



COLORADO

Department of Transportation

2829 W. Howard Place
Denver, CO 80204-2305

Date: September 2023
To: Colorado County or Municipality Representative
From: Bridge and Structure Inspection Unit, CDOT Staff Bridge
Subject: Colorado Department of Transportation (CDOT) Off-System Inspection Program

This goal of this letter is to provide you, the local agency structure owners, with information regarding the CDOT Off-System Inspection Program that is pertinent to your agency.

The objective of the CDOT Off-System Inspection Program is to inventory, inspect and evaluate structures owned by Colorado counties and municipalities (i.e., cities and towns) which qualify for the National Bridge Inventory (NBI). NBI qualifying structures (major structures) are defined as bridges and culverts which carry public roads and have a clear span over greater than 20 feet. Major structures within your jurisdiction are inspected by consultant inspection teams in accordance with the National Bridge Inspection Standards (NBIS) defined in Federal Regulation 23 CFR 650 Subpart C. Minor structures (i.e. minor bridges and minor culverts with combined spans less than or equal to 20 feet) are not inspected under the Off-System Inspection Program. Miscellaneous structures (e.g., railroad bridges, pedestrian bridges, and other structures) over public roads in your jurisdiction will have their vertical clearance over the public road measured and the lateral clearances on either side of the public road measured. Miscellaneous structures over public roads in your jurisdiction will not have condition inspections done. CDOT recommends that your agency inspect all Minor and Miscellaneous structures within your jurisdiction that are not already inspected by this program.

Your agency has the right to:

- Be informed which inspection consultant is responsible for inspecting the structures within your jurisdiction
- Be informed when inspections are scheduled to occur
- Have structures inspected and evaluated per all applicable standards and the regulations listed above
- Receive complete and accurate inspection reports including access to all available data collected
- Request initial and damage inspections

Your agency has a responsibility to:

- Provide information to the inspection consultant that is pertinent to the inspection (see Attachment A)
- Notify the inspection consultant of any changes to your agency's major structure inventory so that initial inspections of new major structures can be performed within 90-days of final project acceptance
- Address inspection findings in a timely manner as indicated by the priority in the critical inspection finding or essential repair finding notifications (see Attachment B)
- Properly place and maintain load posting signs in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) on structures that require load posting (see Attachment D)



- Properly place and maintain vertical clearance signs in accordance with the MUTCD on structures that require vertical clearance signs (see Attachment E)

The inspection consultants assigned to your jurisdictions are responsible for:

- Informing your agency that they are the current inspection consultant and inquiring about changes to your agency's major structure inventory since the last cycle of inspections
- Conducting their work in accordance with all governing safety rules and regulations applicable to the work
- Informing your agency at least two weeks before beginning inspections
- Performing NBI Item and Element Level inspections on your agency's major structures per NBIS (see Attachment C)
- Performing Load Ratings per NBIS and CDOT procedures on your agency's major structures
- Measuring vertical and lateral under clearance on all structures crossing over your agency's public roads
- Evaluating your agency's major structures over waterways for scour risk per NBIS
- Preparing Scour Plans of Action (POA's) for your agency's scour critical major structures per NBIS
- Notifying your agency when an inspection finding requires an action by your agency (see Attachment B)
- Notifying your agency when a major structure that requires load posting is not properly posted so that your agency can make the necessary corrections (see Attachment D)
- Notifying your agency when a structure that requires vertical clearance signs is not properly posted so that your agency can make the necessary corrections (See Attachment E)
- Performing ad hoc (i.e., initial, damage, or in-depth) inspections on your agency's major structures as requested and authorized by the CDOT Structure Inspection Engineer (see Attachment C)
- Providing inspection reports, load ratings, and scour POA's to your agency and meeting with your agency to present the inspection results (see Attachment F)

CDOT Staff Bridge is responsible for:

- Advertising for the inspection consultant contracts
- Selecting responsible and qualified inspection consultants
- Managing the inspection consultant contracts
- Rotating inspection consultant assignments so that consecutive inspections are done by different inspection teams as a quality control measure
- Performing quality assurance reviews and field audits of the inspection consultants' work
- Sending your agency their Scour Critical Bridge list each spring

If you have any further questions on the CDOT Off-System Inspection Program, please contact the following:

Mr. Lynn Croswell, CDOT Bridge and Structure Inspection Engineer, 303-757-9188, lynn.croswell@state.co.us

or Mr. Andrew Brown, Statewide Bridge Inspection Coordinator, 303-512-4172, andrew.brown@state.co.us

or the current inspection consultant assigned to your agency.



Attachments

Attachment A, Documents Typically Required for an Inspection (Jan 2023)

Attachment B, Critical Inspection Findings and Essential Repair Findings (Jan 2023)

Attachment C, Inspection Types (Jan 2023)

Attachment D, Load Posting Guidelines for Specialized Hauling Vehicles and Emergency Vehicles (Jan 2023)

Attachment E, Low Vertical Clearance Sign Guidelines (rev Sep 2023)

Attachment F, Inspection Report Delivery and Presentation (Jan 2023)

Useful Links

CDOT Bridge & Structure Inspection webpage:

<https://www.codot.gov/programs/bridge/bridge-structure-inspection>

CDOT Bridge Project Support, Load Ratings & Overloads webpage:

<https://www.codot.gov/programs/bridge/bridge-project-support-load-ratings-overloads>

CDOT Bridges & Structures webpage:

<https://www.codot.gov/programs/bridge>

FHWA Bridges & Structures, Bridge Inspection webpage:

<https://www.fhwa.dot.gov/bridge/inspection/>



Attachment A

Documents Typically Required for the Structure Record

The documents (electronic format preferred) typically required for the structure records include but are not limited to the following:

