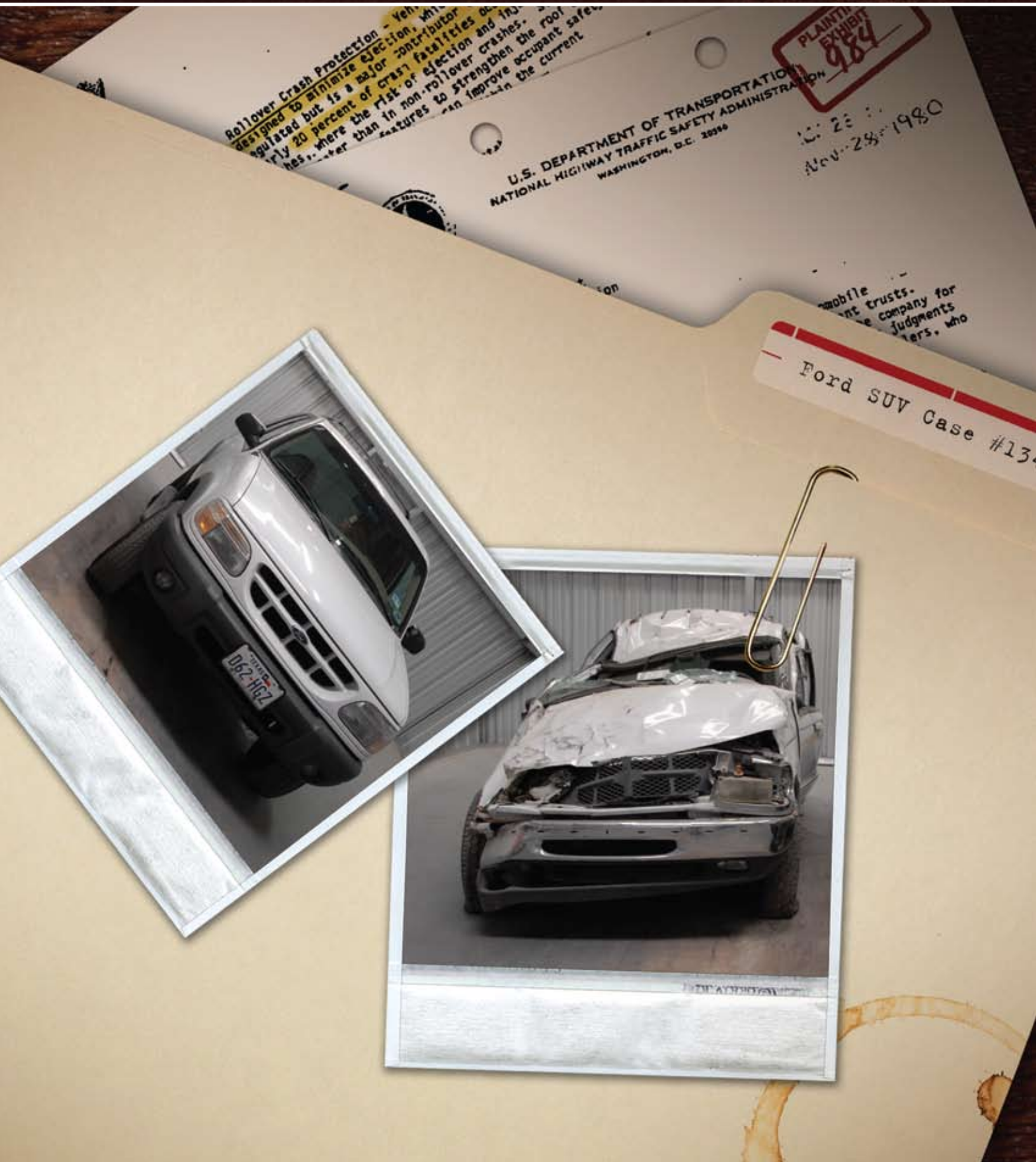
The Making of an Epidemic

THE AMMONS LAW FIRM
A LIMITED LIABILITY PARTNERSHIP



THIS IS A STORY ABOUT AN EPIDEMIC, ONE THAT CRIPPLES AND KILLS. IT STRIKES PEOPLE WITHOUT REGARD FOR THEIR AGE, WEALTH OR RACE. THERE'S NO VACCINE, NO SHOT, NO PILL.

BUT THERE IS A CURE. IT INVOLVES JUST A FEW DOLLARS WORTH OF STEEL, SOME SIMPLE DESIGN CHANGES AND A DIFFERENT WAY OF THINKING, ONE THAT TRULY PUTS SAFETY FIRST.

In Texas, the tread separated from one of the rear tires on this 1998 Ford Explorer and the SUV rolled over two-and-a-half times. The accident killed a 46-year-old man who was wearing his seat belt.

This epidemic involves the world's most popular sport utility vehicle, the Ford Explorer*. The deaths and injuries tied to this SUV too often are a result of its design:

» a tall vehicle with a high center of gravity that is more likely to roll over in an accident;
» a weak roof prone to collapse when the vehicle tumbles; and
» seat belts that fail to keep people close to their seats and inside the car where they're less likely to be hurt or killed.

FORD PROFITS ON 1998 EXPLORERS SOLD IN TEXAS

Total Ford Profits on 1998 Explorers Sold in the U.S.	$1,852,000,000
Total 1998 Explorers Sold in the U.S.	419,568
Ford Profit Per Vehicle on 1998 Explorers Sold in the U.S.	$4,414.06
Total 1998 Explorers Sold in Texas	39,185
Total Ford Profits on 1998 Explorers Sold in Texas	**$172,964,941.10**

Ford made plenty of money on the Explorer, more than $4,000 profit on each one it sold. In Texas alone, the company's profits on the 1998 Explorer were nearly $173 million. All together, the company sold 4,000,000 of the vehicles in the U.S. and Canada at a cumulative profit of $18.6 billion.

But the profits came at a cost, one measured in lives ended or forever changed.

At The Ammons Law Firm, we know those costs too well. In Texas and around the country, we've handled more than 50 cases involving the Ford Explorer and hundreds of rollover cases involving cars, trucks and SUVs. We know the families and the pain they've experienced. We've uncovered the documents and other evidence that prove Ford could have done things differently. We've even hired our own experts and performed our own testing to document the Explorer's fundamental problems and illustrate how simple engineering improvements would make the vehicle safer.

If you have a case involving a Ford Explorer, we have important information that you need to know.

**Unless otherwise noted, the material in this brochure concerns Ford Explorer and Mercury Mountaineer SUVs.*

Teandrea Mason — A Case Study

Teandrea Mason was a typical high school kid. She had family and friends who loved and cared about her and plenty of hopes and dreams for the future.

All of that changed in a moment.

On a fall morning in 2005, Teandrea was driving her family's 1998 Ford Explorer on her way to school. The weather was clear, the road flat and dry. Teandrea was wearing a seat belt and paying attention to the road. She was not speeding.

The highway where Teandrea Mason's Ford Explorer rolled over is a flat, level surface.

In a moment, the Explorer tipped up on two wheels and then rolled over. It tumbled three-and-a-half times before coming to rest on its roof, which had collapsed during the rollover. Because the seat belt failed to do its job, Teandrea was thrown around inside the Explorer. The driver's side window broke, and part of her body ended up outside of the Explorer when it finally came to a stop.

She didn't know it then, but Teandrea had broken her back.

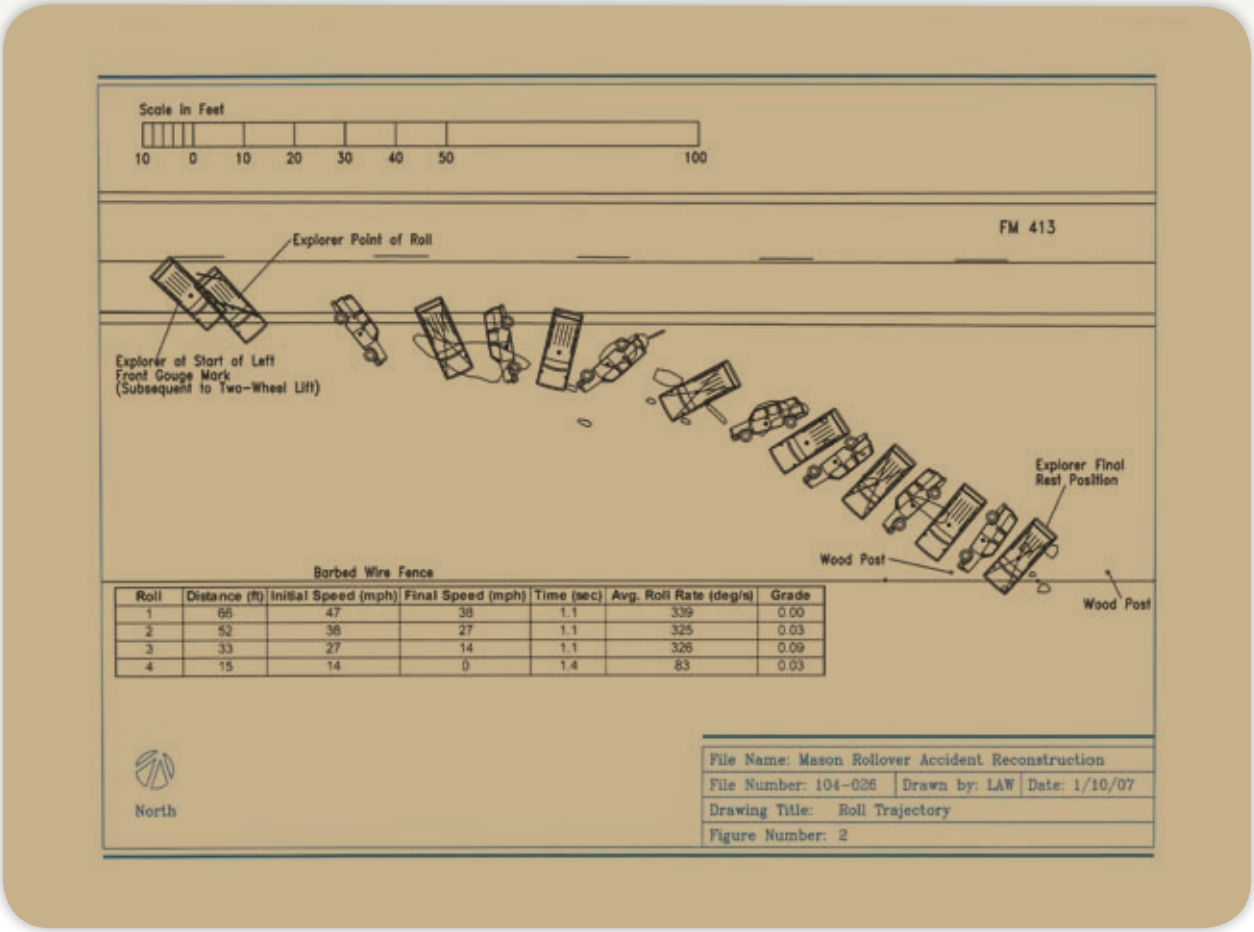
According to the police report, Teandrea made a mild steering correction. She didn't drive off the road, but drifted for just a moment, as so many drivers do. That's when the problems with the Explorer – problems that Ford knew about years in advance – led to tragedy.

