

FULL-SCALE UNINSTRUMENTED TEST OF BRICK MAILBOX STRUCTURES

PREPARED FOR

U.S. Department of Transportation
Federal Highway Administration
Region 6
819 Taylor Street
Fort Worth, Texas

BY:

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JUNE 1988



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Southwest Research Project No. 06-1917-205
Federal Highway Administration Order Number 06-00-113(88)

FULL-SCALE VEHICLE CRASH TEST OF BRICK MAILBOX STRUCTURES

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U.S. Department of Transportation
Federal Highway Administration
Region 6
Fort Worth, Texas 76102-6187

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INTRODUCTION

An American Association of State Highway and Transportation Officials (AASHTO) publication entitled "A Guide for Erecting Mailboxes on Highways" indicates that masonry mailboxes are a hazard and should not be allowed alongside of highways. Government agencies responsible for maintenance and safety of the roadways are becoming concerned and are now beginning to require removal of hazardous mailbox supports. Naturally, there has been some resistance by owners of the more expensive masonry structures. In order to better explain to them the consequences of what could happen if hit by an errant car, it was felt that crash testing of masonry boxes would be necessary. A review of actual practice reveals that about 85% of the masonry boxes are hollow and 15% are solid or filled with concrete. Therefore, it was felt necessary to crash test a hollow box and a solid box to see if there was any appreciable difference in the results. The test speed selected was 50 mph as a compromise between the rural 55 mph limit and the suburban 40-45 mph limit. The results of both tests indicate that masonry mailboxes are a hazard along rural highways and could inflict death or serious injury to the vehicle occupants.

TEST MBH-1

BARRIER INSTALLATION: The barrier evaluated in this test was a 2' x 2' x 4-1/2' brick mailbox stand with a hollow interior. Figure 1 presents mailbox stand construction details.

TEST VEHICLE: The vehicle used in the test was a 1978 Volkswagen rabbit. Gross test weight, including the driver dummy was 1845 lbs. Figure 2 contains photographs of the mailbox stand and the test vehicle.

PERFORMANCE: Impact conditions were 50.0 mph, with the vehicle offset to the right 19.5 inches from the centerline of the vehicle to the centerline of the stand. On impact, the vehicle shattered the brick mailbox stand, Figure 3. The vehicle continued through the stand, made a right hand spin and came to rest. The rear axial of the vehicle traveled 57 feet past the impact point before coming to rest. Figure 4 contains photographs of the mailbox stand and vehicle damage. Speed measurements were obtained from a motion analyzer, after impact. The measured speeds being 45.7 and 35.5 mph after traveling 4 and 8 feet respectively.

BARRIER DAMAGE: The mailbox stand was completely shattered, with only the mailbox base remaining after the test.

VEHICLE DAMAGE: The right headlight and grille were knocked out. The right side of the bumper was pushed back, deforming the right front fender, and buckling and crushing the hood. The left front fender was buckled at the door. The vehicle was not considered to be in operable condition after the test.

Brick Mailbox
Test MBH-1 (Hollow)
Test MBS-1 (Solid-Grout Filled)

