Driver Distraction: Problems, Progress, Priorities
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Research Symposium
Dec 1, 2009

1965

The most explosive and influential best seller of the decade!

UNSAFE AT ANY SPEED
The Designed-in Dangers of the American Automobile

RALPH NADER

[Image of the book cover]
Topics

• Why has distraction become such a concern among the public, industry, media, researchers, legislators?
• What is known about the safety problem in the U.S.
• Progress in identifying effective and acceptable countermeasures
• Future priorities
Distraction Trend

Then

Now

Future

Built-in Devices

10:36
FM 1
INFO
Perstiti
Future Wireless Technologies

- Signal and Stop Sign Violation Warning
- Curve Speed Warning
- Collision Warning
- Smart Parking—Up-to-the-minute information about parking availability
- Vehicle distress signals (alerts other drivers that help is needed)
- Real time re-routing
- Road condition alerts
- Vehicle service alerts

Brought-in Devices
Cell Phones

What did it do, grandpa?

Artists are concerned

- To learn of ongoing initiatives and research needs
- Develop strategies for realizing benefits of in-vehicle technologies without increasing distraction-crash risk
- To call national attention to the issue
NHTSA Distraction Research Program

Understand the magnitude and characteristics of the crash risk

Reduce Device Attentional Demands: Develop metrics & protocols to quantify impacts of interfaces on distraction potential

Reduce Crash Risks: Determine effective and acceptable driver assistance systems

Develop Social Marketing & Behavioral Change Programs

Surrounding the Truth About the Magnitude of the Crash Problem
Incidence of Phone Use and Other Tasks

<table>
<thead>
<tr>
<th></th>
<th>Conversing with passengers</th>
<th>15%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stutts (2005) in-vehicle recording percent of time:</td>
<td>Eating related</td>
<td>4.6%</td>
</tr>
<tr>
<td></td>
<td>Phone related</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phone subscribers, CTIA</th>
<th>2008</th>
<th>270 Million</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2000</td>
<td>110 Million</td>
</tr>
</tbody>
</table>
# Data From Police Reports and From 100 Car Data

<table>
<thead>
<tr>
<th>Source</th>
<th>Category Description</th>
<th>Percentage of Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Broadly defined (i.e., all inattention)</td>
<td>25%</td>
</tr>
<tr>
<td>Stutts (2002) NC state police narratives</td>
<td>Cell phone related</td>
<td>.04%</td>
</tr>
<tr>
<td>Stutts et al (2005)</td>
<td>Distracted</td>
<td>10.5%</td>
</tr>
<tr>
<td></td>
<td>Cell phone related</td>
<td>3.6%</td>
</tr>
<tr>
<td>100 Car data</td>
<td>Looking away in 3 sec prior to crash</td>
<td>80%</td>
</tr>
</tbody>
</table>

# From NHTSA Data Bases

![Crashes Involving Driver Distraction by Crash Severity](image)

- **Fatal**
- **Injury**
- **PDO**
- **Total**

Percentage of crashes involving driver distraction by crash severity over the years 2004 to 2008. The data sources are NCSA, FARS 2004–2007 (Final), 2008 (ARF), GES 2004–2008; PDO—Property Damage Only.
National Motor Vehicle Crash Causation Study (NMVCCS)

Crashes Where the Critical Reasons Were Attributable to Driver

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub category</th>
<th>Percent of Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recognition error (40.6)</td>
<td>Inadequate surveillance</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Internal distraction</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>External distraction</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Inattention (daydreaming)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Other/unknown</td>
<td>2.5</td>
</tr>
<tr>
<td>Decision error</td>
<td>e.g., too fast</td>
<td>41</td>
</tr>
<tr>
<td>Performance error</td>
<td>e.g., overcompensation</td>
<td>34</td>
</tr>
<tr>
<td>Non performance error</td>
<td>e.g., asleep</td>
<td>10</td>
</tr>
<tr>
<td>Other/unknown</td>
<td></td>
<td>8</td>
</tr>
</tbody>
</table>

