



KARTH

Behold, the Lamb of God

ANNALEAH
MAY 15, 1995
MAY 2013

MARY LYDIA
AUG. 6, 1999
MAY 8, 2013



You will not be forgotten

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You will not be forgotten.

imgflip.com







Last
Moments

VARIABLE LISTING OF CASE # 130366 VEHICLE DATA FILE
 FATAL MOTOR VEHICLE TRAFFIC CRASH ON MAY 4, 2013 IN GREENSBORO, GA
 FATALITY ANALYSIS REPORTING SYSTEM(FARS) 2013 ARF

Extent of Damage	Vehicle Removal	Most Harmful Event	Related Factors- Vehicle Level	Related Factors- Vehicle Level 2	Fire Occurrence
Disabling Damage	Towed Due to Disabling Damage	Motor Vehicle In-Transport	None	None	No or Not Reported
Disabling Damage	Towed Due to Disabling Damage	Motor Vehicle In-Transport	None	None	No or Not Reported
Disabling Damage	Towed Due to Disabling Damage	Motor Vehicle In-Transport	None	None	No or Not Reported
Emergency Use	Travel Speed	Override/Override	Rollover	Location of Rollover	Initial Contact Point
Not Applicable	Not Reported	No Override or Override Noted	No Rollover	No Rollover	1 Clock Point
Not Applicable	Not Reported	Underriding a Motor Vehicle In-Transport, Underride, Compartment Intrusion Unknown	No Rollover	No Rollover	11 Clock Point
Not Applicable	Not Reported	No Underride or Override Noted	No Rollover	No Rollover	6 Clock Point
Driver Presence	Driver's License State (FARS Only)	Driver's ZIP Code	Non-CDL License Status	Non-CDL License Type	Commercial Motor Vehicle License Status
Yes	California	90025	Valid	Full Driver License	Valid
Yes	North Carolina	27804	Valid	Full Driver License	No (CDL)
Yes	Florida	34420	Valid	Full Driver License	Valid

Crash Year by Initial Impact Point on the Large Truck	Passenger Vehicle Compartment Intrusion?			Total
	Compartment Intrusion	No Compartment Intrusion	Compartment Intrusion Unknown	
2011	Right Side	0	0	1
	Total	0	0	1
2012	Left Side	1	0	0
	Right Side	0	0	3
	Rear	0	0	4
	Total	1	0	7
2013	Left Side	4	1	2
	Rear	1	0	0
	Total	5	1	2

NO
 Law Enforcement Suspected Drug Use NO
 Drug Test Type TEST NOT GIVEN
 Drug Tested TEST NOT GIVEN
 Drug Test Result

PASSENGER V02
 Person Type PASSENGER NM# Vehicle# V02 Person Type Detail
 First Name ANNALEAH Middle Name Last Name KARTH Suffix Date of Birth 05/15/1995 Age 17 Sex F
 Address 1617 BURNT MILL ROAD Address Other City ROCKY MOUNT State NC Zip Code 27804-9197
 Phone Number 252-903-2444 Phone Number (other) Condition at Time of Crash APPARENTLY NORMAL
 Motor Vehicle Seating Position: Row SECOND Motor Vehicle Seating Position: Seat LEFT Motor Vehicle Seating Position: Other NOT APPLICABLE Seating Position Unknown
 Restraint Systems SHOULDER AND LAP BELT USED Helmet Use
 Air Bag Deployed NOT APPLICABLE Ejection NOT EJECTED
 Trapped Extrication TRAPPED & EXTRICATED WITH JOL
 Injury Severity Level Type FATAL INJURY (K) Injury Severity Level Detail Primary or Most Obvious of Body Area Injured During Crash HEAD
 Source of Transport to Medical Facility EMS GROUND EMS Agency Name or ID GREENE COUNTY EMS EMS Run Number 034 Medical Facility Transported To ST. MARYS HOSPITAL
 Law Enforcement Suspected Alcohol Use NO Alcohol Test Type Alcohol Tested TEST NOT GIVEN Alcohol Test Result BAC
 Law Enforcement Suspected Drug Use NO Drug Test Type Drug Tested TEST NOT GIVEN Drug Test Result

