

Load Posting Decisions

A load rating is only half of the job. When a bridge cannot safely carry the vehicles that State law allows on the road, the owner has to restrict it, and the restriction has to be computed, signed, enforced, documented and reported. This course walks through the load posting decision from start to finish: the federal requirements in 23 CFR 650.313, the way the AASHTO Manual for Bridge Evaluation (MBE) converts legal-load rating factors into posting weights (including the reliability-based Equation 6A.8.3-1 used with LRFR), the closure thresholds, how single-unit, combination and emergency-vehicle postings are combined, the weight limit signs of MUTCD Section 2B.64, and how posting status and posting values are coded under the Specifications for the National Bridge Inventory (SNBI). Worked examples are taken from the South Dakota DOT Load Rating Manual and the SNBI coding guide so that every number can be traced to a published source.

Learning objectives

- Explain when posting is required
- Convert rating factors to posting values
- Describe NBIS timing for posting
- Communicate postings and closures

What a load posting is, and what the NBIS requires

The National Bridge Inspection Standards define the two terms this course depends on. A **load rating** is "the analysis to determine the safe vehicular live load carrying capacity of a bridge using bridge plans and supplemented by measurements and other information gathered from an inspection." A **load posting** is "regulatory signs installed in accordance with the Manual on Uniform Traffic Control Devices and State or local law which represent the maximum vehicular live load which the bridge may safely carry." Both definitions are in 23 CFR 650.305 and are repeated in the definitions section of the SNBI.

Notice what the posting definition requires. A posting is not a number in a rating report or a line on a summary sheet. It is a *regulatory sign*, installed to the MUTCD and backed by State or local law. Until the sign is in the field and legally enforceable, the bridge is not posted, no matter what the calculations say. The SNBI makes this distinction explicit with a separate status code for bridges where posting is recommended but not yet in place.

The three NBIS paragraphs

Three paragraphs of 23 CFR 650.313 govern posting.

- **650.313(k), load rating.** Each bridge must be rated for its safe load carrying capacity in accordance with MBE Sections 6 and 8. A new bridge must be rated within 3 months of the initial inspection, and an existing bridge must be re-rated within 3 months of an inspection that finds changes warranting a new rating.
- **650.313(l), load posting.** When a load rating shows that posting is required, the bridge must be posted as soon as possible, but not later than 30 days after the rating is completed. The same paragraph requires missing or damaged posting signs to be corrected within 30 days of the inspection that found the deficiency.
- **650.313(m), closure.** A bridge must be closed when the gross live load capacity is less than 3 tons.

The 30-day clock is the requirement that most often trips agencies up. It runs from the completed rating, not from the date the sign order is approved or the date a maintenance crew is available. Owners who need an ordinance, a council vote or a

commission action to make a posting legally enforceable must build that process so it can finish inside 30 days.

Who decides

The engineer computes capacity, but the posting decision belongs to the owner. The South Dakota DOT Load Rating Manual puts it plainly: "The decision to load post a bridge will be made by the bridge owner based on an agency's load-posting practice." The MBE supplies the method for converting a rating factor into a posting value, and FHWA policy supplies the deadlines. Agency practice fills in the rest: which vehicle families appear on the sign, how values are rounded, and when an alternative restriction (a lane restriction or speed limit) is used instead of or in addition to a weight limit.

When posting is required: the legal-load rating factor

Posting decisions are based on **legal load ratings**, not design load ratings. A bridge can have an HL-93 inventory rating factor below 1.0 and still carry every legal truck safely, and a bridge with a comfortable design rating can still fall short for a short, heavy specialized hauling vehicle. The MBE organizes LRFR in tiers: the design load rating screens the bridge, and when it fails, the legal load rating decides whether posting is needed. Under LFR and ASR, posting is evaluated with the operating-level rating for the legal vehicles.

The SNBI describes the reported legal load rating factor this way: for LRFR it is the "Legal Load Rating," a second-level rating that provides a single safe load capacity for a given AASHTO legal load; for allowable stress and load factor rating it is "the operating load rating factor calculated for a given AASHTO legal load as part of a posting analysis."

The trigger

For each legal vehicle the engineer computes a rating factor RF. If every legal vehicle has RF of at least 1.0, no posting is required for routine legal traffic. If any legal vehicle has RF below 1.0, posting is required for that vehicle's family. The rest of this course is about what happens below 1.0.

Which vehicles

The legal loads were covered in detail in BR-L02. In summary, a complete posting analysis normally considers:

- the AASHTO routine commercial vehicles Type 3, Type 3S2 and Type 3-3 (or State legal vehicles that envelope them);
- the Specialized Hauling Vehicles SU4, SU5, SU6 and SU7 (gross 27, 31, 34.75 and 38.75 tons), screened by the Notional Rating Load where an agency uses it;
- the FAST Act emergency vehicles EV2 and EV3, for bridges within reasonable access of the Interstate.

The SNBI's Item B.EP.01 (Legal Load Configuration) lists exactly these: 3, 3S2, 3-3, SU4, SU5, SU6, SU7, NRL, EV2 and EV3. A State that uses its own legal vehicles (South Dakota rates an SD Type 3, SD Type 3S2 and SD Type 3-2, for example) still has to cover the federal configurations, either directly or by showing its own vehicles envelope them.

