



BRIDGE ANALYSIS AND RATINGS

BRIDGE NO.: 270018

COUNTY: DARE

STATE PROJECT NO.: WBS 42080.1.80

ANALYSIS DATE: 3/17/2022



FINAL REVIEW BY: Mindy Isenhour, PE

FINAL REVIEW DATE: 3/17/2022

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
STRUCTURES MANAGEMENT UNIT - ANALYSIS SECTION

RATING SUMMARY SHEET

BRIDGE NUMBER: 270018
COUNTY: Dare

COMPLIED BY: BJE
CHECKED BY: MBI

DATE: 3/17/2022
DATE: 3/17/2022

Non-Interstate Highway Bridge

	Member	Truck Weight	Prestressed Concrete Cored Slab					
	Span Length		41 ft.					
	Beam Spacing		3 ft.					
	(C=Continuous)							
	Analysis Method	LFR						
HS Inventory Rating		36.00	16.60					
HS Operating Rating		36.00	27.70					
Single Vehicle Run	SNSH	13.50						
	SNGARBS2	20.00						
	SNAGRIS2	22.00						
	SNCOTTS3	27.25						
	SNAGGRS4	34.93						
	SNS5A	35.55						
	SNS6A	39.95						
SNS7B	42.00							
TTST Run	TNAGRIT3	33.00						
	TNT4A	33.08						
	TNAGRIT4	43.00						
	TNAGT5A	45.00						
	TNAGT5B	45.00						
	TNT6A	41.60						
	TNT7A	42.00						
TNT7B	42.00							

CALCULATED POSTING: No Posting Required	DESIGN LOADING: HS-20
CONTROLLING MEMBER: [Redacted]	INVENTORY RATING: HS 16.6
EXISTING POSTING: Not Posted	OPERATING RATING: HS 27.7
RECOMENDED POSTING: No Posting Required	ITEM 70 - BRIDGE POSTING CODE: 5

ANALYSIS INVENTORY RATING : **EJ** OPERATING RATING **EJ**
 METHOD: Engineering Judgement
 POSTING RATING: **EJ**
 OVERLOAD BRIDGE ONLY: No HS OPERATING DROPPED 3 TONS OR MORE: No
 COMMENTS: Assigned rating was used due to missing plans



801 Jones Franklin Rd.
Raleigh, NC 27606-3394

Bridge Number: 270018
County: Dare
Inspection Date: 2/17/2022
Inspected by: BJE, JEH

Rating by: BJE
Date: 3/17/2022
Checked by: MBI
Date: 3/17/2022

ASSIGNED LOAD RATING

DESIGN PLANS

No plans were provided by NCDOT at notice to proceed. NCDOT and Town of Southern Shores officials were contacted but plans for this site were not found.

ASSUMPTIONS

Bridge does not match any standard set of plans. Therefore, a rating has been assigned based on the condition of the structure at the time of inspection.

Load ratings assigned based on assigned rating methodology as described by NCDOT memos.

STRUCTURE INFORMATION

Type	Precast Prestressed Concrete Cored Slab
Date of Inspection	2/17/2022
Spans/Barrels	2
Span Lengths	36'-0" 41'-0"
Beam Size/Spacing	36"x18" @ 3'-0"
Skew	0°
Continuous for Live Load	No
# of Beams	11
Width of Bridge/Length of Culvert	33'-0" Out-to-Out
Year of Construction	1990



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ASSIGNED LOAD RATING

SUMMARY OF FIELD EVALUATION

Condition Ratings

National Bridge Inventory Items

Item	Grade Scale	Grade
Item 58: Deck	0-9, N	7
Item 59: Superstructure	0-9, N	7
Item 60: Substructure	0-9, N	6
Item 61: Channel and Channel Protection	0-9, N	7
Item 62: Culvert	0-9, N	N
Item 71: Waterway Adequacy	0-9, N	7
Item 72: Approach Roadway Alignment	0-9, N	8

Comments on Structural Defects

Cracking throughout asphalt wearing surface. Exterior girders appear to be pushing/rotating away from adjacent girders with some efflorescence buildup. Cracking and spalling found throughout Bent 1 cap. See inspection report for details.

ASSIGNED RATING

Rating for: Prestressed Concrete

Design Loading: HS20
HS Inventory Rating: HS16.6
HS Operating Rating: HS27.7

- Condition of load carrying components.
- Level of load path redundancy.
- Reconstruction or modifications to the structure.
- Measurable deformations.
- Comparison to comparable structures of known design.
- Observed performance of the structure under traffic.

Prestressed Concrete Bridges

Review inspection reports for evidence of structural distress, such as flexural or shear cracks. For prestressed concrete bridges use the lower of the superstructure or substructure condition ratings (NBI Items #59 and #60) and Table 3 to assign a load rating. Consider whether the condition rating reflects the load carrying capacity of the structure. If a low condition rating is due to a deficiency that does not affect the structure’s load carrying capacity, a higher engineering judgement rating is appropriate, if adequate justification is furnished.

Table 3: Prestressed Concrete Bridges – Engineering Judgement Load Rating

Lowest NBI Condition Rating (Superstructure and Substructure only)	Inventory Rating (RF _{Inv.})	Operating Rating (RF _{Op.})
9	HS20.0 (1.00)	HS33.4 (1.67)
8	HS20.0 (1.00)	HS33.4 (1.67)
7	HS19.0 (0.95)	HS31.7 (1.59)
6	HS16.6 (0.83)	HS27.7 (1.39)
5	HS12.6 (0.63)	HS21.0 (1.05)
4	HS8.0 (0.40)	HS13.4 (0.67)
3 or 2	<ul style="list-style-type: none"> • Assign appropriate rating less than that for NBI Condition Rating of 4. 	
0 or 1	<ul style="list-style-type: none"> • Bridge closed. 	

Substructure grade of 6 dictates rating.

For structures with a superstructure condition rating < 5, use engineering judgement to also estimate a safe load carrying capacity, for single vehicles (SV) with 2 to 7 axles and truck tractor semi-trailers (TTST) with 3 to 7 axles. Structures with a NBI superstructure condition rating ≤ 3 and are open to traffic will require extensive justification for the engineering judgement load rating. Justification should include, but is not limited to an assessment of the following:

- Condition of load carrying components.
- Level of load path redundancy.
- Reconstruction or modifications to the structure.
- Measurable deformations.
- Comparison to comparable structures of known design.
- Observed performance of the structure under traffic.