



U.S. Department
Of Transportation
**Federal Highway
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

December 29, 1989

Refer to: HNG-14/SS-16

Mr. Albert M. Moreno, Jr.
President
Minute Man Breakaway, Inc.
Number One Moreno Place
East Flat Rock, North Carolina 28726

Dear Mr. Moreno:

This is in response to your September 22 and December 12 letters requesting Federal Highway Administration (FHWA) acceptance of your company's revised MMB-breakaway device. The FHWA originally accepted the MMB-1 on March 10, 1988. Your September 22 letter detailed changes you made to the design of the casting which were intended to increase the structural capacity of a support for winds against the back of the sign. Your December letter responded to our concerns that the breakaway performance of the revised "MMB-1HD" was uncertain, and that dynamic and static testing should be performed. Your December letter also transmitted copies of the Southwest Research Institute (SwRI) "Pendulum Test Report of a Model MMB-1HD Breakaway Sign Support", results of the static testing that indicated the stronger direction of the support, and shop drawings illustrating the device. The major changes in the design of the MMB-1 are the increase in the size of the casting and elimination of the steel tether cable. We consider elimination of the tether significant the high-speed performance of your break away unit. Users of the unit should be cautioned against installing tethers.

The SwRI dynamic test was conducted using a 1,800-pound instrumented pendulum with a 10-stage crushable nose impacting at 18 inches above the ground. The test article consisted of a 3-foot 6-inc long high carbon steel flanged channel base post weighing three pounds-per-foot, driven 3 feet 3 inches into the National Cooperative Highway Research Program Report 230 S-2 (weak) soil, the MMB-1HD breakaway unit, and a 9-foot 3-inch mild steel sign post (also a three pound-per-foot flanged channel :U: post) supporting a 2.5 x 2.5-foot aluminum stop sign. The impact speed was 29.3 feet-per-second (20 m.p.h.) and the change in velocity was 7.3 feet-per-second. The base post translated and pulled up slightly in the "weak" soil, but the 3.5-inch stub height was still below the 4 inch maximum permitted by the American Association of Highway Transportation Official (AASHTO) and FHWA requirements. Calculations you provided

show that the change in velocity for a 60 m.p.h impact would be approximately 3.1 feet-per-second.

Therefore, the revised Minute Man Breakaway device, known as MMB-1HD, will be acceptable for use on Federal-aid highway projects in both strong and weak soil conditions, if requested by a State, in single three pound-per-foot installations of flanged-channel posts. This acceptance is limited to the features. Presumably you will supply potential users with sufficient information on structural design and installation requirements to ensure proper support performance.