Limit states

Strength is the limit state that drives posting. The SDDOT manual states that strength "is the primary limit state utilized by SDDOT when LRFR is used to determine posting needs," and that in LRFR "Service and Fatigue limit state checks are optional in the sense that a posting or permit decision does not have to be dictated by the result." Those checks still give the engineer information, and an owner may choose to act on a service-level finding, but the MBE does not make it mandatory to post from them.

The LRFR posting equation, MBE 6A.8.3

Under older practice, a posting weight was usually found by multiplying the rating factor by the weight of the rating vehicle: a 25-ton truck with $RF = 0.80$ gave a 20-ton posting. LRFR replaced that proportional rule for legal-load postings with a reliability-based relationship.

The equation

When the legal load rating factor for a vehicle is between 0.3 and 1.0, MBE Equation 6A.8.3-1 gives the safe posting load:

$$\text{Posting Load} = (W / 0.7) \times [(RF) - 0.3]$$

where RF is the legal load rating factor and W is the weight of the rating vehicle in tons. The SDDOT Load Rating Manual reproduces the equation with exactly these definitions, and it appears in the FHWA LRFR training material and in university course notes on LRFR.

Why it is not proportional

The SDDOT manual summarizes the reason: "in a reliability-based evaluation the relationship between posting values and rating factors is not proportional. For a posted bridge there is a greater probability of vehicles exceeding the posted limit compared to numbers exceeding the legal limit on an un-posted bridge." Drivers comply with a 40-ton legal limit more consistently than with a 15-ton sign on a rural bridge, so the load distribution on a posted bridge has a heavier tail relative to the limit. FHWA LRFR seminar material explains that the posting curve was developed to keep the target reliability of the legal-load rating, and that it builds in a cushion for overweight vehicles on posted bridges. The MBE also presents the same relationship as a posting graph that gives posting weights for different vehicle types as a function of RF .

Behavior of the equation

Two checks confirm the equation behaves sensibly:

- At $RF = 1.0$, the posting load is $(W/0.7)(0.7) = W$. The equation joins the "no posting" case smoothly.
- At $RF = 0.3$, the posting load is zero. Below that, the equation has no meaning.

In between, the equation gives lower values than the proportional rule. For a 27-ton SU4 at $RF = 0.916$ the equation gives $27/0.7 \times 0.616 = 23.8$ tons, compared with $0.916 \times 27 = 24.7$ tons by proportion. The gap grows as RF drops: at $RF = 0.5$ the equation gives 7.7 tons while the proportional rule gives 13.5 tons.

The lower bound

The MBE does not apply the equation below $RF = 0.3$. When RF for a vehicle type is below 0.3, the recommendation is to not allow that vehicle type on the bridge; other vehicle types with RF above 0.3 may continue to use it. If RF is below 0.3 for all legal vehicles, the bridge should be closed. Independently of the equation, 23 CFR 650.313(m) requires closure when the gross live load capacity is less than 3 tons.

Combining vehicles into a sign

A posting analysis produces a posting load for each legal vehicle. A sign has room for one to three numbers. The engineer's job is to combine the vehicle results into values a driver can read and an officer can enforce.

Group by vehicle family

Most agencies group vehicles the way the MUTCD symbols do: single-unit trucks, single-trailer combinations and multi-trailer combinations. The posting for a family is the lowest posting load of any vehicle in that family. The MUTCD supports this: if an R12-5 sign shows only one single-unit symbol, "the weight limit associated with that single-unit vehicle symbol shall apply to all single-unit vehicles, regardless of number of axles."

Round down

Posting values are rounded down to a whole ton. The SNBI requires Item B.EP.04 (Posting Value) to be reported "rounded down to the nearest U.S. ton," and the SDDOT manual tells its engineers to "round all other calculated posting values down." In the SDDOT LRFR example the SU4 through SU7 posting loads are 23.8, 24.7, 25.1 and 28.0 tons, so single units are posted at 23 tons.

Post every family the sign covers

When one family needs posting and another does not, the sign still needs a value for each symbol it shows. SDDOT offers two options in its LFR example: show the lowest capacity of the family that does not need posting, or use a "LEGAL LOADS" legend where every vehicle in that family rates above 1.0.

Emergency vehicles go on their own sign or plaque

EV posting limits (single axle, tandem and gross) are developed with the FHWA flowchart covered in BR-L02 and shown on the R12-7 sign or the R12-7aP plaque, which is mounted below the primary weight limit sign when both are in the same assembly.

Worked example 1: an LRFR posting from the SDDOT manual

Appendix A of the South Dakota DOT Load Rating Manual works one bridge through both the traditional capacity approach and the MBE posting equation. It is a useful example because every input is published, and because it shows how much the choice of method changes the sign.