NMVCCS Report to Congress, July 2008, DOT HS 811 059
Driver-Related, Crash Associated Factors: Interior Non-Driving Activities (NMVCCS)

<table>
<thead>
<tr>
<th>Activity</th>
<th>% of crash involved drivers (multiple choices/driver)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversing with passenger</td>
<td>9.87</td>
</tr>
<tr>
<td>Conversing on phone</td>
<td>1.73</td>
</tr>
<tr>
<td>Retrieving objects</td>
<td>1.6</td>
</tr>
<tr>
<td>Looking at other occupants</td>
<td>1.3</td>
</tr>
<tr>
<td>Adjusting vehicle controls</td>
<td>0.9</td>
</tr>
<tr>
<td>Dialing/hanging up phone</td>
<td>0.2</td>
</tr>
</tbody>
</table>

NMVCCS Report to Congress, July 2008, DOT HS 811 059

Naturalistic Driving Data: Crash/Near Crash Risk Estimates

<table>
<thead>
<tr>
<th></th>
<th>Looking at external object</th>
<th>3.8*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dialing hand-held phone</td>
<td></td>
<td>2.8*</td>
</tr>
<tr>
<td>Inserting/retrieving CD</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>Eating</td>
<td></td>
<td>1.6</td>
</tr>
<tr>
<td>Talking/listening on phone</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>Passenger, front seat</td>
<td></td>
<td>.5*</td>
</tr>
<tr>
<td>Cumulative eyes off forward roadway&gt;2 sec in 5 sec prior and 1 sec after event</td>
<td>2.37*</td>
<td></td>
</tr>
</tbody>
</table>

* Statistically significant
How is problem explained by news media?

- Notable individual crash reports involving distraction

Between 20 and 30 percent of all motor vehicle crashes in the United States are caused in part by driver distraction according to the National Highway Traffic Safety Administration (NHTSA).

msnbc.msn.com (8/06)

Driver distraction accounts for 80 percent of all vehicle crashes and 65 percent of near-crashes, says the National Highway Traffic Safety Administration.—Bangor Daily News (8/09)

The reality is that driver distraction is the number one cause of crashes— motortrend.com (8/09)

The likelihood that they (drivers using phones) will crash is equal to that of someone with a .08 percent blood alcohol level, the point at which drivers are generally considered intoxicated. –New York Times (8/09)

The Obama administration reported that nearly 6,000 people were killed and a half-million injured last year in vehicle crashes connected to driver distraction, a striking indication of the dangers of talking on cell phones and texting while driving.  Msnbc.com (9/09)
Challenges of Characterizing the Distraction Crash Problem

- Crash Data not complete regarding driver distraction
  - driver honesty; misperceptions
  - 40% of cases unknown
- In the U.S., police reporting varies from state to state
  - Definition of distraction varies
  - In 2003, only 7 states had cell phone fatalities
  - 206 out of 285 fatalities were in CA

Understanding the Problem: Progress and Priorities

- Distraction from cell phones and other sources is a safety problem
- The true magnitude of the problem still not known
- Many studies have shown how this increased risk might occur due to the degradation in driving performance during multitasking, including slower reaction time and narrow visual scanning.
  - However, experimental data do not directly translate into estimates of crash risks
- Future naturalistic studies should help to provide better risk estimates and insights regarding the role of distraction in crash causation.
Core elements of distraction crash risk

- **Attentional demands**: The amount of resources required to perform the distraction task
- **Exposure**: How often and when drivers engage in the task. Driver strategies (if any) to compensate for distraction.

