



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

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

March 1, 2005

In Reply Refer To: HSA-10/CC-27A

Mr. Don Robertson
Marketing Regional Director
Engineered Arresting Systems Corporation
2550 Market Street
Aston, Pennsylvania 19014-3426

Dear Mr. Robertson:

In May 1995, a 36-inch diameter ESCO Water Twister Vehicle Arresting System (VAS) with a 60-foot wide net was accepted for use on the National Highway System as an NCHRP Report 350 attenuator at test level 3 (TL-3). This acceptance was based on successful completion of two full-scale crash tests conducted at the Texas Transportation Institute (TTI). Late last year, you requested acceptance of a smaller unit (18-inch diameter) with a 20-foot net based on an analytical comparison of the earlier design. Enclosures 1 and 2 show the key components of your Model 18 VAS and its connections to a 2.25-inch mesh by 42-inch high chain-link restraining net.

Dr. Dean Alberson, the research engineer at TTI who conducted the earlier full-scale tests of the 36-inch diameter VAS, reviewed your modeling procedure by comparing the actual and predicted occupant impact velocities (OIV's) and subsequent ridedown accelerations (G's) from the original tests with the predicted values from the Model 18 VAS unit. In his letter to Mr. Richard Powers dated February 22, he concluded that the OIV with the Model 18 VAS and the 1800-lb test vehicle would be 25.6 ft/s (7.8 m/s) and the ridedown G's would be 5.25. For the 4400-lb pickup truck, the corresponding values were estimated to be 19.5 ft/s (5.9 m/s) and 3.25 G's. All of these values are well within the bounds recommended in NCHRP Report 350 for a test level 3 (TL-3) attenuator. For both vehicles, the stopping distance was predicted to be approximately 50 feet.

Based on Dr. Alberson's review of your data and his conclusions noted above, the Model 18 VAS may be considered an NCHRP Report 350 attenuator at TL-3 and used on the National Highway System when such use is considered appropriate by the transportation authority. Since the Model 18 VAS has not been crash tested, initial installations should be evaluated in the field to verify acceptable crash performance. The rigid structures to which the VAS units are secured should be situated out of harm's way or adequately shielded from traffic.

Please note the following standard provisions that apply to FHWA letters of acceptance:

- Our acceptance is limited to the crashworthiness characteristics of the Model 18 VAS and does not cover its structural features or conformity with the Manual on Uniform Traffic



Control Devices. Appropriate retro-reflective panels should be mounted on the chain-link fencing to increase its visibility to motorists.

- Any design changes that may adversely affect the crashworthiness of the Model 18 VAS will require a new acceptance letter.
- Should the FHWA discover that in-service performance evaluations reveal unacceptable safety problems, or that the device being marketed is significantly different from the version that was accepted and described above, it reserves the right to modify or revoke its acceptance.
- You will be expected to supply potential users with sufficient information on design and installation requirements to ensure proper performance.
- You will be expected to certify to potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance.
- To prevent misunderstanding by others, this letter of acceptance, designated as number CC27A shall not be reproduced except in full. This letter, and the documentation upon which this letter is based, is public information. All such letters and documentation may be reviewed at our office upon request.
- The Model 18 VAS is considered a proprietary product. When proprietary devices are *specified by a highway agency* for use on Federal-aid projects, except exempt, non-NHS projects, they: (a) must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities or that no equally suitable alternative exists or; (c) they must be used for research or for a distinctive type of construction on relatively short sections of road for experimental purposes. Our regulations concerning proprietary products are contained in Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,