The ratings

The bridge was rated with LRFR at the legal load level. South Dakota rates its own legal vehicles alongside the AASHTO single-unit vehicles. The relevant results are:

Vehicle	Family	W (tons)	RF	RF × W (tons)
SD Type 3S2	Combination	40	1.079	43.14
SD Type 3-2	Combination	46	0.981	45.12
SD Type 3	Single unit	24	1.085	26.03
SU4	Single unit	27	0.916	24.74
SU5	Single unit	31	0.858	26.59
SU6	Single unit	34.75	0.806	28.01
SU7	Single unit	38.75	0.806	31.23
EV2	Emergency	28.75	0.903	25.97

EV3	Emergency	43	0.595	25.58
-----	-----------	----	-------	-------

The bridge, built in 1956, is 1.8 miles from Interstate access. In the first pass the manual notes that the owner prefers not to use MBE Eq. 6A.8.3-1; the second pass shows what the equation would give.

Approach 1: capacity in tons

The first approach multiplies RF by W for each vehicle and posts each family at its lowest capacity. Single units: SU4 through SU7 rate below 1.0, so single units must be posted, and SDDOT posts them "at 24 tons, the lowest capacity of any of the single unit vehicles" (the SU4 value of 24.74 tons, rounded down). Combinations: the SD Type 3-2 rates below 1.0, so combinations must be posted, at 43 tons, the lowest combination capacity in tons. That value comes from the SD Type 3S2 (43.14 tons), even though the 3S2 itself rates above 1.0. Emergency vehicles: both EVs rate below 1.0, but posting for EVs is not required because this bridge is not within a mile of Interstate access, which is South Dakota's adopted criterion for reasonable access.

Approach 2: MBE Equation 6A.8.3-1

The manual then applies the MBE equation to every vehicle with RF between 0.3 and 1.0:

- SD Type 3-2: $46/0.7 \times (0.981 - 0.3) = 44.8$ tons
- SU4: $27/0.7 \times (0.916 - 0.3) = 23.8$ tons
- SU5: $31/0.7 \times (0.858 - 0.3) = 24.7$ tons
- SU6: $34.75/0.7 \times (0.806 - 0.3) = 25.1$ tons
- SU7: $38.75/0.7 \times (0.806 - 0.3) = 28.0$ tons

The single-unit posting loads range from 23.8 to 28.0 tons, so single units are posted at 23 tons. Combinations are still posted at 43 tons: the manual notes that "the combination posting is still controlled by the SD Type 3-2 capacity," because the equation's 44.8 tons for the 3-2 is higher than the SD Type 3S2 capacity of 43.14 tons, which still sets the lowest combination value. The final sign reads singles 23 T, combinations 43 T.

What the example teaches

- **The equation lowered the single-unit posting by one ton.** That is typical when RF is in the 0.8 to 0.9 range. The difference is small near RF = 1.0 and grows quickly as RF drops.
- **The controlling vehicle can change.** Under the capacity approach the SU4 controlled the single units at 24.74 tons. Under the equation the SU4 still controlled, but at 23.8 tons. With different rating factors, a heavier SHV can control under one approach and a lighter one under the other, because the equation penalizes low RF more than the proportional rule does.
- **A vehicle with RF above 1.0 does not need the equation.** The SD Type 3 at RF = 1.085 is not entered into Eq. 6A.8.3-1. It can carry its full legal weight.
- **Agency practice decides which values reach the sign.** The MBE gives the method; SDDOT's rules on family grouping, rounding and EV applicability turn the method into a sign.

Check your understanding

Suppose a later inspection finds new section loss and the SU7 rating factor drops to 0.55 while the others stay the same. The SU7 posting load becomes $38.75/0.7 \times (0.55 - 0.3) = 13.8$ tons. The single-unit posting drops from 23 tons to 13 tons, controlled now by the SU7. Under the old proportional approach it would have been $0.55 \times 38.75 = 21.3$ tons. That gap of

eight tons is exactly what the reliability basis of the equation is designed to capture: at low rating factors, a posted bridge is far more sensitive to the drivers who ignore the sign.

Worked example 2: an LFR posting with emergency vehicles

Appendix B of the SDDOT manual works a second bridge rated by Load Factor Rating. The equation in MBE 6A.8.3 is part of the LRFR provisions in Section 6, Part A. For LFR, SDDOT posts at the operating capacity in tons, $RF \times W$, using the lowest value in each family.

The ratings

Vehicle	Family	W (tons)	Operating RF	Capacity (tons)
SD Type 3S2	Combination	40	1.207	48.3
SD Type 3-2	Combination	46	1.194	54.9
SD Type 3	Single unit	24	1.227	29.5
SU4	Single unit	27	1.096	29.6
SU5	Single unit	31	1.003	31.1
SU6	Single unit	34.75	0.919	31.9
SU7	Single unit	38.75	0.892	34.6
EV2	Emergency	28.75	1.152	33.1
EV3	Emergency	43	0.724	31.1

Single units

The SU6 and SU7 rate below 1.0, so single units must be posted. The lowest single-unit capacity is the SD Type 3 at 29.5 tons, so single units are posted at 29 tons. The manual draws attention to a point that surprises many engineers: "the SD Type 3 and SU4 vehicles determine the posting load even though the $RF > 1$ for these vehicles." Once a family must be posted, the sign must protect against every vehicle in that family. A 24-ton Type 3 with RF 1.227 can carry 29.5 tons; if the sign said 31 tons, a three-axle truck loaded to 31 tons would be legal under the sign but over the bridge's capacity for that configuration.

