

I-290 Toolbox - Safety

Presented By:

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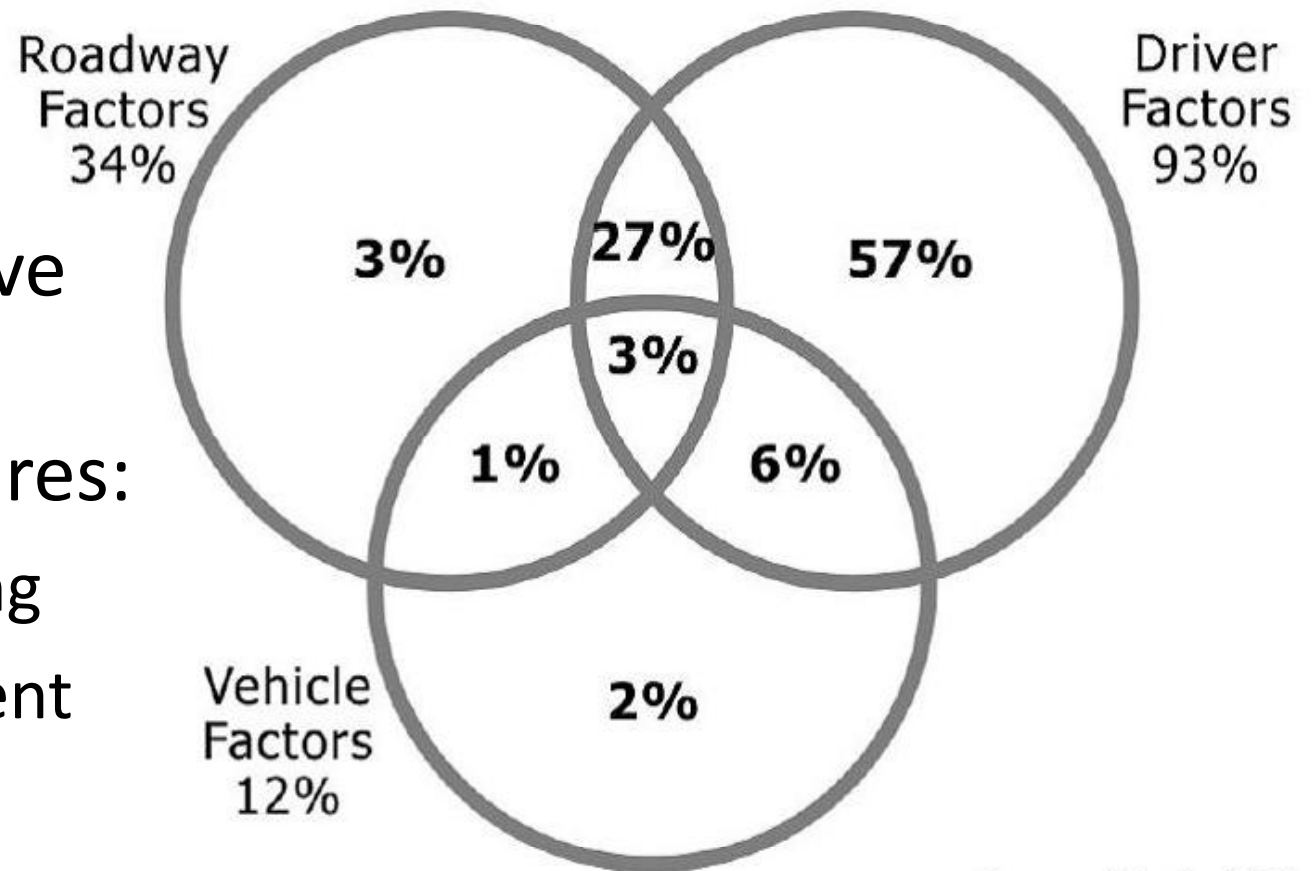
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Overview of Traffic Safety

Comprehensive traffic safety strategy requires:

- Engineering
- Enforcement
- Education
- EMS



Source: Treat, 1980

Different Views of Traffic Safety

- **SUBJECTIVE SAFETY**

- Refers to the users perception of how safe a facility feels; consequently, is a very subjective concept that speaks more to the feeling of personal security

