



LRFR BRIDGE LOAD RATING SUMMARY

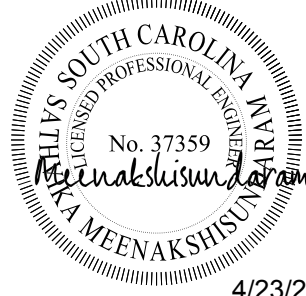
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| SECTION 1 - GENERAL BRIDGE DATA | | | | | | |
|---|-------------------------|-------------------------------|----------------------------------|-------------------------------------|---|---|
| (8) Asset ID 04604 | | Route Type Interstate | | (27) Year Built 1965 | (90) Date of Inspection 12/4/2019 | (411) Date Rated 2/14/2020 |
| (9) Bridge Location SMI NW OF COLUMBIA | | | (7) Facility Carried I-20 | | (6) Feature Intersected/Route Crossing SALUDA RIVER | |
| (49) Length 659 ft. | (11) Milepost 62.754 | (2) District 1 | (3) County LEXINGTON | (22) Owner SCDOT | (418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 7, 7, 6 | |
| (43, 44, 45, & 46) Bridge Description Simple 9 Span PSG Bridge | | | (31) Design Load HS 20 + MOD. | | (108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE | |
| Rating Program & Version BrR 6.8.4 - AASHTO Engine | | | Rating Program & Version N/A | | Rating Method LRFR | AASHTO Reference MBE 3rd Edition, 2018 |
| (58) Deck 7 Good | | (59) Superstructure 7 Good | | (60) Substructure 6 Satisfactory | (62) Culvert N N/A (NBI) | (113) Scour Critical 6 Calcs Not Made |

| SECTION 2 - INVENTORY AND OPERATING LOAD RATINGS | | | | | |
|--|--------------|--------------------|----------------------|-------------------------------|---------------|
| Rating Vehicle | Rating Level | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor |
| HL-93 Truck + Lane | Inventory | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.779 |
| HL-93 Truck Train + Lane (90%) | Inventory | - | - | - | - |
| HL-93 Tandem + Lane | Inventory | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.890 |
| HL-93 Truck + Lane | Operating | G14-G18 | 2.1 | STRENGTH-I Concrete Shear | 1.271 |
| HL-93 Truck Train + Lane (90%) | Operating | - | - | - | - |
| HL-93 Tandem + Lane | Operating | G14-G18 | 2.1 | STRENGTH-I Concrete Shear | 1.531 |

| This LRFR 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 EV3 | Load Posting Required? If Yes, complete Signing/Posting Form. No | Controlling Legal Load Rating Factor 0.632 |

| SECTION 4 - REMARKS & SIGN/SEAL | | | |
|---|--|---|--|
| Load Rating Engineer | | Quality Control Engineer | |
| Name: Sathvika Meenakshisundaram | | Name: William Johnson | |
| Company/Title: HDR / Bridge Engineer | | Company/Title: HDR / Bridge Engineer | |
| Date: 1/30/2020 | | Date: 2/13/2020 | |
| Remarks: | | <input checked="" type="checkbox"/> Structure is part of QA sample set. Quality Assurance Engineer Name: Kelly A. Ruppen Company/Title: Michael Baker International / Bridge Engineer Date: 2/25/2020 | |
| 1. As-built plans 32.467.1 for the original structures and as-let plans 32.806.2 for the widening were used for the rating. 2. Traffic data was input into BrR using Directional % = 55% and Truck % = 18%. 3. Condition factor of 1.00 was used based on the Inspection Report dated 12/04/2019. 4. Spans 1-9 are all linked together under one superstructure definition in BrR. Results shown on the LRSF for Span 2 (i.e. controlling location 2.X) apply to all nine spans. 5. A load of 0.016 ksf was applied to bays 7 and 12 to account for the weight of SIP forms and the extra concrete per the site assessment performed 8/27/2019. 6. The weight of the USGS gaging station is negligible and was not included in the BrR model. 7. By inspection, the weight of 4-6" PVC utilities is greater than the 1-4" steel pipe. Only the weight of 4-6" PVC utilities was entered in the model. 8. A weight of 3.7 plf was assumed for each PVC utility. The weight of the utilities was distributed to two adjacent girders. 9. Controlling member G14-G18 also includes G2-G6. 10. Based on Dec 4, 2019 inspection report and Aug 27, 2019 site assessment, there is no measurable deterioration to warrant a Deteriorated Structure model in BrR. | |  4/23/2020 | |

