



Integrating CSS in Planning and Project Development



CSS Quick Facts – Nominal and Substantive Safety

Highway engineers and stakeholders can improve the quality of analysis and discourse through better understanding of what constitutes a “safe” design or decision. First, the subject of safety should always be addressed carefully. There is no such thing as perfectly “safe” highway; one should never promise this nor characterize safety in absolute terms. Second, properly understood, highway safety has been described as having two dimensions, nominal safety and substantive safety.

- Nominal safety refers to adherence to design practices, standards, warrants, etc.
- Substantive safety refers to actual (or expected) performance as defined by the frequency and severity of crashes.

In the context of design and traffic operations decisions, and specifically with respect to the subject of design exceptions, it is clear that these two dimensions of safety may diverge. A road that is nominally safe may in fact have a poor substantive safety history; and one that is nominally unsafe (i.e., has one or more substandard design features) may not necessarily perform unacceptably.

The fact that nominal safety and substantive safety are not the same is explainable. Design criteria and design values published by AASHTO are based on many considerations in addition to safety. Moreover, the design models that constitute AASHTO values do not reflect explicit known substantive safety relationships in many cases. The substantive safety of a road involves many factors, some within the control of a DOT and some not. Licensing and prevailing laws, level and quality of enforcement, maintenance practices, and operating practices of an agency can influence crash causation.

Integration of design decisions with CSS means the ability to understand and quantify the potential substantive safety impacts of any design decision, including design exceptions. Much recent research and development sponsored by AASHTO and FHWA have greatly expanded the knowledge base and tools for use in determining substantive safety effects of design decisions. DOTs and other agencies can improve the quality of their decision-making by training staff in the use of these tools and integrating them in their project development process. A recent document by the FHWA, “Mitigation for Design Exceptions” offers technical guidance.