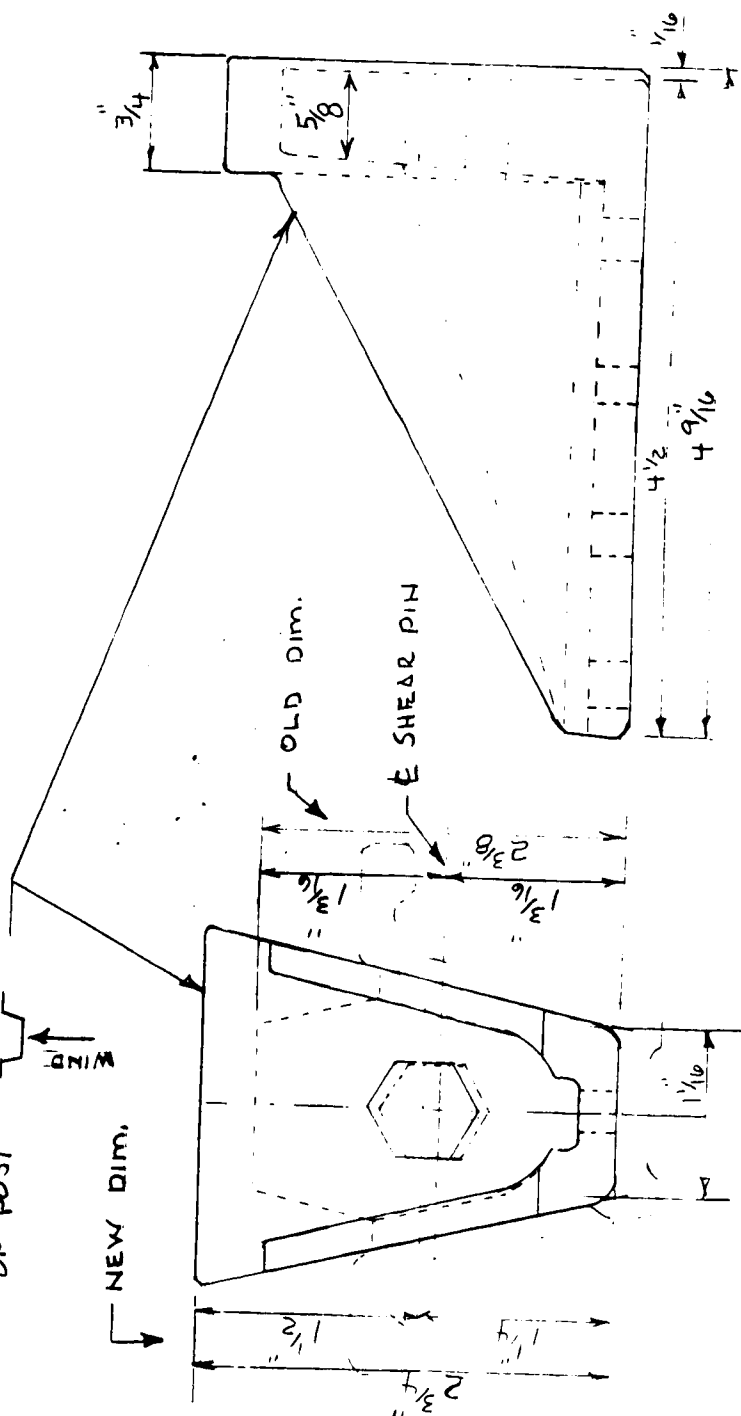
We anticipate that the States will require certification from Minute Man Breakaway, Incorporated, that the devices furnished have essentially the same composition, mechanical properties, and geometry as the tested device and that they will meet the FHWA and AASHTO change in velocity requirements.

Sincerely yours,

L. A. Staron, Chief
Federal-Aid and Design Division

US PAT # 4850565
4858876

NOTE: MMB-1HD
ADDITIONS MADE TO ADD MORE
STRENGTH TO CASTINGS & INCREASE
WIND LOAD SUPPORT FROM BACK SIDE
OF POST



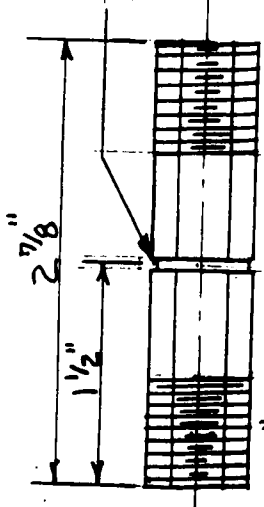
MMB-1
HD ADDITIONS

OVERLAY - MMB-1 AND
MMB-1HD

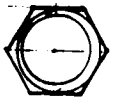
MINUTE MAN BREAKAWAYS
303 WEST WALKER ST.
EAST FLAT ROCK NC 287
704-692 7423
DWG MMB-1HDA

