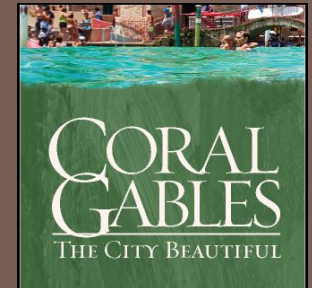


# SW 42<sup>ND</sup> AVENUE OVER CORAL GABLES CANAL BRIDGE NO. 874425



# Bridge Aerial



# Existing Bridge Characteristics

- Built in approximately 1943
- 131.2 feet in Length
- 64 feet Largest Span
  
- Provides for:
  - ▣ Two- 12-foot wide travel lanes
  - ▣ Two- directional traffic
  - ▣ 18” curb sidewalks



# Condition of Bridge

## Reinforced Concrete Deck and Approach Slab



# Condition of Bridge

Concrete Deck Underside



# Condition of Bridge

Steel Beams



# Condition of Bridge

Reinforced Concrete Abutments, Bent Caps and Footings



# Condition of Bridge

## Timber Fender System





# Condition of Bridge

- Noted Deficiencies
  - Reinforced Concrete Deck– Cracking
  - Expansion Joints- Armor Corrosion and Missing Seal
  - Steel Beams
    - Failing Paint System
    - Corrosion
    - Minor Section Loss in Web and Flange
  - Steel Bearings- Corrosion
  - Reinforced Concrete Pier Caps- Cracking and Delamination
  - Reinforced Concrete Columns- Cracking and Delamination
  - Reinforced Concrete Footings- Cracking and Delamination
  - Fender System- Timber Deterioration

# Condition of Bridge

- NBI Ratings from May 2016 Bridge Inspection Report
  - Deck 6 (out of 9) Satisfactory
  - Superstructure 5 (out of 9) Fair
  - Substructure 7 (out of 9) Good
  - Channel 8 (out of 9) Protected
  - Scour – Stable for Erosion
  - Sufficiency Rating 63.8% (out of 100%)
    - <80% → Justification for Rehabilitation
    - <50% → Justification for Replacement
  - Health Index 76.68% (out of 100%)
  - Functionally Obsolete
    - Bridge Geometry
  - NOT Structurally Deficient

# Condition of Bridge

- Bridge Load Rating Analysis
- Operating 62.4 Tons
  - RF = 1.73
- Not Posted for Load

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION  
LOAD CAPACITY INFORMATION

FORM NO. 600-1  
REVISED 1-8-95

1) BRIDGE NUMBER: 8447E  
2) INVENTORY RATING: \_\_\_\_\_  
FORM (LOAD) LOADING: HS20.8  
OTHER ( ) LOADING: \_\_\_\_\_

3) POSTING DATA:  
POSTED: \_\_\_\_\_ IF YES, EXISTING RESTRICTIONS: \_\_\_\_\_  
DATE SIGNS ERECTED: \_\_\_\_\_ DATE: 6-18-95  
POSTING NEEDED: NO IF YES, SEE TABLE BELOW  
DATE SIGNS ERECTED: \_\_\_\_\_

4) GOVERNING SPAN DATA:  
A) MEDIAN OF ANALYSES: X LFD  
X W/D  
B) ANALYSIS SYSTEM:  
X RANS  
X BRIFEM  
OTHER: \_\_\_\_\_

5) MEMBER ANALYZED:  
SUPERSTRUCTURE:  
\_\_\_\_ PRESTRESSED CONCRETE SECT.  
\_\_\_\_ NON-STANDARD SECT.  
\_\_\_\_ ASHTO GUIDERS  
\_\_\_\_ BUILT-UP  
\_\_\_\_ SINGLE-T  
\_\_\_\_ DOUBLE-T  
\_\_\_\_ HOLLOW-VOID SLAB  
\_\_\_\_ ROLL SLAB  
\_\_\_\_ PRECAST SEGMENTAL BOX  
\_\_\_\_ POST TENSIONED  
SUBSTRUCTURE:  
\_\_\_\_ R/C CONC. SECT.  
\_\_\_\_ C/P SLAB  
\_\_\_\_ PRECAST SLAB  
\_\_\_\_ BOX CULVERT  
\_\_\_\_ C/P BOX  
\_\_\_\_ STEEL SECT.  
\_\_\_\_ PLATE GIR.  
\_\_\_\_ BOX  
\_\_\_\_ COMPOSITE

6) LOAD RATING SUMMARY TABLE

SPAN NO.	DOT 1		DOT 2	
	DOT 1	DOT 2	DOT 1	DOT 2
1	31.87	62.67		
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

7) COMMENTS: \_\_\_\_\_

8) COMPUTATIONS PERFORMED BY: R. COLESBY  
CHECKED BY: R. KWICK  
RESPONSIBLE ENGINEER: SUSAN H. POWY

DATE: 6-18-95  
DATE: 6-18-95  
DATE: 6-18-95

PE # 2028

NOTES:  
1. FOR EACH SPAN, SPAN NO. ENTER SPAN NUMBER AND BEARING TO BEARING LENGTH IN SPAN LENGTH PROVIDED.  
2. FOR LOAD RATINGS, COLUMN 1 IS DESIGN STRESS AFTER FACTORS, RIGHT OF RATING.  
3. WHEN SHEAR OR BOLTMENT DETERMINES LOAD RATING, MARK APPROPRIATE COLUMN.

*8-18-95*

# Assessment

- ❑ Original Bridge Design Service Life of 50-Years
- ❑ Built in 1943
- ❑ 75 Years Old
- ❑ Functionally Obsolete (Geometry)
- ❑ Not Structurally Deficient
- ❑ Good Substructure Rating

# Recommendations

- Clean and Coat Structural Steel Superstructure with 4-Coat Zinc Enriched Urethane System
- Repair Cracks in Reinforced Concrete Deck and Replace Expansion Joints
- Repair Spalls in Reinforced Concrete Substructure
- Replace Fender System
- Further Investigation on Type and Capacity of Foundation

# Questions?



Thank you!

# Atiq H. Alvi, P.E.



- T.Y. Lin International Technical Director of Bridge Rehabilitation- South Region
- MSCE with Thesis in Structures Rehabilitation
- 27 Years Experience
- Former Florida Department of Transportation District 7 Structures Maintenance Engineer
- Transportation Research Board (TRB):
  - Bridge Preservation Committee
  - Structural FRP Committee
  - Bridge Life Cycle Cost Analysis
  - Non Destructive Testing (NDT)