

# Driver-Spearing Guardrails Become Crusade for Whistleblower

By Patrick G. Lee  
Bloomberg News

June 12, 2014 – Before dawn on Feb. 23, Darius Williams ran his Nissan Sentra off a North Carolina interstate at 80 miles per hour. A length of guardrail pierced his door, according to the police report, driving the 24-year-old's body into the opposite back seat.

Three days later, with police attributing the accident to reckless driving and Williams lying in intensive care, a self-described safety expert named Joshua Harman drove past the scene. Spotting debris and the jagged end of a guardrail bending toward the highway, he swerved to a stop.

"The evidence always tells a story," he said.

Suspecting he knew this story's ending, he steered his truck to the junkyard where Williams' Nissan had been towed. Some 10 feet of guardrail, doubled back on itself, skewered the car. Harman pointed his camera toward the bloodied back seat and snapped a picture of a 175-pound piece of steel lodged amid the wreckage. A sticker identified its maker: Trinity Highway Products LLC.

To hear Harman tell it, something has gone seriously wrong with America's guardrails. With as much as \$1 billion possibly at stake, Harman's



Self-declared safety advocate Joshua Harman talks with Bloomberg's Patrick Lee about what he alleges is a dangerous design flaw on U.S. roads.  
(Source: Bloomberg)

tale is one of bad blood, allegations of fraud and wrongful death and regulatory gray areas along the country's taxpayer-funded highways.

Harman is suing Trinity Highway and its Dallas-based owner, Trinity Industries Inc., alleging that it made quiet design changes that transformed guardrail systems across the U.S. into potentially deadly hazards. His focus is something called an energy-absorbing end terminal: Installed at the end of a guardrail and typically marked with yellow and black stripes, it's designed to give way when hit, absorbing energy to slow a crashing car.

## Highly Confident

Trinity, one of the biggest guardrail makers in the U.S., first gained federal approval for its ET-

Plus end terminal in 2000. Harman's suit alleges that the company changed the dimensions of the ET-Plus sometime between 2002 and 2005 without telling federal authorities. Instead of acting like a shock absorber, he claims in the 2012 suit, Trinity's modified ET-Plus can lock up, behaving more like a giant shiv.

The case is set to go before a jury in July.

Trinity maintains a "high degree of confidence" in the several hundred thousand ET-Plus units it says are installed around the country, spokesman Jack Todd said. Trinity declined to make executives available for interviews.

### 'Cosmetic Changes'

Trinity's ET-Plus -- including "all improvement modifications thereafter" -- has met federal requirements since its 2000 debut, according to a company filing for the previous quarter. In 2012, a company representative testified in a different suit that Trinity had made several "cosmetic changes" to the end terminal that didn't require new approvals because they didn't hurt its performance.

Trinity fell as much as 1.6 percent today in trading in New York. The shares were down 0.8 percent at \$81.52 at 3 p.m. Through yesterday, its shares had risen 51 percent since the beginning of the year. The company's yearly revenue has more than doubled since 2010, to \$4.4 billion last year.

Trinity characterized Harman in court documents as "an opportunistic litigant hoping for a windfall." He is seeking "to retaliate against Trinity for pursuing a patent- infringement lawsuit against his companies," it added.

Harman used to make and install guardrails himself. Trinity sued him in 2011 for infringing its patents. Since then, Harman scaled down his private

operations, trimmed more than 100 employees -- most of his workforce -- and sought Chapter 11 protection to reorganize his companies.

### Judge's Ruling

The 45-year-old Virginian spent more than 300 days on the road last year, away from his wife and two school-age daughters, visiting crash sites to bolster his case against Trinity. The Chevy Silverado he drives has two end terminals in back -- one that he says is Trinity's original, the other its modified version.

Harman says he's motivated not by business, but by what he sees as a safety hazard.

"It's irrelevant if I'm crazy," he said.

Trinity has sought to get Harman's whistleblower suit dismissed, arguing he isn't a whistleblower because he is basing his allegations largely on public information rather than insider knowledge.

U.S. District Judge Rodney Gilstrap in Marshall, Texas, ruled that Harman's professional experience qualifies him to sue as a whistleblower and dismissed most of Trinity's other objections.

Lawyers representing whistleblowers typically don't earn fees unless they win. Harman is represented by Boies, Schiller & Flexner LLP, whose founder, David Boies, is known for taking on the likes of Microsoft Corp. and MasterCard Inc. Boies Schiller lawyers declined to comment on its fee arrangement.

### Related Lawsuits

Harman isn't the only one asking questions. A coalition of state highway officials is reviewing the performance of several end terminal models,

motivated in part by complaints about the ET-Plus. Nevada stopped installing ET-Plus terminals in January, pending performance testing of the modified version.

And in May, Safety Research & Strategies Inc., a product- safety advocacy group, filed separate suits seeking records related to the ET-Plus from the Department of Transportation's Federal Highway Administration and from the Florida Department of Transportation. SRS, based in Rehoboth, Massachusetts, alleges broad "performance anomalies" with the ET-Plus since it was introduced.

## Billion Dollars

Because Trinity's terminals are approved by the FHWA, state highway departments that buy them are often eligible for federal reimbursements. Under the 2009 stimulus package, the U.S. government reimbursed up to 100 percent of local buyers' costs for highway projects. Still, the FHWA has no authority to ask states to recall equipment, said Joshua Schank, who runs the Eno Center for Transportation, a nonpartisan think tank.

"If there's a problem, who's going to end up being on the hook?" said Sean Kane, SRS's president and founder.

Neil Gaffney, a spokesman for the FHWA, said the ET-Plus was successfully crash-tested in 2005 and that the agency hasn't received complaints from states about the units' performance since then. Dick Kane, a spokesman for the Florida department, said it had produced the requested documents.

Harman, suing to recover taxpayer funds on behalf of the U.S., could take up to about a third



Joshua Harman points to Darius Williams' Nissan Sentra in the junkyard. Photographer: Patrick G. Lee/Bloomberg

of any judgment. His suit potentially presents a "billion dollars' worth of damages" for Trinity, a lawyer for the company said in a May hearing. In a company filing, Trinity said it doesn't believe a loss is probable from the litigation.

