

Attachment A, TABLE II.2

BACKGROUND CRASH TEST INFORMATION FOR CATEGORY 2 DEVICES (Continued)

PORTABLE SIGN SUPPORTS (Grey shading indicates failing tests)											
DEVICE	MANUFACTURER OR DESCRIPTION	SIZE	MATERIAL	MASS	LIGHTS, ETC?	TEST	IMPACT SPEED	TEST VEHICLE	DEBRIS	VEHICLE DAMAGE	Accepted
Spring Mounted	(unknown mfr.)		Metal frame		Plywood sign	453360-2	97 km/h	916 kg	21 m	Windshield penetrated	No
Spring Mounted	(unknown mfr.)		Metal Frame		Fabric sign	453580-1	99 km/h	816 kg	73 m	Minor dents scrapes, and scratches	Cat. 2
Easel Support	(unknown mfr.)		Metal frame		Plastic/fabric sign	453580-2	99 km/h	816 kg	32 m	Windshield penetrated	No
Rigid frame	(unknown mfr.)		Metal frame		Plastic/fabric sign	453790-1	98 km/h	816 kg	20 m	Minor dents scrapes, and scratches	Cat. 2
Trailer	Texas Gen Serv. Div.		Metal frame on wheels		Wooden sign panel	453580-3	99 km/h	816 kg	106 m	Windshield cracked slightly	Cat. 2
Fixed Wood	Wood Type III on skids		Wood		Plywood sign panel at 2.13 m	453360-3	98 km/h	816 kg	59 m	Minor	Cat. 2
Perf Square Steel Tube	Type III Barricade with Wood Panels		Sign on perf tubes att to cross panels		Plywood sign panel at 1.5 m	453880-5	101 km/h	816 kg	91 m	Signif. damage: windshield penetrated	No
			Sign on perf tubes att to frame		Plywood sign panel at 1.5 m	453880-7	100 kmh	816 kg	88 m	Windshield shattered but not penetrated	No, Results Marginal to Poor
Hollow core plastic	Type III barricade with Solid Plastic Base		Sign on plastic posts att. to frame		Aluminum Sign Panel at 1.5m	453880-6	99 kmh	816 kg	83 m	70 mm dent to roof, windshield ok	No, Results marginal to Poor

* Worker Threat

** No lights, signs, ballast, nor any other features may be attached to the top or sides of the drum body under this category. Only closed-top drums will be permitted in this category.

*** Drum Base Ballast must be sand or rubber tire sidewalls. No ballasting of drum bodies will be permitted

**** Due to the variety of available drums, the FHWA will not discriminate between them on the question of debris. Individual manufacturers may be asked to show that their drums do not cause hazardous debris to workers or adjacent traffic.

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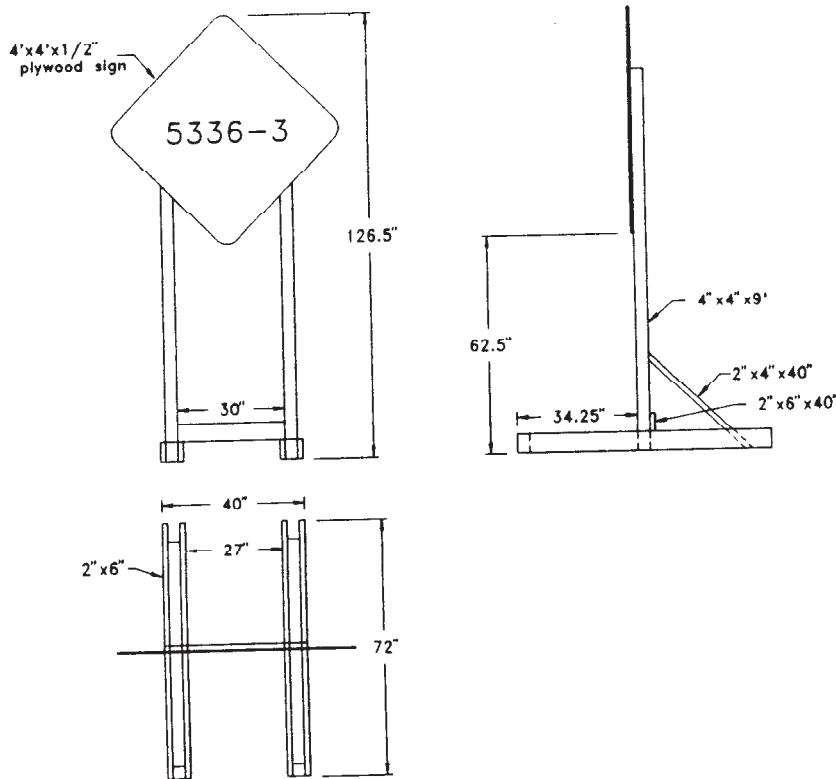