- All Structure Construction documents
 - As-built drawings
 - Working drawings
 - Shop drawings
 - Material certifications
 - Material test reports
- Final Maintenance and Ownership Inter-Governmental Agreement (IGA)
- Final Geotechnical Report
- Final Hydraulic Report
- Final Construction Plans
- Project Specifications
- Scour Evaluation
- Final Structure Selection Report
 - A Structure Selection Report is required when any project phase includes Federal or state funds
- Design Calculations
- Independent Design Check Calculations
- Load Rating Package per the CDOT Bridge Rating Manual

Attachment B

Critical Inspection Findings and Essential Repair Findings

Critical Inspection Findings

Definition: Repairs for a structural or safety related deficiency that require **immediate** follow-up inspection or action necessary to ensure the safe and continued service of off-system major bridge structures. Immediate and potentially critical problems with structures should be reported to the designated local agency contact/maintenance personnel as appropriate by the consultant in your area.

Examples include, but are not limited to:

- Tension members identified as fracture critical members which are significantly damaged by natural or impact forces that may result in partial or full failure.
- A condition which results in a restriction of the maximum acceptable load carrying capacity of a structure to a value less than 3 Tons at the operating level.
- Three adjacent broken girders or stringers in one span.
- Rot in timber piles or corrosion in steel piles that affect the carrying-capacity of the structure.
- Girders sheared at the ends to the extent that displacement has occurred.
- Loss of post-tensioning in girders.
- Trusses with misalignment of a top chord member in an amount that exceeds half the width of the member.
- One element of a two-element built-up bottom chord truss member being severed, or the bottom flange of a steel girder being severed.
- Any substructure problem that threatens the structural integrity of the bridge.

The criticality of the deficiency will result in one or more of the following actions:

- a. Close the bridge until the defect is removed or repaired if the defect may impact users or user safety.
- b. Restrict the area from public access until the defect can be removed or repaired.
- c. Repair the structural member or address the functional or safety issue.

When identifying a needed repair as Critical, the Bridge Inspection Program Manager will classify the repair based on the appropriate time frame for addressing the problem as follows:

Classification	Legacy Color Code	Target Time Frame for Completion	Priority	Federal NBIS	Initial Notification	E-Mail Notification Time Frame	Follow-up Time Frame
Critical Inspection Finding	CIF	Immediate or Within a timely manner	Immediate	Critical Finding	Immediate (phone call, in-person, etc.)	Within 5 working days of finding	10 Calendar days of E-Mail

Essential Repair Findings

Definition: Repairs necessary to ensure the safe and continued service of off-system major bridge structures.

Examples include, but are not limited to:

- Tension members identified as fracture critical members which are damaged by natural or impact forces.
- A condition which results in a restriction of the maximum acceptable load carrying capacity of a structure to some value less than 27 Tons on the Type III, 3-axle truck at the Operating Rating level.
- Three adjacent crushed timber girders or three broken timber girders in one span, two of which are adjacent to one another, stringers with rot at the ends, which may cause the stringer to fall off the cap.
- “Mushrooming” for a depth of 2 inches on three adjacent timber girders.
- Rot in the top of 80 percent of all timber girders in one span, which reduces the effective depth by 25 percent or more.
- Rot in timber piles that affect the carrying-capacity of the structure.
- Concrete girders with over 30 percent of the primary moment steel severed.
- Loss of section in beam ends and/or spalls in concrete girder supports where girders have less than 80 percent bearing area remaining.
- Steel members with over 30 percent section loss or steel or aluminum culverts including super spans with unusual section displacement and/or gaps at the point of overlap and cracks in bolt lines.
- Scour that has increased by greater than one foot since the last inspection and which has caused vertical or horizontal displacement.
- Scour under a spread footing which has caused a loss of 15 percent of the bearing area.

When identifying a needed repair as Essential, the Bridge Inspection Program Manager will classify the repair based on the appropriate time frame for addressing the problem as follows (see definitions of each Classification on the next page):

Classification	Legacy Color Code	Target Time Frame for Completion	Priority	Federal NBIS	Initial Notification	E-Mail Notification Time Frame	Follow-up Time Frame
Urgent Priority Repair	Orange	Within 30 days	Urgent		E-Mail Notification	Within 10 working days of finding	14 Calendar days of E-Mail
High Priority Repair	Yellow	Within 90 days	High		E-Mail Notification	Within 10 working days of finding	14 Calendar days of E-Mail
Moderate Priority Repair	Green	Within one year	Moderate		At presentation	As needed (not required)	As needed or At next inspection
Monitor	Blue	Specified in the letter	Monitor		E-Mail Notification	Within 10 working days of finding	As suggested in the notification
Low Priority Repair (maintenance item)	No Color	As funding allows	Low		Included with transfer files to Owner	N/A	At next inspection

Urgent Priority Repair

An Urgent Priority Repair is assigned when conditions or severe deterioration of key structural elements exist which significantly affect the current capacity, serviceability, and anticipated service life of the element and which may affect safety of the traveling public at the time of inspection. If left uncorrected, the deterioration will likely accelerate and increasingly affect safety of the traveling public.

High Priority Repair

A High Priority Repair is assigned when conditions or advanced deterioration of bridge elements exist which affect the current capacity, serviceability, and anticipated service life of the element or structure requiring action to prolong the service life. If left uncorrected, the deterioration will likely accelerate resulting in increased repair costs or scope or both. A High Priority repair is one that does not significantly affect safety of the traveling public at the time of inspection.

