

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

ALABAMA

Alabama State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Alabama DOT Highway Construction Regulations State Regulations document \(Section 728, p. 521\)](#)

SECTION 728

TRUCK MOUNTED IMPACT ATTENUATOR

728.01 Description.

This Section shall cover the work of furnishing Truck Mounted Impact Attenuator Units and all services and operational supplies necessary to provide a functional unit during the life of the contract. The Contractor shall retain ownership of the truck and impact attenuator unit, including all hardware and attachments, after their use on the project is complete.

728.02 Materials.

All truck mounted impact attenuator units furnished for use under this Section shall be new or acceptable used units which include all of the latest modifications to manufacturer's current production models. The Contractor shall furnish the Engineer a copy of the certification by the testing agency that the attenuator meets the performance standards given in NCHRP Report 350, TL-2 for a work zone speed limit of 45 miles per hour and TL-3 for a work zone speed limit of 50 mph or greater. Truck mounted attenuators shall be used in accordance with the manufacturer's recommendations including the support truck weight and roll ahead distance. The impact attenuator shall have a standard trailer lighting system, including brake lights, tail lights, and turn signals.

728.03 Construction Requirements.

(a) GENERAL.

The truck mounted attenuator unit furnished under this Section shall be used when work is performed under traffic.

(b) MAINTENANCE.

All truck mounted impact attenuator units shall be maintained in such a manner as to

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provide continuous service during their use on the project. Units which become non-operational during use will require the Contractor to suspend work until the units can be repaired or replaced. The truck mounted impact attenuator units shall be stored in an approved secure storage area when not in use.

728.04 Method of Measurement.

Measurement of Truck Mounted Impact Attenuator Units will be made in complete functional units. SECTION 730 TRAFFIC SIGNALS 522

728.05 Basis of Payment.

(a) UNIT PRICE COVERAGE.

The ordered and accepted truck mounted impact attenuator units under this item, measured as noted above, will be paid for at the contract unit price bid which shall be full compensation for the furnishing of the unit, complete with truck, and its exclusive use on the project, for providing all equipment, supplies, services, labor and incidentals necessary to operate and to maintain the units in good serviceable condition during the life of the contract.

(b) PAYMENT WILL BE MADE UNDER ITEM NO.:

728-A Truck Mounted Impact Attenuator Unit – per each

ALASKA

Alaska State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Alaska DOT Highway State Regulations](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

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Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers

from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

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Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 *If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.*

ARIZONA

Arizona State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Arizona Department of Transportation](#)

[ADOT Construction Manual \(Chapter 7, p. 701-6\)](#)

[Standard Specifications for Road and Bridge Construction \(p. 586\)](#)

From "ADOT Construction Manual"

701-3.07 Truck-Mounted Attenuator:

The purpose of a truck-mounted attenuator (TMA) is to decelerate the impacting vehicle at a rate which prevents serious injury to the vehicle occupants. Each type of TMA has specific vehicle weight requirements in which it will operate in an acceptable manner. The Inspector should check to verify that the truck on which the TMA is mounted is the appropriate weight for the application. The TMA should be positioned a sufficient distance ahead of the workers or equipment to allow for the appropriate vehicle roll ahead (distance the vehicle will move during impact). For stationary operations the TMA should be down and locked, wheels locked, parking brake set, and wheels turned away from the work site and traffic. The vehicle on which the TMA is mounted should not be allowed to be used as a utility vehicle, but dedicated to the purpose of work zone safety

From "Standard Specifications for Road and Bridge Construction"

701-3.07 Truck-Mounted Attenuator:

Trucks and truck-mounted attenuators shall be furnished by the contractor at the locations shown on the project plans and/or as directed by the Engineer. Trucks shall

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be highway maintenance service trucks weighing between 10,000 and 24,000 pounds. Trucks equipped with truck-mounted impact attenuators shall be furnished with shoulder and lap restraint safety belts for both driver and passenger seats. All truck-mounted attenuators shall meet NCHRP 350 requirements. The attenuators shall consist of three basic components:

1. A back-up support structure for attaching the back-up to the truck;
2. A back-up; and
3. A crushable cartridge containing an energy absorbing material.

The dimensions of the attenuator shall be approximately seven feet long, two feet high and eight feet wide, and the total weight of the attenuator shall be approximately 1,000 pounds. Attenuators shall have rear-mounted, black and high-intensity yellow chevron stripes and a standard trailer lighting system, including brake lights, turn signals, ICC-bar lights, and two yellow rotating beacons mounted on opposite rear corners of the truck approximately 4-1/2 feet from ground level. When the attenuator is in position, roadway clearance shall be between 10 and 12 inches. The attenuator shall be designed to provide for quick and simple connection to the truck. When impacted head-on at 45 miles per hour, the truck-mounted attenuator shall perform as follows:

- (1) For impacting vehicles weighing from 1,800 to 4,500 pounds, the average overall longitudinal deceleration shall be less than 12 g's; the two-foot flail space velocity shall be less than 40 feet per second; and the roll -ahead distance of the truck, with wheels locked and parking brake set , on clean, dry pavement, shall be less than 15 feet.
- (2) For impacting vehicles weighing up to 1,800 pounds, the average overall longitudinal deceleration shall be less 15 g's; the two-foot flail space velocity shall be less than 40 feet per second; and the roll -ahead distance of the truck, with wheels locked and parking brake set , on clean, dry pavement, shall be less than 10 feet. The contractor shall keep the attenuator bright and clean for maximum visibility.

The contractor shall cease operations when a truck-mounted attenuator is damaged. The contractor shall not resume operations until the attenuator has been repaired or replaced, unless authorized by the Engineer.

ARKANSAS

Arkansas State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control](#)

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Devices”

[Arkansas State Highway and Transportation Department State Regulations document \(p. 38\)](#)

ATTENUATORS, TRUCK MOUNTED

1. Operators shall perform a preoperational check of their equipment. Be familiar with the operator’s manual. Report needed repairs promptly. Do not use any equipment that is unsafe.
2. Hook and unhook on level ground.
3. Keep attenuator wheels blocked when attenuator is not mounted to the truck if so equipped.
4. While operating, be aware of overhang, especially when adjacent to guardrails or fixed objects. Move out gradually.
5. Always be aware of excessive overhang while backing.
6. Understand that the attenuator, although it protects our driver and the public, will not lessen vehicle roll-ahead if hit from behind.
7. Keep attenuator in the down position while shadowing; raise before deadheading.
8. All repairs and adjustments should be made away from the travel way.
9. Drive carefully while deadheading.
10. Wear seat belt and shoulder harness when operating truck.

CALIFORNIA

California State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration’s “Manual on Uniform Traffic Control Devices”](#)

[California Department of Transportation](#)

[California DOT Highway State Regulations](#)

[California MUTCD 2014 Edition. 6.01 Pg 1053](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by

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redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other California MUTCD 2012 Edition (FHWA's MUTCD 2009 Edition, as amended for use in California) Chapter 6F – Temporary Traffic Control Zone Devices January 13, 2012 Part 6 – Temporary Traffic Control Page 1096 obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/ or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

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Guidance:

07 *The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.*

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 *If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.*

Support:

10 Information about designs and types of crash cushions currently approved for use on State highways is available from Department of Transportation's Division of Traffic Operations in Sacramento.