MINUTE MAN BREAKAWAYS
 303 WEST WALKER ST.
 EAST FLAT ROCK NC 28726
 704-692-7423 6mm 9-12-89
 DWG MMB-1HD1

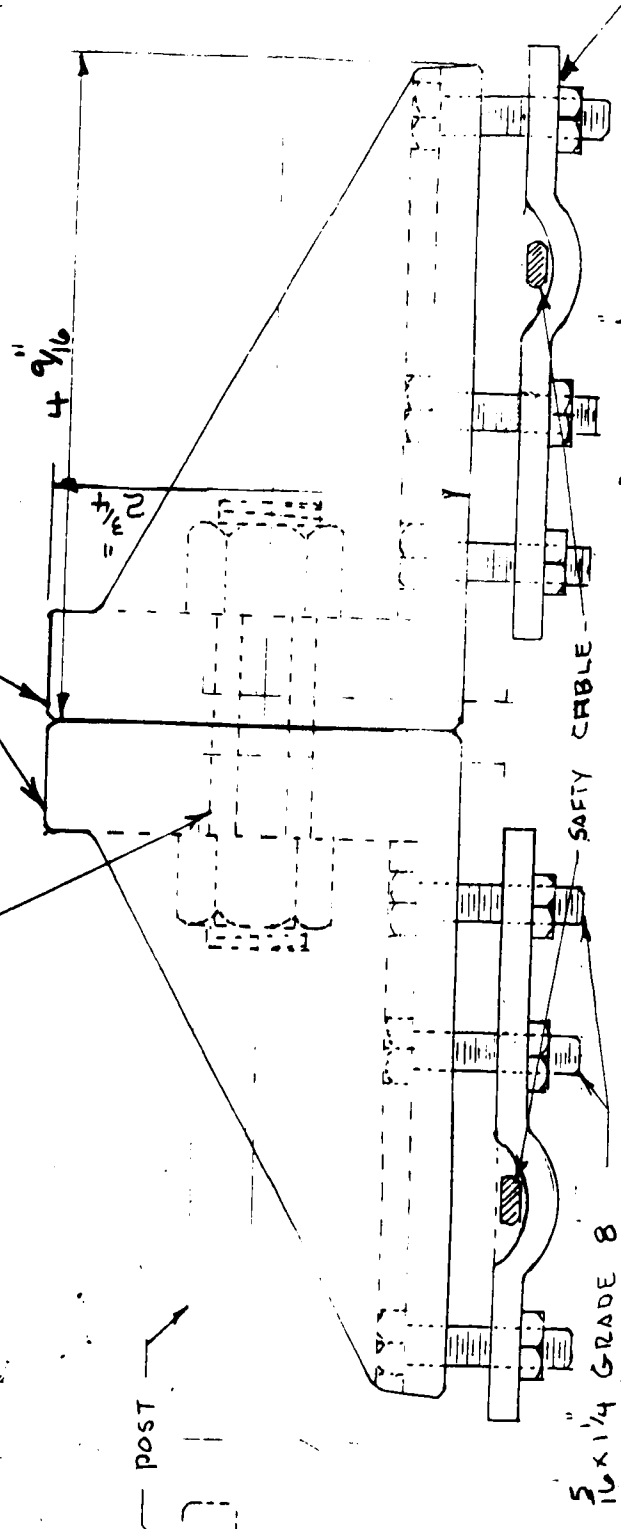
5/5 + 002
 CHAMFER TO .530
 MAX. DIA. SHEAR POINT