The sad thing about this accident is that it's nothing out of the ordinary. In fact, what happened to Teandrea is a textbook example of everything that's wrong with the Explorer and how it can hurt and kill.

Teandrea Mason

The damage to Teandrea Mason's Ford Explorer following the rollover accident that left her a paraplegic.

Investigators combined pictures of the road and Teandrea's SUV to show the jury how the Explorer rolled over.



Roll	Distance (ft)	Initial Speed (mph)	Final Speed (mph)	Time (sec)	Avg. Roll Rate (deg/s)	Grade
1	66	47	38	1.1	339	0.00
2	52	38	27	1.1	325	0.03
3	33	27	14	1.1	326	0.09
4	15	14	0	1.4	83	0.03

An accident reconstruction report demonstrates how Teandrea's Explorer rolled over three-and-a-half times.

What Ford Knew and When

It's simple physics. Ford built the Explorer too tall and too narrow, making it more likely to roll over. There's no surprise here. Documents show that Ford's own engineers suggested – even before the first Explorer ever made it to a showroom – that the company should change the design. Among other things, the engineers advised lowering the SUV's center of gravity (CG) by reducing the height and pushing the wheels outward to make it wider and more stable.

But Ford ignored the advice of its own engineers, deciding that the Explorer needed to reach the market before these changes could be made.

Ford executives also knew – and company documents demonstrate this – that the strength of any car's roof can have an enormous impact on whether people survive a crash. We've discovered that as far back as the 1950's, Ford and others studied roof crush and determined that maintaining the integrity of the structure around the driver and the passengers would result in fewer deaths and injuries.

The
Marlin Democrat
Serving Marlin and Falls County since 1890

Teen injured in rollover settles case

By Tony Marquis

Teandrea Mason, a former Marlin High student who was paralyzed in a one-car rollover accident, reached a settlement in a lawsuit against Ford Motor Company.

The amount of the settlement was not disclosed, but documents showing Ford knew the seat belts in Mason's 1998 Ford Explorer unlocked during rollovers were shown to the court. According to Brady Whitaker, a Marlin native who represented Mason, lawyers showed evidence that Mason's future medical bills could cost more than $4 million.

The case, which took more than a year to get to trial, took less than two weeks to settle.

"I'm just glad it's over with," said Cheryl Mason, Teandrea's mother. "Bringing up the past and all the emotions that come out of you — it would have been so unbearable, I don't know if I could go through it again."

On Oct. 24, 2005, Mason was driving her 1998 Ford Explorer to school, under the speed limit, when she made a "steering correction" that caused the vehicle to roll on its side three times. Mason damaged her spine when the seat belt unlocked, sending her into the vehicle's headliner.

Doctors told Mason the accident had damaged vertebrae in the thoracic spine, the part behind the chest area. She would never walk again.

"It was hard," Mason said. "It was just hard to everybody."

Friends came by and visited Mason in the hospital for the first week. But after the first month, they stopped coming.

"I'm quite sure it could of been from both sides, but they just disappeared," said Cheryl, who took time off from her job at Texas Pneumatic Tools to stay at the hospital.

"For the first year-and-a-half, she was sad, just sad," said Willie Mason, Teandrea's father. "... There were all these goals and expectations and her whole life has changed and all the things she used to talk about, all the things she used to do just stopped."

Mason, who played basketball and was a varsity sprinter on the Marlin track team, had to drop out of school because of the time she missed while she was in the hospital.

"We don't tell anybody that it's perfect in our home, because it's not," Cheryl said. "We have a lot that we have to deal with."

Mason's parents built her a gym, closing off a portion of their house. Inside, Willie built a table for Mason to do her rehab and brought in bars and weights. There's also a punching bag.

"It keeps her frustration down," Cheryl said. "She gets depressed a lot, so she'll get up and go and use her punching bag."

It wasn't until August of 2007, when Mason came into her parents room around midnight to talk, did her parents notice their 18 year-old daughter's attitude change.

"She said, 'I'm ready to move forward in my life, I'm through being depressed and I don't want to do that anymore,'" Cheryl said.

On Thursday, Mason said the settlement has brought some closure.

"It helps, but it really doesn't," Mason said. "But there's not enough money in the world to really fix anything."

According to Ammons, there is no recall for the vehicle's seat belts. Whitaker said he's working or worked on 15-20 cases dealing with the unexpending seat belt issue.

"I am pleased there is a settlement that will take care of this young lady and her special needs," said Bob Ammons, the lead counsel for Mason. "I hope that by introducing some of the evidence that we did, the information about these problems will become more widely known."

A message left Thursday, Feb. 14 with the lead trial lawyer representing Ford, Craig Logsdon, was not returned as of Monday.

Attempts to contact other lawyers for Ford were not successful.

The Teandrea Mason case was the subject of several news stories.

But Ford didn't bother making the roof strong enough to protect Teandrea Mason and others like her.

Finally, Ford and its engineers knew that the Explorer's seat belts could fail in rollover accidents, that rather than locking and holding a person in place, the belts would "spool out" and allow the driver and passengers to be thrown around inside.

Ford's own documents show that engineers recommended changes to prevent this from happening. They wanted pretensioners in the belts and suggested making the belts part of the seat itself, in an integrated design.

Ford chose not to make those changes either.

Inside Ford, these were decisions made at various times over a period of years. But they all came together on a morning in 2005 for Teandrea Mason and her family.

The Explorer was on its roof. Teandrea's legs were outside the SUV. Her back was broken. She reached for her cell phone, called her father and said, "I don't think I'm going to make it. Come help. Come hold me."

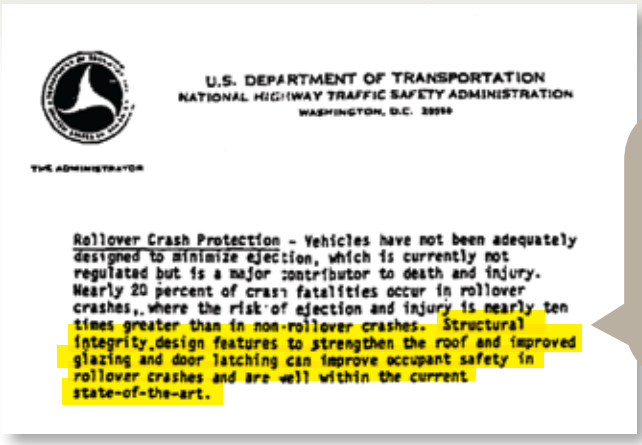
Willie Mason did that.

He and his wife left work and rushed to the scene of the accident, arriving before rescue crews. He crawled inside the overturned SUV, took hold of his daughter's hand, supported her back and waited.

He couldn't give back what Ford and the Explorer had taken away. Teandrea will live the rest of her life in a wheelchair, unable to do so many of the things most of us take for granted.

The Ammons Law Firm filed suit against Ford on Teandrea's behalf. Ford settled the case after five and one-half days of trial.

Attorney Rob Ammons speaks with a reporter from KWTX-TV during a break in the trial involving Teandrea Mason's family and Ford.



U.S. DEPARTMENT OF TRANSPORTATION
NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION
WASHINGTON, D.C. 20590

THE ADMINISTRATOR

Rollover Crash Protection - Vehicles have not been adequately designed to minimize ejection, which is currently not regulated but is a major contributor to death and injury. Nearly 20 percent of crash fatalities occur in rollover crashes, where the risk of ejection and injury is nearly ten times greater than in non-rollover crashes. Structural integrity, design features to strengthen the roof and improved glazing and door latching can improve occupant safety in rollover crashes and are well within the current state-of-the-art.

"Structural integrity, design features to strengthen the roof and improved glazing and door latching can improve occupant safety in rollover crashes and are well within the current state-of-the-art."

Letter from the U.S. Department of Transportation to all automakers on Nov. 28, 1980 – 10 years before the first Explorer was sold.

Problems With The Explorer's Design

Rollover crashes, such as those common to the Explorer, are nothing new. Ford engineers and safety experts elsewhere have studied rollovers for decades in order to learn more about the factors that can cause a car or SUV to roll over.

