TO:

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ENGINEERING INSTRUCTION

NEW YORK STATE DEPARTMENT OF TRANSPORTATION

SUBJECT: SHADOW VEHICLE IN WORK ZONES

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Jobs in the construction trades have always involved a certain amount of danger and those involved in highway work carry with them the additional hazards of being near moving streams of traffic.

Usually we provide for the safety of motorists and workers by guiding traffic around the work zone using one of the schemes shown in the M.U.T.C.D. These schemes consist of a series of barriers, signs, lights, barricades, flagmen and/or delineating devices. However there are some slow moving operations that do not lend themselves to the above methods. Therefore, in order to protect motorists and workers in these situations, we are revising the Standard Specifications to require shadow vehicles equipped with impact attenuators for all slow moving operations. We have defined "slow moving operations" as those which move along a highway, in a travel lane at a speed of 1 mph or more but at least 15 mph below the speed limit.

Several vehicle mounted impact attenuator designs have been approved by FHWA for use on Federal Aid Projects. We are modifying the Standard Specifications by means of the attached notes to require shadow vehicles equipped with these approved impact attenuators for slow moving work areas not otherwise protected by means of barrier, barricade, flagmen or delineation. It will be inserted into proposals by the Main Office Final Plan Review Bureau starting with the letting of May 9, 1985. Because the note itself states the conditions under which the TMA equipped shadow vehicles are required, it generally should not be necessary to show the shadow vehicle on the plans. Shadow vehicles should not be required for circumstances other than those mentioned in the note. Accordingly designers should not be specifying them for work zones protected by means of delineation and guiding devices or by barricade or barrier.

SHADOW VEHICLES

Make the following changes to the Standard Specifications of January 2, 1985:

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Under §619-1.02, Basic Maintenance and Protection of Traffic, add the following:

N. Shadow Vehicle. For purposes of these specifications, a shadow vehicle is defined as a slowly moving or stopped vehicle operating or placed in a traffic lane, or adjacent thereto, upstream of a construction work zone. The purpose of shadow vehicles is to guide traffic around a construction work area and to reduce the possibility of harm to workers in the work area. Shadow vehicles shall be required when shown on the plans or for all slowly moving work areas in travel lanes, except where the travel lane is closed to traffic by barrier, barricades, plastic drums or cones. Slowly moving work areas are those which move at a speed of 1 MPH or more but at least 15 MPH less than the legal speed limit. Shadow vehicles shall weigh 18,000 to 20,000 pounds. Ballast may be used to bring a lighter weight vehicle up to the indicated weight. Shadow vehicles shall be equipped with Mobile Construction Zone Impact Attenuators, §712-06 and one Type B Arrow Panel as described in the MUTCD.

Page 7-99 change "712-06 THRU 712-11 (VACANT)" to the following:

"§712-06 Mobile Construction Zone Impact Attenuators

Scope. This specification covers the material and testing requirements for crash cushions or impact attenuators mounted on the backs of designated work vehicles, including trailers.

Materials Requirements: Mobile Construction Zone Impact Attenuators shall have been tested in accordance with the National Cooperative Highway Research Program Report 230 by a recognized testing agency. The tests shall consist of full scale crash testing. Truck weights, impacting vehicle weights, speeds and impact trajectories shall be as indicated in Table 1 below:

Table 1-Test Matrix

Test No.	Impacting Vehicle Weight Pounds	Impact Speed Miles/Hour	Impact Angle Degrees
1	4500	45	0
2	1800	45	0
3	4500	45	10°-15°

The test vehicle weight shall be between 10,000 and 20,000 pounds. Trucks shall be in second gear with brakes set.

To be satisfactory, attenuators shall satisfy the following performance criteria:

1. Acceptable attenuator performance shall be by controlled stopping of the impacting vehicle.

2. Detached elements, fragments or other debris from the impact attenuator shall not penetrate or show potential for penetrating the passenger compartment or present undue hazard to other traffic, or to nearby pedestrians or workers.

3. The impacting vehicle shall remain upright during and after collision although moderate roll, pitching and yawing are acceptable. Integrity of the passenger compartment shall be maintained with essentially no deformation or intrusion.

4. The impact velocity of hypothetical front seat passenger against vehicle interior, when calculated from vehicle accelerations and 24 inch (0.61m) forward and 12 in. (0.30m) lateral displacements, shall be less than 40 and 20 feet per second respectively. Also, the impacting vehicle's highest 10 milli-second average accelerations subsequent to the instant of hypothetical passenger impact (Occupant Ridedown Acceleration) shall be less than 15g's.

5. After collision, the impacting vehicle trajectory shall be such that its final stopping position would intrude a minimum distance into adjacent traffic lanes assuming the truck equipped with the attenuator was centered in its driving lane.

Basis of Acceptance: The Director of the New York State Department of Transportation's Materials Bureau maintains a list of products which have successfully passed the above listed requirements. Approval of Mobile Construction Zone Impact Attenuators at the contract site shall be on the basis of the product's appearance on that list of products and the manufacturers certification that it complies with these specifications.

712-07 THRU 712-11 (VACANT)"