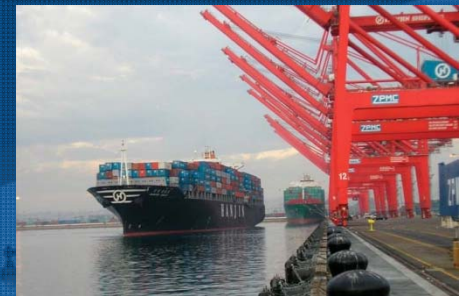
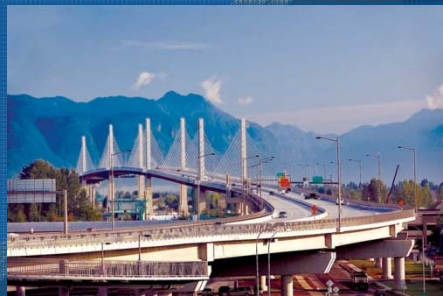
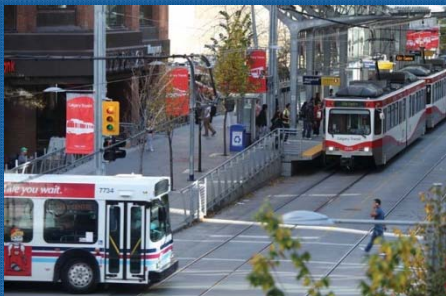


**CH2MHILL®**

## Legal Implications of Using Highway Safety Manual Methodologies to Conduct Safety Analyses



*2014 SASHTO Annual Meeting  
August 25, 2014, New Orleans, LA*

*Timothy Neuman, PE, Chief Highway Engineer, CH2M HILL*

# Presentation Overview

- The AASHTO Highway Safety Manual
- Highway Project Choices
- Duties of Government; Ministerial and Discretionary Actions
- The HSM and Standard of Professional Care
- Mitigating Risk in HSM Project Applications



# The Vision of the Highway Safety Manual – A document akin to the Highway Capacity Manual

1

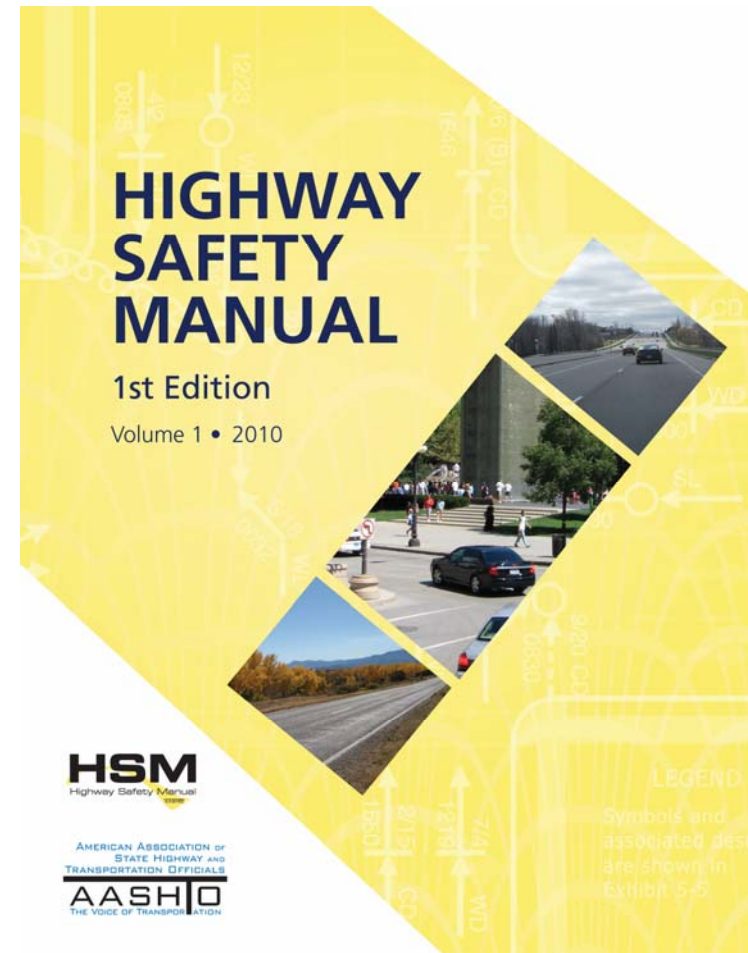
Definitive; represents quantitative 'state-of-the-art' information