- **NOMINAL SAFETY**

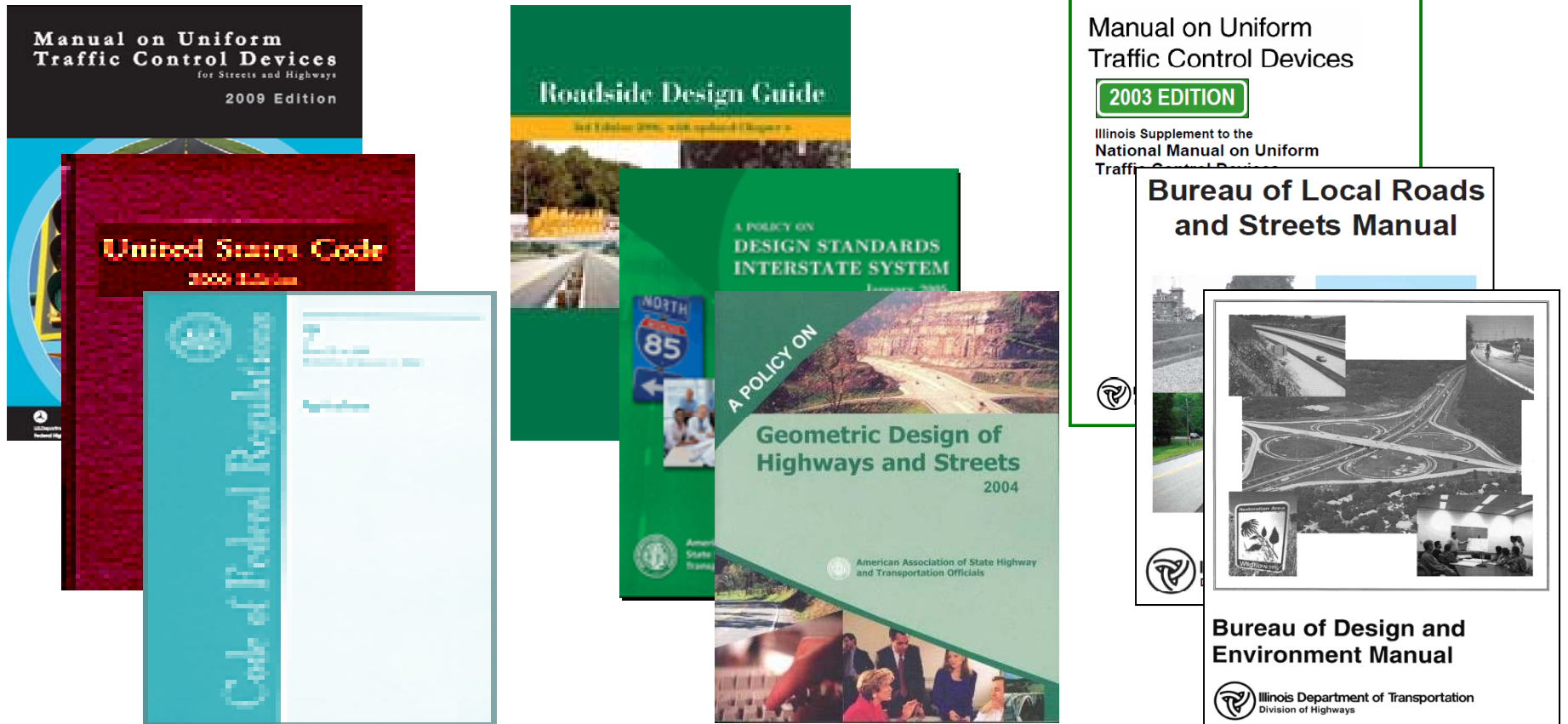
- Refers to compliance with standards, warrants, policies, procedures and guidelines

