

Spinning Their Wheels: How Ford and Firestone Fail to Justify the Limited Tire Recall

**Evidence assembled by
Public Citizen and Safetyforum.com^a
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I. Introduction

On August 9, 2000, Ford Motor Company and Bridgestone/Firestone, Inc. jointly announced the recall of approximately 6.5 million ATX, ATX II and Wilderness AT tires. The recall included the P235/75R15 (15-inch) ATX and ATX II tires, but only a certain number of Wilderness AT tires. The Wilderness AT tires included in the recall were only those P235/75R15 (15-inch) tires produced at Firestone's Decatur, Illinois plant.¹ Most of these tires were used as standard equipment on Ford Explorers.

According to recent figures released by the federal auto safety regulatory agency, the National Highway Traffic Safety Administration (NHTSA), failures associated with these tires have so far resulted in 148 deaths and over 500 injuries. The majority of the tire failures that caused injury or death occurred in the south and southwest regions of the U.S. and virtually all involved Ford Explorers. This report investigates the causes for these tire failures, and marshals the evidence to show that the scope of the recall still underway is significantly too narrow to protect consumers from tire failures and potentially fatal rollover crashes.

A. The Word from Ford and Firestone

1. Firestone

On December 19, 2000, Firestone issued a report acknowledging design flaws in its 6.5 million recalled tires while blaming both itself and Ford for the consequences of the tire failures.² Firestone's news release cited four major causes of the tire failures and crashes of the Explorers:

- Design problems in the Explorer triggered Ford's recommendation that the tires be inflated to 26 pounds per square inch (psi), significantly lower than the maximum allowed. According to Firestone, the lower inflation rate "increased the running temperature of tires and contributed to a decreased belt-adhesion level;"
- There were problems with the manufacturing process in the Firestone Decatur plant. Firestone specifically cited the composition of the rubber used and the adhesion characteristics of tires made in the Decatur plant. According to Firestone, the recalled tires from Decatur "exhibited different belt-adhesion characteristics, including lower initial adhesion, than those same size and line of tires produced at other plants;"

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- There was a problem in the tire’s design, specifically in the shoulder of the tire, which, according to Firestone, "could lead to cracking . . . in the wedge area of the tire [and] result in a reduction of resistance against belt detachment or tread separation;”
- Customer were misusing the tires. Firestone reiterated its common theme that “tire industry experience demonstrates that many tread separations can be caused by various forms of tire damage encountered in daily use, such as punctures, improper repairs, [and] severe impacts.”

2. Ford

A report issued by Ford likewise blamed the failures of the tires on a combination of design problems and manufacturing difficulties encountered at Firestone’s Decatur plant, but Ford disputed Firestone’s claim that Ford Explorer design flaws played a role in the crashes. Ford reported that its “engineers and scientists” were involved in “ongoing statistical analysis” and that the company’s “test data” appeared to agree with many of Firestone’s preliminary conclusions.³ Ford’s report included the following findings:

- Testing on Ford and other makes of vehicles and on tire test rigs showed that the P235/75R15 ATX and Wilderness AT tires do become hotter during use than similar competitive designs, although Ford did not know the cause of this.
- Test data also showed that rubber cohesion is lower in the belt area of Decatur-built tires. The test data, however, did not tell Ford what aspect of the manufacturing process may cause this.
- Ford did not test or analyze tires which have had a puncture repaired, but stated that it seems reasonable that a tire that is already sensitive to heat because of design and manufacturing conditions could be progressively damaged if it was further heated because of lower inflation pressures prior to or following a repair.

While Ford was unable to fully define the cause of the tread separation problem, its “preliminary root cause hypothesis” was as follows:

“The design of the tire generates high stresses and heat in the wedge and belt area. Manufacturing processes at Firestone's Decatur Plant reduce the cohesion level of the rubber in that same area of the tire. This reduced strength permits cracks to propagate between the steel belts. We believe it is a combination of manufacturing factors and the reaction of the tire design to field operating conditions including hot weather and very low tire pressure that have caused the increased failure rate of these tires.”

Despite these differences of opinion relating to the role of the Explorer in causing tread separations, crashes, and, most importantly, many deaths and injuries, and despite the companies’ ongoing inability to define the cause of the problem, both Ford and Firestone argued that the current recall was “adequate” to protect consumers.

B. Why the Recall Should Be Expanded

The purpose of this report is to respond to these assertions by Ford and Firestone concerning the causes and mysteries of this tragic situation, and supplement the factual basis for the repeated calls of various consumer organizations, victims' groups, victims, and family members for an expansion of the recall to include the 15-inch and 16-inch Wilderness AT tires of the type used on the Explorer, regardless of the place of manufacture. The best available data indicate that this amounts to 5.6 million 15-inch tires and a much smaller number of 16-inch tires. This report presents ample proof of the need for an expanded recall of additional Wilderness tires, showing that:

- The recalled Wilderness AT Tires, made in the Decatur plant, are identical in design to the Wilderness AT tires produced primarily in the Wilson and Joliette plants that have yet to be recalled. They are also virtually identical to the non-recalled Wilderness in the materials and process used to manufacture them.
- The failure mode—or reason for failure—in the tires which causes the tread separations is virtually identical in every instance concerning both recalled and non-recalled tires.
- Ford has now formally conceded that the non-recalled Wilderness AT tires, *i.e.*, those made at Firestone plants other than Decatur, are not, in design terms, sufficiently “robust,” and that the tires could very well fail under foreseeable operating conditions in the U.S.
- Ford and Firestone are relying upon a very selective and limited database of unverified “statistical information” to support their continued refusal to recall the remainder of the tires. They refuse to evaluate warranty data (also called adjustment data) or to consider litigation information or consumer complaints in their evaluations.
- Ford originally claimed that “unique environmental conditions” were the cause of tire failures in Saudi Arabia and both Ford and Firestone cited these conditions in support of their decision not to recall 16-inch tires in the U.S., even though the recalls (called “customer satisfaction” campaigns by the companies) conducted in Saudi Arabia were for tires identical to those sold in the U.S. Ford has since conceded that these allegedly “unique” conditions do not in fact explain the tire failure problem in Saudi Arabia, that similar conditions exist in the U.S., and that those conditions may be the cause of tire failures here.
- The large number of deaths and serious injuries associated with Firestone tread separations leading to Explorer rollover crashes raises serious safety issues concerning the design of Ford’s Explorer. Although the majority of the discussion in Ford and Firestone’s respective reports focuses on the “root cause” of the tire failures, as opposed to the role of the Explorer in causing the injuries, the unusually large number of Explorers that roll over following tread separations cannot be ignored. Firestone’s consistent public position that the Explorer plays a significant role in causing deaths and injuries shows the need to include an analysis of safety problems in the Explorer’s design and the lack of rollover safety margin.

Given the catastrophic results that flow from the combination of poorly-performing tires on a rollover-prone vehicle, Ford and Firestone shoulder a heavy burden in refusing to recall all the Ford Explorer Wilderness tires.

The real story behind the recall begins with the design history of the tires and the vehicle for which they were made.

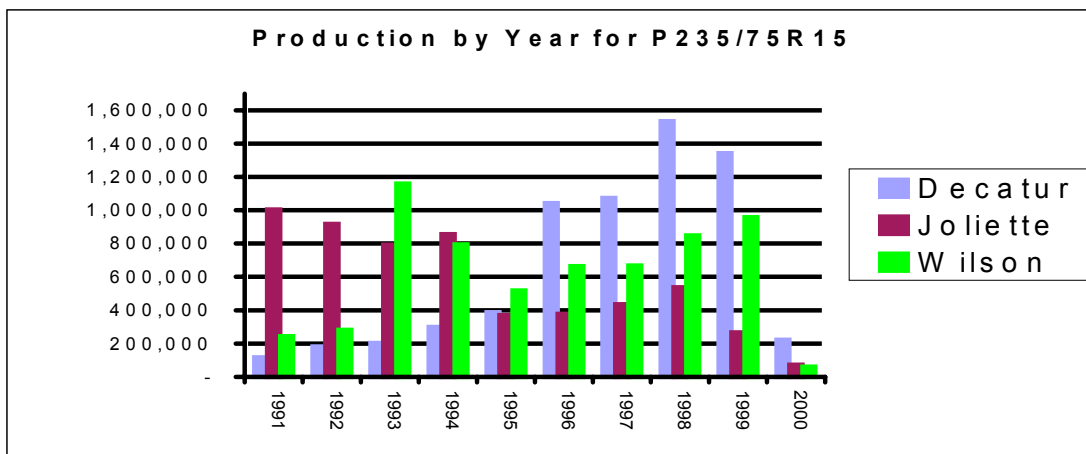
II. The Design History: Ford and Firestone Working Together

A. The ATX and Wilderness AT Tires

The Firestone P235/75R15 ATX – sometimes referred to informally as the ATX II – was specifically created for use on the Explorer.⁴ Earlier versions of the tire were produced as a flotation tire for Recreational Vehicles (RVs) and were designed with aggressive tread patterns and zigzag treatment on the sides, or “shoulders,” of the tires. As the market for sports utility vehicles (SUVs) shifted to include traditional users of station wagons and other family passenger cars, Ford instructed Firestone to develop a “hybrid tire” which looked like an aggressive truck tire but performed like a passenger tire.⁵ Company documents show that this modified ATX tire to be developed by Firestone was ordered by Ford for marketing reasons: Ford wanted larger tires, which it believed would better fit the image of the Explorer and help to increase sales.