2

Widely accepted within professional practice of transportation engineering

3

Science-based; updated regularly to reflect research



# Highway safety is properly understood as having two dimensions

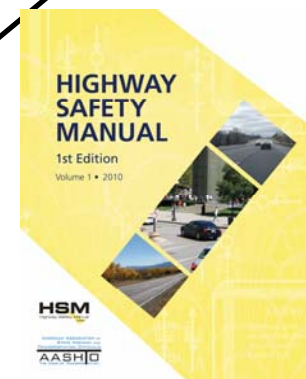
*Nominal  
Safety*

*Substantive  
Safety*

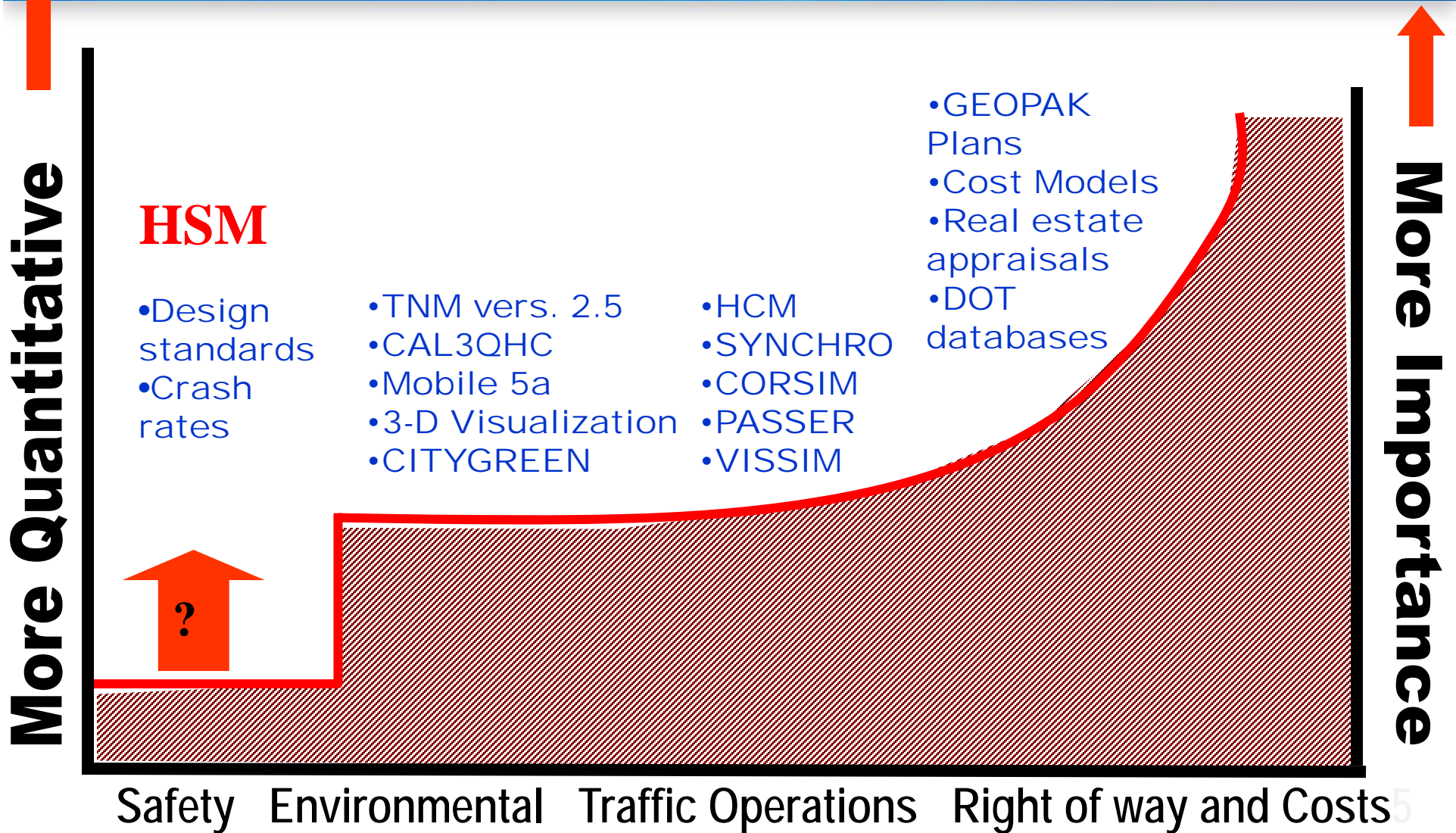


*Examined in reference to compliance with standards, warrants, guidelines and sanctioned design procedures*

*The expected or actual crash frequency and severity for a highway or roadway*

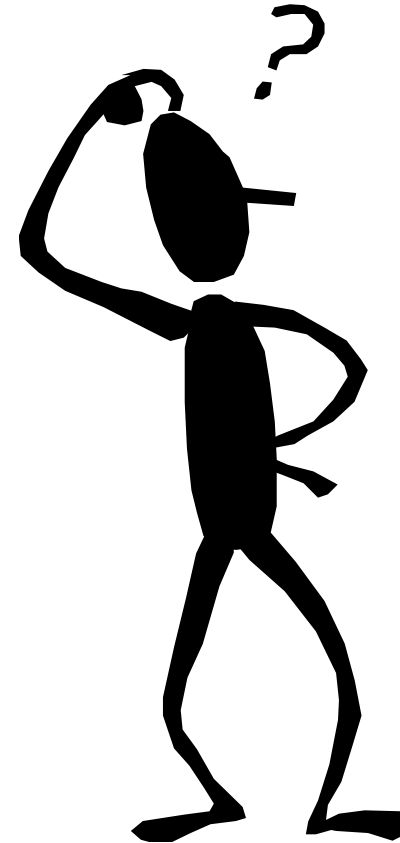


# The Highway Safety Manual fills the one remaining gap in the objective methods for highway alternatives



# Does the use of the HSM in project development increase risk to agencies?

- How can I openly acknowledge that my design will experience crashes (and injuries and fatalities)?
- If I do an alternatives analysis, won't I be required to select the 'safest' (i.e., one with the lowest predicted crashes)?
- If I publish a report that shows a location with high crash experience, doesn't that invite a plaintiff's attorney to sue should something happen there?