- **SUBSTANTIVE SAFETY**

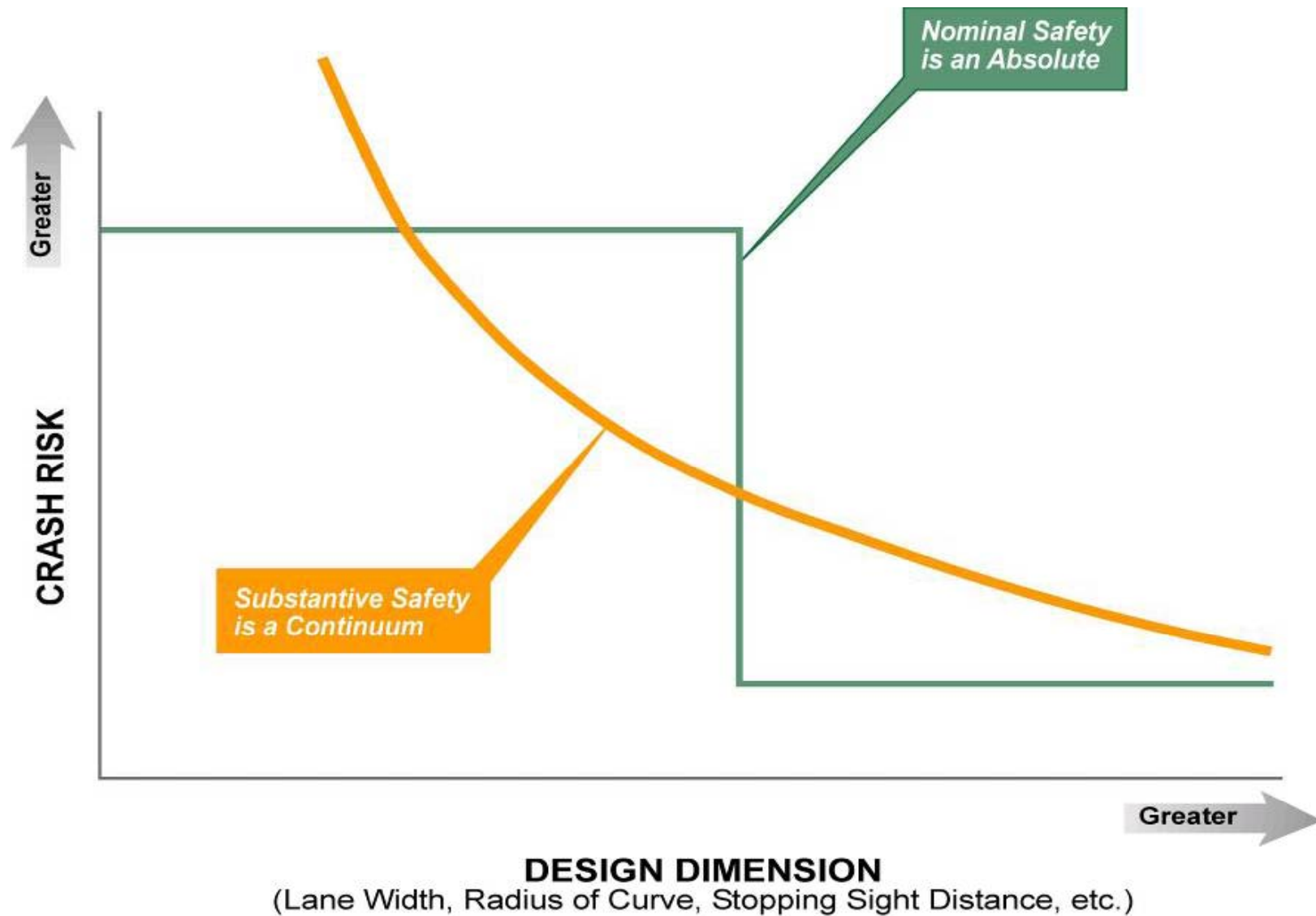
- An objective and factual measure of the actual or expected crash frequency and severity for a highway segment or intersection

Examples of Nominal Safety Sources

The concept of nominal safety is considering whether a design element meets minimum criteria.



