Developing Tools for Highway Safety – the NCHRP 500 Series Guidance Documents

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Presentation Overview

- Background on national research programs in surface transportation
- The National Strategic Highway Safety Plan
- The NCHRP Report 500 Series
- Status of Highway Safety in the U.S.
What is ‘NCHRP’?

- **National Cooperative Highway Research Program**
  - Owned by State DOTs through AASHTO
  - ‘Pooled funds’ support projects of widespread national interest
  - Administered by the National Academies under contract to AASHTO

- For more background see: gulliver.trb.org/CRP/About/DivD.asp
NCHRP Research

• Heavily oriented to practical applications (solving current problems) of interest to state DOTs
• Results often shape or directly influence industry guidance documents, policies and standards
NCHRP Projects

• Program developed annually through AASHTO Standing Committee on Research
• Competitively awarded (universities, research organizations, consulting firms)
• Panels of peers write RFPs, select contractor, oversee technical progress
Some History on Highway Safety

• Despite best efforts, rate of highway fatalities remains high throughout 1980s and early 1990s (over 43,000 annually)
• Many in the industry consider this level unacceptable and resolve to address it
• Up until 2007, travel increased annually
National organizations partnered with AASHTO

- USDOT
- AASHTO
- GHSA
- NTSB
- MADDATA
- AAA
- AAMVA
- AARP
- NSC
- TRB
- ARTBA
- RSF
- ATSSA
- GMC
- IIHS

AASHTO: Transportation Center of Excellence
AASHTO’s leadership provided national direction

- A strategic plan for highway safety that will positively impact the nation’s present and predicted statistics on vehicular related death and injury.
- Published in 1998; implementation has been the focus since 2002.
The SHSP addresses safety on the highways in 22 areas of emphasis involving many stakeholders.
Strategic Highway Safety Plan

- 22 Emphasis Areas ("Goals")
- A "comprehensive approach" to reducing highway fatalities
- To be implemented across all jurisdictions (state, county, municipal)
Highway safety became one-third of FHWA’s ‘Vital Few’

‘Our goal is to reduce roadway related fatalities and injuries by designing a forgiving infrastructure. We advocate highway safety programs related to the roadway and road user.’

A. George Ostensen, Jan/Feb 2003 Public Roads
The Original National Highway Safety Goal

- Reduce the Highway Fatality Rate from 1.5 to **1.0 per 100 million vehicle miles**
- Reduce in absolute numbers highway fatalities by **5000 to 7000 per year** (from 43,000)
Where we started (2002)
Implementing the national plan

States would develop their own ‘tailored’, data-driven state strategic highway safety plan.
Implementation at the state level should be data driven.

Where are the fatalities? What are their circumstances? What measures or approaches will be most effective?
The ‘vision’ -- Guidance documents would aid the implementation of strategic decisions

*Strategic Decision by Agency to Address Emphasis Area*
NCHRP Project 17-18

- Funded in 2000 through SCOR for $1.1 million initially
- Produce guidance for 6 out of 22 ‘high priority’ SHSP emphasis areas
- Intention to extend contract to address other areas
NCHRP 17-18(3) — Guidance for Reducing Fatal Crashes

- Produce “guidebooks” intended to facilitate agency implementation of SHSP objectives
- Focus is on low-cost, readily implementable strategies
  - Proven effective
  - Experimental/innovative
  - Comprehensive
- Audience is state DOTs and other agencies (county, municipal)
Elements of a Successful Team – How CH2M HILL won and executed the work

- Winning acquisition strategy
- Champions and Leadership
- Corporate humility (expertise resides outside your organization)
- Strong project management
- Flexibility (listen, adjust)
NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
  - Tim Neuman, Project Director
  - Ron Pfefer (Maron Engineering, Israel) and Kevin Slack, co-PIs

- **Emphasis Area Managers (Phase I)**
  - Charlie Zegeer (UNCHSRC) -- Trees in Hazardous Locations
  - Hugh McGee (BMI) -- Head-on Crashes
  - Forrest Council (BMI) -- Run-off-road Crashes
  - Doug Harwood (MRI) -- Unsignalized Intersections
  - Roy Lucke and Richard Raub (NUCPS) -- Aggressive Drivers
  - Dr. Pat Waller -- Drivers with Suspended/revoked Licenses
Working Materials Developed by Project Team Under 17-18 (3)

- **Printed Guides** for developing programs to address fatal crashes
- **Website** for collecting and disseminating information on program development and effectiveness, and in-depth technical background; maintain currency of knowledge base
Guidebook Development Process

