NHTSA DRIVER DISTRACTION RESEARCH: Past, Present, and Future

July 18, 2000

By: Dr. W. Riley Garrott

Vehicle Research and Test Center
Chief, Vehicle Stability and Control Division

NHTSA
People Saving People
http://www.nhtsa.dot.gov

Presentation Overview

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- What is the distraction problem?
- Past NHTSA driver distraction/ workload research
- Current research
- Upcoming research

Driver Distraction: What is the Problem?

NHTSA
People Saving People
http://www.nhtsa.dot.gov

Link to video clip of driver inserting a CD while drinking a soft drink and driving on a test track.

Driver Distraction

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Distraction is a known safety problem**
- **New communication and information technologies may make the problem worse**

Driver Distraction Research Objectives

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **How can we measure driver distraction?**
- **What are the effects on safety of:**
  - Using wireless phones while driving?
  - Heavy truck dispatching systems?
  - Route navigation systems?
  - Other multi-function systems?

Past Research

People Saving People
http://www.nhtsa.dot.gov

- **Truck Driver Workload Study**

  (1992 – 1995)

- **Wireless Communications Study**

  (1993 – 1997)

- **Route Navigation Systems Studies**

  (1992 – 2000)

Truck Driver Workload Study: Goals

People Saving People
http://www.nhtsa.dot.gov

- Develop and evaluate workload assessment tools
- Conduct on-road research with instrumented tractor-semi trailer using professional drivers

Truck Driver Workload Study: Test Video

People Saving People
http://www.nhtsa.dot.gov

Link to video clip of truck driver dialing a cellular phone while driving on a public road.

Truck Driver Workload Study: Results

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Comparative assessment of distraction-related crash risk more useful than absolute measures**
- **Workload assessment tools (visual allocation, lane tracking, etc.) widely accepted**

Wireless Communication Report

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Assessed current state of knowledge on impact of phone use while driving**

Wireless Communication Report

People Saving People
http://www.nhtsa.dot.gov

- **Does cellular telephone use while driving increase the risk of a crash?**
  - "Yes, at least in some cases."
- **Will crashes likely increase with increasing number of cellular telephones in the fleet?**
  - "Yes."

Wireless Communication Report

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Magnitude of traffic safety problem?**
  - Unknown due to insufficient data
- **"…conversation itself is the most prevalent single behavior associated with cellular telephone related crashes…"**
  - Hands-free phones will not totally solve the problem.