Combinations

Both combination vehicles rate above 1.0, so combinations do not need posting. Because the sign shows a combination symbol, it still needs a value. SDDOT allows either the lowest combination capacity in tons (48 tons) or a "LEGAL LOADS" legend.

Emergency vehicles

This bridge is 0.4 miles from Interstate access, inside South Dakota's one-mile criterion, and EV3 rates below 1.0, so EV posting is required. Following the FHWA flowchart:

- $RF3 = 0.724 < 1.0$, so posting is needed. $RF2 = 1.152$ is not below 1.0.
- Single axle: $W2 = 33.5/2 = 17$ tons (the EV2 rear axle is 33.5 kips).
- Tandem: $W3 = RF3 \times 31 \text{ tons} = 0.724 \times 31 = 22$ tons.
- Gross: $GVW = RF3 \times 43 \text{ tons} = 0.724 \times 43 = 31$ tons.

SDDOT explains that it posts the single axle at 17 tons when EV2 rates above 1.0 "only because posting example 2" in the FHWA EV Questions and Answers shows this, and directs that all other calculated values be rounded down. The EV sign (EMERGENCY VEHICLES, SINGLE AXLE 17 T, TANDEM 22 T, GROSS 31 T) is mounted below the single-unit/combination sign.

LFR versus LRFR posting

Compare the two examples. In the LFR case, posting values come straight from $RF \times W$. In the LRFR case, the MBE equation reduces them further for RF below 1.0. Agencies with a mix of LFR and LRFR ratings in their inventory should expect LRFR to produce somewhat lower postings for the same physical condition when rating factors are well below 1.0, and should document which method produced each posting. SNBI Item B.LR.04 (Load Rating Method) records whether a rating was LFR, ASR, LRFR, load testing, assigned rating or engineering judgment, and the SNBI notes that for ASR and LFR the reported legal load rating factor is the operating rating factor for that legal load.

Impact, multiple presence and other legal-load inputs that move the posting

Because the posting is derived from the legal-load rating factor, every input to that rating factor moves the sign. Several inputs are specific to legal-load rating and are worth reviewing before a posting is finalized.

Live load factor

In LRFR, the legal-load live load factor depends on the truck traffic at the site; BR-L02 covers the table. A higher ADTT gives a higher live load factor and a lower RF. If an ADTT estimate is out of date, the posting may be wrong in either direction. For EV ratings, FHWA set the live load factor at 1.3 with the EV in one lane, as covered in BR-L02.

Dynamic load allowance

For legal-load rating the MBE allows the dynamic load allowance to be reduced from the design value based on the riding surface. FHWA LRFR seminar materials present the options as 10 percent for a smooth riding surface, 20 percent for minor surface deviations or depressions, and 33 percent for major deviations. A deck with potholes, a bump at the end of the bridge or a failed joint can move the impact from 10 percent to 33 percent, and the posting with it. This is a direct link between the inspection and the posting: the inspector's condition notes on the approach and joints are rating inputs, not just maintenance items.

Condition and system factors

In LRFR the member resistance is multiplied by the condition factor ϕ_c and the system factor ϕ_s . A drop in the superstructure condition rating can lower ϕ_c and therefore RF. BR-L04 covers condition factors and section loss in detail. The practical point for posting is that a rating update triggered by a condition change under 650.313(k) can produce a posting change, and the 30-day clock in 650.313(l) then applies to the new posting.

Analysis refinement

The SDDOT manual notes that refined methods of analysis "are justified where needed to avoid load posting or to ease restrictions." Refinement can include more accurate distribution factors, consideration of actual material strengths, or a field load test (BR-L06). An owner considering a posting that will detour school buses, farm equipment or emergency apparatus should weigh the cost of refinement against the cost of the restriction. The posting must still go in on time; refinement can justify raising it later.

Concrete bridges without plans

Some agencies allow a concrete bridge with unknown details to remain unposted if it has carried normal traffic for an appreciable period and shows no distress. The SDDOT manual references this in its LRFR posting section. This is an assigned-rating or engineering-judgment approach, and it must be documented as such (SNBI Item B.LR.04 has separate codes for assigned rating and for field evaluation and documented engineering judgment).

Weight limit signs: MUTCD Section 2B.64

A posting exists only when the sign is in the field, so the engineer who recommends a posting must know what the signs can and cannot say. In the 11th Edition of the MUTCD (December 2023), weight limit signs are covered in Section 2B.64, "Weight Limit Signs (R12-1 through R12-7)." Earlier editions used different section numbers, so check which edition your State has adopted and whether it has a State supplement.

The basic standard

Paragraph 01 is a Standard: weight limit signs "shall be used to indicate a section of highway or structure that has a vehicle weight restriction." Paragraph 02 is Guidance that the units on any weight limit sign "should be consistent within a State or region with respect to pounds or tons." Mixing pounds and tons on neighboring bridges invites confusion and enforcement problems.

