Data-Driven Safety Training
Application Areas
Part 1 Design Exceptions

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Outline

1 Design Exception

Circumstances for application

Nominal vs. substantive safety

Documentation and analysis

2 Traffic Impact Study

3 Design Build

4 Safety Programming

Design Exceptions

- Circumstances
  - Inability to meet design criteria
    - technically impossible to reasonably meet
  - Potential for additional value and practicality

- See MoDOT EPG 131.1 Design Exception Process

Design Exceptions

FHWA 10 controlling criteria - NHS with design speed > 50 mph

Examples of criteria related to HSM safety analysis

- design speed

- lane width

- shoulder width

- horizontal curve radius

- superelevation rate

- stopping sight distance

Design Exception

- Approval process depends if on NHS or not

- Projects of Divisional Interest (PODI) – FHWA approval

- MoDOT approval only

Design Exceptions

- Not a breach of policy

- Alternate design approach with potential
    - add practicality or value
   - improve safety

Design Exceptions

- Actual/substantive vs. nominal safety

- Design codes reduce safety analysis to just meeting codes
  - Codes are rigid, often do on reflect site-specific conditions

- Alternative is to perform a specific safety analysis

- Specific safety analysis is a more accurate assessment of safety
  - It takes into account site-specific conditions

Substantive vs. Nominal Safety

Substantive safety is a continuum

Nominal safety is an absolute, inflexible

FHWA Safety 2020
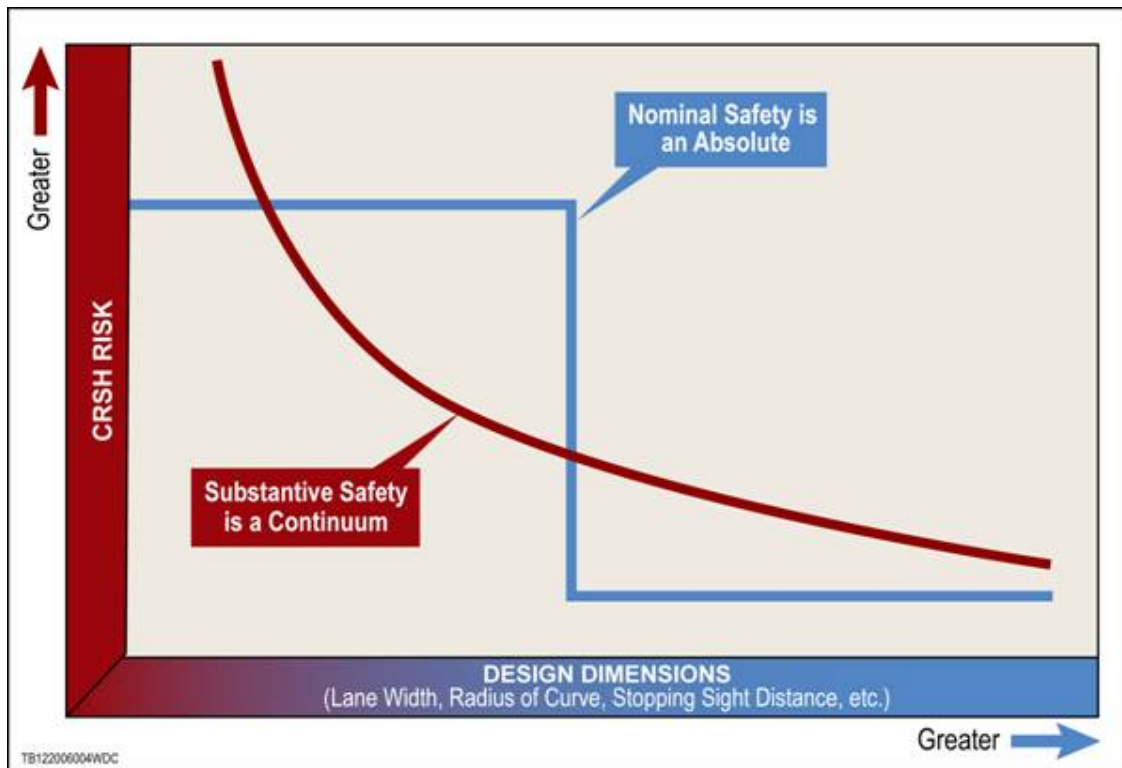
Design Exception

- Nominal vs. actual/substantive safety

- Nominal

  - compliance with applicable standards, guidelines, procedures, etc.
    - e.g. AASHTO Green Book, MUTCD
  - guidelines typically address only one element of design without taking into account full array of factors that affect safety
  - binary

Design Exception

- Nominal vs. actual/substantive safety

- Substantive
  - not binary, but a continuum
  - safety can be improved even over a nominal design

Design Exception

- Analysis and documentation
  - justification for design exception
  - exercise of reasonable care in selecting design
  - comparison of safety and operational performance

Design Exception

- HSM safety analysis
    - expected change in crashes from existing to standard design
    - expected change in crashes from existing to design exception

- i.e. HSM modeling
    - existing/no change
    - standard design
    - design exception