

## Session 23

### William Nickas

FL. Dept. of Transportation - Structures

### *Widenings & Railings : Philosophy / (White Paper)*

#### Topic Description

FDOT, like many other state DOT's, is wrestling with construction dollar funding challenges. One area that is affected is upgrading or retrofitting existing facilities, including bridge railings, to meet current standards. This briefing discusses an evolving approach to determining when and how to widen an existing bridge and provide new railings versus simply retrofitting the existing railings. It also will discuss various concepts including railing offsets, strengths and shapes to determine if an existing railing is "fit for use" and can remain as is or if it should be replaced or retrofitted.

#### Speaker Biography

Graduated from the Citadel in 1983.

William began with Department of Transportation on the P.E. Trainee Program 1983-1984.

Served as Junior Engineer in the Structures Bureau – 1984

Served as Structural Analyst for the DOT – 1984-1987

Entered Private Sector – 1987-1997

Served as FDOT State Value Engineer – 1997-1998

Appointed and Serving as State Structures Design Engineer since April 17, 1998 to Present

Mr. Nickas is a member of the Skyway Steering Committee;

He is presently Chairman of the AASHTO T-10 Concrete Bridge Committee;

Florida voting member of the AASHTO Sub-Committee on Bridges.

# Widenings & Railings: Philosophy



William Nickas, P.E.  
FDOT Structures Design Office  
Special Thanks to Charles Boyd, P.E.

## Introduction

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- Four proposed upgrade classes:
  - Class A: Add full FDOT PPM width shoulders and TL-4 Railings to meet FDOT requirements
  - Class B: Add shoulders to meet AASHTO minimum requirements and TL-4 Railings to meet FDOT requirements



## Introduction

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- Four proposed upgrade classes:
  - Class C: Add only Railings and decks that meet FDOT requirements
  - Class D: Add retrofit railings that meet FDOT requirements without removing existing deck



## Class A Upgrade

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- Preferred solution without fiscal constraint
- Meets FDOT requirements for traffic railings and lane & shoulder widths
- 30+ year remaining service life
- Partial deck demolition
- Construction of new superstructure & substructure
- Substantial TCP and \$
- Requires NO Exception or Variance



## Class B Upgrade (like A except...)

- Meets FDOT requirements for traffic railings and AASHTO minimums for lane & shoulder widths
- 20+ year remaining service life
- Desired minimum for Interstates and LA facilities regardless of remaining service life
- Select based on geometric constraints – R/W, approach lane widths



## Class C Upgrade

- Add railings and supporting decks to meet FDOT requirements
- 10+ year remaining service life
- Select due to even tighter geometric constraints, or lane & shoulder widths already meet FDOT or AASHTO minimums
- Currently requires variance to FDOT policy



## Class D Upgrade

- Minimum upgrade (railing retrofit) to meet AASHTO railing criteria
- Mandatory minimum for bridges over Interstates and LA facilities
- May require less TCP
- May require exceptions to AASHTO for shoulder widths and deck strength



## Estimated Construction Costs

Upgrade Class	Cost Range \$	Average Cost \$/LF
A	721,000 948,000	1820
B	565,000 746,000	1430
C	187,000 225,000	450
D	105,000 109,000	230



## Estimated Construction Costs

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- Average FDOT bridge deck area = 15,644 Sq. Ft.
- Assume deck width of 34' (28' roadway + two 3' safety curb / railings)
- "Average hypothetical bridge" length = 460'



## Estimated Construction Costs

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- 3,525 pre-1975 FDOT owned bridges
- Assume 14 year paving cycle, 252 bridges on RRR projects annually
- Assume 35% have already been widened or railings upgraded
- 164 bridges remain to be upgraded annually

## Estimated Construction Costs\*

Upgrade Class	% Bridges per class	No. Bridges per class	Avg. Cost to upgrade \$/LF	Cost to upgrade per class Million \$
A	40	66	1820	55.3
B	10	16	1430	10.5
C	10	16	450	3.3
D	40	66	230	7.0
Total	100	164	na	76.1
14 year program total = \$1.065 billion				

\* w/o Mobilization, TCP and approach roadway work

## Future Direction

- This is why FDOT is still handling so many Variances and Exceptions.
- Some locations improvements are needed and a logic like this will offer decision makers the dollar range and general values associated with these type investment decisions.



## Future Direction

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- Stay tuned as more information is made available to streamline exception and variance paperwork.



## Where to Get More Information

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- Comments or questions contact:  
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