Options to Minimize Distraction Crash Risk

- **Change Driver Behavior**
  - Laws to prohibit unsafe device use
  - Educate drivers about dangers of driving while distracted
- **Improve Device Designs**
  - Human engineer equipment designs to minimize demands on drivers
  - Workload managers to automatically limit information to driver
- **Warn Distracted Drivers**
  - Deploy effective and acceptable advanced driver assistance systems
  - Provide drivers with real time feedback about their risky behaviors
Behavior Change Activities

- Education
- Information Campaigns
- Warning labels
- Laws

Information Campaigns
Typical Phone Safety Tips

- Get to know your wireless phone and its features
- Position your wireless phone within easy reach
- Let the person you are speaking with know you are driving
- Suspend calls in adverse weather and heavy traffic

Wireless Phone Information

Important Safety Precautions

- Violation of the instructions may cause serious injury or death.

Warning

- Never use an unapproved battery since this could damage the phone and/or battery and could cause the battery to explode.
- Never place your phone in a microwave oven as it will cause the battery to explode.
- Never store your phone in temperatures less than -4°F or greater than 122°F.
- Do not dispose of your battery near fire or with hazardous or flammable materials.
- When riding in a car, do not leave your phone or set up the hands-free kit near the air bag. If wireless equipment is improperly installed and the air bag is deployed, you may be seriously injured.
- Do not use a hands-free phone while driving.
- Do not use the phone in areas where its use is prohibited. (For example: aircraft)

Consumer Information

Drive responsibly

When behind the wheel, safe driving is your responsibility and it should always be your first priority.

Scientific research on the subject of wireless phone use and driving has been conducted worldwide for several years. According to the National Highway Traffic Safety Administration (NHTSA), the available research indicates that using a wireless phone while driving degrades a driver’s performance, whether it is a hands-free or hand-held wireless phone. NHTSA advises that the “safest course of action is to refrain from using a cell phone while driving.” NHTSA’s policy on “Cell Phone Use While Driving,” as well as Frequently Asked Questions on the subject, are available at www.nhtsa.gov (click on “Traffic Safety” then on “Drowsy and Distracted Driving”).

For your well being and the well being of those around you, you should consider turning your phone off and allowing calls to go to Voice Mail while you are driving.

If you choose to use your wireless phone while driving, several jurisdictions have adopted “hands-free” and other restrictions on the use of wireless devices while driving. It is your responsibility to know and to comply with the law in your area.
2009 Survey by AAA Foundation for Traffic Safety*

- 95% of drivers said that text messaging while driving was completely or somewhat unacceptable;
  - 18% of those same drivers admitted having read or sent a text message or email while driving in the past month.
- 71% rated talking on a handheld cell phone while driving as unacceptable
  - 30% of those same drivers reported doing this
- 95% rated driving 15 mph over the speed limit on a residential street as unacceptable
  - 21% of those same drivers admitted having done this.


Automobile Information in Owners Manuals and Navigation Displays

⚠️ CAUTION:

This system provides you with far greater access to audio stations and song listings. Giving extended attention to entertainment tasks while driving can cause a crash and you or others can be injured or killed. Always keep your eyes on the road and your mind on the drive — avoid engaging in extended searching while driving.

SAFETY INFORMATION

⚠️ Driving while distracted can result in loss of vehicle control, accident and injury. Ford strongly recommends that drivers use extreme caution when using any device that may take their focus off the road. The driver's primary responsibility is the safe operation of their vehicle. Only use cell phones and other devices not essential to the driving task when it is safe to do so.
Survey of Early Adopters: OEM Navigation Systems

- Questionnaire responses from 1500 drivers who purchased cars with navigation systems
- 63% not aware of any manufacturer’s warnings

Are you aware of manufacturers warnings or limitations about Nav System?

2008 NHTSA Report with AAA Foundation for Traffic Safety, DOT-HS 810 927

Hand Held Phone Bans

Insurance Institute for Highway Safety: www.iihs.org
Proposed Ban on All Phone Use

Federal Actions Focused on Behavior Change

- NHTSA policy: “The safest course of action is to refrain from using a cell phone while driving.”
- NHTSA recommends that States adopt teen Graduated License provision prohibiting use of portable communications and entertainment devices
- A bill was introduced in U.S. Senate in July to reduce federal funding to States that do not enact an anti-texting law.
- In 2008, the Federal Railroad Administration ordered a ban on all personal electronic devices for employees while operating trains
- U.S. Department of Transportation just held Distraction Summit
## What works?

