Implementation of the HSM

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AASHTO Subcommittee on Design  
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Presentation Outline

• Why is WSDOT implementing the HSM?
  – Target Zero
  – Sustainable Transportation Business Practices

• What is needed?
  – Executive Support and Endorsement
  – Resources
  – Policy Development
  – Training
  – Tools

• Challenges and Lessons Learned
Achieve zero traffic deaths and zero serious injuries in Washington State by the year 2030

www.targetzero.com
All Washington Traffic Fatalities: Trends, Forecasts, and Goals

Draft Secretary’s Executive Order E 1082.00

- “My expectation is that each employee will incorporate sustainability into our daily decision making and actions”
- Includes section on Sustainable Highway Safety
Sustainable Highway Safety

Safety assessment at all levels using quantitative analysis to develop cost effective solutions
Goals of Sustainable Highway Safety

- Create an enduring highway safety culture within WSDOT around the sustainable safety principles and practices using the AASHTO Highway Safety Manual and Safety Analyst software
- Develop the necessary core competencies and knowledge
- Identify, prioritize, resource, and collect the data necessary to achieve the target zero goals
- Integrate the Sustainable Safety tools, principles, and highway safety decision-making processes into each role, responsibility, process, interaction, and operation within WSDOT
What is different?

• In the past we were doing what is called a “Standards Based Design” or what the HSM calls “Nominal Safety”

• We are moving more to a “Performance Based Design” or what the HSM calls “Substantive Safety”
The HSM provides insights to designers faced with design exception decisions.
Design will use the HSM for

Safety Projects
- To determine where the crash hot spots are.
- To help determine why crashes are happening.
- To help determine what countermeasures will effectively counter those crashes.

Corridor & Project Analyses
- To help pick the preferred alternative design for a corridor or a project based on the predicted crash rates of the alternatives.

Design Deviations
- To predict the crash rates of each alternative and to help weigh the safety risks of each.
Other Uses

Improvement Project Design
• To determine the safety performance of competing designs. (i.e. low cost channelization, traffic signal or roundabout)

IJR Policy Point 3
• Collision analysis for before and after a new or modified Interchange.
• And, analyze the affected local roadway system.

Work Zone Design
• To determine the best work zone design.
• Or, at least know the risk of a design.
What is needed for implementation?
Recommendation
Endorse Safety Analyst and the HSM methodologies for identifying sites with the greatest potential for safety improvement for all phases of the project development process (Planning, Scoping, Pre-Design, Design, and Operations). Purchase annual statewide site licenses for the AASHTOWare Software Safety Analyst. Develop and deploy the Safety Analyst Implementation Plan in alignment with WSDOT’s HSM Implementation Plan.

Adopted by Highway Safety Executive Committee on December 2, 2010

Signature: John C. Milton, Ph.D., P.E.
Date: 1/5/11
Highway Safety Executive Committee Chair
Sustainable Highway Safety

Highway Safety Executive Committee

Highway Safety Work Group

Highway Safety Issues Group

HSIG Committees
- CMF Committee
- Design Manual Comm.
- HSM Users Group
- Training Committee
- Intersection Analysis Location Review Panel
- Safety Analyst Implementation team
- Rural Roads Committee
- Roadside Features Inventory Program
Highway Safety Executive Committee (HSEC)

John Milton, Ph.D., P.E.
Director, Enterprise Risk Management Division (Chair)

Jay Alexander
Director, Program Management Division

Pasco Bakotich III, P.E.
Director, Development Division

Kathleen Davis
Director, Highways & Local Programs

John Nisbet, P.E.
Director, Traffic Operations Division

Brian Smith, AICP
Director, Strategic Planning Division
Highway Safety Executive Committee (HSEC)

- Provides executive support to the Safety Program
- Approves expenditures of funds in the Safety Program
- Resolves organizational, policy and procedural issues as necessary
- Supports an environment of collaboration and cooperation
- Approves and supports resource commitment to the implementation of the Sustainable Highway Safety Program
Needed Resources

• Financial resources are needed to implement the HSM and Safety Analyst
  – Training
  – Purchase copies of the HSM
  – Purchase Safety Analyst
  – $’s to gather the additional data needed

• Dedicated resources
  – WSDOT has just begun to dedicate resources solely for the implementation of the HSM and Safety Analyst
  – IT Staff time to transfer data into Safety Analyst
Policy changes

• Programming changes
  – Identification and prioritization of Safety projects
  – Preservation project changes
  – Other programs

• Design Manual changes
  – Safety Projects
  – Basic Safety
  – Design Decisions and Exceptions
  – Project/Corridor Analysis
  – Interchange Justification Reports
Collision Analysis Locations (CALs), Collision Analysis Corridors (CACs), Intersection Analysis Locations (IALs): Sites identified through a system-wide analysis that have a high-severity collision history. These sites are created with the intent to modify, where appropriate, specific highway elements that are focused on addressing the contributing factors of the identified high-severity collisions.

