PRACTICAL TRANSPORTATION

Better Solutions for Better Transportation Systems

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"Practical" States

- Missouri (Design, 2005 Manual)
- Kentucky (Solutions, 2007 Research Report)
- Idaho (Design, 2007 Memorandum)
- Oregon (Design, 2010 Guidebook)
- Utah (Design, 2011 Guide)

Missouri Approach

Build good projects, not great projects, to achieve a great system.

- Adopted new policies (planning & design criteria) in areas most affecting cost.
- Planning:
  - Set new LOS standards for rural & urban facilities.
  - Guidance on At-Grade Intersections & Interchanges
- Design
  - Controlling Elements – AASHTO Greenbook
  - Design Exceptions encouraged

Kentucky Approach

Good roads creating a great system.

- Adopted a new procedure to:
  - Assure purpose & need is targeted with an acceptable solution that balances major issues and constraints
  - Considers the point of diminishing returns for the project's/corridor's major features.
- Views each project as an investment - seek a maximum mobility/capacity/safety return.
- Did not develop new design criteria, but instead requires full range of alternatives to be studied.

Oregon Approach:

The right project at the right time at the right cost and in the right way.

- Revised their project delivery life-cycle to include Practical Design:
  - Provides flexible design parameters (not new criteria).
  - Planning focuses on multi-disciplinary teams and public input for corridor plans.
  - Identified critical decision points project development cycle.
  - Design teams frame up solutions for individual projects.

Utah Approach

(No Slogan)

- Sets Practical Design "overarching" goals and commensurate approaches/practices to achieve each.
  1. Optimize the transportation system as a whole.
  2. Meet the goals of each project's <u>objective</u> statement (deficiencies to be solved and long-term goals to be achieved).
  3. Design the most cost-efficient method to achieve the objective (return on investment).
- Prescribe the roles and responsibilities.
- Define success indicators and performance measures.

Practical Design Guide

Planning and Designing Practical Transportation Solutions for Utah

Practical Design Fundamentals

1. A Goal You Wish to Achieve.
2. Project-specific Purpose & Need Statement.
3. Values/Filters through which each project must pass.

Practical Design: Fundamental 1 - Goal

1. Appropriately allocate limited resources to maximize system-wide improvements.
2. Deliver the broadest benefits to the system within existing resources by appropriate scopes to deliver specific results.
3. Reduce costs throughout the project development process.
4. Build good projects not great projects to achieve a great system.

a. -

b. -

c. -

d. -

Practical Design: Fundamental 2, Purpose & Need

- The project's foundation against which all improvements/solutions are evaluated.
- Focus on what needs to be built, not what needs to be taken away.
- Sets a unambiguous & specific performance values/targets, not lowest threshold of acceptable performance.
- Requires planning & design discipline to meet not exceed the target.
- Balance other factors (outside of need).

Practical Design: Fundamental 3, "Filters"

Values through which all projects must pass.

Missouri:

- Safety will be improved not compromised.
- The solution will be a collaborative effort.
- Design speed will equal posted speed.

Utah:

- Take care of what we have.
- Make the system better.
- Improve safety.
- Increase capacity.

Practical Design: Fundamental 3, Filters

Oregon:

- **S**afety – maintain or improve
- **C**orridor Context - respect context and apply criteria on a corridor-wide basis.
- **O**ptimize System
- **P**ublic Support – provide opportunities for communities to shape chosen solution.
- **E**fficient Cost

Practical Design: Fundamental 3, Filters

Kentucky:

- Target project objectives to purpose & need.
- Meet anticipated capacity needs.
- Evaluate safety compared to existing conditions.
- Develop & evaluate design options & alternatives.
- Maximize design to the point of diminishing return.

"Practical" Florida

GUIDANCE

- **Mission:** provide a safe transportation system that ensures the mobility of people and goods, enhances economic prosperity and preserves the quality of our environment and communities.
- **Vision:** Serving the people of Florida by delivering a transportation system that is fatality and congestion free.
- **Consistent, Predictable & Repeatable** in our processes, procedures & practices.