The sign family

Sign	Legend or content	Use
R12-1	WEIGHT LIMIT XX TONS	Gross weight limit for all vehicles
R12-2	AXLE WEIGHT LIMIT XX TONS (or XX LBS)	Restriction applies to axle weight rather than gross load
R12-4	WEIGHT LIMIT XX TONS PER AXLE, XX TONS GROSS	Both axle and gross limits on one sign
R12-5	WEIGHT LIMIT with up to three truck symbols and XX T values; optional GROSS WT line	Separate limits by vehicle configuration
R12-6	Weight limit for specialized hauling vehicles	SHV restrictions
R12-7	EMERGENCY VEHICLE WEIGHT LIMIT, SINGLE AXLE XX TONS, TANDEM XX TONS, GROSS XX TONS	Emergency vehicle restrictions
R12-7aP	Emergency Vehicle Weight Limit plaque	Mounted below the primary weight limit sign when in the same assembly

Table 2B-1 in the 11th Edition lists conventional-road sizes such as 24 × 30 inches for R12-1 and R12-2, 24 × 36 inches for R12-5, 30 × 42 inches for R12-6 on a single-lane conventional road, and 30 × 36 inches for R12-7, with larger sizes for expressways and freeways. Agencies should use the table rather than memorized sizes, because sizes vary by road type.

Rules for the R12-5 symbol sign

The R12-5 is the sign most often used for bridge postings that differ by truck type. Section 2B.64 sets several Standards for it:

- The symbols "shall apply to all trucks of that configuration (single-unit, single-trailer or multi-trailer) regardless of the shape of the vehicle." Modified symbols or other vehicle shapes "shall not be used."

- If the sign shows only one single-unit symbol, that limit "shall apply to all single-unit vehicles, regardless of number of axles."
- The single-trailer limit applies to all single-trailer vehicles "regardless of number of axles or vehicle shape."
- The multi-trailer limit applies to all vehicles with two or more trailers.

These rules matter for SHVs. Because the single-unit symbol covers every single-unit truck, the single-unit value on an R12-5 has to be low enough for the worst single-unit vehicle, including SU4 through SU7. That is why, in the SNBI example for Bridge 15558X, the single-unit value of 15 tons is used for the Type 3 and all four SHVs, and the SNBI notes that "no separate sign is used to post for specialized hauling vehicles beyond the single unit configuration on the R12-5 sign."

The R12-6 SHV sign

Paragraph 06 explains that a specialized hauling vehicle "is a single unit truck with multiple closely-spaced axles," giving dump trucks, construction vehicles and solid waste trucks as examples, and noting they typically have 4 to 7 axles. Paragraph 07 allows the R12-6 sign to be used for SHV restrictions. An agency can use it when it wants to keep a higher limit for ordinary two- and three-axle single units while restricting the SHVs, rather than lowering the single-unit value for all of them.

Some States use their own signs

States may adopt supplements. South Dakota, for example, discontinued the R12-5 silhouette sign in 2015 "because of difficulty in communicating the actual truck configuration and number of axles especially when considering specialized hauling vehicles," and replaced it with signs that show the maximum limit for single-unit and combination vehicles, defining a single-unit vehicle as one where the power unit and body "are permanently attached and can't be easily separated, regardless of number of tires, axles, etc." Always design the posting around the signs your State actually uses.

Location and advance signing

Two Standards in 2B.64 control placement. A weight limit sign "shall be located at the applicable section of highway or structure." And "an additional weight limit sign, with an advisory distance or directional legend, shall be located in advance of the applicable section of highway or structure so that prohibited vehicles can detour or turn around prior to the limit zone." A posting sign mounted only at the bridge end, with no advance sign at the last intersection or turnaround, does not meet the MUTCD and leaves a driver who has already committed with no lawful option. Paragraph 09 also allows the facility type, such as "BRIDGE," to be added to the legend to make clear what the limit applies to.

Emergency vehicle and SHV postings on the sign

BR-L02 explained how FHWA's November 2016 memorandum and its Questions and Answers require EV rating and posting for bridges within reasonable access to the Interstate. This section focuses on what reaches the sign.

The EV sign content

MUTCD 2B.64 paragraph 15 explains that emergency vehicles "can create higher load effects compared to non-emergency vehicles of similar weight." Paragraph 16 allows the R12-7 sign with the legend EMERGENCY VEHICLE WEIGHT LIMIT, SINGLE AXLE XX TONS, TANDEM XX TONS, and GROSS XX TONS. Paragraph 17 is a Standard: when the EV limit is in the same assembly as the primary weight limit sign, the R12-7aP plaque "shall be mounted below."

So a typical assembly at a bridge that needs both a truck posting and an EV posting has the truck weight limit sign on top and the EV plaque underneath. A bridge that needs only an EV posting (for example, all routine legal trucks and SHVs rate above

1.0 but EV3 does not) gets a standalone R12-7. SDDOT illustrates both uses: the standalone sign is used "when only emergency vehicles need to be posted," and the add-on plaque is placed below the other posting sign.