As is further explained below, the ATX II tire was redesigned in 1994. Those modifications reduced the weight of the tire by approximately 10 percent.

The Wilderness AT tire was eventually designed to replace the ATX II tire beginning with Ford’s 1995 Explorer model.⁶ Tires of both types were mainly manufactured at three Firestone facilities in Decatur, IL, Joliette, N.C., and Joliette in Quebec, Canada. According to information provided by Firestone, the production of ATX II and Wilderness AT P235/75R15 tires varied by year and plant site:



B. Rollover Risks and the Ford Explorer

The Ford Explorer was first produced in 1990 to replace the Bronco II starting in the 1991 model year. Bronco II was known to have a dangerous tendency to flip over during typical emergency turning maneuvers. The Explorer was referred to as the “4 door Bronco II” during development. The name was changed when the Bronco II came under severe scrutiny as deaths mounted from rollover crashes.

Stability problems associated with the Explorer developed as early as May of 1987 when engineers working within Ford’s light truck department reported that the Explorer’s static stability factor (SSF)—one measure of a vehicle’s tendency to roll over—was worse than the Bronco II. The engineers recommended that Ford increase the vehicle’s track width, lower the height of the vehicle’s vertical center of gravity, and use smaller tires, called P215/75R15 tires. These proposals were all designed to result in a more stable vehicle with a better SSF rating. None of the recommendations were adopted by management.

As development of the vehicle continued through the late 1980s, computer simulation testing of the prototype Explorer revealed that it still had a tendency to lift two wheels off the pavement in typical Ford emergency maneuver tests. Having experienced first-hand the devastation resulting from SUVs, such as the Bronco II, that had also experienced design-related rollover problems, Ford engineers suggested deflating the tires from 35 pounds per square inch (psi) to 26 psi in an effort to help keep the wheels of the vehicle on the ground during test maneuvers.⁷ Ford had investigated the possibility of deflating tires as a cosmetic adjustment that allowed the use of larger tires on SUVs as early as 1982.⁸

In the late spring and early summer of 1989, Ford management authorized the on-road testing of a prototype Explorer, a production level Bronco II, and a production level Chevy S10 Blazer at its Arizona Proving Grounds. The testing was begun in response to the adverse publicity generated by SUV wheels that had lifted off the ground in testing conducted by Consumers Union, an independent non-profit organization that tests cars and publishes *Consumer Reports* magazine. Ford’s tests were focused on the performance of the Bronco II, because that vehicle had previously demonstrated a clear tendency to lift two wheels off the ground in steering maneuvers.

The Arizona testing revealed that the Explorer’s wheels were lifting off the ground at speeds equivalent to the Bronco II’s poor performance. Because Ford was aware of the significance of this finding in the marketplace, Ford engineers again recommended four design changes to the Explorer to help cure the wheel lift problem and achieve performance equivalent to the Chevy S10 Blazer.⁹

But instead of following the recommendations of its own engineers, Ford management chose to adopt only two of the four design change recommendation, created a recommended inflation level of 26 psi and agreed to consider the remainder of the recommended design changes as “running changes” in subsequent model years.¹⁰ Ford’s decision was based on the corporate unacceptability

of any delay in production of the 1991 model Explorer, called “Job 1,” and the costs associated with making late changes to the vehicle and subsequent delay in the launch date.¹¹

Although Ford has implied that these decisions were primarily intended to improve ride comfort, the company’s documents, now public as a result of the congressional hearings, prove that the lower recommended tire air pressure was a specific remedy for the tendency of the vehicle to lift its wheels off the pavement, and consequently to roll over, in typical emergency maneuvers. Ford’s decision to set the recommended tire pressure at 26 psi later became a central focus of the dispute between Ford and Firestone about the cause of the tread separation problem faced by consumers.

Ford successfully met its Job 1 deadline and, at least according to testimony, met the company’s internal rollover guideline in testing.¹²

C. Ford’s Request for a Firestone Redesign of the ATX Tire

Ford’s decision to lower the original equipment Firestone tires to a recommended 26 psi resulted in decreased fuel economy for the Explorer due to the greater friction between the lower-inflated tires and the road. Immediately following Job 1 in 1990, Ford management began raising “concerns” about the poor “rolling resistance,” or higher friction, provided by the ATX tire and the resulting harm to the fuel economy of the vehicle.¹³ According to internal Ford documents, the Explorer was seven percent worse than its competition from a fuel economy standpoint.¹⁴ Ford management ordered an improvement in the vehicle’s relative fuel economy performance. Ford employee Jim Burdette was charged with the responsibility of achieving this improvement through modification of the rolling resistance of Firestone tires.¹⁵

There were three methods available for improving the rolling resistance of the tires:

1) modifying the rubber compounds by using low rolling resistance compounds; 2) increasing air pressure in the tires; or 3) reducing the weight of the tires.

Incorporating low rolling resistance compounds was not a good solution because the modified compounds altered the traction characteristics of the tires to the extent that the wheels of the Explorer would not stay on the ground in turning test maneuvers.¹⁶ After learning of this fact, Mr. Burdette requested that the engineers again increase the recommended tire inflation pressure from 26/26 psi to 30/35 psi.¹⁷ Mr. Burdette’s request was never heeded because this change also caused the wheels of the Explorer to lift off the ground in turning test maneuvers,¹⁸ the condition that had prompted Ford’s request to take air of the tires in the first instance.

When these first two methods failed, Firestone was told to take action to use the only other method available for improving rolling resistance: to reduce the weight of the tire by modifying and reducing the weight of certain components. The tire was eventually reduced in weight by approximately 10 percent¹⁹ in order to accommodate Ford’s desire to improve rolling resistance--resistance which had originally been sacrificed in order to keep the wheels of the Explorer on the ground during turning maneuvers. The following chronology of tire construction detail sheets from

both Ford and Firestone documents the history of proposed tire construction and the 1994 reduction in weight:

DATE	TIRE DESIGN	SIZE	AVG. WT
01-03-89	ATX – SL531J	P235/75R15	30.1 lbs
01-02-91	ATX – SL598J	P235/75R15	30.1 lbs
07-08-92	ATX – SL598J	P235/75R15	30.1 lbs
04-11-94	ATX – SR897J	P235/75R15	28.50 lbs ²⁰

According to Firestone, the weight loss was achieved by reducing the gauge of various internal components, modifying the sub tread compound, using a lightweight belt package, and making specific modifications to the tire sidewall.²¹ In short, Firestone removed weight from the tire by reducing its rubber and steel components. The tire was made lighter, less durable – and therefore, as defined below, less “robust” – and more susceptible to tread separations.

II. The Growing Tread Separation Problem

A. Early Knowledge

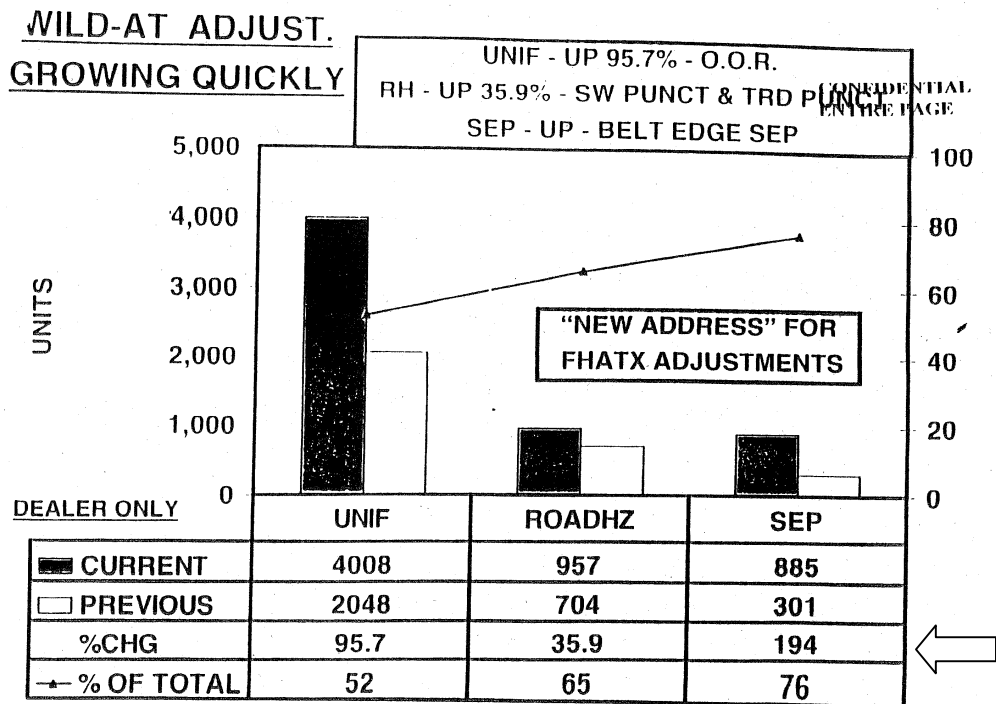
The tread separation problems of ATX tires on Explorers began not long after the SUV reached the consuming public in 1990, and both corporations have been settling lawsuits over the defective tires ever since, typically after securing agreements to maintain the confidentiality of company documents.²² According to the available records, the lawsuits were fairly sporadic until a tire weight design change was made in 1994. Following 1994, tire failures and crashes – including consumer deaths – mushroomed.²³