COLORADO

Colorado State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Colorado Department of Transportation](#)

[Colorado DOT Highway State Regulations](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

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Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains

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additional information
regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

CONNECTICUT

Connecticut State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Connecticut Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

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Support:

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Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

DELAWARE

Delaware State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[Delaware Department of Transportation](#)

[State regulations document \(MUTCD, Section 6F.86, pp. 617-618\)](#)

[Delaware Manual on Uniform Traffic Control Devices \(Subsection 6: Temporary Traffic Control\)](#)

Section 6F.86 Crash Cushions

Support:

01 (DE Revision) In Delaware, crash cushions typically refer to sand crash cushion arrays and impact

attenuators. Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by

smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types

of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash

cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles,

and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside

Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

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Guidance:

04A (DE Revision) *The following factors should be considered when selecting the type of crash cushion or impact attenuator:*

- A. Speed of vehicles;*
- B. Duration of use (maintenance);*
- C. Width of device;*
- D. Cross-section of roadway (pavement and slope); and*
- E. Direction of impact.*
- F. Runout area behind attenuator/barrier*

04B (DE Revision) *Sand crash cushion arrays should not be used in applications that could result in a reverse strike by vehicles traveling in the opposite direction. It is acceptable to use sand crash cushion arrays if they are outside the clear zone of the opposite direction of traffic.*

Standard:

04C (DE Revision) **Sand crash cushions shall be designed according to manufacturer's recommendations and NCHRP 350 or MASH approved testing methods.**

Guidance:

04D (DE Revision) *If it is expected that sand crash cushions will be used in conditions where freezing could be expected, a suitable mixture of material should be used to preclude the ballast from freezing.*

Option:

04E (DE Revision) *Sand crash cushions may be used for short-duration maintenance purposes or for long-term projects where it is infeasible to install an impact attenuator.*

Guidance:

04F (DE Revision) *Stationary impact attenuators should be used instead of sand crash cushions for most long-term projects and, where practical, for short-duration maintenance purposes.*

04G (DE Revision) *Except for short-duration maintenance purposes, sand crash cushions should not be used without DelDOT Traffic approval.*

Standard:

05 **Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator**

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shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

05A (DE Revision) For long-term, intermediate-term, short-term, and mobile operations requiring shoulder and/or lane closures, a truck-mounted attenuator shall be used on roadways with a posted speed limit or 85th-percentile speed greater than 40 miles per hour, except as provided in Paragraphs 5B, 5C and 5E.

Option:

05B (DE Revision) For short-duration operations along roadways with a posted speed limit or 85th-percentile speed greater than 40 miles per hour, a truck-mounted attenuator may be omitted if a vehicle with activated high-intensity rotating, flashing, oscillating, or strobe lights is used or if the shoulder width is less than the width of a truck-mounted attenuator.

05C (DE Revision) Truck-mounted attenuators may be omitted from specialized work vehicles, such as sweeper, vacuum, and pothole patching trucks, and other work vehicles that cannot support the installation of a truck-mounted attenuator.

05D (DE Revision) Truck-mounted attenuators may be used for all operations along roadways with a posted speed limit or 85th-percentile speed less than or equal to 40 miles per hour based on engineering judgment.

05E (DE Revision) If a shadow vehicle is used for mowing operations along a two-way, two-lane road, a truck-mounted attenuator may be omitted.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators.

Guidance:

07 (DE Revision) *The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected*

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workers and/or equipment. This “roll-ahead” distance should be based on the truck-mounted attenuator manufacturer’s specifications.

Support:

08 Chapter 9 of AASHTO’s “Roadside Design Guide” (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 *If used, the truck-mounted attenuator should be used in accordance with the manufacturer’s specifications.*

FLORIDA

Florida State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration’s “Manual on Uniform Traffic Control Devices”](#)

[Florida Department of Transportation](#)

[Traffic Control Trucks with Mounted Crash Cushions \(section 600, p. 1\)](#)

[Traffic Control Through Work Zones document \(pp. 1 & 9\)](#)

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

The Florida Department of Transportation has adopted the “Manual On Uniform Traffic Control Devices For Streets And Highways: (MUTCD) and subsequent revisions and addendums, as published by the U.S. Department of Transportation, Federal Highway Administration, for mandatory use on the State maintained Highway System whenever there exists the need for construction, maintenance operations or utility work.

TRUCK/TRAILER-MOUNTED ATTENUATORS

Truck/Trailer-mounted attenuators (TMA) can be used for moving operations and short-term stationary operations. For moving operations, see Index Nos. 607 and 619. For short-term, stationary operations, see Part VI of the MUTCD.

GEORGIA

Georgia State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration’s “Manual on Uniform Traffic Control Devices”](#)

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[Georgia Department of Transportation
State regulations document](#)

Section 648—Traffic Impact Attenuator

648.1 General Description

This work includes furnishing and installing impact attenuation devices that conform to the details. Install where shown on the Plans.

HAWAII

Hawaii State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control
Devices"](#)

[Hawaii Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

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Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

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Guidance:

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IDAHO

Idaho State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[Idaho Department of Transportation
State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

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oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

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07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

ILLINOIS

Illinois State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Illinois Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

INDIANA

Indiana State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Indiana Department of Transportation](#)

[Work-zone Traffic Control Guidelines \(pp. 13, 64, 66\)](#)

Intermittent Mobile Operations – These mobile operations often involve frequent short stops that are similar to stationary operations.

Warning signs, flashing vehicle lights, and/or channelizing devices should be used.

With operations that move slowly (less than 3 MPH), it may be feasible to use stationary signing that is periodically retrieved and repositioned in the advance warning area. In addition, vehicles may be equipped with such devices as vehicle warning lights, truck mounted attenuators, and appropriate signs.

Flaggers may be used, but caution must be exercised so they are not exposed to unnecessary hazards

IOWA

Iowa State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Iowa Department of Transportation](#)

[Iowa Work Zone Safety Guidelines \(p. 27\)](#)

Truck-mounted Attenuators

Trucks or trailers are often used as protective vehicles to protect workers or work equipment from errant vehicles. These protective vehicles are normally equipped with flashing arrows, changeable message signs and/or flashers, and must be located properly in advance of the workers and/or equipment they are protecting. However,

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

these protective vehicles may themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators (TMAs).

TMAs capable of absorbing the impact of errant vehicles can be attached to the rear of these protective vehicles to reduce the severity of rear-end crashes. There is a variety of TMA designs available.

The protective truck must be positioned a sufficient distance from the workers or equipment being protected to allow for appropriate vehicle roll-ahead, but not so far that the errant vehicles will travel around the vehicle and strike the workers/equipment. The attenuator should be in the full down-and-locked position. For stationary operations, the truck's parking brake should be set and, when possible, the front wheels turned away from the work site. Turning the front wheels should be based on specific conditions at the site so the after-impact trajectory is into a safe area.