<table>
<thead>
<tr>
<th>COUNTERMEASURE</th>
<th>EFFECTIVENESS</th>
<th>USE</th>
<th>COST</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDL for teens</td>
<td>★★★★★</td>
<td>High</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Cell phone laws</td>
<td>★★★</td>
<td>Low</td>
<td>Varies</td>
<td>Short</td>
</tr>
<tr>
<td>Reckless driving laws</td>
<td>★</td>
<td>High</td>
<td>Varies</td>
<td>Short</td>
</tr>
<tr>
<td>Communication and outreach</td>
<td>★</td>
<td>?</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Others</td>
<td>?</td>
<td>?</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

- Demonstrated to be effective
- Demonstrated to be effective in certain situations
- Likely to be effective
- Effectiveness still undetermined
- Limited or no high-quality evaluation evidence


## Behavioral Change Challenges

- Laws are unpopular and difficult to enforce
- Difficult to evaluate effectiveness
- Many drivers know distraction is a problem but do it anyway
Behavioral Change: Progress and Priorities

- Many different traditional approaches have been tried
- Very little known about what works or how to make them effective and acceptable
- Explore innovative approaches
- Will high visibility enforcement work?

Improving Device Designs
### Destination Entry for Nav Systems: Number of Keystrokes/button presses

- **Min Keystrokes**
  - Street Address: 12
  - Point of Interest: 10.36
  - Address Book: 6.33

- **Max Keystrokes**
  - Street Address: 32.67
  - Point of Interest: 22.18
  - Address Book: 8.41

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### Survey of Display Locations

- **10%**
- **80%**
- **10%**

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**Inventory of in-vehicle technology human factors design characteristics, 2002, DOT HS 809 457**
Naturalistic Study of Cell Phone Interfaces at NHTSA

- 10 drivers, regular phone users
- 6 weeks
- 25-55 yrs old

<table>
<thead>
<tr>
<th>Interface</th>
<th>Dialing</th>
<th>Talking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand-held</td>
<td>Manual</td>
<td>Hand-held</td>
</tr>
<tr>
<td>Hands-free talking</td>
<td>Manual</td>
<td>Hands-free</td>
</tr>
<tr>
<td>Enhanced hands-free</td>
<td>Voice*</td>
<td>Hands-free</td>
</tr>
</tbody>
</table>

*implemented using AutoPC

Findings for calls from moving car

<table>
<thead>
<tr>
<th>Interface</th>
<th>% driving hours talking</th>
<th>Avg. talk duration (sec.)</th>
<th>% time both hands on wheel when talking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand-held</td>
<td>9.1</td>
<td>204.8</td>
<td>0.1</td>
</tr>
<tr>
<td>Hands-free Talking</td>
<td>6.7</td>
<td>136.6</td>
<td>13</td>
</tr>
<tr>
<td>Enhanced Hands-free</td>
<td>5.3*</td>
<td>120.8</td>
<td>16 (baseline = 13%)</td>
</tr>
<tr>
<td>(includes manual interface)</td>
<td></td>
<td>107.1*</td>
<td></td>
</tr>
</tbody>
</table>

Wireless Phone and AutoPC Related Technology: Driver Distraction and Use Effects on the Road, Dot 809 752, 2004
Driver Workload Metrics Project--Collision Avoidance Metrics Partnership

- Metrics and procedures to assess visual, manual, and cognitive distraction.
- Toolkit of evaluation methods to help device developers
- Metrics criteria:
  - repeatable, safety relevant, and sensitive to level of attentional demand
  - lab metrics that were predictive of driving measures
  - on road measures that distinguished multitasking from ‘just driving’

Driver Workload Metrics Final Report, 2006, DOT HS 810 635

Range of Metrics Tested

Measuring workload in lab

- Static Task Time
- Visual Occlusion
- Peripheral Detection Task (PDT)