## Road Trip

Eleven of 15 analysts tracked by Bloomberg rate Trinity shares as a buy. Only one, Art Hatfield of Raymond James & Associates, expects it to underperform the market. Hatfield believes that the railway industry will slow, hurting Trinity's railcar operation, he said in an interview.

Todd, the Trinity spokesman, pointed out that the federal government investigated Harman's allegations against Trinity and declined to join in the suit. Peter Carr, a U.S. Department of Justice spokesman, declined to comment on that decision.

On a recent five-state guardrail-scouting trip from Texas to North Carolina, Harman was at the wheel at 2 a.m. Riding shotgun was Steven Lawrence, a Texas lawyer who works alongside Boies Schiller on Harman's suit and also has filed personal injury and wrongful

death suits against Trinity.

Among Lawrence's clients is a 37-year-old former Marine named Jay Traylor, who lost both legs in a January 2014 car wreck. Lawrence's suit alleges that Trinity's "unreasonably dangerous" ET-Plus penetrated Traylor's floorboard, impaled him and left him a double amputee.

### **Lost Leg**

Harman put North Carolina on his itinerary to see Traylor, and the two found common ground. Harman gave Traylor a formula for a pain-relieving salve. Harman says he used it himself, two decades ago, after he lost his own left leg in a construction accident.

"I've looked at every guardrail since I've had this accident," Traylor said in an interview. "When measures are put out to prevent accidents and injuries as safety precautions, you should be able to trust them."

Lawrence and other attorneys have brought at least nine personal-injury and wrongful-death suits against Trinity. After visiting some 200 crash sites and combing through news reports, Harman says he has turned up what he believes are roughly 20 deaths in accidents linked to the modified ET-Plus.

In all these cases, Trinity says it would take a more comprehensive analysis – one that considers a vehicle's speed, weight and angle of impact – to determine how its system performed. Federal crash criteria specify conditions under which the guardrail system must perform to certain standards, which don't necessarily cover every crash scenario.

### **Virginia Teenagers**

Harman started his first business with his brother in 1988 when both were teenagers in Virginia. They planted grass at roadsides and later began installing guardrails and fencing. From the mid-1990s to the mid-2000s, Harman bought Trinity guardrail systems to install on state highways, he said.

It was the dawn of a new era in roadside safety. The guardrails with exposed ends that were the standard into the early 1960s could spear cars that hit them. Later, road crews buried the ends of some guardrails – but those, it turned out, could serve as ramps, causing cars that hit them to roll over.

In 1989, a company called Syro Steel Co. introduced the ET-2000, an energy-absorbing end terminal designed by Texas A&M University and funded by the Texas Department of Transportation.

### **Buffer Mechanism**

The ET-2000 did for guardrails what air bags did for cars. When a car hit Syro's end terminal, the mechanism would act as a buffer that would absorb energy as it pressed into the rail behind it – forcing the W-shaped guardrail through a slot and flattening it into a ribbon of steel that deflected away from the car.

Trinity Industries bought Syro in 1992. In 2000, Trinity received approval from the FHWA for its ET-Plus, a lighter version of the ET-2000, according to the FHWA acceptance letter that unlocked federal funding.

Around 2008, Harman said he started looking at the patent numbers marked on end-terminal models to see if any patents had lapsed.

He reverse-engineered an ET-Plus from 2000, he said, using it as a model for a generic copy. He said one of his companies, SPIG Industry LLC, made 280 of them that he installed on Virginia's highways.

## Patent Infringement

In March 2011, Trinity sued SPIG for patent infringement.

Harman claimed in court filings that Trinity had listed incorrect and expired patent numbers on their ET-Plus units. "If I knew it was a patented product, I wouldn't have ever made it," he said.

In a court filing, Trinity denied allegations that it marked its ET-Plus heads with the wrong patent numbers.

Harman's company agreed to stop production and work with Virginia highway authorities to determine if they should remove the ones already installed, Harman said.

Trinity continued its suit against Harman. The most Trinity could recover in damages for patent infringement was about \$53,000, according to an expert report Trinity submitted as part of the case. The legal bills, on Harman's side, were far greater – at least \$7 million by the time the patent suit ended in a confidential settlement in late 2012, according to Chapter 11 documents filed by SPIG.

## Full Accounting

Trinity Highway also wanted to know where Harman had installed every one of his copies. In September 2011, one of its employees sent Harman an e-mail, reviewed by Bloomberg News, repeating its request for "a full and complete



Source: Bloomberg

listing of all locations/installations" of the terminals.

The patent case had nothing to do with money and "everything to do with stopping somebody from copying our product and getting the non-tested products off the roadway," said a Trinity employee who asked not to be named because this person isn't authorized to speak on the subject.

Harman's own copy of an early ET-Plus, he said in an interview, had been involved in five accidents and had performed "100 percent appropriate." If his models were working, he asked himself, why was Trinity so eager to get them off the road?

Harman started surveying accident sites in Virginia and Tennessee. In December 2011, he took a two-week trip across eight states, documenting what he said were more than 50 accident sites as far west as New Mexico.

## Eureka Moment

Harman said his Eureka moment came at a crash site at Mile 153 on I-40, in Arkansas. This rail emerged from an ET-Plus with one of its

edges folded over: Something was restricting it. Harman pulled out his calipers. The guardrail, he found, was trying to squeeze through a slot that was at one point an inch shorter and an inch narrower than in the original.

“There was no question,” he said, it was the smaller versions that were seizing. “Then I found another in Virginia.”

He sued Trinity in March 2012, alleging in an amended complaint that it had made five changes to the ET-Plus without notifying the FHWA. He alleged Trinity’s move lowered its manufacturing costs and made the ET-Plus more difficult to reuse after accidents than the earlier version, requiring highway authorities to purchase new ones.

Trinity, in court filings, cited FHWA standards that say manufacturers don’t have to report modifications that reduce costs or improve functioning if “good engineering judgment” deems they won’t degrade performance.