- Strategy and “best practices” identification (literature review, surveys, phone interviews)
- Workshops and Tree Symposium involving agency leaders
- Selection of Demonstration Agencies*
- Demonstration of Guides*
- Final Revisions and Publication
Emphasis area workshop participants

- Outside experts, researchers, etc.
- Academics
- Practitioners (potential users)
- Agency managers (implementers)
Challenges in Guide Development

- Be comprehensive
- Represent current research
- Be scientifically rigorous
- Reflect input from key stakeholders
- Be user friendly
Guidebook and Website Content

• Introduction
• Types of Problems Addressed
• Strategies for Addressing Problems
• Model Implementation Process
• Profiles of Recent Implementation Efforts*
• Resources and Materials*
Strategy Outline

- Target Crashes
- Expected Effectiveness
- Keys to Success
- Potential Difficulties
- Appropriate Measures and Data
- Associated Needs for, or relation to, Support Services (e.g., Public Information and Education, Traffic Law Enforcement, and Emergency Medical Services)
- Organizational, Institutional and Policy Issues
- Interagency Participation
- Issues Affecting Implementation Time
- Costs Involved
- Training and Other Personnel Needs
- Legislative Needs
Identification of Strategies

- **Proven** -- Research and experience demonstrates high confidence that measurable impact will be observed
- **Tried** -- Not ‘proven’ or results not well documented
- **Experimental**
Model Implementation Process

1. Identify & Detail the Problem & Receive Approval to Proceed
2. Recruit Appropriate Participants for the Program
3. Establish Crash Reduction Goals
4. Develop Program Policies, Guidelines and Specifications
5. Develop Alternative Approaches to Addressing the Problem
6. Assess the Alternatives and Select a Plan
7. Submit Recommendations for Action by Decision-Makers
8. Develop a Plan of Action
9. Establish the Foundations for the Plan
10. Carry Out the Action Plan
11. Assess the Program and Transition

AASHTO Strategic Highway Safety Plan Model Implementation Process
SHSP Guidance -- NCHRP Report 500 Series

- Vol. 1 -- Aggressive Driving
- Vol. 2 -- Suspended and Revoked Licenses
- Vol. 3 -- Trees in Hazardous Locations
- Vol. 4 -- Head-on Crashes
- Vol. 5 -- Unsignalized intersections
- Vol. 6 -- Run-off-Road Crashes

see [http://safety.transportation.org/plan.aspx](http://safety.transportation.org/plan.aspx)
Go to http://safety.transportation.org/
Lead State Groups Promote Active Usage of Guides

- ‘Lane Departure’ (combines run-off-road, head-on, trees in hazardous locations)
- Unsignalized Intersections
- Aggressive Driving
- Suspended/Revoked Drivers
Lead State Program - Use the Guides to:

- Establish a statewide goal for reducing fatalities in a given emphasis area
- Develop a detailed action/implementation plan
- Provide feedback on the guide for future enhancement
NCHRP Project 17-18(3) Project Organization

- **CH2M HILL Project Executive Team**
  - Tim Neuman, Project Director
  - **Ron Pfefer** (Maron Engineering) and **Kevin Slack**, co-PIs

- **Emphasis Area Managers (Phase II)**
  - Doug Harwood (MRI) – Highway Curves
  - Jane Stutts (UNCHSRC) and Ingrid Potts (MRI) – Older Drivers
  - Charlie Zegeer (UNCHSRC) -- Pedestrians
  - Nick Antonucci (CH2M HILL)-- Signalized Intersections
  - Dr. Pat Waller (Univ of Michigan) and Ron Knipling (VaTech) – Large Trucks
  - Dick Raub (Northwestern Univ CPS) – Unbelted Drivers
NCHRP Project 17-18(3) Project Organization

- CH2M HILL Project Executive Team
  - Tim Neuman, Project Director
  - Ron Pfefer (Maron Engineering) and Kevin Slack, co-PIs

- Emphasis Area Managers (Phase III)
  - Jane Stutts (UNCHSRC) and Ron Knipling (Va Tech) – Drowsy and Distracted Drivers
  - Robert Foss (UNCHSRC) and Jim Hedlund (Highway Safety North) – Alcohol
  - Darren Torbic (MRI) and John Chew (The EMSSTAR Group) -- Rural EMS
  - Ingrid Potts (MRI), Steve Garets (OSU) and Jim Nichols - Motorcycles
  - Jim Bryden and Nick Antonucci (CH2M HILL) -- Work Zones
NCHRP Project 17-18(3) Project Organization

