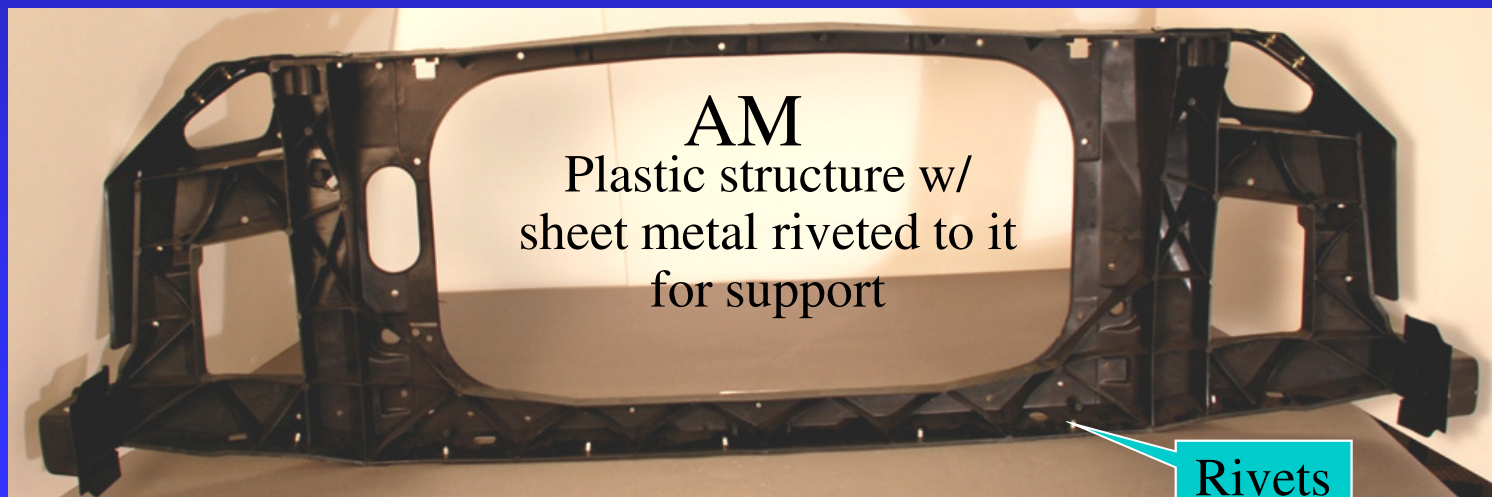
# Mustang Rear Bumper Beam

	Ford OEM	Sherman	RockAuto
<b>Vehicle Application</b>	05-09 Mustang		
<b>Part Name</b>	Rear Bumper Beam		
<b>Part Number</b>	5R3Z-17906-AA	CCC 475-83	F01106340
<b>OE List Price/AM Invoice*</b>	\$182.95	\$120.99	\$149.00
<b>Estimated Annual AM Sales**</b>		307	
<b>Material Composition</b>	Boron Steel	Mild Steel	Mild Steel
<b>Cost per pound***</b>	\$57.00	\$40.35	\$40.35
<b>Production Process</b>	Cold rolled, heat quenched, tig welded	Stamped, spot welded	Stamped, spot welded
<b>Weight</b>	12.35 lbs.		11.65 lbs.
<b>Thickness</b>	1.40 mm		1.15 mm
<b>Manufacturer</b>	Available Upon Request		AP
<b>Country of Manufacture</b>	USA		Taiwan
<b>AM Like Kind as OE?</b>	-	No	No
<b>AM Like Quality as OE?</b>	-	No	No

