



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

New Mexico Division

October 23, 2015

4001 Office Court Drive
Suite 801
Santa Fe, NM 87507
505-820-2021

In Reply Refer To:
HFO-NM
ENGI 23

Mr. Tom Church
Cabinet Secretary
New Mexico Department of Transportation
PO Box 1149
Santa Fe, NM 87507

SUBJECT: Request of Product Certification for Vehicle Impact Attenuator Crash Cushion Units

Dear Secretary Church:

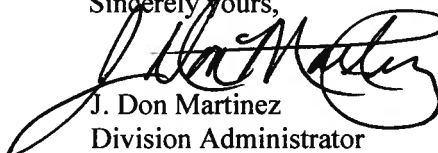
The Federal Highway Administration, New Mexico Division Office, has reviewed the New Mexico Department of Transportation's (NMDOT) request for approval of the produce certification for certain vehicle impact attenuators/crash cushions to be used within District 3.

It is understood from the submittal that this proprietary equipment is for the use of the Quardguard Elite, SMART Crash Cushion and TRACC Family attenuators within District 3 as this will reduce maintenance costs; reduce costs in duplication of training, tools, and replacement parts; expedite speed of repairs and reduce storage of replacement equipment. In addition, as stated in your supporting documentation this may also provide an opportunity to reduce potential litigation due to lack of maintenance training.

In accordance with 23 CFR 635.411 and based on the information provided, FHWA NM Division Office approves the use of the request for the above mentioned project for a duration of 3 years from September 30, 2015. After this date, a new request will need to be submitted and reviewed by this office.

Please contact Ms. Jolena Palau at 505-660-7798, or Jolena.Palau@dot.gov if you require any additional information or assistance related to this issue.

Sincerely yours,



J. Don Martinez
Division Administrator

cc:

Mr. Ken Murphy, NMDOT, Acting District 3 Engineer
Mr. Armando Armendariz, NMDOT, Division Director
Ms. Jill Mosher, NMDOT, Acting ADE Technical Support
Ms. Nancy Perea, NMDOT, D3 Traffic Engineer
Ms. Margaret Haynes, NMDOT, D3 Assistant Traffic Engineer
Ms. Nancy Perea, NMDOT, D3 Traffic Engineer
Ms. Rhonda Lopez, NMDOT, D3 Construction Liaison Engineer
Ms. Priscilla Benavides, NMDOT, CRD Design Manager



16 September, 2015

J. Don Martinez
Division Administrator, FHWA
4001 Office Court, Suite 801
Santa Fe, NM 87507

Re: Request of Product Certification for Vehicle Impact Attenuator Crash Cushion Units for District Three

Dear Mr. Martinez:

The New Mexico Department of Transportation (NMDOT) District Three (D3) is requesting a product certification for certain vehicle impact attenuators/crash cushions, hereinafter called 'attenuators' to be used on all federal and state funded projects installed within the D3 boundary.

The extent of the Certification is specific to all NEW installations within D3.

I, Thomas Kratochvil, Assistant District Engineer - Maintenance D3, do hereby certify that in accordance with the requirements of 23 CFR 635.411(a)(2), that these proprietary items are essential for improving functionality, safety and maintainability of the existing highway facilities throughout D3.

The attenuators listed below are necessary for the satisfactory operation of the existing facilities and are interchangeable with products in D3's maintenance inventory.

- *Quadguard Elite*
- *SMART Crash Cushion*
- *TRACC Family*

The installation of the attenuators listed above are in the best interest of the public because they have substantially lower maintenance costs while performing at or above required standards than other attenuators listed on the NMDOT's Approved Products List (APL). These attenuators will maintain compatibility with D3 maintenance training, tools and replacement parts therefore decreasing user delays and worker exposure during repair. Minimizing the selection of attenuators on the APL will decrease storage of equipment at each of the five D3 Patrol yards. Finally, NMDOT may minimize potential litigation tied to maintenance of numerous attenuators on the APL. This is explained in detail below.

Susana Martinez
Governor

Tom Church
Cabinet Secretary

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Ronald Schmeits
Chairman
District 4

Dr. Kenneth White
Secretary
District 1

David Sepich
Commissioner
District 2

Keith Mortensen
Commissioner
District 3

Butch Mathews
Commissioner
District 5

Jackson Gibson
Commissioner
District 6

Certification Documentation:

(1) Maintenance Cost

- The attenuators listed above may be reset after most crashes numerous times at the lowest maintenance cost. The number of times an attenuator can be reset cannot be measured since each crash may be significantly different than those experienced in testing. Each attenuator must be inspected after each crash to determine if it can be reset or must be replaced. Most attenuators require replacement parts and many labor hours to be replaced after each crash. For example the Quadguard II, has cartridges that must be replaced after each crash. Each cartridge costs around \$800 and a typical crash will require a minimum 4-6 replacement cartridges, totaling approximately \$4,800 per crash per unit in the cost of parts alone. See District 3 – Permanent Attenuator/Crash Cushion Unit Matrix of Maintenance Cost attached.
- D3 ideally stockpiles at least one replacement unit for each attenuator. The maintenance cost increases with each new unit that must be stockpiled. D3 currently has nine (9) different attenuators installed within the District. See District 3 – Permanent Attenuator/Crash Cushion Units Inventory.
- Some attenuators require special tools which require additional cost. The Universal TAU-II requires special tools. Specialty tools are tools that are required by the manufacture for installation of the attenuator's replacement parts.
- Each attenuator requires special replacement parts. The replacement parts are not interchangeable. Placing a wrong type part in the attenuator may result in an unacceptable crash performance; therefore each D3 Patrol Yard must have replacement parts for each attenuator.

