March 13, 2015

Mr. Frederick G. "Bud" Wright
Executive Director
American Association of State Highway and Transportation Officials
444 North Capitol Street, Northwest
Suite 249
Washington, DC 20001

Dear Mr. Wright:

The Federal Highway Administration has released the results of the final four crash tests of the ET Plus® System.

Based on media coverage and public comments by lawyers representing Mr. Joshua Harman, we are aware the eighth and final crash test will be the topic of much criticism and discussion. Mr. Harman and other critics have continued a campaign to undermine the FHWA, Trinity and the Texas A&M Transportation Institute (TTI). They seek to cause the demise of the ET Plus® System and profit from that demise.

But let there be no doubt – the eighth crash test passed.

Here's why.

The purpose of guardrail end-terminals is not to prevent damage to the *outside* of the car, but to reduce the risk of serious injury or death to the occupants *inside* the car.

Test 3-30, the eighth test, was conducted on January 27, 2015, at Southwest Research Institute (SwRI), an independent and accredited testing facility. This test, like the seven that preceded it, was data driven based on NCHRP Report 350 evaluation criteria. As in the real world, significant damage to the outside of the car is expected and occurs in every crash test. Every crash test is a violent event. When a vehicle impacts a steel guardrail end terminal at more than 60 miles per hour, significant damage to the outside of the vehicle is expected. Guardrail experts know this. Many successful crash tests that meet NCHRP Report 350 evaluation criteria involve significant damage to the outside of the test vehicles.

In this test, the car impacts the guardrail end-terminal at an offset, which means the front of the car impacts the end-terminal right of the vehicle's centerline.

- Upon impact, the car is expected to extrude some guardrail and then rotate or spin away from the head of the end-terminal and toward the traffic side of the end-terminal.

- Any suggestion that the car is not expected to spin or rotate in this test is incorrect. Impacting the head of the end-terminal at an offset is expected to create this spin or yaw in the vehicle. It is not a result of "throat lock" or "jamming" inside the ET Plus® extruder head.

Some exterior deformation causing intrusion into the occupant compartment of the test vehicle is allowed by the crash test standards in NCHRP Report 350. Intrusion occurs when the shape of the occupant compartment interior is changed due to forces experienced on the outside of the vehicle during its interaction with the guardrail end-terminal.

NCHRP Report 350 evaluation criteria allows deformations to the exterior of the test article as long as the deformations do not, in the testing facility's opinion, expose occupants to serious, disabling or life-threatening injuries.

Penetration, on the other hand, is when the guardrail itself actually cuts through the exterior of the test vehicle and enters the passenger compartment. In the eighth test, guardrail and test article debris did not penetrate the vehicle. No part of the guardrail entered into the passenger compartment.

This distinction is critical: Vehicle exterior deformation and occupant compartment intrusion alone do not dictate or signal a failed crash test under NCHRP Report 350.

To make any determination under NCHRP Report 350, the test facility must analyze all of the crash test data. This data includes:

- Objective occupant risk data obtained from electronic accelerometers mounted on the vehicle. These devices record vehicle acceleration, from which the occupant impact velocities and ridedown accelerations are calculated.

- Videos taken from outside and inside the vehicle, including two on-board digital cameras behind the driver and passenger's seats, which record the surrogate dummy during impact.

- Photographs and videos of the occupant compartment before, during and after the crash test impact.

- The location and magnitude of any vehicle deformation or intrusion, and how the surrogate dummy interacted with any deformation during impact.

An objective, informed and unbiased review of the crash test data confirms the ET Plus® System passed the eighth test and met NCHRP Report 350 evaluation criteria. The reasons for passing include:

- The guardrail and test article debris did not penetrate the vehicle. No part of the guardrail entered into the passenger compartment. There was no "spearing."
- The test did not demonstrate a propensity of the guardrail to penetrate the vehicle.
- In the opinion of multiple independent experts there was no indication of risk of serious or life threatening injuries to vehicle occupants due to deformation to the vehicle.

The maximum post-test occupant compartment deformation was measured by SwRI engineers to be approximately 6.75 inches, at a point located approximately 2 inches aft of the radio panel at a height roughly even with the front edge of the seat. Based on the location and magnitude of the deformation, and the fact that there was no vehicle penetration by the guardrail itself, there was no indication of serious or life-threatening injury due to the deformation of the door. A thorough examination and analysis of the interior of the car after the crash test showed the door deformation would not cause serious injury to occupants. The high-speed video of the interior of the car shows the surrogate dummy was not at risk for serious injury during the impact.

In the experts' opinion, occupants in this car would not have been seriously injured in this impact.

The car decelerated in a controlled manner. The car remained upright during and following the impact. The ET Plus® System provided for controlled deceleration with occupant impact velocity and ride down acceleration values below preferred limits. The occupant risk data passed NCHRP Report 350 evaluation criteria.

All objective data demonstrates this test met NCHRP Report 350 evaluation criteria.

Test 3-30 was the eighth test conducted of the ET Plus® System with 4-inch guide channels. This test was conducted at a 31-inch guardrail height. This test passed NCHRP Report 350 evaluation criteria.

Professional engineers at the FHWA and Dr. Clay Gabler, an independent engineering expert retained by FHWA, agreed with the independent analysis performed by SwRI. The FHWA has determined after reviewing all of the crash test data that the eighth test met NCHRP Report 350 evaluation criteria.

It is also important to note that the ET Plus® head selected for this test was obtained from the California Transportation Department's (CalTrans) existing inventory. Trinity did not select the ET Plus® head. The FHWA selected and approved all eight ET Plus® heads used in testing. None were rejected. They were measured at CalTrans by FHWA technical staff. They were delivered directly from the CalTrans facility to SwRI with no modifications. SwRI measured them again, and the measurements at SwRI were confirmed by FHWA and AASHTO personnel. Those head measurements are included with the test data.

SwRI independently analyzed and produced the test results. Independent professional engineers at SwRI determined that this test passed NCHRP Report 350 evaluation criteria.

As you know, on March 11, 2015, the FHWA and AASHTO released data it collected that confirms there is only one version of the ET Plus® System head. This confirmation discredits false assertions by third parties that Trinity Highway Products manufactured multiple versions to facilitate passing the tests. It also shows the product tested by the FHWA is representative of the ET Plus® System installed on U.S. roadways.

Texas A&M Transportation Institute ("TTI") designed the end-terminal system technology employed in the ET Plus® System. Trinity Highway manufactures and markets the ET Plus® System under an exclusive license granted by The Texas A&M University System of its intellectual property.

The ET Plus® System is now the most crash-tested guardrail end-terminal system available. It has an unbroken chain of eligibility for federal-aid reimbursement from the FHWA.

Together, TTI and Trinity stand behind the ET Plus® System.

As always, Trinity Highway and TTI remain available to answer your questions about any of our products. Please do not hesitate to contact us.

Sincerely,

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CC: State Departments of Transportation