



# The Historic Bridge Dilemma and It's Effect on Production

**FDOT**  
**2016 Design Conference**  
**Daytona Beach, Florida**

# Welcome and Introductions

## **Barbara Culhane, M.S., A.I.C.P.**

- District 6 Cultural Resource Coordinator
- 27 years experience

## **Ken Hardin, M.A.**

- Janus Research
- 36 years experience

## **Jim Phillips, PE**

- Bridge Practice Lead, Hardesty & Hanover
- 34 years experience

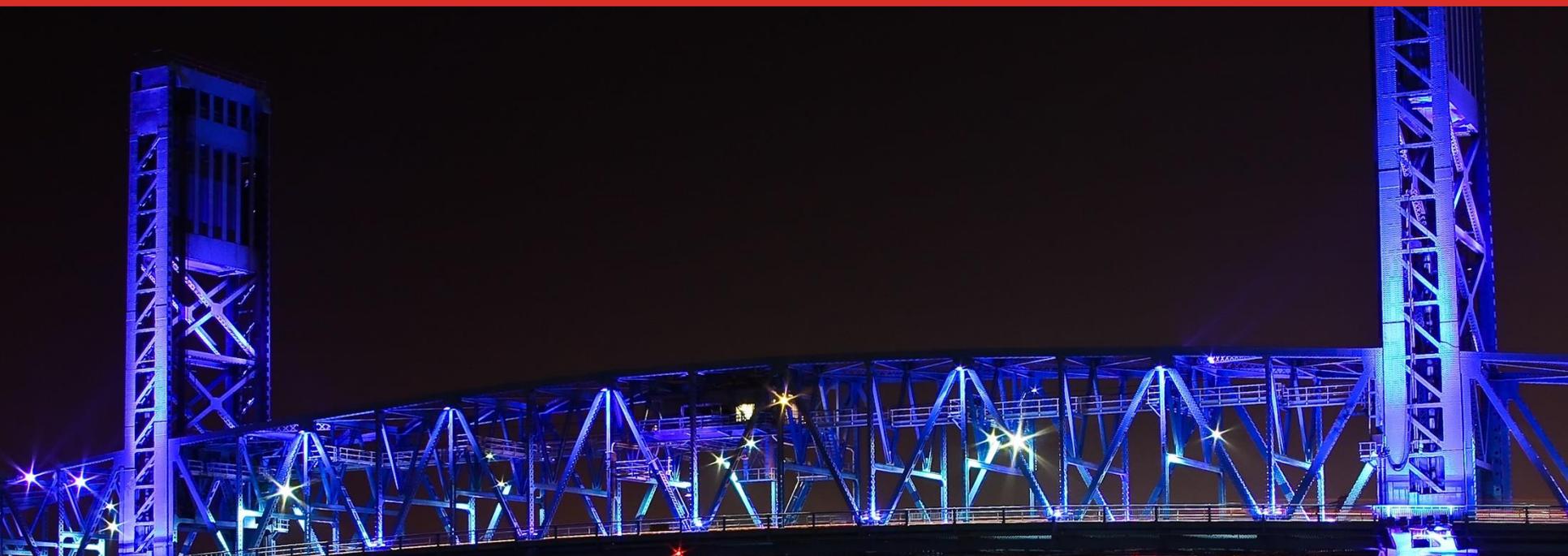
# Recognizing the Dilemma

District 6 Secretary Gus Pego identified impact of rehabilitation and replacement of historic bridges on production schedules

Recognized their engineering importance

Suggested this current presentation be developed for the Design Conference to highlight the issues

# Historic Bridges from an Engineering Perspective



# ASCE Policy for Rehabilitation of Bridges

“Historic bridges are important links in our past, serve as safe and vital transportation routes in the present, and can represent significant resources for the future.... **Bridges are the single most visible icon of the civil engineer’s art.** By demonstrating interest in the rehabilitation and reuse of historic bridges, the civil engineering profession acknowledges concern with these resources and an awareness of the historic built environment”

# Replacing the CSX Railroad Bridge Over the New River



Replacing the  
**CSX** Railroad Bridge  
Over the New River in Ft. Lauderdale

# The Value of Historic Bridges to the Engineering Profession

- Symbols of Engineering Achievement and Legacy
- Display High Degree of Craftsmanship
- Examples of Engineering Analysis and Skill:
  - Application of sophisticated analytical methods
  - Incorporation of innovative materials or engineering principles
  - Use of advanced fabrication technique



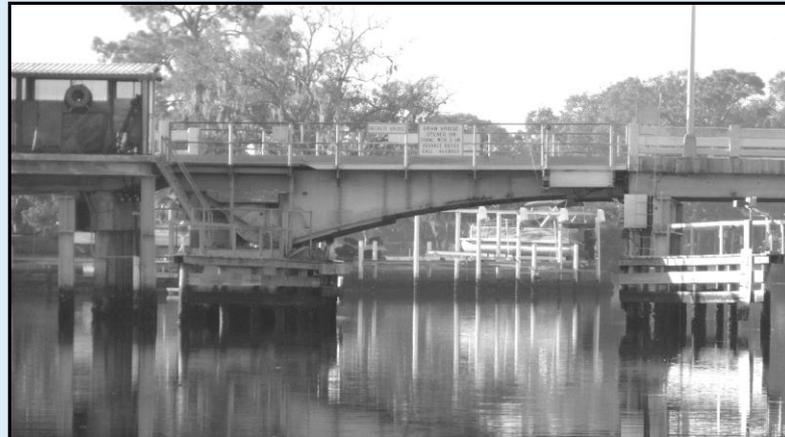
# What Are We Preserving?

