NCUTE Geometric Design Committee
Design Flexibility Guidance Update
(Performance-Based Geometric Design)
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- This presentation is based on presentation done at Mn County Engineers Conference
- This is about a transition from standards-based approach to an enhanced data-based design approach (i.e., Highway Safety Manual)
  - more flexible, less "rule-based," more practical/economical
- Road design is not like building design
- Standards-based design often costs more than needed
- This is applicable to sports and other industries
- Why are there standards? Mostly consistency, which is important
- Plus, convenience, and to some degree a minimum standard of performance, but not as much as generally thought
- Even before standards were developed in early 1960's and research that went into these...in still applicable today.
- Jim recommends reading NCUTP Research Report 839, also "Divided Highways" for recreational reading.
- The changed was slow as long as we meet the design standard, will be safe
  - This is fine, but localities would say, oops in 1960's, after the interstate was built...because vehicles weren't built to that degree of safety, and other near-road design factors
  - Paul Kepner's "Blue Book" (1965) encouraged designing to a high design speed to accommodate "need for speed"
  - So, with increasingly expensive testing, road building and decreasing road revenue today's real designers know I want the design...and more out of
- NCUTP 839 found that the same criteria applied in different situations produces different outcomes
  - Dimensional criteria should be based on known and proven measurable performance effects
  - Replace with fixed performance guidance
- Also see NCUTP 785 as a great read about Performance-Based Analysis
- It's fun to discuss performance based applications on projects!
- Need to understand desired outcomes, rather than output
- Two primary facets:
  1. Discerned focus on needs, problems, and objectives
  2. Use of performance-based tools, methods, to address problems & meet objectives
Just because something doesn't meet standards doesn't mean it's a problem.

- Whether it's a problem depends on performance.

- What are some deficiencies?
  - Misidentified problems/needs, or missing problems
  - Non-issues, backtracking the project

- Good resources now are:
  2. Highway Capacity
  3. NCHRP Rep. 567 is a good example.

- Yes, this takes more time & effort, but we'll get better at it.

- There is practically no correlation between design speed and safety.

- What about-total urban/suburban design? Artisanal design?

- Read NCHRP TP 73 (Comprehensive LB & Design Criteria)

- Form it: Basic is the criteria moniker for urban & suburban

- Then FHWA retained only 2 of them for low-speed facilities: 1) Structural capacity and 2) Design Speed. But design speed doesn't directly affect performance.

- NCHRP said - intersections & access management are most important, esp. related to pedestrian/cycles.

- But as "rules of thumb":

- Remarkable, we’re very helpful to have spread cost modification factors.

- 1 note on cross-sections:

- Town utility: There is no indication that lanes less than 12 ft are legal, technically lower lane widths lead to safer roads.

- MDOT's 2013 research by David Nolte, on some narrowing of

- sections projects - safety was improved.

- So now, the Thunder 20 to 22 has a little space to motor vehicles as needed to maintain functionality.

- Lane width is a design measure.

- Note that LOS is a performance measure, not a design standard.

- Now, rightsize & balance things, esp. between urban & design speed.

- Urban vs. rural - urban & rural are quite different.