

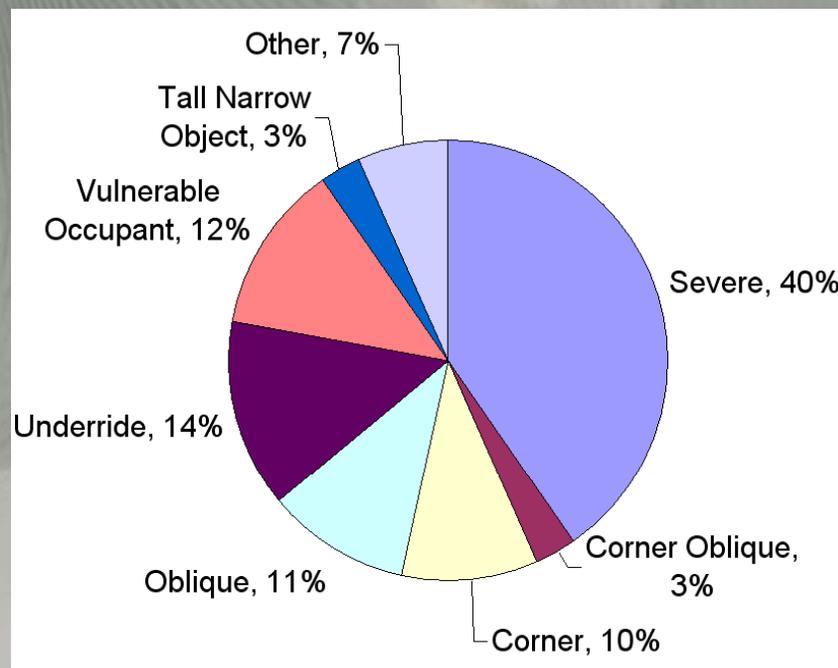
Evaluation of Small Overlap / Oblique Test Procedures



James Saunders
NHTSA Vehicle Safety Research

Fatalities in Frontal Crashes Despite Seat Belts and Air Bags

- 2000-2007 NASS fatalities for model year vehicles 2000+ where occupant was restrained



