



ASR/LFR BRIDGE LOAD RATING SUMMARY

Version 1.0

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SECTION 1 - GENERAL BRIDGE DATA					
(8) Asset ID 04407		(27) Year Built 1964		(90) Date of Inspection 12/2019	
(9) Bridge Location 5 MI NW OF COLUMBIA		(7) Facility Carried I-26		(6) Feature Intersected/Route Crossing I-20	
(49) Length 280 ft.	(11) Milepost 107.140	(2) District 1	(3) County RICHLAND	(22) Owner SCDOT	(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 7, 6, 6
(43, 44, 45, & 46) Bridge Description Simple 4 Span PSG Bridge			(31) Design Load HS-20		(108) Existing Wearing Surface Type & Depth BITUMINOUS
Rating Program & Version BrR 6.8.4 - AASHTO Engine		Rating Program & Version N/A		Rating Method LFR	AASHTO Reference MBE 3rd Edition, 2018
(58) Deck 7 Good		(59) Superstructure 6 Satisfactory		(60) Substructure 6 Satisfactory	(62) Culvert N N/A (NBI)
				(113) Scour Critical N Not Over Waterway	

SECTION 2A - INVENTORY RATINGS - Design Vehicles and AASHTO Legal Trucks							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
H-20	Truck	20	G3&G21	1.40	PS Tensile Stress - Concrete	1.250	25
H-20 Lane	Lane	20	G3&G21	1.40	PS Tensile Stress - Concrete	1.171	23
HS-20	Truck	36	G3&G21	1.40	PS Tensile Stress - Concrete	0.818	29
HS-20 Lane	Lane	36	G3&G21	1.40	PS Tensile Stress - Concrete	1.171	42
Alternate Military Loading	Truck	24	G3&G21	1.40	PS Tensile Stress - Concrete	1.020	24
Modified AASHTO SC - Type 3	Truck	25	G3&G21	1.40	PS Tensile Stress - Concrete	1.109	27
Modified AASHTO SC - Type 3S2	Truck	36.6	G3&G21	1.40	PS Tensile Stress - Concrete	1.015	37
AASHTO - Type 3-3	Truck	40	G3&G21	1.40	PS Tensile Stress - Concrete	1.123	44

SECTION 2B - INVENTORY RATINGS - Specialized Hauling Vehicles (SHV)							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Truck	32.5	G3&G21	1.40	PS Tensile Stress - Concrete	0.813	26
SC-SHV1B	Truck	35	G3&G21	1.40	PS Tensile Stress - Concrete	0.764	26
SC-SHV2A	Truck	33	G3&G21	1.40	PS Tensile Stress - Concrete	0.809	26
SC-SHV2B	Truck	40	G3&G21	1.40	PS Tensile Stress - Concrete	0.682	27
SC-SHV3A	Truck	42.5	G3&G21	1.40	PS Tensile Stress - Concrete	0.848	36
SC-SHV3B	Truck	45	G3&G21	1.40	PS Tensile Stress - Concrete	0.802	36
SC Representative School Bus	Truck	17.525	G3&G21	1.40	PS Tensile Stress - Concrete	1.611	28
SC-SU2	Truck	20	G3&G21	1.40	PS Tensile Stress - Concrete	1.376	27
SU4	Truck	27	G3&G21	1.40	PS Tensile Stress - Concrete	0.999	26
SU5	Truck	31	G3&G21	1.40	PS Tensile Stress - Concrete	0.898	27
SU6	Truck	34.75	G3&G21	1.40	PS Tensile Stress - Concrete	0.814	28
SU7	Truck	38.75	G3&G21	1.40	PS Tensile Stress - Concrete	0.749	29

This ASR/LFR Load Rating is based on:		<input checked="" type="checkbox"/> Design Plans	<input type="checkbox"/> Design Plans & Approved Shop Drawings	<input type="checkbox"/> Other (Please explain in Remarks)
		<input checked="" type="checkbox"/> As-Built Plans		

SECTION 3 - BRIDGE LOAD RATING SUMMARY		
Controlling Legal Truck	Load Posting Required? If Yes, complete Signing/Posting Form.	Controlling Legal Load Rating Factor (at Operating level)
EV3	No	1.533

SECTION 4 - REMARKS & SIGN/SEAL			
Load Rating Engineer		Quality Control Engineer	
Name: Malcolm Tencate		Name: Elsa Zimmerly	
Company/Title: HDR		Company/Title: HDR	
Date: 1/22/2020		Date: 3/11/2020	
Remarks:		<input type="checkbox"/> Structure is part of QA sample set. Quality Assurance Engineer	
<ol style="list-style-type: none"> As-built plans 3240.378 and As-let plans 3240.289 & 3240.408 were used for the rating. Traffic data was input into BrR using Directional % = 55% and Truck % = 12%. Condition factor of 1.0 was used based on the 12/2019 Inspection Report. Spans 1-4 are all linked together under one superstructure definition in BrR. Results shown on the LRSF for Span 1 (i.e. Controlling Location 1.X) apply to all four spans. Controlling Member G4-G9 also includes G15-G20. A load of 0.016 ksf was applied to account for the weight of SIP forms and the extra concrete. Utility was estimated to be 1" diameter std. wt. steel pipe. Parapet and Median dead loads were distributed to the 3 adjacent girders. The original bridge deck is 6.5" with 3" asphalt overlay. The widening bridge decks are 7" with 3" asphalt overlay and is used in BrR for deck thickness. 0.5" Extra deck thickness for the original bridge section was input as non-composite negative dead load. The original structure and widening structures were assumed to act as a unit because both layers of reinforcing are shown across the interface between the original and widened deck and because there are intermediate diaphragms between the original and widened girders. The maximum overhangs at midspan and girder spacings were used since the variation in these widths is not significant. Structure is on a curved alignment with chorded girders. The bridge was modeled as a straight bridge. The bridge supports were modeled using a consistent skew of 19.72 deg. (average skew between WB & EB structures). 			