"Practical" Florida

GUIDANCE

- **Transportation Vision Plan for 21st Century** is the state's bold, innovative roadmap for the future which will provide the most advanced and effective transportation system in the country. Florida is on the cutting edge to produce more transportation projects, to provide Florida's taxpayers with a greater return on our investment, and to create the conditions for the private sector to invest, grow and provide good paying jobs.

"Practical" Florida: Goal Setting

- Scope of Policy – Planning, Design, Construction, Operations, & Maintenance ?
- Minimize construction cost vs. Maximize rate of return?
- Creative Project Solutions vs. CPR?
- Context Sensitive Solutions?
- Highway Safety Manual?

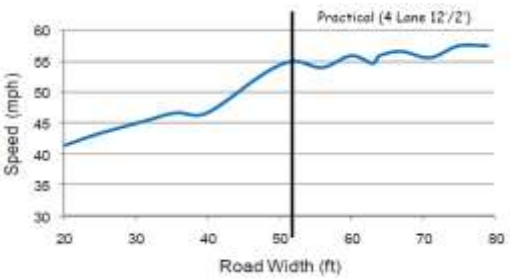
"Practical" Florida: Goal

- Maximize system performance within existing funding constraints through project discipline & engineering judgment.
  - Meet the Basic Purpose and Need of Each Project (Travelway, ADA, Safety, Mobility, and/or Operations)
  - Prioritized Approach Toward Other Upgrades
  - Encourage more Flexibility & Innovation in Alternatives considered by Planning, Design & Operations
  - Expenditures Based on Return on Investment / Diminishing Returns Approach

Diminishing Returns

Mobility:

Road Type	Width (ft) Lane	Shoulder	Road
4 Lane Undivided	11	2	48
	11	6	56
	11	8	60
	12	2	52
	12	6	60
	12	8	64
4 Lane Divided (15 ft median)	11	2	63
	11	6	71
	11	8	75
	12	2	67
	12	6	75
	12	8	79
2 Lane	10	0	20
	10	6	32
	10	2	24
	11	2	26
	11	6	34
	12	0	24
	12	6	36
	12	8	40

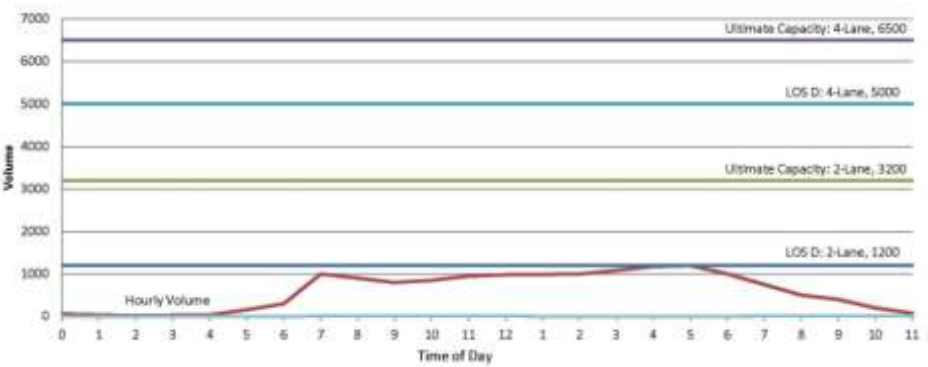


"Typical" Kentucky Rural Road Assumptions:
- 15,000 VPD
- 10% trucks
- 10 access points/mile
- Rolling Terrain

Diminishing Returns

Capacity:

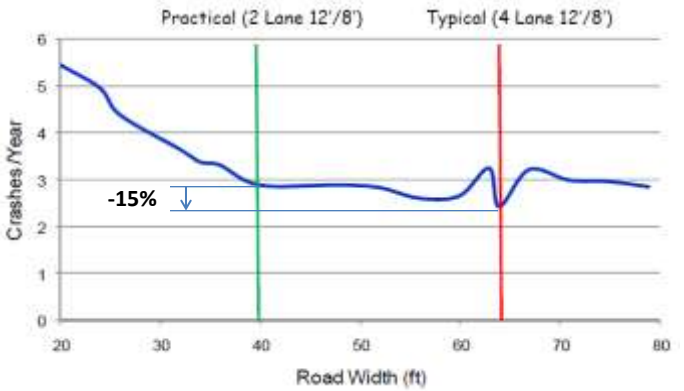
"Typical" Kentucky Rural Road Assumptions:
- 15,000 VPD
- 10% trucks
- 10 access points/mile
- Rolling Terrain



Diminishing Returns

Safety:

"Typical" Kentucky Rural Road Assumptions:
15,000 VPD
10% trucks
10 access points/mile
Rolling Terrain



Return on Investment

System-wide Impact (Kentucky):

$500M Budget to upgrade deficient 2-lane facilities (10' lanes)
2-lane 24' wide to 2-lane 40' wide:$5.7-$8.7M/mile ($7.2M)
2-lane 24' wide to 4-lane 64' wide:$18.9-23.9M/mile ($21.5M)

			Improvement			Total Improvement[1]	
Cross Section	Crashes per Year	Travel Speed (mph)	Miles	Crashes per Year	Speed (mph)	Crashes[2]	Speed[2]
2 Lane, 10 ft L, 2 ft S	5.4	41.4	--	--	--		
2 Lane, 12 ft L, 8 ft S	2.9	46.7	69.4	-2.5	+5.3	-173.5	367.8
4 Lane, 12 ft L, 8 ft S	2.4	55.9	23.3	-3.0	+14.5	-69.9	337.9

[1] The total improvement is the product of miles to improve and metric (crashes or speed)
[2] Units are crash-miles per year and mph-miles

ROI = 173 crashes/yr x 20 years x $300K/crash / $500M = 2.0 !

"Practical" Florida Purpose & Need Statements

- Policy: PD&E Manual, Part 2, Chapter 5 (under revision)
- Purpose is a "driver" of the project, it is a goal that reflects the fundamental reason why the project is being pursued.
- The Need for the project provides the rationale for pursuing the action. Consists of a factual, objective description of the specific transportation problem with a summary of the data and analysis that supports the conclusion that there is a problem requiring action.
- When: Programming, Planning, Design; Safety & Operations (?); Revisions.
- Who: MPO, FDOT Office, Multi-Discipline Team, etc.

"Practical" Florida: Filters

GUIDANCE:

- Secretary K's Vital Four: Safety, Mobility, Funding & Customer Service.
- Mission: Safety, economic prosperity, environmental & community preservation.
- Vision: Fatality & congestion free
- Vision Plan: Most advanced and effective system, cutting edge, return on investment, create opportunities for private sector

"Practical" Florida: Filters

- Take Care of What We Have
- Maintain or Improve Safety
- Make the system better (environment, mobility, capacity, new technology, community)
- Demonstrate the Return on Investment

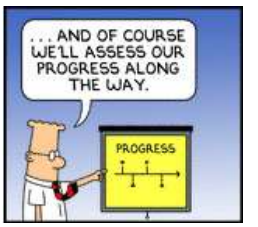
Other Practical Design Elements

Success Indicators: Pass/Fail criteria for determining if Practical Design is being integrated into the Department.

- All projects
  - Have clear Purpose & Need
  - Meet Department's Practical Design Goal
  - Pass through all Filters
- Project teams
  - Identify, monitor & document Practical Design decisions
  - Focus on improving system not just project
  - Report Savings due to Practical Design

Other Practical Design Elements

Performance Measures: Objective criteria for determining if Practical Design is achieving its (or Department's) goals



- Percent Savings per Year
- Percent of Projects using Practical Design

Highway Safety Manual (HSM)

The HSM provides methods to integrate <u>quantitative</u> estimates of crash frequency and severity into planning, project alternatives analysis, and program development and evaluation, allowing safety to be considered at all levels of transportation decision making.

