

Asset Management Score WorkGroup



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Previous AM Score

1. the BRIDGE measure:

f (Bridge Closed, Load Ratings, Vert. Clearance, Ratings)

2. the PAVEMENT measure:

Scaled($10 / (\text{Year}_{\text{NT}} - 2016 + 1) \times \text{Cost}_{\text{TPM}} \times \text{Length}$)

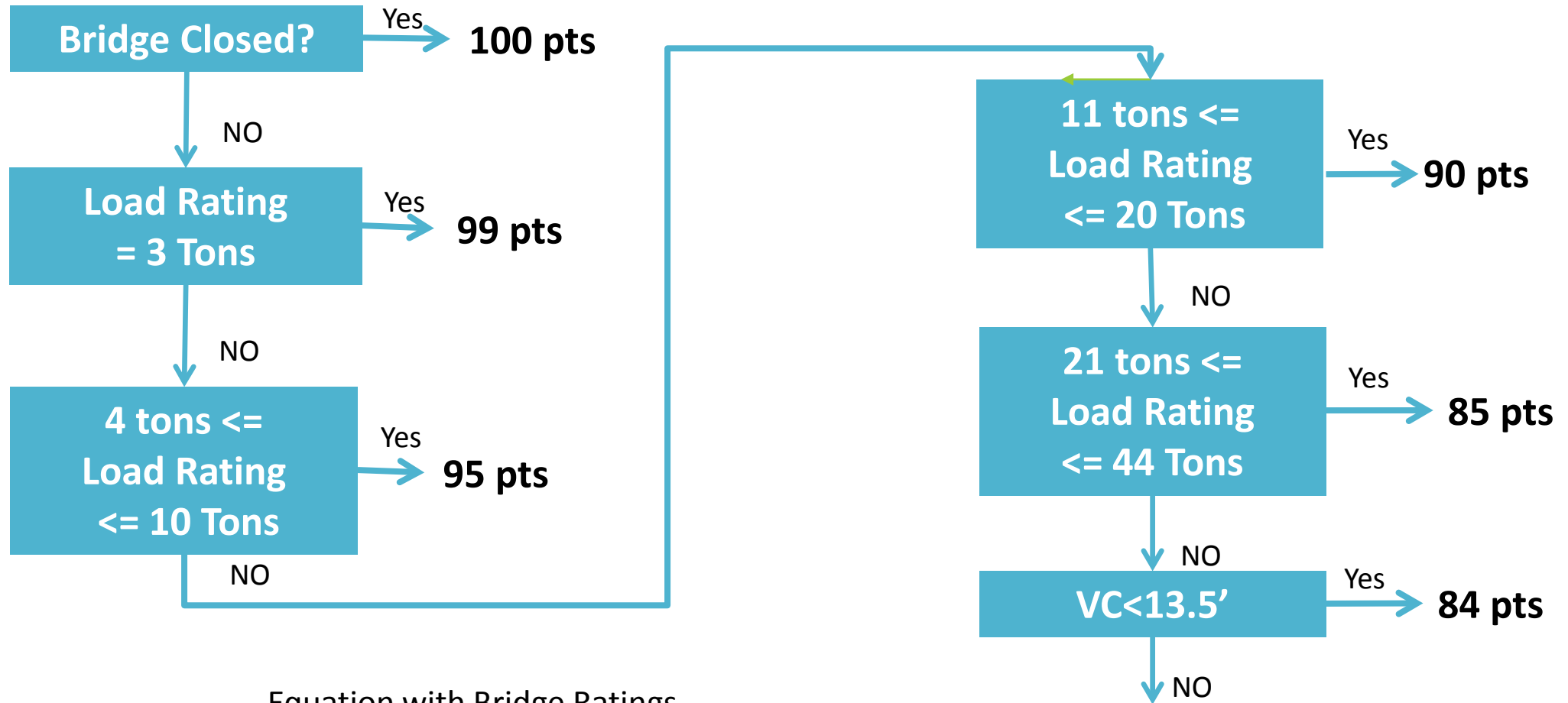
3. the BRIDGE + PAVEMENT measure:

Max(Bridge, Pavement)



Asset Management Score

Bridge Measure



Equation with Bridge Ratings

$$3 * [(9 - RD) + (18 - 2 * RSB) + (18 - 2 * RSP)] - 3 + 27 / \text{MIN}(RD, RSB, RSP)$$



Asset Management: Bridges

Items considered in Bridge review

- Linking improvement type to bridge work
- Include Scour Critical (NBI item 113) in score formula
- Include Sufficiency Rating in score formula
- Map21 Good/Fair/Poor (Replacing structurally deficient (SD))
- Detour length for bridge closure (User Cost+)
- Other BrM measures