PASSENGER V02
 Person Type PASSENGER NM# Vehicle# V02 Person Type Detail
 First Name MARY Middle Name Last Name KARTH Suffix Date of Birth 08/06/1999 Age 13 Sex F
 Address 1617 BURNT MILL ROAD Address Other City ROCKY MOUNT State NC Zip Code 27804-9197
 Phone Number 252-903-2444 Phone Number (other) Condition at Time of Crash APPARENTLY NORMAL
 Motor Vehicle Seating Position: Row SECOND Motor Vehicle Seating Position: Seat RIGHT Motor Vehicle Seating Position: Other NOT APPLICABLE Seating Position Unknown
 Restraint Systems SHOULDER AND LAP BELT USED Helmet Use
 Air Bag Deployed NOT APPLICABLE Ejection NOT EJECTED
 Trapped Extrication TRAPPED & EXTRICATED WITH JOL
 Injury Severity Level Type NON FATAL INJURY Injury Severity Level Detail INCAPACITATING (A) Primary or Most Obvious of Body Area Injured During Crash HEAD
 Source of Transport to Medical Facility EMS GROUND EMS Agency Name or ID GREENE COUNTY EMS EMS Run Number 031 Medical Facility Transported To MCG AUGUSTA
 Law Enforcement Suspected Alcohol Use NO Alcohol Test Type Alcohol Tested TEST NOT GIVEN Alcohol Test Result BAC
 Law Enforcement Suspected Drug Use NO Drug Test Type Drug Tested TEST NOT GIVEN Drug Test Result

DRIVER V03
 Person Type DRIVER NM# Vehicle# V03 Person Type Detail
 First Name Middle Name Last Name Suffix Date of Birth 05/27/1957 Age 55 Sex M

Overview of 50 Years of Work on Rear Underride Prevention

1970: NHTSA proposed a strong RIG Rule but it was never adopted.

would be eliminated, and the vehicle could meet the strength requirement with whatever components are in position to contact the test block. Test responses conducted by both the NHTSB and concerned industries indicated that the 15,000-pound test force was unnecessarily large. The proposed requirement has been changed to 50,000 pounds in accordance with these findings. Some comments suggested that the 16-inch penetration limit be increased to a larger figure. These suggestions have

Location	Length	Weight	Depth	Depth	Energy (ft-lb)	Energy (ft-lb)	Aug Force (lb)	Aug Force (lb)
1000	1000	1000	1000	1000	1000	1000	1000	1000
1000	1000	1000	1000	1000	1000	1000	1000	1000
1000	1000	1000	1000	1000	1000	1000	1000	1000



1971: NY Times reported that the trucking industry successfully lobbied to weaken the rule.

2004: Transport Canada issues standard after crash tests show U.S. standard is insufficient. Canadian rule approximately doubles strength requirements.

2013: IIHS research showed - [Underride guards can be lifesavers, but most could be improved](#) On May 4, the Karth family underride crash occurred. Later that year, DOT Secretary of Transportation Anthony Foxx told victim families, “I can promise you tangible progress in a short period of time.”



2016: In the absence of federal regulatory action, IIHS publishes test protocol for the TOUGHGuard designation, which goes significantly beyond the Canadian standard to include protection against 30% offset crashes.

2021: Congress requires NHTSA to issue a Final Rear Impact Guard Rule, and encourages meeting the TOUGHGuard test protocol.

2022: NHTSA issues Final Rear Impact Guard Rule merely adopting Transport Canada’s 2004 standard.

2024: IIJA-mandated NHTSA rear underride research by Elemance is completed.