In an effort to improve tread wear and fuel economy, and in keeping with Ford’s desire for an aggressive tire image, Ford again asked Firestone to redesign the ATX.²⁴ In 1995, Firestone released for production the Wilderness AT design, a tire specifically designed to accommodate Ford’s request for a truck-looking tire that performed like a passenger car tire. The tire was a standard load tire that incorporated virtually identical internal components as the ATX tire, but was equipped with a different, more aggressive-looking, tread pattern.²⁵

The Wilderness AT tire design did not incorporate internal components of the size and gauge that a tire expert would typically expect in a light truck tire because Ford specifically requested passenger car performance. The Wilderness AT tire was assigned a “C” rating for temperature/heat resistance, which is the lowest possible rating allowed under NHTSA’s Uniform Tire Quality Grading System.²⁶

Within 12 months of production of the first Wilderness AT tire for use on the Ford Explorer, Firestone engineers made a design change to a part of the tire called a “wedge” in an effort to improve

durability and reduce the risk of tread separation. The following internal Firestone document reflects the percentage change in adjustment, or warranty, data for tread separation problems in the mid-1990s [arrow added for clarity].²⁷



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According to Firestone's internal records, as shown in the third row of the third column, reports of tread separations increased 194 percent during the period covered in the document.

III. The Venezuelan Debacle

In 1997, Ford of Venezuela attended a meeting with lawyers there to discuss a rash of Wilderness AT tread separations and resulting Explorer rollover crashes.²⁸ The problems included "mistakes" made by both Ford and Firestone that Ford has now admitted likely resulted in harm to citizens of Venezuela.²⁹

The Venezuelan scenario, and Ford's admissions in relation to its conduct there, are important for U.S. citizens because a significant number of the tires that failed in Venezuela were made at Firestone's Wilson, North Carolina plant. Those tires are precisely the same tires U.S. citizens are continuing to use on U.S.-made Ford Explorers,³⁰ and have not been the subject of any recall.

After 100 deaths and 400 crashes in Venezuela were linked to tread separations on Firestone tires (out of a total vehicle population of about 39,800), Ford offered to replace the tires on Explorers in Venezuela, Colombia and Ecuador.

IV. The Saudi Arabian Fiasco

At or about the same time in 1997 that Ford representatives were actively meeting with lawyers in Venezuela about tread separation rollovers involving Wilderness AT tires and Ford Explorers, a virtually identical situation involving bad tires and Explorer rollovers arose in the Arabian Gulf Coast Countries and, in particular, in Saudi Arabia.

These vehicles and tires were designed and manufactured in the U.S. and exported to the Arabian Gulf Coast Countries.³¹ Eight reports of Explorer rollovers following tread separations in that part of the world got the attention of Ford's internal quality oversight committee, the Critical Concern Review Group (CCRG), led by Thomas Baughman of Ford.³² As the American public now knows, the Saudi Arabian situation resulted in a recall or, as Ford refers to it, a "Consumer Assistance Program" or "Dealer Notification Program" to remove the bad tires from the market there.

Firestone has denied responsibility for the crashes in Saudi Arabia, claiming: 1) that Firestone provided the tire that Ford had asked for in that market; 2) that "unique environmental conditions" of the Arabian Gulf Coast Countries, *i.e.*, consumer abuse and extremely hot ambient temperatures, combined to cause the tire failures; and 3) that no design problem existed.

Representatives of Ford, on the other hand, have suggested that Firestone's position concerning the "unique environmental conditions" in Saudi Arabia is unsupported by the facts. In a deposition, Mr. Baughman clarified this disagreement between the companies as follows:

20 Q. You made a comment to Firestone's lawyer, just a minute
21 ago, about a concern that was raised at Ford Motor Company
22 about Firestone's explanation for the 16-inch Wilderness
23 tire failures in Saudi Arabia; is that correct?
24 A. Yes.
25 Q. Would you explain what you mean by that?
1 A. I was told by the people who accompanied the Firestone
2 employees to Saudi Arabia during the investigation of the
3 16 inch that they saw tires that had failed. There was no
4 evidence of a tire repair ever having been conducted to the
5 tire, and when they interviewed the employee of the
6 dealership, who owned the tire, he steadfastly claimed that
7 the vehicle had never been operated off-road, he never
8 drove it at high speeds, he only took it back and forth to
9 work, and he had never operated the vehicle with the tire
10 being underinflated. So there was a disagreement as to
11 whether or not those unique operating circumstances totally
12 described the population of failures that were seen in
13 Saudi Arabia. Not to say that it didn't describe most of
14 the failures, it just didn't describe all of the failures.
15 Q. So there were failures that Ford Motor Company became aware
16 of in Saudi Arabia involving P255/70R16 Wilderness AT tires
17 made by Firestone that were not explainable by reference to
18 these unique environmental circumstances?
19 MR. WOODROW: Objection, lack of foundation.
20 THE WITNESS: If you accepted that the statement
21 by the people being interviewed was 100 percent factual,
22 then yes, it was not fully explained by the unique
23 environmental operating conditions there.

Upon further questioning, Mr. Baughman agreed that the so-called “unique environmental conditions” that allegedly existed in the Arabian Gulf Coast Countries were no different than the conditions in certain areas in the U.S.— conditions that, not surprisingly, correlate with the concentration of current tire failure-related death in the south and southwestern United States in data maintained by NHTSA.³³

Following the decision by Ford to remove the Wilderness AT tires from the market in the Arabian Gulf Coast Countries, Ford and Firestone decided to conceal that action from NHTSA. Although both Ford and Firestone have repeatedly back-peddled from the clear and unequivocal language contained in the companies’ internal documents that were produced to Congress, the record is crystal clear that both companies knowingly considered the ramifications of federal notification of a recall in the Arabian Gulf Coast Countries on tires sales in the U.S. and consciously chose to withhold from the American public that information.

In a deposition, Ford representative Mr. Baughman was unable to provide a clear answer to the question of why the risk posed by the tire/vehicle combination was not quickly shared with NHTSA and the American public in view of the fact that the identical tires were being operated under the same conditions within parts of the United States.³⁴

VI. Firestone Reacts to the Tread Separation Problem

Although both Ford and Firestone have maintained in response to the public outrage over this tragic safety problem that the danger to consumers was a “surprise,” litigation-related discovery of internal company documents has started to flesh out the truth. In fact, Firestone knew of the tire separation problems and took action to fix the design of Wilderness AT tires that were repeatedly peeling apart on Ford Explorers.

On September 21, 2000, *The Washington Post* reported that Firestone had modified the design of the Wilderness AT tire in 1998 by widening a piece of rubber, called a “wedge,” located between the two steel belts of the tires. While in the midst of Congressional hearings on the Ford/Firestone issue, the *Post* reported that Firestone spokesman Dan Adomitis said the 1998 wedge redesign was not designed to eliminate a particular problem: “This was part of our continuous improvement program,” he said. “That was not in response to some specific problem with Explorers or even the [recalled tires], for that matter.”

However, subsequent litigation-related discovery has revealed what appears to be a significant difference between the facts as they actually occurred and those reported by Firestone in the heat of questioning at the Congressional hearings in Washington. According to the deposition testimony of Firestone employees, the newer “wedge” redesign was incorporated into tires produced in 1998. Due to the lag time between design and production, the tire redesign must have begun some time before 1998.³⁵

In contrast to their public statements, the evidence demonstrates that the redesign was actually initiated by Firestone as a result of tire failure warranty claims, called adjustments. Firestone's adjustment data indicated that tread separation problems were on the rise. The redesign was aimed at increasing durability and was focused on tread separations that specifically involved sport utility vehicles. Given Firestone's unique position as virtually the sole tire supplier for the highest selling SUV model – Ford's Explorer – there can be little dispute that the redesign was designed to solve a growing problem associated with this specific combination of tire and vehicle.