The HSM, when applicable, is a tool to be used to evaluate Practical Design on projects.

Highway Safety Manual (HSM)

- CAPACITY/INTERSECTION PROJECTS:
  - Accessing Safety Needs:
    - Diagnosis of safety challenges (Chapter 5)
    - Contributing Factors & Framework for Selecting Countermeasures (Chapter 6)
  - Safety maintenance and efficacy of alternatives (number of crashes): Volumes 2 & 3
  - Rank Countermeasures for a Given Site: Economic Appraisal (Chapter 7)
  - Return on Investment: Before/After Studies of solution Effectiveness (Chapter 9)

Highway Safety Manual (HSM)

3R PROJECTS (Volume 3):

- Project Modifications
  - Add shoulders, bike lanes, medians, median barriers, rumble strips, lighting, etc.)
  - Reductions in criteria (steeper slopes, narrowing medians)
  - Changes to operations (parking, access management)
- Design Exceptions
  - Justification
  - Mitigation Strategies

Context Sensitive Design (CSS)

Context Sensitive Solutions is a proactive, collaborative, interdisciplinary approach to transportation decision making, project development, and implementation, taking into account, the views of stakeholders, and the local area where a project will exist, be operated, and be maintained. CSS considers the physical setting in which a project or activity is to be implemented, and seeks to enhance and conserve community defining features and environmental resources. This approach seeks to balance safety and mobility with local priorities. FDOT will encourage communities to contribute financially or in-kind toward enhanced project features and maintenance.

Context Sensitive Solutions (CSS)

- Practical Design – a system-wide approach applied at the corridor/project level
- CSS – a corridor/project approach
- Practical Design creates consistency to CSS:
  - Application of "betterment" filter (environment, mobility, capacity, new technology, community)
  - Application of "safety" filter
  - Approach to local priorities & funding

Consistent, Predictable & Repeatable (CPR)

- All projects are different (capacity, enhancement, safety, maintenance, 3R).
- CPR applies to processes, procedures & practices.
- How the system performs should be CPR.
- Customers expectations are for CPR experience
- How we approach each project should be CPR:
  - Few District Preferences
  - Engineering Judgment (vs. Design by Manual)
  - Design Up Process (vs. Strip Down)

Value Engineering

The systematic application of recognized techniques by a multi-disciplined team which identifies the function of a product or service; establishes a worth for that function; generates alternatives through the use of creative thinking; and provides the needed functions to accomplish the original intent of the project, reliably and at the lowest life-cycle cost without sacrificing project requirements for safety, quality, operations, maintenance, and environment.

Conducted during one of the following phases of project development: Planning, Project Development & Environmental (PD&E), or Initial Engineering Design.

Value Engineering

Practical Design/Solutions:

- Targets Criteria and Standards for revision.
- Focuses on Return on Investment not necessarily Project Life Cycle or Construction Cost.
- May filter project alternatives for betterment for criteria other than safety, operations, maintenance, and environment.
- Should apply to all projects.
- Challenges the designer to challenge his design (not wait for another team to).

Design Variations

Current Definition: *Design Variations are required when proposed design elements are below the Department's criteria (PPM Chapter 23).*

Proposed Definition: *Design Variations are required when one of the 13 Controlling Design Elements do not meet the Department's criteria or when Central Office approval is required for other criteria specified herein.*

"Practical Transportation" Florida

- Maximize system performance within existing funding constraints through project discipline & engineering judgment.
  - Just Meet the Basic Purpose and Need of Each Project
  - Prioritized Approach Toward Other Upgrades
  - Encourage more Flexibility & Innovation in Alternatives considered by Planning, Design & Operations
  - Expenditures Based on Return on Investment / Diminishing Returns Approach

Your Questions…