



FHWA/NHTSA National Crash Analysis Center

Research that is Essential, Indispensable, and Connected to Our Customers.

PURPOSE

When safety experts worldwide need to review crash data, look at computer models of vehicles, or analyze roadside hardware designs, they rely on the researchers and the resources available at the National Crash Analysis Center (NCAC). As a unique storehouse of safety information and safety expertise throughout the world, NCAC supports the Federal Highway Administration's (FHWA) strategic objective to reduce fatalities and injuries by 20 percent in 10 years. NCAC's research goal is to curtail the safety problems of occupants in crashes. NCAC's resources help researchers understand and quantify a vehicle's performance and its components, occupants, and roadside hardware in crashes, and provide optimum design solutions to minimize crash impact severity.

DESCRIPTION

NCAC is an exemplary demonstration of FHWA's successful partnerships with other government agencies, private industry, and academia. In 1992, the National Highway Traffic Safety Administration (NHTSA) joined FHWA as a full partner in the administration and guidance of NCAC. This laboratory, located on the Loudoun County campus of The George Washington University, is an internationally recognized cooperative center for automotive and highway safety research. NCAC's comprehensive ability to analyze roadside hardware designs, simulate crashes, and evaluate occupant injuries through analytical and computer modeling is unique through-

out the world. This laboratory develops and maintains computer models of vehicles, ongoing biomechanics models, and progressive models of roadside hardware. NCAC also includes a Vehicle Digitizing and Reverse Engineering laboratory and a High-Performance Parallel Computing laboratory. In addition, NCAC maintains a national library of crash test films and documentation collected over the past two decades by FHWA and NHTSA, and operates the FHWA's Federal Outdoor Impact Laboratory, a full-scale research and development crash test facility.

COMPONENTS

Examples of roadside safety feature models and efforts are:

- Portable concrete barriers.
- Oregon slip-base sign support systems.
- 1.82 kilograms/meter (4 pounds/foot) U-channel sign support system.
- Sign blank mounting heights evaluation.
- G4-1S guardrail system.
- Guardrail to concrete barrier transitions.
- Secure mailboxes safety analysis.
- Security barriers.
- Detailed and reduced vehicle models for impact analysis required to evaluate roadside hardware.

- Surrogate crash test vehicles, known as bogies, for impact analysis of roadside hardware; bogies often are used instead of vehicles in actual crashes to determine the safety performance of roadside hardware.

- Occupant models for the future and enhanced safety impact of roadside hardware designs; occupant models can determine the specific harm or injuries in vehicle crashes with roadside hardware, such as the type and level of injuries caused by intrusions or load transfers.

- Improved techniques for finite element structural analysis of roadside hardware impacts.
- Impact analysis training for the research and industry communities.
- Workshops and seminars for developing priorities to address States' safety needs.

CURRENT ACTIVITIES

- Optimizing roadside safety features.
- Analyzing and designing various security barriers.
- Modeling future standard vehicles for roadside safety performance evaluation.
- Conducting crash tests to improve the accuracy of computer models and to reduce the overall time and cost of new hardware designs.

The Turner-Fairbank Highway Research Center (TFHRC) has more than 24 laboratories for research in the following areas: safety; operations, including intelligent transportation systems; materials technology; pavements; structures; and human centered systems. The expertise of TFHRC

scientists and engineers covers more than 20 transportation-related disciplines. These laboratories are a vital resource for advancing this body of knowledge created and nurtured by our researchers. The Federal Highway Administration's Office of Research, Development, and Technology

operates and manages TFHRC to conduct innovative research to provide solutions to transportation problems both nationwide and internationally. TFHRC is located in McLean, Virginia. Information on TFHRC is available on the Web at www.tfhrc.gov.

- Performing statistical analyses of accident data.
- Relating crash events to occupant injuries through hospital studies.
- Understanding injury patterns by applying accident investigation methods and biomechanics research.
- Researching vehicle rollover mitigation and countermeasures.
- Evaluating vehicle and roadside hardware crash performance by reviewing crash test films and accident data, and by using advanced computer simulation.
- Investigating the next generation of high-performance computers and virtual displays for an integrated, user friendly and high-speed design environment.
- Administering a visiting scholars program.

FUTURE ACTIVITIES

NCAC is working to develop additional partnerships with:

- U.S. Department of Transportation to further studies of railroad crossing hazard mitigation for the Federal Railroad Administration, and aircraft landing crashworthiness for the Federal Aviation Administration.
- U.S. Department of Defense agencies to research the use of impact analysis tools for various applications.
- U.S. Department of State to research security installations' analysis and design.
- Additional State departments of transportation to study the use of computer simulation for evaluation and optimum design of roadside hardware, and to work with university research centers that develop innovative design models of roadside hardware to enhance safety.
- Automotive and roadside hardware manufacturers to advance the state-of-the-art in industry as it pertains to safety design, hence reducing the cost to market and enhancing the global competitiveness of U.S. industry.

PARTNERSHIPS AND CUSTOMERS

Outside partners that use NCAC's capabilities include: NHTSA, U.S. Department of State, U.S. Department of Energy, Alliance for Automobile Manufacturers (formerly the American Automobile Manufacturers Association), the automotive industry, and FHWA's University Centers of Excellence.

Location

Offsite at The George Washington University, Virginia Campus, Ashburn, VA

Laboratory Manager

Leonard Meczkowski, Roadside Team
(202) 493-3317
leonard.meczkowski@fhwa.dot.gov