In a deposition, Michael Reep, a Firestone engineer, initially tried to explain the wedge redesign as having occurred because Firestone was "learning" that consumers were beginning to use larger passenger tires on light trucks like the Ford Explorer.³⁶ The implication was that these tires were originally designed for use on passenger cars and not on SUVs. As further questioning revealed, however, the Wilderness AT, the tire in question, was specifically designed by Firestone as original equipment for the Ford Explorer, a light truck/SUV:

- 20 Q. When this tire, this Wilderness AT tire was created,
21 Mike, this was created for use on a light truck,
22 wasn't it?
- 23 A. This tire was created primarily for the Explorer
24 in this particular size. At that time sport
25 utilities were kind of a new and emergent market.
1 At that point in time from the load-carrying
2 capacity and overall usage of the vehicle, passenger
3 style tires with some revisions were deemed good
4 tires for that type of vehicle.
- 5 Q. I'm a little bit confused. What I'm trying to make
6 sure I'm clear on is, why it is that if the change
7 -- when you were increasing the wedge, these areas
8 right in here, if you were doing this because you
9 realized or somebody at Firestone realized people
10 using these kinds of tires on light trucks, why
11 didn't you originally design the wedge that way
12 because this tire was specifically designed for
13 light truck, wasn't it?
14 The Explorer is a light truck, right?
- 15 A. The Explorer is a light truck. At the time it was
16 introduced its usage was going to be considerably
17 different than a pickup truck. It was going to be
18 kind of a dual purpose vehicle carrying more people
19 and some cargo as well.
20 So we made some changes into the actual
21 tread pattern itself to make it more conducive to
22 light truck usage but at that time it did not appear
23 necessary to go beyond normal passenger tire design
24 standards.

The essence of Mr. Reep's testimony, when confronted with the fact that the Wilderness AT was specifically designed for the Explorer, is that Firestone designed the Wilderness tire using "passenger tire design standards," *i.e.*, thinking that passenger car standards would suffice for the types of uses that Ford expected from its Explorer customers. When Firestone learned of the problems generated by the use of this hybrid tire on the Explorer, Firestone decided that it better go

back to the drawing board, take out the “passenger tire” wedge and replace it with a “light truck” wedge to increase durability. Mr. Reep further testified as follows:

- 19 Q. That's why that these wedges right here were not
20 made like you typically made your light truck tire
21 wedges, right?
22 A. Yes. At that time it was decided and tested that
23 that gauge of wedge would in fact be more than
24 suitable for this particular usage.³⁷

Brian Queisar, another Firestone tire engineer charged with responsibility for the Wilderness AT tire design, has stated that adjustments data – many involving actual tire tread separations in the real world – were the impetus for the redesign of the “wedge” for the 1998 model of the Wilderness tire. Mr. Queisar’s testimony is as follows.³⁸

- 17 Q. But somehow it got into the system and the Quality
18 Assurance people came over to the technical people
19 and this change was made to the wedge in the terms
20 of dimensions for not only the P235/75R15 but other
21 lines of tires as well, correct?
22 A. Other lines and other sizes. And again, I think you
23 need to understand, it's important to understand in
24 the context as far as adjustments go, we are
25 tracking -- my understanding we are tracking
1 adjustments lower and lower and lower every year.
2 In the tire business, I believe
3 differentiating yourself in the market -- there's
4 obviously marketing concerns but there's also
5 customer satisfaction and word of mouth and you want
6 people who have your tires and buy your tires to
7 be satisfied with them and continue to buy.
8 So this type of change if it's going to
9 improve customer satisfaction, I believe that's one
10 of the reasons why they did it.
11 Q. Because that kind of change we're talking about in
12 the context of customer satisfaction means less
13 tires failing and less people complaining, hopefully
14 at least?
15 A. You want to minimize customer complaints and you
16 want them to be happy, whatever it takes.

Both Ford and Firestone repeatedly use the phrase “robust” in describing the proper design of a tire for consumer usage. Firestone engineer Brian Quiesar provided a definition of “robust” in this context:

- 8 Q. Do you design tires to have a robust design?
9 A. Absolutely.
10 Q. What does that mean?
11 A. Robustness?
12 Q. In the context of tire design, what does it mean?
13 A. It can mean a lot of things to a consumer.
14 Robustness to the consumer --
15 Q. Let me interrupt. Not from a consumer standpoint.
16 I want to know from a tire engineer's standpoint,
17 from Firestone's standpoint.

18 What is a robust tire design?
19 A. A robust design would be a design that meets the
20 objectives of the customer and assures the customer
21 satisfaction for whatever it may be and robustness
22 is associated with tire wear and tire durability and
23 a lot of other things with respect to the tire from
24 when it's new to when it's worn out and discarded.
25 Q. For the life of the tire?
1 A. For the life of the tire.
2 Q. What is the expected life of a Wilderness AT tire?
3 A. That's probably varies. I'm not certain of what our
4 marketing expected requirements are.
5 Q. Can you give me a range?
6 A. A tire like this, I think the average customer would
7 expect the tire to be a 40, 50,000 mile tire, maybe
8 higher depending on their expectations.
9 Q. Does robustness include good strength and durability
10 in a tire?
11 A. Yes.
12 Q. Does robustness include the ability to perform
13 safely and appropriately given the loads to which
14 the tire was designed?
15 A. Yes.
16 Q. Does robustness include having the right components,
17 right mix of components to withstand the expected
18 forces given the loads that are going to be applied
19 to it?
20 A. The components themselves are -- there's an
21 individual robustness associated with components but
22 I think that the robustness associated with the
23 tires -- it's a combination of all those things put
24 together.
25 Q. It's a combination of the dimensions of the various
1 components that [are] used in a tire --
2 A. The components that go into it, the size that it
3 is and what it's used on. Those are all variables
4 associated with the tire robustness.
5 Q. Some of those factors would be things like the
6 dimensions of the compounds, layers of the tire,
7 type of steel cord, dimensions of the steel cord,
8 how much rubber is in the tire and those kinds of
9 things?
10 General factors, yes.³⁹

From the evidence, it appears that both Ford and Firestone knew, long before 1999, that the Wilderness AT tire being used on the highway was not "robust" for use on the Ford Explorer and that the resulting tread separations were directly related to tire design. Ford's quality control officer Tom Baughman stated:

2 Q. And let's put a range on a small amount.
3 A. That's really difficult because we've looked at lots of
4 tread separations from tires that have been returned. We
5 have simulated tread separations on a rig data and run
6 those tests and swept various psi range, and that data's
7 encompassed here. We start to see differences in the way
8 the tires perform with differences as small as 3 psi. We
9 see the failure mechanism sometimes change, predominantly

10 the failures of blowouts, and suddenly predominantly the
11 failures become tread separations, but it seems to vary
12 with manufacturer or tire manufacturer. And it's my
13 opinion that the Firestone 15-inch tires are not robust
14 against variations and inflation pressure and in operating
15 condition, load and speed.
16 Q. And the tires you are talking about are not robust, include
17 all Wilderness AT 15-inch tires and 16-inch tires?
18 A. I think my statement would be more strongly focused at the
19 15-inch tire than the 16-inch tire. Our evaluations of the
20 16-inch tire would suggest those tires by design, whether
21 intentional or by luck, run cooler than the equivalent
22 15-inch tire at the same operating conditions. [emphasis added.]⁴⁰

Given the catastrophic nature of the safety problem faced by the consuming public with the lethal combination of Ford Explorers and Firestone tires, the foregoing admissions by Ford and Firestone raise serious questions about the legitimacy of the positions asserted by these two companies in defense of the limited recall. In addition, the cumulative evidence suggests that both companies repeatedly made design changes in the tire based upon their developing record of consumer experience and complaints.

VII. The Story Breaks—Ford and Firestone Blame Each Other While the Record of Deaths and Injuries Increases

As consumer complaints and injuries stacked up around the world, both Ford and Firestone sought first to blame tread separations on a peculiar set of circumstances that it termed “unique regional usage patterns and environmental conditions.”

As they had in the past, the corporations also blamed consumers, contending that the inordinate number of tread and belt separations should be attributed to various combinations of factors such as: 1) excessively loaded vehicles; 2) excessively hot climates (*e.g.*, Saudi Arabia, Venezuela, West Texas, Arizona); 3) high speeds; 4) tires that had been deflated for better traction on desert sand and then never re-inflated properly for highway use; or, alternatively, 5) tires that were being operated in an under-inflated condition by unsuspecting consumers who were too lazy to check their tire air pressure.