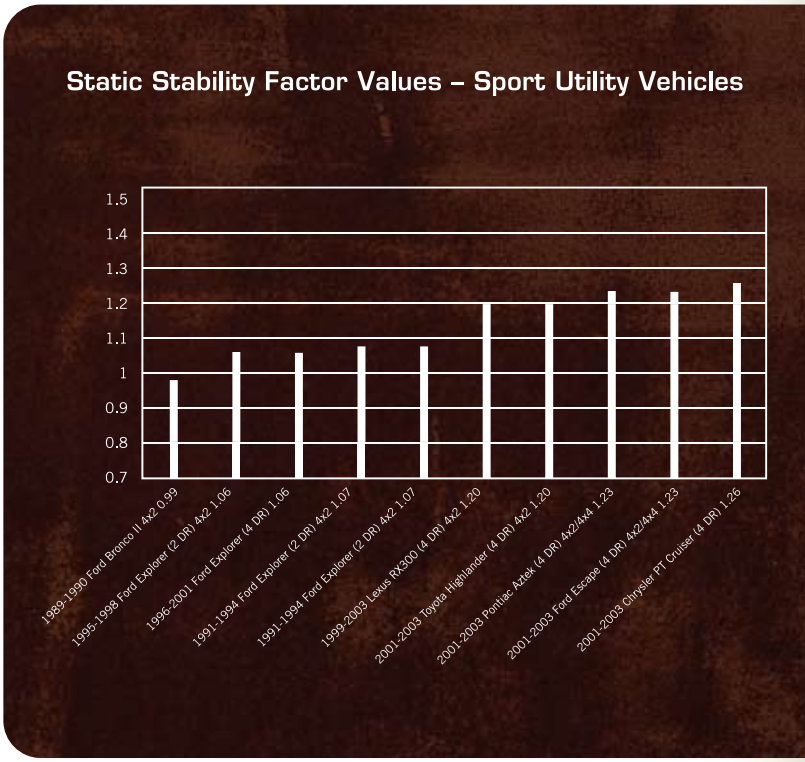
They have even developed a means of measuring the tendency of a car or SUV to roll over, something called Static Stability Factor. Determining the Static Stability Factor of any vehicle involves some very basic math; first engineers measure the track width (the distance between the two front or rear tires) and then divide it by two times the center of gravity height.

Doing so produces a number and allows for a comparison between the Explorer and other SUVs. In the accompanying chart, note that Explorers typically end up on the left side of the graph, indicating a lower Static Stability Factor. The only vehicle with a worse score is the Ford Bronco II, a vehicle that pre-dates the Explorer.

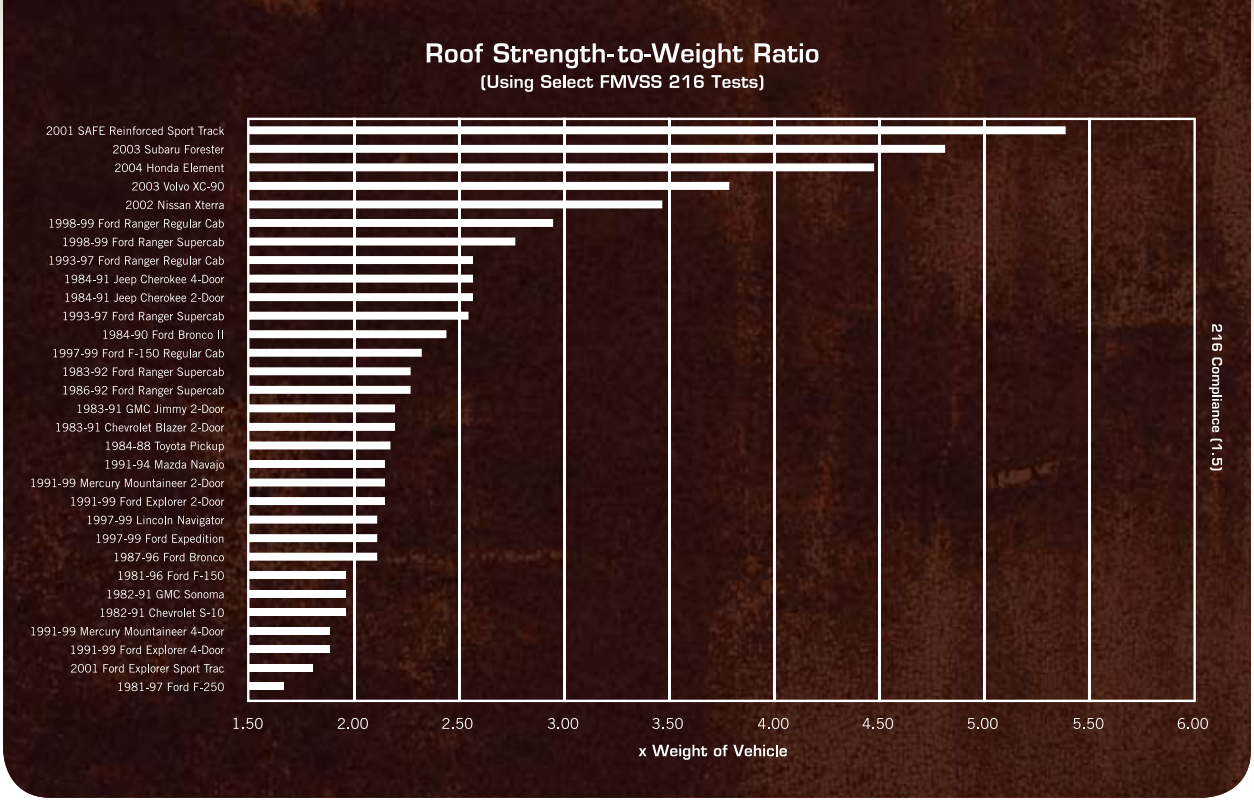
This is not high-level engineering. It's a basic calculation that a middle-school student could perform and something that Ford certainly knew about early on.

Ford also knew about roof strength and the role it could play in rollover accidents.

As far back as 1968, Ford engineers experimented by dropping about 40 cars on their roofs. Years later,



Static stability factor values for the Ford Explorer and other SUVs.



Strength-to-weight ratios of various SUVs and light trucks. Note the rankings for Explorers and Mountaineers – second, third and fourth from the bottom. See also the top ranking for the Explorer with the reinforced roof.

in an interview with *The Detroit News*, the man who headed Ford's Impact Dynamics Department at the time of those tests admitted, "The engineers who worked for me were just shocked (at the results). The roof strength was terrible."

A 1970 research study that involved Ford's United Kingdom division and the Society of Automotive Engineers at the University of Birmingham supported those findings. It found that, "If the roof collapse is so great that the weight of the car can be transmitted to the occupant's head…then very serious crushing injuries occur."

Remember, this was 20 years before the dawn of the SUV, a vehicle that would replace the station wagon as a dominant mode of family transportation while also making rollover accidents far more common.

Given that knowledge, Ford's engineers recommended the company adopt – at a minimum – a roof strength standard of two times a vehicle's weight. That means if a car weighed 3,000 pounds, then the engineers felt the roof should be strong enough to support 6,000 pounds.

Compare the roof strength-to-weight ratios for a number of trucks and SUVs: the 2001 Explorer Sport Trac and the 1991-99 Explorer 4-door are second and third from the bottom. Next check the ratio for the SUV made by Volvo, the 2003 Volvo XC 90 (interestingly, Ford now owns Volvo). See also the ratios for the 2004 Honda Element and 2003 Subaru Forester. As the Volvo, Honda and Subaru models demonstrate, car companies can build, market and sell safer SUVs.

Artist's rendering showing how roof crush in an Explorer accident eliminated the "survival space," leading to the death of a passenger. On the right, how the survival space would have protected the passenger, if the Explorer's roof did not crush.

Finally, look at the line at the very top of the chart. It represents the roof strength-to-weight ratio of a modified 2001 Ford Explorer Sport Trac.

Testing revealed that simple modifications had increased the ratio from its original value of 1.84 to 5.51.

Inexpensive modifications tripled the Explorer's roof strength-to-weight ratio.

What changed? Did the modifications include hundreds of pounds of steel and cost thousands of dollars?

Actually, the changes added only 16.26 pounds of steel, the same weight you might add if you took the SUV to the filling station and added about two gallons of gasoline. The cost of this additional steel - $30.40.

Various "Weight and Cost to Modify" Calculations:
2001 Ford Explorer SportTrac (MUVW = 4,550 lb)

Ford Explorer SportTrac Roof Strength = 8,356 lb (strength to weight ratio = 1.84)
TRIPLED Ford Explorer SportTrac Roof Strength = 25,068 lb (strength to weight ratio = 5.51)

Actual Additional Strength (lb)	Cost for Additional Strength	Weight for Additional Strength (lb)	Additional Strength to Triple 216 Peak Load (lb)	Cost to Triple Strength	Additional Weight to Triple Strength (lb)
From Ford Internal Documents:					
2,270	$8.25	7.50	16,712	$60.74	55.22
From Dodge and General Motors Case Studies:					
780	$2.25	1.25	16,712	$48.21	26.78
From EASI Engineering and ULSAB Case Studies:					
1,028	$1.87	1.00	16,712	$30.40	16.26

Chart showing various costs and the weight associated with tripling the strength of the Ford Explorer's roof. Note the numbers in the two boxes at the lower right corner.

More than 30 years before that test, Ford also considered what it might do to make vehicle roofs stronger. In 1973, Ford carried out tests with something it called the Experimental Safety Vehicle (ESV), a modified Ford Galaxie. Among other things, Ford modified the car's roof structure by adding a roll bar configuration. In tests, Ford learned that it could easily and inexpensively build a vehicle with a safe roof.

But maintaining the integrity of the roof in a rollover accident is only part of the challenge. Another is to keep the driver and passengers in place. In fact, federal standards require that seat belts provide pelvic restraint in all manner of accidents, including rollovers. In other words, the government standard calls for seat belts to keep people in their seats.

In rollover crashes, the Ford Explorer's seat belts often fail to meet that basic standard. They didn't do so in the accident that left Teandrea Mason a paraplegic. And evidence found at the scene of other Ford Explorer crash sites – pictures showing the seat belts still latched *after* a driver or passenger has been ejected or removed from the vehicle – indicate the same sort of phenomenon has happened time and again.

"Engineers shall hold paramount the safety, health and welfare of the public…"

American Society of Civil Engineers, Code of Ethics, Canon 1.

Engineering Safer Cars

Engineers who design products or machines are guided by a number of safety principles, including the statement above from the Fundamental Canons of Engineering Ethics as adopted by the American Society of Civil Engineers.