9/16" HEX SHEAR PIN
 125,000 PSI YIELD STRENGTH
 FATIGUE PROOF STEEL



DUCTILE IRON CASTING
 ASTM A536 GRADE 80



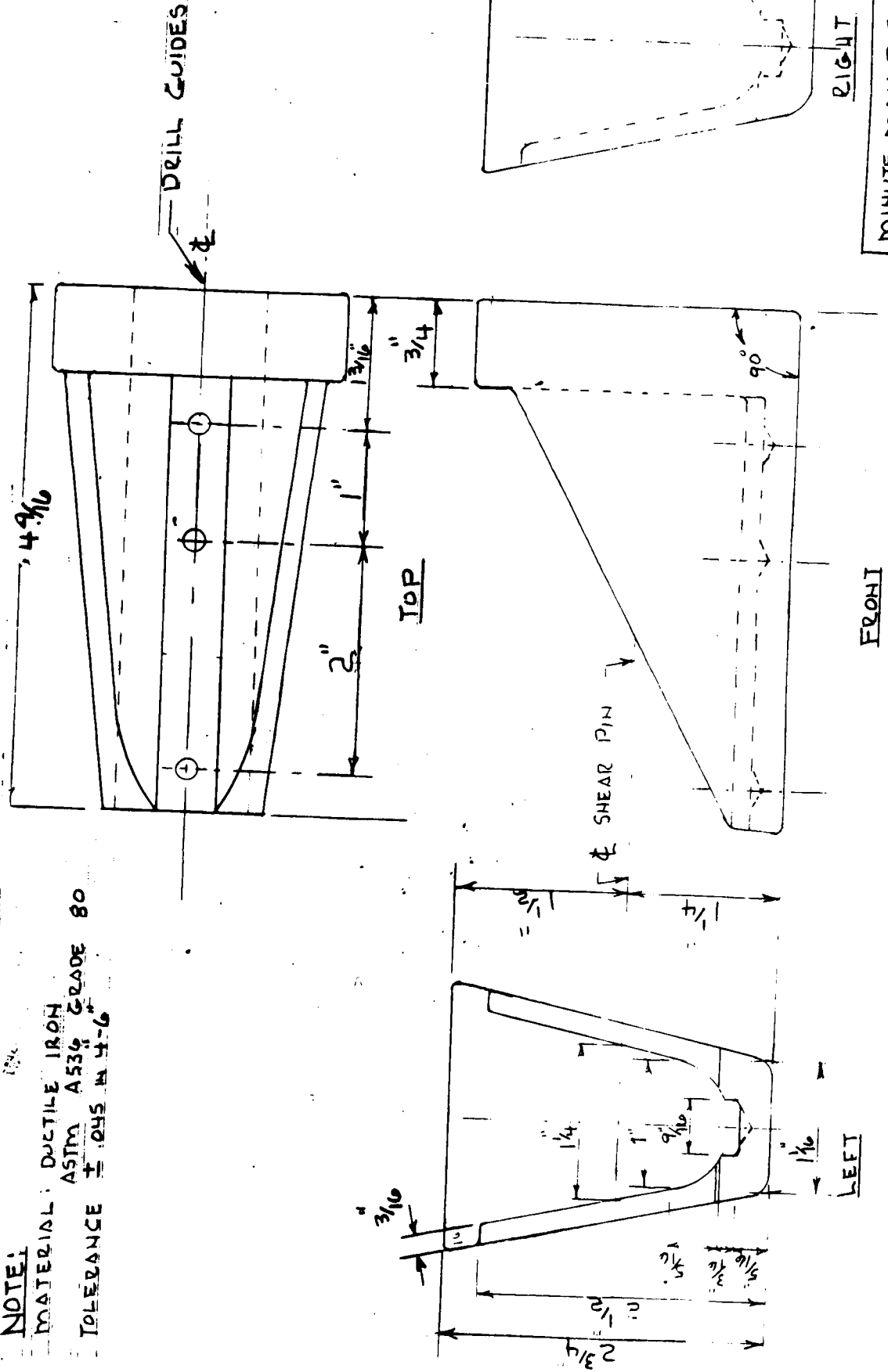
200 MIN x 1 1/4" FB ASTM A36
 BACK UP PLATE & CABLE CLAMP