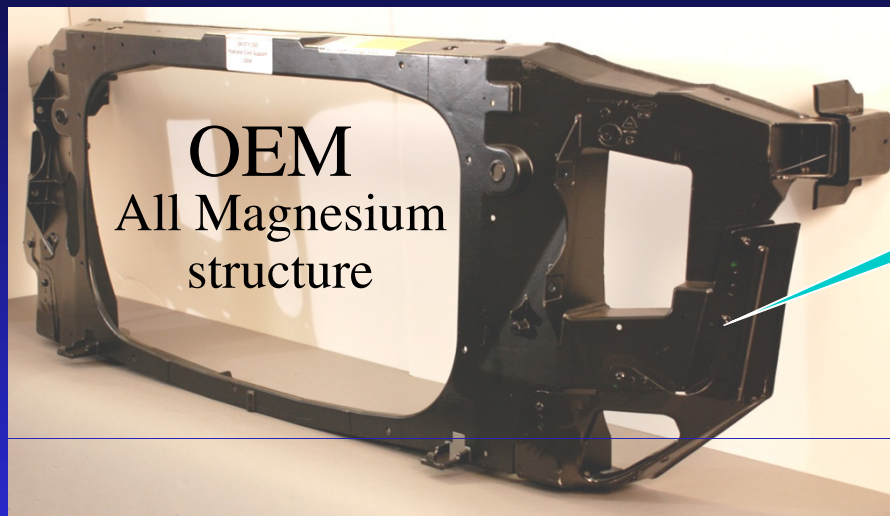
\* As of 3/26/2010 (upon completion of parts purchases)  
 \*\* Estimated 12-months rolling sales found in estimating equipment volumes  
 \*\*\* As of 07/02/2010



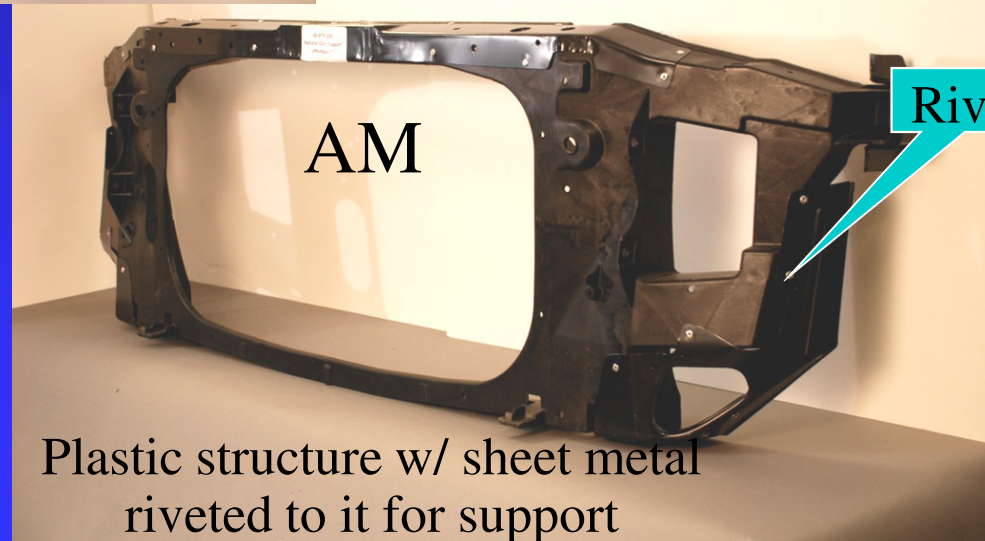
# F-150 Radiator Support



# Visual Comparison of Aftermarket and OEM Parts



Bolts



Rivets

# Visual Comparison of Aftermarket and OEM Parts



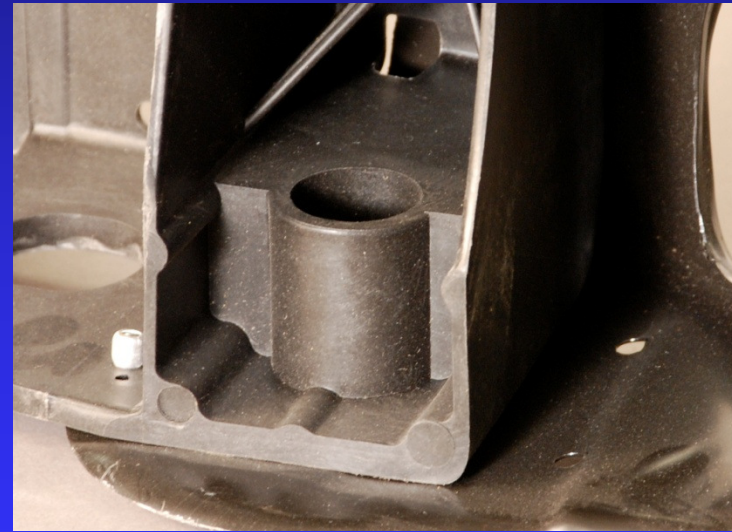
OEM

Note reinforcement on forward  
insulator mount



AM

Note lack of reinforcement on  
forward insulator mount





# Ford Safety Engineering

## 2007MY F-Series Radiator Support

Material Change from  
Magnesium to Plastic  
for Aftermarket Copy Radiator  
Support