Moderate (Medium) Priority Repair

A Moderate Priority Repair is assigned when conditions or deterioration exist which may affect the current capacity or shorten the service life of the element. If left uncorrected these conditions may accelerate deterioration of the element, system, or structure resulting in additional deterioration, maintenance, or increased repair cost and/or scope. A Moderate Priority repair is one that does not affect safety of the traveling public at the time of inspection.

Monitor

Monitor is used when no immediate maintenance is required, or maintenance action cost-benefit is not efficient at this time. Conditions need to be monitored to assure that conditions are not worsening. This code is not to be used to address routine inspection procedures.

Low Priority Repair (Maintenance Item)

A Low Priority Repair is assigned when conditions or minor deterioration exist which may shorten the service life of the element but has minimal to no effect on the current capacity or serviceability of the element or the safety of the traveling public. If left uncorrected, these conditions may accelerate deterioration of the localized defect and will likely result in the general deterioration of the bridge which will accelerate the need for replacement.

Attachment C

Inspection Types

Scheduled Inspection Types¹	
Routine	<p>Routine inspections are the most common type of inspection and are regularly scheduled inspections consisting of visual observations and measurements needed to determine the physical and functional condition of the structure, to identify any changes from “initial” or previously recorded conditions, and to ensure that the structure continues to satisfy present service conditions. Routine inspections are general conducted from the deck, ground level, ladders, and water level for wadable flows less than 3 feet deep. The scope of a routine inspection only includes a visual assessment of the structure and is not an in-depth assessment.</p> <p>A routine inspection is scheduled every 6, 12, 24 or 48 months depending on the condition of the structure. FHWA approval must be obtained for any frequencies greater than 24 months.</p>
Fracture Critical	<p>A fracture critical inspection is a visual “hands-on” inspection of Fracture Critical Members (FCM’s) or components. The fracture critical inspection is coincident with the routine inspection.</p> <p>A FCM, is a steel member, or part of a member, in tension whose failure would probably cause all or a portion of the entire structure to collapse.</p>
Underwater	<p>An underwater inspection is the inspection of the structural elements and surrounding channel that are underwater utilizing diving or other appropriate procedures. CDOT makes use of an underwater inspection for any major structure with a consistent water depth greater than three feet which cannot be inspected visually at low water by wading or probing. An underwater inspection is scheduled every four years utilizing a separate consultant contract from the routine inspections.</p>
Structure Pin Nondestructive Testing	<p>A structure pin nondestructive test is done utilizing an ultrasonic inspection procedure to detect any defects in the structure pin.</p> <p>A structure pin nondestructive test is scheduled every four years utilizing a separate consultant task order from the routine inspections.</p>
Special Element	<p>A special element inspection is used for inspecting a specific structural element at a frequency less than 12 months. Special Element Inspections are in addition to the Routine Inspections and are intended for damaged or deteriorated elements until they are repaired or replaced.</p>
Complex Structure	<p>A complex structure is inspected following a predefined inspection procedure specific to the structure. The complex structure inspection is coincident with the routine inspection.</p> <p>A complex structure is a movable, suspension, cable stayed, or a structure with unusual characteristics.</p>

Ad Hoc Inspection Types	
Initial	<p>Initial inspections are the first inspection of a bridge after it is added to the inventory and opened to traffic. Initial inspections are to be done within 90 days of final project acceptance. An initial inspection may also apply when there has been a significant change in structure configuration. An initial inspection includes collecting all Structure Inventory and Appraisal (SI&A) data, determining bridge elements and quantities, determining a baseline of structural conditions, determining a load rating, and collecting any other relevant bridge information.</p> <p>Initial inspections are part of the typical consultant inspection task order.</p>
Damage	<p>Damage inspections are as needed inspections to assess structural damage resulting from environmental or human factors (flooding, vehicle impacts, etc.). Damage inspections are typically requested by the structure owner when they become aware of an incident or discover the damage.</p> <p>CDOT utilizes accident damage inspections to assess structural damage resulting from damage caused by human actions and natural event damage inspections to assess structural damage resulting from damage caused by environmental factors.</p> <p>Damage inspections are part of the typical consultant inspection task order as authorized by the CDOT Structure Inspection Engineer.</p>
In-Depth	<p>In-depth inspections are close-up, hands-on inspections of one or more members to identify any deficiencies not readily detectable using routine (visual) inspection procedures.</p> <p>In-depth inspections are not a part of the typical consultant inspection task order unless specifically directed by the CDOT Structure Inspection Engineer.</p>

¹ Scheduled inspections are part of the typical consultant inspection task order.

Attachment D

Colorado Department of Transportation (CDOT)

Load Posting Guidelines for the Colorado Posting Trucks, Specialized Hauling Vehicles and Emergency Vehicles

In 1975, the American Association of State Highway and Transportation Officials (AASHTO) introduced three legal load models, designated as Type 3, Type 3S2, and Type 3-3 to simulate loadings from dump trucks, semi-trailer trucks and semi-trailer trucks with a pup trailer, respectively. In recent years, the trucking industry has introduced modified single-unit trucks (Specialized Hauling Vehicles or SHVs) with multiple drop axles that raise or lower as needed to allow these short-wheelbase trucks to carry the maximum load of up to 80,000 lbs and still meet the Federal Bridge Gross Weight Formula, or “Bridge Formula B” equation (https://ops.fhwa.dot.gov/freight/publications/brdg_frm_wghts/index.htm#table). These short-wheelbase vehicles are commonly used in the construction, waste management, bulk cargo and commodities hauling industries throughout the United States.

The AASHTO Type 3, Type 3S2, and Type 3-3 trucks closely match the Formula B equation in the short, medium, and long truck length ranges but do not adequately represent the live load effects of the short-wheelbase axle configurations of SHV’s. SHVs are legal vehicles with legal axle weights that meet the Formula B equation for maximum axle group weight and represent loadings of short-wheelbase vehicles. Bridges with short spans and those with transverse floor beams are most sensitive to these more closely spaced axles.