Three numbers, three checks

The FHWA EV flowchart produces a single-axle limit, a tandem limit and a gross limit. The sign shows all three. Before a sign order is released, check:

- that each value has been rounded down;
- that the single-axle value follows the flowchart branch for the EV2 result (when EV2 rates at least 1.0, FHWA's example posts the full EV2 rear axle, 33.5 kips ≈ 17 tons, as SDDOT notes);
- that the tandem and gross values come from the EV3 rating factor applied to the EV3 tandem and gross weights.

Reasonable access

Whether a bridge must be evaluated for EVs depends on whether it is within reasonable access of the Interstate. FHWA left the definition to States. South Dakota uses one mile; other States use different criteria. Record the criterion and the distance in the rating file so a reviewer can see why EV posting was or was not considered. In the SDDOT examples, the LRFR bridge at 1.8 miles needed no EV posting even though both EVs rated below 1.0, while the LFR bridge at 0.4 miles did.

SHVs

An agency can handle SHVs in one of two ways on the sign. It can lower the single-unit value so that it covers SU4 through SU7 along with the Type 3, which is what the SNBI example does. Or it can use the R12-6 sign so that ordinary single units keep a higher limit. The first is simpler and easier to enforce. The second keeps more of the network open to two- and three-axle trucks but needs officers and drivers to recognize SHVs. FHWA's SHV guidance (BR-L02) leaves this choice to the States.

Reporting posting status under the SNBI

The Specifications for the National Bridge Inventory (SNBI, March 2022) replaced the old Coding Guide's single posting item with two sets of items: Load Posting Status (Subsection 5.2) and Load Evaluation and Posting (Subsection 5.3). Getting them right matters, because FHWA uses them to monitor compliance with 650.313(l) and (m).

Item B.PS.01, Load Posting Status

B.PS.01 is a two-character code. The first character says what kind of structure is in place, and the second says the status.

	New	Open	Needs action	Weight	Other	Needs reduction	Missing	Closed
Permanent	N	PO	PA	PP	PR	PD	PM	C
Temporary		TO	TA	TP	TR	TD	TM	C
Supported		SO	SA	SP	SR	SD	SM	C

The SNBI defines the terms:

- **Permanent (P):** permanent bridge in place with no temporary supports.

- **Temporary (T):** a temporary bridge carrying traffic while the permanent bridge is closed awaiting repair, rehabilitation or replacement.
- **Supported (S):** a bridge with temporary shoring, supports, repairs or supplemental members in place to keep it open pending active or imminent repair or replacement.
- **Needs Action (A):** open "with load posting recommended, but no posting signs in place, or a posting sign that is not legally enforceable."
- **Weight (P):** posted with a weight limit sign or signs.
- **Other (R):** a posting sign or other device that reduces loading "by reducing speed (to reduce impact), limiting the number of lanes or vehicles, or restricting commercial vehicles in general."
- **Needs Reduction (D):** posted, with a posting reduction recommended but not implemented.
- **Missing (M):** legally posted, but "one or more required signs are missing or illegible."
- **Closed (C):** closed to all traffic.

When both a weight restriction and another restriction exist, the SNBI says to use the weight code (PP, TP or SP).

Why the A, D and M codes matter

Three codes describe a bridge that is out of compliance or on its way to compliance: A (posting needed but not in place), D (lower posting needed but not in place) and M (signs missing). Each maps to a 30-day requirement in 650.313(l): post within 30 days of the rating, and correct missing or damaged signs within 30 days of the inspection that found them. A bridge that sits in an A, D or M status for longer than 30 days is a compliance finding waiting to happen.

Item B.PS.02, Posting Status Change Date

Each change in status is reported as a separate record with the date the bridge entered that status. For a bridge entering posted status, the SNBI commentary says it is preferable that the date "represent the date on which signs were properly installed at the bridge." If that is unknown, the date the posting became legally enforceable can be used; if neither is known, the date the posting was first documented.

The SNBI example

The SNBI works the history of Bridge 15558X. It was posted in March 2005. A February 14, 2016 rating and posting evaluation recommended a reduction (status D). The new posting was installed April 15, 2016 (status P). During an inspection on July 23, 2016, a sign was found missing (status M), and it was replaced September 5, 2016 (status P). Four records, each with its own date, tell the full story, and a reviewer can see that the reduction took about two months to implement and the missing sign about six weeks to replace. Both intervals are longer than 30 days, which is exactly the kind of gap the status history is designed to expose.

Reporting the evaluation: SNBI Items B.EP.01 to B.EP.04

Subsection 5.3 records the legal load evaluation that supports the posting. It has one record per legal load configuration evaluated.

B.EP.01, Legal Load Configuration

Codes: 3, 3S2, 3-3, SU4, SU5, SU6, SU7, NRL, EV2 and EV3. The commentary refers to the MBE for configurations and to the November 3, 2016 FHWA memorandum for emergency vehicles.