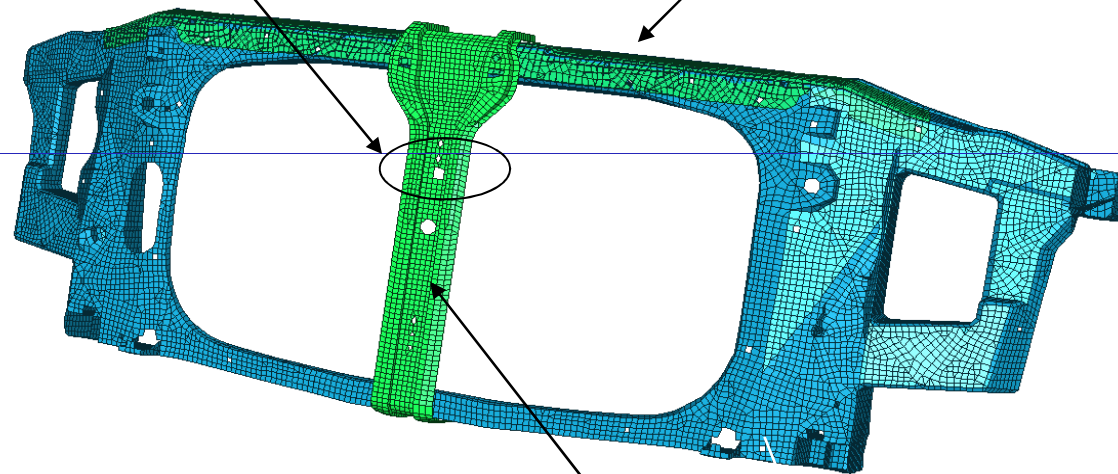


# Aftermarket Copy Radiator Support Computer Scan



Location of front airbag sensor

Aftermarket sheet metal reinforcement



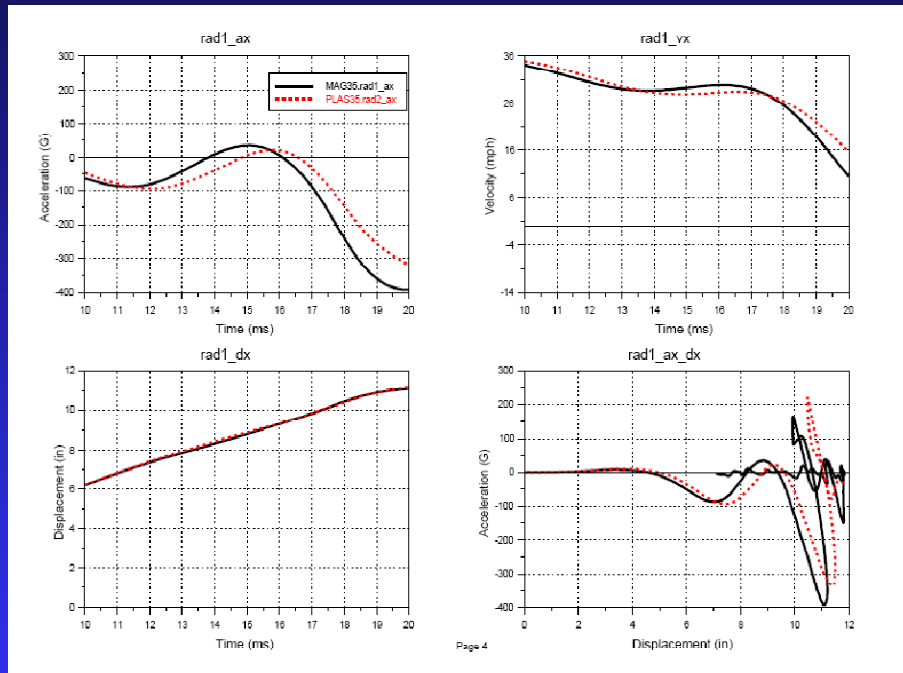
c/o center radiator support modified to fit aftermarket part