KANSAS

Kansas State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Kansas Department of Transportation](#)

[Special Provision to the Standard Specifications](#)

WORK ZONE TRAFFIC CONTROL AND SAFETY (MOBILE OPERATIONS) (PAVEMENT MARKING) ON MULTI-LANE HIGHWAY

Equip the rear shadow vehicle with a Truck Mounted Attenuator (TMA) and an arrow display. The Engineer may require additional shadow vehicles with arrow panels to warn traffic of the striping operation.

KENTUCKY

Kentucky State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Kentucky Department of Transportation](#)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[Kentucky Standard Specifications Specifications Manual \(Section 725.03.03, pp. 725-1, 725-3\)](#)

SECTION 725 CRASH CUSHIONS

725.03.03 Type VIII. Mount on a truck of the size, and in a manner, recommended by the crash cushion manufacturer. During the course of the work, deploy, operate, and maintain the truck-mounted crash cushion at locations the Engineer directs. Stock enough cells to restore one crash cushion after one impact, and repair all damaged crash cushions as soon as practicable after damage occurs. After its usefulness has ended, remove the crash cushion from the truck and store the crash cushion together with mounting hardware on the right-of-way at a site the Engineer approves.

LOUISIANA

Louisiana State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Louisiana Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

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Standard:

02 **Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or**

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

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Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

MAINE

Maine State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Maine Department of Transportation](#)

[Maine DOT Specifications \(Section 527, pp. 5-131 – 5-132\)](#)

SECTION 527 – ENERGY ABSORBING UNIT (Work Zone Crash Cushion)

527.01 Description The Contractor shall furnish and install Work Zone Crash Cushions as specified in Special Provision 652 or as directed by the Resident.

527.02 Materials Work Zone Crash Cushions must comply with NCHRP Report 350. Work Zone Crash Cushions meeting NCHRP 350 include, but are not limited to, the following: The N-E-A-T from Energy Absorption Systems of Chicago, Illinois, Adiem-II from Syro Inc. of Dallas, Texas, Clusters of the Energite III sand barrels from Energy Absorption Systems of Chicago, Illinois, or an approved equal.

527.03 Construction Requirements Work Zone Crash Cushions shall be provided and installed in accordance with the manufacturer's recommendations for the specific application and the posted speed limit.

Work Zone Crash Cushions, which are damaged or destroyed, shall be repaired or replaced promptly. The Contractor shall have on hand one complete set of replacements.

527.04 Method of Measurement The Department will measure Work Zone Crash Cushions by the Unit, complete in place and accepted. A cluster of Portable Crash Barrels or a cluster of Energite III sand barrels is considered a Unit. Each N-E-A-T or Adiem II is considered a Unit.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

5-136 527.05 Basis of Payment The Department will pay for the accepted quantity of Work Zone Crash Cushions at the Contract unit price for each Unit, which price shall be full compensation for furnishing and placing the Work Zone Crash Cushion, including all incidentals and for resetting as many times as required.

Replacements for the Work Zone Crash Cushions damaged beyond functionality by collisions will be paid for as new Work Zone Crash Cushions, and the removal of the impacted devices and debris will be considered incidental to the replacement units. Replacement Work Zone Crash Cushions on hand, but unused, will not be paid for directly.

MARYLAND

Maryland State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Maryland Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

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Support:

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Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Massachusetts State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Massachusetts Department of Transportation](#)

[Supplemental Specifications to to the 1988 English Standard Specifications for Highways and Bridges and the 1995 Metric Standard Specifications for Highways and Bridges \(p.980\)](#)

SECTION 850 TRAFFIC CONTROLS FOR CONSTRUCTION AND MAINTENANCE OPERATIONS

850.54 Truck-Mounted Attenuator.

Only those truck mounted attenuators previously approved for the purpose intended and listed on the Qualified Construction Materials List may be used. Since most approvals are conditional, any associated issues including but not limited to anticipated conditions, model, variations, modifications, proper installation of truck-mounted units and tow-vehicle specifications shall be resolved to the satisfaction of the Engineer before

use in the field. The submitted information shall include estimated displacement characteristics for a variety of impacts (assumptions regarding both impacting vehicle weight and speed) so that appropriate temporary traffic control set-ups can be undertaken in the field.

The flashing arrow board shall conform to the requirements of Section 850.45 of the Standard Specifications.

MICHIGAN

Michigan State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Michigan Department of Transportation](#)

[Work Zone Safety and Mobility Manual \(Chapter 17: Subpart K, p. 17-1\)](#)

Mobile Attenuators (MA)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

In 2003, MDOT published the Guidelines for Using a Truck-Mounted Attenuator on Construction Projects. This guideline was attached to Bureau of Highway Instructional Memorandum 2004-09, Guidelines for Using a Truck-Mounted Attenuator on Construction Projects. The document is used by project designers to determine when to specify MA on construction projects. The guidelines also provide direction to construction personnel on how to set-up and operate a MA on construction projects. In addition, the guidelines point out the appropriate MA to be used on certain roadway types. In 2008, trailer mounted attenuators have been included for use as an equivalent to truck-mounted attenuators and all truck-mounted attenuation is now noted as mobile attenuation as described in the special provision.

MINNESOTA

Minnesota State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Minnesota Department of Transportation](#)

[Minnesota Traffic Engineering Manual \(Chapter 8: Work Zone Traffic Controls, p. 8-17\)](#)

8 5.10 Crash Cushions and Attenuators

This specification details the general requirements for crash cushions used to protect the end(s) of PPCB in highway work zones. The crash cushions shall be one of two types.

1. Non-Redirective (Gating)

The non-redirective impact attenuator shall consist of barrel-type modules complete with cores and discs for proper retention of predetermined sand content and have tight fitting covers. Depending upon manufacturer, the modules are approximately 1m (36 inches) in diameter and height. The number of barrels, layout pattern, and installation shall be as recommended by the manufacturer. Sand for filling the modules shall be reasonably dry and mixed with a minimum of 5% by mass of sodium chloride.

2. Redirective (Non-Gating)

The redirective impact attenuator shall be a six bay unit provided with a deflector vane anchored to the concrete median barrier. Installation shall be as recommended by the manufacturer.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

For approved Crash Cushion and Attenuator products, see the Temporary Traffic Control Approved Product List on the Approved Products web page listed below.

MISSISSIPPI

Mississippi State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Mississippi Department of Transportation](#)

[Division 600 - Incidental Construction \(Section 619, pp. 423-424\)](#)

SECTION 619 – TRAFFIC CONTROL FOR CONSTRUCTION ZONES

Category 3 Traffic Control Devices. Category 3 Traffic Control Devices are items similar to Category 2 but weigh more than 100 pounds. Category 3 Traffic Control Devices include concrete barrier, truck mounted attenuators (TMAs), work zone crash cushions, and fixed sign supports.

Concrete barrier and fixed sign supports, furnished and used, and purchased after October 1, 2002 must meet the requirements of Report 350.

The Contractor shall furnish a letter ONLY certifying that all concrete barrier and fixed sign supports purchased after October 1, 2002 meets the requirements of NCHRP Report 350. Concrete barrier and fixed sign supports purchased prior to October 1, 2002 may be used without written certification until they complete their normal service life.

Work zone crash cushions and truck mounted attenuators (TMAs), furnished and used, and purchased after October 1, 1998 must meet the requirements of Report 350.

