Women In Transportation Seminar – The Future of Transportation How Do We Get There

US Department of Transportation
NHTSA
Julie J Kang
NHTSA’s Mission and Strategy

• NHTSA is an organization under the U.S. Department of Transportation (DOT) whose mission is to save lives, prevent injuries and reduce economic costs due to road traffic crashes, through education, research, safety standards and enforcement activity.
NHTSA’s Mission and Strategy

Safety Problem Identification
- Crash Data Analysis
- Naturalistic Studies
- Surveys

Identify Safe and Effective Designs
- Laboratory Testing
- Simulators
- Track Testing

Evaluate System Acceptance Effectiveness & Safety Use
- Field Operational Tests
- Early Adopters Surveys

Safety Enhancing Systems and Safety Impacting Systems

Technology Deployment Decreased Crashes
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<th>Crash Avoidance</th>
<th>Crashworthiness</th>
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<td>NORMAL DRIVING</td>
<td>CRASH IMMINENT</td>
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| PASSENGER CARS/TRUCKS| • Driver Distraction  
                   • Driver Support Systems  
                   • Blind Spot Detection  
                   • Alcohol Detection  
                   • Drowsy Driver Detection | • Forward Crash Warning  
                   • Lane Departure Warning  
                   • Automatic Braking  
                   • Lane Keeping  
                   • V2V & V2 | • Advanced Airbags  
                   • Dynamic Rollover  
                   • Oblique/Off-set Frontal  
                   • Adaptive Restraints  
                   • Child Side Impact  
                   • Elderly Occupants | • Auto Crash Notification  
                   • Advanced ACN  
                   • Medical Outcome (CIREN)  
                   • First Responder Safety |
| HEAVY VEHICLES - Truck/Bus | • Driver Distraction  
                   • Drowsy Driver Detection  
                   • Enhanced Vision Systems  
                   • Blind Spot Detection | • ESC/RSC  
                   • Forward Collision Warning  
                   • Lane Change Warning  
                   • V2V & V2I | • Underride | • Electronic Data Recorders  
                   • ACN? |
| MOTORCYCLES | • Conspicuity | • ABS/CBS  
                   • V2V | • Helmet Use  
                   • Airbags | • ACN? |
| PEDESTRIANS | • Quiet Car Detection  
                   • Lighting Systems for Peds | • Pedestrian Warning  
                   • Automatic Braking  
                   • P2V | • GTR – Hoods / Bumpers | • ACN? |
| BATTERY ELECTRIC VEHICLES | • Charging Safety  
                   • Lithium Ion Battery | • Shut-Down Strategies | • Lithium Ion Battery  
                   • Electrical Isolation | • First Responder Safety |
| ELECTRONICS RELIABILITY & SECURITY | • Fail-Safe Strategies  
                   • Software Reliability  
                   • Fault Detection & Reporting & HMI | • Control System Management Strategies & HMI | • Control System Management Strategies | • Electronic Data Recorders |
Crash Avoidance Research

• Crash Avoidance research supports:
  – Federal Motor Vehicle Safety Standards
  • U.S. federal regulations specifying design, construction, performance, and durability requirements for motor vehicles and regulated Automobile safety-related components, systems, and design features.
  – Safety defects investigations
  – Advances knowledge about driver behavior, and assists in: the development of new vehicle technologies
Vehicle Safety Act Requirement (NHTSA’s enabling statues)

• To establish FMVSS, must demonstrate:
  – meets a safety need
  – is practicable (technologically and economically)
  – and states its requirements in a way that permits compliance to be determined in an objective fashion
  – FMVSSs must be performance-oriented
  – FMVSSs must be appropriate for each vehicle type to which they apply.
Future of Vehicle Technology: How Do We Get There?

- Disruptor Technology - an innovation that creates a new market and value network and eventually disrupts an existing market and value network, displacing established market leading firms, products and alliances
- Tends to be produced by outsiders and entrepreneurs
- Examples:
  - Craigslist, Skype, iTunes, Google, eBay, Uber, Twitter, Netflix
How Do You Regulate Disruptor Technologies?