# Aftermarket Copy Radiator Support CAE Model Set-up



- The aftermarket copy radiator support material is Plastic (E=8.0 gpa). The 07MY F-Series radiator support material is Magnesium (E=45 gpa). The material property of the aftermarket plastic material was determined from the tensile tests
- An aftermarket sheet metal reinforcement (mild steel) connects to the top of the radiator support by pop rivets
- The center support is carry-over with shape modification to fit the aftermarket radiator support
- Carry-over connections to the front structure were utilized for the analysis
- The X-acceleration of the aftermarket radiator is compared with the 07MY F-Series at the front airbag sensor location

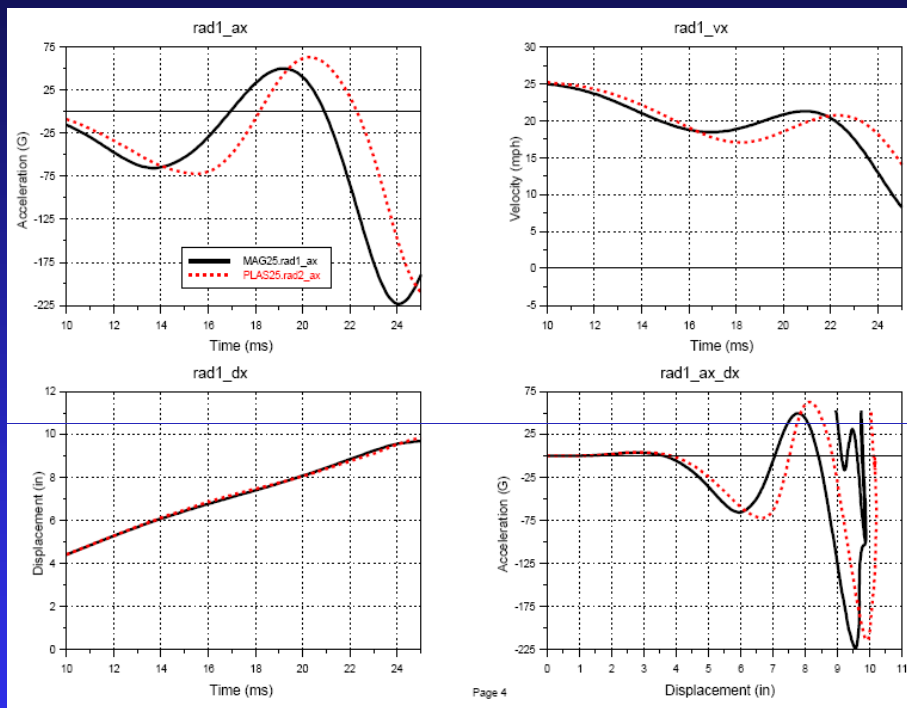
# CAE Comparison of Response for Initial Velocity = 35mph



OEM = Solid Black Line  
AM = Dotted Red Line

- The CAE model output rate for all velocities is 12500hz (0.08e-03 s).
- The acceleration plot shows that the aftermarket radiator response is time shifted and damped compared to the 07MY F-Series. At 14ms, there is a 50g difference between the two radiator supports