Develop Test Procedures

o Real world analysis

o Vehicle-to-Vehicle

o Compare MDB and Vehicle-to-Vehicle

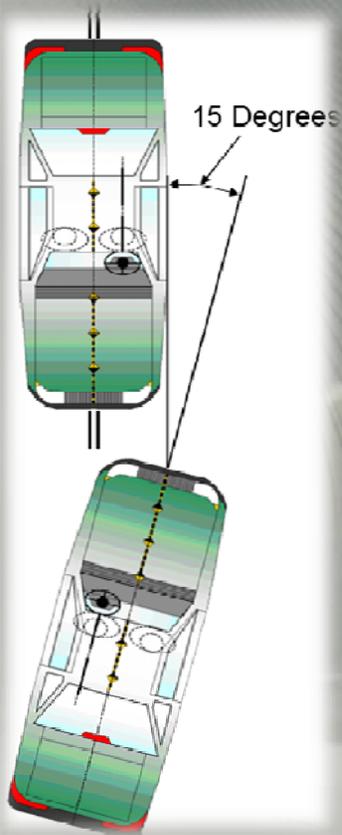
o Vehicle-to-Pole

Presented Gov/Industry
Located on NHTSA's website

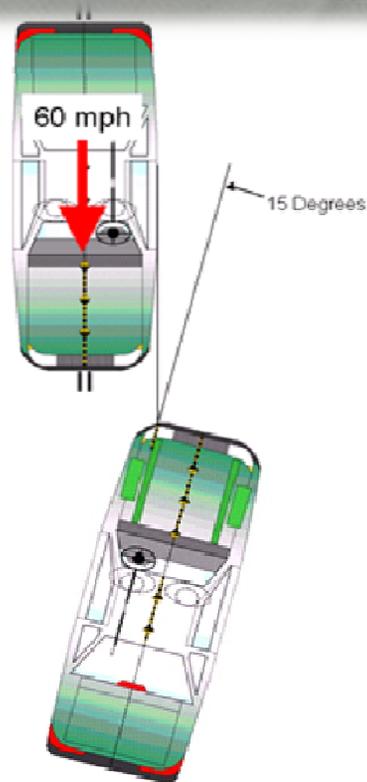


Test Setup

50 percent overlap



Aligned with Structure



Thor-NT placed in driver seat of target vehicle

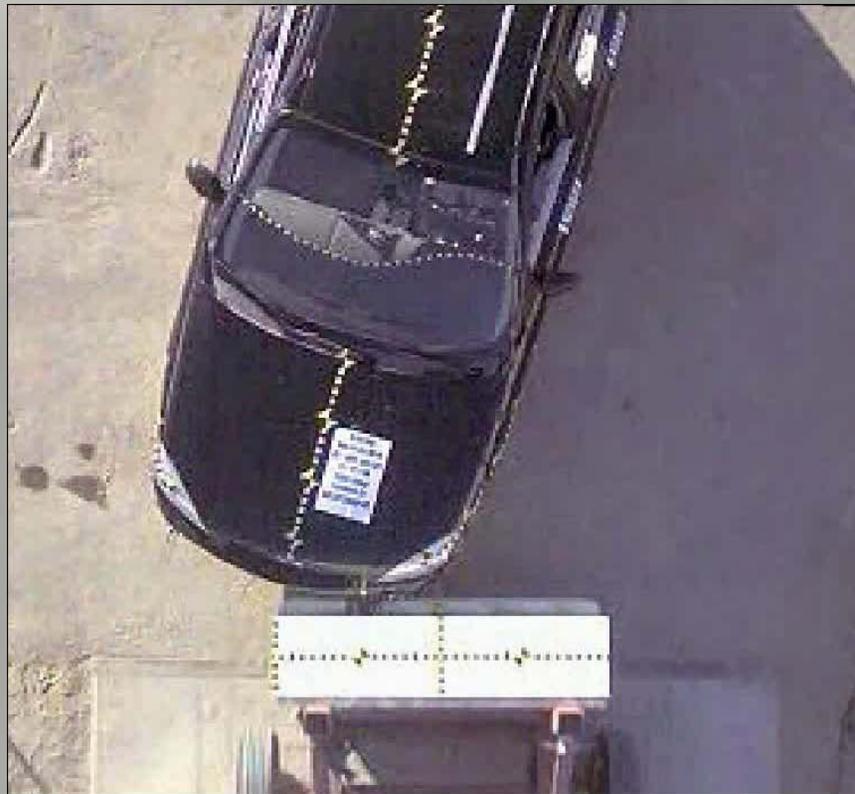
18 percent overlap