Measuring workload on road

- Vehicle Control
- Object & Event Detection
- Visual Scanning
Measurement of Device Distraction Potential

Occlusion Goggles

Peripheral Detection Task

Statement of Principles, Criteria and Verification Procedures on Driver Interactions with Advanced In-Vehicle Information and Communication Systems

- Led by the U.S. Alliance of Automobile Manufacturers
- Sections
  - Placement
  - Information presentation
  - Interactions with displays & controls
  - System behavior
  - Driver instructions
- Focused on visual-manual interfaces, not voice
- How well are these or other guidelines being followed? Are they helping safety?
Examples of Auto Company Approaches

- Keep the driver's eyes on the road and hands on the wheel
- Minimize the number of steps to perform any task
- Create a common interface
- Utilize a lock-out protocol to prohibit especially demanding tasks
- Intense and lengthy discussions can indeed be distracting
- Visual distraction, not cognitive distraction, is the main safety concern in the real world
- Research indicates the superiority of hands-free voice interfaces as compared to hand-held or visual–manual interfaces

Survey of Early Adopters: OEM Navigation Systems

- Questionnaire responses from 1500 drivers who purchased Navigation systems

<table>
<thead>
<tr>
<th>Did voice directions reduce time looking at screen?</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>76</td>
</tr>
<tr>
<td>NO</td>
<td>16</td>
</tr>
<tr>
<td>DON'T KNOW</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is responding to driver voice commands useful?</th>
<th>Percent ‘yes’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lexus</td>
<td>51</td>
</tr>
<tr>
<td>Mercedes</td>
<td>72</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Preference for Viewed or Spoken Directions?</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>View</td>
<td>13</td>
</tr>
<tr>
<td>Listen</td>
<td>26</td>
</tr>
<tr>
<td>Both</td>
<td>61</td>
</tr>
</tbody>
</table>

2008 NHTSA Report with AAAFoundation for Traffic Safety, DOT-HS 810 927
Can Consumer Distraction Ratings Lead to Better Choices?

Challenges of Improving Device Designs

• How to achieve desired changes: Performance Standards vs. Design Standards vs. Guidelines vs. Consumer Ratings
  – PS based on driver performance are difficult to implement objectively (e.g., glance times less than 2 seconds)
  – DS are too restrictive and limit innovations
  – Hard to apply to multiple devices with additive demands on driver
• Difficult to relate to crash reduction
A Few Cell Phone Challenges

- Not all phone interfaces are the same
  - Hand held; hands free mean?
- How to put risk of phone conversations in perspective
  - Like drunk driving?
- How to make the connection between experimental study findings and real world driving and crashes
  - Many unknown variables affect crash likelihood

Improving Device Designs: Progress and Priorities

- Many metrics of distraction potential developed
- Many design guidelines and principles exist
- Vehicle manufacturers may be incorporating some guidelines based on metrics, but to what extent?
- Continue to Enhance Human Factors Guidelines
  - focus on cognitive tasks, such as voice interfaces
  - increase applicability to portable devices
- Phone Interfaces: Is hands free an acceptable risk?
- Relate distraction metrics to safety metrics
  - Application to consumer ratings
Warning Distracted Drivers

All Crashes (2005)

- Lane Departure Warning
- Lane Keeping
- Curve Speed Warning
- Stability Control
- 23% Off Roadway
- 28% Rear-End
- 9% Lane Change
- 25% Crossing Paths
- Others
- Intersection Movement Assist
- Stop Sign & Signal Violation Warnings
- Blind Spot Detection
- Side Radar
- Forward Crash Warning
- Adaptive Cruise Control
- Brake Assist
- Automatic Braking
Driver Assistance Systems
To Alert Distracted Drivers

1. Improving system effectiveness and acceptability with designs that are human engineered to match drivers’ capabilities
2. Evaluating system safety benefits

100 Car Data: Suggests that warning systems may be less useful when the driver is looking forward
Countermeasures and Adaptive Inputs

