
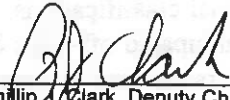


To: SUPERSEDED BY EI 12-01P EFFECTIVE 1/10/13		New York State Department of Transportation ENGINEERING INSTRUCTION	EI 99-032
Title: DESIGN SPEED FOR BARRIERS, END TERMINALS, AND CRASH CUSHIONS			
Distribution: <input type="checkbox"/> Manufacturers (18) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Regions/Agencies (32)	<input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Consultants (34) <input type="checkbox"/> Contractors (39) <input type="checkbox"/> _____ ()	Approved:  Phillip Clark, Deputy Chief Engineer Design Division	10/12/99 Date

Administrative Information. This Engineering Instruction (EI) becomes effective on projects initially scheduled for the May 4, 2000 and later lettings. This instruction does not supersede any previous issuances. The information contained herein will be included in the *HDM*.

Purpose. The purpose of this EI is to clarify the terms "operating speed" or "speed" as used in the current engineering instructions dealing with weak post guide rail and median barrier, end assemblies for box beam guide rail and median barrier, the REACT 350, SRT, the QuadGuard, the ET 2000, and the SKT 350. The affected EI's are listed in Footnote 1. In each, "speed" or "operating speed" is to be considered when designing and/or selecting guide rails, median barriers, end terminals and other means of terminating those barriers, or crash cushions.

Materials Transmitted. Nothing is hereby transmitted.

Policy. When selecting and/or designing guide rails, median barriers, end terminals and other means of terminating those safety articles, or crash cushions, use the anticipated off-peak 85th percentile operating speed (determined in accordance with HDM §2.7) of the highway or ramp segment after construction (usually this is also the design speed of the facility).

At present, the highest rated NCHRP 350 barriers and end terminals available are rated at Test Level 3, which is 100 km/h. These include TL3 barriers such as box beam and heavy post blocked-out corrugated guide rails, and terminals such as the SKT 350 and ET 2000. However, there are several, better performing permanent and temporary crash cushions, such as the REACT 350 and the QuadGuard, which are rated at 110 km/h. These are preferred for use on freeways and other locations where 85th percentile operating speeds will be in excess of 100 km/h. While the better performing crash cushions should be used in preference to Test Level 3 devices on freeways and on other facilities where the anticipated off-peak 85th percentile operating speed will exceed 100 km/h, the TL3 barriers and terminals are not precluded from use in such situations.

If it is necessary to design or select an end terminal, barrier, or crash cushion (impact attenuator) during construction, and the appropriate 85th percentile operating speed is not known, the Regional Traffic and Safety Group should be consulted.

For up-to-date listings, the FHWA plans to post all their approval letters on the internet. These will provide what Test Levels the devices are rated at and other information pertaining to the selection and use of these devices. In addition to that, we plan to post similar summary information on the DQAB IntraDot home page for devices in common usage in the State.

Exceptions. Because of the undue maintenance demands of the NCHRP 350 compliant end terminals, the turned down end terminals shown on the Standard Sheets may continue to be used on urban facilities where 85th percentile operating speeds will be 70 km/h or less. This exception affects EI 99-016. Also, the appropriate truck mounted impact attenuator test level given in the *Standard Specifications* is based on current posted speeds, and remains unaffected by this instruction.

Background. There have been a number of instructions and bulletins which have provided pay items and other

design information on the above. Some of these¹ have included information indicating that the choice of these articles depends on the "speed" or "operating speed" of the facility. Because it is important that all safety articles provide uniformly good safety performance statewide, and "operating speed" might mean different things to different people, it was decided to discuss, in some detail, what speed to use when designing and/or selecting guide rails, median barriers, end terminals, and impact attenuators.

Design speed for highway geometric purposes is generally defined in §2.6.2 of the *Highway Design Manual*. Other subsections of the *HDM*² provide additional discussion on what design speeds are appropriate for highways of the different functional classifications.

How to determine the anticipated off-peak 85th percentile operating speed is also discussed in the *HDM* in §2.7.1.1A, Design Speed for interstates and freeways, and in, or by reference to, §2.7.2.1 A, Design Speed for the other facilities.

Contact Person. Larry Brown of the Design Quality Assurance Bureau, (518) 457-4093.

¹ EI 97-014, EI 98-005, EI 98-014, EI 98-016, EI 98-026, EI 98-028, and EI 99-016.

² §2.7.1.1 A., §2.7.2.1 A., §2.7.2.2. A., §2.7.3.1. A., §2.7.3.2. A., §2.7.4.1. A.