Safety Performance: Nominal vs. Substantive



Substantive Safety May Vary When Nominal Safety Does Not



Existing Conditions



Alternative 1



Alternative 2



Alternative 3

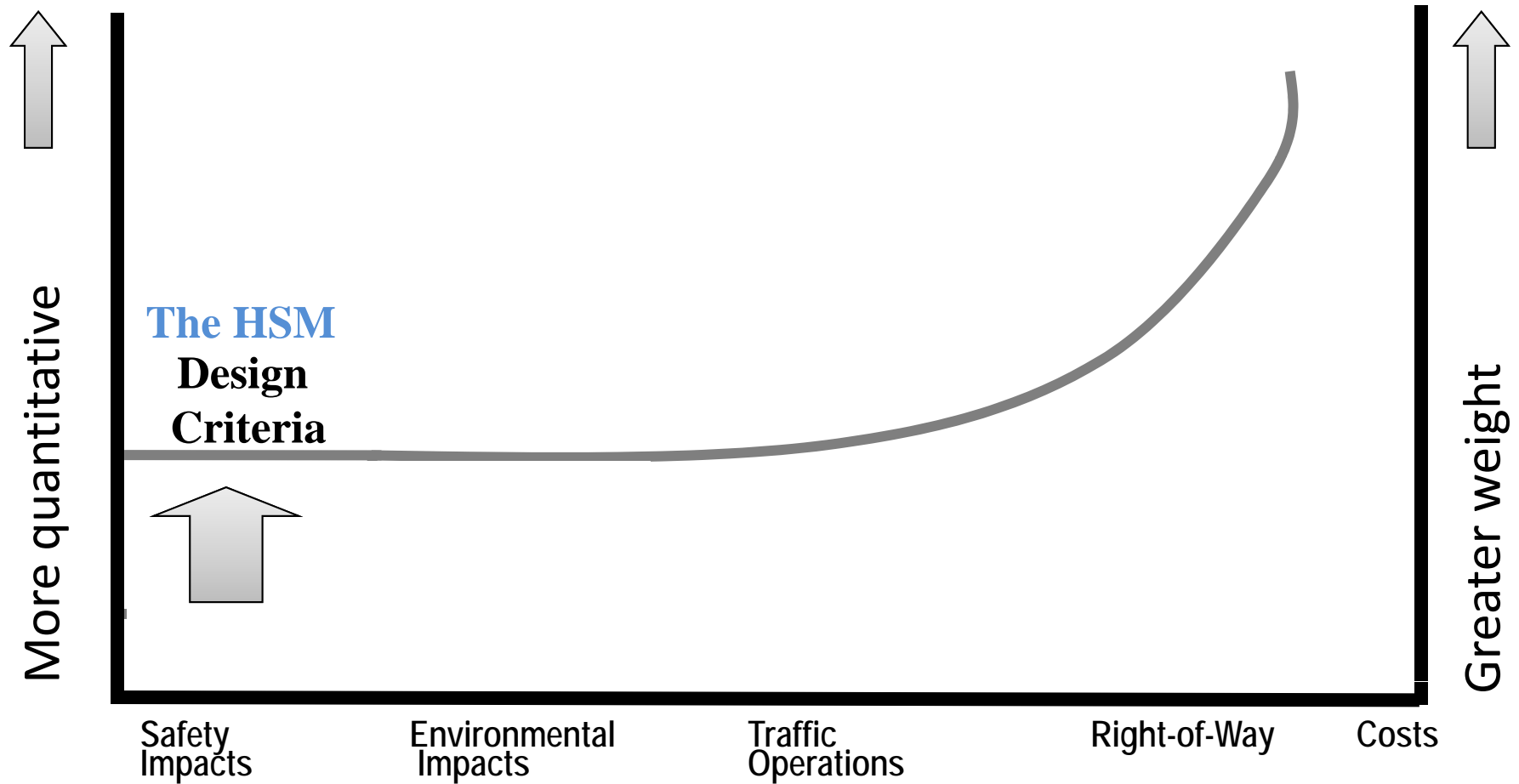
Addressing Substantive Safety Involves Applying Risk Management

Risk comes in many forms and is inherent in the delivery and operation of transportation projects. Examples of where risk is incurred:

- Project cost (cost escalation, changes to project scope)
- Level of engineering analysis (greater investigation generally means fewer unknowns)
- Serviceability (when projects fail to meet expectations or satisfy performance demands)
- Legal claims and tort liability
- **Safety (geometric design, structure design, geotechnical design)**

