Update on NHTSA’s Small Overlap/Oblique Testing

James Saunders
NHTSA Vehicle Safety Research

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Contents

- Background
- Small overlap vehicle-to-vehicle testing
- Real-world comparison
- Observation for Small Overlap Vehicle-to-Vehicle testing
- Future research
- Research plan
Background
Fatalities in Frontal Crashes Despite Seat Belts and Air Bags

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

![Pie chart showing proportions of fatalities from different types of crashes]
Oblique Offset Testing
(15 degrees, 50% Overlap)

- 2010 SAE Government/Industry
  - Demonstrated the Thor head contact similar to case reviews
  - A-pillar, door, or IP in all tests
  - Crush pattern similar to case reviews
Small Overlap VtV Testing
2007 Taurus-to-Taurus

*Aligned outside the rails
*Thor-NT in driver position
*Theoretical DV = 35 mph (Bullet moving 70 mph)
*Target positioned 7 degrees relative to bullet vehicle
2007 Taurus-to-Taurus
Tears down the rail and engages occupant compartment causes A-pillar collapse and IP intrusion.
2010 Yaris-to-Yaris

* Aligned outside the rails
* Thor-NT in driver position
* Theoretical DV = 35 mph (Bullet moving 70 mph)
* Target positioned 7 degrees relative to bullet vehicle
2010 Yaris-to-Yaris

Tears down the rail, but does not cause A-pillar collapse or a lot of IP intrusion. May be due to overlap or vehicle design. (Need to look at newer vehicles)
Real-world Comparison

NASS: 2002-09-131
2001 Taurus into 1994 Impala

Crash Test
Observations

- Taurus-to-Taurus small overlap crush similar to real-world cases.
- Thor dummy rolled off the airbag.
Future Research
Future Research

- Try recreate vehicle-to-vehicle results using a MDB in both small overlap and Oblique crash modes
Research Plan
NASS Definition of Crash Modes

- MCW developed a methodology using NASS data to define small overlap crashes
  - Publishing report and SAE paper

- MCW developing methodology to define oblique crashes and other frontal crash modes
Intrusion versus Injury

- Updating previous NASS analysis to evaluate relationship of intrusion to injury for frontal crashes
Vehicle-to-Vehicle Testing

- Oblique Offset
  - Yaris-to-Yaris (35 mph DV, 15 degrees, 50% Overlap)
New MDB Design

Why New Barrier?
- 214 honeycomb bottomed out to soon
- Damage to the barrier
MDB Test Setup

Oblique Offset

Note: Test conditions may change

Overlap 35%

Theoretical DV=35 mph

15 Degrees

Align with outside the rail

Theoretical DV=35 mph

7 Degrees

Small Overlap

Note: Thor-NT in driver position and HILL 5th female in left rear seat
MDB Test Matrix

- Oblique Offset
  - 2007 Ford Taurus
  - 2007 Ford 500
  - 2010 Toyota Yaris
  - 2010 Ford Fusion

- Small Overlap
  - 2007 Ford Taurus
  - 2010 Toyota Yaris

Note: The test matrix may change due to results
THANK YOU!