/Original Signed by Richard Powers/

~for~

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

2 Enclosures

OM9D01301

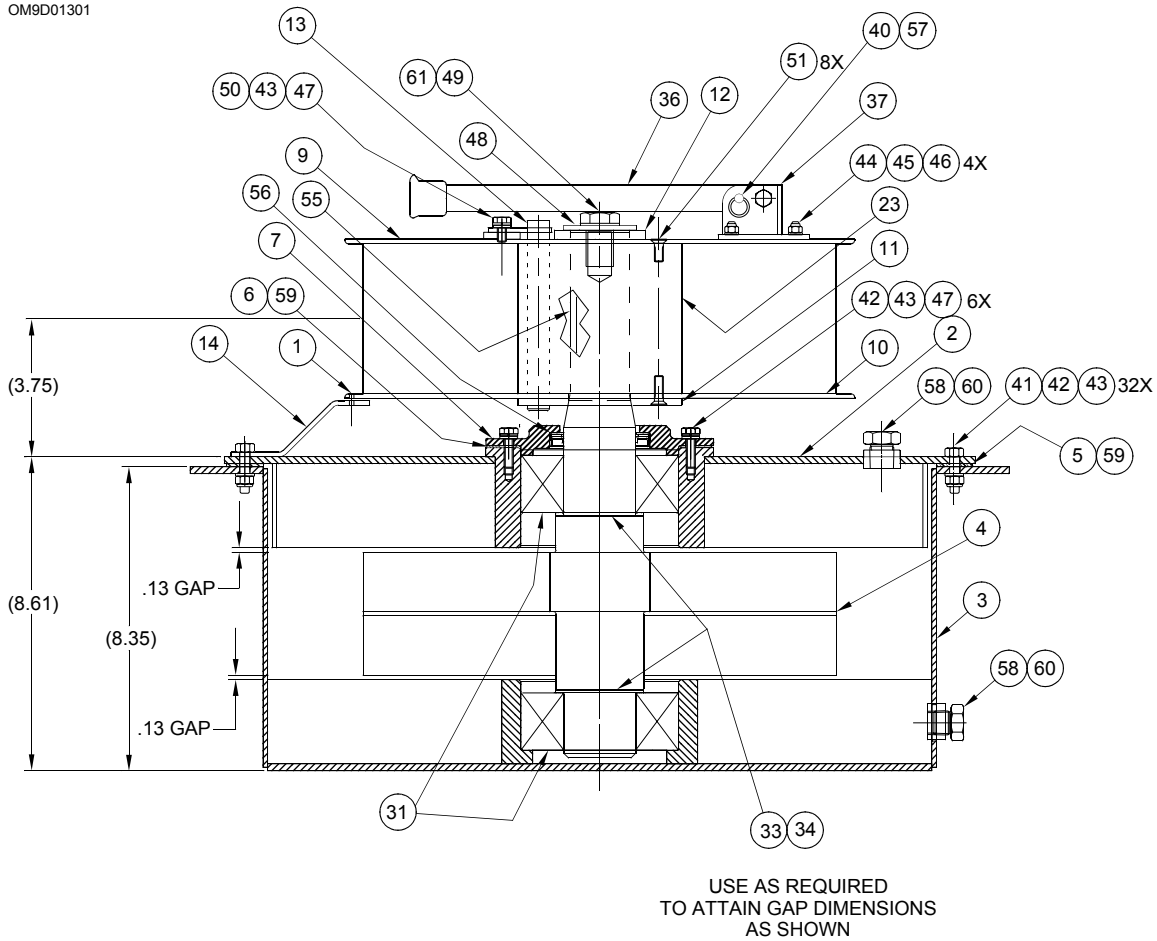


Figure 7-6. Energy Absorber Assembly, VAS Model 18.

Fig & Index No.	Part Number	Description	Qty	Usable on Code
7-6	9D01301-1 a	Energy Absorber Assembly, VAS Model 18..... (see Figure 7-1-5 for NHA)	REF	
-2	9D01301-2	• Cover Assembly (weldment)	1	
-3	9D01301-3	• E/A housing (weldment)	1	
-4	9D01301-4	• Rotor/shaft (weldment)	1	
-5	9D01301-5	• Gasket, cover	1	
-6	9D01301-6	• Gasket, retainer cap	1	
-7	9D01301-7	• Retainer cap	1	
-9	9D01301-9	• Tape flange, upper.....	1	
-10	9D01301-10	• Tape flange, lower	1	
-11	9D01301-11	• Flange plate, lower	1	
-12	9D01301-12	• Spacer	1	
-13	9D01301-13	• Tape pin assembly.....	1	
-14	9D01301-14	• Shear pin bracket	1	

Fig & Index No.	Part Number	Description	1 2 3 4 5 6						Usable on Code
			Qty						
7-6		Energy Absorber Assembly, VAS Model 18 (Continued)							
-23	9D01301-23	• Hub, tape.....							1
-31	70004-265	• Bearing, rotor shaft.....							2
-33	9D01301-33	• Shim, rotor shaft, brass.....							AR
-34	9D01301-34	• Shim, rotor shaft, brass.....							AR
-36	12909-1	• Handle assembly, rewind.....							1
-37	12910-1	• Support, handle.....							1
-40	MS17990-412	• Quick release pin.....							1
-41	29725-014	• Nut, selflocking, 0.250-20UNC-3A.....							32
-42	18257-005	• Bolt, hex hd, gr 5, 0.250-20 UNC x 1.0.....							38
-43	13393-069	• Washer, flat, 0.250 nom.....							38
-44	29725-002	• Nut, slflkg, No. 10-32.....							4
-45	70004-262	• Screw, mach, flat hd, 1.0, #10-32.....							4
-46	13393-002	• Washer, flat, No. 10 nom.....							4
-47	14218-006	• Washer, lock, 0.250 nom.....							7
-48	13393-066	• Washer, flat, 0.750 nom.....							1
-49	70004-264	• Bolt, hex hd, gr 5, 0.750-10 UNC x 1.0.....							1
-50	18257-001	• Bolt, hex hd, gr 5, 0.250-20 UNC x .50.....							1
-51	70004-263	• Screw, machine, flat hd, 0.63, 0.250-20.....							8
-55	70004-267	• Keystock, 0.375 x 0.375.....							1
-56	70004-266	• Seal, shaft.....							1
-57	70009-310	• Cable assembly.....							1
-58	06077-002	• Pipe plug, sq hd, stl, 0.375 NPT.....							2
-59	165001.1	• No. 2 Gasket Sealant.....							AR
-60	70009-056	• Sealant, pipe thread.....							AR