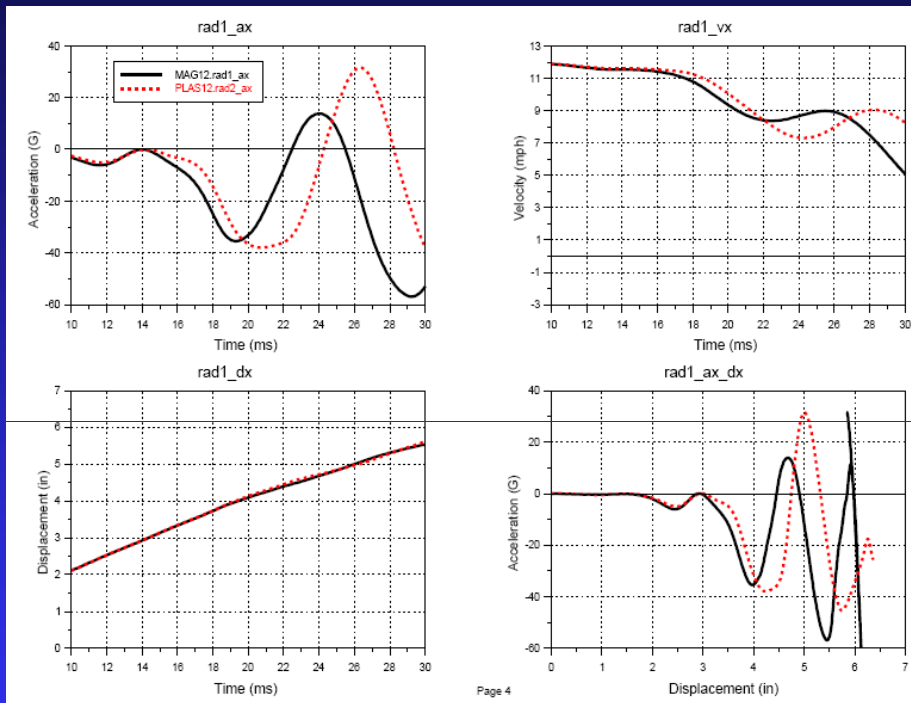
# 07MY F-Series Airbag Deployment Time for 25mph is 13.5-18.5 ms



OEM = Solid Black Line  
AM = Dotted Red Line

- The acceleration plot shows that the aftermarket radiator response is time shifted compared to the 07MY F-Series
- At 16ms, there is a 50g difference between the two radiator supports

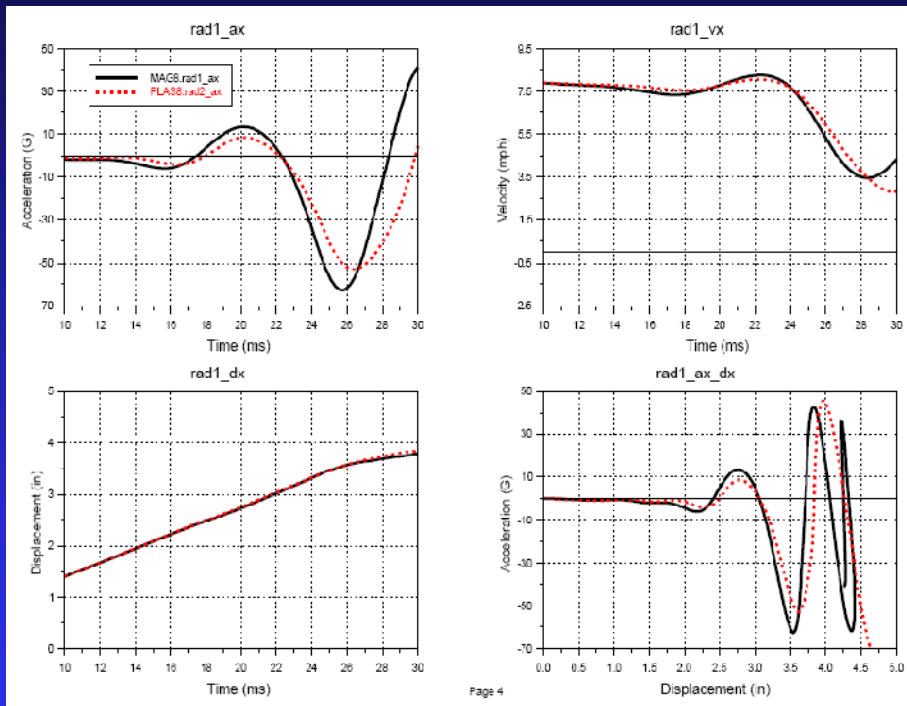
# 07MY F-Series Airbag Deployment Time for 12mph is 23-26 ms



OEM = Solid Black Line  
AM = Dotted Red Line

- The acceleration plot shows that the aftermarket radiator response is time shifted compared to the 07MY F-Series
- At 24ms, there is <20g difference between the two radiator supports
- At 26ms, the difference becomes larger because of the time shift

# 07MY F-Series 8mph Crash is a Non-Deployment Of Airbag



OEM = Solid Black Line  
AM = Dotted Red Line

- The acceleration plot shows that the aftermarket radiator response is time shifted compared to the 07MY F-Series
- At 24ms, there is a <math><10g</math> difference between the two radiator supports