In addition, countless textbooks and manuals lay out what engineers call a "safety hierarchy": a list of things they should do to remove a safety hazard from a product or design. First among these is the following:

Engineering Safety Hierarchy

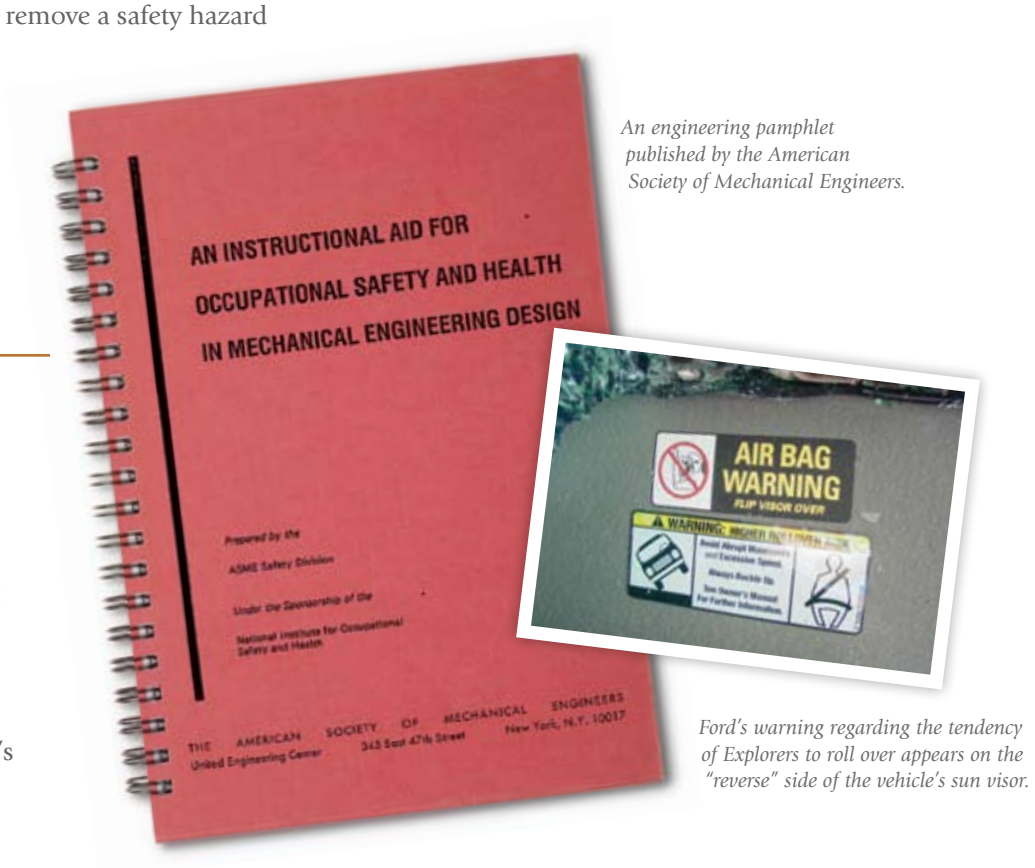
✓ **Hazard elimination**

Engineers are taught that if you can change the design of something in such a way that you eliminate the danger, you should do so. What's more, because this item appears at the top of the safety hierarchy, it is to be given top priority. Before considering any of the options that follow, engineers should attempt to fix the problem, to change the design in such a manner that the danger no longer exists.

Second in the safety hierarchy is this:

✓ **Guard against the danger**

In cases where engineers cannot possibly eliminate the danger or potential harm by changing the design, they are taught to guard against it. For instance, in designing a car, engineers can't eliminate the danger created by the presence of a volatile fuel (gasoline) onboard.



An engineering pamphlet published by the American Society of Mechanical Engineers.

Ford's warning regarding the tendency of Explorers to roll over appears on the "reverse" side of the vehicle's sun visor.

Instead, they shield the gas tank and keep it away from bolts and other sharp objects that might cut into it during a crash.

In the case of an SUV such as the Explorer, eliminating the danger (the first principle) would have meant reducing the height and increasing the width of the vehicle, thus making it more stable. Guarding against the danger (the second principle) would have meant building a roof that was more resistant to the crushing forces it might experience on impact, and equipping the SUV with seat belts designed to keep the occupants in place. But Ford did neither of those things.

If they can't remove the danger or provide safeguards, engineers are taught that the least desirable option is:

✓ **Provide a warning or instructions**

This is what Ford chose to do in the case of the Explorer. Rather than fix the design and correct the tendency of the vehicle to roll over, instead of providing some sort of safeguard that might prevent the rollover or guard against it, Ford went to the bottom of the safety hierarchy.

It provided only a warning. It's there on the reverse side of the sun visor, a statement that cautions drivers against making an abrupt steer. Of course the problem is that drivers sometimes have to steer clear of obstacles such as dogs and others animals, debris in the road, potholes, etc. And sometimes, through no fault on the part of the driver, they have to steer away from such objects quickly.

But more than all of that, engineers say it's a breach of their ethical duty to provide only a warning when they have the ability to fix the danger. A warning is not a substitute for a safe design. And a warning is not a license to break the rules.

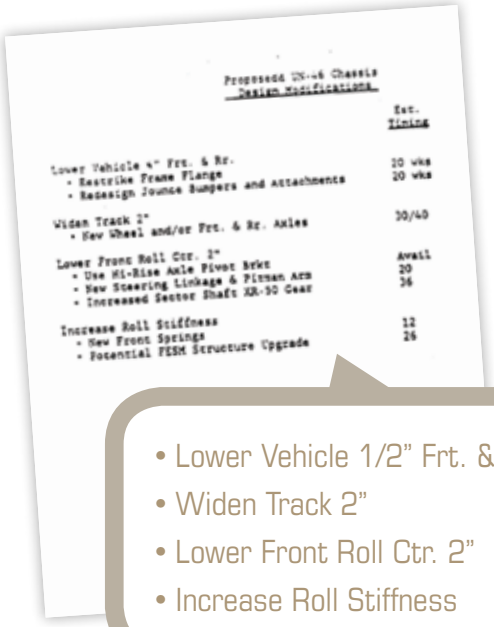
But Ford did break the rules, one of them a simple fundamental concept of physics that says if you build a tall car with a narrow base, it's inherently less stable than one that's shorter with a wider base.

Investigators for the Ammons Law Firm added spacers to each of the wheels on this 1998 Ford Explorer, making the wheelbase wider. In testing, this wider wheelbase kept the Explorer from tipping up, reducing its tendency to roll over.

Fixing The Ford Explorer

To prove that, we modified a Ford Explorer in a very simple manner: we widened the vehicle. We started with a stock 1998 Explorer and then, using a type of spacer on each wheel, we were able to add about four inches to the width of the SUV.

In doing so, we actually were following the advice of Ford's own engineers, who, during the Explorer's development in 1989, suggested that making the vehicle wider would make it more stable. In fact, Ford engineers wrote a document recommending the company do four things:



- Lower Vehicle 1/2" Frt. & Rr.
- Widen Track 2"
- Lower Front Roll Ctr. 2"
- Increase Roll Stiffness

Engineers' recommended stability improvements – June 15, 1989

Did Ford follow through on all of these recommendations? No. It did only two of them, lowering the vehicle by one-half inch and increasing the roll stiffness. And Ford didn't lower the Explorer by redesigning the car; instead, it simply installed smaller tires.

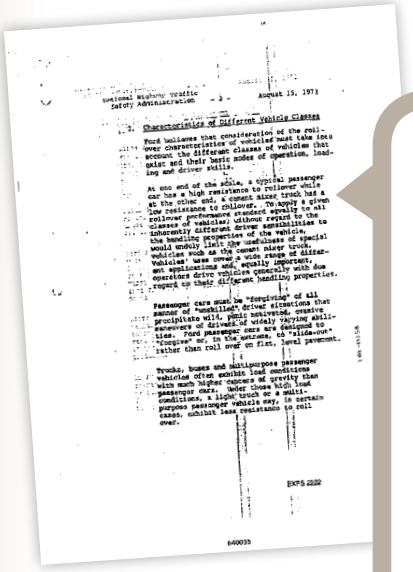
In the test we performed, we took both the stock Explorer and the one we modified and put them through a steering maneuver known as a J-turn, the very same maneuver Ford has also used to test the stability of its SUVs. In our test, the stock Explorer tipped up onto two wheels at a speed of 44 miles per hour. If this were a real SUV and not a test vehicle on a test track, it would have rolled over.

In testing, a stock Ford Explorer tips up on two wheels and then rolls over several times.

Now, take the version that we modified, the one that's about four inches wider. In the same J-turn test, our modified Explorer never tipped up on two wheels even though it was traveling at a higher speed, 51 miles per hour. In a real-world scenario then, this driver would have been just fine.

That begs the question: If we can do this kind of testing, if we can make very minor modifications and solve a problem that has killed, disabled and injured countless numbers of people, then why wouldn't Ford do the same?

And why didn't the Explorer live up to the standards Ford itself set back in 1973? That's when the company wrote this letter to the National Highway Traffic Safety Administration:



National Highway Traffic Safety Administration — 3 — August 15, 1973

Characteristics of Different Vehicle Classes

Ford believes that consideration of the roll-over characteristics of vehicles must take into account the different classes of vehicles that exist and their basic modes of operation, loading and driver skills.

At one end of the scale, a typical passenger car has a high resistance to rollover while at the other end, a cement mixer truck has a low resistance to rollover. To apply a given rollover performance standard equally to all classes of vehicles, without regard to the inherently different driver capabilities to the handling properties of the vehicle, the usefulness of special vehicles such as the cement mixer truck, would unduly limit the number of different vehicles' uses over a wide range of applications and, equally important, operators drive vehicles generally with due regard to their different handling properties.

Passenger cars must be 'forgiving' of all manner of 'unskilled' driver situations that precipitate wild, panic motivated, evasive maneuvers of drivers of widely varying abilities. Ford passenger cars are designed to 'forgive' or, in the extreme, to 'slide-out,' rather than roll over on flat, level pavement.

Trucks, buses and multipurpose passenger vehicles often exhibit load conditions with much higher centers of gravity than passenger cars. Under those high load conditions, a light truck or a multi-purpose passenger vehicle may, in certain cases, exhibit less resistance to roll over.

EXPS 2222

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1973 letter from Ford to the National Highway Traffic Safety Administration.

