August 30, 2002

HSA-10/CC81

Mr. Rodney A. Boyd
Trinity Highway Safety Products Division
Box 568887
Dallas, Texas 75356-9619

Dear Mr. Boyd:

In his June 5 letter to Mr. Richard Powers of my staff, Mr. Don Johnson requested Federal Highway Administration review and acceptance of a device named the Collision Performance Side Impact (CPSI) intended for use as a modification to energy-absorbing w-beam guardrail terminals like the ET-2000, specifically to improve its side impact performance. The CPSI is manufactured from 10-gauge steel with 6-mm interior "wings" as shown in Enclosure 1A. Enclosure 1B shows its installation on an ET-2000.

The CPSI was installed on the impact face of an ET-2000 and struck with an 820-kg car propelled sideways at 50 km/h. The impact point was at the driver's door. As shown on the enclosed test summary sheet (Enclosure 2), maximum passenger compartment intrusion was 104 mm, occupant impact velocity was 5.8 m/sec and the 10-millisecond ridedown accelerations were 7.1 g's. Approximately 1.7 m of w-beam was extruded in the crash. Although no baseline test was run on a standard ET-2000, side impact tests at the same speed have been conducted previously on flared terminals such as the BCT and the MELT, with significantly greater penetrations into the passenger compartment.

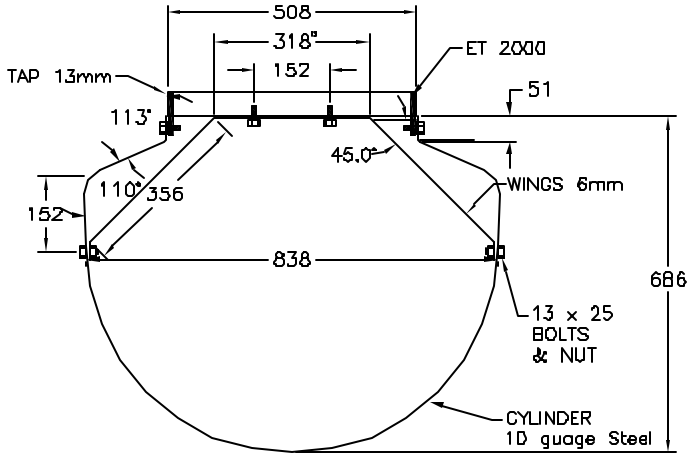
While the CPSI cannot be considered a safety device on its own, it will not likely degrade the performance of any approved energy-absorbing terminal to which it is attached and it can reduce the severity of certain types of impacts as demonstrated in the crash test. It is therefore acceptable for use as an add-on or retrofit to the ET-2000 and other types of energy-absorbing w-beam terminals at the discretion of the appropriate transportation authority and with the permission of the terminal manufacturer.

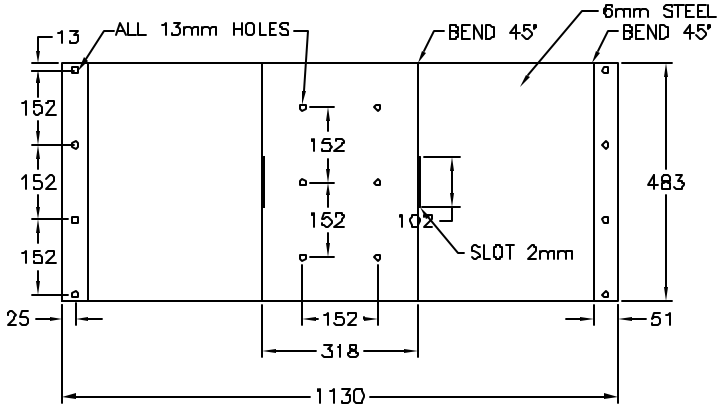
Sincerely yours,

(original signed by Carol H. Jacoby)

