

May 4, 2001

Refer to: HSA-CC73

Barry D. Stephens, P.E.
Senior Vice President - Engineering
Energy Absorption Systems, Inc.
3617 Cincinnati Avenue
Rocklin, CA 95765

Dear Mr. Stephens:

In your April 6 letter, you requested the Federal Highway Administration's review and acceptance of your REACT 350 (60") System, a self-restoring impact attenuator designed to meet the National Cooperative Highway Research Program (NCHRP) Report 350 evaluation criteria for a Test Level 3 (TL-3) crash cushion. To support your request, you provided Mr. Richard Powers of my staff copies of the March 2001 E-TECH Testing Services, Inc. report entitled "NCHRP Report 350 Crash Test Results for the REACT 350 (60)" which included your engineering summary "REACT 350 (60") (5 Foot [1525 mm] Wide System) Qualification to NCHRP Report 350 Test Level 3" and a videotape showing the full-scale tests that were conducted.

The TL-3 REACT 350 (60"), intended as a replacement for the original Wide REACT, consists of an array of High Density Polyethylene (HDPE) cylinders 610 mm (24 inches) in diameter. They are arranged in thirteen rows of two cylinders each, plus a single nose cylinder, making the unit 8915-mm (29 feet) long. The single nose cylinder and the cylinders in rows 1-3 have a wall thickness of 19 mm (0.74 inches) and are 813-mm (32 inches) tall. The cylinders in rows 4-9 are the same thickness but 1070-mm (42 inches) high. Those in rows 10-13 remain 1070-mm (42 inches) high but their wall thickness is increased to 29 mm (1.14 inches). All cylinders in rows 5-13 contain self-restoring, hinged internal steel struts to provide redirection in side impacts. The two cylinders in each row are attached to steel space frame diaphragms that are mounted on a steel monorail similar to the monorail used with the QuadGuard family of impact attenuators. Your specifications require the monorail to be bolted to a concrete foundation using 19 mm (0.75 inch) diameter by 191 mm (7.5 inch) long ASTM A-193 Grade B7 polyester grouted studs. Enclosure 1 is a schematic drawing of the tested unit.

Since the REACT 350 (60") System is classified as a redirective, non-gating crash cushion, the recommended NCHRP Report 350 test matrix consists of eight tests. Six of these tests were run and successfully completed. My staff agreed beforehand that test 3-36 (820-kg vehicle/100 km/h impact speed/15 degree impact angle at the Critical Impact Point) was less severe than test 3-37 (2000-kg vehicle/100 km/h/20 degree impact at the same location) and that the former could be waived if test 3-37 was fully satisfactory. Test 3-39, the reverse direction impact, was waived because the rearmost corner of the REACT 350 (60") is effectively shielded by the concrete

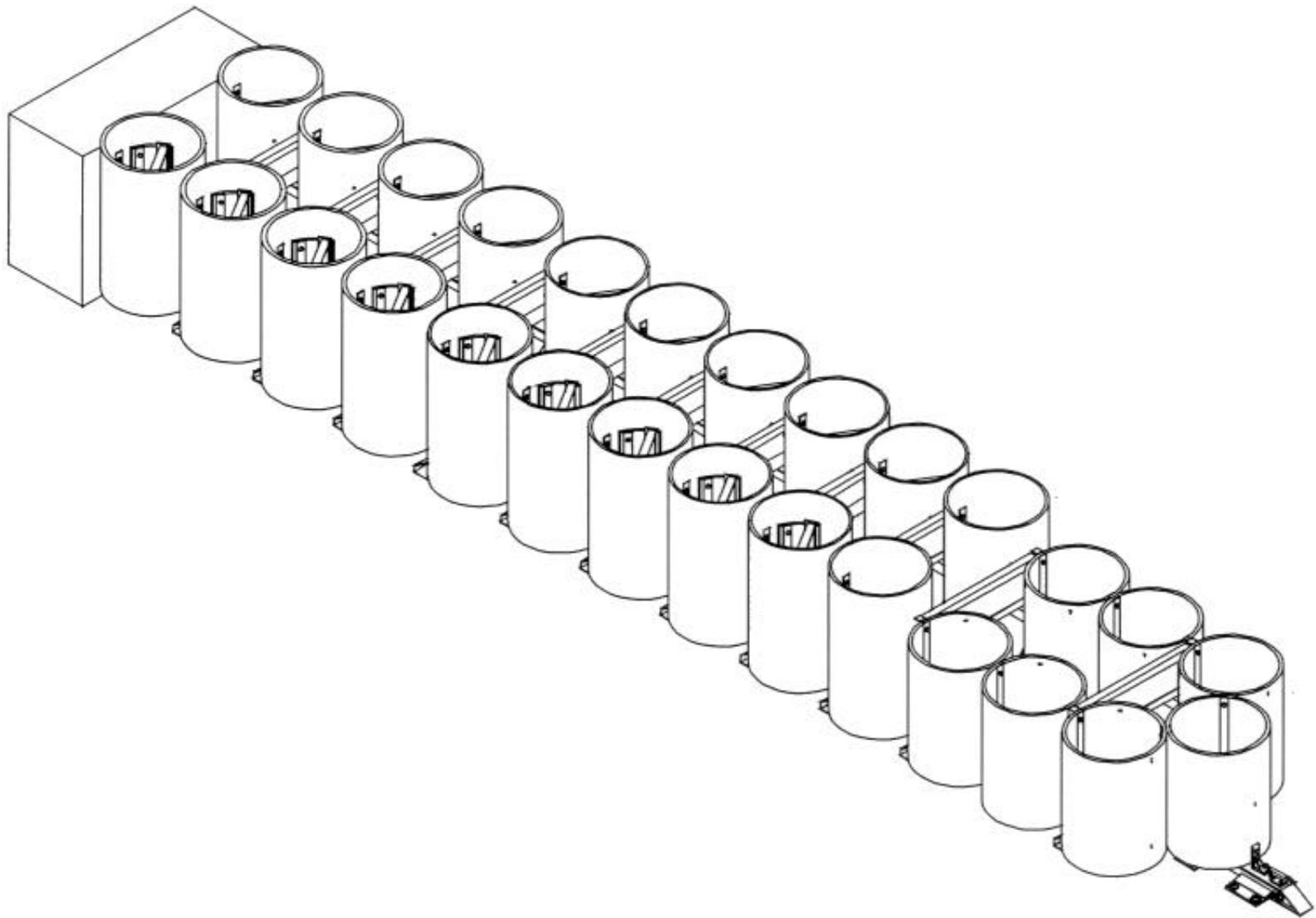
backup structure and there are no external components on the cylinders that might cause an impacting vehicle to snag. Enclosure 2 contains summary information on the six tests that were successfully conducted.