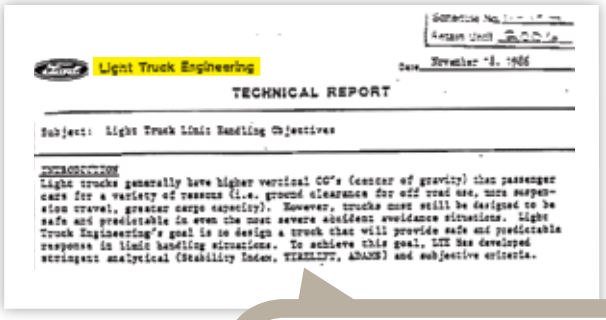
"Passenger cars must be 'forgiving' of all manner of 'unskilled' driver situations that precipitate wild, panic motivated, evasive maneuvers of drivers of widely varying abilities. Ford passenger cars are designed to 'forgive' or, in the extreme, to 'slide-out,' rather than roll over on flat, level pavement."

We didn't write that. That's what Ford had to say to the National Highway Traffic Safety Administration when that organization asked for input to develop design standards that would prevent rollover accidents. Ford claimed its vehicles were supposed to slide out and not roll over.

What happened? Why didn't Teandrea Mason's Explorer slide out?

The Bronco II: An Unstable Ancestor

To find the answer, you have to look back to the 1980s and the Explorer's predecessor, a vehicle called the Bronco II. Ford built the Bronco II to compete with Jeep vehicles, which, ironically, had their own problems with rollover accidents. During the 1980s, Ford sold about 700,000 Bronco IIs.



Light Truck Engineering

TECHNICAL REPORT

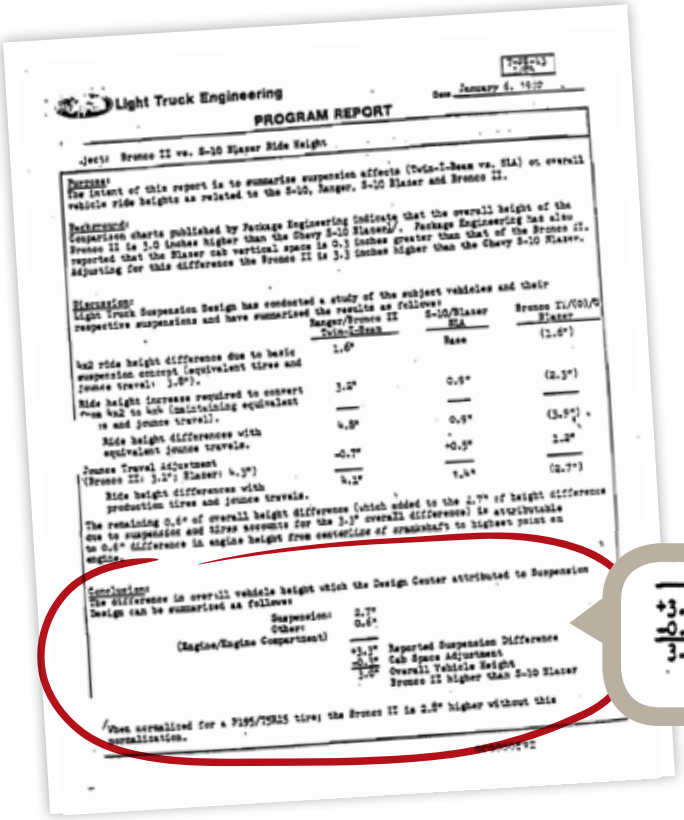
Subject: Light Truck Limit Handling Objectives

SUMMARY

Light trucks generally have higher vertical CG's (center of gravity) than passenger cars for a variety of reasons (i.e. ground clearance for off road use, more suspension travel, greater cargo capacity). However, trucks must still be designed to be safe and predictable in even the most severe accident avoidance situations. Light Truck Engineering's goal is to design a truck that will provide safe and predictable response in limit handling situations. To achieve this goal, LTE has developed stringent analytical (Stability Index, [illegible], ADAMS) and subjective criteria.

A 1986 Ford memo indicating the company's own belief that light trucks should be "safe and predictable" in all driving conditions.

"However, trucks must still be designed to be safe and predictable in even the most severe accident avoidance situations."



Light Truck Engineering

PROGRAM REPORT

Subject: Bronco II vs. S-10 Blazer Ride Height

Purpose:
The intent of this report is to summarize suspension effects (Twin-I-Beam vs. SLA) on overall vehicle ride heights as related to the S-10, Ranger, S-10 Blazer and Bronco II.

Background:
Comparison charts published by Package Engineering indicate that the overall height of the Bronco II is 3.0 inches higher than the Chevy S-10 Blazer[1]. Package Engineering has also reported that the Blazer cab vertical space is 0.1 inches greater than that of the Bronco II. Adjusting for this difference the Bronco II is 3.1 inches higher than the Chevy S-10 Blazer.

Discussion:
Light Truck Suspension Design has conducted a study of the subject vehicles and their respective suspensions and have summarized the results as follows:

	Ranger/Bronco II Twin-I-Beam	S-10/Blazer SLA	Bronco II/1[illegible] Blazer
Unit ride height difference due to basic suspension concept (equivalent tires and jounce travel: 3.8").	1.6"	Base	(1.6")
Ride height increase required to convert from unit to axle (maintaining equivalent jounce travel).	3.2"	0.8"	(2.3")
Ride height differences with equivalent jounce travels.	4.8"	0.9"	(3.9")
Jounce Travel Adjustment (Bronco II: 3.3"; Blazer: 4.3")	-0.7"	+0.5"	2.3"
Ride height differences with production tires and jounce travels.	4.1"	1.4"	(2.7")

The remaining 0.4" of overall height difference (which added to the 2.7" of height difference due to suspension and tires accounts for the 3.1" overall difference) is attributable to 0.4" difference in engine height from centerline of crankshaft to highest point on engine.

Conclusions:
The difference in overall vehicle height which the Design Center attributed to Suspension Design can be summarized as follows:

Suspension:	2.7"
Other:	0.4"
(Engine/Engine Compartment)	
	+3.1" Reported Suspension Difference
	-0.1" Cab Space Adjustment
	3.0" Overall Vehicle Height
	Bronco II higher than S-10 Blazer

[illegible] when normalized for a P195/75R15 tire; the Bronco II is 2.8" higher without this normalization.

+3.1" Reported Suspension Difference
-0.1" Cab Space Adjustment
3.0" Overall Vehicle Height
Bronco II higher than S-10 Blazer

An internal Ford memo comparing the Bronco II to the Chevrolet S-10 Blazer. It concludes that Ford's use of the twin I-beam suspension caused the Bronco II to be three inches taller than the Blazer.

A key component of the Bronco II, one that would affect it and vehicles that followed, is something called twin I-beam front suspension. The twin I-beam was a suspension common to Ford trucks; some credit it with being the secret to the success of the F-series line of pickups. And that's another key thing to remember; both the Bronco II and the Explorer were built on a platform designed for pickup trucks, one used by the Ford Ranger. In essence then, both the Bronco II and the Explorer are trucks.

That didn't have to create problems. Ford documents show the company knew it had a responsibility to design light trucks such that they would avoid accidents without tipping up. In the case of the Bronco II, however, that didn't happen.

To use the twin I-beam suspension, Ford engineers would have to increase the height of the engine in order to accommodate the twin I-beam's movement. That set off a chain reaction of significant design modifications to accommodate the suspension. First, the higher engine meant the Bronco II would need a higher hood, but as the hood height increased, engineers had to raise the front seats so drivers could see over it. Higher front seats meant the roof would have to be higher as well, in order to provide adequate headroom.

By the time this cascade of cause and effect was over, the choice of a twin I-beam suspension meant the Bronco II was going to be a tall vehicle. And because the vehicle body makes up about 80 percent of the vehicle's weight, the suspension and high engine made for a higher center of gravity.

In fact, the Bronco II measured three inches taller than its main competitor, the Chevrolet S-10 Blazer, which used a different kind of front suspension known as SLA, for short-long arm.

What happened? Rollover accidents involving the Bronco II became a problem almost immediately. Even Bronco II prototypes – vehicles Ford made before taking it to market – tipped up at speeds as slow as 20 miles per hour.

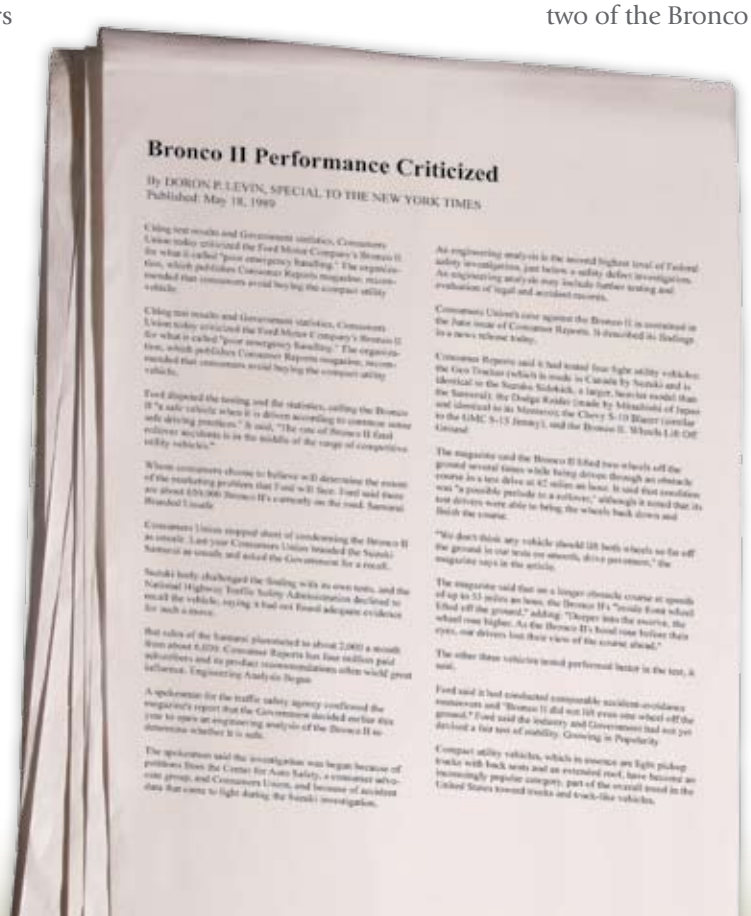
Faced with the realities of their design flaws, Ford engineers suggested the company make the vehicle wider by two inches. But since doing so would have delayed production – Ford calls it "Job 1" – Ford left the Bronco II as it was.

