



September 17, 2008

In Reply Refer To: HSSD/CC-42B

Mr. Barry Stephens
Energy Absorption Systems, Inc.
3617 Cincinnati Avenue
Rocklin, CA 95765

Dear Mr. Stephens:

This letter is in response to your request for Federal Highway Administration (FHWA) acceptance of a roadside safety device for use on the National Highway System (NHS).

Name of device: High Speed (70 mph) QuadGuard – Flared Version
Type of device: Impact Attenuator
Test Level: NCHRP Report 350 Test Level 3
Testing conducted by: N/A
Date of request: April 14, 2008

You requested that we find this device acceptable for use on the NHS under the provisions of National Cooperative Highway Research Program (NCHRP) Report 350 “Recommended Procedures for the Safety Performance Evaluation of Highway Features.”

Requirements

Roadside safety devices should meet the guidelines contained in the NCHRP Report 350, FHWA Memorandum “Action: Identifying Acceptable Highway Safety Features” of July 25, 1997, provides further guidance on crash testing requirements of longitudinal barriers.

Description

The QuadGuard, QuadGuard-Wide, and QuadGuard High Speed crash cushions have been tested and found acceptable in the FHWA Acceptance Letters noted below.

CC-35	06/21/96	<u>TL-3</u>	QUADGUARD Crash Cushion - unidirectional
CC-35A	08/05/96	<u>TL-3</u>	QUADGUARD CZ - Construction Zone
CC-35B	10/17/96	<u>TL-3</u>	QUADGUARD Crash Cushion – bi-directional
CC-35C	06/17/99	<u>TL-2</u>	3-bay QUADGUARD at test level 2 (TL-2)
CC-35D	10/13/00	<u>TL-3</u>	Acknowledgment of limited 70 MPH tests
CC-35E	10/19/01	<u>TL-3</u>	QuadGuard HS: Full test matrix at 70 mph
CC-35F	12/10/03	<u>TL-3</u>	QuadGuard CZ on steel plate
CC-35G	11/01/04	var.	Drivable Pile Anchor for QG CZ on steel plate



CC-35H	07/16/07	var.	Change in QuadGuard Cartridge
CC-42	07/16/97	<u>TL-3</u>	QUADGUARD-WIDE system (6-degree sides)
CC-42A	12/10/03	<u>TL-3</u>	QUADGUARD with 10-degree sides

Crash Testing

No actual crash tests were submitted for this request. Instead, results from previous successful tests of parallel-sided and flared QuadGuards (QG and QG-Flared) at TL-3 impact speeds were presented as well as tests into a parallel-sided QuadGuard high speed unit at elevated impact speeds of 70 mph (QG-HS). Using the data from those successful tests, engineering logic was presented predicting the results for similar tests into your proposed High Speed Quad Guard – Flared Version.

The following is a brief summary of the NCHRP Report 350 non-gating crash cushion tests that were evaluated in your analysis:

Test 3-30 - Typically waived because 3-32 is more severe

Test 3-31 - Compared to both QG-HS and QG-Flared tests. Flare does not materially affect this head-on test.

Test 3-32 - Compared to both QG-HS and QG-Flared tests. Occupant risk values of earlier test were low enough that QG-HS-Flared would be expected to pass.

Test 3-33 - Compared to both QG-HS and QG-Flared tests. Occupant risk values of earlier test were low enough that QG-HS-Flared would be expected to pass.

(Tests 3-34 and 3-35 are for gating terminals only)

Test 3-36 – Compared to QG-Flared and QG-HS. Occupant risk values of earlier test were low enough that QG-HS-Flared would be expected to pass.

Test 3-37 – Compared to QG-Flared and QG-HS. Occupant risk values of earlier test were low enough that QG-HS-Flared would be expected to pass.

Test 3-38 – Compared to QG-Flared and QG-HS. Occupant risk values of earlier test were low enough that QG-HS-Flared would be expected to pass.

Test 3-39 – Reverse direction test would be expected to perform as well or better due to flare.

Findings

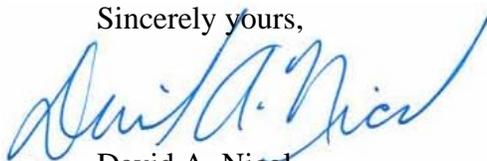
As a service to the highway community, FHWA finds devices meeting NCHRP Report 350 acceptable for use on the National Highway System for impact speeds up to 100 km/hr. You have shown that the QG-HS-Flared will likely meet similar evaluation criteria when tested at 113 km/hr. FHWA concurs that the device described above and detailed in the enclosed drawing is acceptable for use on the NHS under NCHRP Report 350 TL-3 conditions, when acceptable to a highway agency. Should an agency wish to specify an attenuator with capacity exceeding TL-3 the QG-HS-Flared is acceptable for use at speeds up to 113 km/hr.