Asset Management: Bridges

BRIDGE_ID	Posting	Vertical	Deck	Super	Sub		Old score	Sufficiency	if VC<=13.5 OR SR<=50, then 84 pts
031B00002N	58	100	6	4	6	✓	61	19.7	84
022B00033N	81	100	5	4	5	✓	70	25.6	84
033B00017N	87	100	7	6	4	✓	58	41	84
030B00096N	78	100	7	6	4	✓	58	42.8	84
023B00066N	49	100	4	4	5	✓	73	43.8	84
009B00002N	85	100	6	6	4	✓	61	46.8	84
033B00038N	45	100	6	4	6	✓	61	47.6	84
034B00001N	54	100	6	7	4	✓	55	48.1	84
022B00070N	67	100	5	5	4	✓	70	48.3	84
008C00001N	51	100	5	5	5	✓	62	48.5	84
009B00041N	77	100	6	4	5	✓	67	49.3	84
021B00009N	77	100	5	4	4	✓	76	49.9	84

Asset Management: Bridges

Final Recommendation:

- No change to previous bridge formula
- Remain function of Bridge Closed, Load Ratings, Vert. Clearance, Ratings

- Any bridge passing flow chart captured with this formula:

$$3 * [(9 - RD) + (18 - 2 * RSB) + (18 - 2 * RSP)] - 3 + 27 / \text{MIN}(RD, RSB, RSP)$$

- Extensive review indicates current method captures bridge asset reliably

Asset Management: Pavement

- Formula: $10 / (\text{Year}_{\text{NT}} - 2016 + 1) \times \text{Cost}_{\text{TPM}} \times \text{Length}$
- Captures pavement deterioration in Years
- Missing condition component
- Cost is a large factor in score
- Missing Traffic / Truck component

Asset Management: Pavement

Pavement Distress Index (PDI)

- Developed by UofL using Analytical Hierarchy Process
- Composed of AADT, Pavement Distresses, International Roughness Index (IRI)

Fatigue Cracking

Raveling

Other Cracking

Out of Section

Appearance

Joint Separation

Asset Management: Pavement

New Pavement Formula

- Include PDI with previous formula
- Use 0.688 as top value for PDI (Threshold for Poor)
- Transform PDI to same scale as Treatment Year
- Give equal weighting to PDI and Treatment Year

Asset Management: Pavement

Route	Begin	End	TrYear	KY_PDI	ScaleScore	NewScaleScore	OldRank	NewRank	COST
110-US-0068 -000	0	10.359	2016	0.462	99.9	99.9	1	1	\$5,500,000
010-US-0023 -000	2.921	10.678	2016	0.577	99.8	99.8	2	2	\$3,500,000
036-KY-0114 -000	0	4.16	2016	0.687	99.4	99.7	6	3	\$2,504,841
048-US-0421 -000	7.366	10.752	2016	0.692	99.3	99.6	7	4	\$2,336,185
010-US-0023 -000	10.667	11.756	2017	0.725	99.1	99.5	9	5	\$2,210,000
011-US-0127B -000	0	5.27	2015	0.706	98.9	99.4	11	6	\$2,150,000
045-US-0023 -000	17.52	23.002	2017	0.560	99.6	99.3	4	7	\$2,750,000
022-KY-0009 -000	6.98	14.985	2017	0.713	98.5	99.1	15	8	\$2,050,000
100-US-0027 -000	0	6.776	2017	0.578	99.5	99.2	5	9	\$2,530,275
048-US-0119 -000	0	5.98	2015	0.709	98.4	99	16	10	\$1,964,333
034-US-0027 -000	10.676	15.767	2015	0.493	99.7	98.9	3	11	\$2,900,000
034-KY-1974 -000	7.5	7.751	2017	0.590	99.2	98.8	8	12	\$2,243,000