Although the two corporations initially stood side by side in a display of unity, the public outrage that ensued after media exposure of the problems led both to eventually hurl blame at each other in public. Ford insisted that the problem was a 5ire problem.⁴ Although slow in responding, Firestone countered by insisting that it was a 5vehicle problem,⁴ citing the performance of its tires on vehicles made by other companies. Consumers were caught in the middle, as they were repeatedly assured that their tires were 5safe⁴ and that they had no reason for concern, even though Firestone was now recommending 6contrary to Ford’s opinion 6that its tires be operated at no less than 30 psi.

By November 2000, Firestone’s Chief Executive Officer, John Lampe, conceded that both tire and vehicle were implicated. 5The performance issue with the tire," he said, 5ultimately will be the cumulative effect of tire design, tire components and the interaction of the tire with the vehicle." Both Ford and Firestone still maintain, however, that they have isolated the problems on 1996 and

later model years to those 15-inch Wilderness AT tires that were produced in the Decatur, Illinois plant. Although both corporations said they did not know the root cause of the tire failures, they assured the public that the cause was isolated in Decatur, as originally claimed, because a disproportionate number of tires made there were involved in damage claims. Neither offered a plausible explanation of why this was so.

VIII. The Recall Should Be Expanded

On August 9, 2000, prior to any findings about the “root cause” of the problems, Ford and Firestone limited the recall to only a subset of the Wilderness AT tires that had been produced and put onto Ford Explorers. Specifically, Ford and Firestone chose to recall only those Wilderness AT tires manufactured at Firestone’s plant in Decatur, Illinois. To everyone’s surprise, Ford and Firestone proposed replacing the bad Wilderness AT tires with Wilderness AT tires made at plants other than Decatur. The reasoning underlying this decision included the following:

“Company officials said they do not know the cause of the problem, but are confident that whatever the problem, it is isolated to the tires being recalled.”

In other words, although both companies claimed ignorance as to what was causing the tread separation problem, both assured the American public that whatever the problem, it was limited to the Decatur plant. When pressed on the issue, the companies responded as follows:

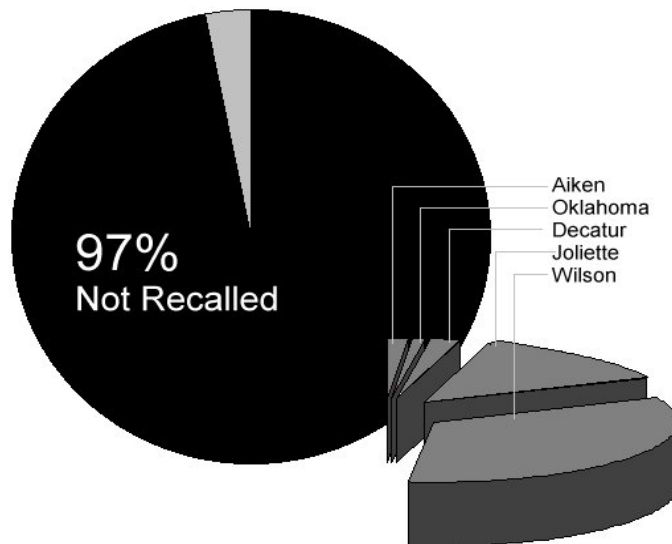
Ford and Firestone officials, however, said their data, some of which was released this past weekend, show that only 15-inch Wilderness tires made in Decatur showed higher-than-normal numbers of tread-separation problems.

Independent analysis challenges Ford and Firestone’s conclusion that only ATX and Decatur-made Wilderness tires are defective. The following briefly summarizes what an enlarged analysis reveals.

- **NHTSA complaint data show non-recalled tires should be recalled.**

Notwithstanding Ford and Firestone’s public statements regarding the safety of non-recalled Wilderness AT tires, information available from NHTSA data reveals that 97 percent of the consumer complaint letters received by the agency, containing sufficiently detailed information to be analyzed, concerned tires that were not included in the recall:

Complaints Received By NHTSA Firestone Wilderness Tire Failures



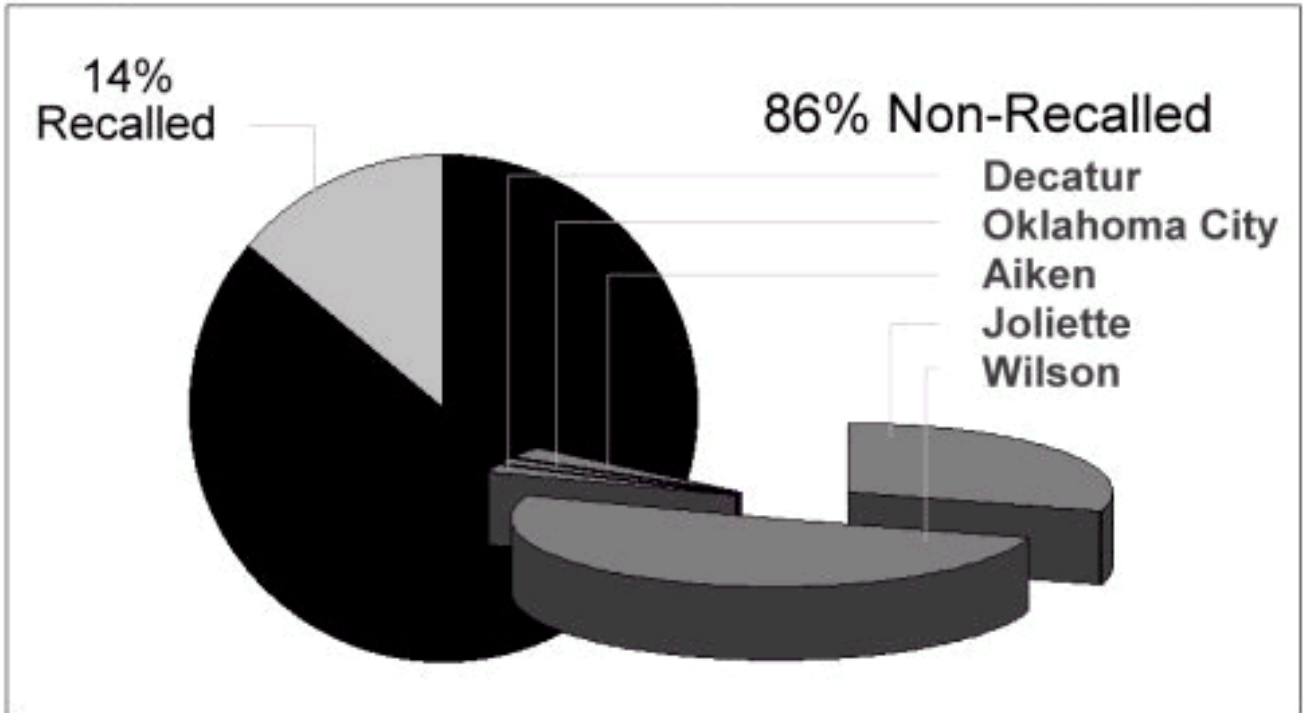
The information above is derived from the NHTSA database as of December 6, 2000, which contained a total of 4,308 incidents. Safetyforum.com determined that, of the 4,308 complaints, 1,094 Wilderness tire complaints included enough information to ascertain whether the tire involved had been included in the recall. Of the 1,094, 1060 were non-recalled Wilderness tires and 34 were recalled Wilderness tires. Of the 1060 non-recalled Wilderness tires identified, the production plants divide as follows: 16 were from Aiken, SC; 7 from Oklahoma City, OK; 155 from Joliette, Canada; 363 from Wilson, NC; and 496 were from unknown plants.

Of the 1,094 Wilderness tire complaints, 336 can be clearly identified as Wilderness AT P235/75R15 (15-inch) or Wilderness AT P255/70R16 (16-inch) tires. The Firestone plant of origin can be determined for 246 Wilderness At tires. Of these, NHTSA has 125 reports of the tires made in Wilson, North Carolina (51 percent), 73 reports of tires made in Canada (30 percent), and 38 reports of tires made at Decatur (15 percent). The remaining 4 percent were made at the Oklahoma City or Aiken South Carolina plants.

These Wilderness AT tire complaints produce a picture that undercuts the Firestone and Ford claim that the bulk of failures occur in the Decatur-made Wilderness tires. In fact, failures of Wilderness AT tires produced at Firestone's other facilities have been reported to NHTSA six times more than failures of tires made in Decatur, at a ratio of 86 percent to 14 percent.

Wilderness AT Tire Failures Complaints Received By NHTSA P235/75R15 and P255/70R16

(Figures include Wilderness tires where size and plant of manufacture were provided.)