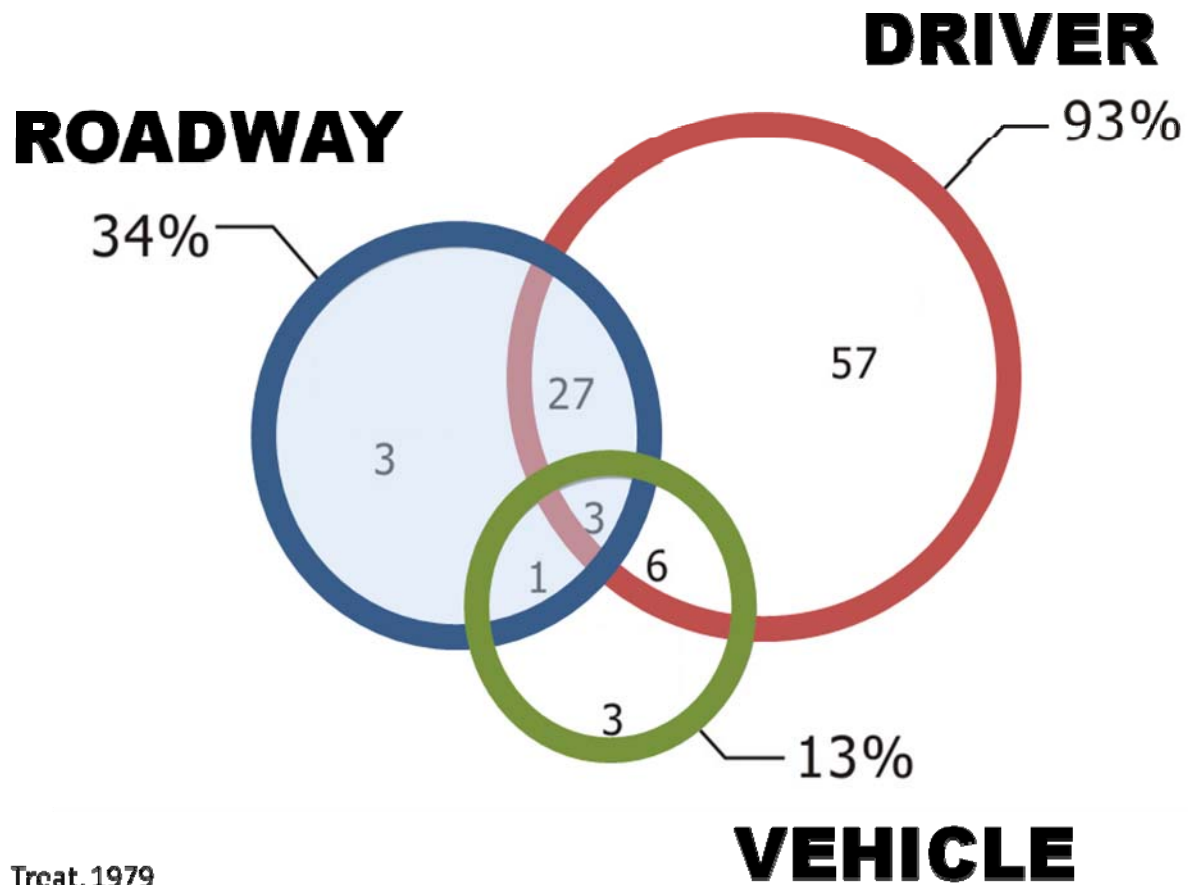


# The HSM codifies what we knew all along

How much of what we do in highway project development potentially influences crash occurrence?