The Contractor shall furnish a letter certifying that all work zone crash cushions and TMAs purchased after October 1, 1998 meets the requirements of NCHRP Report 350. Work zone crash cushions and TMAs purchased prior to October 1, 1998 may be used without written certification until they complete their normal service life.

MISSOURI

Missouri State Regulations and Specifications for Crash / Attenuator / TMA Trucks

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Missouri Department of Transportation](#)

[Missouri DOT TMA Training Manual \(p. 22\)](#)

Truck-Mounted Attenuators

Truck mounted attenuators are energy absorbing devices attached to the rear of trucks used as protective vehicles. These devices are designed to protect the motorist and protect the vehicle's driver upon impact.

MONTANA

Montana State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Montana Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

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Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

NEBRASKA

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Nebraska State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Nebraska Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

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TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

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Guidance:

07 *The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.*

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 *If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.*

NEVADA

strong>Nevada State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Nevada Department of Transportation](#)

[State of Nevada DOT Construction Manual \(Section 6: Construction, p. 6-187\)](#)

[Work Zone Safety and Mobility Implementation Guide \(p. 7\)](#)

From "State of Nevada DOT Construction Manual":

6-624.1 GENERAL

This section provides guidance on worker protection and the safe passage of public traffic through and around construction with as little inconvenience and delay as possible. Refer to the current version of the Manual on Uniform Traffic Control Devices

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

(MUTCD) and the plans for details on signs, lights, and traffic control devices used on construction projects. An electronic version of the MUTCD is found at the following web site: <http://mutcd.fhwa.dot.gov/kno-2003r1.htm> .

From "Work Zone Safety and Mobility Implementation Guide":

Temporary Traffic Control (TTC) Plan – TTC plan is used for managing traffic through a work zone. The TTC will follow NDOT and Federal Standards and Guidance for the layout and placement of traffic control devices, signs, and related equipment for the project. The degree of detail in the TTC would depend on the project complexity and traffic interference with construction activity.

NEW HAMPSHIRE

New Hampshire State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[New Hampshire Department of Transportation](#)

[Standard Specifications for Road and Bridge Construction \(Section 606, p. 6-27\)](#)

2.10 Temporary Impact Attenuators.

2.10.1 Temporary impact attenuation devices for traffic control shall be designed to meet the requirements of the National Cooperative Highway Research Program (NCHRP) Report 350 at a minimum of Test Level 2 [43.5 mph (70 km/h)] or Test Level 3 [62.1 mph (100 km/h)] as specified in the item description.

2.10.2 Temporary impact attenuation devices (redirective and Non-redirective) shall be products as included on the Qualified Products List unless allowed per 2.12.4 or specifically specified in the Contract.

2.10.3 Temporary impact attenuation devices shall be redirective or non-redirective as specified in the item description. Redirective devices shall be capable of redirecting the impacting vehicle over the full length of the device.

2.10.4 Sand barrels and water filled arrays will not be allowed for use November 1st to April 15 unless they are at least ten feet away from the travelway (measured to the face) or specifically approved in writing by the Engineer. If approved by the Engineer for winter use, the sand or water shall be treated to prevent freezing.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

2.10.4.1 The Contractor may elect to utilize either sand barrels or water filled attenuators for the non-redirective category between April 15th and November 1st. The Contractor shall provide certification that the unit complies with the NCHRP 350 test level specified.

2.10.4.2 Sand Barrel arrays and water filled impact attenuators shall be made up of modules that are durable and weather proof with outer components formulated to resist deterioration from ultraviolet rays.

2.10.4.3 When a project that is anticipated to be completed prior to November 1st , is delayed until the next season due to the Contractor's method of construction, it shall be the responsibility of the Contractor to replace sand barrel arrays with an impact attenuation device included on the Quality Products List, at no cost to the Department. When an extension of time is granted under 108.07 the additional cost for replacement will be paid in accordance with the provisions of 109.04.

2.10.5 Used impact attenuators, beam guardrail, and terminal units for traffic control barrier, in good operating condition will be allowed with approval from the Engineer.

2.10.6 Truck mounted attenuators (TMA) may be used temporary impact attenuators in accordance with 619 with approval by the Engineer. In no case shall a TMA be left in place during non-work hours, it shall be stored outside the clear zone.

NEW JERSEY

New Jersey State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[New Jersey Department of Transportation](#)

[Standard Specifications for Road and Bridge Construction 2007 \(Section 1001.03\)](#)

[Standard Specifications for Road and Bridge Construction 2007 \(section 611, p. 254\)](#)

New Jersey Certification Summary

Provide a truck having a minimum gross weight of 10 tons.

When using ballast, ensure that it is secured to the truck. Submit drawings to the RE detailing the manner of securing the ballast, signed and sealed by a Professional

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Engineer, certifying that it is capable of withstanding the impact forces for which the impact attenuator is rated.

1001.03 TRAFFIC CONTROL TRUCK WITH MOUNTED CRASH CUSHIONS

Provide a truck having a minimum gross weight of 10 tons, affixed with a bed-mounted, type C flashing arrow board, as specified in [1001.01](#), and a rear mounted crash cushion. The Contractor may use precast concrete ballast to meet the weight requirement. When using ballast, ensure that it is securely fastened to the truck. Provide crash cushions that conforms to the following requirements:

1. Meets NCHRP 350 Level 3 crash-worthiness requirements.
2. Designed to be attached to the rear of a truck.
3. Equipped with a 90-degree hydraulic tilt system to raise and lower the crash cushion. The tilt system shall have a locking mechanism to secure the crash cushion when in the raised position.
4. If equipped with energy absorbing modules, ensure that they are painted yellow.
5. Displays alternating 6-inch wide black and yellow bands, composed of Type III-retroreflective sheeting, as specified in ASTM D 4956, in an inverted “V” chevron pattern on the surface of the rear module that faces traffic. When in the raised position, ensure that the surface of the rear facing module also displays the chevron pattern.
6. Equipped with standard trailer lighting systems, including brake lights, taillights, and turn signals that are visible in the raised and lowered positions.

159.03.02 Traffic Control Devices – Section 6.

Traffic Control Truck with Mounted Crash Cushions. Provide the RE with a copy of the crash cushion manufacturer’s recommendations. Position the traffic control truck to ensure that there is adequate stopping distance after impact and to prevent errant vehicles from traveling around the truck and endangering workers. When used in a fixed position, place manual transmission vehicles in second gear and place automatic transmission vehicles in park. Ensure that the parking brake is set, and the wheels are turned to avoid rolling into active traffic lanes. Do not use traffic control trucks in place of other temporary impact attenuators for more than 24 hours. Relocate the traffic control truck as specified by the TCP, or as directed by the RE. Do not use the truck to carry additional equipment, materials, or debris. When using ballast, ensure that it is secured to the truck. Submit drawings to the RE detailing the manner of securing the

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

ballast, signed and sealed by a Professional Engineer, certifying that it is capable of withstanding the impact forces for which the impact attenuator is rated.

NEW MEXICO

New Mexico State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[New Mexico Department of Transportation](#)

[Standard Specifications for Highway and Bridge Construction 2014 \(p. 766\)](#)

SECTION 720: VEHICULAR IMPACT ATTENUATOR UNITS

720.1 DESCRIPTION

This Work consists of providing and installing vehicular impact attenuator units and sand barrel vehicular impact attenuator units.