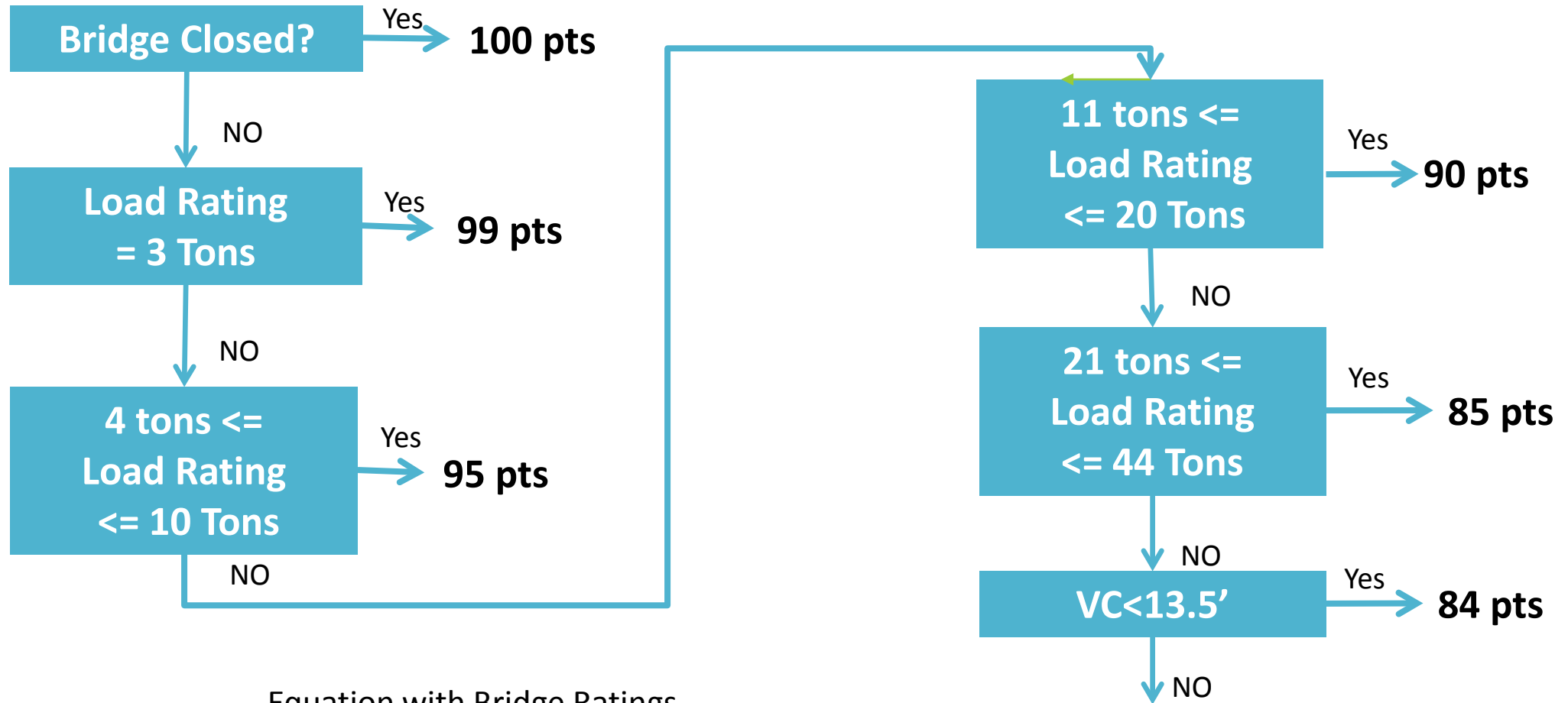
Asset Management: Pavement

New Pavement Formula

- PDIweight – $(0.688 - \text{PDI}) / 0.688$
- PDIvalue – $1 / \text{PDIweight}$ (Capped at 10)
- YEARvalue – $10 / (\text{Year}_{\text{NT}} - \text{Year}_{\text{SYP}} + 1)$
- Score – $\text{Scaled}((\text{PDIvalue} + \text{YEARvalue}) * \text{Cost}_{\text{TPM}} * \text{Length})$

Asset Management Score

Bridge Measure



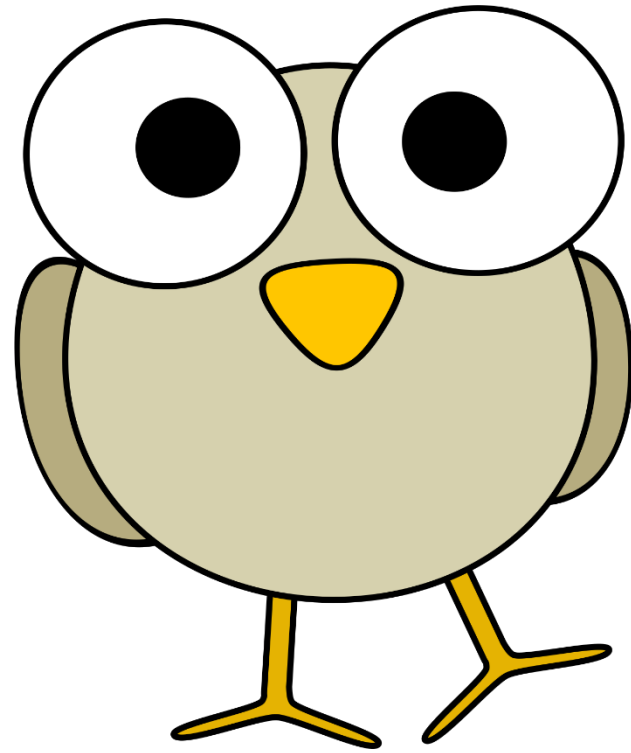
Equation with Bridge Ratings

$$3 * [(9 - RD) + (18 - 2 * RSB) + (18 - 2 * RSP)] - 3 + 27 / \text{MIN}(RD, RSB, RSP)$$

Asset Management: Bridge + Pavement

- Asset Management Measure (AMM) = $\text{Max}(\text{Bridge}, \text{Pavement})$
- Concerns that both assets are not addressed in all projects
- More data needed, possibly addressed outside of AM

Questions?



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