### **Performance Enhancements**

In the filings, it said it made four “fabrication revisions” in 2005 at the suggestion of engineers with the Texas A&M Transportation Institute, which originally designed and patented the ET-Plus. In a February 2013 letter to state transportation departments, Trinity and Texas A&M said the revisions were meant “to enhance the already demonstrated performance of the system in the field.”

Rick Davenport, a spokesman for the Texas A&M Transportation Institute, declined to comment on matters involving ongoing litigation.

On Feb. 14, 2012, about seven years after Harman alleged the changes began showing up

on U.S. roads, Trinity officials met with FHWA engineer Nick Artimovich, according to e-mails sent by Artimovich that were reviewed by Bloomberg News. They alerted him to one change in the end terminal - the reduction in the guide channel’s width, to four inches from five - that it had omitted in documentation for a May 2005 crash-test.

### **‘Valid Question’**

About two weeks later, Artimovich wrote to two FHWA colleagues saying that he believed Trinity had correctly tested the modified ET-Plus design during the crash test. “However, there does seem to be a valid question over the field performance of the current ET-Plus compared to earlier versions,” he wrote in the e-mail, a copy of which was obtained by Bloomberg News.

Artimovich declined to comment for this article.

Harman, in his suit, said it isn’t clear which version of the ET-Plus was crash-tested. Gaffney of the FHWA said in his statement that Trinity told the agency that the ET-Plus with a four-inch channel had met crash-test standards.

Yesterday, Judge Gilstrap ruled to keep the trial in July, despite a motion by both parties to delay it until September. “The parties have conducted themselves with a level of contentiousness and vitriol that is as surprising as it is unwarranted,” Gilstrap wrote in his order.

Harman, meanwhile, continues his guardrail search.

### **Carolina Junkyard**

Back in the North Carolina junkyard, Harman inspected Williams’ white Nissan resting along a

chain-link fence. Its roof was caved in. Windshields were gone. A door, detached, leaned against the vehicle's side.

"Lord, have mercy," Harman said. "I don't know how he survived - if he survived."

Williams suffered a bruised lung, lower spine injuries and fractures to his leg, upper arm, eye and pelvis, he said by e-mail. He declined to comment further.

On the way out of the junkyard, Harman asked whether he could buy the wreck to

preserve it as evidence. A few minutes later, he was back on the highway.

"People are dying," Harman said. "This is an issue I brought to light, and I will see it to the end."

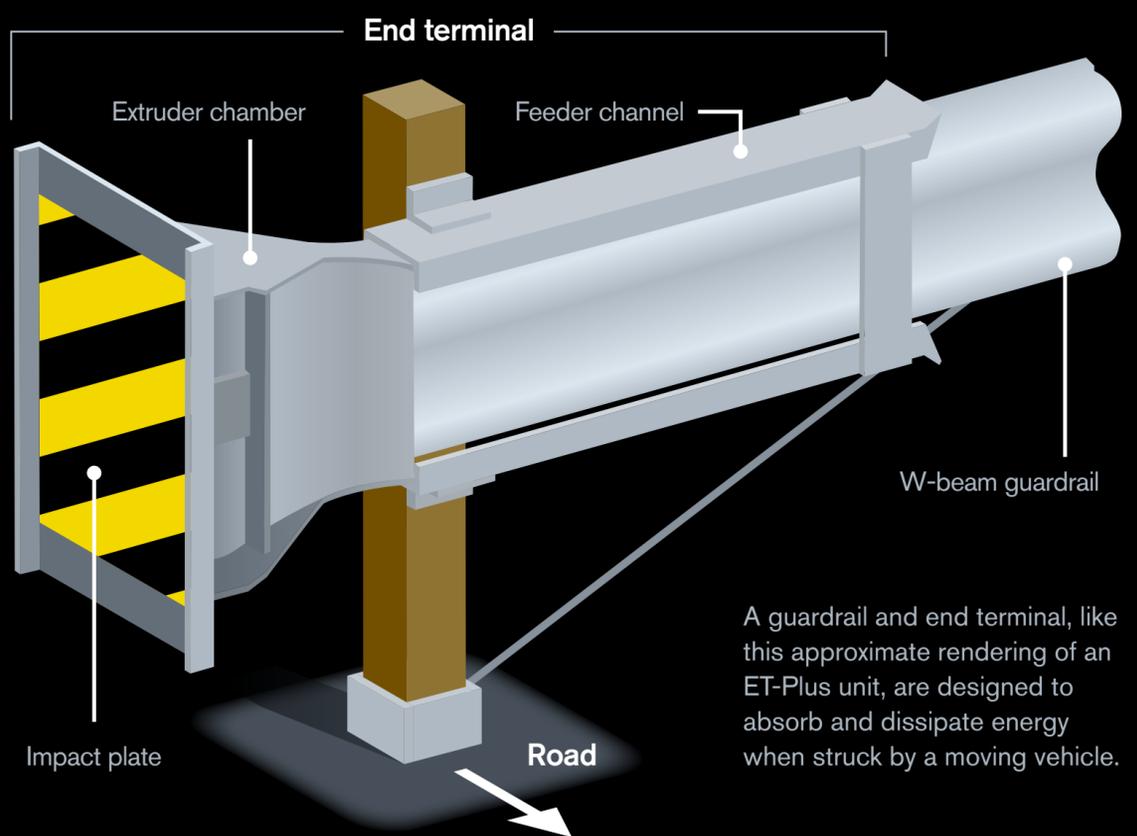
*—Editors: Michael Hytha, Jeffrey D Grocott, Anne Reifenberg*

# Lawsuit Alleges Deadly Fault at Guardrails' End

PUBLISHED JUNE xx, 2014

Publicly traded Trinity Industries Inc. produces an energy-absorbing end terminal, the ET-Plus, mounted on guardrails across the U.S.