720.2 MATERIALS

Provide Materials from the Department's Approved Products List for vehicular impact attenuator units, which the Contractor may obtain from the State Maintenance Bureau. Use Materials of the manufacturer's latest approved design. Use Materials of a uniform type and from a single manufacturer. Do not mix component parts.

Suppliers of vehicular impact attenuator units proposed for including on the Department's Approved Products List shall submit certification for approval to the Traffic Services Engineer. The certification shall be a signed and notarized statement prepared by the manufacturer stating that the Materials proposed for use have met the testing requirements in accordance with NCHRP Report 350.

Submit manufacturers' certificates, literature, and shop drawings to the Project Manager for approval before fabrication and installation of the units.

Provide Class A concrete, if required by the Contract for foundations and anchors, in accordance with Section 510, "Portland Cement Concrete."

Provide reinforcing steel in accordance with Section 540, "Steel Reinforcement."

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

720.2.1 Vehicular Impact Attenuator Units

720.2.1.1 Manufacturer Identification and Marking

Provide vehicular impact attenuator units identifying the type of unit permanently stamped on each unit. The permanent stamp shall correspond with those shown on the shop drawings.

NEW YORK

New York State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[New York Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

NORTH CAROLINA

North Carolina State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[North Carolina Department of Transportation](#)
[North Carolina Department of Transportation Maintenance / Utility Traffic Control Guidelines \(pp. 42-43\)](#)

Notes for Truck Mounted Attenuators

1. The weight of Truck and TMA in a moving and stationary operation varies from 10,000 lbs. to 20,000 lbs. The truck may be ballasted as needed to reach the required weight using NCDOT approved ballasting methods. The Qualified Work Zone Supervisor will determine if the truck is properly ballasted.
2. When TMA's used for shadow vehicles, contact the TMA manufacturer for specific truck requirements.
3. TMA must meet or exceed the requirements of NCHRP 350 test level II for work zones with posted speed limit of 45 mph or less; or test level III for work zones with posted speed limit of 50 mph or greater. TMA may either be truck mounted or trailer mounted.
4. Each Truck Mounted Attenuator has different roll-ahead distances for stationary use and moving and mobile operation use. Use the manufacturer's recommendations for these distances. Insure you have taken these distances into account when positioning the TMA in front of workers on foot. When using a TMA in a stationary work zone turn wheels away from the live traffic lane, engage the emergency brake, and place the truck in gear.
5. TMA's must be operated during moving and mobile work zones either COMPLETELY in the lane or COMPLETELY on the shoulder of the roadway.
6. Do not use 5-point harness for drivers unless is it fitted to their body size.
7. TMA drivers shall not leave vehicle while in a moving or mobile work operation.

NORTH DAKOTA

North Dakota State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)
[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)
[North Dakota Department of Transportation](#)
[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

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TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

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Support:

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Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

OHIO

Ohio State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Ohio Department of Transportation](#)

[Ohio Manual of Uniform Traffic Control \(Part 6, Temporary Traffic Control, p. 623\) State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 **Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or**

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

OKLAHOMA

Oklahoma State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Oklahoma Department of Transportation](#)

[Oklahoma Department of Transportation Commission document \(Section 876, p. 786\)](#)

TRUCK MOUNTED IMPACT ATTENUATORS

876.01 DESCRIPTION

The work consists of providing, installing, operating, maintaining, and relocating truck-mounted impact attenuators. This work also consists of providing, stockpiling, and moving repair packages.

876.02 MATERIALS

Provide truck-mounted impact attenuators with the following components:

- Crushable cartridge encased in a shell,
- Backup and support assembly to attach the backup to the truck, and
- Truck with a gross vehicle weight from 15,000 lb to 35,000 lb [6,800 kg to 15,800 kg].

Provide a truck chassis to mount the impact attenuator with a clearance from 11 in to 13 in [280 mm to 330 mm] between the bottom of the shell and the roadway.

Provide truck-mounted attenuators in accordance with the test requirements, procedures, and results in NCHRP 350 report Test Level III approved by the FHWA. Submit certified test results meeting the test and performance criteria in accordance with NCHRP 350.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Provide the truck-mounted impact attenuator cartridge with a standard trailer lighting system. Provide a 90° tilt system with a mechanical locking device to secure the truck-mounted attenuator cartridge in the 90° position.

OREGON

Oregon State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Oregon Department of Transportation](#)

[Oregon's Guidelines for Product Review website \(Spec # 00225.12\)](#)

00225.12 – Impact Attenuator, Truck Mounted

ODOT keeps two types of truck-mounted attenuators on the Qualified Products List (QPL).

- NCHRP 350 Test Level 2
- NCHRP 350 Test Level 3

Specifications – We require the product to comply with the following:

- (a) The attenuator shall be constructed so that its components are retained and will not be obstacles to nearby traffic if impacted and not go under the support truck.
- (b) The attenuator tilt assembly shall position the attenuator in the operating position and travel position.
- (c) The impacted attenuator shall not encapsulate the impacting vehicle so as to trap the occupants inside the impacting vehicle.

To have your product listed, you must show satisfactory compliance with:

1. Crash test standards set forth by NCRHP 350 TL 2, or
2. Crash test standards set forth by NCRHP 350 TL 3.

PENNSYLVANIA

Pennsylvania State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

[Pennsylvania Department of Transportation](#)

[Pennsylvania Department of Transportation Attenuator Regulations](#)

§ 212.416. Shadow vehicles.

When used with a truck-mounted attenuator (TMA), the shadow vehicle must be loaded to a weight recommended by the manufacturer of the TMA.

RHODE ISLAND

Rhode Island State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Rhode Island Department of Transportation](#)

[Standard Specifications for Road and Bridge Construction \(Section 928, pp. 9-50 – 9-51\)](#)

TRUCK MOUNTED ATTENUATOR (TMA) WITH TRUCK MOUNTED FLASHING ARROW BOARD (TMFAB)

928.01 DESCRIPTION. This work consists of providing, operating, and maintaining truck mounted energy absorbing impact attenuators, replacement attenuator cartridges, and truck mounted flashing arrow boards, at the locations indicated on the Plans or as directed by the Engineer, all in accordance with these Specifications.

928.02 MATERIALS.

928.02.1 Truck Mounted Attenuator (TMA). The TMA is a lightweight attenuation system designed for installation at the back of traffic control trucks. It consists of three basic component sections – a crushable module, a lightweight steel backup, and a support frame for attaching the backup to the truck.

The complete TMA shall be designed to make attachment or detachment from the truck simple and fast and shall be installed in accordance with the manufacturer's recommendations.

a. Module Materials. Light fixtures shall consist of combination run, turn, brake, and side clearance lights with ICC identification lights on the rear of the TMA. All light fixtures shall have rubber grommet seals. A standard SAE/AT/TTMA interchangeable 7-way trailer light wire connector shall be installed and wired to SAE standards.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

All standard modules shall have a chevron pattern painted on the rear of the module. The standard chevron pattern shall have 4-inch wide stripes, alternating black and yellow, slanted at 45 degrees in an inverted “V” form with the “V” located at the center of the module.