## Environment

- Design
- Context
- Period



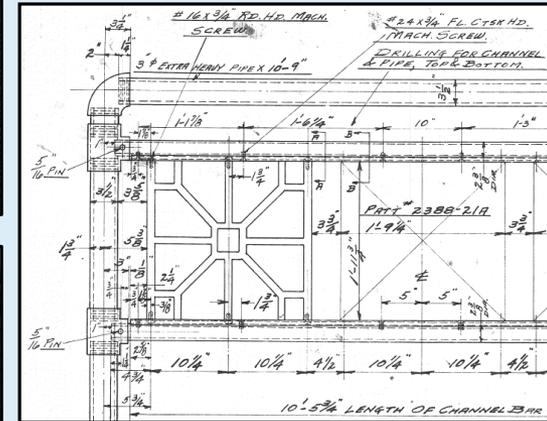
Platt Street, Tampa  
(1926)



Beckett Bridge, Tarpon  
Springs (1924)

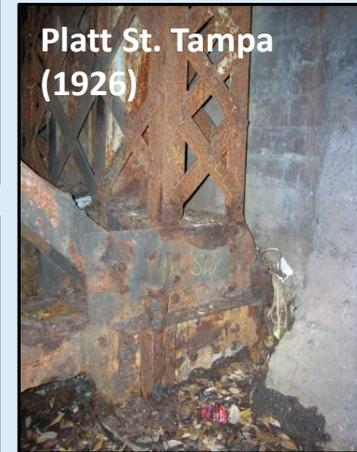
# Craftmanship

- Engineering – example is the design drawings on velum for the Kennedy Bridge (formerly Lafayette Street) in Tampa (1913)
- Construction – examples are rivets and the cornices on the Platt Street Bridge houses (1926)



# Engineering

- Unique Designs
  - Kennedy Blvd (SR 60 Downtown Tampa), skewed rolling-lift (1913) designed by the Scherzer Rolling Lift Bridge Co.
- Progression of Design Development
- Use of prior materials
- Why we do things differently today, how did we get to where we are?



# Hanover Skew Boca Raton Inlet (1963)



# Replacement of the NW 36<sup>th</sup> Street Bridge Over the Miami Canal

*Replacement of the  
NW 36<sup>th</sup> Street Bridge  
Over the Miami Canal*

**FDOT**  
District Six

# Florida Historic Bridges are Disappearing

**59** historic bridges or 12% of the historic bridges identified in the *Florida Historic Highway Bridge Book* inventory were demolished between 2000 and 2010

# Most Endangered Historic Bridge Types

- Vertical Lift: 4 remaining in Florida
- Swing: 11 remaining in Florida
- Rolling Lift: 9 remaining statewide



# FDOT Historic Bridge Book

*“Florida’s surviving historic highway bridges continue to both reflect the significant patterns of our history, as well as to embody the highest achievements in bridge design, construction, technological innovation, artistry, and aesthetics, in wood, metal, and concrete.”*

# Preservation Challenges

## Design Deficiencies

- Modern loading is larger and heavier – SW 1st Street / Miami River (1929) and Vilano Bridge, A1A over AICWW (1939) were subjected to repeated vehicle impacts
- Codes are more safety oriented – OSHA, NFPA
- Codes are more broad in scope – ADA
- Design for extreme events previously not considered – earthquakes, scour, storm surge, vessel impact
- Original materials are now considered hazardous, e.g. lead based paint, asbestos



SW 1<sup>st</sup> Street (1929) Approach Spans over North River Drive – Substandard Vertical Clearance

# Preservation Challenges

## Functionality

- Capacity – traffic, navigation
- Multimodal Needs – wider lanes, sidewalks, bike lanes, shoulders