Source: NHTSA

- **The design of the non-recalled tires is identical to that of the recalled tires.**

Firestone has conceded that all 15-inch and 16-inch Wilderness AT tires are identical by design. As stated by Robert Martin, Firestone's head of Quality Assurance:

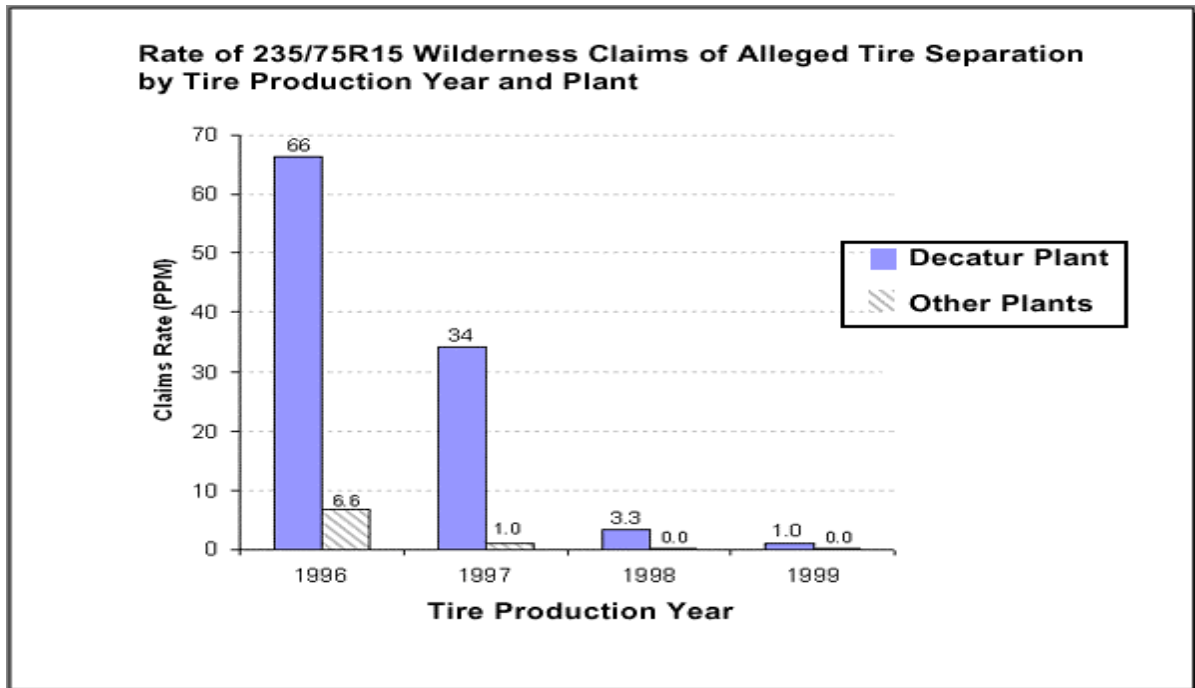
Q: When we talk about these different plants and the tires being made in different plants, just to make sure everybody is crystal clear on this, each of those plants is making, for instance, if they're making the Wilderness AT P235/75R15, they're making the same tire. They're not making a different design tire in one plant than they are in the other plant. It's the same design basically, isn't it?

A: Yes, it is.⁴¹

Not only did Ford and Firestone intend for all of the tires to be virtually identical from a design and manufacturing standpoint, Firestone was required to – and did – provide Ford with documentation verifying that all Wilderness AT tires, regardless of the plant of manufacture, were identical in both dimension and performance.

- **Decatur production is not the sole problem.**

Although Ford attempted to lay blame directly at the doorstep of the Decatur plant alone, Firestone defended its plant with the following statement: “We are confident in the quality of our tires and in the effectiveness of our inspection processes at the Decatur, Ill., plant and at all of our plants.”⁴² Despite Firestone’s confidence in Decatur, both Ford and Firestone limited the recall of Wilderness AT tires to Decatur-made tires and demonstrated their reasoning using the following graph, which depicts property claims sorted by the plant of tire production:



This chart is solely based upon Ford’s analysis of Firestone “property damage claims data” and does not include data from litigation-related claims, Firestone warranty or tire failure claims, called adjustments, or consumer complaints.

Both Ford and Firestone have claimed that a “pellitizing” process is used at Decatur to coat the steel belts with rubber is a “likely” source of some adhesion- related problems in the Decatur-built tires. Although the companies point to this process as a factor that appears to distinguish Decatur from the other plants, both now likewise concede that the adhesion characteristics of Decatur-made tires are within the specifications created for these tires, and so should have the same level of durability on the road as other tires built by Firestone for use on Ford Explorers.

There may be some validity to the suggestion that pellitizing does result in less adhesion than other available manufacturing methods. But because that the adhesion characteristics of tires produced in Decatur were within Ford and Firestone specifications, it seems likely that Firestone’s use of the pelletizing process in Decatur cannot fully explain the differences in tire performance as to property claims. Furthermore, if pellitizing were the cause of the problem, then other tire brands

produced at the Decatur plant should have similar failure rates. There is no evidence that this is the case.

Then what factors might explain the over-representation of Decatur-made tires in the damage claims data cited by Ford and Firestone? Decatur may appear to be over-represented in terms of tire failures for some of the following reasons:

- Firestone representatives testified that the failure rate for Decatur-made tires is likely the result of the fact that more Decatur-made tires ended up on vehicles provided to the south and southwest regions of the United States, which represent the areas of the U.S. where tread separations of the tires are more concentrated.⁴³ Litigation claims tend to confirm this distinction: For example, Decatur-made tires were on 83 percent of St. Louis-produced Explorers involved in lawsuits, but only 42 percent of those built in Louisville, Kentucky. Ford publicly disagrees with Firestone's conclusion.
 - Decatur was Firestone's oldest plant and is commonly referred to as a "short-run" plant. Industry insiders note that "short-run" plants – plants that make tires for short as opposed to long runs of production – are historically over-represented in terms of adjustments and claims. The increased rate of failure is based on: a) unfamiliarity with the production process; b) lack of continuity in the production process; and c) the lack of time necessary to obtain good uniformity in the production process.
 - A well-publicized labor strike at the Decatur plant likely played a role in the increased frequency of failure rates with Decatur tires. Although Firestone has repeatedly denied a relationship between the strike and the increased failure rate in tires, common sense suggests that the strike very likely was a factor, albeit small, in the increased rates of failure.
- **The companies' own design analysis shows that there is a common pattern in all of the tire failures.**

All of the tires, regardless of their plant of manufacture, have a common pattern of failure. Representatives of Ford Motor Company now concede that the tire failures in question do form a common pattern and that the ATX and Wilderness tires, including the 15-inch non-Decatur, non-recalled tires, are not "robust," meaning that these tires are failing in the same manner due to a design flaw across the group.⁴⁴

Although Ford and Firestone continue to maintain that the "root cause" of the failures has not been formally identified, the forensic evidence that has been released to date does indicate a common pattern of failure:

- Internal Ford records indicate a pattern of failure in the area described as the "wedge." The "wedge" is designed to provide increased durability at the tire's belt edges.⁴⁵

- Internal Firestone records from forensic inspections of failed tires in both the U.S. and Arabian Gulf Coast Countries pinpoint problems in the “wedge” area of the failed tires.⁴⁶
 - Firestone employees have conceded that the “wedge” used in the original Wilderness AT tire was a “passenger car-type wedge” as opposed to a “truck-type wedge,”⁴⁷ despite the fact that the Ford Explorer is built upon a light truck chassis.
 - Firestone employees have conceded that the “wedge” of the Wilderness AT tire – along with other similar tires – was redesigned for the 1998 model year due to a review of tire tread separation failure claims and adjustments, and that the tire was redesigned, with a stronger, more durable “wedge” in hopes of reducing the risk of tread separation.⁴⁸
 - Although the public has yet to receive a final report, the foregoing is further supported by Firestone’s retained “consultant,” Sanjay Govindjee, a professor from California, who issued preliminary findings that included the following statement: “All evidence to date points to a slowly developing fatigue crack.” The crack he described included fatigue in the area called the “wedge,” which spread to the area between the steel belts. Professor Govindjee reported no differences among tires from different plants.
- **The statistical data relied upon to support the limited recall is incomplete and may be flawed.**

In discussions on the scope of the recall in the U.S., Ford and Firestone have repeatedly retreated to statistical analyses in defending their refusal to recall additional tires. Although Ford now concedes that the non-recalled Wilderness AT tires are not “robust” and are therefore susceptible to failure when operated within foreseeable conditions, Ford and Firestone continue to defend the decision to allow consumers to use the tires.