All standard modules assembly shall be covered for debris containment during an impact and for environmental protection.

b. Crushable Frame. The crushable frame which supports the TMA assembly shall be fabricated from standard steel shapes. The module shall be fastened to the internal frame.

c. Steel Backup. The steel backup shall be special lightweight assembly which shall support the TMA cartridge during normal use and shall resist the loads applied to it during impacts. This backup shall be capable of tilting upward toward the truck 90 degrees for travel or storage. Positions will be either 90 degrees or horizontal.

d. Attachment to the Truck. The TMA shall be designed to interface with a truck as specified herein. Engineers from the TMA manufacturers shall be supplied with a dimensional layout sheet of the truck to which the TMA will be attached. The interface structure between the TMA and the truck will then be custom fabricated by TMA manufacturers.

e. Metal Work-Fasteners. All metal work shall be fabricated from ASTM A36 or M1020 merchant quality steel. After fabrication, all metal work shall be coated with metal primer and painted black. All welding shall be done by, or under the direction of, a certified welder. All bolts, nuts, and washers shall be corrosion resistant American National Standard.

f. Wire Rope. All wire ropes shall be 3/8-inch diameter galvanized, 7 x 19 aircraft cable manufactured to Military Specifications.

g. Weight. The TMA with 90-degree tilt shall weigh approximately 1200 pounds.

h. Hydraulics. The TMA with 90-degree tilt shall have a 12 volt D.C. hydraulic pump and cylinder which will be used to tilt the Hex-Foam module 90 degrees up from horizontal position. The hydraulic pump shall be supplied with a remote activation switch.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

i. Wheel Jacks. The TMA with 90-degree tilt shall be capable of accepting two hand crank swivel jacks and two swing jacks at the rear to assist in the removal of the module and backup from the truck. These jacks shall have wheels to provide portability of the TMA once it is removed from the truck.

j. Testing Criteria. The TMA until shall have been tested to the criteria as listed in the National Cooperative Highway Research Program No. 350, dated 1993. A copy of the results of such testing must be available upon request and have been written by a Registered Professional Engineer. The TMA shall be capable of passing the following tests:

1. **Vibration.** Eight hours of constant vibration with a frequency of 5 HZ and a minimum amplitude of .5-inch, input at the base of the backup. The intent of this test is to simulate worst case road vibrations.
2. **Moisture.** Twenty-four hours of simulated rain on the top of the unit at the rate of 10 inches per hour. Twenty-four hours of simulated rain on the bottom of the unit at 10 inches per hour. The test should result in no water accumulation or moisture absorption by the module material.
3. **Corrosion.** When subjected to 50 hours of salt spray (fog), in accordance with ASTM B117, the energy absorbing material shall show no signs of corrosion or decrease in the energy absorbing capacity of the material.

928.02.2 Replacement Cartridges. The Contractor shall have a replacement cartridge available at all times. In the event that the original TMA is damaged due to a crash of an oncoming vehicle during construction the replacement cartridge will be used. The replacement cartridge shall include the module, internal support system, and hydraulic jacks. If the original TMA is damaged, the replacement cartridge will be used and a third cartridge will be ordered and paid for on a Force Account basis as set forth in Subsection 109.04, Para. a.4 of these Specifications.

928.02.3 Truck Mounted Flashing Arrow Board (TMFAB). Attached to the traffic control truck, as described herein, shall be an illuminated truck mounted flashing arrow board. The TMFAB shall be a 4 foot by 8 foot board mounted at the rear of the truck.

The TMFAB shall contain at least 12 #4412A (or equal) amber lights each of which shall have approximately 6,000 initial maximum candle power with a flash rate of approximately 30 per minute and which shall indicate an arrow to the left, an arrow to the right or an arrow to both sides simultaneously to warn approaching traffic. The

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

center of the arrow shall be mounted a minimum of 9 feet above the roadway. For nighttime use the unit shall be equipped for lamp intensity reduction to eliminate glare.

The TMFAB shall be powered by a diesel-fueled generator equipped with backup batteries.

928.02.4 Traffic Control Truck. The Contractor shall provide a truck weighing between 10,000 pounds to 24,000 pounds or one specified by the manufacturer and approved by the Engineer. The truck shall be adaptable to mounting the TMA and TMFAB to the rear of the truck.

928.03 CONSTRUCTION METHODS. The TMA and TMFAB shall be available for use throughout the duration of the Contract. It shall be positioned and repositioned at the direction of the Engineer.

The Contractor shall properly maintain the TMA and TMFAB throughout the Contract period.

SOUTH CAROLINA

South Carolina State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[South Carolina Department of Transportation](#)

[Stand Specifications for Highway Construction document \(Section 605, pp. 324-325\)](#)

605.2.2 Work Zone Attenuators

605.2.2.1 General

Ensure that each attenuator complies with requirements of the NCHRP Report 350. Use attenuators included on the Approved Products List For Traffic Control Devices in Work Zones.

605.2.2.2 Truck-Mounted Attenuators

605.2.2.2.1 General

Provide truck-mounted attenuators designed and constructed for controlled deceleration of an impacting vehicle and dissipation of the vehicle's kinetic energy. When struck on the front of the unit, ensure that the unit has

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

the capability to bring the errant vehicle to a safe and controlled stop and functions within the requirements as detailed by the Specifications and the manufacturer's specifications.

Use the truck-mounted attenuators included on the *Approved Products List For Traffic Control Devices in Work Zones*.

605.2.2.2.2 Performance Requirements

605.2.2.2.2.1 General

Ensure that each truck-mounted attenuator complies with *NCHRP Report 350* requirements for Test Level 2 or Test Level 3.

When an attenuator mounted on a truck weighing 15,000 pounds or more is impacted by an errant vehicle, ensure that the truck-mounted attenuator performs as specified in Subsection **605.2.2.2.2.2** or **605.2.2.2.2.3** according to the test level required.

605.2.2.2.2.2 Test Level 2

Ensure that the truck-mounted attenuator is capable of decelerating and stopping vehicles weighing 1800 pounds during head-on impacts at 43 mph. Make certain that the truck-mounted attenuator meets the occupant risk criteria during the impact of a small car into the unit as required by the *NCHRP Report 350*, Test 50.

605.2.2.2.2.3 Test Level 3

Ensure that the truck-mounted attenuator performs under Test 3 conditions in accordance with the following requirements:

A. Decelerate and stop vehicles weighing 1800 pounds during head-on impacts at 62 mph. Meet the occupant risk criteria during the impact of a small car into the unit as required by the *NCHRP Report 350*, Test 50.

B. Decelerate and stop vehicles weighing 4400 pounds during head-on impacts at 62 mph. Meet the structural adequacy requirements, the occupant risk criteria, and the criteria for an acceptable roll-ahead distance of the supporting truck during the impact of a heavy passenger vehicle into the unit as required by the *NCHRP Report 350*, Test 51.

C. *NCHRP Report 350* Test 52 and Test 53 results are desirable. If requested by the Department, submit a detailed report of certified test data showing conformance to the requirements of Test Numbers 50 and 51 of *NCHRP Report 350*.

