Load Capacity and Condition

These points are based on two factors judged of equal importance: the load capacity of the bridge (A) and its physical condition (B). The points for this section are computed as (A+B)/2

Subpart A: Load Capacity

Data Items used:
- Item 64 F   Federal Operating Rating (metric tons)
- Item 48   Maximum Span Length (meters)
- Item 26   Functional Classification

First, a required operating rating is computed which, for that maximum span length, would provide adequate capacity to carry legal loads. This assumes that bending moment in simple span longitudinal members controls, which applies for most bridges.

Compute Required Operating Rating (ROR):

For Max Span < 26m: ROR = 58.3 - 0.62 * (26 - Max Span)

For Max Span < 43m and ≥ 26 m: ROR = 63.0 - 0.28 * (43 - Max Span)

For Max Span ≥ 43m: ROR = 63.0 – 0.50 * (Max Span – 43)

Next, the Actual Operating Rating (AOR) is compared to the Required Operating Rating (ROR). Where AOR ≥ ROR, Operating Rating Points (ORP) = 0. Where AOR < ROR, the Operating Rating Points earned are a function of the degree of shortage in capacity and the functional class. Operating Rating Points are computed as follows:

Arterials: If AOR < 75% of ROR, then ORP = 17 points.
     If AOR > 75% of ROR, then ORP = 17 * (ROR – AOR) / [0.25 * ROR]

Collectors: If AOR < 50% of ROR, then ORP = 17 points.
     If AOR > 50% of ROR, then ORP = 17 * (ROR-AOR) / [0.50 * ROR]

Locals: If AOR < 25% of ROR, then ORP = 17 points.
     If AOR > 25% of ROR, then ORP = 17 * (ROR – AOR) / [0.75 * ROR]

Subpart B: Physical Condition

Data Items Used:

Item 42B	Service Type Under
Item 43B	Bridge Design Type
Item 58	Deck Rating
Item 59	Superstructure Rating
Item 60	Substructure Rating
Item 62	Culvert Rating
Item 71	Waterway Adequacy

TABLE 1 – ALL BRIDGES		
Condition Rating Points (CRP)	Non-Culverts (Item 43B ≠ 19)	Culverts (Item 43B = 19)
	Lowest of Items 58, 59, 60	Item 62
17	< 3	< 3
12	3	3
7	4	4
3	5	5
0	> 5	> 5

TABLE 2 – RIVER CROSSINGS ONLY (Item 42B = 5, 6, 7, or 8)	
Condition Rating Points (CRP)	Item 71 Waterway Adequacy
17	2

Use the maximum of values in table 1 and table 2.

Final operating and Condition Rating Points:
Operating and Condition Rating Points = (ORP + CRP) / 2

Safety Factors

a. Structural Inventory and Appraisal (SI&A) Data Items Used:

        Item 28A   Lanes on Structure
        Item 29   Average Daily Traffic
        Item 32   Approach Roadway Width
        Item 43B   Bridge Design Type
        Item 51   Bridge Roadway Width
        Item 68   Deck Geometry
        Item 72   Approach Roadway Alignment

b. Compute Deck Geometry Factor, C

Table 1, Deck Geometry Factor, C		
Item #68 of SI&A	Factor C	Normalized for 10 point scale = C * (10/23)
≤ 3	4	1.74
4	2	0.87
5	1	0.44
≥ 6	0	0

c. Compute Approach Road Alignment Factor, F

Table 2, Approach Road Alignment Factor, F		
Item # 72 of SI&A	Factor F	Normalized for 10 point scale = F * (10/23)
≤ 3	4	1.74
4	2	0.87
5	1	0.44
≥ 6	0	0

d. Compute Width of Roadway (Deck) Insufficiency Factor, (G + H)

    i) Determine Factor X: X = Item 29 / Item 28A

    ii) Determine Factor Y:

        (1)   For Non-Culverts Only (Item 43B $\neq$ 19)

            Y = Item 51 / Item 28A (Item 51 must be in metric)

        (2)   For Culverts Only (Item 43B = 19)