B.EP.02, Legal Load Rating Factor

The rating factor for that configuration, "truncated to the hundredth." The SNBI example: a calculated factor of 0.926 for the Type 3S2 is reported as 0.92, not 0.93. When temporary or supported conditions exist (as shown in B.PS.01), report the factor for the bridge including those conditions.

B.EP.03, Posting Type

Reported only for configurations with RF below 1.0, and not reported if no posting sign is used for that configuration. Codes: G gross load, A single axle load, D tandem axle load, T truck load (truck silhouettes), C no commercial vehicles, S speed reduction, L number of lanes restricted, V number of vehicles restricted, and X other.

B.EP.04, Posting Value

The weight limit shown on the sign for that configuration, "rounded down to the nearest U.S. ton." Not reported if no sign is used, or if the posting type is C, S, L or V (restrictions with no weight value). The SNBI example sign with silhouettes at 8, 12 and 16 tons is reported as 8 for Type 3, 12 for Type 3S2 and 16 for Type 3-3.

The 15558X evaluation

In the SNBI example, the February 2016 evaluation gave rating factors below 1.0 for all seven configurations (Type 3, 3S2, 3-3 and SU4 to SU7). The bridge was posted with an R12-5 sign, and the coding reports posting type T for each configuration, with posting values of 15 tons for the Type 3 and for each of SU4 to SU7, 25 tons for the 3S2 and 30 tons for the 3-3. The four SHVs share the single-unit value because the R12-5 single-unit symbol applies to every single-unit truck. EV2 and EV3 were not evaluated, so nothing is reported for them. (The SNBI's narrative table and coding table show slightly different rating factors; when you use the example for training, focus on the coding logic rather than the numbers.)

Common coding errors

- Reporting B.EP.03 and B.EP.04 for a configuration that rates at or above 1.0.
- Rounding B.EP.02 instead of truncating it.
- Reporting the calculated posting load (for example 23.8) in B.EP.04 instead of the value on the sign (23).
- Reporting a posting value when the posting type is a lane restriction or a no-commercial-vehicle restriction.
- Leaving B.PS.01 at PP after an inspection finds a sign missing, instead of changing it to PM with a new B.PS.02 date.
- Coding PP when the rating recommends a posting but the ordinance making it enforceable has not been adopted. That is PA until the sign is legally enforceable.

Alternatives and supplements to a weight limit

A weight limit is not the only tool. The SNBI's "Other (R)" status and posting types C, S, L and V exist because owners sometimes reduce load effects in other ways. Each has strengths and limits.

Lane restriction

If a rating is controlled by two trucks side by side, restricting the bridge to one lane (posting type L) can raise the rating enough to avoid a weight posting. The rating must then be recomputed with the restricted lane configuration, and the restriction must be physically enforced with striping, barriers or channelization. A sign alone asking trucks to use the center of a two-lane bridge is weak protection because it depends on every driver complying.

Speed restriction

Reducing speed is meant to reduce dynamic effects (posting type S). It is most credible where the riding surface is poor and the rating used a high impact allowance. The rating file should show which impact value was used with and without the restriction. As noted earlier, FHWA LRFR training material relates the legal-load dynamic allowance to the condition of the riding surface, so repairing the approach slab or joint can sometimes do more than a speed sign.

Number of vehicles

A "one truck at a time" restriction (posting type V) can help longer spans where the rating is governed by more than one truck on the span. It is hard to enforce and depends on sight distance at both ends.

No commercial vehicles

Restricting commercial vehicles (posting type C) is a blunt instrument, often used for very low capacities where a weight number would be meaningless to drivers. It must still be legally enforceable and must be considered against the 3-ton closure rule in 650.313(m) and the RF below 0.3 guidance in the MBE.

Temporary supports

Shoring or supplemental members can keep a bridge open while repairs are designed. The SNBI codes such a bridge as "Supported," and the commentary to B.PS.01 requires the geometry, condition and load rating items to describe the supported condition. The supports must be rated as part of the structure, and inspected at an interval suitable for temporary works.

Choosing among them

Weigh the effect on traffic, emergency response, school buses, agriculture and freight against the cost and speed of each option. Document the choice. And remember that the 30-day clock in 650.313(l) applies regardless of which option is chosen: if a weight posting is needed now and a lane restriction will take three months to construct, post the weight now and revise later.

From recommendation to enforceable sign: the workflow

Most posting failures are process failures, not calculation errors. A workable process has the following steps, each with an owner and a date.

1. **Rating completed.** The load rating engineer completes and seals the rating, including the legal-load evaluation and recommended posting values. This date starts the 30-day clock in 650.313(l).
2. **Posting recommendation issued.** The rating summary states the recommended values for each vehicle family, the sign type, and whether EV posting applies. SDDOT, for example, adds posting recommendations to its Load Rating Summary sheet.
3. **Legal authority.** The owner takes whatever action State or local law requires to make the posting enforceable. Until then the bridge is "Needs Action" in SNBI terms.
4. **Sign fabrication and installation.** Signs are made to MUTCD 2B.64 (or the State supplement), installed at the structure and in advance, with legends consistent at both ends.
5. **Verification.** Someone confirms the signs are in place and match the recommendation, with photographs and a count. B.PS.01 and B.PS.02 are updated.