And so, the company came to market with a vehicle that had a high rollover propensity. Predictably, accidents happened and families sued the automaker. The Bronco II eventually would cost Ford $2.4 billion in verdicts and settlements.

The Bronco II rollovers were not just happenstance, nor were they the fault of bad drivers, as Ford attempted to argue in the lawsuits. Road conditions did not make the Bronco II dangerous. Instead, it was a predictable result of what happens when bad design choices meet up with the laws of physics.

Building on the Bronco II – both its commercial success and its stability problems – the Ford Product Planning Committee approved plans in June 1987 for a four-door version of the vehicle, which the company designated "UN46." Again, stability problems were immediate. In testing, the UN46 had a stability index of only 2.09, even worse than the Bronco II's 2.10-2.16 rating. At 2.09, the UN46 failed to meet Ford's own criteria for rollover resistance.

Two years later, *Consumer Reports* magazine published an article entitled, "How Safe Is the Bronco II?" with information on a series of tests it had performed on SUVs. The magazine concluded the Bronco II had "poor emergency handling." Specifically, it found that two of the Bronco II's wheels lifted off the ground during certain maneuvers, adding, "We don't think any vehicle should lift both wheels so far off the ground in our tests on smooth, dry pavement."



Bronco II Performance Criticized

By DORON P. LEVIN, SPECIAL TO THE NEW YORK TIMES
Published: May 18, 1989

Citing test results and Government statistics, Consumers Union today criticized the Ford Motor Company's Bronco II for what it called "poor emergency handling." The organization, which publishes Consumer Reports magazine, recommended that consumers avoid buying the compact utility vehicle.

Ford disputed the testing and the statistics, calling the Bronco II "a safe vehicle when it is driven according to common sense safe driving practices." It said, "The rate of Bronco II fatal rollover accidents is in the middle of the range of competitive utility vehicles."

Whom consumers choose to believe will determine the extent of the marketing problem that Ford will face. Ford said there are about 650,000 Bronco II's currently on the road. Samurai Branded Unsafe

Consumers Union stopped short of condemning the Bronco II as unsafe. Last year Consumers Union branded the Suzuki Samurai as unsafe, and asked the Government for a recall.

Suzuki hotly challenged the finding with its own tests, and the National Highway Traffic Safety Administration declined to recall the vehicle, saying it had not found adequate evidence for such a move.

But sales of the Samurai plummeted to about 2,000 a month from about 8,000. Consumer Reports has four million paid subscribers and its product recommendations often wield great influence. Engineering Analysis Began

A spokesman for the traffic safety agency confirmed the magazine's report that the Government decided earlier this year to open an engineering analysis of the Bronco II to determine whether it is safe.

The spokesman said the investigation was began because of petitions from the Center for Auto Safety, a consumer advocate group, and Consumers Union, and because of accident data that came to light during the Suzuki investigation.

An engineering analysis is the second highest level of Federal safety investigation, just below a safety defect investigation. An engineering analysis may include further testing and evaluation of legal and accident records.

Consumers Union's case against the Bronco II is contained in the June issue of Consumer Reports. It described its findings in a news release today.

Consumer Reports said it had tested four light utility vehicles: the Geo Tracker (which is made in Canada by Suzuki and is identical to the Suzuki Sidekick, a larger, four-by model than the Samurai); the Dodge Raider (made by Mitsubishi of Japan and identical to its Montero); the Chevy S-10 Blazer (similar to the GMC S-15 Jimmy), and the Bronco II. Wheels Lift Off Ground

The magazine said the Bronco II lifted two wheels off the ground several times while being driven through an obstacle course in a test drive at 42 miles an hour. It said that condition was "a possible prelude to a rollover," although it noted that its test drivers were able to bring the wheels back down and finish the course.

"We don't think any vehicle should lift both wheels so far off the ground in our tests on smooth, drive pavement," the magazine says in the article.

The magazine said that on a longer obstacle course at speeds of up to 53 miles an hour, the Bronco II's "inside front wheel lifted off the ground," adding: "Deeper into the reverse, the wheel rose higher. As the Bronco II's hood rose before their eyes, our drivers lost their view of the course ahead."

The other three vehicles tested performed better in the test, it said.

Ford said it had conducted comparable accident-avoidance maneuvers and "Bronco II did not lift even one wheel off the ground." Ford said the industry and Government had not yet devised a fair test of stability. Growing in Popularity

Compact utility vehicles, which in essence are light pickup trucks with back seats and an extended roof, have become an increasingly popular category, part of the overall trend in the United States toward trucks and truck-like vehicles.

Following the Consumer Reports article, other media began reporting about problems with the Ford Bronco II.

TREAD SEPARATION: FORD VS. FIRESTONE

In 2000, government regulators noticed a high failure rate of Firestone Wilderness AT tires. Especially in warmer climates such as Florida, Texas and the Middle East, the tires were experiencing tread separation. The tread would peel off and then the rest of the tire would disintegrate.

Along with Firestone, those regulators also notified Ford of the problem because the Wilderness AT was the tire of choice for the Ford Explorer. Eventually, Firestone recalled 6.5 million of the tires and Ford replaced another 13 million.

Before that could happen, the defective tires (Firestone traced the problem to a manufacturing issue at its Decatur, IL plant) and inherently unstable Ford Explorers combined to create a spate of rollover accidents here in the U.S. and around the world.

Both sides engaged in finger-pointing, Firestone insisting Ford was at fault and Ford laying the blame on the tires alone. The argument resulted in a corporate divorce of the two companies that had been linked together since the days of Henry Ford and Harvey Firestone.

Ford insisted there was nothing wrong with the Explorer.

But two years later, Ford came to market with an all-new version of its SUV, claiming a "new level of safety." The new Explorer was wider and lower than the SUV it replaced, in much the way engineers had recommended years before.

Just weeks after the *Consumer Reports* article, Ford took the UN46 prototype (the four-door Bronco II) to a testing track in Arizona and discovered it showed a rollover response at speeds between 35-39 miles per hour. This prompted engineers at Ford to draft eight different proposals – including a suggestion that the company widen the track and lower the vehicle – in order to get it to pass the rollover tests.

Again, Ford made only minor modifications. Truly fixing the problem would have meant delaying production of the SUV – Job 1 – and Ford wasn't about to do that. Nor would it continue using realistic, track-based testing to determine how the vehicle might perform in situations that would prompt a rollover.

Later that same year – 1989 – Ford admitted that it chose not to name the UN46 "Bronco II" due to the bad publicity for the vehicle generated by the *Consumer Reports* coverage.

So, the automaker chose another name. It called UN46 the Ford Explorer.

The first of the new models arrived in dealer showrooms in March 1990. It would become the best-selling SUV in the world.

HOW THE PROBLEMS WITH THE FORD EXPLORER PLAY OUT IN A ROLLOVER ACCIDENT

- The high center of gravity means the SUV is inherently unstable.
- The driver maneuvers to avoid an object in the road, or a tread separation occurs (see previous page) resulting in the vehicle tipping up on two wheels.
- The Explorer rolls over.
- Because it's not strong enough, the roof crushes, eliminating what safety experts call "the survival space," the area around the driver and passengers.
- The windows break and create openings through which parts of the body may travel outside the vehicle.
- The roof rail moves, creating the possibility an occupant's head may move outside the vehicle.
- The B-pillar moves. If you're sitting in the driver's seat, the B-pillar is the steel beam just behind your left shoulder, the spot where the seat belt often attaches to the car body. When it moves – a consequence of the rollover, roof crush and loss of structural integrity – the seat belt becomes loose, allowing a person to move around inside the vehicle.

What Happens in a Ford Explorer Rollover Accident?

Ford sold the Explorer as the replacement for the station wagon, a rougher, tougher car that could go off-road and still take the kids to soccer practice. What the company's marketing failed to mention, what families such as Teandrea Mason's wouldn't know until it was far too late, was that the SUV was actually a rolling, gas-powered mixture of safety problems, design defects and corporate compromise.

The Explorer represents the dangerous intersection of three fundamental problems – a vehicle built too high and narrow, a roof that isn't strong enough and a seat belt system that fails to keep occupants in place. Alone, any one of these safety defects would be trouble enough; together they often are deadly.

A Mercury Mountaineer following a rollover accident that killed a 24-year-old woman despite the fact she was wearing her seat belt. The belt was still buckled after investigators turned the SUV right-side up.

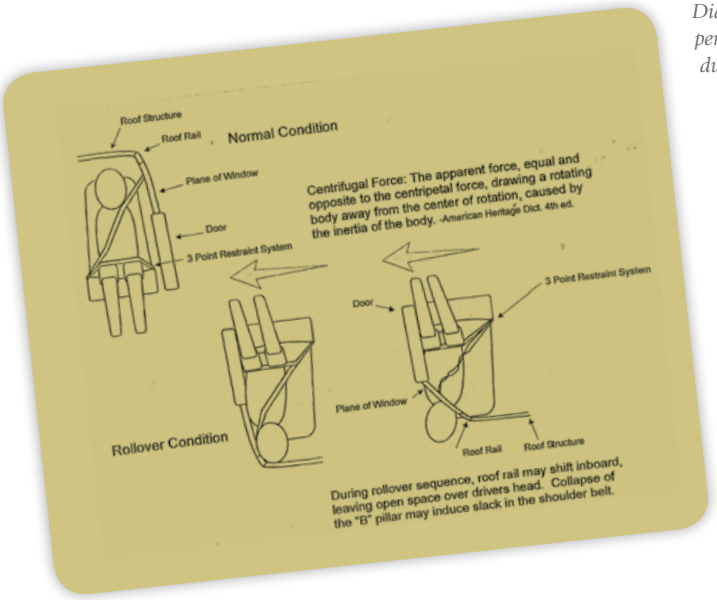


Diagram demonstrating what happens to the driver and passengers during a rollover accident.