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SECTION 1 (PAGE 2) - GENERAL BRIDGE DATA							
(8) Asset ID 04407		Route Type Interstate		(27) Year Built 1964	(90) Date of Inspection 12/2019		(411) Date Rated 3/13/2020
(9) Bridge Location 5 MI NW OF COLUMBIA			(7) Facility Carried I-26		(6) Feature Intersected/Route Crossing I-20		
(49) Length 280 ft.	(11) Milepost 107.140	(2) District 1	(3) County RICHLAND		(22) Owner SCDOT	(418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 7, 6, 6	
(43, 44, 45, & 46) Bridge Description Simple 4 Span PSG Bridge				(31) Design Load HS-20	(108) Existing Wearing Surface Type & Depth BITUMINOUS		
Rating Program & Version BrR 6.8.4 - AASHTO Engine			Rating Program & Version N/A			Rating Method LFR	AASHTO Reference MBE 3rd Edition, 2018
(58) Deck 7 Good		(59) Superstructure 6 Satisfactory		(60) Substructure 6 Satisfactory		(62) Culvert N N/A (NBI)	(113) Scour Critical N Not Over Waterway

SECTION 5 - OPERATING RATINGS - Design Vehicles & AASHTO Legal Trucks							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
H-20	Truck	20	G3&G21	1.30	Design Shear - Concrete	3.193	63
H-20 Lane	Lane	20	G3&G21	1.70	Design Shear - Concrete	2.708	54
HS-20	Truck	36	G3&G21	1.70	Design Shear - Concrete	2.110	75
HS-20 Lane	Lane	36	G3&G21	1.70	Design Shear - Concrete	2.708	97
Alternate Military Loading	Truck	24	G3&G21	1.70	Design Shear - Concrete	2.635	63
Modified AASHTO SC - Type 3	Truck	25	G3&G21	1.60	Design Shear - Concrete	2.659	66
Modified AASHTO SC - Type 3S2	Truck	36.6	G3&G21	1.70	Design Shear - Concrete	2.220	81
AASHTO - Type 3-3	Truck	40	G3&G21	1.70	Design Shear - Concrete	2.570	102

SECTION 6A - OPERATING RATINGS - SC Specialized Hauling Vehicles (SHV) - Legal on Non-Interstate and Permit on Interstate							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC-SHV1A	Truck	32.5	G3&G21	1.60	Design Shear - Concrete	1.929	62
SC-SHV1B	Truck	35	G3&G21	1.60	Design Shear - Concrete	1.828	63
SC-SHV2A	Truck	33	G3&G21	1.60	Design Shear - Concrete	2.011	66
SC-SHV2B	Truck	40	G3&G21	1.70	Design Shear - Concrete	1.607	64
SC-SHV3A	Truck	42.5	G3&G21	1.05	Design Shear - Concrete	2.189	93
SC-SHV3B	Truck	45	G3&G21	1.05	Design Shear - Concrete	2.073	93

SECTION 6B - OPERATING RATINGS - Two Miscellaneous SHV & AASHTO SHV - Legal on all roads							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC Representative School Bus	Truck	17.525	G3&G21	1.30	Design Shear - Concrete	3.995	70
SC-SU2	Truck	20	G3&G21	1.30	Design Shear - Concrete	3.451	69
SU4	Truck	27	G3&G21	1.60	Design Shear - Concrete	2.453	66
SU5	Truck	31	G3&G21	1.70	Design Shear - Concrete	2.061	63
SU6	Truck	34.75	G3&G21	1.60	Design Shear - Concrete	2.129	73
SU7	Truck	38.75	G3&G21	1.70	Design Shear - Concrete	1.978	76

SECTION 6C - OPERATING RATINGS - Standard Permit Vehicles & Typical Cranes							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
SC - 100k	Truck	50	G3&G21	1.05	Design Shear - Concrete	1.941	97
SC - 120k	Truck	60	G3&G21	1.70	Design Shear - Concrete	1.534	92
SC - 130k	Truck	65	G3&G21	1.70	Design Shear - Concrete	1.498	97
SC Crane #544726	Truck	80	G3&G21	1.05	Design Shear - Concrete	1.349	107
SC Crane #527568	Truck	88.85	G3&G21	1.05	Design Shear - Concrete	1.315	116

SECTION 6D - OPERATING RATINGS - Emergency Vehicles (EV)							
Rating Vehicle	Controlling Configuration	Weight (Tons)	Controlling Member	Controlling Location	Controlling Limit State	Rating Factor	Rating (Tons)
EV2	Truck	28.75	G3&G21	1.70	Design Shear - Concrete	2.433	69
EV3	Truck	43	G3&G21	1.60	Design Shear - Concrete	1.533	65

Remarks:

- Based on the August 27, 2019 Site Assessment, there is no measurable deterioration to warrant a Deteriorated structure model in BrR.
- Sacrificial wearing surface = 0" per LRGD section 10.2 and 11.2.1.1.
- An additional 5% of self-load was applied to all steel girders to account for materials such as welds, bolts, etc.
- Diaphragm connection plates were not modeled because plates do not meet requirements of Std Specs Section 10.34.4.6.
- Overhead sign not shown in plans. Dimensions and location based on the August 27, 2019 Site Assessment. Load input into BrR as a point load and applied to first three girders as composite load. Assumed 20 psf of sign area for weight.