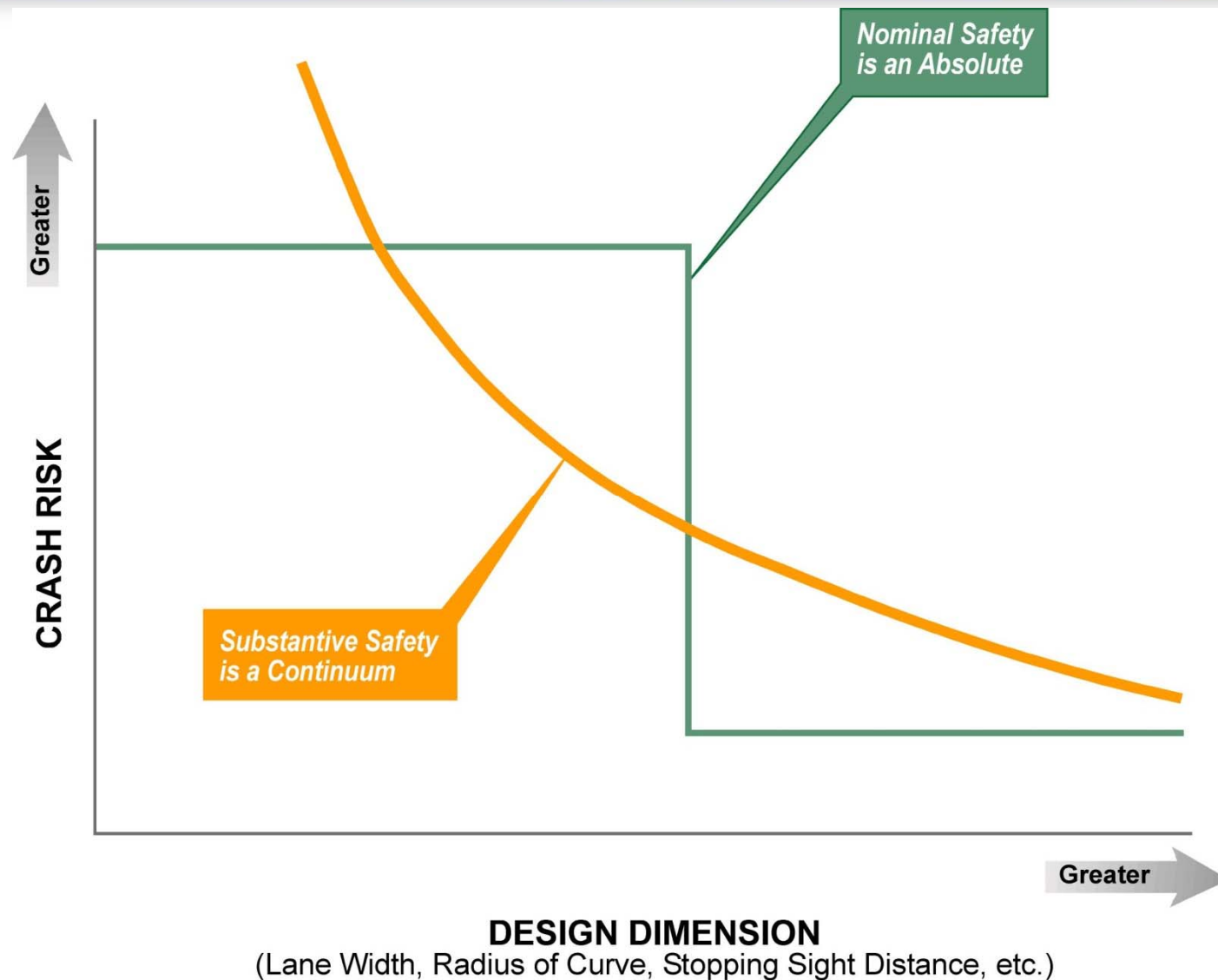


We cannot (nor should we promise to) design a perfectly 'safe' road





# Which mental model properly characterizes the choices we must make in projects?



# Activities of Government and Public Duties

- Governments have waived sovereign immunity
- **Ministerial Actions** are mandatory in nature; these may be established by regulation, policy or statute.
  - Highway Maintenance activities are ministerial in nature
  - Certain aspects of traffic engineering and design are ministerial
- **Discretionary Actions** are those based on judgments of public officials and those working in government
  - Allocation of limited resources across competing priorities
  - Alternatives in highway projects\* (which alignment, type of intersection or interchange, etc.)

\*Engineers have a ministerial duty to use the professional standards of care in performing their jobs

# Standard of Professional Care is Evolving – Quantitative Safety Analysis is Here

- With publication of the HSM and the availability of software, expectations for the engineering profession are being elevated. Sole reliance on nominal safety concepts is becoming outmoded.

*There may be a point in time when quantitative safety analysis will be required for Environmental Impact Statements*

- ***This a good thing – it serves the public interest;*** it allows the engineer to examine and objectively measure the safety performance of a range of alternative treatments, which establishes a sound basis for decision-making that may significantly reduce tort liability risk.

# Risk Mitigation in HSM Applications (\*Bre Gowen)

- The engineer must fully understand the analysis and methodology used in measuring quantitative safety performance to avoid incorrect or irrational results.
- The engineer's analysis cannot contain errors. Using incomplete data or misapplying a formula undercuts the validity of the conclusion.
- The engineer should consider the safety implications of alternative treatments beyond immediate crash reduction, such as the future risks arising out of maintenance and operational needs. A particular solution may achieve an expected reduction in the number of crashes at the expense of increased exposure of agency operational and maintenance personnel to traffic risks.



# Risk Mitigation in HSM Applications (\*Bre Gowen)

- Full and complete documentation of all factors leading to a decision is essential; lack of documentation (e.g., a 'design exception' analysis) may be interpreted as an error.
- Documentation must be accessible for some time after construction
- All actions and decisions should clearly show the application of sound engineering judgment

As long as humans operate cars..... there is no such thing as a zero-risk road



# Discussion