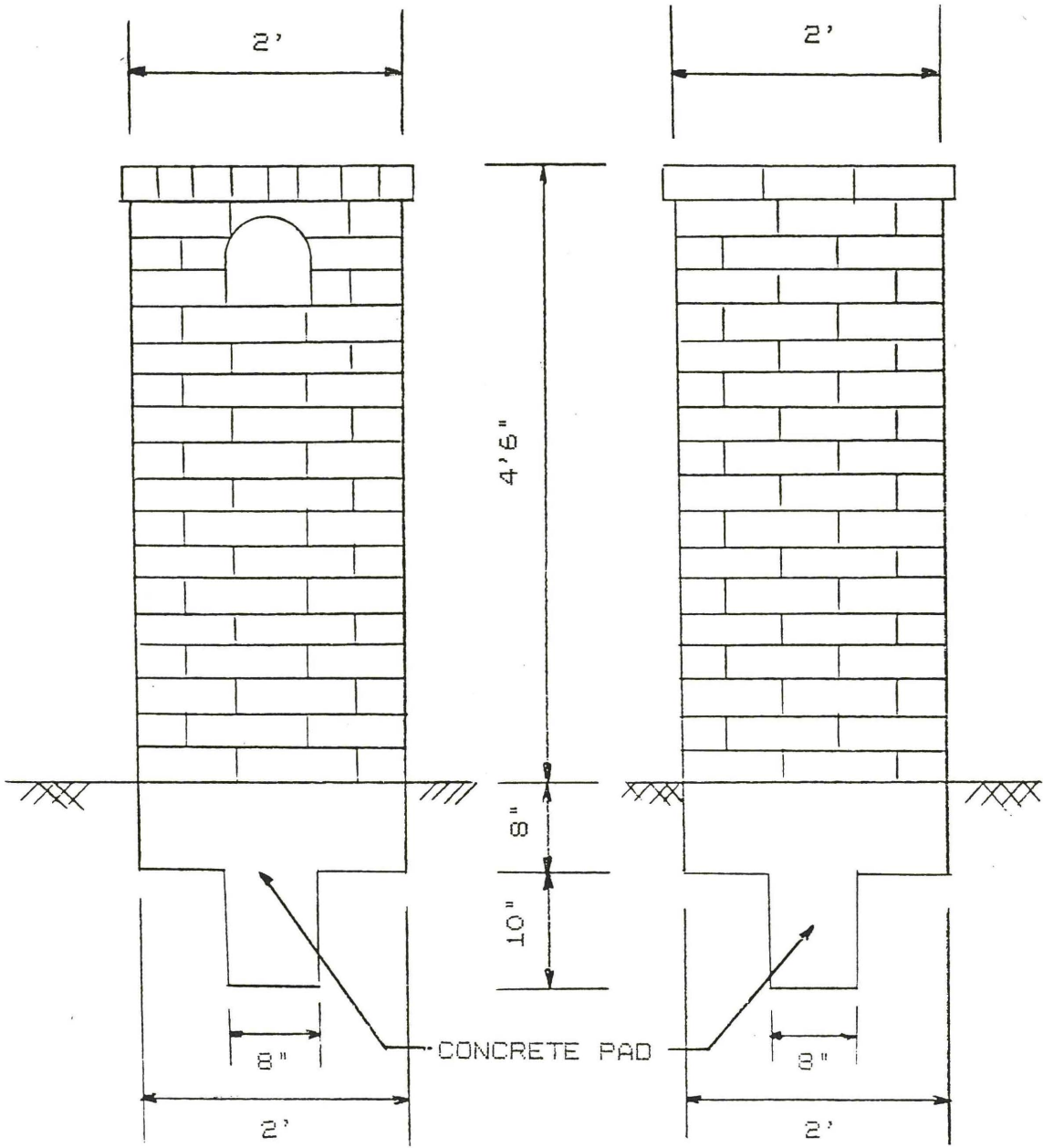


Figure 1. Mailbox Stand Construction Details

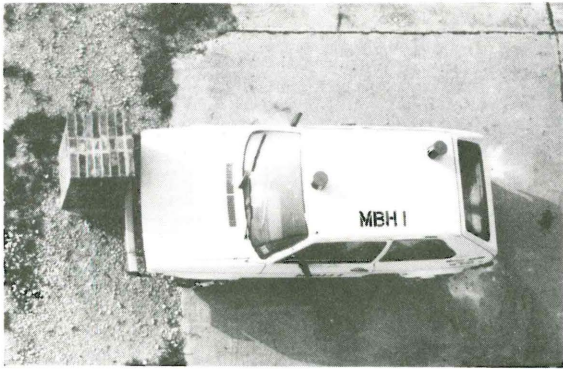


Figure 2. Mailbox Stand and Vehicle Details
Test MBH-1



Figure 3. Mailbox Stand and Vehicle Impact Test MBH-1

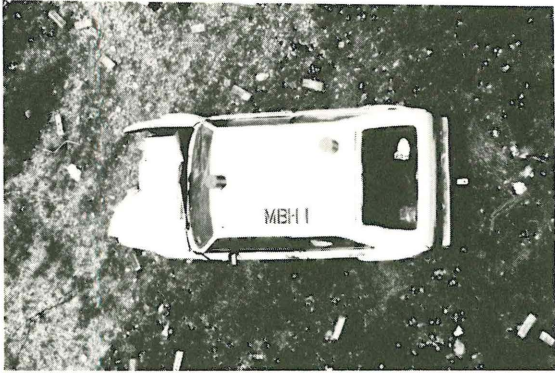


Figure 4. Mailbox Stand and Vehicle Damage
Test MBH-1

TEST MBS-1

BARRIER INSTALLATION: The barrier evaluated in this test was a 2' x 2' x 4-1/2' brick mailbox stand with a solid grout interior. Figure 1 presents mailbox stand construction details.