On November 15, 2013, the Federal Highway Administration (FHWA) issued a memorandum titled “Load Rating of Specialized Hauling Vehicles” (<https://www.fhwa.dot.gov/bridge/loadrating/131115.cfm>) which required every state to post bridges for SHVs that do not pass a load rating analysis for these vehicles. On November 3, 2016, FHWA issued another memorandum titled “Load Rating for the FAST Act’s Emergency Vehicles” (<https://www.fhwa.dot.gov/bridge/loadrating/161103.cfm>) to provide guidance on load rating bridges for emergency vehicles (EVs). EVs are defined as those designed to be used under emergency conditions to transport personnel and equipment in response to fires and other hazardous situations. The memorandum states that bridges on the Interstate System or within one road mile of the Interstate System shall be rated for EVs. For the purpose of load rating, FHWA determined that two EV configurations produce live load effects that envelop the live load effects of the vehicles from the family of typical emergency vehicles. Both EV configurations have a single front axle and are differentiated by the single rear axle (EV2) and tandem rear axle (EV3).

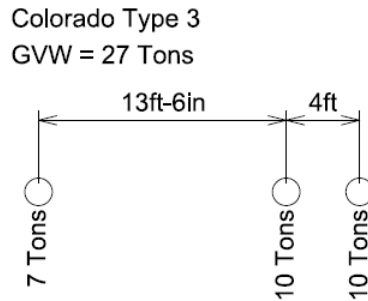
Legal Load Models Used for Posting in Colorado

The AASHTO legal loads are sufficiently representative of the vast majority of routine truck configurations in use throughout the United States and are therefore used as vehicle models for load ratings. When a load rating shows that a bridge does not have sufficient capacity (i.e., an Operating rating factor less than 1.0) for any one of these legal load vehicles, the bridge must be posted. For bridges not on the Interstate System, the Colorado legal load vehicles (designated as Type 3, Type 3S2,

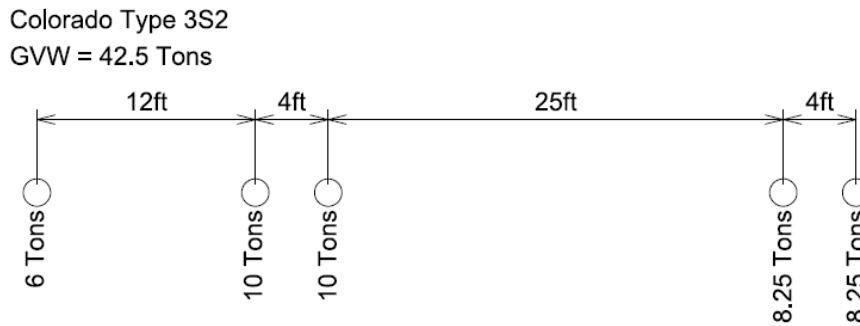
CDOT Off-System Inspection Program Letter
Attachment D

and Type 3-2) are used for load postings instead of the AASHTO legal vehicles. The Colorado posting truck configurations are as follows:

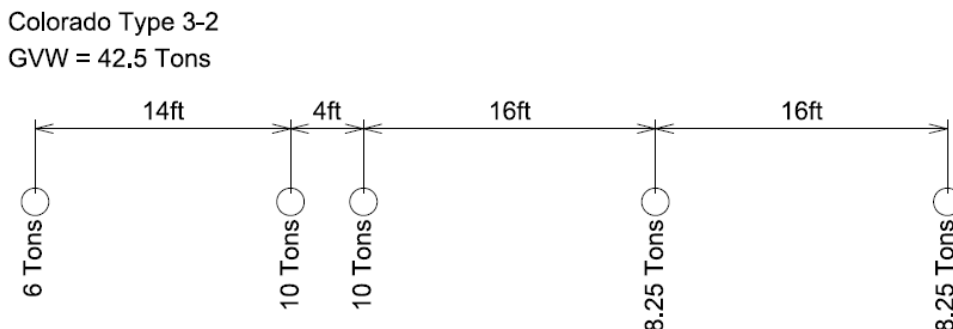
The Colorado Type 3 legal vehicle is a three-axle single-unit vehicle with a gross vehicle weight of 54,000 lbs. (27 tons). This Colorado vehicle model is heavier than the 50,000 lbs. (25 tons) AASHTO Type 3 legal vehicle. Note the weights shown are axle weights.



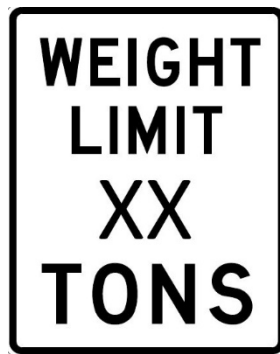
The Colorado Type 3S2 legal vehicle is a five-axle semi-tractor and trailer combination with a gross vehicle weight of 85,000 lbs. (42.5 tons). This Colorado vehicle model is heavier than the 72,000 lbs. (36 tons) AASHTO Type 3S2 legal vehicle. Note the weights shown are axle weights.



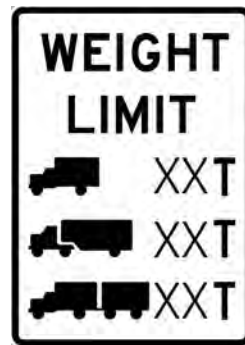
The Colorado Type 3-2 legal vehicle is a five-axle combination of a three axle semi-tractor and trailer combination pulling a loaded trailer and having a gross vehicle weight of 85,000 lbs. (42.5 tons). This Colorado vehicle model is heavier than the 80,000 lbs. (40 tons) AASHTO Type 3-3 legal vehicle. Note the weights shown are axle weights.