| SECTION 5A - LEGAL & PERMIT RATINGS - AASHTO Legal Trucks | | | | | | | | |
|--|--------------|-------------------|--------------------------|----------------------|-------------------------------|---------------|---------------|--|
| The ADTT value listed below is to be used to establish Legal and Permit γ_{LL} factors. | | | | | | | | |
| (30) ADT Year | (29) ADT | (109) Truck % ADT | ADTT (ADT x Truck % ADT) | | | | | |
| 2017 | 41850 | 18 | 7533 | | | | | |
| Rating Vehicle | Rating Level | Weight (Tons) | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor | Rating (Tons) | |
| Modified AASHTO SC - Type 3 | Legal | 25 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 1.095 | 27 | |
| Modified AASHTO SC - Type 352 | Legal | 36.6 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.989 | 36 | |
| AASHTO - Type 3-3 | Legal | 40 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 1.068 | 42 | |
| Lane Type Loading (Neg. M only) | Legal | 40 | - | - | - | - | N/A | |
| Lane Type Loading (Span > 200 ft) | Legal | 40 | - | - | - | - | N/A | |
| Modified AASHTO SC - Type 3 | Permit | 25 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 2.230 | 55 | |
| Modified AASHTO SC - Type 352 | Permit | 36.6 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.763 | 64 | |
| AASHTO - Type 3-3 | Permit | 40 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.895 | 75 | |
| Lane Type Loading (Neg. M only) | Permit | 40 | - | - | - | - | N/A | |
| Lane Type Loading (Span > 200 ft) | Permit | 40 | - | - | - | - | N/A | |



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| SECTION 1 (PAGE 2) - GENERAL BRIDGE DATA | | | | | | | | |
|---|-------------------------|-------------------------------|---------------------------------|-------------------------------------|---------------------|---|--|---|
| (8) Asset ID 04604 | | Route Type Interstate | | (27) Year Built 1965 | | (90) Date of Inspection 12/4/2019 | | (411) Date Rated 2/14/2020 |
| (9) Bridge Location 5MI NW OF COLUMBIA | | | (7) Facility Carried I-20 | | | (6) Feature Intersected/Route Crossing SALUDA RIVER | | |
| (49) Length 659 ft. | (11) Milepost 62.754 | (2) District 1 | (3) County LEXINGTON | | (22) Owner SCDOT | (418) Conditions During Rating (NBI Item 58, NBI Item 59, NBI Item 60) 7, 7, 6 | | |
| (43, 44, 45, & 46) Bridge Description Simple 9 Span PSG Bridge | | | | (31) Design Load HS 20 + MOD. | | (108) Existing Wearing Surface Type & Depth MONOLITHIC CONCRETE | | |
| Rating Program & Version BrR 6.8.4 - AASHTO Engine | | | Rating Program & Version N/A | | | Rating Method LRFR | | AASHTO Reference MBE 3rd Edition, 2018 |
| (58) Deck 7 Good | | (59) Superstructure 7 Good | | (60) Substructure 6 Satisfactory | | (62) Culvert N N/A (NBI) | | (113) Scour Critical 6 Calcs Not Made |

| SECTION 5B - LEGAL RATINGS - SC Specialized Hauling Vehicles (SHV) - Legal on Non-Interstate Only (Permit on Interstate) | | | | | | | |
|--|--------------|---------------|--------------------|----------------------|-------------------------------|---------------|---------------|
| Rating Vehicle | Rating Level | Weight (Tons) | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor | Rating (Tons) |
| SC-SHV1A | Legal | 32.5 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.795 | 25 |
| SC-SHV1B | Legal | 35 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.750 | 26 |
| SC-SHV2A | Legal | 33 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.796 | 26 |
| SC-SHV2B | Legal | 40 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.676 | 27 |
| SC-SHV3A | Legal | 42.5 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.828 | 35 |
| SC-SHV3B | Legal | 45 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.783 | 35 |