TEST VEHICLE: The vehicle used in the test was a 1978 Volkswagon rabbit. Gross test weight, including the driver dummy was 1845 lbs. Figure 5 contains photographs of the mailbox stand and the test vehicle.

PERFORMANCE: Impact conditions were 49.1 mph, with the vehicle hitting head-on into the mailbox stand. On impact, the stand was broken in half. The vehicle pushed the lower half of the stand over, climbing it, which stood the vehicle vertical on the rear bumper, Figure 6. The front end of the vehicle came back down over the stand, hitting the ground and popping the windshield out. The vehicle came to rest, with the rear axial on top of the stand. The distance from the point of impact and the rear axial of the vehicle was 2 feet. Figure 7 contains photographs of the mailbox stand and vehicle damage. Speed measurements were obtained from a motion analyzer, after impact. The measured speeds being 18.7 and 16.7 mph after traveling 4 and 8 feet respectively.

BARRIER DAMAGE: The mailbox stand was broken in half. The upper half being intact. The lower half of the stand was pushed off the base, but was also intact.

VEHICLE DAMAGE: The front end of the vehicle was deformed to the shape of the mailbox stand. The center portion of the vehicle was pushed back two feet. The front bumper was pushed back, both headlights were out, the grille knocked out, the hood was crushed back, both front fenders were buckled, the windshield popped out. The vehicle was not considered to be in operable condition after the test.

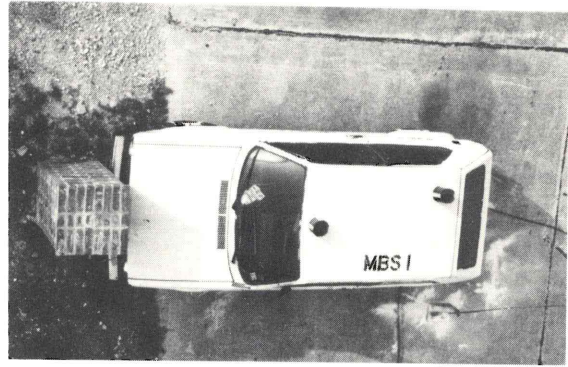


Figure 5. Mailbox Stand and Vehicle Details

Test MBS-1

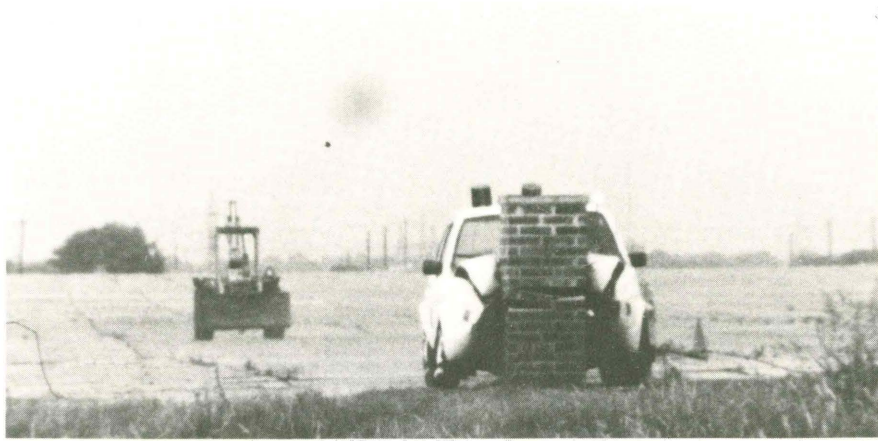


Figure 6. Mailbox Stand and Vehicle Impact Test MBS-1

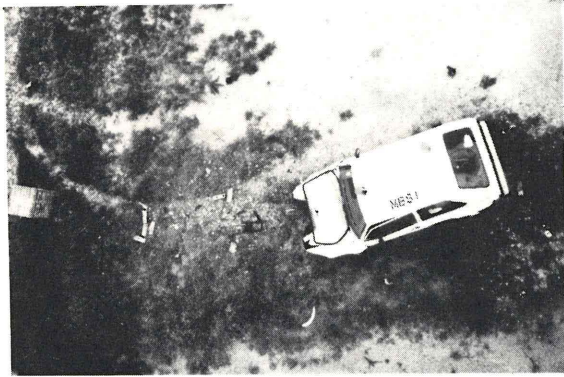


Figure 7. Mailbox Stand and Vehicle Damage

Test MBS-1