As discussed earlier, when the Operating Rating Factor for one or more of the Colorado legal vehicles is less than 1.0, Colorado uses a single weight-limit sign or a three-vehicle combination sign per the FHWA Manual on Uniform Traffic Control Devices (MUTCD). The silhouettes on the three-vehicle combination sign shown below represent the three Colorado legal vehicles described above.



MUTCD Sign R12-1

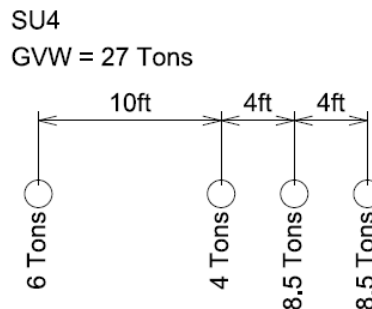


MUTCD Sign R12-5

Specialized Hauling Vehicles Loading Models

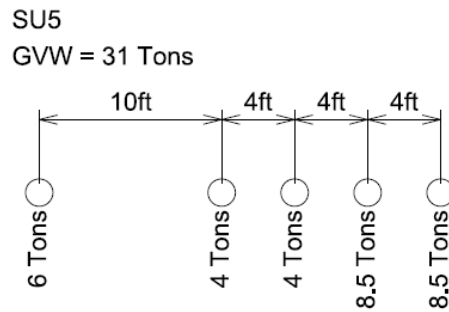
Four SHV models (SU4-SU7) were developed and adopted by AASHTO in 2005 to represent newer axle configurations that comply with Formula B and meet all Federal weight regulations but whose live load effects exceed the stresses induced by the Type 3, Type 3S2, or Type 3-3 legal vehicles.

The SU4 model is a four-axle vehicle with a gross vehicle weight of 54,000 lbs. (27 tons). Note the weights shown are axle weights.

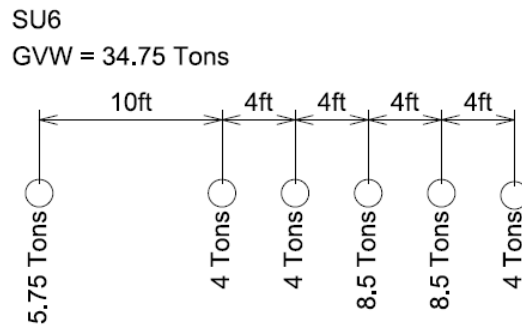


CDOT Off-System Inspection Program Letter
Attachment D

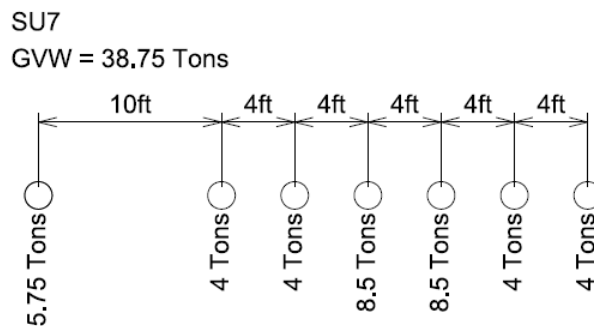
The SU5 model is a five-axle vehicle with a gross vehicle weight of 62,000 lbs. (31 tons). Note the weights shown are axle weights.



The SU6 model is a six-axle vehicle with a gross vehicle weight of 69,500 lbs. (34.75 tons). Note the weights shown are axle weights. Currently, the SU6 as shown below is only legal on Interstate Highways in Colorado. The SU6 GVW is limited to 33 tons on all other roads in Colorado based on the Colorado Bridge Formula.



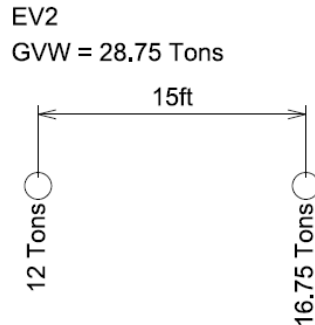
The SU7 model is a seven-axle vehicle with a gross vehicle weight of 77,500 lbs. (38.75 tons). Note the weights shown are axle weights. Currently, the SU7 as shown below is only legal on Interstate Highways in Colorado. The SU7 GVW is limited to 35 tons on all other roads in Colorado based on the Colorado Bridge Formula.



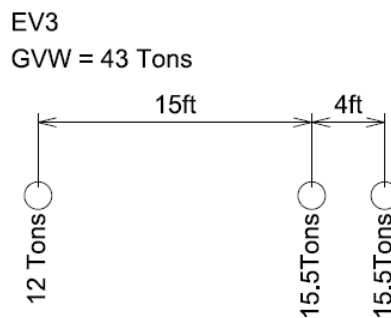
Emergency Vehicle Loading Models

EVs may not meet the Federal Bridge Formula B and can create higher load effects compared to the Colorado legal loads and the SHV models currently included in the AASHTO Manual for Bridge Evaluation.

The first EV model is the EV2, which is a single rear axle vehicle with a gross vehicle weight of 57,500 lbs. (28.75 tons). Note the weights shown are axle weights.



The second EV model is the EV3, which is a tandem rear axle vehicle with a gross vehicle weight of 86,000 lbs. (43 tons). Note the weights shown are axle weights.