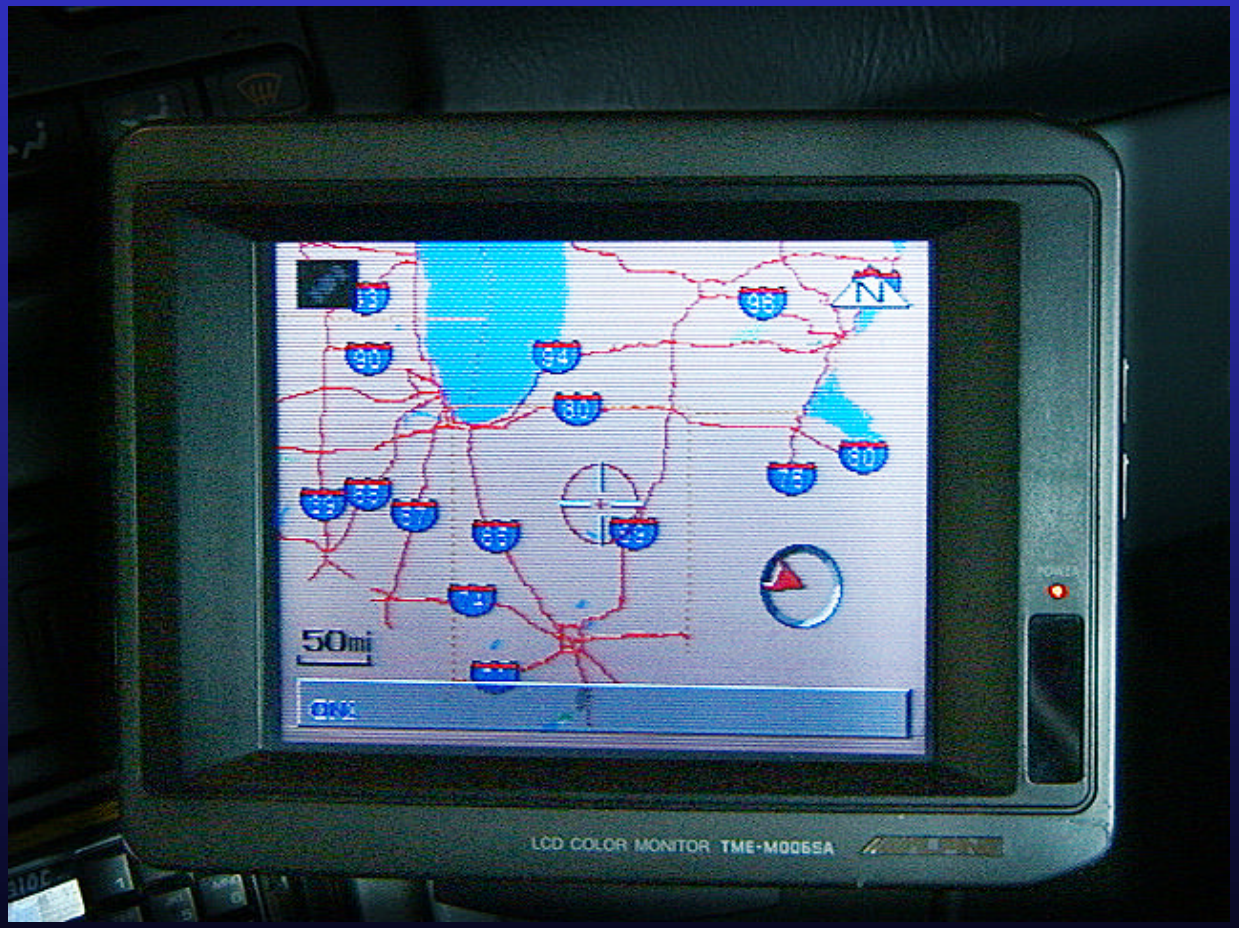
Wireless Communication Report

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Recommended actions**
  - Improve data collection and reporting with appropriate training of enforcement personnel
  - Conduct research
  - Perform benefits analyses
  - Encourage states to enforce their reckless and inattentive driving laws
  - Improve consumer education

Route Navigation Systems Studies

NHTSA
People Saving People
http://www.nhtsa.dot.gov



TravTek Study

People Saving People
http://www.nhtsa.dot.gov

- **Route navigation systems installed in 100 rental vehicles in Orlando**
  - Approximately 1 million miles driven in 10 months
  - Destination entry locked out while vehicle is in motion

TravTek Study Results

People Saving People
http://www.nhtsa.dot.gov

- **TravTek systems did not degrade driving safety**
  - Safety neutral on congested roads
  - Safety neutral to safety positive on un-congested roads

Destination Entry Study: Goals

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Compare distraction potential among:**
  - Destination entry using 4 route navigation systems, including voice activation
  - Phone dialing
  - Radio tuning
- **Compare performance for younger (35-) vs. older (55+)subjects**

Destination Entry

People Saving People
http://www.nhtsa.dot.gov

Link to video clip of driver entering a destination into a route navigation system while driving on a test track.

Destination Entry Study: Results

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- Visual/manual destination entry while driving is ill-advised
- Voice recognition technology less distracting than visual/manual destination entry
- Older drivers had more difficulty with visual/manual destination entry
- Age differences disappeared for voice input

15-Second Rule

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- 15 second rule was developed by the SAE Safety and Human Factors Committee
- Intended to provide guidance to designers as to what route navigation functions should be available to drivers while driving
- Developed by consensus between researchers and designers

15-Second Rule Study

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- Evaluated proposed SAE recommended practice for route navigation systems (e.g., destination entry functions)
- 10 older (55-69) subjects performed static and dynamic tasks, including destination entry

15-Second Rule Study

People Saving People
http://www.nhtsa.dot.gov

Link to video clip of driver entering a destination into a route navigation system while sitting in a parked vehicle as part of NHTSA's 15 second rule testing.

15-Second Rule Study: Results

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Static test not sufficient to identify tasks with significant distraction potential**
- **Revision of 15-second rule proposal recommended**

Research Currently Underway

People Saving People
http://www.nhtsa.dot.gov

- AutoPC test track study

AutoPC Test Track Study

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Cooperative study between NHTSA and Transport Canada**
- **Compare voice and non-voice technologies for:**
  - Phone dialing
  - Radio tuning
  - E-mail retrieval

- **Determine how drivers learn to use complex multi-function technologies**

AutoPC Test Track Study

People Saving People
http://www.nhtsa.dot.gov

- Driving performance and eye glance behavior will be analyzed

- Results will help determine what tasks are appropriate for drivers to access while driving on public roads

Research Currently Underway

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- Wireless telephone interface on-road study

Wireless Telephone Interface Study

People Saving People
http://www.nhtsa.dot.gov

Hand-held

Link to video clip of driver dialing and talking on a hand-held wireless phone while driving on a test track.

Wireless Telephone Interface Study

People Saving People
http://www.nhtsa.dot.gov

Hands-free (manual dialing, hands-free talking)

Link to video clip of driver dialing and talking on a hands-free wireless phone while driving on a test track.

Wireless Telephone Interface Study

People Saving People
http://www.nhtsa.dot.gov

Totally hands-free (voice dialing, hands-free talking)

Link to video clip of driver dialing and talking on a totally hands-free (AutoPC) wireless phone while driving on a test track.

Wireless Telephone Interface Study

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Naturalistic Study**
  - Instrumented vehicles driven by members of general public for 6 weeks

Wireless Telephone Interface Study

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- Compare distraction potential for different interface designs
- Compare use patterns for different interface designs
- Determine conditions under which drivers are willing to use wireless phones

Upcoming Research

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- Major portion of future research will be performed on NADS

National Advanced Driving Simulator

People Saving People
http://www.nhtsa.dot.gov

- **National Advanced Driving Simulator (NADS) becomes operational in 2000**

Link to video clip of National Advanced Driving Simulator (NADS)

Upcoming NADS Research

NHTSA
People Saving People
http://www.nhtsa.dot.gov

- **Planning underway for series of projects on driver workload and distraction**
  - Due to Wireless Communications Devices
  - Due to In-Vehicle Information Systems
- **Development of Research Tools**
  - Standard NADS Driver Distraction Test Methods, Procedures, & Test Courses
  - Assessment Techniques for Evaluating Cognitive Driver Distraction

Questions ?