



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

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

March 11, 2005

In Reply Refer To: HSA-10/CC-78B

Mr. Barry D. Stephens, P.E.  
Senior Vice President Engineering  
Energy Absorption Systems, Inc.  
3617 Cincinnati Avenue  
Rocklin, California 95678

Dear Mr. Stephens:

Mr. Douglas Bernard recently delivered your February 24, 2005, letter to Mr. Richard Powers of my staff. In this letter, you requested formal Federal Highway Administration (FHWA) review and acknowledgement of a successful Test Level 2 (TL-2) crash into a Safe Stop™ 180 TMA when in its folded (transport) position on a support vehicle. Your letter included a one-page test summary prepared by E-Tech Testing Services and a video of this crash event.

The tested Safe Stop 180 TMA was identical to the original design previously submitted to our office for acceptance as a test level 3 (TL-3) TMA (reference FHWA acceptance letters HSA-10/CC-78 & CC-78A). For the new test, the Safe Stop 180 was mounted to the back of an 8550-kg support vehicle and was impacted in its folded position, with the rear portion of the unit rotated onto the top of the front portion. In this configuration the top of the unit is 2.03 m (6'-8") off the ground and it projects out from the back of its support truck 2.4 m (7'-10").

The folded TMA was impacted head-on at 72.4 km/h by a 2026-kg pickup truck. The results of test 2-51 are summarized on the enclosed one-page test summary sheet. All reported occupant risk, vehicle trajectory and structural adequacy values were within acceptable limits. The roll-ahead distance for the support vehicle was reported to be 5.8 m.

Based upon this information, the FHWA acknowledges that the Safe Stop 180 TMA affords an acceptable level of protection in the folded position for a vehicle weighing approximately 2000 kg when impacted at speeds up to 70 km/h. In its deployed position, the Safe Stop 180 remains a TL-3 device.



Please note that this acknowledgement is for the test described above only and is not meant to imply that the folded Safe Stop 180 meets all the requirements for a National Cooperative Highway Research Program Report 350 TL-2 attenuator.

Sincerely yours,

*/Original Signed by/*

John R. Baxter, P.E.  
Director, Office of Safety Design  
Office of Safety

Enclosure



t = 0.000 sec



t = 0.070 sec



t = 0.140 sec



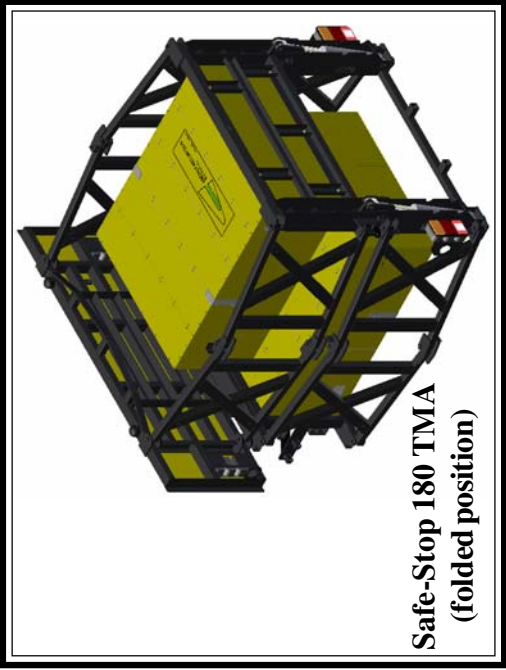
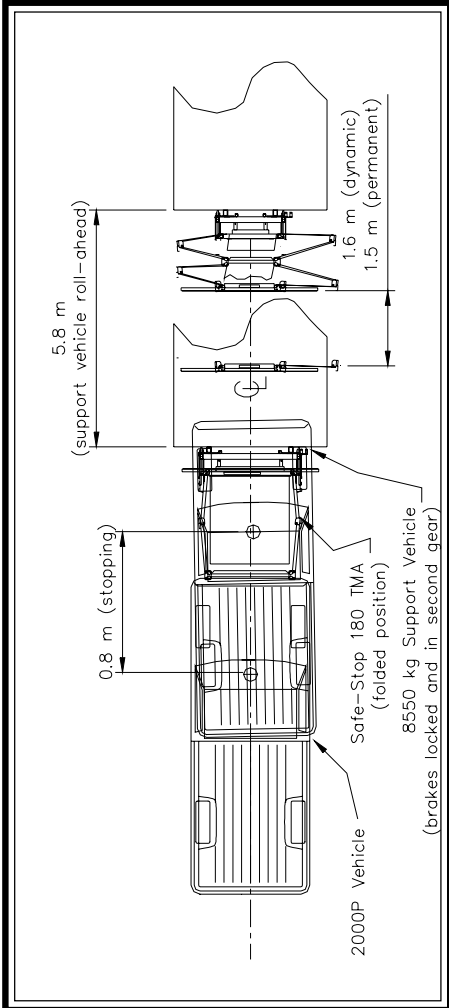
t = 0.210 sec



t = 0.280 sec



t = 0.430 sec



**General Information**

E-TECH Testing Services, Inc.  
 NCHRP 350 Test 2-51  
 01-4307-008  
 9/15/04

Energy Absorption Systems, Inc.  
 Safe-Stop™ 180 TMA  
 2.39 m (overall system folded)  
 (2) Aluminum Cartridges;  
 1524 x 1219 x 572 mm (L x W x H)  
 Concrete,  
 clean and dry

Production Model  
 2000P  
 1993 GMC C2500

2094  
 2026  
 N/A  
 2026

72.4  
 0  
 409.6

N/A  
 N/A

**Summary of Results - Safe-Stop 180 TMA NCHRP 350 Test 2-51 in Folded Position**

The results of this report relate only to the Safe-Stop 180 TMA configuration tested. This report may not be reproduced except in full, without the prior written approval of E-TECH Testing Services, Inc. Prepared by: John F. LaTurner, P.E. - Manager. Report 252 - Issued 2/24/05

Occupant Risk Values	
Impact Velocity (m/s)	
x-direction	10.2
y-direction	0.0
Ridedown Acceleration (g's)	
x-direction	-13.71
y-direction	3.5
Support Vehicle Acceleration (g's)	
x-direction	3.4
European Committee for Normalization (CEN) Values	
THIV (km/h)	36.6
PHD (g's)	13.7
ASI	1.0
Test Article Deflections (m)	
Dynamic	1.6
Permanent	1.5
Vehicle Damage (Primary Impact)	
Exterior	
VDS	FD-4
CDC	12FDEW4
Interior	
VCDI	AS0000000
Maximum Deformation (mm)	None
Post-Impact Vehicular Behavior (deg - rate gyro)	
Maximum Roll Angle	-1.7
Maximum Pitch Angle	-6.5
Maximum Yaw Angle	1.9