CDOT Posting Sign Guidelines for Off-System Bridges

When a load rating shows that a bridge does not have sufficient capacity for any one of the SHV or EV models, the bridge must be posted in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). Currently, the MUTCD only has two signs (R12-1 with a single weight limit and R12-5 with the three silhouettes of legal vehicles) for load posting. The MUTCD does not allow States to add any other silhouettes of trucks to the R12-5 posting sign since it is dangerous for truck drivers to attempt to read a crowded sign while traveling at highway speeds.

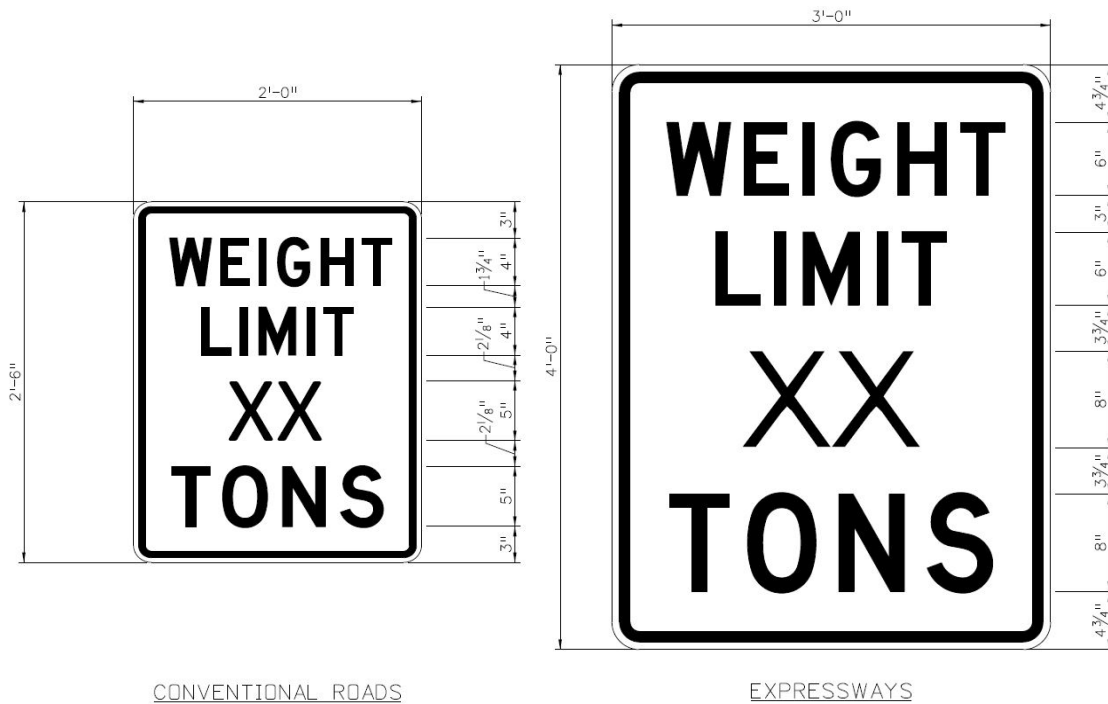
The MUTCD allows supplemental posting signs to be modified to account for the posting of SHVs or EVs. It is up to each state to determine the language to be used on these supplemental posting signs. CDOT has designed supplemental posting signs, shown below, that will be used under different scenarios

CDOT Off-System Inspection Program Letter
Attachment D

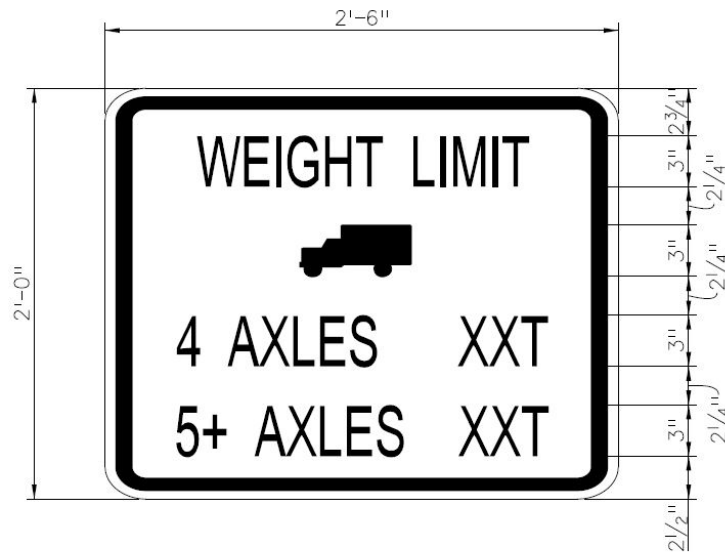
when a bridge requires posting for the Colorado Posting Trucks, SHVs, EVs or combinations thereof. Sign dimensions and letter heights of the posting signs are different depending on whether the bridge is on a conventional road or an expressway/freeway. A conventional road is a road that allows direct access to homes and businesses along it, or a low-volume road with an AADT (Annual Average Daily Traffic) of 400 or less. An expressway/freeway is a road that has partial or full control of access, or a road with an AADT greater than 400.

If a bridge requires posting for Colorado posting trucks, SHV's and EV's, or any combination thereof, the signs will be mounted in succession, with the Colorado posting truck sign (MUTCD R12-1 or R12-5) appearing first, then the SHV sign, then the EV sign. Spacing of the signs will depend on the posted speed of the roadway. The dimensions shown below and on the following pages shall be used when ordering the signs.