| SECTION 5C - LEGAL RATINGS - Two Miscellaneous SHV & AASHTO SHV | | | | | | | |
|---|--------------|---------------|--------------------|----------------------|-------------------------------|---------------|---------------|
| Rating Vehicle | Rating Level | Weight (Tons) | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor | Rating (Tons) |
| SC Representative School Bus | Legal | 17.525 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 1.595 | 27 |
| SC-SU2 | Legal | 20 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 1.364 | 27 |
| SU4 | Legal | 27 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.985 | 26 |
| SU5 | Legal | 31 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.889 | 27 |
| SU6 | Legal | 34.75 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.799 | 27 |
| SU7 | Legal | 38.75 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.731 | 28 |

| SECTION 5D - LEGAL RATINGS - Emergency Vehicles (EV) | | | | | | | |
|--|--------------|---------------|--------------------|----------------------|-------------------------------|---------------|---------------|
| Rating Vehicle | Rating Level | Weight (Tons) | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor | Rating (Tons) |
| EV2 | Legal | 28.75 | G14-G18 | 2.4 | SERVICE-III PS Tensile Stress | 0.948 | 27 |
| EV3 | Legal | 43 | G14-G18 | 2.5 | SERVICE-III PS Tensile Stress | 0.632 | 27 |

| SECTION 6 - PERMIT RATINGS - Specialized Hauling Vehicles (SHV), Standard Permit Vehicles & Typical Cranes | | | | | | | |
|--|--------------|---------------|--------------------|----------------------|----------------------------|---------------|---------------|
| Rating Vehicle | Rating Level | Weight (Tons) | Controlling Member | Controlling Location | Controlling Limit State | Rating Factor | Rating (Tons) |
| SC-SHV1A | Permit | 32.5 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.721 | 55 |
| SC-SHV1B | Permit | 35 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.618 | 56 |
| SC-SHV2A | Permit | 33 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.730 | 57 |
| SC-SHV2B | Permit | 40 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.460 | 58 |
| SC-SHV3A | Permit | 42.5 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.617 | 68 |
| SC-SHV3B | Permit | 45 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.531 | 68 |
| SC Representative School Bus | Permit | 17.525 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 3.049 | 53 |
| SC-SU2 | Permit | 20 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 2.752 | 55 |
| SU4 | Permit | 27 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 2.124 | 57 |
| SU5 | Permit | 31 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.828 | 56 |
| SU6 | Permit | 34.75 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.707 | 59 |
| SU7 | Permit | 38.75 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.607 | 62 |
| SC - 100k | Permit | 50 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.435 | 71 |
| SC - 120k | Permit | 60 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.182 | 70 |
| SC - 130k | Permit | 65 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.143 | 74 |
| SC Crane #544726 | Permit | 80 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.039 | 83 |
| SC Crane #527568 | Permit | 88.85 | G14-G18 | 2.1 | STRENGTH-II Concrete Shear | 1.015 | 90 |

Remarks (continued):

- The original structure and the widened structure 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 original bridge deck is 6.5" with a 3" concrete overlay after 1/4" deck sacrification. The typical widening bridge deck thickness is 7" which was used in the BrR Superstructure definition. Extra thickness of 2.25" was distributed equally to the original girders and applied as a non-composite member load.
- Sacrificial wearing surface = 0" per LRGD Section 10.2.
- A 1" haunch depth at CL bearing and 1.178" at midspan was assumed for the exterior widening girders. A 1.5" haunch depth at CL bearing and 1.572" at midspan was assumed for the interior widening girders. A 0.1875" haunch depth at CL bearing and 0" at midspan was assumed for the original girders.
- The compressive strength for the original bridge deck is $f'_c = 3$ ksi. The compressive strength for the deck on widening is $f'_c = 4$ ksi. Conservatively, used $f'_c = 3$ ksi for deck concrete compressive strength for the entire bridge in the BrR model.
- Also rated by LFR and results show that posting is not required.