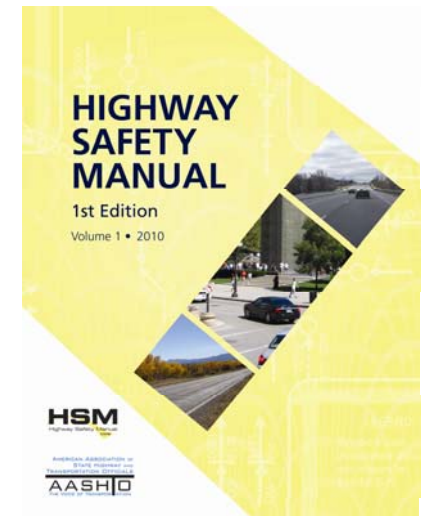


Factoring Safety Performance into Project and Program Decisions



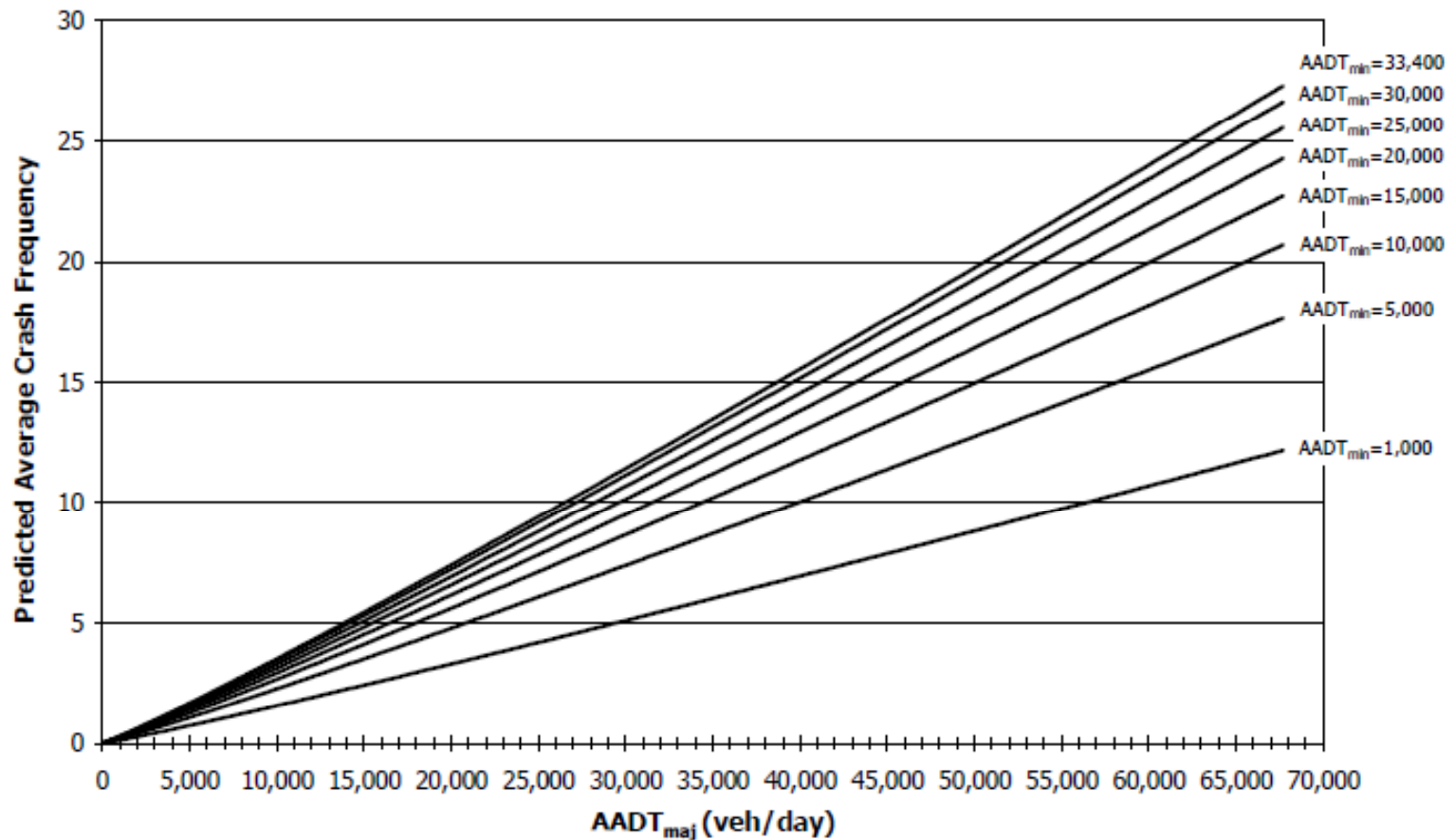
The Science of Substantive Safety

- Embodied in the new AASHTO Highway Safety Manual
- Quantitative-based approach using
 - Safety Performance Functions (SPF)
 - Crash Modification Factors (CMF)
- Where HSM leaves off
 - Crash Reduction Factors (CRF)
 - Research and experience (NCHRP, UTC, ITE etc.)



Example Safety Performance Function

Exhibit 12-23: Graphical Form of the Intersection SPF for Multiple Vehicle collisions on Four-Leg Signalized Intersections (4SG) (from Equation 12-21 and Exhibit 12-19)



Illustrative Countermeasures & CMFs



Extending Ramp Length for Acceleration/Deceleration

CMF 0.93



Change Left-Turn Phase from Permissive to Protected-Only

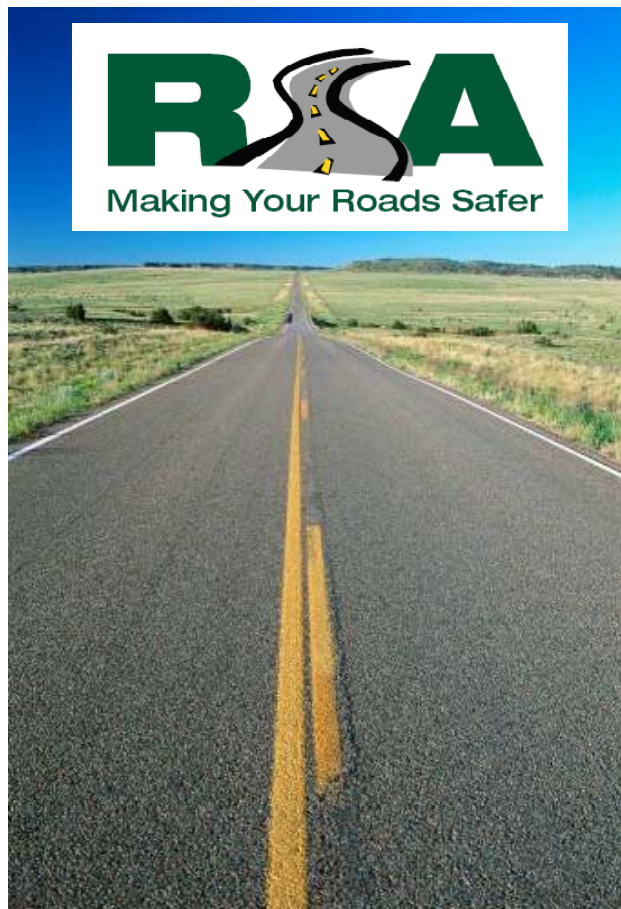
CMF 0.94



Provide Pedestrian Refuge Islands at Crosswalks

CMF unknown; trend is reduction in ped crashes

Road Safety Assessments



A **FORMAL** safety performance examination of
of
An existing or future road segment/intersection
by
An **Independent** and **Multidisciplinary** team

Important Aspects of RSAs

RSAs are designed to:

- Consider the safety needs of **ALL** road users
- Evaluate interactions at the borders or limits of a project
- Examine the interaction of project elements
- Suggest **PROACTIVE** mitigation measures
- Be conducted at **ANY** stage of a facility lifecycle



RSA Multidisciplinary Dimension



MULTIDISCIPLINARY:

- Engineering
- Law Enforcement
- Construction
- Maintenance/Ops
- Human Factors
- Planning
- Other Specialists

Added Value of Conducting RSAs

- Balancing many factors are a normal part of transportation planning and design
- Evaluate the **SAFETY** implications of roadway elements and trade-offs
- Can ensure that safety is an explicit consideration
- Can foster **COLLABORATION** with the “non-engineering” safety stakeholders (i.e. law enforcement)