Since NHTSA had not raised safety requirements in two decades, IIHS published test protocol for Rear Impact Guards and awarded trailer manufacturers the TOUGHGuard Award when they passed it.

Test protocols

Semitrailer underride test protocol

[Version II, May 2021](#) 

[Version I, August 2016](#) 

Semitrailer rear impact guard quasi-static test protocol

[Version II, January 2024](#) 

[Version I, May 2021](#) 

9 major trailer manufacturers

received the TOUGHGuard Award:

- **7 offer their TOUGHGuard RIG as Standard.**
- **2 offer it as an Option.**

This Wabash RIG-16, which they proudly announced in 2016, is offered as an *Option*.



Yet, still today, Wabash National sells the TOUGHGuard RIG as an *Option* not as *Standard*.

According to court records, 90 – 95% of the Wabash trailers currently being sold do not qualify for the TOUGHGuard Award.

Wabash shipped 51,090 new trailers in 2022. 90%, or 45,981, of those trailers likely do *not* have a TOUGHGuard RIG-16.

NHTSA's 2022 Final Rule adopted the 17 year-old Canadian standard. It did *not* require trailer manufacturers to meet the TOUGHGuard test protocol.

**What was NHTSA's basis?
A false statement about
Stoughton Trailers' RIG.**

Stoughton Trailer, a trailer manufacturer, produces trailers with rear impact guards that prevent PCI in all three overlap conditions at 56 km/h (35 mph) as standard equipment and notes on its website that its rear impact guards do not add additional weight, cost, or negatively impact aerodynamics (presumably compared to rear impact guards that would meet this final rule requirements).^[74]

The Stoughton rear impact guard, made of steel, includes two vertical supports on the outer ends of the horizontal member that fasten to a robust undercarriage of the trailer. It does not appear feasible engineering-wise for the additional material (two steel vertical members on the outer edge of the horizontal member that is bolted to a reinforced undercarriage) not to add weight or cost to the trailer. Accordingly, NHTSA decided not to include this guard design in this analysis.



STOUGHTON®

It's in the details

NEW REAR UNDERRIDE GUARD Now standard on our dry vans. No additional cost. No additional weight.



PROTECTS THE DRIVING PUBLIC

The new rear underride guard resists compartmental intrusion of an automobile when the location of impact is at 30% to 100% overlap of the width of the car to the underride guard, meeting the testing protocol established by the IIHS and complying with all applicable U.S. and Canadian regulations.

TESTED AND PROVEN DESIGN

Stoughton trailers equipped with the new patent-pending rear underride guard underwent extensive tests both internally and through multiple independent testing agencies, including crash testing performed at the Insurance Institute for Highway Safety (IIHS) facility.

The leading-edge enhancements of the rear underride guard are engineered to smoothly integrate into the trailer, creating a robust and sleek rear appearance, without adding weight to the trailer.





[Video link](#)



"I SURVIVED BECAUSE OF STOUGHTON"


With its new, robust rear underride guard, Stoughton is making the roads safer for everyone. No one knows that better than accident survivor Terry Rivet and his passenger Mark Robinson. "Early morning on March 2, we found our car headed toward the rear corner of a tractor-trailer that had slid and jack knifed on a snowy, slippery I-90. But thankfully, the rear underride guard on the Stoughton® trailer prevented our car from sliding underneath the trailer."

Stoughton's guard increases the ability to resist compartmental intrusion of a car when the location of impact is at the rear corners. And, it's standard on new Stoughton dry van trailers – with no added cost or weight.



Terry S. Rivet
Actual accident survivor
Rochester, New York
March 2, 2017

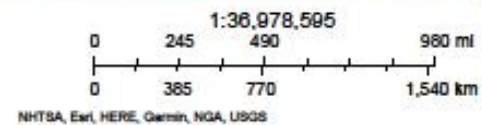
STOUGHTON®

 U.S.A. Owned & U.S.A. Made

Rear Underride Crashes In FARS 2007-2020 (n=1,589)



1/17/2024



Estimated number of side underride, rear underride, and front override crashes and associated fatalities in the United States from 2007 to 2020 using cataloged FARS data multiplied by side underride undercount correction factors.

