WELCOME!
Ford’s Safety Research Activities and Features

CMI Annual Meeting
February 21, 2008
Traffic Safety Facts in the U.S.A.

- Over 42,000 fatalities each year
- 200,000 seriously injured each year
- 500,000 people hospitalized each year
- $230 Billion societal cost each year (NHTSA estimate)
  - $1000 per vehicle each year cost of ownership
<table>
<thead>
<tr>
<th>Country</th>
<th>Announced Target</th>
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<tbody>
<tr>
<td>Sweden</td>
<td>Zero Fatality Vision</td>
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<tr>
<td>Netherlands</td>
<td>Zero Fatality Vision</td>
</tr>
<tr>
<td>Japan</td>
<td>50% Reduction in Fatalities by 2015</td>
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<tr>
<td>Australia</td>
<td>40% Reduction in Fatalities by 2010</td>
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<tr>
<td>United Kingdom</td>
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<tr>
<td>Canada</td>
<td>30% Reduction in Fatalities by 2010</td>
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<tr>
<td>European Union</td>
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</tr>
<tr>
<td>United States</td>
<td>33% Reduction in Fatalities by 2008</td>
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Historical Trends in Total Traffic Accident Fatalities in the Developed Markets

Historical Trends in Total Traffic Accident Fatalities in the Developed Markets

- **U.S.**
- **U.K., Germany and France**
- **Japan**

Future Increase Expected*:
- Population increase
- Aging Population
- Fleet Shift

* Excludes effect of counter-measures
“Active” or “Primary” Safety = Accident Avoidance and/or Crash Severity Reduction

“Passive” or “Secondary” Safety = Injury Avoidance and/or Injury Severity Reduction

“Tertiary” Safety = Avoidance of Post-crash Risks and Ease of Rescue
Adaptive Cruise Control (ACC) and Distance Alert

Current Status: In Production: Jaguar XK, XJ, S-Type; Ford Mondeo, Galaxy, SMax, Volvo S80, XC70, V70
Collision Warning with Auto Brake

Vision + Radar Fusion

Long Range Radar

Vision

Current Status: In production: Volvo XC70, V70 and S80 (2008MY)
Driver Alert Control (DAC)

Current status: In Production: Volvo XC70, 70, S80 2008MY
Low Speed Collision Mitigation by Braking (aka “CitySafety”)

**Competition:** None

**Current status:** Planned Production: Volvo 2009MY
Human Body Modeling (HBM)

A detailed, 3-dimensional, FE model of the human body for the study of human injury mechanisms and the development of emerging tissue level injury criteria.

- Fully validated Head/Brain and Neck model
- Fully validated Thorax/Shoulder and Upper Extremities model
- Fully validated Abdomen with internal organs model
- Fully validated Pelvis and Lower Extremity (knee & lower leg) model
- Models of internal organs such as heart, kidney, spleen liver etc included
- Validations performed against cadavers and human volunteers data
- Model used as a research tool to better understand real-world injuries in vehicle crashes
- Model used to supplement cadaver testing in developing new emerging injury criteria
- Model used in evaluating future restraint systems to improve real-world safety
- Model available in three different crash Finite Element codes (Ls-Dyna, Pam-Crash, & Radioss)
- Model shared with National Highway Safety Traffic Administration (NHTSA)
- Future work towards development of various sizes, including child HBM
Total Human Body Modeling
Human Head/Brain & Neck Models

3-Year Old Skull

3-Year Old Brain

3-Year Old Head/Brain Model

Pressure of the Brain

Adult Head/Neck Model

Human skull fracture risks and tolerance

Adult Head/Brain Model
Ford’s Human Body Model Applications

Various seatbelts and airbag simulations with the Ford’s HBM
Developed a MADYMO model of a 3-year old occupant on a Fisher-Price CRS (with top tethers and ISOFIX system) in the back seat of a typical minivan.

Compared model output with test results.