(2) Multiple Maintenance Training, Tools and Replacement Parts

- D3 maintenance staff has not been receiving initial and updated training when manufacture modifications take place and when a new attenuator is installed. Of the nine (9) different attenuator units D3 has within the District, D3 has only been trained on two (2) different units by the manufacturer.
- Some of the attenuators require special tools to properly maintain them. Using these tools may require additional training and cost. Maintenance staff turnover requires periodic training for each unit. Excessive training requirements associated with too many and diverse types of attenuators will be minimized if fewer types of attenuators are installed and maintained within D3.
- D3 has recently been trained on the inspection and maintenance required for the Quadguard Elite. ADE Maintenance Engineer provides additional inspection to verify compatibility of the concrete foundation when new units are replaced. D3 staff is experienced with installation of concrete slabs if the foundation does not meet the current pad requirement of the low cost attenuators.

(3) *Speed of Repairs*

- D3 is familiar with the preferred attenuators (listed above); therefore repairs can be made quickly and efficiently. Those units that do not require new or replacement parts after each crash can be repaired immediately, in lieu of ordering new parts, picking them up and then installing them.
- Minimizing user delays can be achieved by faster repairs to the attenuator/crash cushion units.
- Minimizing D3 maintenance staff exposure to traffic during repairs to improve safety for maintenance staff during installation.

(4) *Storage of Replacement Equipment*

- Each patrol stockpiles on average one – four replacement attenuators and various replacement parts, depending on number of attenuators within their patrol and the amount of space within their patrol. Each attenuator would require a stockpile of spare parts which requires additional storage area.
- Based on the wide variety of each patrol's stockpile, there is a possibility of using similar parts from one system that somewhat fits on another system that does not meet design criteria.

(5) *Potential Litigation due to lack of maintenance training*

- Since the majority of D3 maintenance staff is self-taught to maintain attenuators, this opens up NMDOT to additional claims and litigation as different or unfamiliar units are installed and not maintained to manufacture's specifications and standards within D3.

Summary of Documentation

In summary, D3 requests FHWA concurrence for use of Quadguard Elite, SMART Crash Cushion, and TRACC Family attenuators within D3.

The installation of these attenuators is in the best interest of the public because these attenuators have the lowest maintenance costs, as shown in the attached District 3 – Permanent Attenuator/Crash Cushion Unit Matrix of Maintenance Cost. The installation of these attenuators will also benefit D3 by improving response to repairs for the reason that the patrols will have the same inventory on hand with compatible maintenance training for staff and similar maintenance tools. D3's familiarity with these units will benefit the public because it will decrease user delays and more importantly reduce workers exposure time during repair. Finally, D3 would like to minimize and avoid potential litigation by enhancing patrol staff training with familiarity to properly maintain D3's attenuators.

Approval of these three preferred systems still assure healthy competition by three manufactures and two major vendors/distributors of these types of products. As new

low cost attenuators are added to the NMDOT's APL, D3 will perform an annual evaluation of the Permanent Attenuator/Crash Cushion Unit Matrix of Maintenance Cost and amend this product certification accordingly.

Duration of Approval

This certification will be valid for all Permanent Attenuator/Crash Cushion Units installed within District 3 until September 30, 2018.

Sincerely,



Thomas Kratochvil, PE
Assistant District Engineer - Maintenance
New Mexico Department of Transportation District 3

FHWA Concurrence

J. Don Martinez

Date:

cc:

Jolena Palau, FHWA Area Engineer
Frank Lozano, FHWA Transportation Operations Engineer
Margaret Haynes, NMDOT D3 Assistant Traffic Engineer
Nancy Perea, NMDOT D3 Traffic Engineer
Jill Mosher, NMDOT D3 Acting ADE Engineering Support
Ken Murphy, NMDOT D3 Acting District Engineer
Rhonda Lopez, NMDOT D3 Construction Liaison Engineer
Armando Armendariz, NMDOT Division Director
Priscilla Benavides, CRD Design Manager