605.2.2.2.3 System Description

605.2.2.2.3.1 General

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Ensure that each truck-mounted attenuator is new or in like-new condition. Furnish each unit with all equipment, options, and features as required by the Specifications.

605.2.2.2.3.2 Lights

Equip each truck-mounted attenuator with lights and reflectors in compliance with applicable South Carolina motor vehicle laws, including turn signals, dual tail lights, and brake lights. Ensure that lights are visible in both the raised and lowered positions of the attenuator.

605.2.2.2.3.3 Color

Stripe the rear face of the unit in the operating position with alternating 4-inch black and 4-inch safety yellow 45-degree striping. Ensure that the striping forms an inverted “V” at the center of the unit and will slope down and toward the outside of the unit, in both directions from the center. Use industrial grade enamel paint.

605.2.2.2.3.4 Types of Truck-Mounted Attenuators

605.2.2.2.3.4.1 Cartridge Type

Make certain that the major performance characteristic of this type of truckmounted attenuator is an energy absorbing material surrounded with an aluminum shell. Ensure that each unit consists of an expendable (crushable) cartridge, a backup structure, and a mounting assembly.

605.2.2.2.3.4.2 Mechanical Type

Ensure that the major performance characteristic of this type of truckmounted attenuator is a steel frame structure with a bracket assembly attached to a bumper assembly. Make certain that the steel frame has sufficient structural strength to compress evenly.

SOUTH DAKOTA

South Dakota State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration’s “Manual on Uniform Traffic Control Devices”](#)

[South Dakota Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

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TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

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TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

TENNESSEE

Tennessee State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Tennessee Department of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

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01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 **Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or**

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damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

TEXAS

Texas State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Texas Department of Transportation](#)

[Compliant Work Zone Traffic Control Device List document \(Section L, p. 9-12\)](#)

L. TRUCK-MOUNTED PROTECTIVE DEVICES

L.1. Truck-Mounted Attenuators

Truck-mounted attenuators (TMA) used on TxDOT facilities must be NCHRP 350 or MASH compliant. NCHRP 350 Level 2 compliant TMAs are approved for use only on roadways with regulatory speed limits of 45 mph or less. NCHRP 350 Level 3 compliant TMAs may be used on any TxDOT facility.

The supporting vehicle shall have a gross (i.e., ballasted) vehicular weight of 20000 ± 1000 pounds unless another weight is recommended by the TMA manufacturer. If a contractor chooses to use a lighter vehicle to mount the TMA, then the contractor is responsible for following the TMA manufacturer's recommendations and for being aware of the effect that a lighter vehicle will have on the roll-ahead distance and on the driver of the shadow vehicle. Attachment of TMA shall be in accordance with manufacturer's recommendations.

NCHRP 350 Test Level 3 Compliant

- U-MAD Cushion 100K Impact TMA (Barrier Systems, Inc.).
- U-MAD 100k Trailer TMA (Barrier Systems, Inc.).
- Alpha 100K (Energy Absorption Systems, Inc.).
- SAFE-STOP™ (Energy Absorption Systems, Inc.).
- SAFE-STOP™ 180 TMA (Energy Absorption Systems, Inc.).
- SAFE-STOP™ Trailer TMA (Energy Absorption Systems, Inc.).
- Vorteq TL-3 Trailer TMA (Energy Absorption Systems, Inc.).
- RAM 100K (Renco, Inc.).
- SS90 HD TMA (Trinity Highway Products).

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- MPS 350 III TMA (Trinity Industries, Inc.).
- Scorpion C 10000 (TraFFix Devices, Inc.).
- Scorpion Trailer Attenuator (17.3' long) (TraFFix Devices, Inc.).
- TTMA-100 Trailer TMA (Gregory Industries, Inc.).
- NCHRP 350 Test Level 2 Compliant
- Alpha 70K (Energy Absorption Systems, Inc.).
- Ren-Gard 815 (Renco, Inc.).
- Scorpion A 10000 (TraFFix Devices, Inc.).
- U-MAD 70k Trailer TMA (Barrier Systems, Inc.).

UTAH

Utah State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Utah Department of Transportation](#)

[State Highway Maintenance Manual \(Guideline 51.43\)](#)

A. General Policy

A truck mounted attenuator (TMA) is an energy absorption device that can serve as a temporary barrier when placed between live traffic and a work area on highways that must remain open to traffic during repairs or accidents. The TMA may significantly help to minimize injuries or fatalities associated with a collision between a vehicle and a truck used for protecting (blocking) a work area.

A TMA should be used to protect workers, equipment, and/or materials in lane and/or shoulder closures if a county has a TMA supplied by the department or has already purchased one. However, a county may not have a TMA available to use due to budgetary constraints. If this occurs, the use of a blocking vehicle without a TMA is acceptable. It is also possible that a county may not have enough TMAs available for use on all their projects on a particular day. If this occurs, the county should use all of the TMAs available to them first before using vehicles without TMAs for protection.

C. Implementation

Truck Mounted Attenuators should be used to protect people, equipment, and or materials in a work or accident area that is part of a closed traffic lane and/or shoulder while the road remains open to traffic. TMAs can be used for both stationary and

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moving operations. Diagrams showing the proper use of TMAs can be found in the Manual of Uniform Traffic Control Devices (MUTCD), Part VI. Sample diagrams derived from MUTCD Part VI along with the proper spacing requirements between the TMA and the work area can be found in Guideline 51.20.

VERMONT

Vermont State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Vermont Agency of Transportation](#)

[State Regulations document \(MUTCD, Section 6F.86, pp.617-618\)](#)

Section 6F.86 Crash Cushions

Support:

01 Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles, either by smoothly decelerating the vehicle to a stop when hit head-on, or by redirecting the errant vehicle. The two types of crash cushions that are used in TTC zones are stationary crash cushions and truck-mounted attenuators. Crash cushions in TTC zones help protect the drivers from the exposed ends of barriers, fixed objects, shadow vehicles, and other obstacles. Specific information on the use of crash cushions can be found in AASHTO's "Roadside Design Guide" (see Section 1A.11).

Standard:

02 Crash cushions shall be crashworthy. They shall also be designed for each application to stop or redirect errant vehicles under prescribed conditions. Crash cushions shall be periodically inspected to verify that they have not been hit or damaged. Damaged crash cushions shall be promptly repaired or replaced to maintain their crashworthiness.

Support:

03 Stationary crash cushions are used in the same manner as permanent highway installations to protect drivers from the exposed ends of barriers, fixed objects, and other obstacles.

TMA TRUCK STATE REGULATIONS – LAST UPDATED NOV. 2015

Standard:

04 Stationary crash cushions shall be designed for the specific application intended.

05 Truck-mounted attenuators shall be energy-absorbing devices attached to the rear of shadow trailers or trucks. If used, the shadow vehicle with the attenuator shall be located in advance of the work area, workers, or equipment to reduce the severity of rear-end crashes from errant vehicles.