• CH2M HILL Project Executive Team
  – Tim Neuman, Project Director
  – Kevin Slack and Kelly Hardy, co-PIs

• Emphasis Area Managers and Primary Authors (Phase IV)
  – Darren Torbic (MRI) and Craig Raborn (UNCHSRC) -- Bicycles
  – Will Stein and John Nitzel (CH2M HILL) -- Freeway Head-on Crashes
  – John Nitzel (CH2M HILL), Ingrid Potts (MRI) and Neil Lerner (WESTAT) -- Speed Management
  – Doug Harwood (MRI) and Dr. Forrest Council (UNCHSRC) -- Highway Safety Data
  – Rob Foss (UNCHSRC) – Younger Drivers
Implementation Guides

Volume 06: A Guide for Addressing Run-Off-Road Collisions

Percent of Fatal Crashes Involve Leaving the Roadway

Run-Off-Road (ROR) crashes involve vehicles that leave the travel lane and encroach onto the shoulder and beyond and hit one or more objects. Nearly 4 of every 10 fatal motor vehicle crashes—well over 14,000 a year—involve a single vehicle leaving the roadway. There are more than twice as many ROR fatal crashes on rural roads than on urban roads. Some 42 percent of ROR fatal
Strategies and Countermeasures
7 New Implementation Guides Released

Seven new guides for implementing the Strategic Highway Safety Plan are now available. Report 500: Volumes 3-14 provide detailed information on strategies for reducing collisions and injuries in these emphasis areas:

- Horizontal Curves
- Utility Poles
- Older Drivers
- Pedestrians
- Signalized Intersections
- Heavy Trucks
- Increased Safety Belt Use

Scheduled for release later this year: a guidance document addressing alcohol-related crashes. Guides that were previously released addressed these emphasis areas:

- Aggressive Driving
- Head-on Collisions
- Run off the Road
- Trees
- Unlicensed/Suspended/Revoked Drivers
- Unsignalized Intersections

Also available as a NCHRP Report 501:

- Integrated Safety Management Process (Report 501) (PDF)

Click on image to download latest issue

SAD FACT
42,643 died in highway crashes in 2003.
Aggressive Driving

Description of Strategies

Objectives

Two objectives have been identified for addressing aggressive driving:

1. Deter aggressive driving in specific populations and at specific locations (this includes those with a history of such behavior).
2. Improve the driving environment to eliminate or minimize the external “triggers” of aggressive driving.

Both populations and specific individuals among whom aggressive driving appears to be over-represented are to be identified. In addition, geographical areas where such events most frequently occur are to be identified. The approach uses three components:

- Crash records and observations to identify populations and geographical areas,
- Driver records to identify individuals displaying a propensity toward aggressive driving, and
- Observations to examine the driving environment to identify “triggers” that could set off aggressive driving.

Where populations or geographical areas are over-represented, two approaches are appropriate for taking corrective action:

- Identify means of reaching the populations through targeted education, public information, and sanctions.
- Reinforce education and public information through enforcement.

Where “triggers” in the roadway environment are identified, efforts are to be directed at eliminating or modifying the problems in the driving environment. Two key approaches are proposed:

- Make changes in roadways and traffic control devices to improve the flow of traffic.
- Reduce the frustrations arising from delays.
The motorcycle guide – a story of power and intrigue

- Initiated in late 2003 (Phase III)
- Finally completed in mid 2008!
- Why should this take so long?

It was all about helmets
Lessons Learned

• Wanting to save lives is not enough – you need
  – tools and data and know-how
  – organizational leadership and champions
  – ability to work and cooperate across organizations

• Not everyone shares your vision and priorities
Where are we now

- Most guides are available in pdf (some remain to be posted)
- Guides have been used by many states and are routinely referenced
- FHWA has funded research to address strategies labeled as ‘tried’
- Earliest guides are now 5 years old; some believe updating of information is needed
Where are we now with highway safety nationally?

- SAFETEA-Lu legislation provided special funding
- It takes time for states to assemble knowledge base and leadership
- It takes time for programs and projects to be widely implemented
- 2006 ‘report card’ assessed progress on implementation and results
- 2007 and 2008 statistics finally show strong downward trends emerging
- Today’s challenge – highway safety at the local level
Highway Fatality Trends from FARS

2008 – less than 40,000

12.6% of total

5.7% of total

Motorcycle Fatalities

Total Fatalities

Year
Thank you -- questions
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