District 3 - Permanent Attenuator/Crash Cushion Units Inventory

		No of Units in each District 3 Patrol						
	Product Name	Manufacturer	Bernalillo	North Urban	South Urban	Tijeras	Belén	TOTAL
1	Quest TL-2 System (70km/h)	Energy Absorption Systems, Inc.	5					5
2	2005 TRACC	Trinity Highway Products, LLC		2	6	2		10
3	SCI-70GM Smart Cushion	SCI Products, Inc.	1	7	4			12
	Hybrid Energy Absorbing Resusable Terminal (HEART)	Trinity Highway Products, LLC						0
	ABSORB 350	Lindsay Transportation Solutions/Barrier						0
	Universal TAU-II-R	Lindsay Transportation Solutions/Barrier						0
4	Universal TAU-II	Lindsay Transportation Solutions/Barrier	4	1	9	18		32
	X-Tension Median Attenuator (X-MAS)	Lindsay Transportation Solutions/Barrier						0
	MP-3 Anchoring System for Attenuators	Energy Absorption Systems, Inc.						0
	SCI-100GM (Impact Attenuator)	SCI Products, Inc.						0
5	React 350 (Energy Absorption)	Energy Absorption Systems, Inc.		4	2			6
6	Quadguard II	Energy Absorption Systems, Inc.	1	8	34	11	1	55
	Quadguard System Narrow (24", 30", 36")	Energy Absorption Systems, Inc.						0
	Quadguard System Wide (69", 90")	Energy Absorption Systems, Inc.						0
7	Quadtrend 350 End Treatment	Energy Absorption Systems, Inc.			12			12
	Easi-Cell System	Energy Absorption Systems, Inc.						0
	The Quest System TL-3 (100km/h)	Energy Absorption Systems, Inc.						0
	Quadguard LMC	Energy Absorption Systems, Inc.						0
8	Quadguard Elite	Energy Absorption Systems, Inc.		8		1		9

Other (please list)

9 GREAT

23	24	9							

Total amount of Units in each Patrol

34	54	76	32	1					197
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Note: D3 Patrols inventory completed on January 2015

District 3 - Permanent Attenuator/Crash Cushion Unit Matrix of Maintenance Cost

Product Name	Number of D3 Units		Cost to replace Unit (excluding tax)	May be reset for most design crashes ¹ (Y/N)	Average Crash Repairs (Items replaced Total cost of materials ²)	Manhours (# people, # hours average cost ³)	Overall Average Cost
Quest TL-2 System (70km/h)	5		\$10,900	N	Requires new system \$10,900	5 men, 12 hours \$900	\$11,800
2005 TRACC	10	TL-2	\$11,600	Y	(2) rip plate @ \$40 EA (1) nose @ \$300 \$380	4 men, 8 hours \$480	\$860
		TL-3	\$15,000 - \$21,200				
SCI-70GM Smart Cushion	12	TL-2	\$16,800 - \$17,200	Y	shear bolt @ \$2 \$2	3 men, 2 hours \$90	\$92
		TL-3	\$21,200 - \$21,800				
Universal TAU-II	32		\$14,570	Y	(4) barrels @ \$310 (1) nose @ \$475 \$1715	2 men, 2 hours \$60	\$1,775
React 350 (Energy Absorption)	6	TL-1 Wide	\$30,000 - \$30,600	Y	(1) new back up single cable @ \$200 (2) galvanized stabilizer bar @ \$230 EA nose @ \$327 \$987	3 men, 4 hours \$180	\$1,167
		TL-2 Narrow	\$28,400 - \$29,000				
		TL-3 Narrow	\$33,500 - \$43,600				
		TL-2 Wide	\$40,500 - \$45,000				
		TL-3 Wide	\$44,700 - \$66,900				

Quadguard II Quadguard Narrow Quadguard Wide	55	TL-2 Narrow	\$4,000 - \$8,500	N	(4) cartridge assembly @ \$745 EA (4) cartridge assembly @ \$784 EA (1) back-up assembly @ \$1500 EA \$7616	3 men, 4 hours \$180	\$7,796
		TL-3 Narrow	\$10,100 - \$18,000				
		High Speed	\$19,300 - \$33,600				
		TL-2 Wide	\$12,500 - \$13,300				
		TL-3 Wide	\$16,000 - \$20,400				
		High Speed	\$23,100 - \$34,900				
Quadtrend 350 End Treatment	12	TL-3	\$5,100 - \$6,100	N	Requires new system \$4000-\$5000	3 men, 3 hours \$135	\$4,135
Quadguard Elite	9	Narrow	\$16,500 - \$41,300	Y	No additional parts required \$0.00	1 man, 1 hour \$15	\$15
		Wide	\$20,100 - \$39,000				
GREAT	56		No longer available	N	(6) hexfoam @ \$1100 EA (2) nose supported assembly @ \$76 EA (1) nose @ \$960 EA (1) diaphragm @ \$1700 \$9412	4 men, 4 hours \$240	\$9,652

Notes:

¹The number of times each attenuator can be reset has many factors including severity of crash, position of impact, and number times it has already been reset, therefore the manufacturer cannot predict how many times a attenuator can be reset

²The unit cost of each part is based off of the NMDOT Attenuators and Supplies Price Agreement which expired on November 8, 2014 and quotes from vendors if parts were not included in the price agreement

³This cost is based on an hourly wage of \$15/hour