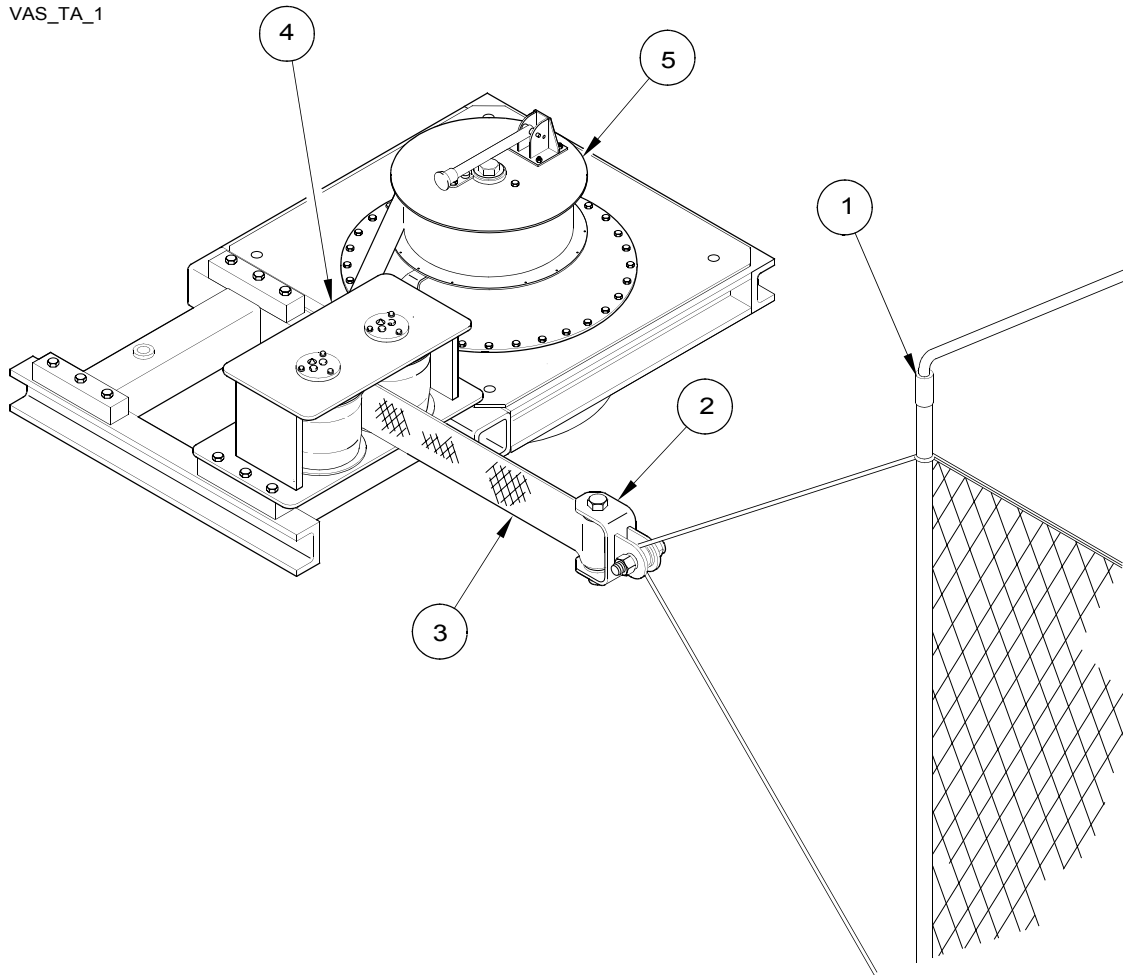


Figure 7-1. VAS Energy Absorber System.

Fig & Index No.	Part Number	Description	1 2 3 4 5 6						Usable on Code
			Qty						
7-1	No Number	Vehicle Arresting System.....							REF
-1	9D01318-1	• VAS Net Assembly <i>(see Figure 7-2 for detailed information)</i>							1
-2	9D01316-1	• Tape Connector <i>(see Figure 7-3 for detailed information)</i>							2
-3	9D01307-1	• Tape.....							2
-4	9D01313-1	• 4 Inch Sheave Housing Assembly..... <i>(see Figure 7-4 for detailed information)</i>							2
-5	9D01301-1	• Energy Absorber <i>(see Figure 7-6 for detailed information)</i>							2