## Physical Condition

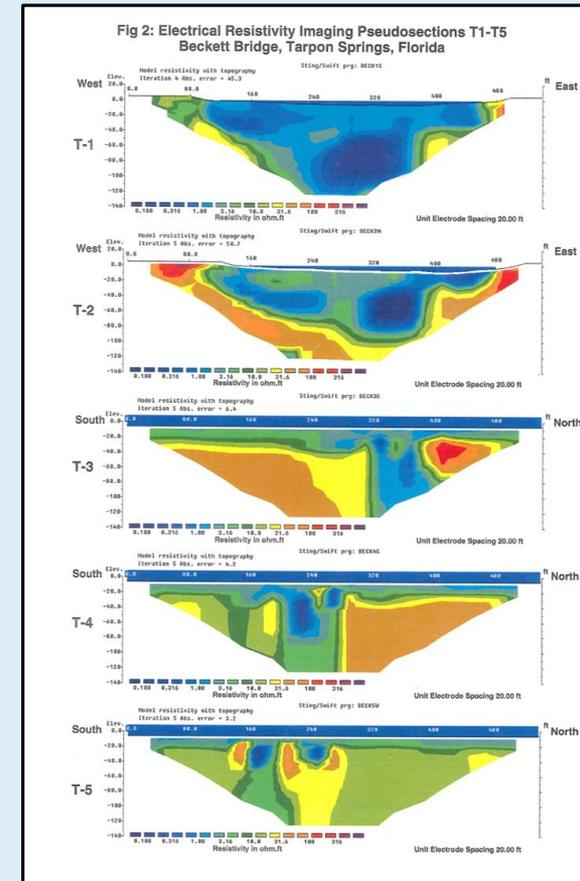
- Environmental Exposure – corrosion, sulfate attack, chloride attack, marine borers, freeze thaw
- Wear – abrasion of roadway surfaces, wear of machinery
- Fatigue – failure due to cyclic loading



Beckett Bridge (Circa 1924) – No Shoulders or Bike Lanes, 2'-2" Sidewalks

# Obsolescence and Unforeseen Conditions

- Specific equipment or technology no longer supported – examples include movable bridge machinery and control systems
- Sinkhole conditions – Beckett Bridge
- Changes in use – Snell Isle Blvd. / Coffee Pot Bayou – no longer a movable span, welded shut



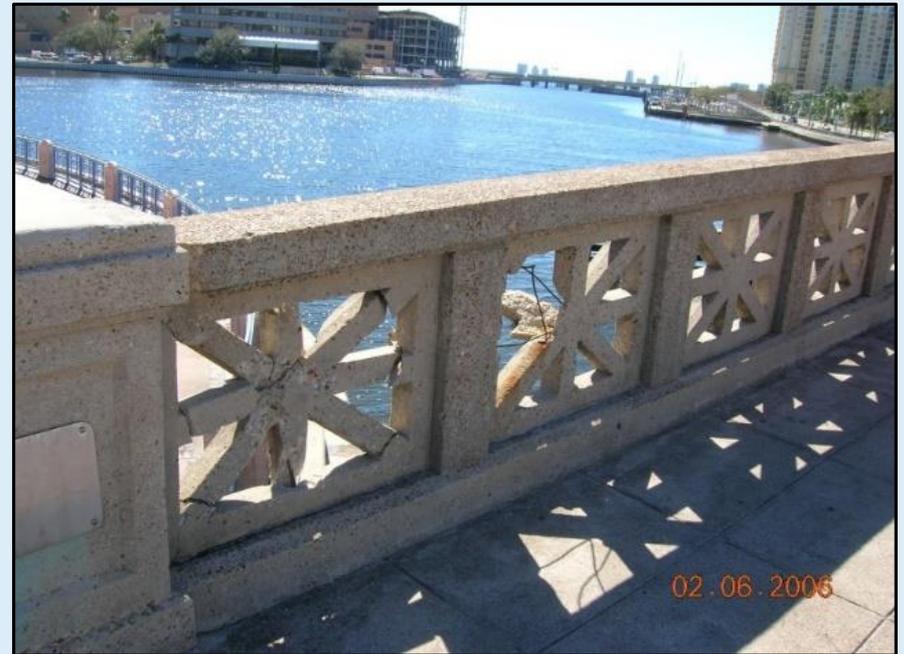
# Strategies



# Meeting Production Schedules

## PD&E

- Early Identification of Historic Resource
- Determination of Preservation or Replacement
  - Identify Exceptions and Variations – Process or Confirm Viability



Platt Street Bridge Railing – Required a Design Exception to Replace In-Kind

## Section 106 Process

- Clearly defined MOA

# Meeting Production Schedules

## Preliminary Design

- BDR
  - Process Exceptions and Variations
  - Approval of Mitigation

## Final Design

- Confirm Mitigation Approval



Ortega Bridge Railing (1927) – Required a Design Exception to Replace In-Kind



# Questions and Answers

## 1. INITIATE the process

- Determine Undertaking
- Coordination with other reviews (NEPA)
- Notify SHPO/THPO
- Identify Tribes and other consulting parties
- Plan to involve the public

Undertaking with potential to cause effects?

NO

YES

## 2. IDENTIFY historic properties

- Determine APE
- Identify historic properties
- Consult with SHPO/THPO, Tribes and other consulting parties
- Involve the public

Historic properties present and affected?

NO

YES

## 3. ASSESS adverse effects

- Apply criteria of adverse effects
- Consult with SHPO/THPO, Tribes and other consulting parties
- Involve the public

Historic properties adversely affected?

NO

YES

## 4. RESOLVE adverse effects

- Avoid, minimize, or mitigate adverse effects
- Notify ACHP
- Consult with SHPO/THPO, Tribes and other consulting parties
- Involve the public

Agreement (MOA/PA) or council comment

PROCESS COMPLETE