6. **Notification.** Many agencies notify enforcement, emergency services, school transportation and permit offices. Permit routing systems must be updated so that permits are not issued over a posted bridge without analysis.
7. **Ongoing inspection.** Each inspection verifies the signs. SDDOT's manual states that verification of the posting "will be confirmed at each bridge inspection," that "all posting signs must display the same information," and that the number of signs and a photo of a typical sign will be documented at each inspection.

Temporary measures

Where a permanent sign cannot be fabricated quickly, many agencies install temporary signs or barricades to meet the 30-day requirement. Check that the temporary installation is legally enforceable in your State; a temporary sign that is not enforceable is still "Needs Action."

Critical findings

An inspection may find damage severe enough that the bridge must be restricted or closed immediately, long before a formal re-rating is done. The NBIS critical finding procedures (BR-S02) cover that case. Once the immediate action is taken, the formal re-rating and posting process above still has to be completed.

Common mistakes and a posting checklist

The errors below appear repeatedly in posting reviews. Each is avoidable with a checklist.

Calculation errors

- **Using the proportional rule with LRFR without saying so.** $RF \times W$ gives higher posting values than Eq. 6A.8.3-1 when RF is below 1.0. If an owner's policy is to use $RF \times W$ with LRFR (as the SDDOT example shows an owner can prefer), the file should state that policy.
- **Applying the equation outside its range.** The equation is for $0.3 < RF < 1.0$. Above 1.0 no posting is needed for that vehicle; below 0.3 the vehicle type should not be allowed.
- **Posting only from the vehicles below 1.0.** Once a family must be posted, the sign must protect every vehicle in that family. In the SDDOT LFR example, the Type 3 and SU4 controlled even though both rated above 1.0.
- **Rounding up.** Posting values are rounded down.
- **Ignoring SHVs on an R12-5.** The single-unit symbol covers every single-unit truck, so its value must cover SU4 to SU7.
- **Using a stale impact or ADTT.** Check the riding surface and truck traffic used in the legal-load rating.

Process errors

- Treating the posting date as the date the recommendation was approved instead of the date signs were legally in place.
- Missing advance signs, so prohibited vehicles cannot detour.
- Different values on the two ends of the bridge.
- Not updating SNBI status when a sign is found missing.
- Not telling the permit office.

Checklist

1. Legal-load ratings complete for 3, 3S2, 3-3 (or State equivalents), SU4 to SU7 (or NRL screen), and EV2 and EV3 where reasonable access applies.

2. Rating method recorded (LRFR, LFR, ASR, load test, assigned rating, engineering judgment).
3. For each vehicle with RF below 1.0: posting load computed by the agency's adopted method, with Eq. 6A.8.3-1 for LRFR unless policy says otherwise.
4. Any vehicle with RF below 0.3 identified; closure considered if all legal vehicles are below 0.3 or gross capacity is below 3 tons.
5. Lowest value in each family taken, rounded down to a whole ton.
6. Sign type selected (R12-1, R12-2, R12-4, R12-5, R12-6, R12-7, R12-7aP or State equivalent), with advance signs.
7. Legal authority obtained; installation within 30 days of the rating.
8. Field verification with photographs and sign count.
9. SNBI B.PS.01, B.PS.02, and B.EP.01 to B.EP.04 updated.
10. Permit office, enforcement and emergency services notified.

Summary

Posting connects the rating engineer, the owner's legal process, the sign shop, the inspector and the data manager. The MBE gives a defensible way to convert a rating factor into a weight, the MUTCD tells you how to say it on a sign, the NBIS sets the deadlines, and the SNBI records whether you met them. A posting is complete only when all four agree.

Key takeaways

- A load posting is a regulatory sign installed to the MUTCD and enforceable under State or local law (23 CFR 650.305); a number in a report is not a posting.
- Post as soon as possible but within 30 days of the rating, fix missing signs within 30 days, and close when gross capacity is below 3 tons (23 CFR 650.313(l), (m)).
- LRFR posting load = $(W/0.7)[RF - 0.3]$ for $0.3 < RF < 1.0$ (MBE Eq. 6A.8.3-1); it is deliberately lower than $RF \times W$ because posted bridges see more overloads.
- Below $RF = 0.3$ a vehicle type is not allowed; below 0.3 for all legal vehicles the bridge is closed.
- Group vehicles by family, take the lowest posting load in each family, and round down to a whole ton.
- Use MUTCD 2B.64 signs (R12-1, R12-2, R12-4, R12-5, R12-6, R12-7/R12-7aP) with an advance sign so prohibited vehicles can detour, and report status and values in SNBI Items B.PS and B.EP.

References

1. AASHTO, The Manual for Bridge Evaluation, 3rd Edition, 2018 (with interim revisions)
2. 23 CFR Part 650, Subpart C — National Bridge Inspection Standards (final rule published May 6, 2022)
3. FHWA Memorandum, Load Rating for the FAST Act's Emergency Vehicles, November 3, 2016

Study text only; the final quiz is taken online. Verify all references against the edition your agency has adopted.