Ford and Firestone based their statistical analyses on “property damage claims” information produced by Firestone.⁴⁹ According to Firestone, the “property damage claims” data have never before been used by the company to evaluate the real world performance of its tires.⁵⁰ According to Ford, the claims data, albeit limited to less than 2,000 incidents of failure, is “more reliable” than the usual method used by Firestone – adjustment, orr warranty claims, data – to evaluate field performance. Ford claims, at least to date, that it is unable to understand the manner in which Firestone “codes” customer complaints at dealerships.⁵¹

Adjustment claims, which number in the thousands, represent much broader sources of information. These data include customers who show up at Firestone dealerships across the country with a tread-separated tire that did not cause an incident which resulted in property damage or personal injury. Additionally, Ford and Firestone originally included only property damage in their analysis, omitting any evaluation of litigation-related claims involving personal injury.⁵² Information regarding their own litigation history is of course readily available to both companies.

Another potential problem with Firestone's internal claims data that Ford has not publicly acknowledged is a concern about the reliability of the property damage claim information provided by Firestone. As Tom Baughman of Ford testified, Ford has no way of determining whether the data that Ford relied upon has been "manipulated" or is incomplete in some manner:

22 That is fact. I mean, unless the databases in some way
23 have been manipulated to not portray the correct situation
24 and I can't be a judge of that, it is Firestone's database
25 as provided to me. But if that database is factual then
1 the facts are that statistically those tires are performing
2 at what is almost of sixth sigma level of capability, if
3 you are familiar with.⁵³

Mr. Baughman also stated that the Firestone property damage database that Ford relied upon does not include highly relevant tire failures from the warranty, or adjustment, data, a source that neither Ford nor Firestone have shared with the American public nor included in their own analyses. In fact, his only, very weak, explanation for Ford's failure to analyze the warranty claims data is that Ford has a current interest in the performance of tires made at Decatur that are other than ATX or Wilderness AT brands. Obviously, Ford could have looked at Firestone warranty data in addition to analyzing information regarding these other Decatur-made tires. But this is not what Ford chose to do:

19 Q. And you don't think it would be important if there are
20 another 50,000 tread separations in the adjustment database
21 over and above your 1,703 to evaluate how frequently these
22 tires are, in fact, coming apart in the real world?
1 THE WITNESS: I think your suggestion is
2 undoubtedly a good one, okay. There is probably some
3 insight to be gained by doing that analysis. Quite
4 frankly, we are much more interested in understanding the
5 data sets associated with the other tires that went on Ford
6 vehicles that were produced from tires that were produced
7 at Decatur. So we have prioritized our data analysis going
8 back through and looking at the June, July and August
9 update was very important because it validates the original
10 campaign scope, and also, I think validates that we don't
11 need to expand the recall. But I must tell you that all
12 Decatur may be at risk and I need to go through that. I
13 have to do that before I start getting reports of accidents
14 and deaths on othertires.⁵⁴

Ford and Firestone have stonewalled the use of any real world warranty, litigation or consumer complaint data to fully evaluate the safety performance of the non-recalled Wilderness tires. Regardless of their rationales, however, what cannot be overlooked is that the American public has been—and is being—told that the non-Decatur Wilderness tires are "safe" for use on America's highways. This is unconscionable give Ford's admissions that the Wilderness AT tires are not "robust" and have little or no built-in safety margin for low tire pressure, heavy vehicle load or the possibility of rollover.

- **The same 16-inch tires recalled in Saudi Arabia should be recalled in the U.S.**

Ford and Firestone have refused to recall P255/70R16 Wilderness AT tires in the U.S. despite the admission that the identical tire was the subject of a voluntary recall-type campaign in the Arabian Gulf Coast Countries, including Saudi Arabia. The 16-inch tires failing in the Arabian Gulf Coast Countries were manufactured in the U.S. and are identical by design to those sold on U.S. Explorers.

When Ford learned of tread separations and rollovers in Saudi Arabia in 1997, they consulted Firestone to determine why the tires were failing. Firestone blamed the problem on “unique environmental problems,” including consumer usage and high operating heat conditions. Ford chose to conduct a voluntary campaign to replace the tires. Ford now concedes that Firestone’s claim of “unique environmental conditions” did not explain all of the tire failures occurring in the Arabian Gulf Coast Countries. Mr. Baughman testified as follows:

15 Q. So there were failures that Ford Motor Company became aware
16 of in Saudi Arabia involving P255/70R16 Wilderness AT tires
17 made by Firestone that were not explainable by reference to
18 these unique environmental circumstances?
20 THE WITNESS: If you accepted that the statement
21 by the people being interviewed was 100 percent factual,
22 then yes, it was not fully explained by the unique
23 environmental operating conditions there.⁵⁵

Evidence shows that 16-inch Wilderness tires are failing in the U.S. as well. Using NHTSA’s database, analysis shows that of the 1,060 non-recalled Wilderness tires that failed, almost one-third (320) involved 16-inch Wilderness tires.

Similarly, an analysis conducted by Ford of Venezuela of a random sample of 367 Wilderness AT tires revealed that 16-inch tires— not subject to recall in the U.S.— had a worse failure record than 15-inch tires: tread separation of an inch or more was found in 16 percent of the 15-inch tires but in 21.7 percent of the 16-inch tires.⁵⁶

- **Litigation claims data further support the need for an expanded recall.**

As of December 2000, information has been collected on 276 lawsuits that involved Firestone tires. Sixty-one percent of the cases (161) had sufficient information to identify the tire model, size and manufacturing plant. Thirty-nine involved Wilderness AT tires, more than one third (14) of the 39 tires would not have qualified for the Ford-Firestone recall.⁵⁷

- **The numbers of potentially-affected tires may be inaccurate.**

Firestone’s record relating to the production volume of the tires at issue is unclear, and therefore there is some question as to the precise number of additional tires that should be recalled. Early figures released by NHTSA indicated that approximately 47 million tires were initially under investigation.

More recent numbers indicate that there may have been an over-estimation of the relevant number of tires. In an August 9, 2000, press release, Firestone stated that the recall of ATX, ATX II and Wilderness AT tires included 14.4 million tires, approximately 6.5 million of which were still in the marketplace. Those 6.5 million tires purportedly included 3.8 million ATX and ATX II tires and 2.7 million Decatur-made Wilderness AT tires.

These numbers differ somewhat from the hard production data submitted to Congress. According to that data, Firestone produced 10,850,939 P235/75R15 (15-inch) ATX II tires between 1991 and March 2000, and 8,987,362 P235/75R15 (15-inch) Wilderness AT tires between 1995 and March 2000. Assuming that the Firestone documents filed with Congress are accurate, total production for P235/75R15 ATX II and Wilderness AT tires is 19,838,301 for the period 1991 through March 2000. Based on a detailed analysis of the production information in the data, 5,617,286 P235/75R15 Wilderness AT tires were manufactured by Firestone between 1995 and March 2000 at plants other than Decatur, and therefore are not subject to the current recall.

Production volume of P255/70R16 (16-inch) Wilderness AT tires has not been publicly released by Firestone to date. Firestone has previously represented that only ATX II and Wilderness AT tires were placed on Ford Explorers. Why ATX tires – as opposed to ATX II tires – were included in the recall is unknown as is the production volume associated with these tires.

VIII. Conclusion

The authors of this report, alongside victims and the victims' family members who support these efforts, continue to advocate for the recall of the remaining Wilderness AT tires, both 15- and 16-inch, that were produced for the Explorer. The overwhelming weight of the evidence supports this expansion of the recall before more consumers are placed at risk and harmed by the combination of bad Firestone tires on dangerous Ford vehicles.

Appendix A

The following are selected milestones in the history of the Ford-Firestone tire problem.

- ˘ *May 1, 1987* - A Ford internal memo states that the stability of the Ford Explorer prototype is worse than that of the Bronco II.
- ˘ *November 25, 1988* - A Ford Test Report states that the Explorer lifts two wheels off the ground in a cornering test at 55 miles per hour (an action not unlike what might happen when a tire fails and control of the vehicle is wrenched from the driver's hands). The report blames the SUV's high center of gravity, front suspension system and tires.
- ˘ *January 26, 1989* - In another internal memo, Ford engineers state that the Explorer still lifts two wheels at 55 mph, despite larger tires, suspension revisions and tire pressure reduction to limit its cornering capacity.
- ˘ *February 9, 1989* - A tire-testing firm reports to Ford that certain Firestone tires being considered for use on the Explorer showed a severe tread package separation from the tire carcass at 29 psi of pressure. Firestone subsequently modifies the test procedure, re-runs the tests and concludes that our testing used a more realistic procedure and we don't think it will be a problem.
- ˘ *September 11, 1989* - In an internal email, Ford's Office of General Counsel raises concerns that the Explorer is the only vehicle of its type that has a significant chance of failing the CU (Consumer's Union) rollover test. One of the chief engineers on the program states that I believe that management is aware of the potential risk w/P235 (Firestone) tires and has accepted risk.
- ˘ *February 1990* - Despite warnings from its own engineers, and in order to meet production deadlines and avoid losing profits, Ford management rejects two of four design modifications recommended to improve the Explorer's stability, one of which included widening the track width. (Although Ford says it will make the other modifications in later model years, the automaker later admits the running changes were never made.)
- ˘ *March 1990* - The Ford Explorer goes into production. Engineers recommend that Ford immediately begin redesigning the Explorer's suspension system for the 1995 model year to allow lowering the engine and, thus, the SUV's center of gravity. Management again refuses to fix the Explorer's rollover problem because of timing and cost considerations.
- ˘ *June, 1990* - Concerned that increased rolling resistance from lowering tire pressure is giving the Explorer worse fuel economy than its competition, Ford and Firestone start redesigning the tire, including reducing its weight.