Type of Crash	Number of Crashes in FARS	Number of Fatalities in FARS	Undercount Factor	Estimated Number of Crashes	Estimated Number of Fatalities	Estimated Average Number of Crashes and Fatalities Per Year
Side Underride	1,238	1,847	1.77	2,191 ^A	3,269	157/234
Rear Underride	1,589	2,273	1.77	2,813	4,023	201/287
Front Override	1,135	1,296	1.77	2,009	2,294	144/164
Total	3,962	5,416		7,013	9,586	

^AExample Calculation: number of side underride crashes multiplied by undercount correction factor: $1,238 \times 1.77 = 2,191$

Estimated number of side underride, rear underride, and front override crashes and associated fatalities in the United States from 1969 to 2020 using estimated average number of crashes and fatalities from 2007 to 2020.

Type of Crash	Estimated Average Number of Crashes and Fatalities Per Year	Estimated Number of Crashes Over 51 Years	Estimated Number of Fatalities Over 51 Years
Side Underride	157 ^A /234	8,007	11,934
Rear Underride	201/287	10,251	14,637
Front Override	144/164	7,344	8,364
Total		25,602	34,935

^AExample Calculation: estimated number of side underride crashes per year multiplied by 51 years: $157 \times 51 = 8,007$

Links to:

- [Methodology](#)
- [Tables](#)

Congress charged the ACUP with two tasks:

(6) REPORT.—The Committee shall submit to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Transportation and Infrastructure of the House of Representatives a biennial report that—

(A) describes the advice and recommendations made to the Secretary; and

(B) includes an assessment of progress made by the Secretary in advancing safety regulations relating to underride crashes.

Recommendations.

Assessment.

Assessment:

Based on this history, we determine the following about NHTSA action on Rear Impact Guards -

- **Too Little**
- **Too Late**
- **Too Many Preventable Deaths**

Recommendation #1

The 2022 RIG Rule should be amended immediately to require that all new trailers meet the TOUGHGuard test protocol.

The need for further research on rear guards has been repeatedly raised but then ignored by NHTSA.

5. In order to ensure that underride equipment is strong enough to allow the inherent crashworthiness of modern passenger vehicles to be realized, as well as to significantly **increase the survivable impact speeds through the energy absorption capability of the underride equipment** itself, NHTSA should immediately issue a RFP to investigate, develop, and test such technology and update the standards accordingly.

Additional Rear Research

- Virginia Tech Senior Design Team presented a RIG design at the First Underride Roundtable in May 2016.
- Sapa Aluminum Extrusions RIG was successfully tested at 40 mph in 2017.
- Collision Safety Consulting RIG Retrofit was successfully tested at 39 mph in 2020.



This is how a car looks after a 35 mph full-width crash into the rear of a Hyundai trailer with a weak underride guard.

This is a car after a 35 mph full-width crash into a Wabash trailer with a strong guard. The occupant compartment is intact.