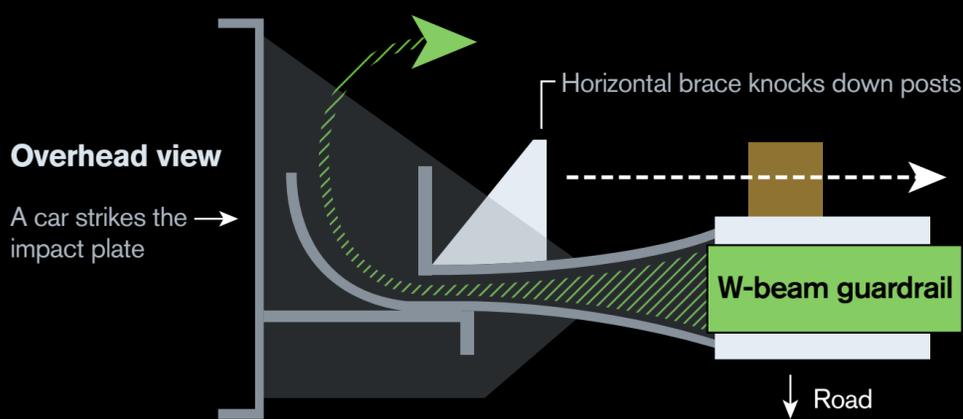
In a whistleblower suit heading to trial as early as July, self-declared safety advocate Joshua Harman is suing on behalf of the U.S., alleging that Trinity changed the dimensions of the ET-Plus between 2002 and 2005 without notifying the Federal Highway Administration. End terminals with the the new dimensions can malfunction when hit by a vehicle, he alleges.



A guardrail and end terminal, like this approximate rendering of an ET-Plus unit, are designed to absorb and dissipate energy when struck by a moving vehicle.

## How It's Meant to Work

When a vehicle hits the impact plate, the end terminal is supposed to begin moving: the W-shaped guardrail is meant to feed through it, becoming a flattened steel ribbon that curls away from the road. The process absorbs energy as the car is slowed.



An ET-Plus terminal after a crash. The length of flattened guardrail that fed through it can be seen.

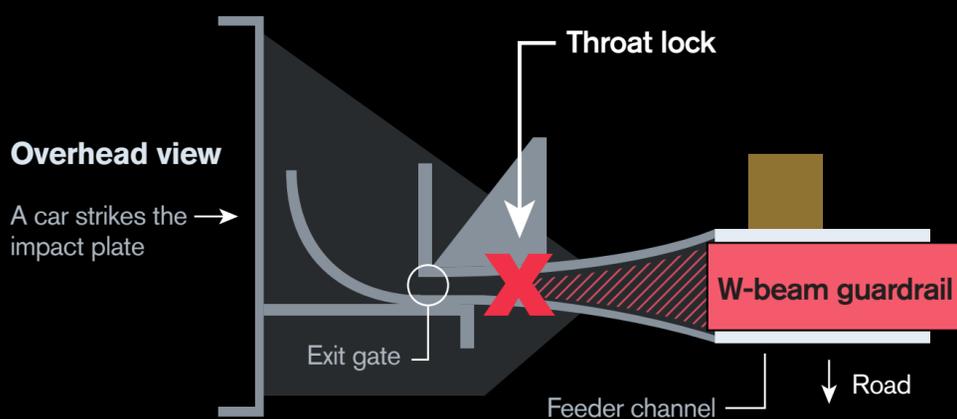


Photo courtesy of Joshua Harman

## Units With Smaller Dimensions Lock Up, Suit Alleges

Harman measured more recent ET-Plus terminals and alleged in his suit that Trinity had decreased the dimensions compared with the version that had gained FHWA approval, including in:

Exit gate	decreases up to ½ inch
Feeder channel width	1 inch
F.C. exterior height	½ inch
F.C. interior height	1 inch
F.C. length	¾ inch



An ET-Plus end terminal that Harman alleges locked up after a crash in Tennessee. He said this one had narrower dimensions than those approved by the FHWA.



Photo courtesy of Joshua Harman

Harman alleges in his lawsuit that the smaller dimensions can prevent the guardrail from properly traveling through the feeder channel, causing a 'throat lock' that he says he has documented at many accident sites. A locked mechanism can spear the vehicle, he alleges.

Trinity, in comments and legal filings, has said it is confident in its product and that the changes it made were cosmetic and didn't require re-approval. The terminal is tested to perform in several scenarios but can't account for all real-world angles of impact, vehicle weights and speeds, it says.

# Highway Official Stood By Guardrail System as Doubt Mounted

By Patrick G. Lee  
Bloomberg News

November 3, 2014 – U.S. highway safety officials defended a widely used guardrail system’s crashworthiness even as they worried whether its design had been altered in a potentially deadly way, according to internal e-mails.

Starting in 2012, a Federal Highway Administration engineer fielded e-mails from state officials, plaintiffs’ lawyers and others asking about a change that Trinity Industries Inc. had made to its guardrail system years earlier.

The engineer, Nick Artimovich, told one state official that Trinity had a good track record. In another instance, after a safety expert wrote to Artimovich that Trinity may have made a second unauthorized change, the engineer forwarded the allegation to a Trinity consultant, suggesting he alert the company’s lawyers.

Several such exchanges show how Artimovich, whose agency’s aim is to ensure the safety of America’s roads, related to Trinity, which stood to gain millions of dollars in federal funds from the agency’s sign-off on its products.

“My ‘customers’ include both the industry and the driving public,” Artimovich responded in a March 2012 e-mail to a plaintiff’s lawyer who



Joshua Harman is suing Trinity Highway Products LLC and its Dallas-based owner, Trinity Industries, Inc., alleging that it made a quiet design change that transformed guardrail systems across the U.S. into potentially deadly hazards.

Photographer: Patrick G. Lee/Bloomberg

had asked him to investigate the design change. He added: “However, profit does not outweigh human life.”

Trinity did continue to profit, for more than two years, as it sold the system under the federal agency’s certification.

## Speared Vehicles

On Oct. 20, a Texas jury found that Trinity, one of the nation’s main producers of the shock-absorbing mechanisms mounted at the end of guardrails, had changed the units’ dimensions without notifying the safety agency.

The plaintiff, Joshua Harman, alleges that there are hundreds of thousands of modified Trinity end terminals around the country prone to

jamming up instead of giving way when hit, potentially spearing vehicles and leaving their occupants with grave injuries. Harman's cross-country quest to document accidents related to Trinity's so-called ET-Plus end terminal was the subject of a Bloomberg News article in June.