# F-150 Radiator Support

## Ford Safety Engineering Conclusions :

- Due to the acceleration and time shifts the potential airbag deployments may be altered. This could affect occupant performance in some crash situations.
  - ◆ The acceleration plots show that the aftermarket radiator response is time shifted compared to the 07MY F-Series.
    - ◆ At speeds of 35mph and 25mph there is a difference of 50g at the nominal airbag deployment time.
    - ◆ At speeds of 12mph and 8mph there is a difference of 10-20g at the nominal airbag deployment time.
- Tensile test shows that the plastic material ruptures immediately after yielding (rupture stress=80mpa, rupture strain=3.15%). The rupture of the plastic radiator support can have effect on the response of the airbag sensor.



# Radiator Support Appendix

- The CAE model output rate for all initial velocities is 12500hz (0.08e-03 s).
- The objective of the analysis is to determine the change in the acceleration due to the aftermarket radiator support and not predict rupture. Earliest time (after impact) when the aftermarket copy radiator support reaches 70% of fracture stress is listed below and is only a rough estimate.

Initial Velocity (mph)	Time (ms) to reach 70% fracture stress
35	18-20
25	>20
12	>35
8	>35





# F-Series Radiator Support

	Ford OEM	Sherman
<b>Vehicle Application</b>	04-07 F-150	
<b>Part Name</b>	Radiator Support	
<b>Part Number</b>	5L3Z-16138-BA	CCC 579B-49
<b>OE List Price/AM Invoice*</b>	\$470.32	\$242.99
<b>Estimated Annual AM Sales**</b>		103
<b>Material Composition</b>	Magnesium/Metal	Plastic/Metal Support/Pop Rivets
<b>Cost per pound***</b>	\$4.00	n/a
<b>Production Process</b>	Casting/Stamped/ Bolted	Molded/Stamped/ Riveted
<b>Weight</b>	16.30 lbs.	13.60 lbs.
<b>Thickness</b>	n/a	n/a
<b>Manufacturer</b>	Available Upon Request	??
<b>Country of Manufacture</b>	USA	Taiwan
<b>AM Like Kind as OE?</b>	-	No
<b>AM Like Quality as OE?</b>	-	No
* As of 3/26/2010 (upon completion of parts purchases)		
** Estimated 12-months rolling sales found in estimating equipment volumes		
*** As of 07/02/2010		

7/18/2010

Ford Motor Company

65



## Aftermarket Copy Parts Tested Are NOT of “Like Kind and Quality”

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- Our analysis revealed tested aftermarket copy parts are substantially different in:
  - ◆ Raw materials used to make the part
  - ◆ Material weight and thickness
  - ◆ Manufacturing processes to construct the part
  - ◆ Dimensional and structural integrity
  - ◆ Performance (for the tested bumper beam and radiator support )
- They do not meet the test of “Like Kind and Quality” required by ~20 states for use in collision repair



This further supports the use of genuine Ford OE replacement parts in collision repairs as previously documented in Ford policy statements and technical manuals

The use of these tested aftermarket copy parts will change the dynamics of the crash process resulting in a differing response from the vehicle safety systems than those calibrated by Ford Motor Company



Ford Motor Company parts used to produce the vehicle are thoroughly tested during the vehicle development process. Ford vehicles are subjected to a battery of stringent internal tests as well as Federal Motor Vehicle Safety Standards (FMVSS) tests to help ensure all individual components work as a system during a crash sequence and meet or exceed the performance standards established by Ford Motor Company and the U.S. Government (National Highway Traffic Safety Administration).

Genuine Ford original equipment replacement collision parts are made on the same tools and dies as parts used in new-vehicle production. The same manufacturing processes and raw materials are also used. For these reasons, Ford Motor Company strongly recommends the use of original equipment replacement parts for collision repair. Use of aftermarket copy parts (non-OEM) or salvaged OEM parts could result in diminished value of the vehicle, increased damage in a subsequent collision, and may increase the risk of injury to the occupants in the event of a crash.



# Ford's Next Steps

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- Individual component level testing on crash test sleds if time can be made available
- Work with industry trade associations, Automobile Alliance, governmental and regulatory agencies, and elected officials for oversight of aftermarket parts and their impact on the safety of the driving public