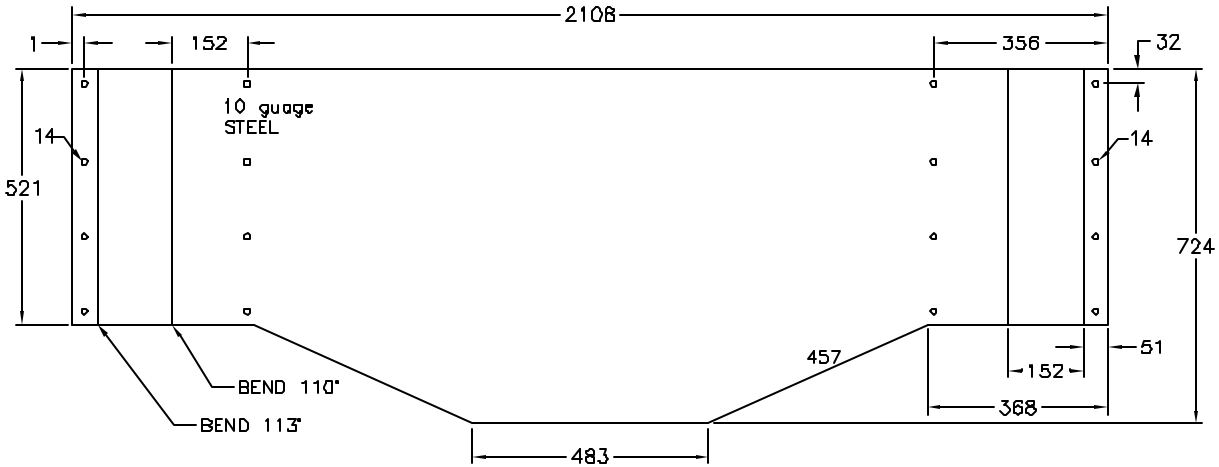
Carol H. Jacoby, P.E.
Director, Office of Safety Design