- Distraction Guidelines
- Need for additional research on distraction and its effects on driving
- Rapid pace of technology changes
- NHTSA also recognized that driver distraction testing involves drivers with individual differences. These individual difference present new challenges for developing repeatable, objective test procedures.
NHTSA Products

- Rulemaking/ FMVSS Regulations
- Advanced Notice of Proposal for Rulemaking
- Voluntary Guidelines
- New Car Assessment Program
- Memorandum of Agreement
Future of Vehicle Research: How Do We Get There?

• Vehicle trends and advanced technologies
• NHTSA goals - based on their mission statement
• NHTSA’s existing framework and requirements for accomplishing their mission
• HF questions and potential issues
Thank you

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Talk

• NHTSA’s Mission
• Where We Are
  – NHTSA’s Research Organization
    • Behavioral Research
    • Vehicle Research
      – Crash Worthiness
      – Crash Avoidance
• Crash Avoidance topic areas
Office of Vehicle Crash Avoidance and Electronic Controls Research

- Seeks to develop a broad base of understanding of advanced electronic, computer, and communication technologies that can help drivers avoid crashes that can lead to introduction of advanced crash avoidance systems.
NHTSA Research and Evaluation: Programs

• NHTSA conducts research and evaluation projects dealing with behaviors and attitudes in highway safety. Program focus is on drivers, passengers, pedestrians, and motorcyclists and their role in the traffic safety. Laboratory and field studies are conducted to identify and measure behaviors involved in crashes or associated with injuries.

• Scientific research is conducted to develop and refine countermeasures to deter unsafe behaviors and promote safe alternatives.
NHTSA Crash Worthiness

- Crashworthiness focuses on occupant protection to reduce the number of fatal and serious injuries that occur in the United States each year.
- This research program is responsible for developing and upgrading test procedures for evaluating motor vehicle safety. Crashworthiness research encompasses new and improved vehicle design, safety countermeasures and equipment to enhance occupant safety.
How Does the Agency ID the Need for Rulemaking

- How does an agency identify the need for a rulemaking?
- There are many reasons why an agency may decide to initiate the rulemaking process. The major reasons for DOT agencies fit mostly in the following categories:
  - **Statutory mandate.** Congress may specifically require a rule or at least the initiation of the rulemaking process - sometimes with a deadline.
  - **Agency identification of a problem.** To the extent an agency has discretion to decide whether to issue a rule, it may identify the need to initiate the rulemaking process in a variety of ways, including the following: We may identify a problem as a result of inspectors’ reports or general agency oversight. For example, we review accident reports or data that may show an increasing safety problem with motor vehicle side collisions or leaks of hazardous materials during transportation. Investigations of accidents may indicate a manufacturing problem that needs to be addressed. We may have difficulties enforcing existing rules, and this may provide evidence of a need to modify the rules. Requests for interpretations or exemptions may demonstrate that a rule needs to be clarified or modified. Finally, changes in technology may justify a change to a rule. For example, new technology may warrant modifying existing rules to permit the use of new materials. The accessibility of the Internet may justify changing reporting requirements to permit electronic filing.
  - **Petition for rulemaking.** The public has the right to petition an agency to issue, modify, or rescind a rule, and we may agree on the need for action.
  - **NTSB, GAO, IG, or similar recommendations.** Recommendations for rules may come from the National Transportation Safety Board (NTSB), the Government Accountability Office (GAO), the DOT Inspector General (IG), or special commissions or other bodies asked by Congress or the President to develop recommendations on particular issues.
Car Safety Timeline

- First seat belt
Crash Avoidance – Focus Areas

• Human Factors:
  – Driver Impairment and Inattention
  – Driver-Vehicle Interface research
  – Rulemaking Support (several topics, including Quiet Car)

• Intelligent Technologies:
  – Onboard Safety Systems
    • Forward Crash Warning, Lane Keeping, Automatic Emergency Braking, etc
  – Connected Vehicles (V2V) Communications

• Electronic Systems Safety
  – Electronics Reliability
  – Cybersecurity
  – Emerging Technologies (e.g. Automated vehicles)
Standards for Test Procedures

- The Safety standard rulemaking approach establishes various repeatable test procedures and performance requirements that will generate countermeasures effective in the chaotic real-world events.
- Performance based - regulating the performance rather than the design of vehicles and their components.
- Science and Data Driven - RM is only undertaken when grounded in theory and sound, empirical evidence.
- Repeatability.
- Reproducibility of produced test procedures.