Trinity's false claims about the unit defrauded taxpayers of \$175 million, the Texas jury said. States received that much in federal reimbursements for the ET-Plus since 2006. The jury wasn't asked to rule on the ET-Plus's safety.

The day after the verdict, the FHWA told Trinity, which stands by the product's safety and plans to appeal the verdict, that it had 10 days to come up with a plan to crash-test the modified version. The agency said it would review the plan it received on Oct. 31 "expeditiously, but carefully."

### **Growling, Not Cuddling**

"Widespread use of these potentially dangerous guardrails was on FHWA's watch, and I demand to know why FHWA allowed it" even after evidence of the change became apparent in 2012, U.S. Senator Richard Blumenthal, a Connecticut Democrat, wrote last week in a statement accompanying a letter to the FHWA's acting administrator, Gregory Nadeau.

Federal safety officials "need to be growling, not cuddling up to the industry," Blumenthal added in an interview.

Criticism of the FHWA, a division of the Department of Transportation, is emerging as U.S. highway-safety overseers face some of their sharpest scrutiny in years. Another DOT agency, the National Highway Traffic Safety Administration, is at the center of firestorms over

whether it has been slow to respond to defective ignition switches in General Motors Co. vehicles and Takata Corp. air bags that can deploy with potentially lethal force.

Artimovich didn't respond to requests for comment and the FHWA declined to make him available.

In an e-mailed statement last week, the FHWA said that in 2012, it reviewed ET-Plus crash test data and reports from states about accidents involving end terminals. This summer, the agency reviewed ET-Plus-related data from a national crash study, it said. None of those analyses revealed any performance issues, the agency said.

### **Shipments Stopped**

Dallas-based Trinity said on Oct. 24 it had halted shipments pending completion of the additional crash-testing the FHWA mandated this month. Trinity has said, including in a 2013 open letter, that the lack of disclosure was an inadvertent omission in paperwork submitted to the FHWA.

"We have confidence in the ET-Plus System as designed," Gregg Mitchell, president of one of Trinity's highway products units, said in a statement. "It has met all tests previously requested by FHWA. We take the safety of the products we manufacture very seriously."

At least 36 states have said they'll stop installing the terminals. Virginia has said it will start removing them.

### **FHWA's Mission**

The FHWA, according to its website, offers financial and technical assistance to state and

local governments to ensure that America's highways are among the world's most technologically sound. While states are responsible for ensuring their roadside hardware meets safety standards, most look to the FHWA to certify such gear by vetting crash-test data compiled by accredited laboratories. The federal government reimburses states for some of their spending on highway safety systems, but only on those certified to be crash-worthy.

The agency doesn't regulate manufacturers of highway equipment and doesn't have the power to require makers to recall faulty devices. The FHWA can, however, revoke or modify a certification, a move that could encourage states to switch to a different company's product.

The government deemed versions of the ET-Plus system eligible for federal reimbursement in 2000 and again in 2005 and 2010, according to FHWA letters.

Trinity made several changes to the device from 2002 to 2005 without informing the agency, alleges Harman, the plaintiff in the Texas whistleblower suit.

### **Shattered Leg**

Harman, whose Virginia companies used to make and install guardrail equipment, was defending himself in late 2011 against a patent-infringement suit brought by Trinity, he has said, when he discovered that Trinity had changed the ET-Plus's dimensions. He alerted the FHWA's Artimovich to the change in January 2012, he said.

Seven months later, late on an August night, Texan Aaron Rausche was driving home after coaching his nephew's little league team and

attending a charity event. Rausche said he nodded off at the wheel. When he awoke, he said, he was bleeding, with one of his legs broken and the other shattered by a length of guardrail piercing through his door.

### **'Impaled' Vehicle**

Rausche, now 37, sued Trinity in August, alleging that he hit a malfunctioning ET-Plus that "acted as a spear and impaled the vehicle and its occupant."

His suit is among at least 18 that have been filed against Trinity since 2005, alleging that defective terminals are to blame for at least 14 injuries and eight deaths. Ten were filed this year alone. More than a dozen of the suits are pending.

"We take any lawsuit against us seriously and will respond in the appropriate manner," Trinity said in an e-mailed response to inquiries about the personal-injury suits.

After Harman shared his findings with the FHWA in January 2012, Artimovich told Trinity about them. Artimovich later forwarded Trinity a presentation Harman had put together, according to one of the e-mails reviewed by Bloomberg News, which include Trinity-related conversations among FHWA officials as well as with people outside the agency.

"I think it provides some pretty good documentation that there are extruder heads out there that do not conform to the crash-tested designs. Let me know what you think," Artimovich wrote to Brian Smith, Trinity's vice president of international sales, in a Feb. 2, 2012, e-mail.

Trinity declined to make Smith available for comment.

## Industry Conference

Trinity officials met with Artimovich on Feb. 14 during a highway-safety industry conference in Florida, according to the e-mails. At the meeting, Trinity employees told Washington-based Artimovich that they hadn't previously informed the agency of a 2005 change to the ET-Plus and that the revised version had been properly crash tested, Trinity and the FHWA have said.

Artimovich, the FHWA pointed out, met with both Harman and Trinity to gather information. "These separate meetings allowed both Trinity and Mr. Harman an opportunity to provide information about the ET-Plus and the questions that Mr. Harman had raised," agency spokesman Neil Gaffney said in a statement.

## Inventor's Letter

In March 2012, Artimovich received an e-mail from Dean Sicking, who helped develop a predecessor to the ET-Plus as well as competing products. Sicking forwarded a law firm's press release about a suit it was bringing against Trinity over the device. "Is the claim about making changes without testing or gaining FHWA acceptance true?" wrote Sicking, who is now an engineering professor at the University of Alabama at Birmingham.

Artimovich responded that he had seen additional crash tests of the modified version "that performed as expected." He added: "However it's hard to ignore the fatal results."

"He expressed what I thought he should express," Sicking said in a phone interview. "I took that to mean they were going to look into it."

Also in March 2012, personal-injury lawyer Ted Leopold e-mailed Artimovich, asking him about the alterations. "I just hope and trust that despite some

calling you an 'industry guy' that that is not true and you will fully and completely investigate this very important and life threatening issue," Leopold wrote.