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

- This acceptance is limited to the crashworthiness characteristics of the devices and does not cover their structural features, nor conformity with the Manual on Uniform Traffic Control Devices.

- Any changes that may adversely influence the crashworthiness of the device will require a new acceptance letter.
- Should the FHWA discover that the qualification testing was flawed, that in-service performance reveals unacceptable safety problems, or that the device being marketed is significantly different from the version that was crash tested, we reserve the right to modify or revoke our 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, and that it will meet the crashworthiness requirements of the FHWA and the NCHRP Report 350
- To prevent misunderstanding by others, this letter of acceptance is designated as number CC-42B and shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed at our office upon request.
- The QuadGuard family of attenuators are patented products and considered proprietary. If proprietary devices are specified by a highway agency for use on Federal-aid projects, except exempt, non-NHS projects, (a) they must be supplied through competitive bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with the 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.
- This acceptance letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented device for which the applicant is not the patent holder. The acceptance letter is limited to the crashworthiness characteristics of the candidate device, and the FHWA is neither prepared nor required to become involved in issues concerning patent law. Patent issues, if any, are to be resolved by the applicant.

Sincerely yours,



David A. Nicol
Director, Office of Safety Design
Office of Safety

Enclosures

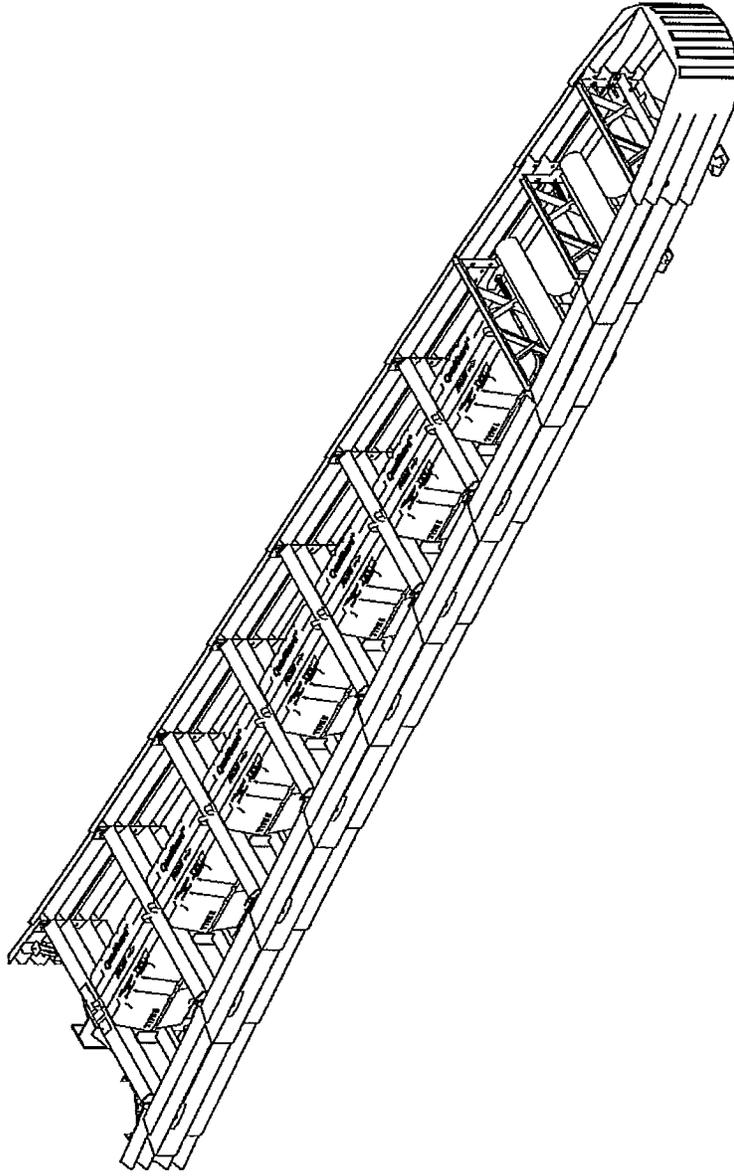


Figure 1

 ENERGY ABSORPTION SYSTEMS, INC. ENGINEERING AND RESEARCH DEPARTMENT		QUADGUARD-HIGH SPEED FLARED TL-3 (113km/h)		SHEET 1 of 1 REV
DRAWN: W. Loddington	DATE: 4/10/2008	CHECKED: DATE:	APPROVED: DATE:	CODE:
PROJECT: CHTS6889YP.dwg		PROJECT NUMBER:		