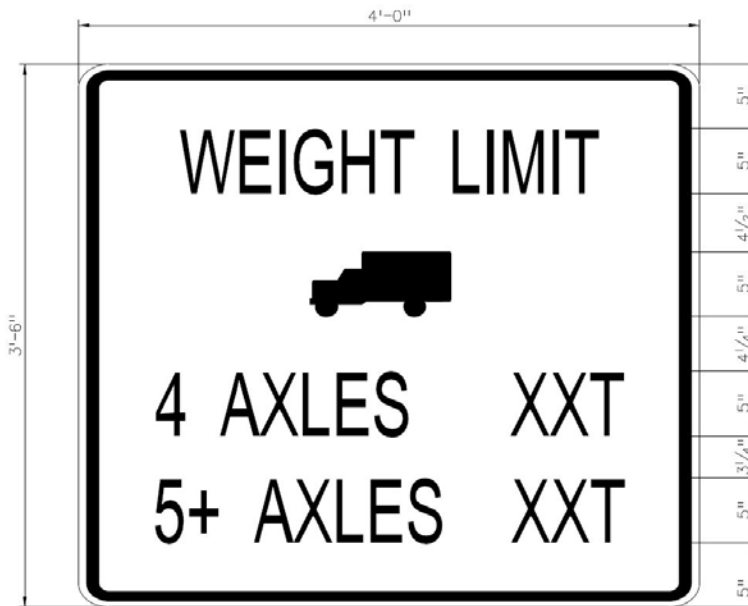
Posting signs for Single Weight Limit:



Posting signs for SHV's:

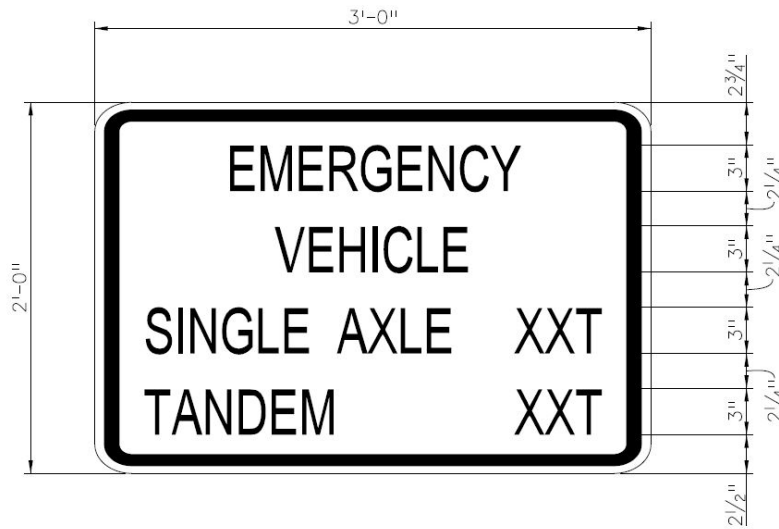


CONVENTIONAL ROADS

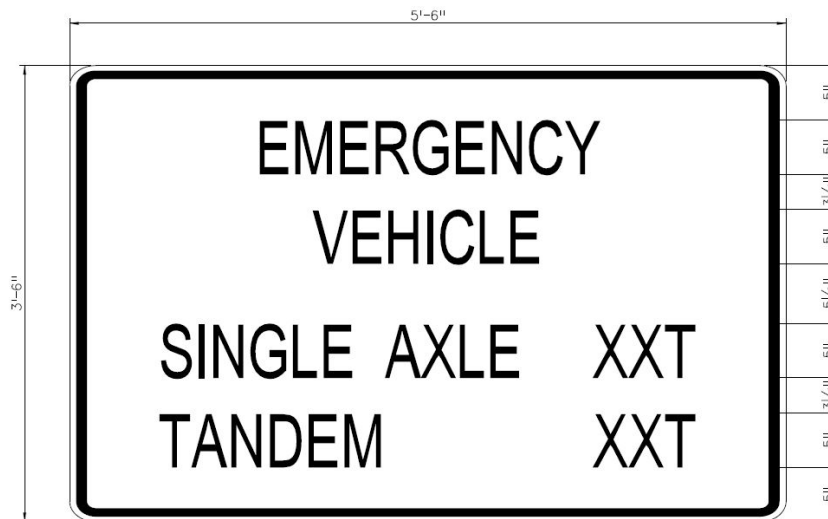


EXPRESSWAYS

Posting signs for EV's:



CONVENTIONAL ROADS



EXPRESSWAYS

Attachment E
Colorado Department of Transportation (CDOT)
Low Vertical Clearance Sign Guidelines

Low vertical clearance signs are recommended for the following situations:

- For Interstates, US Highways, and State Highways, when the measured clearance over the roadway is less than or equal to 16'-3" low vertical clearance signs are required. It is recommended that structures with clearances less than or equal to 16'-3" be posted for 4" less than the measured clearance. For example, a bridge with a measured vertical clearance of 16'-4" does not require a sign, but a bridge with a measured vertical clearance of 16'-3" would require a sign for 15'-11". The 4" buffer is used to account for any future overlays, any variations in asphalt thickness, and to be consistent with the CDOT Oversize/Overweight (OSOW) permit office who used this buffer to account for any "bouncing" of the load.

Low vertical clearance signs may be installed on or in advance of the structure. An additional advanced warning low vertical clearance sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

- For all other Local Agency owned roads, it is recommended that low vertical clearance signs be required when the measured clearance over the roadway is less than or equal to 14'-3". It is recommended that structures with clearances less than or equal to 14'-3" be posted for 4" less than the measured clearance. For example, a bridge with a measured vertical clearance of 14'-4" does not require a sign, but a bridge with a measured vertical clearance of 14'-3" would require a sign for 13'-11". This meets or exceeds the C.R.S. and MUTCD referenced below. The 4" buffer is used to account for any future overlays, to account for any variations in gravel or asphalt thickness. If the Local Agency owner has different requirements, please notify this office and the consultant performing inspection in your area of your requirements.