Test conditions determined from real-world analysis and modeling



50% Overlap



MDB-to-Taurus



Taurus-to-Taurus

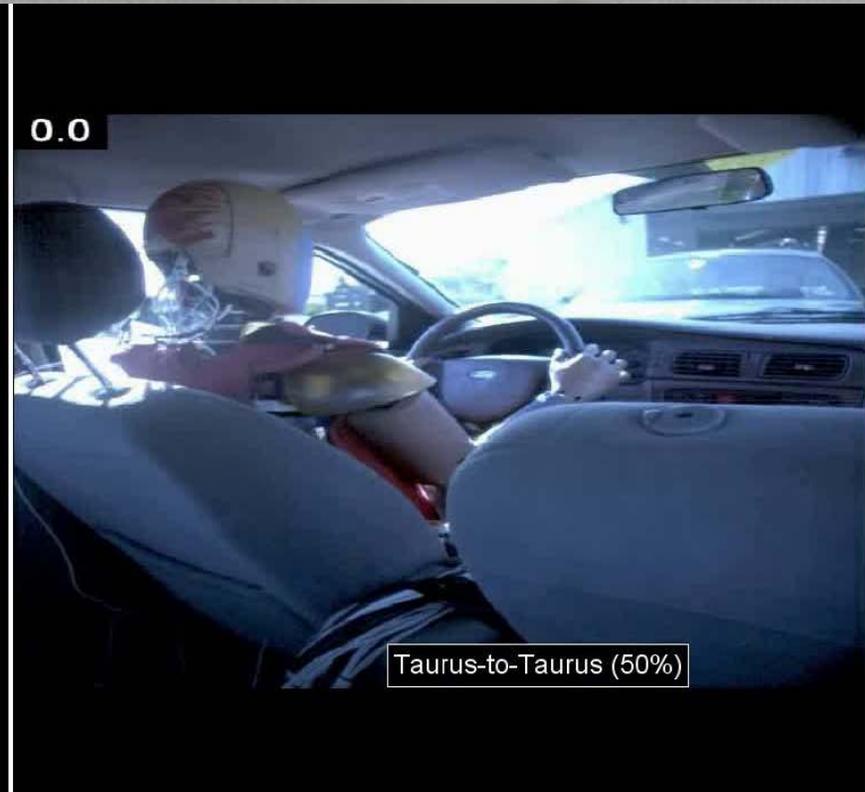


Dummy Kinematics: V-to-V vs. MDB-to-V



MDB-to-Taurus

- *Air bag deploys at 13 ms
- *SW catches dummy shoulder, inhibiting forward movement
- *Head contacts steering wheel



Taurus-to-Taurus

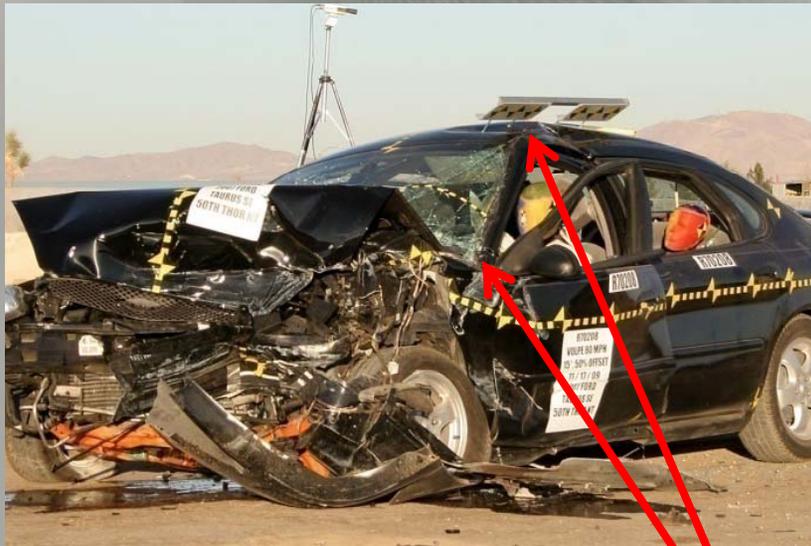
- *Air bag deploys at 29 ms
- *Dummy rolls off the bag
- *Head contacts door



