



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

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

November 28, 2000

Refer to: HSA-1/LS-49

Mr. John L. Hill, III
UTD Inc.
10242 Battleview Parkway
Manassas, VA 20109-2336

Dear Mr. Hill:

Thank you for your letter of September 22 requesting Federal Highway Administration (FHWA) acceptance of your company's "UTD Safety Link" as a breakaway mechanism for utility pole guy wires for use on the National Highway System (NHS). Accompanying your letter was a report from Texas Transportation Institute and videos of the crash tests. You requested that we find guy wires using your company's Safety Link acceptable for use on the NHS under the provisions of the National Cooperative Highway Research Program (NCHRP) Report 350 "Recommended Procedures for the Safety Performance Evaluation of Highway Features."

Introduction

Testing of the supports was in compliance with the guidelines contained in the NCHRP Report 350, "Recommended Procedures for the Safety Performance Evaluation of Highway Features." Requirements for breakaway supports are those in the American Association of State Highway and Transportation Officials' (AASHTO) Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals.

The UTD Safety Link consists of a threaded steel rod inside a two-piece outer cylinder. One end of the outer cylinder is anchored to the ground, while one end of the threaded rod protrudes through the top of the outer cylinder and attaches to the guy wire. The threaded rod is constrained at the joint between the two pieces of the outer cylinder. When the link is struck by an errant vehicle, the two-piece outer cylinder bends at the joint. This increases the tension in the threaded rod until it fails, releasing the guy wire connection to the ground. The two-pieces of the outer cylinder remain connected to each other by external chains or internal cables while the threaded rod is pulled out by the guy wire.

There were four varieties made during the development of the link.

- A: Single internal cable loop
- B: Chain welded to two sides of link
- C: Two internal cable loops
- D: Four independent internal strands of wire rope

Testing

Full-scale automobile testing was conducted on your company's devices. The mass of the test vehicle was 820 kg in all tests. The complete devices as tested are shown in the Enclosure 1.

Test #	NCHRP 350	Speed	Version	Article	Occup. Speed	Delta V
1	Test 3-60	33.1	A	Light Link	No Contact	0.55
2	Test 3-61	96.6	A	Light Link	No Contact	0.22
3	Test 3-60	34.2	B	Light Link	No Contact	0.33
4	Test 3-61	94.7	B	Light Link	1.3	1.1
5	Test 3-60	97.4	B	Double Link	No Contact	0.81
6	Test 3-60	31.7	B	Double Link	No Contact	0.1
7	Test 3-60	35.9	C	Improved	No Contact	0.58
8	Test 3-61	101.5	C	Improved	1.5	0.83
9	Test 3-61	102.1	D	Improved	1.6	0.50

Speed: Actual impact speed of the test vehicle. Units are kilometers per hour.

Occup. Speed: The Occupant Impact Speed is the speed at which a theoretical front seat occupant will contact the windshield. Units are meters per second.

Delta V: Speed change of the test vehicle before and after contacting test article. Units are meters per second.

Light Link: refers to a single guy and link device.

Double Link: refers to two guys to the pole attached to a single point on the ground. Each guy was fitted with a Safety Link.

Findings

Damage was limited to denting of the bumper and hood, with windshield contact occurring in only two tests. In one of those tests there was localized cracking that would not interfere with the driver's ability to see, and no damage at all in the other test.

Velocity changes were all within acceptable limits, and the only stub remaining was the lower half of the Safety Link lying flat on the ground after each test. The results of tests met the FHWA requirements and, therefore, the four different designs (A through D) of the device, described above and shown in the enclosed drawings for reference, are

acceptable for us as Test Level 3 devices on the NHS under the range of conditions tested, when proposed by a State. Design B (chain welded to two sides of the Link) is the preferred design.

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

- Our 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, it reserved 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 potential users that the hardware furnished has essentially the same chemistry, mechanical properties, and geometry as that submitted for acceptance, and that they will meet the crashworthiness requirements of FHWA and NCHRP Report 350.
- To prevent misunderstanding by others, this letter of acceptance, designated as number LS-49 shall not be reproduced except in full. As this letter and the supporting documentation which support it become public information, it will be available for inspection at our office by interested parties.
- The “Safety Link” is or will be a patented product and is considered “proprietary.” The use of proprietary devices specified on Federal-aid projects, except exempt, non-NHS projects: (a) must be supplied through complete bidding with equally suitable unpatented items; (b) the highway agency must certify that they are essential for synchronization with existing highway facilities for 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, a copy of which is enclosed.

Sincerely Yours,

Frederick G. Wright, Jr.
Program Manager, Safety

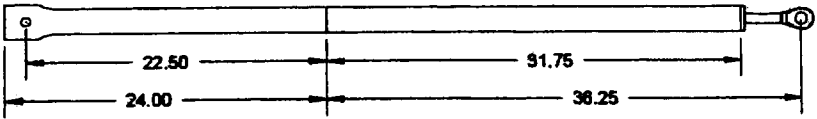
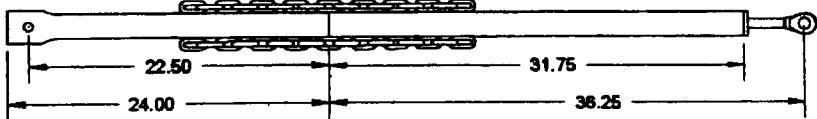
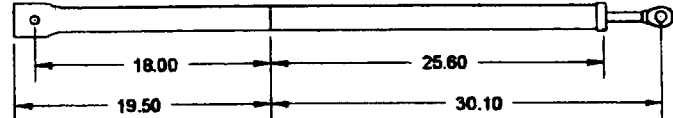

Enclosure

FHWA:HSA-1:Artimovich:tm:61331:11/27/00

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Table 1 briefly summarizes which version of the Safety Link was used in each test.

