SUPERSEDED BY EB 99-083 EFFECTIVE 1/30/00 MODIFIED BY EI 99-016 EFFECTIVE 11/4/99		*New York State Department of Transportation* ENGINEERING INSTRUCTION	**EI** **97-016**

Title: **HEAVY POST BLOCKED-OUT GUIDE RAIL AND MEDIAN BARRIER**

Distribution:
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Approved:

P. J. Clark, Deputy Chief Engineer,design Division — Date: 6/30/97

ADMINISTRATIVE INFORMATION. This instruction will be effective with the letting of January 15, 1998.

PURPOSES. The purposes of this instruction are: 1) to issue standard sheets and specifications for heavy post guide rail and median barrier revised to show timber blockouts; 2) to issue a policy for the use of the transmitted materials. It also discusses the replacement of existing Heavy Post Blocked-out (HPBO) barrier, but does not call for the replacement of existing runs of this at this time.

TRANSMITTED MATERIALS. This instruction transmits the following:

- STANDARD SHEET M606-8R1 (SHEET 1 OF 2) — HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING WITH TIMBER BLOCKOUTS
- STANDARD SHEET M 606-9R1 (SHEET 2 OF 2) — HEAVY POST BLOCKED-OUT CORRUGATED BEAM GUIDE RAILING WITH TIMBER BLOCKOUTS
- STANDARD SHEET M 606-10R1 — HEAVY POST BLOCKED-OUT MEDIAN BARRIER WITH TIMBER BLOCKOUTS
- PROPOSAL INSERT NOTE ENTITLED "HEAVY POST BLOCKED-OUT BARRIER WITH TIMBER BLOCK-OUTS"

The english unit equivalents will be transmitted under separate cover.

BACKGROUND. In July of 1993, pursuant to the 1991 ISTEA, the FHWA issued a final rule. That rule indicated that five years hence (1998) all new installations of roadside safety hardware on the national highway system (NHS), such as guide rail and median barriers, would be only those that had either passed NCHRP 350 crash testing or were judged (by the FHWA) to be able to pass such a test on the basis of engineering judgement. This matter is discussed also in the Engineering Instruction on Weak Post Corrugated Guide Rail EI 97-014.

The FHWA, by contract, crash tested a steel post HPBO guide rail having steel blockouts. Its steel blockouts collapsed, the truck engaged the guide rail posts and, as it departed from the barrier, the truck tipped over onto its side. This test barrier was rated as a failure.

The FHWA's researchers also tested a heavy post blocked out guide rail system with steel posts and timber blockouts. The timber blockouts were 360 mm long by 150 mm wide by 200 mm deep with a 10 mm deep channel milled into one of the narrow faces to receive the flange of the steel post. The heavy post blocked out corrugated guide rail system with steel posts and the described timber block-outs did satisfactorily redirect the P2000 test vehicle and was regarded to have passed the crash test.

The attached standard sheets are modifications of existing metric Standard Sheets M606-8, M606-9, & M606-10. The existing metric standard sheets, just mentioned, depict HPBO having steel blockouts and steel posts. The standard sheets herewith transmitted depict the new national HPBO system guide rail and the new national HPBO system median barrier. Accordingly, they show timber blockouts, button headed post bolts, and 1830 mm standard length steel posts, which are 150 mm longer than the standard length steel posts that we've been using for HPBO barrier. Also, the transmitted sheets show no washers beneath the post bolt heads on the traffic side of the rail.

POLICY. General. The Department's policy will be to comply with the final federal rule. On new installations, this means that we will use the modified HPBO barrier depicted on the transmitted sheets for new installations of HPBO barrier on metric contracts. With respect to the retention of existing HPBO barrier, the rule contains no requirement that it be replaced. Pending a decision based on the results of the study mentioned above in the background section, existing runs of HPBO installed in accordance with Standard Sheets 606-8,9,&10 and Standard Sheets 606-8R1, 9R1, & 10R1 may remain in place if otherwise acceptable.