Low vertical clearance signs may be installed on or in advance of the structure. An additional advanced warning low vertical clearance sign with a supplemental distance plaque should be placed at the nearest intersecting road or wide point in the road at which a vehicle can detour or turn around.

The sensitivity of this issue increased with the collapse of the I-5 Skagit River Bridge following a strike by an oversize combination vehicle near Mount Vernon Washington on May 23, 2013. The resulting NTSB report available at <https://www.nts.gov/investigations/Pages/HWY13MH012.aspx> makes several recommendations related to vertical clearance signing. One key recommendation is a requirement to provide a uniform minimum clearance height between the roadway and the bottom of the structure which, if not met, necessitates the installation of low-clearance signage.

The statutory and regulatory guidance references are summarized below.

The Colorado Revised Statute (C.R.S.) 42-4-504(1) states:

CDOT Off-System Inspection Program Letter
Attachment E

- *No vehicle unladen or with load shall exceed a height of thirteen feet; except that vehicles with a height of fourteen feet six inches shall be operated only on highways designated by the department of transportation.*

The Rules and Regulations of the State of Colorado Department of Transportation Pertaining to Transport Permits for the Movement of Extra-Legal Vehicles Chapter 3 states in part:

- *304.2 The Maximum Limits that may be authorized for an Extra-legal Vehicle or Load operating under an Annual Oversize/Overweight permit are as follows:*
 - *304.2.1 Sixteen feet in Height, subject to the Maximum Limits for Height designated on the Height Restriction Map.*

Manual of Uniform Traffic Control Devices 2009 Edition Including Revision 1 dated May 2012, Revision 2 dated, May 2012, and Revision 3 dated August 2022 (MUTCD) Chapter 2C Section 2C.27, Low Clearance Signs (W12-2 and W12-2a).

- *The Low Clearance (W12-2) sign shall be used to warn road users of clearances less than 12 inches above the statutory maximum vehicle height.*



W12-2



W12-2a

Attachment F
Colorado Department of Transportation (CDOT)
Inspection Report Delivery and Presentation

The following documents will be submitted to the Local Agency Owner at least 1 week prior to the Inspection Results Presentation:

- All documents are to be provided in electronic format unless hardcopy format is requested by the local agency owner
 - Full Inspection Report for each structure consisting of the following (in this order):
 - SIA / Element inspection report
 - Photo Sheets (inventory photos followed by substantiating photos with captions describing the subject of each photo)
 - Tally sheet (if applicable)
 - Structure sketch
 - Fracture Critical Sheet/Memo (if applicable)
 - Vertical clearance sheet (if applicable)
 - Load rating summary sheet
 - Scour Screening Chart
 - Scour Plan of Action (if applicable)
 - Streambed profile sheet (if applicable)
 - Critical Inspection Finding (if applicable)
 - Essential Repair Letter (if applicable)
 - Load Posting Certification listing major structures and current NBI Item 41, Structure Open, Posted, or Closed to Traffic status
 - Supporting files as follows (electronic format only):
 - PDF of Critical Inspection findings Letter
 - PDF of Essential Repair Letter
 - PDF of SIA / Element Inspection report
 - PDF of the last Underwater Inspection Report (if applicable)
 - PDF of the last Ultrasonic Pin Inspection Report (if applicable)
 - PDF of Timber Girder Sheet (if applicable)
 - Excel file of Tally Sheet (Timber, Steel, Concrete ...)
 - PDF of Load Rating Summary Sheet
 - PDF of Load Rating Calculation Package
 - XML of Load Rating BrR Input File
 - Miscellaneous other Load Rating Files
 - PDF of Fracture Critical sheets (if applicable, combined FCM memo and elements)
 - PDF and DGN files of Sketch
 - PDF of Structure Plans (for new or rehabilitated structures, if available)
 - DGN of Structure Plans (for new or rehabilitated structures, if available)
 - PDF of Streambed Profile
 - PDF of Scour Plan of Action (if applicable)
 - PDF of Scour Change Request Memo (if applicable and if revised during this inspection)
 - PDF of Scour Item 113 Screening Chart
 - PDF of Vertical Clearance Sheet (if applicable)

CDOT Off-System Inspection Program Letter
Attachment F

- JPG file of all photos taken during the inspection with full caption as name
- PDF of Miscellaneous Structure Files (Design Calculations, etc.)
- Inspection Summary addressing the following items:
 - Structure Inspection Results
 - NBI Items 58-Deck, 59-Superstructure, 60-Substructure, and/or 62-Culvert, 113-Scour Critical Bridges,
 - Load Posting Restrictions, Essential Repair Findings (ERF), Scour Repairs
 - Structures added/removed from inventory
 - Maintenance recommendations including Priority, sorted by Structure Number
 - Additional Reference Information:
 - CDOT Off-System Inspection Program Letter
 - Definitions of NBI Condition Rating Codes
 - Glossary of Terms

A presentation to present the inspection findings to the Owner will occur no later than 60 days after the final reports have been accepted by the CDOT project manager unless otherwise approved by the CDOT Structure Inspection Engineer. The general structure of the presentation will be as follows:

- To be a face-to-face presentation to the local agency owner's representatives unless otherwise requested by the local agency owner, i.e., teleconference or no presentation.
- Topics:
 - Overview of CDOT Off-System Bridge Inspection Program
 - Inspection Results
 - Critical Inspection Findings
 - Essential Repair Findings
 - Maintenance/Repair Recommendations with Timing and Priority Definitions
 - Highlight Specific Structures with Significant Inspection Findings
 - Load Posted Bridges
 - Address Owner Questions