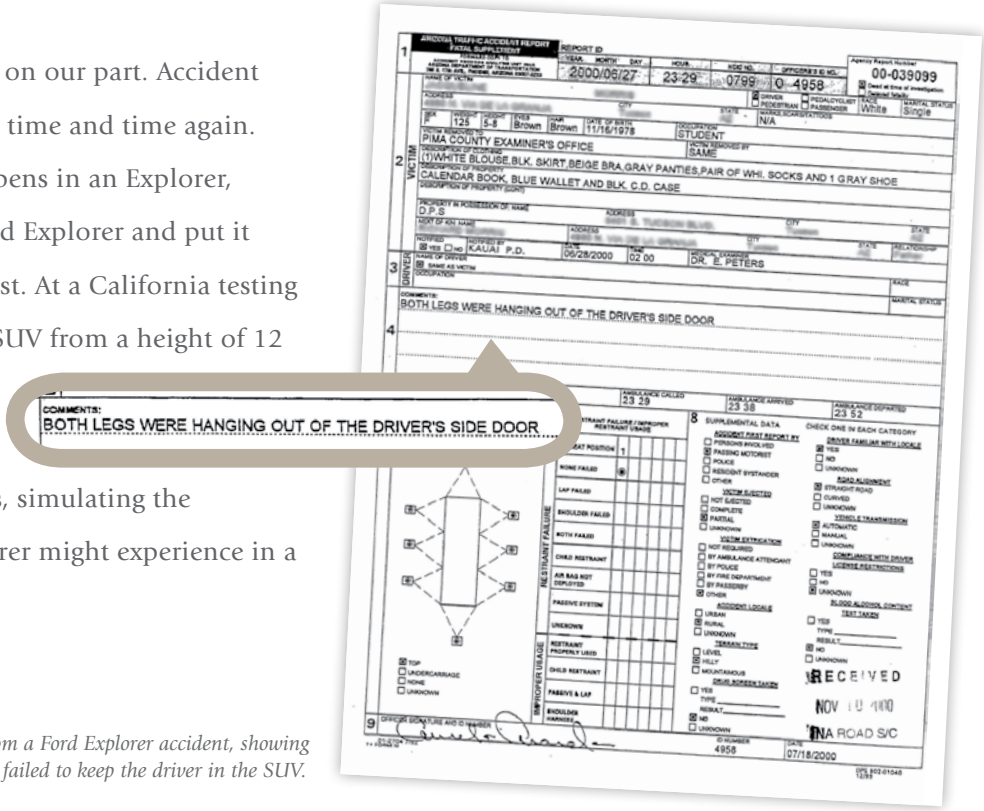
The investigators' report of what happened states the following:

"The vehicle sustained significant damage to the roof structure over the driver's compartment and the B-pillar deformed outboard at the window opening line. Additionally, a significant buckle formed in driver's side header approximately 5" rearward of the top of the A-pillar."

The A-pillar is the roof support just above the windshield. The same report notes that the driver's side front and rear windows shattered. Had someone been driving the car, the lack of window glass would have allowed parts of his or her body outside the vehicle.

Contributing to this, the Explorer's seat belts can "spool out," meaning that rather than locking and keeping a person in place, they can become loose in a rollover accident. Police records document case after case of Explorer rollover accidents where photographs show the seat belts still latched even after the driver or occupant was thrown from the vehicle.

This list isn't just a guess on our part. Accident investigators have seen it time and time again. To prove just how it happens in an Explorer, we purchased a 2000 Ford Explorer and put it through our own drop test. At a California testing facility, we dropped the SUV from a height of 12 inches, with a pitch angle of 5 degrees and a roll angle of 25 degrees, simulating the kinds of forces the Explorer might experience in a rollover accident.



Police report from a Ford Explorer accident, showing the seat belt failed to keep the driver in the SUV.

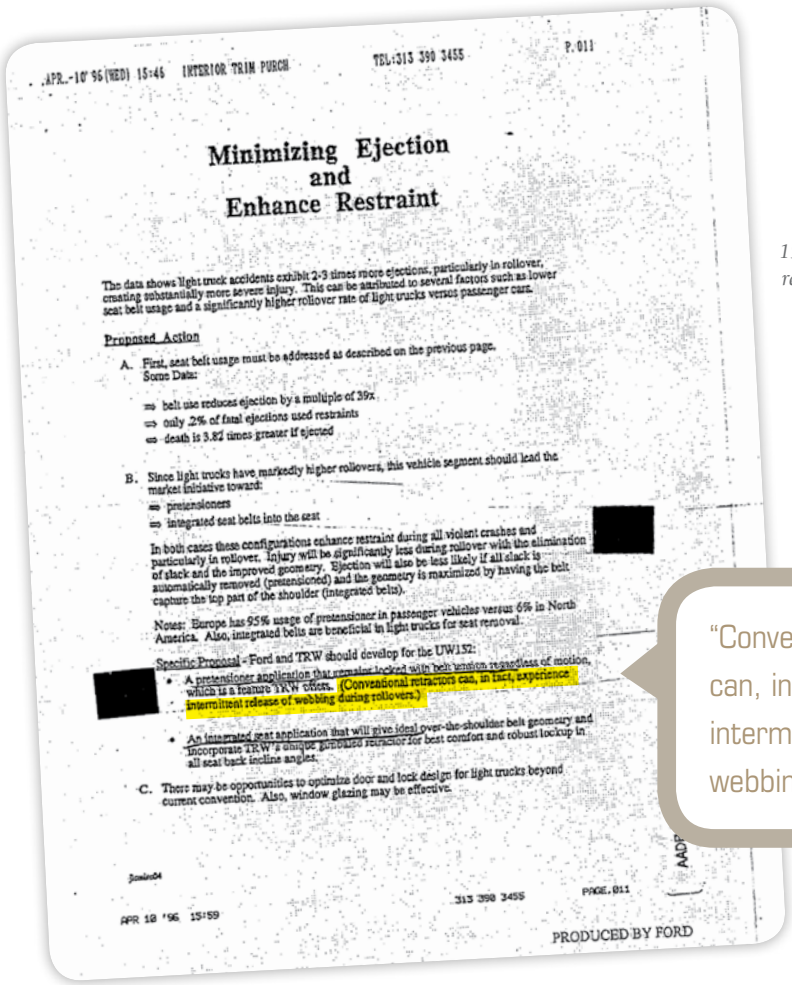
The last problem on the list – spool out – is another matter that's no surprise to Ford. TRW, the automotive safety company that made the Explorer's seat belts, worked with Ford in 1996 to analyze various changes they might make to cut down on the problem of drivers and passengers being ejected from Ford light trucks, including the Explorer.

TRW documents, produced by Ford, state:

"Conventional retractors can, in fact, experience intermittent release of webbing during rollovers."

That means that in an accident, the seat belts that normally hold a car's occupant in place can become loose. In the same document, TRW proposed Ford add pretensioners to the Explorer seat belts and make the belts and belt anchor positions part of the seat itself, rather than attaching them to the B-pillar.

At the beginning of a rollover, pretensioners would remove any slack from the seat belt and keep a driver or passenger firmly in place. A belt system that was part of the seat structure and its geometry would be more likely to hold as well. Ford made neither of these changes.



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Minimizing Ejection and Enhance Restraint

The data shows light truck accidents exhibit 2-3 times more ejections, particularly in rollover, creating substantially more severe injury. This can be attributed to several factors such as lower seat belt usage and a significantly higher rollover rate of light trucks versus passenger cars.

Proposed Action

A. First, seat belt usage must be addressed as described on the previous page.
Some Data:

- belt use reduces ejection by a multiple of 39x
- only .2% of fatal ejections used restraints
- death is 3.82 times greater if ejected

B. Since light trucks have markedly higher rollovers, this vehicle segment should lead the market initiative toward:

- pretensioners
- integrated seat belts into the seat

In both cases these configurations enhance restraint during all violent crashes and particularly in rollover. Injury will be significantly less during rollover with the elimination of slack and the improved geometry. Ejection will also be less likely if all slack is automatically removed (pretensioned) and the geometry is maximized by having the belt capture the top part of the shoulder (integrated belts).

Notes: Europe has 95% usage of pretensioner in passenger vehicles versus 6% in North America. Also, integrated belts are beneficial in light trucks for seat removal.

Specific Proposal - Ford and TRW should develop for the UW152:

- A pretensioner application that remains locked with belt tension regardless of motion, which is a feature TRW offers. (Conventional retractors can, in fact, experience intermittent release of webbing during rollovers.)
- An integrated seat application that will give ideal over-the-shoulder belt geometry and incorporate TRW's unique pretensed retractor for best comfort and robust lockup in all seat back incline angles.

C. There may be opportunities to optimize door and lock design for light trucks beyond current convention. Also, window glazing may be effective.

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PRODUCED BY FORD

"Conventional retractors can, in fact, experience intermittent release of webbing during rollovers."

1996 TRW memo to Ford regarding seat belt safety.

Our drop tests showed significant damage when a stock Ford Explorer was dropped from just 12 inches above the ground.

Crashworthiness: It's Not a New Science

It didn't have to be that way. Engineering and auto safety concepts that might have saved Teandrea Mason and countless others like her from catastrophic injury or death are based on research that began almost a century ago. Those concepts are part of a discipline known as crashworthiness.

Many consider Hugh DeHaven to be the father of crashworthiness. Following a World War I airplane crash that left him injured, DeHaven dedicated his life and career to aviation and auto safety.

Through his work, DeHaven defined several principles to follow in designing vehicles for human transport including the notion that safety features should keep people inside any vehicle and that the vehicle itself should not collapse under expected conditions of force.

The Explorer, a vehicle built more than four decades after these safety rules were written, meets neither of those standards.

But other manufacturers are doing it the right way, building on the standards set down by DeHaven and others who followed in his path. They have made crashworthiness a part of their corporate culture and

developed rollover protection systems designed to manage the energy, maintain the survival space and keep people in the vehicle.

DEHAVEN'S SAFETY PRINCIPLES

1. **First principle:** The package [the passenger compartment] should not collapse under expected conditions of force, thereby exposing objects [people] inside it to damage.
2. **Second principle:** Packaging structures which shield the inner container must not be made of brittle or frail materials; they should resist force by yielding and absorbing energy applied to the outer container so as to cushion and distribute impact forces and thereby protect the inner container.
3. **Third principle:** Articles contained in the package should be held inside the outer structure by interior packaging that restrains movement and resultant damage from forceful impact against the inside of the package.
4. **Fourth principle:** The means for holding an object inside a shipping container must transmit the forces applied to the container to the strongest parts of the contained objects.