The turned down anchorage units depicted on sheets M606-9R1 and 10R1 are acceptable unshielded or in the clear zone only when posted speeds on the facility are not high. This means less than 80 km/h and 90 km/h for the two sheets, respectively. When these conditions are not met, the anchorage unit must be protected with either impact attenuators or crashworthy end terminals.

NEW INSTALLATIONS OF HPBO SYSTEM ON AND OFF THE NHS. Starting with the indicated letting, the transmitted Standard Sheets M 606-8R1, M606-9R1, & M606-10R1 and the transmitted proposal insert notes should be used for new installations of HPBO on metric contracts. Equivalent contract materials, consisting of standard sheets and proposal insert notes for use in English unit contracts will be transmitted under separate cover.

REPLACEMENT OF EXISTING NYS HPBO. The federal rule does not require the replacement of existing articles. It applies just to new installations. Our own policies as contained in the Highway Design Manual and in other policy statements, however, do presently require replacement of existing non-conforming barriers with current designs. This policy was formulated at a time, however, when the non-conforming systems then under consideration for replacement consisted of a variety of older heavy posted "cable and can" guiderails and non-blocked out corrugated guiderail mounted directly to heavy posts. These systems had some severe deficiencies and their performance in service did not measure up to the performance of the barriers now constructed. The HPBO system depicted on Standard Sheets M606-8,9,& 10 and the english unit counterparts are modern systems with what appears to be excellent performance in service despite their marginally failing performance in the full scale crash test with the 2000P test vehicle. On the basis of available information, therefore, replacing HPBO systems depicted on the above mentioned standard sheets does not seem to be a justifiable investment and, thus, the department must consider whether it intends to follow its existing policies or to modify them to permit the continuance of existing installations of HPBO system in service.

This is not an easy matter. At the least, accident studies must be performed. These are now either being conducted, or are planned. When the results of these are available, an engineering instruction will be prepared indicating what the replacement policy is to be. Until this replacement policy instruction is issued, existing runs of HPBO system need not be replaced.

CONTACT PERSON. Larry Brown of the Design Quality Assurance Bureau at (518) 457-4093.

HEAVY POST BLOCKED-OUT BARRIER WITH TIMBER BLOCK-OUTS

Make the following changes to the Standard Specifications of January 2, 1995:

Page 6-20, Line 16. §606-2, *Insert* "Wood and Timber Posts and Timber Blockouts 710-13" immediately below this line.

Page 6-21, Line 45, §606-2.09, *Insert* the words "timber block-outs," between the words "posts" and "offset beams"

Page 6-24, Line 46, §606-3.04B, *change* the line to read "holes for the expansion anchors shall be drilled to the minimum depths and diameters shown on the plans or standard sheets or to larger values if specified by the"

Page 7-106. Lines 5 to 17. *Replace* these lines with the following:

"710-13 WOOD AND TIMBER POSTS AND TIMBER BLOCKOUTS

SCOPE. This specification covers wood posts used as witness posts, timber posts, and blockouts used in guiderail construction.

MATERIALS REQUIREMENTS. Wood posts, timber posts, and timber blockouts shall comply with the requirements of §712-14, Stress Graded Timber and Lumber. Using the clean wood properties of ASTM D2555, the bending stress(Modulus of Rupture) shall not be less than 28 MPa. They shall be surfaced on four sides and the dimensions shall be actual or nominal as indicated on the plans. If the dimensions are indicated to be nominal, the actual dimensions provided shall be in accordance with current trade practice. Surface dried redwood, red cedar, cypress or black locust may be used untreated. Other lumber including douglas fir, pine, oak, birch, apple, and beech may also be used but shall be pressure treated in accordance with §708-31, Wood Preservative-Water Borne after all the holes have been drilled and all other woodworking operations have been performed. Bituminous preservative treatments will not be permitted. Before using, the Contractor shall submit to the Engineer, for approval, information as to the species of timber to be used and method of preservative treatment to be employed.

BASIS OF ACCEPTANCE. Acceptance will be based on the manufacturer's certification with supplementary sampling and testing at the discretion of the Materials Bureau."