Crash Comparison

MDB-to-Taurus

Taurus-to-Taurus

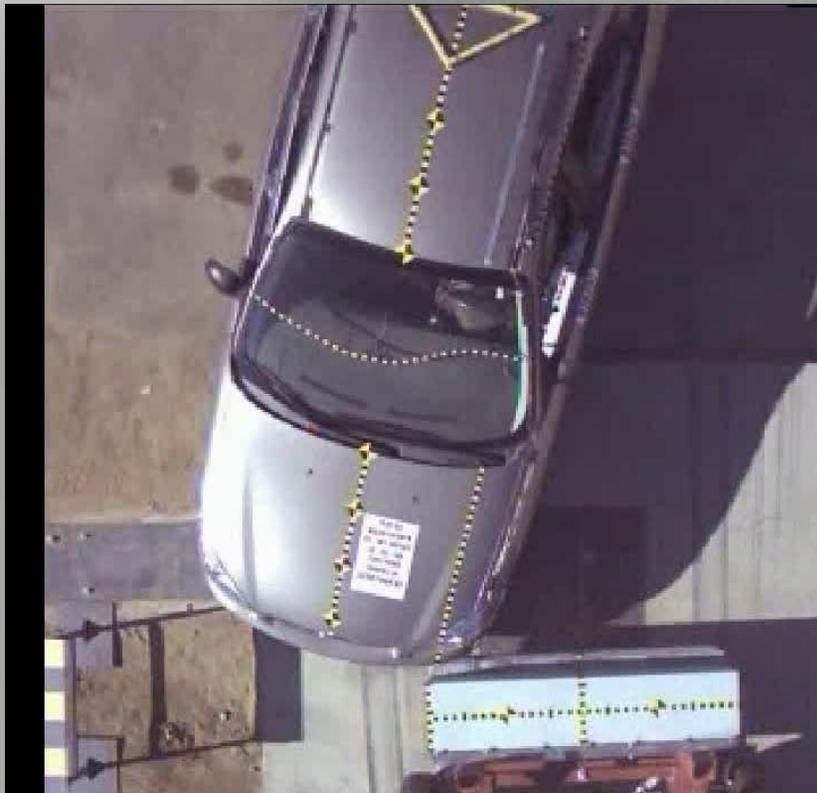


Difference in A-pillar deformation

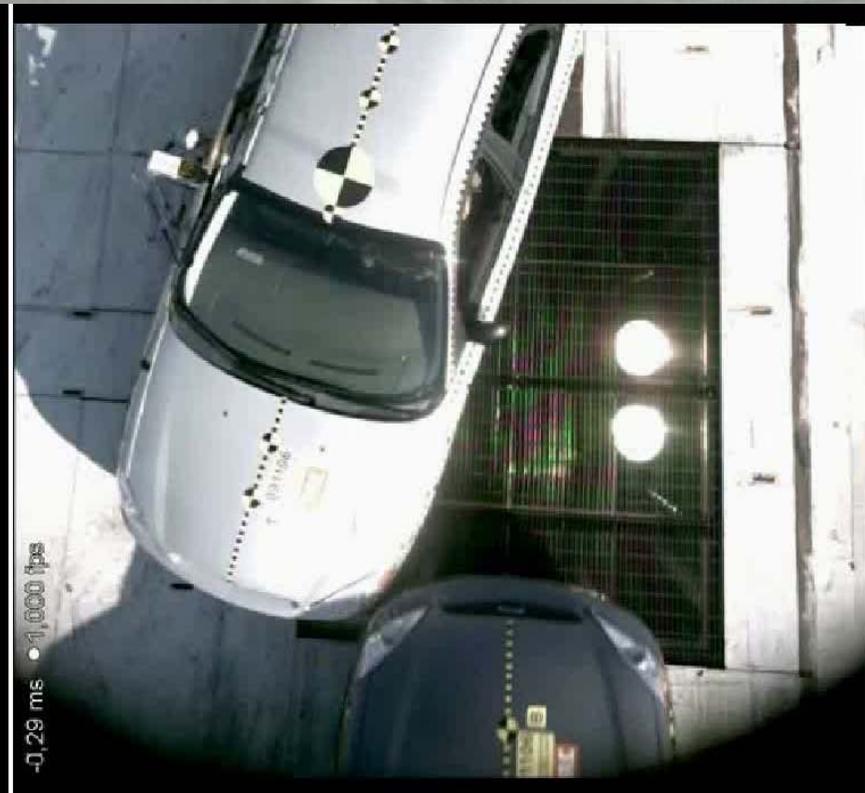


Small Overlap Comparison Taurus-to-Taurus to MDB-to-Taurus

Can not compare V-t-V test to real-world and MDB-t-V due to unexpected engagement of vehicles