Support:

06 Trucks or trailers are often used as shadow vehicles to protect workers or work equipment from errant vehicles. These shadow vehicles are normally equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights located properly in advance of the workers and/or equipment that they are protecting. However, these shadow vehicles might themselves cause injuries to occupants of the errant vehicles if they are not equipped with truck-mounted attenuators. December 2009 Sect. 6F.85 to 6F.86age 618 2009 Edition

Guidance:

07 The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected so that there will be sufficient distance, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

Support:

08 Chapter 9 of AASHTO's "Roadside Design Guide" (see Section 1A.11) contains additional information regarding the use of shadow vehicles.

Guidance:

09 If used, the truck-mounted attenuator should be used in accordance with the manufacturer's specifications.

VIRGINIA

Virginia State Regulations and Specifications for Crash / Attenuator / TMA Trucks
[U.S. Department of Transportation](#)
[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

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[Virginia Department of Transportation
Road and Bridge Specifications document \(p. 579\)](#)

(p) Truck-mounted Attenuators: Truck-mounted attenuators shall conform to the requirements of NCHRP Report 350, Test Level 3.

Prior to their use, the Contractor shall submit catalog cuts/brochures of the truck-mounted attenuator and a copy of the FHWA's acceptance letter documenting acceptance of the specific truck-mounted attenuator.

The truck-mounted attenuator shall be no less than 72 inches wide and no more than 96 inches wide. The color of the truck-mounted attenuators shall be yellow or orange.

The rear panel shall have alternate 6-inch-wide orange and black chevron (inverted V) stripes. Stripes shall be sloped at a 45-degree angle downward in both directions from the upper center of the rear panel. Stripes shall be fabricated from fluorescent orange prismatic lens reflective sheeting conforming to the requirements of Section 247.02(e).

The support vehicle shall have at least one rotating amber light or high-intensity amber strobe light functioning while in operation in accordance with the *Virginia Work Area Protection Manual (visible for 360 degrees)*. When allowed by the *Virginia Work Area Protection Manual*, an electronic arrow operated in the caution mode may be used in lieu of the rotating or high-intensity amber strobe light.

The transmission of the support vehicle with the truck-mounted attenuator in use shall be in second gear, except for those with automatic transmission, which shall be in park. The parking brake shall be applied and the front wheels aligned straight ahead when operating in the stationary mode.

Limitations: Support vehicles shall not be used for other purposes while the truck-mounted attenuator is being used. There shall be no additional devices in the bed of the support vehicle except the additional weight as allowed in the Section and traffic control devices such as truck-mounted electronic arrows. There shall be no additional devices, including, but not limited to, signs, lights, and flag holders attached to the truck-mounted attenuator except those that were tested on the truck-mounted attenuator and provided by the manufacturer of the truck-mounted attenuator.

In the event the truck-mounted attenuator is impacted, resulting in damage that would cause the unit to be ineffective, all work requiring the use of the truck-mounted

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attenuator shall be ceased until such time that the Contractor can provide an acceptable unit by means of repair or replacement.

WASHINGTON

Washington State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Washington Department of Transportation](#)

[Manual on Uniform Traffic Control \(MUTCD\) \(2009\)](#)

[Washington State Modifications to the 2009 Manual on Uniform Traffic Control Devices for Streets and Highways \(Chapter WAC 468-95\)](#)

[Design Manual \(p. 1010-20\)](#)

1010.08 Work Zone Design Standards

Part 6 of the MUTCD mostly addresses short-duration temporary traffic control standards. Some long-duration work zones may require temporary alignments and channelization, including barrier and attenuator use, temporary illumination and signals, and temporary pedestrian and bicycle routes. Refer to the Design Manual's chapters on permanent features for design guidance.

WEST VIRGINIA

West Virginia State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[West Virginia Department of Transportation](#)

[Work Zone Safety: Guidelines for Temporary Traffic Control \(p. 18-19\)](#)

Shadow Vehicles

A shadow vehicle (see Truck Mounted Attenuators) shall be placed 80' to 120' in advance of the first work crew encountered by traveling motorists. A shadow vehicle should be used when installing and removing TTC devices and be placed 80' to 120' in advance of the each work crew. **Each shadow vehicle shall have at least one**

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amber high intensity rotating, oscillating, strobe or flashing light functioning while in operation. A work vehicle shall be used to store, install and remove TTC devices.

Truck Mounted Attenuators

A shadow vehicle requires a truck mounted attenuator (TMA) in all lane and/or partial ramp closures on four or more lane roadways when the posted speed limit is 45 mph or greater, and for mobile operations which fully or partially block a lane on roadways posted 45 mph or greater. All TMA units shall conform to the requirements of NCHRP 350 – Test Level 3 or MASH regardless of where the unit will be used.

Placement of shadow vehicle with the TMA shall be 80' to 120' in front of the first work crew, equipment, or hazard encountered by traveling motorists. A shadow vehicle should be placed 80' to 120' in advance of the each work crew. Each TMA vehicle shall have at least one amber high intensity rotating, oscillating, strobe or flashing light functioning while in operation.

WISCONSIN

Wisconsin State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Wisconsin Department of Transportation](#)

[Work Zone Safety: Guidelines for Construction, Maintenance, & Utility Operations \(p. 52\)](#)

Mobile Operations on a Multi-Lane Road (continued)

Notes

1. Vehicles used for these operations should be made highly visible with appropriate equipment, such as activated high intensity lights, flags, signs, or arrow boards.
2. Shadow vehicle #1 should be equipped with an arrow board and truck mounted attenuator.

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3. Shadow vehicle #2 should be equipped with an arrow board and may be equipped with a truck mounted attenuator. An appropriate lane closure sign should be placed on shadow vehicle #2 so as not to obscure the arrow board.

WYOMING

Wyoming State Regulations and Specifications for Crash / Attenuator / TMA Trucks

[U.S. Department of Transportation](#)

[U.S. DOT Federal Highway Administration's "Manual on Uniform Traffic Control Devices"](#)

[Wyoming Department of Transportation](#)

[Traffic Control for Roadway Work Operations \(pp. 17-18\)](#)

Shadow Vehicle

In the case of mobile and constantly moving short duration operations, such as pothole patching and striping operations, a shadow vehicle equipped with appropriate lights and warning signs shall be used to protect workers.

These shadow vehicles are normally equipped with:

- sequential chevrons
- changeable message signs
- and/or high-intensity rotating, flashing, oscillating, or strobe
- lights located properly in advance of the workers and/or equipment that they are protecting
- black on orange signs

The shadow truck should be positioned a sufficient distance in advance of the workers or equipment being protected, but not so much so that errant vehicles will travel around the shadow truck and strike the protected workers and/or equipment.

- • If shadow vehicles are not used, a lane closure must be used
- • Don't stop just over crest of hill
- • Keep buffer space

The shadow vehicle is the first vehicle that a motorist sees, so it should stay as far to the right or left as possible.

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Truck-mounted attenuators and trailer-mounted attenuators can provide an extra measure of safety to workers and errant motorists by absorbing the energy of a crash. If used, the TMA should be used in accordance with the manufacturer's specifications. For mobile or short duration operations, a TMA is required if the AADT is 10,000 vehicles or more (5,000 vehicles per direction of travel) on the Interstate. For two-lane roads, an AADT of 5,000 requires a TMA. If a TMA is not available, a lane closure shall be used. For roads that do not meet the AADT requirement, a TMA is strongly encouraged but not required.