2 Enclosures

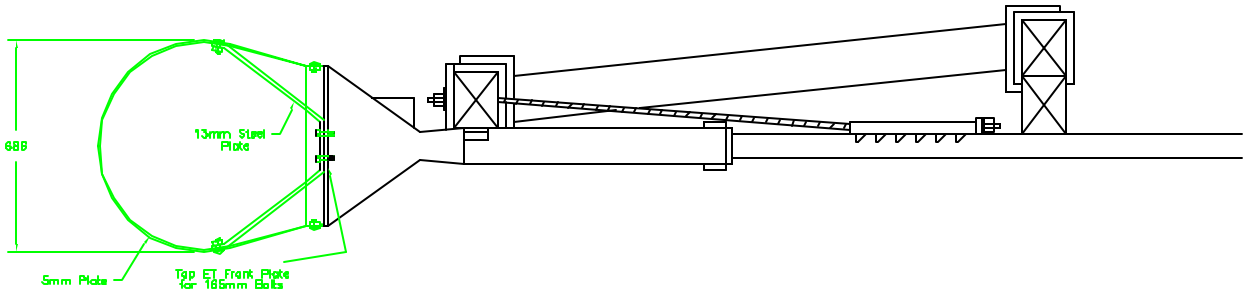


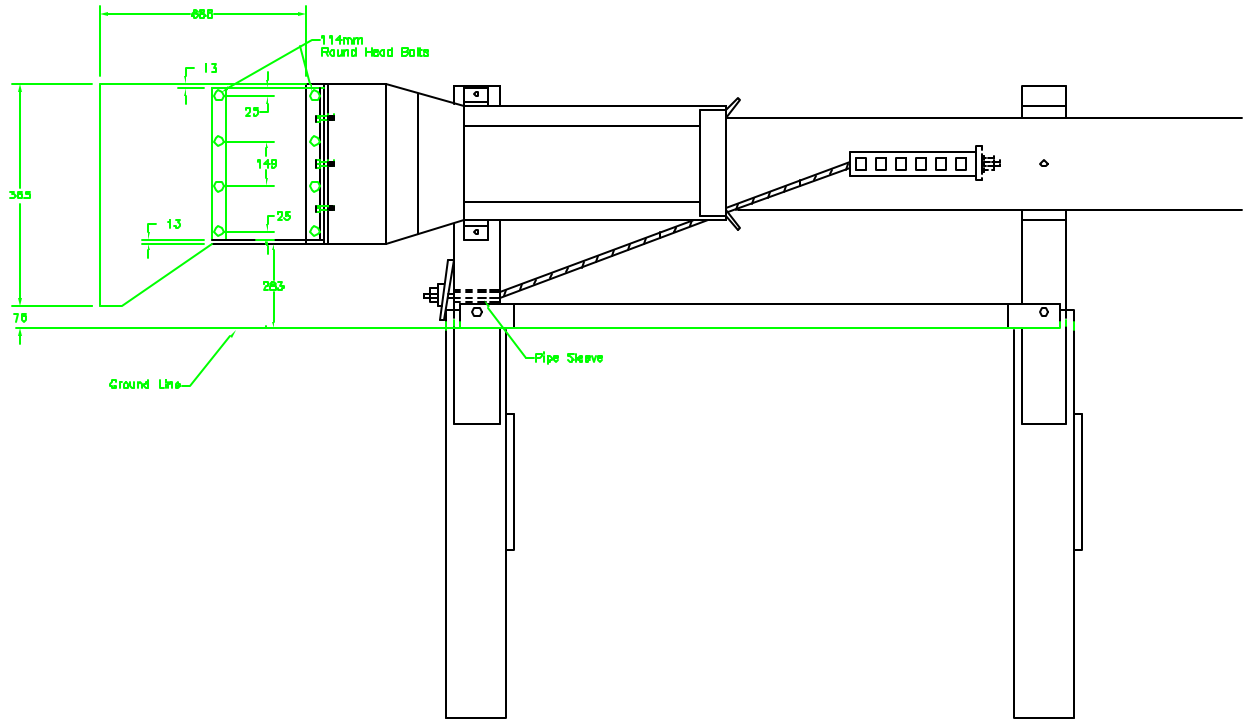


WING



CYLINDER


688
13mm Steel Plate
5mm Plate
Top ET Front Plate for 16mm Bolts

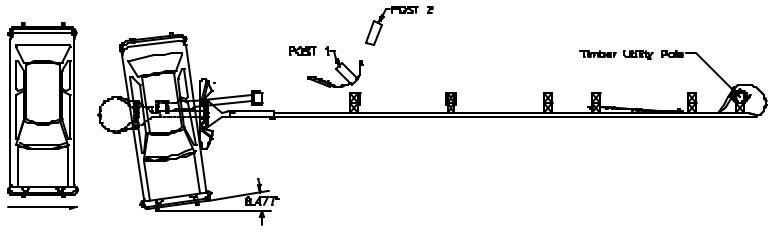

355
114mm Round Head Bolts
13
25
149
25
13
283
76
Ground Line
Pipe Sleeve

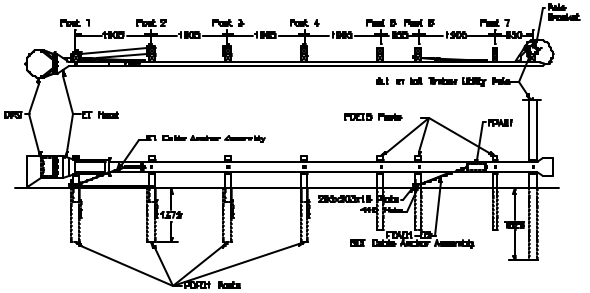
0.000 s

0.118 s

0.332 s

0.711 s





General Information

Test Agency	Texas Transportation Institute
Test No.	Side Impact 220542-1
Date	01/08/98

Test Article

Type	Side Impact Protection for End
Name	Treatments
Installation Length (m)	ET-CPSI
Material or Key Elements	12.5
	ET-2000 with CPSI and
Soil Type and Condition	Timber Utility Pole

Test Vehicle

Type	Standard Soil, Damp
Designation	
Model	Production
Mass (kg)Curb	820C
Test Inertial	1991 Ford Festiva
Dummy	832
Gross Static	820
	76
	896

Impact Conditions

Speed (km/h)	56.1
Angle (deg)	90

Exit Conditions

Speed (km/h)	Stopped
Angle (deg)	8.1

Occupant Risk Values

Impact Velocity (m/s)	
x-direction	No Contact
y-direction	5.8
Ridedown Accelerations (g's)	
x-direction	No Contact
y-direction	7.1
Max. 0.050-s Average (g's)	
x-direction	0.9
y-direction	6.2
z-direction	-2.7

Test Article Deflections (m)

Dynamic	2.11
Permanent	2.11

Vehicle Damage

Exterior	
VDS	09LP3
CDC	09LPEW2
Maximum Exterior	
Vehicle Crush (mm)	170
Interior	
OCDI	LS0000100
Max. Occ. Compart.	
Deformation (mm)	104

Post-Impact Behavior

(during 1.0 s after impact)	
Max. Yaw Angle (deg)	-10
Max. Pitch Angle (deg)	-2
Max. Roll Angle (deg)	-7

Summary of Results for ET-CPSI Side Impact Test, NCHRP Report 350 SI-1.