Artimovich's response – that he serves both industry and the public but that profit doesn't trump human life – was "vague at best," Leopold said in an interview.

## 'I'm Leery'

Over the next year, officials from at least six more states contacted Artimovich about the design change, according to the e-mails. Most said they had heard about it from Harman, who said he was contacting state transportation officials to pressure them to act.

"I'm leery of this product. What am I to do? How do I advise my state on the use of this product? Should I put a moratorium on new installations?" Monique Burns, a Connecticut transportation engineer, wrote to Artimovich in March 2012. "How is a user agency expected to make good informed decisions about these systems if not all changes are reported?"

Burns confirmed the e-mail exchange.

## Challenge Flagged

"These are questions we are looking into also," Artimovich responded to Burns. "Trinity is actually one of the better manufacturers in trying to document changes via letter or at least through email correspondence."

Later, Artimovich alerted Trinity to a potential legal challenge.

Late on Dec. 17, 2012, Tom Klement, an independent road engineer, sent Artimovich an e-mail noting a possible "unauthorized change by Trinity" to the guardrails' support posts. Klement

declined to comment on the e-mail.

The next morning before 8:30, Artimovich forwarded that message to a longtime Trinity consultant: “You might send Mr. Klement’s note below to Trinity’s lawyers,” he wrote.

It’s not clear whether Artimovich had sent the note to others first. Alerting the manufacturer’s lawyers, rather than its engineers and federal highway officials, sounds inappropriate and could raise the prospect of a collusive relationship, said Joan Claybrook, a public safety advocate and former NHTSA administrator.

“If the government gets information, they’re not supposed to give it to suppliers so they can protect themselves in court,” Claybrook said. “They may need to use that” in their own investigations, she said.

## Reluctant to Wait

Around that time, a second FHWA official, Atlanta-based Frank Julian, was raising questions. Julian put Harman in touch with a New Hampshire transportation official, who in turn e-mailed his concerns about the ET-Plus to Artimovich.

“I am not sure if I want to wait until the court case is decided and all the appeals have been completed to take action,” wrote Keith Cota, the New Hampshire official, who confirmed the e-mail exchange in an interview.

Artimovich’s response to Cota matched those to several state highway officials: The FHWA’s position was that the changed version was crash-tested in 2005 and remained eligible for federal reimbursement.

“FHWA has received no complaints from the states over the past seven years during which the terminal has been used nationwide,” according to an

e-mail Artimovich sent to an FHWA colleague in North Carolina in February 2013.

That same month, Julian received an e-mail from a safety specialist in Kentucky, who pointed out a recently published investigative article on the website Consortium News laying out Harman’s allegations. “Thought it would interest you since it appears to be about the ET-Plus,” the specialist wrote.

## ‘On Autopilot’

“It does not matter how we got here, the important thing is we need to assess the performance and decide if this thing is a problem,” Julian responded. Until 2012, Julian noted, “nobody in the field realized this was not the approved design being installed.”

He added: “It seems nobody is looking and everybody is on autopilot.”

Julian declined to comment on the e-mails.

Julian forwarded the article to Artimovich.

“FYI It continues,” Julian wrote to him. “Next few meetings should be fun.”

Rausche, who has titanium rods in both legs after several surgeries, said his 2012 accident left him grateful to be alive. “I was just trying to focus on how lucky I was and how much worse it could have been,” he said.

Months later, he said, his father told him he’d seen something on the news about allegedly defective end terminals. In August, Rausche sued Trinity.

“You go to the whole other end of the spectrum a year later, that it shouldn’t have been that bad,” he added. “You just want no one else to have to go through this.”

– Editors: Michael Hytha, Jeffrey D Grocott

# Guardrails Seen as Fatal Underwent Quiet Fix, Inventor Says

By Patrick G. Lee  
Bloomberg News

December 12, 2014 – First came the car-impaling guardrails. Then came the coverup.

That, at least, is the assertion of two guardrail-industry professionals, a claim that suggests the confusion over U.S. roadside safety may run deeper than previously reported. Their statements, if borne out, cast additional doubt on a top guardrail maker, raise new questions about the effectiveness of a federal highway regulator and would leave state officials with an even shakier grasp of which guardrail systems on their roads may pose a potential danger to drivers.

The focus of the two professionals, they said in interviews with Bloomberg News, is the ET-Plus end terminal, a shock-absorbing device meant to mitigate damage to a vehicle that plows into the leading edge of a guardrail.

Its maker, Dallas-based Trinity Industries Inc., has been in the spotlight already for an alleged lack of disclosure about the ET-Plus. In October, a Texas jury found that Trinity had made cost-cutting changes to its system around 2005 without first alerting the government. Trinity, facing at least \$525 million in penalties, says it will appeal.

The company is named, too, in at least 21 other lawsuits, most filed starting in 2012, alleging that its



A Trinity Industries ET-Plus end terminal off U.S. Route 70 in southeastern Arizona. Two guardrail industry professionals say units including this one represent a quiet change Trinity made to its product to address what these people say is a potentially deadly, car-spearing defect. Trinity has denied any of its units are faulty and says they are crash-tested.

Photographer: Patrick G. Lee/Bloomberg

modified ET-Plus can lock up on impact, spearing cars rather than slowing them. The suits collectively allege a link between Trinity's product and at least eight deaths. Trinity has denied that its 2005 revision has a deadly flaw.

The guardrail professionals' latest assertion, which hasn't previously been reported, threatens to undercut that safety claim.

## Third Version

For at least a year and a half, these people said, Trinity has quietly produced a third version of its ET-Plus with dimensions they say make it less prone to malfunctioning – addressing the alleged car-piercing defect in the second version that Trinity has dismissed as untrue.

Trinity, in an e-mailed statement, said it has fully disclosed to the federal government “all of the fabrication adjustments” it has made to its ET-Plus system since 2005. All changes have been successfully crash-tested, it added.