The following documentation should be completed:
- Include an analysis of the crash history to identify contributing factors.
- Identify which of the 4 E’s (Engineering, Enforcement, Education and Emergency Services) will best address the contributing factors, if Engineering solutions are selected to address the contributing factors, then consider countermeasures that include operational, low-cost, and high-cost solutions.
- Select the recommended countermeasure based on a benefit/cost analysis.
Training

- HSM Training
- Safety Analyst Training
Core Competencies by Functional Area

- **A**
  - Denotes primary responsibility to task, leads activities related to functional aspects, these tasks may be correlated to other functional leads tasks. In these cases multiple owners may exist.

- **B**
  - Denotes secondary responsibility, often supports activities by provision of data or expertise. These functions are typically needed throughout the tasks. An office that has limited function with the tasks, but uses the outcomes in critical applications may be identified as a B (e.g., risk management uses deviations in court).

- **C**
  - Denotes a significant interest role, often provides input throughout tasks, may be needed from time to time, but not necessary to the day to day functioning.

- **D**
  - Denotes a limited interest role, may use the information from time to time, but not necessary to day to day functioning.
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Executive management training for Sustainable Safety and HSM implementation
Senior manager training (2 days)
Technical Staff training (2 days)
IAL project review panel/training
SafetyAnalyst and NCHRP 17-45 training
Human Factors training
Collision analysis training
Hands on HSM training
Sustainable Highway Safety Tools

- Safety Analyst
- Collision Analysis Tool (CAT) “WSDOT developed”
- Simplified Spreadsheets
- Road Safety Assessments
- Roadside Features Inventory
- Design Documentation Templates
- Safety Project Scoping Flowchart
• Use visual tools such as GIS to show results of SafetyAnalyst, contributing factors and crash type analysis for decision makers
• Simplify HSM spreadsheets, including automated Part C worksheets for all corridor types
• Modify design policy to allow for quantitative analysis as the means for determining appropriate design levels
• Start from a base level design
• Drive out liability fears
Sustainable Highway Safety Review Panel

• Expert review panel
  – Accepts or rejects project proposals
  – Shares knowledge and experience around the state
  – Multidiscipline members
  – Assists with improving consistency
Implementation efforts

- HSEC and HSIG efforts
- Safety Analyst Software Tools
- Design Matrix Review Committee
- Roadside Feature Inventory Program (RFIP)
- HSM and Safety Analyst Training
- Safety Assessments
- CMF Usage at WSDOT
- WSDOT SPF Development (Penn State Research)
Challenges

- Keep all Sustainable Highway Safety efforts focused and on schedule
- Keep the implementation of the HSM and Safety Analyst scalable
- Manage tort exposure concerns
- Get Engineers comfortable using engineering judgment versus just applying standards
- Selecting and consistently applying the CMF’s
- Budget reductions
Challenges

• Staff reductions
• Safety Analyst is very much data driven, there were challenges getting our data into it
• Cross walking WSDOT data into Safety Analyst data format
Lesson’s Learned

- Appropriate training at the right time
- Timely development of design policy to allow for program and project considerations
- Development of tools
- Technical leads for each discipline
- IT and data office resource availability
- Provide the additional financial resources
- Keep implementation scalable, positive and productive
Next Steps

• Refinement of the implementation plan
• Team to continue working on selecting WSDOT approved CMF’s and deviation process
• Work with Model Inventory of Roadway Elements (MIRE) on gathering minor leg counts
• Continue to expand use of Safety Analyst
• Continue with the development of more tools
• Develop hands-on training
• Develop users group to share knowledge
HSM Contacts

Safety Analyst-Implementation
Scott Zeller  360-705-7253

Crash Modification Factors
Mike Dornfeld   360-705-7288

Highway Safety Manual Training
Dan Sunde   360-704-6332

Safety Project Scoping Guidance
Matt Neeley   360-705-7143
Questions?