



OFFICE MEMORANDUM

DATE: February 9, 2004

TO: Region Engineers
Region Delivery Engineers
TSC Managers
Resident/Project Engineers
Region Construction Engineers
Region/TSC Development Engineers

FROM: Larry E. Tibbits
Chief Operations Officer

John C. Friend
Engineer of Delivery

SUBJECT: Bureau of Highway Instructional Memorandum 2004-09
Guidelines for Using a Truck-Mounted Attenuator on Construction Projects

This document should be used by project designers to determine when to specify truck-mounted attenuators (TMAs) on construction projects. The attached guidelines also give direction to construction personnel on how to set up and operate TMAs on construction projects. In addition, the guidelines point out the appropriate TMA to be used on certain roadway types.

Consider the content of the guidelines for all construction projects in 2004 that have not been turned in for advertising.

Chief Operations Officer

Engineer of Delivery

BOHD:C/T:JKG:kab

Index: Safety

Attachment

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Guidelines for Using a Truck-Mounted Attenuator On Construction Projects

C&T: JKG

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Background

Trucks are often used as protective vehicles to shield workers or work equipment from errant vehicles. However, these protective vehicles themselves may cause injuries to both the occupants of the errant vehicles and the workers. Truck-mounted attenuators (TMAs) can be attached to the rear of these protective vehicles to reduce the severity of rear-end crashes. The use of TMAs has resulted in improved safety for both workers and motorists.

Suggested TMA Uses

TMAs should be used for projects on freeways and multilane roadways (four or more lanes) with operating speeds of 45 mph or greater where exposed personnel or equipment occupy a lane customarily used by traffic. If the work and traffic conditions fit any of the following conditions, then TMAs should be considered:

- All vehicles designated as protective vehicles (shadow or barrier).
- When personnel perform aerial work on scaffolding, lifts, hoists, bucket trucks, etc. that is exposed to moving traffic in an occupied lane or shoulder. (The TMA is not to be mounted on the lift vehicle.) TMAs should also be considered for this type of work on roadways with speeds posted less than 45 mph.
- Moving/intermittent operations such as pavement marking convoys, raised pavement marker replacements, grinding in rumble strips, sign installations, luminescent installations, etc.
- When implementing lane closures, traffic shift operations, temporary painting operations, etc.
- When placing/retrieving traffic control devices related to construction/work zone activities.

Placement Recommendations

The TMA is normally positioned in advance of the first work crew, piece of equipment, or roadside obstacle the motorist encounters. Some operations may require more than one TMA.

The number of TMAs required should be based on the number of lanes closed and the spacing of operations being conducted, as described below. The use of an additional TMA is recommended on the shoulder of urban freeways.

The TMA should be mounted on the first vehicle encountered by the motorist. An additional TMA should be used to shield exposed workers during roadway operations or directly behind any operational vehicle with exposed personnel.

Placement and operation of TMAs should, at a minimum, meet the manufacturers' guidelines. Placement and operation of TMAs should follow the current Special Provision for Truck-Mounted Attenuators, the plans, maintaining traffic typicals, and/or the engineer.

Use of a TMA does not eliminate or reduce the need for the application of traffic control devices and measures normally provided to warn the motorist and protect workers.

Exceptions

Some operations are not suited to the use of TMAs such as bituminous or concrete paving, roller operations, installation of overhead traffic signals, etc. Projects with several operations in a closed lane over a span of several miles may not require TMAs at all work locations.

TMAs should not be used as a temporary/permanent barrier ending except during placement. Other types of attenuators will provide better and broader attenuation characteristics.

Proper Setup and Use of TMAs

Stationary Operation. The work shall consist of furnishing a vehicle with an actual gross vehicle weight of 11.5 tons (minimum weight), and furnishing, installing and operating a truck-mounted attenuator according to the manufacturer's recommendations, the plans/proposal, and/or as directed by the engineer.

Material loaded onto the vehicle to obtain the required gross weight shall be securely attached to the vehicle as directed by the engineer.

Mobile Operation. The work shall consist of furnishing a vehicle with an actual gross vehicle weight of five tons (minimum weight), and furnishing, installing and operating a truck-mounted attenuator as shown on the pavement marking convoy requirements, the manufacturer's recommendations, and/or as directed by the engineer.

Material loaded onto the vehicle for transport or during work operations shall be attached securely to the vehicle. Hazardous materials shall not be allowed on this vehicle. Materials loaded onto the vehicle shall not be considered part of the vehicle gross weight.

Materials and Design. The design and materials used for the truck-mounted attenuator shall be those which perform successfully when tested as specified in NCHRP 230 or NCHRP 350.

The face of the TMA, visible to approaching traffic, shall have high-intensity reflectorized alternating yellow and black stripes, similar to the obstacle markers illustrated in the Michigan Manual of Uniform Traffic Control Devices.

Operating Details and Utilization. The TMA shall be operated per the manufacturer's recommendations, the plans/proposal, and/or as directed by the engineer. This includes, but is not limited to, the following:

- \$ The height from the bottom of the TMA to the roadway surface shall be 12 inches (+/- 1 inch).
- \$ The TMA shall be parallel (level) with the roadway surface.
- \$ The manufacturers of the approved TMAs recommend providing a shoulder harness and headrest for the operator of the TMA vehicle.
- \$ For stationary operations: When operating the vehicle with the attenuator installed, the vehicle shall be in gear if it has a standard transmission (park if an automatic transmission), with the brakes set and steering wheels turned away from the work area and traffic, if possible.

A TMA rated for 45 mph (NCHRP 230 criteria) or 70 km/hr (NCHRP 350 - Test Level 2) shall be used on non-freeway roadways with a normal posted speed of 55 mph or less, which have been reduced to 45 mph or less. These TMAs shall be prohibited for use on all freeways, non-freeway roadways with posted speed limits of 65 mph or greater, and all work zones posted at 50 mph or greater.

A TMA rated for 62 mph/100 km/hr (NCHRP 350 - Test Level 3) must be utilized on all freeways, non-freeway roadways with posted speed limits of 65 mph or greater, and all work zones posted at 50 mph or greater. The TMAs may also be used on all other roadways.

TMA vehicle roll-ahead distance shall be as indicated on the attached chart.

The TMA vehicle shall have a letter from the contractor or manufacturer stating the TMA being used meets the above stated NCHRP 230/350 criteria, and has been installed and maintained according to manufacturer's specifications. Upon request, a copy of this letter must be furnished to the engineer.

GUIDELINES FOR ROLL-AHEAD DISTANCE FOR TMA VEHICLES		
Weight of TMA Vehicle	Prevailing Speed (mph) (Posted Speed Prior to Work Zone)	Roll-Ahead Distance (Distance from front of TMA Vehicle to Work Area)
10,000 lbs (Stationary)	60-70 50-55 45	100 ft 75 ft 50 ft
10,000 lbs (Mobile)	60-70 50-55 45	175 ft 150 ft 100 ft
15,000 lbs (Stationary)	60-70 50-55 45	100 ft 75 ft 50 ft
15,000 lbs (Mobile)	60-70 50-55 45	150 ft 125 ft 100 ft
23,000 lbs (Stationary)	60-70 50-55 45	100 ft 75 ft 50 ft
23,000 lbs (Mobile)	60-70 50-55 45	100 ft 75 ft 75 ft