Goal is to prevent underride in all overlapping scenarios

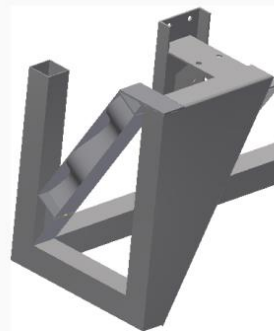
Reduce fatality rate among impacts

Requirement	Category	Specification	Threshold Value	Target Value	Requirements Met?
Payload shall not be affected	Design	Weight	100 kg	40 kg	Has Yet to Be Tested
Part shall meet current budget for trucking industry	Manufacturing	Production Cost	\$1000 US	\$500 US	One-off: no; Product with Bulk Purchasing: Yes
Part shall not corrode or react to road salt/sea air	Design	Non-Reactive	Low Grade Steel	Non-Reactive Coating & Low Grade Steel	Yes, Low Grade Steel
Part shall not require excessive assembly time for purchaser of completed trailer bumper	Manufacturing	Assembly Time	45 mins	15 mins	Has Yet to Be Tested
Part shall be applicable to several trailers with minor attachment point design variations	Functionality	Modularity	Fits 1 Trailer	Translatable to Several Trailers	Fits the Wabash Trailer
Part shall not interfere with trailer axle functionality	Functionality	% Mobility Lost	≤10 cm	0	Has Yet to Be Tested
Loading ability shall not be impeded	Functionality	Gap Between Trailer and Loading Dock	5 cm	0	Yes, 0 cm Gap with Final Design
Part shall absorb at least 20 kJ within the first 125 mm of deflection	Functionality	Damping/Deceleration Zone	5 cm	45 cm	Yes, 18 cm Deceleration Zone at Small Overlap with Sine Beam

Detailed Design - Side Impact Protection



- Noticed rear impact was the only direction being protected
- Added a side, horizontal member with another vertical member to protect against off axis or side impact collisions
- Sheet metal gusset on these vertical members to provide structural integrity



Final Report



Collision Safety Consulting RIG Retrofit at 39 mph



Underride Section 23011 of the IIJA – 11/15/21

(2) **ADDITIONAL RESEARCH.**—The Secretary shall conduct additional research on the design and development of rear impact guards that can—

(A) prevent underride crashes in cases in which the passenger motor vehicle is traveling at speeds of up to 65 miles per hour; and

(B) protect passengers in passenger motor vehicles against severe injury in crashes in which the passenger motor vehicle is traveling at speeds of up to 65 miles per hour.

(3) **REVIEW OF STANDARDS.**—Not later than 5 years after the date on which the regulations under paragraph (1)(A) are promulgated, the Secretary shall—

(A) review the Federal Motor Vehicle Safety Standards revised pursuant to those regulations and any other requirements of those regulations relating to rear underride guards on trailers or semitrailers to evaluate the need for changes in response to advancements in technology; and

(B) update those Federal Motor Vehicle Safety Standards and those regulations accordingly.

Elemance Rear Impact Guard Research Results

- The IJA mandated research to determine the outer limits of survivable rear impact protection.
- NHTSA-contracted computer simulation study has been completed: [*Development and Preliminary Validation of Computational Finite Element Truck Underride Guards*](#)
- ACUP should receive a presentation on these results.

Elemance Rear Impact Guard Research Results

- **Did the study conduct the research set forth by the IJA?**

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(B) protect passengers in passenger motor vehicles against severe injury in crashes in which the passenger motor vehicle is traveling at speeds of up to 65 miles per hour.

- **If not, when will it be completed?**

Additional simulations shall be conducted at 40 mph, 45 mph and 65 mph with the redesigned guards and at different overlap levels (full, 50% and 30% overlap). The quasi-static strength and energy absorption of these redesigned guards shall be evaluated against the three quasi-static tests in CMVSS No. 223 and the additional test conducted by NHTSA at the edge of the guard.

The last objective is to investigate occupant response when impacting one (1) rear underride guards at different speeds and overlap. This involves using THOR-50M ATD and human body models in the driver and right front passenger in a FE model of a passenger vehicle with restraints.

Statement of Work per NHTSA

Recommendation #2

Pursuant to the IIJA, NHTSA should evaluate the need for changes in rear underride regulations in response to advancements in technology and update the Rear Impact Guard regulation accordingly.

Recommendation #3

In line with [OMB Circular A-119](#), NHTSA should establish an ACUP voluntary consensus standard working group to collaboratively develop a voluntary consensus rear guard standard.

Operation Warp Speed for Underride Protection



Win/Win

