

Missouri Department of Transportation

PURCHASE SPECIFICATIONS FOR TRUCK MOUNTED ATTENUATORS (TMA's) AND TRAILER MOUNTED ATTENUATORS (TrMA's) MEETING NCHRP 350 TEST LEVEL 3 FOR USE BY MoDOT.

Truck Mounted Attenuator (TMA) General Specifications

All Truck Mounted Attenuators, hereinafter referred to as TMA's, shall:

1. Be a model that has been successfully crash tested and certified in accordance with National Cooperative Highway Research Project (NCHRP) 350 Test Level 3 requirement with compatible support vehicle attachment installation as approved by the engineer.
2. Be a model that has been approved by the Federal Highway Administration for meeting NCHRP 350 Test Level 3 crashworthiness.
3. Be a model that has been reviewed and approved by MoDOT. .
4. Be a model that complies with MoDOT's specifications as follows.

COMPONENTS OF TMA SYSTEM

The TMA shall consist of the following basic components:

1. Truck mounting bracket or plate, including any resting and locking brackets for transport. (Components that mount directly to the TMA support vehicle and permits the attenuator to be attached to the bracket or plate in a quick connect/disconnect method.)
2. TMA head frame, support frame assembly, or universal bracket extension required to meet the safety requirements stated in the TMA Manufacturer's literature (the component which is attached to the truck mounting bracket or plate, and supports the attenuating device, and is generally reusable after impact). Vendors should bid their standard support frame. Tailgate mounting systems or other systems should be bid as options or under parts list.
3. Attenuating device (that component which is sacrificed by the impacting vehicle and is not reusable after impact).

DESCRIPTION OF TMA SUPPORT VEHICLE

MoDOT has the need for TMAs to be installed on single and tandem axle trucks. The single axle trucks have 28,000 to 34,000 GVW, tare at 11,000 lbs to 16,000 lbs, and are ballasted to about 19,000 lbs. for TMA applications. The tandem axle trucks have a 42,000 to 62,000 GVW ratings and tare at 18,000 to 26,000 lbs. MoDOT has special applications, such as striping nurse trucks, where TMAs are needed for trucks, which may start the day at 66,000 lbs and end the day at about 24,000 lbs. MoDOT will select the best model to best meet our needs for routine and special operations with consideration of each models recommended capabilities. Vendors shall provide their recommended gross vehicle operating weight range for every model. MoDOT will

consider these operating ranges to meet special needs.

Vendor shall provide a copy of the FHWA approval letter and supporting literature regarding the FHWA approval for each model of TMA.

Vehicle fuel (saddle) tanks are typically mounted on the truck frame located at the cab. The minimum distance from the rear bumper of the truck to the rear of the fuel tank is approximately 112 inches.

DESCRIPTION OF TMA SYSTEM

SUPPORT VEHICLE VERSATILITY

Any truck-mounting bracket or plate permanently attached to the TMA support vehicle intended to accommodate the TMA shall permit the pintle hitch to remain on the TMA support vehicle, and not have any portion of the bracket extend beyond the bed of the support vehicle (that might interfere with slip in salt spreaders).

MoDOT has a few regions that utilize under tailgate spreaders having brine tanks mounted on the tailgates. Vendors should list mounting extensions in their parts list to accommodate the use of TMAs on these types of trucks.

MoDOT continues to consider other enhancements to TMA systems which include extensions which allow an operator to stand between the TMA and the truck to hand set and pick up traffic cones. Vendors should list this system with their parts lists.

MOUNTING SIMPLICITY

The TMA must have the capability to be attached to or removed from the support vehicle without the aid of additional transfer or lifting equipment and be able to be moved on its own support system, consisting of a sufficient number of hand crank wheel jacks with swivel casters. Wheel jacks on the attenuator shall be swivel or retractable. The jacks shall not interfere with the operation of the unit, nor cause the unit to be illegal in width. If the wheel jacks are intended to be removable, they shall be quick connect/disconnect. If the wheel jacks are intended to be retractable, they must retract in a manner such that the bottom of the wheel on the jack does not extend below the bottom of the TMA.