One of the people who asserts Trinity quietly re-revised the ET-Plus is the man who helped invent the technology behind it. Dean Sicking, an engineering professor at the University of Alabama at Birmingham, helped to develop the predecessor to the ET-Plus and has collected millions of dollars in royalties for it. He also helped develop a competitor to the ET-Plus and was a paid consultant, against Trinity, in the Texas lawsuit.

## Quarter Inch

Sicking first came across what he said is the third version of the ET-Plus on Alabama highways in April 2013. Bloomberg News measured dozens of Trinity devices installed last year in southeastern Arizona – accompanied by Joshua Harman, a guardrail maker who was the plaintiff in the Texas suit – finding dimensions similar to those Sicking outlined.

The dimension change Sicking saw was small, in a place few would know to look. Trinity, he asserted, expanded one dimension in its welded-steel unit by a quarter-inch. But that, he said, was enough.

“That little bit of difference makes a whole lot of difference to the world,” he said.

Sicking told safety regulators at the Federal Highway Administration about his measurements in October 2013, he said in an interview with Bloomberg News. The agency, which signs off on the crashworthiness of products, counts on manufacturers to make and deliver them as billed.

Sicking’s assertion flags the question of whether the FHWA has been aware of a safer third version for about a year, during which it has defended the crashworthiness of the ET-Plus.

## Measuring Guardrails

The FHWA confirmed that Sicking spoke with two agency officials in late 2013 but said they didn’t recall Sicking mentioning a possible third version.

The agency is now aware of the allegations of further changes, agency spokesman Neil Gaffney said in an e-mailed statement. Last month it sent engineers into the field to help determine whether there are more iterations of the ET-Plus in service than it has been told about, Gaffney said, adding that the agency expects to receive their measurements by January at the latest.

That may come a bit after the fact. In November, the agency approved Trinity’s plan for conducting fresh crash tests on the ET-Plus. Those trials started with a crash test on Dec. 10 and are scheduled to be completed by the end of January. What isn’t clear now, though, is whether those tests will involve a sampling of all of the ET-Plus versions recently installed on the nation’s highways.

## Exceeding Tolerance

Differences in ET-Plus dimensions could, in theory, be the result of variations in production. However, the disparity between versions detected by Sicking in most cases exceeds the manufacturing tolerance that, according to court testimony, Trinity allows.

The company declined to comment on its tolerance.

There was no discussion of a third version in the Texas trial against Trinity. The company hasn’t

been accused in court of making any such changes.

Sicking did play a pivotal role in the Texas trial, though. The inventor, who had been raising his concerns about a third version for more than a year, told the jury in July that a Trinity official had paid him a visit and attempted to bully him into keeping quiet about the ET-Plus. The judge, claiming potential witness tampering, dismissed the jury and called for a fresh trial in October.

The bullying allegation is “completely untrue,” Trinity has said.

### **Bureaucratic Snarl**

The upshot of all this is a potential bureaucratic snarl on America’s roadsides that may take state officials years to untangle. There are some 200,000 ET-Plus systems installed around the country, the FHWA has said. There’s likely no way to say which are the allegedly defective ones, short of states measuring them one by one.

At least 15 states are planning to do just that, state officials said in interviews. One, Missouri, has already taken measurements and found size variations that it intends to analyze more fully, according to Joseph Jones, the state’s engineering-policy administrator, who will review the data.

“We want to know what we have out there,” Jones said.

### **Shifting Allegiances**

The story of the alleged third version is one of industrial sleuthing and shifting allegiances among insiders in the guardrail trade, a business worth hundreds of millions of dollars in taxpayer-funded purchases.

Sicking got his start in roadside safety in the 1980s. Before then, many guardrails had exposed

ends that could skewer vehicles that ran into them. Others had buried ends that could double as car-flipping ramps.

In 1986, Sicking and a few colleagues based at Texas A&M University began developing a way to transform the end of a guardrail, an immovable object, into a forgiving shock-absorber.

They invented a piece to mount onto a guardrail’s end – a steel plate to receive a vehicle’s blow and, behind that, a slot into which the guardrail was threaded. When hit under the right conditions, the end terminal would be forced down the length of the W-shaped rail.

As the guardrail pushed through the narrow slot, it would flatten, in an energy-absorbing instant, into a ribbon deflected away from the car. Guardrail posts would fall away. Several feet or yards later, the car would come to a less catastrophically abrupt stop.

### **Rail Royalties**

In 1989, the FHWA certified their invention, the ET-2000, as crashworthy. Soon, a company called Syro Steel Co. started selling it. Trinity bought Syro a few years later.

In 2000, Trinity introduced the ET-Plus, a lighter version of the ET-2000. That January, the federal agency vetted the ET- Plus, allowing states to seek federal reimbursements for some of their spending on it.

By then, Sicking had already invented a competing end-terminal and was collecting royalties from it, too. He says he received about \$4 million in royalties for the ET-2000 and ET- Plus until they expired after 2008. He has received about the same amount in royalties from the competing system and will continue to collect them for at least

another decade, he said.

There's no independent measure of the market for the ET- Plus and similar energy-absorbing end terminals. Sicking estimates that Trinity currently accounts for about 60 percent of the market while the competitor he developed – sold by Road Systems Inc. – has about half that. Models sold by Barrier Systems Inc. account for the rest, he said.

The Road Systems figure is reasonable, a company spokesman said. Trinity and Barrier declined to comment on market share.

## 2005 Changes

Scrutiny of Trinity's system began in 2011. Harman, who runs a small guardrail manufacturer and installer, said that late that year, he discovered the company had made undocumented changes to its system around 2005. In early 2012, he told the FHWA about his finding. That March, he sued Trinity in Marshall, Texas, on behalf of U.S. taxpayers who had helped pay for the devices.

Trinity then said it had revised the dimensions of its ET- Plus system around 2005, saying that details of the change were "inadvertently omitted" in paperwork sent to the FHWA. The changes didn't hurt the ET-Plus's performance, Trinity said, and the modified unit had been successfully crash tested.

In November 2012, as word of Harman's allegations spread and Trinity was named in several personal-injury suits, Sicking began looking at accident sites involving the ET-Plus.