            Y = Item 32 / Item 28A

iii) Determine Factor H: max = 15 (H depends on Item 28A and Factors X and Y)

Number of Lanes (Item 28A)	Factor X	Factor Y	Factor H
1	Not Applicable	Y < 4.3	15
		4.3 ≤ Y < 5.5	15[(5.5-Y)/1.2]
		Y ≥ 5.5	0
2	Not Applicable	Y ≥ 4.9	0
3		Y ≥ 4.6	
4		Y ≥ 4.3	
≥ 5		Y ≥ 3.7	
> 1	X > 50	Y < 2.7	15
	X ≤ 50	Y < 2.7	7.5
	X ≤ 50	Y ≥ 2.7	0
	50 < X ≤ 125	Y < 3.0	15
		3.0 ≤ Y < 4.0	15 (4 - Y)
		Y ≥ 4.0	0
	125 < X ≤ 375	Y < 3.4	15
		3.4 ≤ Y < 4.3	15 (4.3 - Y)
		Y ≥ 4.3	0
	375 < X ≤ 1350	Y < 3.7	15
		3.7 ≤ Y < 4.9	15[(4.9-Y)/1.2]
		Y ≥ 4.9	0
	X > 1350	Y < 4.6	15
		4.6 ≤ Y < 4.9	15[(4.9-Y)/0.3]
		Y ≥ 4.9	0

iv) Determine Factor G: max = 5 (Applies only to bridges (Item 43B ≠ 19))

    (1)   If Item 51 + 0.6 < Item 32:   G = 5

    (2)   If Item 51 + 0.6 ≥ Item 32:   G = 0

v) Insufficiency Factor (G + H): max = 15

vi) Normalize for 10 point scale: (G + H) * (10/23)

e. Safety Rating = sum of normalized values C, F, and (G + H), maximum normalized value = 10 points: [C + F + (G + H)] * (10/23)

Traffic Factors

ADT	RURAL			URBAN		
	Arterial	Collector	Local	Arterial	Collector	Local
0	0	0	0	0	0	0
1-400	7	7	7	5	5	5
401-1200	9	9	9	5	5	5
1201-1600	10	10	10	5	5	5
1601-2000	10	10	10	7	7	7
2001-5000	10	10	10	7	7	7
5001-10,000	10	10	10	8	8	9
10,001-12,000	12	13	11	12	12	12
12,001-18,000	12	13	11	12	12	12
18,001-20,000	12	13	11	13	13	12
20,001-30,000	15	15	11	15	15	12
Over 30,000	17	15	11	17	15	12

Financial Factors

This is computed as the sum of three factors with a cap of 16 points.

- A. Data Required (Per Agency)
    1. MTF Money Received
    2. Miles of Roadway
    3. Square Feet of Bridge Deck Area
        a. Item 43B: Bridge Type
        b. Item 49: Bridge Length
        c. Item 52: Deck Width
        d. Item 32: Approach Roadway Width
    4. Population (County Populations Omit Cities Contained Therein)

- B. The factors below are computed using scaling factors which will from time to time require adjustment depending on fluctuations in MTF. The factors are based on current MTF disbursements are shown below:

    1. Factor 1: MTF per Mile of Roadway

        For each agency, compute MTF received / Miles of Roadway. The current scaling factor is 27,973.

        Agency Factor 1 = 27973 / (Agency MTF/Mile)
            (maximum of 5.00 points)

    2. Factor 2: MTF per Square Meter of Deck Area

        For each agency, sum the deck area. For bridges, use Item 49 X Item 52. For culverts, use Item 49 X Item 32. The current scaling factor is 2000.

        Agency Factor 2 = 2000 / (MTF / Deck Area in square meters)
            (maximum of 6.00 points)

    3. Factor 3: MTF per Person

        For each agency, compute MTF per person. The current scaling factor is 500.

        Agency Factor 3 = 500 / (Agency MTF per Person)
            (maximum of 5.00 points)

- C. Agency Financial Capability Points:

    (Factor 1 + Factor 2 + Factor 3) ≤ 16 points