ELECTRICAL/LIGHTING SYSTEM

Electrical power for the stop, turn and tail lights on the TMA shall be via a 7-pin male connector (SAE J560 Standard, most recent revision) on the TMA to fit a 7-pin female connector on the rear of the support vehicle. The power requirements of the TMA shall be compatible with the 12-volt electrical system of the TMA support vehicle. Each TMA shall be equipped with a four lamp stop, turn and tail lighting system and a standard three lamp identification light bar system, configured in such a manner as to provide proper lighting when the attenuator is in the horizontal (protective) mode or in the vertical (traveling or non-protective) mode. Turn signal lights on the TMA shall operate independently of the brake lights. All wiring terminal connections shall be crimped, soldered, heat shrink and with weatherproof connectors.

MAXIMUM DIMENSIONS

The overall width of the TMA assembly shall not exceed eight (8) feet (Legal width). The overall height in the vertical position (traveling mode or non-protective mode) shall not exceed thirteen (13) feet six (6) inches (Legal height).

TMA CONTROLS

POWER UP/DOWN

For bidding purposes, the TMA shall be equipped to raise and lower by an independent self-contained system powered by the truck electrical system. Option A is intended to delete this electric over hydraulic lift system and use the standard snow plow lift hydraulics, which are on most all trucks.

The typical MoDOT hydraulic system includes two valves, which normally control the front snowplow lift (single acting) and reversing (double acting) functions at 3 to 8 G.P.M. The valves are spring return to neutral with adjustable section flow compensator. Either or both can be used to operate the TMA. MoDOT installs some TMA's on trucks that do not have on-board hydraulics.

If the truck electrical system is used to power the raise and lower mechanism, adequate safe guards must be included in the control system to prevent a direct short from damaging the truck or the truck electrical system. The TMA supplier shall provide any electrical cables or components needed for controlling the raising and lowering function of the TMA.

IN CAB CONTROLS

A locking device is required for securing the TMA unit in place for transport in the vertical position (traveling or non-protective mode) and must be capable of being controlled from inside the cab of the TMA support vehicle. The TMA shall have the capability of being raised from the horizontal position (protective mode) to the vertical position (traveling or non-protective mode) and vice versa from the cab without the need to manually release or set any locking device. The TMA manufacturer shall supply any in cab remote control locking devices that are separate from the hydraulic controls of the MoDOT vehicle of choice as part of the bid. Any remote control locking device must be easily installed and removable such that the TMA can be used on different MoDOT vehicles. Vendor can quote an option to delete any hard-wire controls and substitute wireless systems in their tabulation of parts with pricing.

COMBINATION TMA WITH ARROW BOARD

MoDOT routinely bids and contracts arrow boards. Some TMA vendors provide TMA systems which incorporate arrow boards. Vendors can provide quotes for TMA / arrow board combinations, but any proposed arrow boards should be quoted in the parts lists with detailed information. These will be considered and approved under current arrow board specifications.

FINISH

EXTERIOR

Exterior steel surfaces shall be galvanized or finished with a corrosion resistant primer and finish paint coat (either black or chrome yellow). Exterior aluminum surfaces shall be finished with chrome yellow paint.

SPECIAL MARKINGS

The rear face of the attenuator device, when in the horizontal or operating position (protective mode), shall be marked with red and white retroreflective sheeting. The marking shall form a checkerboard pattern consisting of 12" by 12" red squares and 12" by 12" white squares spaced symmetrically starting from the top center.

The rear face of the attenuator device, when in the vertical position (traveling mode or non-protective mode), shall NOT be marked with yellow or black sheeting. The TMA shall be marked with red and white DOT conspicuity tape to simulate the looks of a standard van body trailer when traveling.

FINISHED ASSEMBLY

The TMA manufacturer shall supply all parts necessary to meet this specification and a parts manual showing the different replacement parts that are available for making repairs to the TMA. A simple easy to follow assembly instruction book shall also be provided. The manufacturer shall state the total weight of the complete TMA (this includes all pins, bolts and hardware to mount the TMA unit to the TMA support vehicle).

Trailer Mounted Attenuator (TrMA) General Specifications

All Trailer Mounted Attenuators, hereinafter referred to as TrMA's, shall:

1. Be a model that has been successfully crash tested and certified in accordance with National Cooperative Highway Research Project (NCHRP) 350 Test Level 3 requirement with compatible support vehicle attachment installation as approved by the engineer.
2. Be a model that has been approved by the Federal Highway Administration for meeting NCHRP 350 Test Level 3 crashworthiness.
3. Be a model that has been reviewed and approved by MoDOT. .
4. Be a model that complies with MoDOT's specifications as follows.