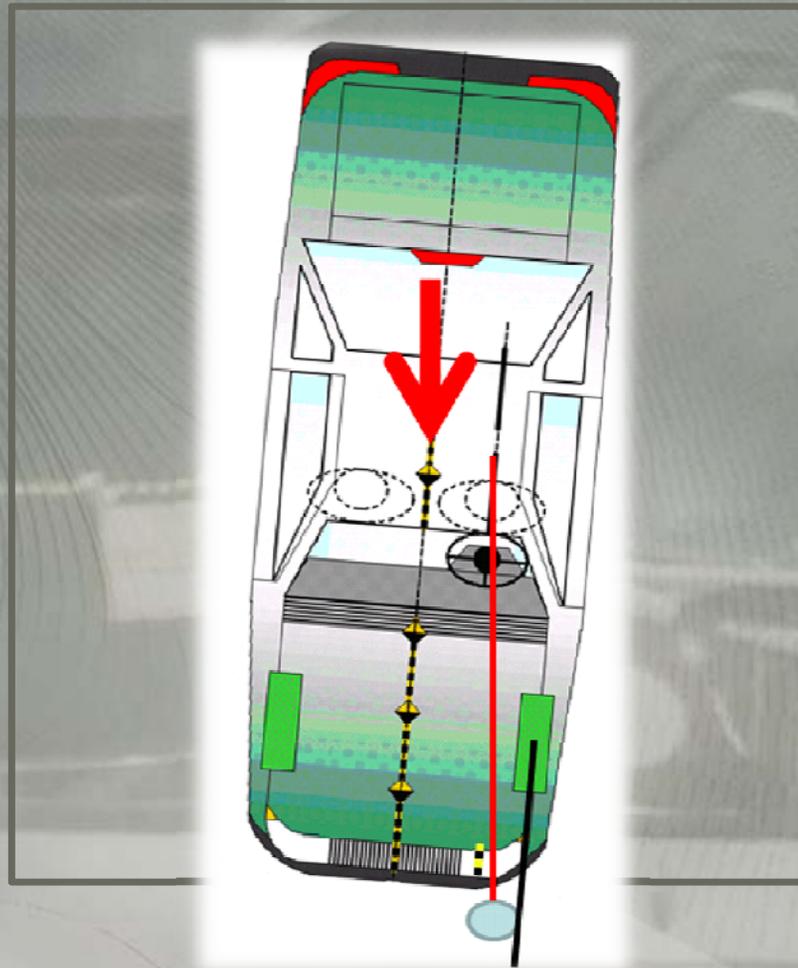
MDB-to-Taurus



Taurus-to-Taurus



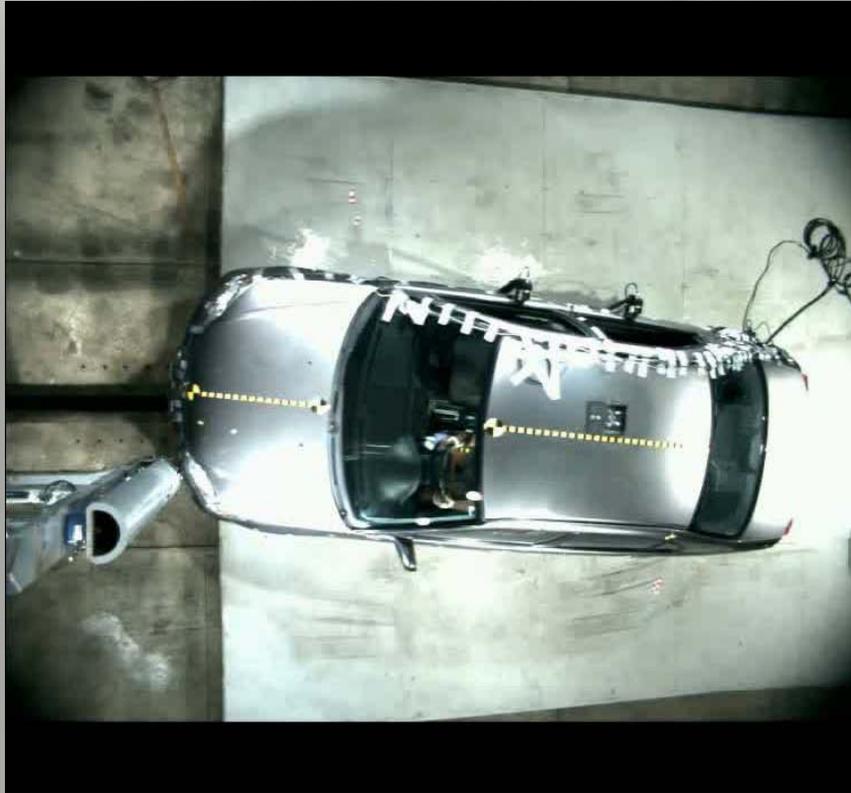
Pole Setup



Floating Floor



Countermeasure Evaluation



'05 Civic (Non-ACE)