## Guide Channel

Sicking documented 20 crashes in a row where he thought the Trinity terminals he measured hadn't performed as designed, he said in a September 2014 deposition for the Texas trial, a

transcript of which was provided by Harman's lawyers.

In April 2013, Sicking said, he noticed something different. That month, he stopped by the sites of three accidents near Birmingham, Alabama, that involved recently installed ET-Plus systems, he said in the deposition. Those units had appeared to work as intended, he said.

He measured them. In the deposition and interview, he said he found that the rectangular guide channel – which feeds the rail into the slot – was a quarter inch taller than in the ones he said had malfunctioned.

Several months after Sicking's Alabama measurements, Harman was in Arizona surveying guardrails as part of his own research. There, he said, he measured versions with taller guide channels that matched those Sicking had seen. In an interview, Harman said the revision appeared to address what he says is the safety problem with the 2005 version.

Since then, Harman said he has seen versions with similar measurements in Texas, Tennessee and California. Sicking has seen them in Texas as well as Mississippi, he said.

## Calls to FHWA

Sicking told Jeffrey Paniati, the FHWA's executive director, about his discovery in an October 2013 phone call, he said in the interview. Paniati referred him to Tony Furst, the agency's associate administrator for safety, who Sicking said called him a few days later.

"Nothing came of this," Sicking said.

Both Paniati and Furst remember speaking with Sicking in late 2013, but only about Sicking's concerns related to Trinity's 2005 changes, the

agency said in its statement. They didn't recall any mention of further alterations by Trinity, according to the agency.

Around the same time, Sicking got involved in the Texas lawsuit against Trinity, as a consultant for Harman's side. He said he agreed to a \$350 an hour rate and hasn't yet tallied his hours.

### 'Industry Rumors'

In February 2014, Sicking spoke to members of a panel reviewing end-terminal performance and shared his assertion that there was a third version, he said in his deposition. On that phone conference were several state and federal highway officials, he said in the interview.

Shortly after, Sicking got a call from Gregg Mitchell, the president of the Trinity unit that makes the ET-Plus, both Sicking and Mitchell testified in October.

Mitchell requested a meeting with Sicking because he had heard "industry rumors" that the inventor had been sharing his concerns about the ET-Plus's performance with states and the FHWA, Mitchell testified. In March, Mitchell traveled to Birmingham to meet with Sicking, both testified in October.

In July, during the first trial in the Texas lawsuit, one of Harman's lawyers asked Mitchell whether he had told Sicking during the meeting that he would "smear him and make sure that he never worked in the industry again" if he testified against Trinity.

"Absolutely not," Mitchell testified.

### 'That's a Threat'

That evening, Sicking – who hadn't been planning to appear – traveled to Marshall from Birmingham to testify that Mitchell had said he

would try to ruin the reputation of any witness who spoke against Trinity. "That's a threat if I ever heard one," Sicking said in his deposition.

U.S. District Judge Rodney Gilstrap met with Sicking in his chambers. He later declared a mistrial.

"Serious concerns exist with respect to Trinity's conduct and the veracity of testimony" by Mitchell, Gilstrap wrote.

Trinity declined to make Mitchell available for comment.

Sicking, who had talked about a third version in his deposition, wasn't asked about it at the trial: His testimony was mostly limited to speaking about the alleged bullying.

On Oct. 21, a day after a retrial resulted in the jury's verdict against Trinity, the FHWA demanded that the company crash-test its modified ET-Plus. The agency backed the company's test plan in early November.

### California Terminals

Eight terminals were pulled from California's maintenance inventory for the tests, according to the federal regulator. The state ordered them in June, and they were among two dozen that arrived in September, said Mark Dinger, a spokesman for California's transportation department.

Both Trinity and FHWA officials measured the units before shipping them to the test facility, according to the FHWA.

The FHWA provided Bloomberg News with measurements of three dimensions for each of the test systems. They all match those of the 2005 version. Trinity declined to share the complete design measurements of the units it says are under review, citing trade secrets. The company also said reporters, who were allowed to view the Dec. 10

crash-test, wouldn't be allowed to measure the test unit.

Taking such measurements requires technical expertise, according to a statement from Jeff Eller, a Trinity spokesman, who added that the test units' measurements will be released when the testing is complete.

## Arizona Roadside

The existence of a different model was confirmed during a field examination in Arizona by Bloomberg News.

On a stretch of U.S. Route 70 that cuts across desert scrub near the Apache Gold Casino Resort, there are six dozen ET-Plus systems that an Arizona official said were installed sometime from May to August of 2013.

Measurements of these units – taken in November with Harman, the Texas plaintiff – revealed at least two dimensions that in the majority of cases didn't match Trinity's official measurements for the 2005 version, which were disclosed at the Texas trial. These changes include the taller guide channel noted by Sicking.

Trinity's manufacturing tolerance – the maximum variation from stated dimensions that a maker allows – is one-eighth of an inch, experts from both sides testified in July.

Of the 72 recently installed guardrails examined in Arizona, 14 had a guide-channel height right at the upper tolerance for the model Trinity says it sells. Another 56 were higher than that maximum tolerance, including more than two dozen that had the same quarter-inch increase that Sicking observed in Alabama.

In 51 of the Arizona systems, the slot's width was at one point wider than Trinity's official measurement by more than a quarter-inch. While Sicking says those gaps have varied in size for years, Harman points out that they are well outside Trinity's tolerance.

## 'Old School'

A few dozen feet down the same Arizona highway were older ET-Plus models. Their measurements matched those of the original design that federal officials certified in 2000. Also nearby were systems with the measurements of the 2005 version.

At least 42 states and the District of Columbia have suspended new installations of Trinity's systems, as many assess what's already on roadsides.

"We're dealing with an old-school steel product that nobody seemed to be paying attention to until recently," said Sean Kane, president of Safety Research & Strategies Inc., an independent group that investigates potential product hazards. "The states are going to be left holding the bag, and motor safety is going to be affected by these decisions."

Sicking, for his part, said he worries that a potentially lethal version of the technology he helped invent is still out there.

"Everybody is proud of their biggest accomplishment. This was my biggest," he said. "They tarnished it."

– Editors: Michael Hytha, Jeffrey D Grocott