COMPONENTS OF TrMA SYSTEM

The TrMA shall consist of the following basic components:

1. TrMA trailer assembly on which the attenuating device is supported and transported by the host vehicle.
2. Attenuating device (that component which is sacrificed by the impacting vehicle and is not reusable after impact).

DESCRIPTION OF TrMA SUPPORT VEHICLE

MoDOT has the need for TrMAs to be installed on single and tandem axle trucks. The single axle trucks have 28,000 to 34,000 GVW, tare at 11,000 lbs to 16,000 lbs. The tandem axle trucks have a 42,000 to 62,000 GVW ratings and tare at 18,000 to 26,000 lbs. MoDOT has special applications, such as striping nurse trucks, where TrMAs are needed for trucks, which may start the day at 66,000 lbs and end the day at about 24,000 lbs. MoDOT will select the best model to best meet our needs for routine and special operations with consideration of each models recommended capabilities. Vendors shall provide their recommended gross vehicle operating weight range for every model. MoDOT will consider these operating ranges to meet special needs.

Vendor shall provide a copy of the FHWA approval letter and supporting literature regarding the FHWA approval for each model of TrMA.

Vehicle fuel (saddle) tanks are typically mounted on the truck frame located at the cab. The minimum distance from the rear bumper of the truck to the rear of the fuel tank is approximately 112 inches.

PINTLE HITCH

Requirements for the pintle hitch eye are as follows:

Maximum x-section: 1 5/8

Minimum eye opening: 3"

Minimum weight rating: 16,000 lb.

MOUNTING SIMPLICITY

The TrMA must have the capability to be attached to or removed from the support vehicle without the aid of additional transfer or lifting equipment and be able to be moved on its own support system. Wheel jacks on the attenuator shall be swivel or retractable. The jacks shall not interfere with the operation of the unit, nor cause the unit to be illegal in width. If the wheel jacks are intended to be removable, they shall be quick connect/disconnect. If the wheel jacks are intended to be retractable, they must retract in a manner such that the bottom of the wheel on the jack does not extend below the bottom of the TrMA.

ELECTRICAL/LIGHTING SYSTEM

Electrical power for the stop, turn and tail lights on the TrMA shall be via a 7-pin male connector (SAE J560 Standard, most recent revision) on the TrMA to fit a 7-pin female connector on the rear of the support vehicle. The power requirements of the TrMA shall be compatible with the 12-volt electrical system of the TrMA support vehicle. Each TrMA shall be equipped with a four lamp stop, turn and tail lighting system and a standard three lamp identification light bar system, configured in such a manner as to provide proper lighting when the attenuator is in the horizontal (protective) mode or in the vertical (traveling or non-protective) mode. Turn signal lights on the TrMA shall operate independently of the brake lights. All wiring terminal connections shall be crimped, soldered, heat shrink and with weatherproof connectors.

MAXIMUM DIMENSIONS

The overall width of the TrMA assembly shall not exceed eight (8) feet (Legal width). The overall height shall not exceed thirteen (13) feet six (6) inches (Legal height).

COMBINATION TrMA WITH ARROW BOARD

MoDOT routinely bids and contracts arrow boards. Some TrMA vendors provide TrMA systems which incorporate arrow boards. Vendors can provide quotes for TrMA / arrow board combinations, but any proposed arrow boards should be quoted in the parts lists with detailed information. These will be considered and approved under current arrow board specifications

FINISH

EXTERIOR

Exterior steel surfaces shall be galvanized or finished with a corrosion resistant primer and finish

paint coat (either black or chrome yellow). Exterior aluminum surfaces shall be finished with chrome yellow paint.

SPECIAL MARKINGS

The rear face of the attenuator device, when in the operating position (protective mode), shall be marked with red and white retroreflective sheeting. The marking shall form a checkerboard pattern consisting of 12" by 12" red squares and 12" by 12" white squares spaced symmetrically starting from the top center.

FINISHED ASSEMBLY

The TrMA manufacturer shall supply all parts necessary to meet this specification and a parts manual showing the different replacement parts that are available for making repairs to the TrMA. A simple easy to follow assembly instruction book shall also be provided. The manufacturer shall state the total weight of the complete TrMA.