Table 1. Safety Link Versions.

Configuration Labels	Configuration Description	Test No.
A	<p>Single Internal Cable Loop 7 x 19 Wire Rope 3-mm (1/8 in) diameter Link Diameter - 48 mm (1.9 in) O.D. Link Length = \approx 1.5 m (5 ft) Anchor to Guy</p> 	1,2
B	<p>Chain Welded to 2 Sides of Link, 180 degrees Apart No Internal Cables Same Link Dimensions As Above (A)</p> 	3,4,5,6
C	<p>Two Internal Cable Loops 7x19 Wire Rope - 48 mm (1.9 in) O.D. Link Length = \approx 1.2 m (4 ft) Anchor to Guy</p> 	7,8
D	<p>Four Independent Internal Strands of 7x19 Wire Rope 5 mm (3/16 in) diameter Same Link Dimensions as Above (C)</p> 	9

Enclosure cont.

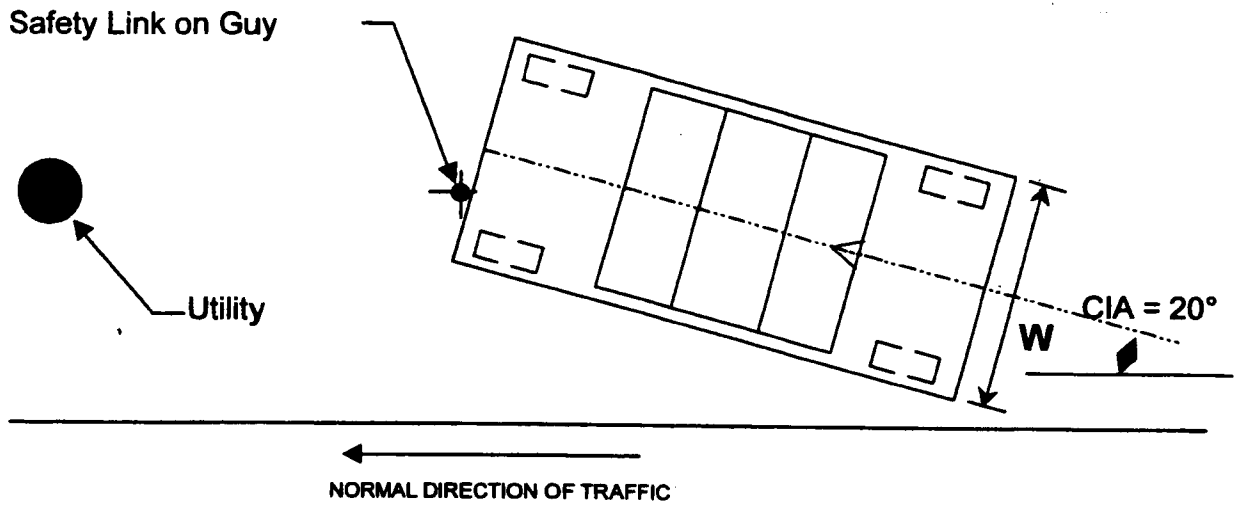


Figure 4. Orientation of vehicle striking the Safety Link for tests 473660-1, 2, 5, 7 and 8.

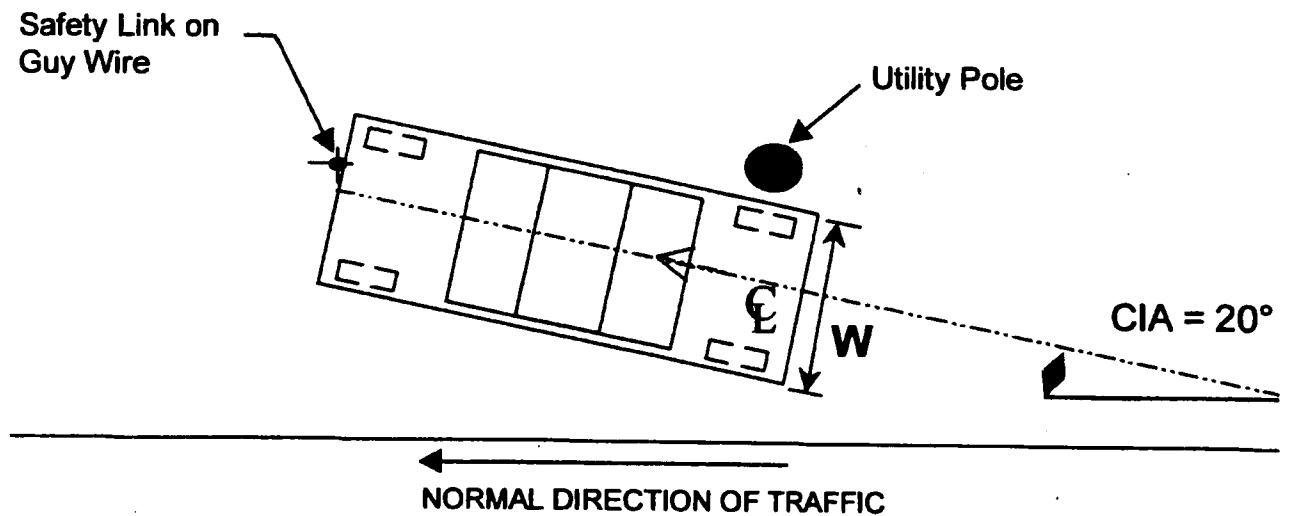


Figure 5. Orientation of vehicle striking the Safety Link for tests 473660-3, 4, 6, and 9.