Figure 37. Schematic of Skid-Mounted Sign Support with Wooden Sign Panel (Test No. 453360-3)

3.4 FIXED SIGN SUPPORT (Test No. 453360-3)

The skid-mounted sign support is shown in the TxDOT "Barricade and Construction Standards" sheets as one of the approved fixed sign support designs. Signs erected on fixed supports are required to have a minimum height from the ground to the bottom of the sign panel of 1.52 m (5 ft) in rural areas and 2.13 m (7 ft) in urban applications. The mounting height of 1.52 m (5 ft) was considered to have a higher potential for impacting and penetrating the windshield of an impacting vehicle and thus a more critical condition. Also, a pickup truck was considered a more critical test vehicle than the small passenger car due to the geometry of the sign support in relation to the vehicle. Thus, a mounting height of 1.52 m (5 ft) for the sign panel was selected for the test as well as a pickup truck.

Note that the Department has since revised its standards to use a sign panel mounting height of 2.13 m (7 ft) for all fixed sign supports in both rural and urban applications. However, since the 1.52-m (5-ft) mounting height is considered more critical from the impact standpoint, results of this crash test should also apply to a fixed sign support with a mounting height of 2.13 m (7 ft). In other words, it is believed that a fixed sign support with a mounting height of 2.13 m (7 ft) would perform equally, if not better, than one with a mounting height of 1.52 m (5 ft). Since the sign support performed satisfactorily in this crash test, it can be concluded that a fixed sign support with a 2.13-m (7-ft) mounting height would also perform satisfactorily and there is no need to rerun the test with the higher mounting height.

A schematic of the skid-mounted sign support with a 1219 mm x 1219 mm (48 in x 48 in) wooden sign panel mounted at a height of 1.52 m (5 ft) is shown in Figure 37. The test vehicle was a 1984 Chevrolet pickup truck, as shown in Figure 38. Dimensions and information on the vehicle are given in Appendix Figure 95. The test vehicle impacted the skid mounted sign support head-on with the centerline of the vehicle aligned with the centerline of the sign support, traveling at a speed of 98.0 km/h (60.9 mi/h).

Immediately upon impact, the vertical supports began to fracture at bumper height and approximately 1.8 m (6 ft) above ground level. The panel and pieces of the support rose up and over the hood of the pickup, while the pickup traveled over the bases. A broken segment of the support then struck the roof near the rear of the cab at 79 msec and bounced off at 126 msec. Pieces of the support continued over the pickup with several pieces landing in the bed of the pickup. The time at loss of contact with the sign support, i.e., when the fractured support ended contact with the vehicle, was 126 msec and the vehicle had slowed to 91.4 km/h (56.8 mi/h). After the vehicle cleared the immediate test site, brakes on the vehicle were applied at 950 msec after impact. Prior to brake application the test vehicle was traveling on a relatively straight-forward path. The vehicle subsequently came to rest 133 m (435 ft) down and 4 m (12 ft) to the left of the point of impact. Sequential photographs of the test period are shown in Figure 39.

As can be seen in Figure 38, the skid-mounted sign support fractured upon impact. Debris and sand were strewn along the path of the vehicle in an area 9 m (30 ft) wide by 59 m (195 ft) long. Damage to the vehicle is also shown in Figure 38. There were two dents in the bumper, 13 mm (0.5 in) and 19 mm (0.75 in) from impact with the supports. There was a small dent in the rear of the roof of the cab.

A brief summary of the results of this test is presented in Figure 40. The vertical supports fractured upon impact and the sign panel and fractured vertical support impacted the roof of the vehicle but did not deform into the occupant compartment, therefore showing no potential risk to occupants of the vehicle. Debris from the barricade was thrown along an area 9 m (30 ft) wide by 59 m (195 ft) long. Some fragments were fairly large which could pose potential hazard to oncoming traffic in adjacent lanes and to workers in the area. Sand was also scattered on the pavement which could lead to loss of control of other vehicles. The vehicle sustained damage to the front bumper, hood, and roof. The longitudinal occupant impact velocity was 0.7 m/s (2.2 ft/s), and the highest 10-msec average ridedown acceleration was 1 g. The lateral occupant impact velocity was 0.8 m/s (2.6 ft/s), and the highest 10-msec average ridedown acceleration was -0.2 g. The maximum 50-msec average accelerations were -0.8 g in the longitudinal direction and 0.5 g in the lateral direction. The vehicle exited the immediate test site in a relatively smooth, stable manner and showed no potential for intrusion into adjacent traffic lanes.

In summary, the skid-mounted sign support with wooden sign panel was judged to have met all evaluation criteria set forth in NCHRP Report 350. As discussed previously, this assessment was for both mounting heights of 1.52 m (5 ft) and 2.13 m (7 ft).