'09 Civic (ACE)



Countermeasure Evaluation



'05 Civic (Non-ACE)



'09 Civic (ACE)



Summary of Testing

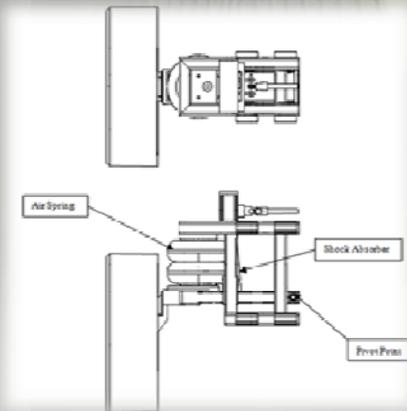
Target Vehicle*	Bullet Vehicle*	Target Vehicle DV/Bullet Vehicle Speed (mp)	Angle	Overlap	NHTSA Test Number
2005 Taurus (TH)	2005 Taurus (HIII)	35/70	15 degrees	80%	6829
2005 Taurus (TH)	2005 Taurus (HIII)	35/70	15 degrees	50%	6830
2005 Taurus (TH)	2005 Taurus (HIII)	30/60	15 degrees	18%	6832
2007 Ford 500 (TH)	2007 Ford 500(HIII)	35/70	15 degrees	50%	6831
2005 Taurus (TH)	214 MDB	35/79	15 degrees	50%	6852
2005 Taurus (TH)	214 MDB	30/≈70	15 degrees	18%	6855
2007 Ford 500 (TH)	214 MDB	35/≈80	15 degrees	50%	6865
2007 Ford 500 (HIII)	2007 Ford 500 (TH)	35/70	15 degrees	50%	6865
2005 Civic (TH)	Pole	30/30	15 degrees	20%	6872
2009 Civic (TH)	Pole	30/30	15 degrees	20%	6873

* TH – Thor NT 50 percentile male in driver seat
 HIII – HIII 50 percentile male in driver seat

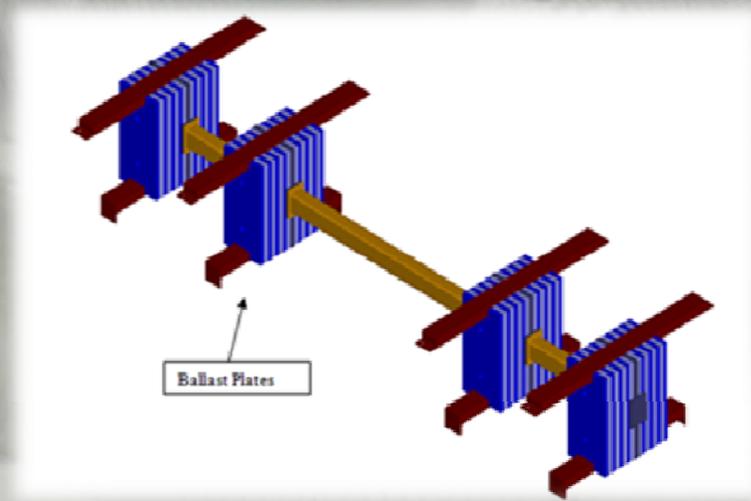


Future Work

- o Use Research MDB (RMDB)
 - o Modified FMVSS No. 214 cart
 - o higher and lower barrier face
 - o Suspension system
 - o Ballasting system



Suspension system of the RMDB



Ballasting system of the RMDB



Future Work (continued)

- Repeat the Taurus-to-Taurus small overlap test
- Perform another Vehicle-to-Vehicle small overlap test
 - General Trend



Future Work (continued)

- Perform two RMDB tests 50% overlap
 - Taurus and Ford 500
 - Determine next set of testing
- Perform Taurus into Pole (small overlap)
 - Comparison of test procedures
- Perform Current Vehicle into Pole (small overlap)



THANK YOU!