Based on staff review of the information you submitted, I agree that the REACT 350 (60") System, when attached to a 1525-mm (60 inch) wide reinforced and anchored concrete backup, meets the appropriate evaluation criteria for an NCHRP Report 350 TL-3 crash cushion and may be used on the National Highway System (NHS) when selected by a transportation agency. Since the REACT 350 (60") is a proprietary device, its use on Federal-aid projects, except exempt, non-NHS projects, is subject to the conditions listed in Title 23, Code of Federal Regulations, Section 635.411.

Sincerely yours,

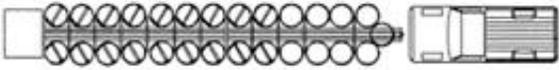
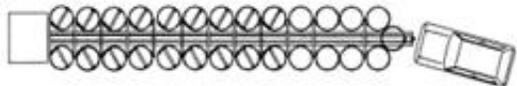
(original signed by Frederick G. Wright, Jr.)

Frederick G. Wright, Jr.
Program Manager, Safety



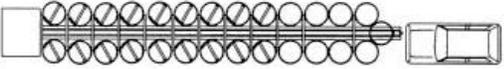
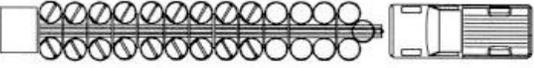
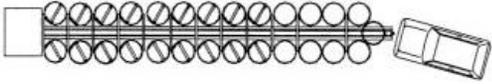
REACT 350[®] (60") (5 Foot [1525 mm] Wide System)

REACT 350[®] (60") Crash Tests Submitted for Product Certification.

NCHRP 350 Test	Test Results	Comments
 <p>Test 3-30, 820c / 100kph / 0° / W/4 offset</p>	<p>Long. Delta-V = (11.4) m/s</p> <p>Lateral Delta-V = (-2.3) m/s</p> <p>Long. Ridedown = (-12.3) G</p> <p>Lateral Ridedown = (3.0) G</p>	<p>Test Passed</p>
 <p>Test 3-31, 2000P / 100kph / 0°</p>	<p>Long. Delta-V = (8.9) m/s</p> <p>Lateral Delta-V = (-0.2) m/s</p> <p>Long. Ridedown = (-10.8) G</p> <p>Lateral Ridedown = (1.8) G</p>	<p>Test Passed</p>
 <p>Test 3-32, 820c / 100kph / 15° Nose</p>	<p>Long. Delta-V = (10.8) m/s</p> <p>Lateral Delta-V = (-0.1) m/s</p> <p>Long. Ridedown = (-11.9) G</p> <p>Lateral Ridedown = (2.9) G</p>	<p>Test Passed</p>

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 <p>Test 3-31, 2000P / 100kph / 0°</p>	<p>Long. Delta-V = (8.9) m/s</p> <p>Lateral Delta-V = (-0.2) m/s</p> <p>Long. Ridedown = (-10.8) G</p> <p>Lateral Ridedown = (1.8) G</p>	<p align="center">Test Passed</p>
 <p>Test 3-32, 820c / 100kph / 15° Nose</p>	<p>Long. Delta-V = (10.8) m/s</p> <p>Lateral Delta-V = (-0.1) m/s</p> <p>Long. Ridedown = (-11.9) G</p> <p>Lateral Ridedown = (2.9) G</p>	<p align="center">Test Passed</p>

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