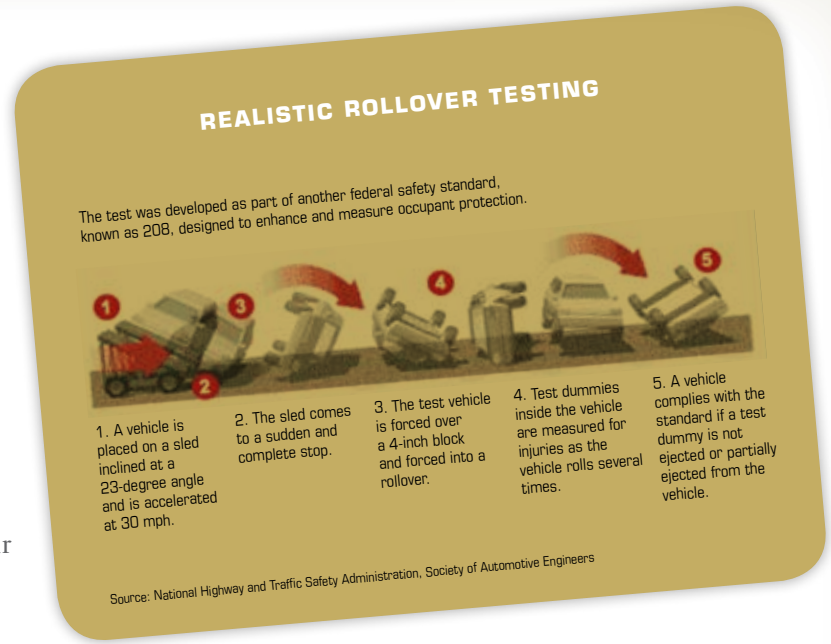
Many manufacturers conduct realistic rollover testing by dropping vehicles on their roofs or by using an angled dolly and track mechanism that accelerates a car to a certain speed and then stops quickly, prompting it to roll. Included in that list of manufacturers is Volvo, which Ford owns, and Ford of Europe. But Ford does not do any such realistic testing here in the United States.

It's just one example of how Ford has lagged behind in preventing rollover accidents. Another has to do with the development of Electronic Stability Control or ESC. Those are the now-familiar systems that combine yaw sensors, accelerometers, wheel-speed sensors, anti-lock brakes and traction control to anticipate and prevent rollover accidents.

All of the components of ESC (Ford calls it IVD for "Interactive Vehicle Dynamics") were available by 1992, but Ford didn't use them then. In 1995, three automakers – Toyota, Mercedes and BMW – made the technology available on their vehicles. But it wasn't until 1999 that Ford followed their lead, and then on one model only, the expensive Lincoln LS. By then, 14 different manufacturers – Audi, Honda, BMW, GM, Chrysler, Lexus, Mazda, Mercedes, Mitsubishi, Opel, Nissan, Porsche, Toyota and Volkswagen – already were offering ESC on at least one of their vehicles.

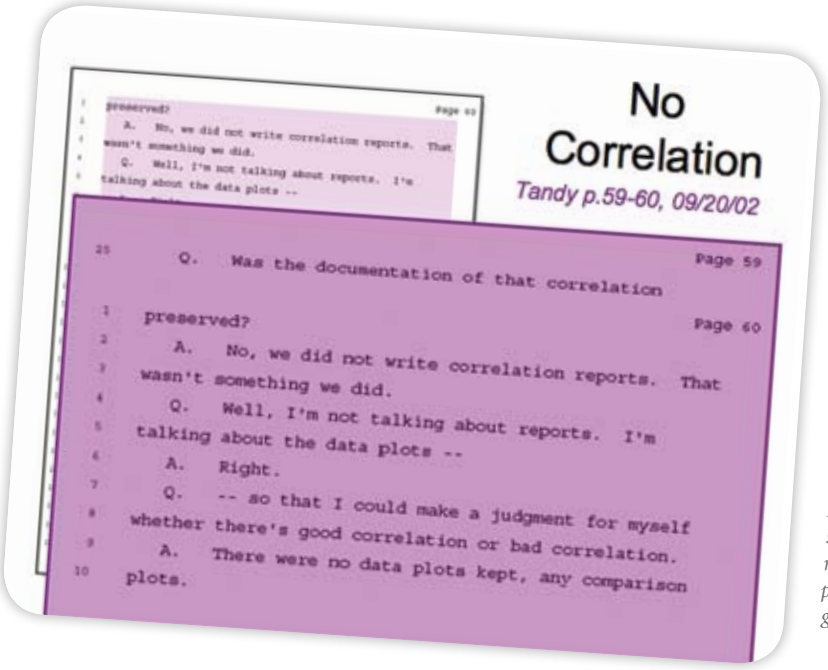
What's more, Ford wouldn't make ESC part of the Explorer and other light trucks that were most prone to rollover until 2002. Apparently, the company failed to learn from the lesson – and the embarrassment – that Mercedes experienced in what those familiar with crashworthiness

now call the "elk test." In 1997, one of the European carmaker's A-Class vehicles – filled with a load of Scandinavian reporters – rolled over during a test meant to simulate a maneuver to avoid wandering elk. One reporter was injured.



In response, Mercedes recalled every A-Class car on the road at the time and spent $25 million to fix the problem by installing new tires and ESC systems. The company also spent another $56 million to do the same on other A-Class cars over the life of the model, at no cost to consumers.

Compare that to the approach Ford took in developing the Explorer. There was no ESC or IVD system on the early models. Ford conducted no realistic rollover testing. Worse yet, during development, the company was so concerned its Explorer would not pass the *Consumer Reports* track test that it chose to forgo such testing. Instead, Ford signed off on a statement indicating the Explorer met the company's standard for resistance to rollover based on computer modeling known as an ADAMS test.



Years later in court cases resulting from Explorer rollovers, Ford was asked to produce the data showing a passing ADAMS grade. It was only then that the company admitted it had destroyed the information.

Ford indicated the Explorer met the company's standards based on computer modeling, not real-world tests. When asked, under oath, to produce the data that would support a passing grade, Ford admitted it no longer existed.

What Might Have Been

The truly sad thing about this story is that it didn't have to happen. Teandrea Mason and others like her should never have been injured or killed. Ford could have followed the advice of its own engineers and built the Explorer the right way. The company could have delayed "Job 1" and spent just a small amount of money to make sure its customers were protected. Doing so would have produced a safer SUV and likely still would have made the company billions of dollars in profits.

But Ford didn't do that. Instead, it built, marketed and sold the Explorer in a fashion that almost guaranteed the injuries and deaths that follow the SUV wherever it goes.

At The Ammons Law Firm, we know the story of the Ford Explorer. We know the mistakes, design compromises and safety defects that make it a dangerous vehicle.

We know the evidence that shows how the Explorer is prone to rolling over and how Ford knew about it long before people were injured and killed on our nation's highways. We know the experts who can explain things to juries in a way they can understand.

We've even done our own testing to prove how the SUV was far from the family-friendly product its marketing claimed.

If you have a case involving a Ford Explorer, call us at 866-523-1603 or email us at info@ammonslaw.com.

About The Ammons Law Firm

The Ammons Law Firm is a trial firm devoted exclusively to the representation of individuals who have been catastrophically injured through the misdeeds of others. The firm has a national practice that focuses on the prosecution of automobile product liability cases, including vehicle rollovers, fuel-fed fires, crashworthiness cases and tire failures.

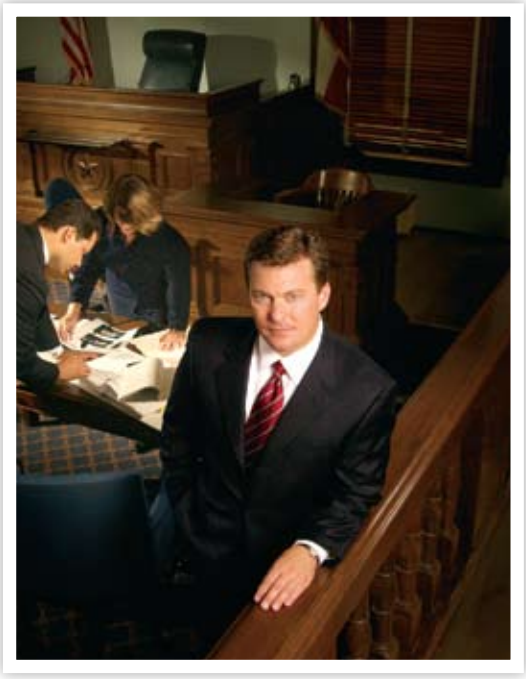
More information is available on the Web at http://www.ammonslaw.com.

About Rob Ammons

Rob Ammons earned his B.A. from Baylor University in Waco, Texas. After receiving an academic scholarship, Rob continued his education at Baylor Law School, where he was Editor of the *Baylor Law Review* and a member of both the Order of the Barristers and the Phi Delta Phi Legal Fraternity. He earned his J.D. with Honors in 1988 and was selected to serve as a Briefing Attorney for The Supreme Court of Texas.

In 1989, Rob began his private practice with the Vinson & Elkins law firm. Five years later, he developed his plaintiffs personal injury practice and began representing consumers in catastrophic injury and wrongful death cases. Rob has gained a national reputation as a leading personal injury lawyer. He focuses on the prosecution of serious injury cases, such as burns, spinal cord injuries, traumatic brain injuries and wrongful death claims against automobile and tire manufacturers. He has taken on significant cases against General Motors, Ford, Chrysler, Honda, Toyota, Isuzu, Hyundai, Nissan, Mitsubishi, Bridgestone/Firestone, Kumho Tire, Cooper Tire and Michelin.

Since 2003, Rob's peers in the legal community have named him to the list of *Texas Super Lawyers®*, published by Key Professional Media and featured in *Texas Monthly* magazine.



Attorney Rob Ammons

Rob is Board Certified in Personal Injury Trial Law by the Texas Board of Legal Specialization and Board Certified in Civil Law by the National Board of Trial Advocacy. He is "AV" rated by the Martindale-Hubbell® Law Directory, the highest rating attainable. Rob is a frequent speaker on product liability issues and is a published author.

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