Integrating CSS in Planning and Project Development

CSS Quick Facts – Design Exceptions

The subject of design exceptions at the project level inevitably generates controversy. CSS skeptics have argued that accepting the premise of CSS inevitably means that more design exceptions will occur, or that they will be expected to more readily accept a design exception under pressure from a stakeholder or interest group.

A commitment to CSS by an agency does not mean abandonment of design standards. Professional engineers are ethically and legally required to follow the accepted practices of the profession. A design exception is a documented decision to design a highway element or segment of highway to a design criterion or value that does not meet the minimum value that has been established for that highway or project. Examples may include the use of a narrower shoulder than design standards show, a curve with radius smaller than the minimum for the selected design speed, or a crest vertical curve that does not provide the minimum stopping sight distance for the selected design speed. FHWA has designated 13 controlling criteria as being of sufficient importance to warrant a formal design exception, summarized below.

- Design speed
- Lane width
- Shoulder width
- Normal cross slope
- Horizontal curvature
- Super-elevation
- Tangent curve
- Vertical curvature
- Vertical clearance
- Stopping sight distance
- Bridge width
- Horizontal clearance
- Structural capacity

It is important that agencies and their professional staff have perspective on design and operational decisions, and design exceptions specifically. The notion that safety always comes first and no safety trade-offs can be tolerated is demonstrably false. Many routine and uncontroversial decisions and actions that DOTs take involve some safety trade-off whether it is recognized or not. Choosing to permit left terns under permissive (not just protected) signalization, to construct medians or not, and allowing right turns on red are all design choices.

Design exceptions are nothing new. They predate CSS by many years. The need for a design exception process was recognized in the late 1970s, as more and more states voluntarily gave up sovereign immunity. At this time it was recognized that lack of a formal review and documentation process left agencies open to claims of negligence or error in their designs if one could prove than an applicable design value was not used and there was no explanation why this was done. Over the years, formal design exceptions review and approval protocols have served State DOTS and FHWA well by assuring appropriate effort and thought has been applied to the design problem and its solution. It is the documentation (or lack thereof) of design decisions and design exceptions specifically that address risk and risk management.

The salient point is that agencies for many years have accepted the practical needs for design exceptions for any number of reasons, whether they embrace CSS or not. No studies have established that design exceptions increase with implementation of CSS. Some states have argued that there is no change in the number of design exceptions with CSS, or they may do fewer exceptions. Whatever the case may be, there is nothing inherent in integrating CSS as part of agency project development that would increase the need for design exceptions.

Full adoption of CSS principles - including studying multiple alternatives, full engagement of stakeholders in decision-making, and preparing complete documentation of reasons for design decisions – are all strong risk management actions that should aid DOTs should a design exception become an issue at a later date. Finally, CSS or not, appropriate use of design exceptions requires a professional engineer to carefully study a situation, make a professional judgment and accept the consequences on behalf of the agency. CSS does not mean ceding external control or responsibility for such matters to external stakeholders.

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Integrating CSS in Design Decisions

The CSS environment suggests a more complex or nuanced decision-making environment. Managing a complex process, retaining control, and assuring that good decisions are made should be the responsibility of the owning agency. Integrating CSS may not necessarily mean agencies need to change technical execution of their projects; but it may call for changes in the way projects are advanced. Two important keys to success in project development are evident. The first is in the fundamental understanding and acceptance of the NEPA process as the technical basis for decision-making. Despite NEPA's almost 40 years of existence, there remains in some agencies and individual, a lack of buy-in or acceptance of the fundamental intent of NEPA, which is to make sound decision based on all the facts (not just those pertaining to transportation or highways.

Second, the order in which important tasks are completed can significantly improve chances of success. Successful CSS projects generally follow this project development process:

- Engage technical and non-technical stakeholders in problem definition.
- Establish roles and responsibilities of all stakeholders; identify decision makers, advisers and influencers and get everyone's buy-in as to their roles and limits.
- Develop evaluation and decision making frameworks in advance of design alternatives development.
- Agree on key inputs, assumptions, constraints and design parameters in advance of alternatives development
- Commit to looking at multiple alternatives in efficient ways.
- Fully document intermediate work, key decisions, ad assumptions, including specifically the final decision.

This open and transparent process retains highway engineers as integral to alternatives development, but places their work in its proper place within the continuum of stakeholder input and collaborative decision-making.