By saving feedback to the end of the drive, we better avoid adding additional distraction. Provided to the driver for a brief review after each drive but it can be ignored if they are not interested.
Mean Willingness Ratings

On road study of drivers willingness to engage in distracting tasks, 2008, DOT HS 810919

Crash Warning System Interfaces: Human Factors Insights and Lessons Learned

- General Guidelines for Crash Warning System (CWS) Design
- Auditory Warnings
- Visual Warnings
- Haptic Warnings
- Controls for CWS Devices
- Forward Collision Warning Systems
- Lane Change Warning Systems
- Road Departure Warning Systems
- Application to Heavy Trucks and Buses

Campbell et al. DOT HS 810 697, January 2007 (www.nhtsa.gov)
Unintended Consequences

If you encountered a stopped car in your lane ahead with the ACC system engaged, how do you think the system would react?

<table>
<thead>
<tr>
<th>Response</th>
<th>Percent Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detect the car, start to slow until stopped</td>
<td>23</td>
</tr>
<tr>
<td>Detect the car, start to slow, but driver needs to stop</td>
<td>63</td>
</tr>
<tr>
<td>System will not detect stopped car</td>
<td>1</td>
</tr>
<tr>
<td>Don’t know</td>
<td>13</td>
</tr>
</tbody>
</table>

CAUTION
Under certain conditions where the vehicle in front slows drastically or is stopped, the dynamic laser cruise control will neither warn you nor decelerate. The driver must depress the brake pedal to slow down, ensuring collision avoidance or that sufficient vehicle-to-vehicle distance is maintained.
Standardization

Integrating Multiple Systems

- Curve speed warning
- Pedestrian warning
- Drowsy driver monitor
- Driver distraction monitor
- Intersection Violation Warning
- Lane Change Warning
- Lane Departure Warning
- Forward Collision Warning
- Blind Spot Warning
- Safety belt reminder
Assessing Benefits and Acceptability

- **Field Operational Tests**
  - Relatively few volunteers
  - Short exposure
  - No actual crashes

- **Analytic Modeling**
  - Crash statistics
  - System performance
  - Human factors experiments

**FCW + ACC**
- 163,000 km
- 66 drivers
- 4 weeks

**Road Departure + Curve Speed**
- 140,000 km
- 78 drivers
- 4 weeks

**FCW + RD + Lane Change**
- 108 drivers
- 6 weeks

- Estimated to reduce rear end crashes 10% ±7
- No unintended effects
- 25% would purchase FCW
- 44% would purchase ACC

- Estimated to reduce road departure crashes between 0.8% and 6.6%
- No unintended effects
- 42% would purchase LDW

**Evaluation of an Automotive Rear-end Collision Avoidance System**, 2006, DOT HS 810569

**Evaluation of a Road-Departure Crash Warning System**, 2007, DOT 8210 854
Challenges of Warning Distracted Drivers

- Representativeness of volunteers and test area?
- How to best estimate benefits?
  - How well can estimates account for all the variables?
- Will drivers change behavior over time and become complacent?
- Will non-standardized warning interfaces confuse drivers?
- Will too many warnings increase driver workload?
- Will systems be acceptable to drivers?
  - Cost
  - Annoyance

Warning Distracted Drivers: Progress and Priorities

- Technology has advanced considerably
- Warning systems and driver monitoring systems being deployed
- How can interfaces be evaluated objectively to determine effectiveness and acceptability?
- What can be learned from early adopters about acceptability, safety benefits, and improvements needed?
  - Possible large scale fleet experiment
  - Behavioral adaptation insights
Closing Thoughts: Unanswered Questions

- Is a true hands free phone safer than a hand held one? How much safer? How acceptable is the risk?
- How can research findings be accurately and meaningfully conveyed to the driving public and equipment designers?
- How can real time distraction monitoring be effectively used to be acceptable and effective in changing unsafe driver behaviors?
- What is the true safety benefit of crash warning systems for distracted drivers?

Your Questions and Comments

Most references at www.nhtsa.gov

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