MINUTE MAN BREAKAWAY DEVICE
 FRONT

5 1/2" x 1 1/4" GRADE 8
 BOLTS & NUTS

LEFT

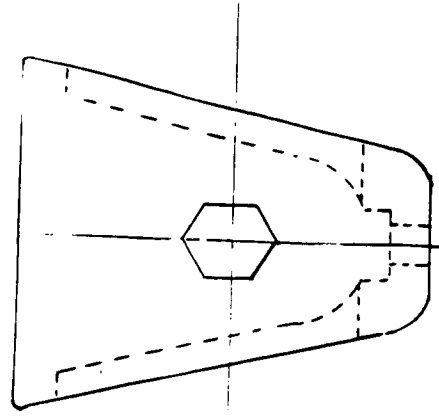
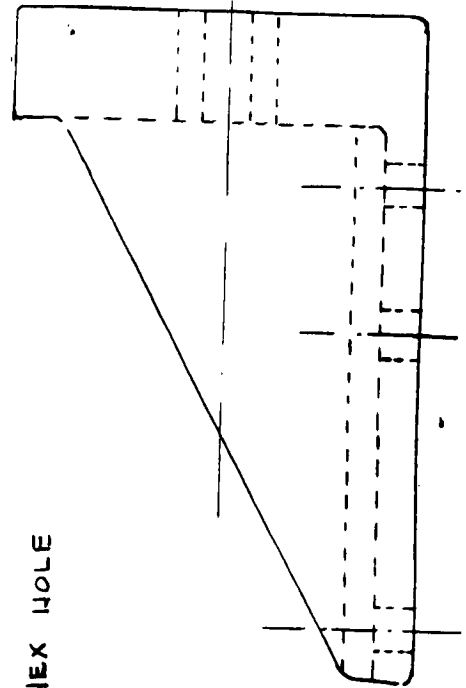
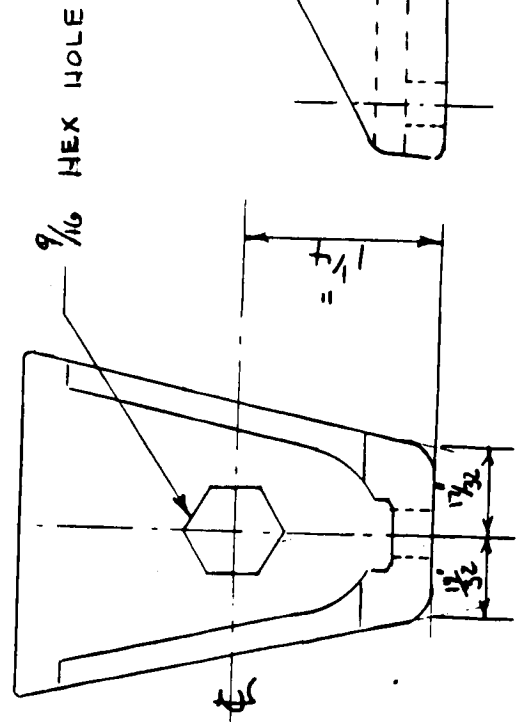
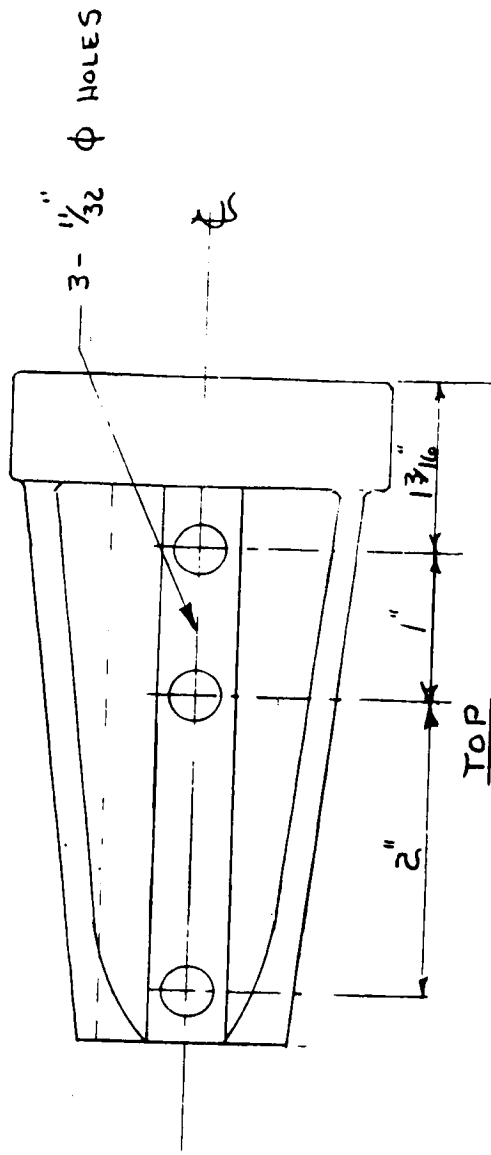
NOTE:
 MATERIAL: DUCTILE IRON
 ASTM A536 GRADE 80
 TOLERANCE $\pm .045$ IN 4-6"



FRONT
MMB-1HD
CASTING DETAILS

US PAT # 4850565
 # 4858876

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 303 WEST WALKER ST.
 EAST FLAT ROCK, NC 28726



MMB-1HD
HOLE DETAILS

MINUTE MAN BREAKAWAYS INC
303 WEST WALKER ST
EAST FLAT ROCK NC 28877

US PAT # 4850565
4458870