- ~ *February 12, 1991* - The first tread-separation lawsuit is filed against Firestone. Three more are filed in the spring of 1992.
- ~ *1996* - Wilderness tires go into production and replace ATX tires as original equipment on Explorers and other Ford-made SUVs and light trucks to correct deficiencies in the ATX tire's rolling resistance and tendency to wear poorly. Internal documents indicate that one goal is to increase tire pressure above 26 psi, but Ford also learns that 26 psi is still needed to keep the SUV's wheels from lifting off the ground in emergency turns.
- ~ *July 12, 1996* - The Deputy Yuma County (Arizona) Attorney advises local law enforcement officers that Firestone ATX Firehawk tires are experiencing tread separation: "Firestone is aware of the problem and will be replacing tires where needed. (A shipment of tires is currently on its way for various sheriff's vehicles.)" It is strongly recommended that you do not drive vehicles equipped with these tires at freeway speeds (or at all, if possible) until you have them ... evaluated.⁴
- ~ *August 19, 1996* - A dealership in Danbury, Conn., reports to Ford that it has 16 Explorers with tires whose belts are "obviously distorted and about to separate."⁴
- ~ *August 1997* - As lawsuits accumulate in the U.S., Ford and Firestone are notified of tire separation problems in Saudi Arabia.
- ~ *January 1998* - Ford's regional marketing manager in the United Arab Emirates e-mails Ford executives: "If this was a single case, I would accept Firestone's response as they are the experts in the tire business, case closed. However, we now have three cases and it is possible that Firestone is not telling us the whole story to protect them from a recall or a lawsuit."⁴
- ~ *June 24, 1998* - An internal Bridgestone/Firestone memo acknowledges that in 1997, tread separations accounted for 92.8 percent of all ATX II tire claims and 53.6 percent of all Firestone light truck claims. It states that the tire's warranty claims jumped from 42 in 1995 to 279 in 1997, an almost sevenfold increase, and that by 1998, tread separations accounted for 469 light truck claims, compared to only eight claims attributed to road hazards.
- ~ *July 22, 1998* - A State Farm Insurance research administrator emails NHTSA that the insurer knows of 21 Firestone ATX tire failures that caused injuries, 14 of them on 1991-1995 Fords. NHTSA dismisses the problem as "unremarkable."⁴
- ~ *October 24, 1998* - A Saudi Arabian Ford dealer writes Firestone to complain that he is being "kept in the dark" about his warning that tires are unsafe. "As you know, this concern goes back to mid-1997 when we first notified you." "I have to state that I believe this situation to be of a safety concern, which could endanger both the vehicle and more importantly the user of the vehicle. So I am asking what is going on? Do we have to have a fatality before any action is taken of this subject? I would recommend to ensure that we do not have any further incidents regarding tyres, that Firestone recall all 1995/1996/1997 Explorers fitted with this type of tyre,

as this is a safety related concern.”

- ~ *January 27, 1999* - A memo from Venezuela Firestone to the corporation’s Nashville office reports 47 tread or belt separations.
- ~ *February 14, 1999* - Yet another tire tread separation in Saudi Arabia causes the dealership to write Ford that the dealer will not accept any liability whatsoever for any vehicle or human damage caused by any accident, over any time frame, that is the result of tread [sic] separation of this nature.⁴
- ~ *August 17, 1999* - After 19 rollover crashes, 14 fatalities and 10 injuries in the Middle East, Ford begins replacing all Wilderness 16-inch tires on about 6,800 Explorers and Mountaineers in nine countries: Saudi Arabia, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Oman, Qatar and the United Arab Emirates. Ford insists it is not a recall but a customer notification enhancement action⁴ and blames "unique M usage patterns, environmental conditions and maintenance practices⁴ for tread separations.
- ~ *February 2000* - Ford offers free replacement tires for vehicles in Malaysia and Thailand. Meanwhile, briefing charts at a Firestone sales meeting in the U.S. warn that tread separation reports involving Wilderness tires jumped 144 percent from 1998 to 1999.
- ~ *February 7 and 10, 2000* - KHOU-TV, the CBS affiliate in Houston, breaks the story of numerous deaths and lawsuits attributable to tread separations of Firestone tires on Ford Explorers; the media coverage unleashes an outpouring of consumer complaints to NHTSA.
- ~ *March 6, 2000* - NHTSA opens a preliminary investigation.
- ~ *May 2000* - After 100 deaths and 400 crashes in Venezuela have been linked to tread separations on Firestone tires (out of a total vehicle population of about 39,800) Ford offers to replace tires on Explorers in Venezuela, Colombia and Ecuador.
- ~ *May 2, 2000* - NHTSA opens a formal investigation into 47 million Firestone ATX, ATX II, and Wilderness tires.
- ~ *August 9, 2000* - Firestone announces it will recall the 6.5 million 15-inch tires of the ATX, ATX II, and Wilderness AT series that it estimates are still on the road out of the 14.4 million manufactured. It limits the Wilderness tires to those made at its Decatur, Illinois, plant.

Appendix B

Litigation Involving P235/75R15 (15") Non-Decatur or P255/70R16 (16") Wilderness Tire Failures

DATE	LAWSUIT	TIRE BRAND	PLANT	SIZE	FAILURE	DAMAGES	TIRE DESCRIPTION
6/27/96	UNK	Wilderness	VN	16	Blowout	Injury	P255/70R16
2/15/97	Burroughs	Wilderness AT	VN	15	Blowout	Injury	P235/75R15
2/13/00*	Garzon	Wilderness AT	W2	15	UNK	Fatality	P235/75R15
6/24/00*	Telegadis	Wilderness AT	W2	15	Separation	Fatality	P235/75R15
9/12/00	Villar	Wilderness AT	W2	15	Separation	Injury	P235/75R15
4/25/00	Albom	Wilderness	W2	15	Blowout	Injury	P235/75R15
3/10/00	Bailey	Wilderness	W2	15	Separation	Quadriplegia	P235/75R15
5/22/00	Boone	Wilderness	VN	15	Separation	Fatality (2)	P235/75R15
8/5/00	Fehmer	Wilderness	W2	16	Separation	Injury	P255/70R16
6/18/99	Heath	Wilderness	W2	16	Blowout	Fatality	P255/70R16
11/14/99	Kapitan	Wilderness	W2	15	Separation	Fatality	P235/75R15
UNK	Martin	Wilderness	W2	15	UNK	UNK	P235/75R15
12/15/97	Oines	Wilderness	VN	15	UNK	Fatality	P235/75R15
3/15/00	Smith	Wilderness AT	VD	16	Separation	Injury	P255/70R16

*Also found in NHTSA's Consumer Complaint Database

Endnotes

¹ Approximately three weeks after the recall was announced, NHTSA asked Firestone to expand the recall to include other tires because of the consumer complaints that the agency had received and the early results from its own defect investigation revealed that other models were experiencing 5rate(s) of tread separationsM(that) exceed[ed] those of the recalled tires, sometimes by a large margin. 4Firestone refused to expand the recall. NHTSA responded by issuing a “consumer advisory” designed to warn consumers that about 1.4 million other Firestone tires, about half of which were still on the road, were experiencing high tread-separation rates, many of them other models of ATX and Wilderness tires made in the early 1990s. After being chastised during congressional hearings the following month, Firestone promised to replace the tires listed in NHTSA's consumer advisory at the consumer’s request, but still refused to expand the scope of the recall. The burden of requesting that tires listed in the consumer advisory be replaced fell upon the consumer.

² See Firestone press release dated 12-19-00.

³ See Ford Motor Company press release dated 12-19-00 [<http://media.ford.com>].

⁴ Deposition of Robert Martin, Vice President, Quality Assurance, Firestone [11-27-00].

⁵ Deposition of Robert Martin, Vice President, Quality Assurance, Firestone [11-27-00].

⁶ Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

⁷ Deposition of Roger Simpson, Explorer Program Manager, Ford Motor Company [11-14-00].

⁸ Deposition of Roger Simpson, Explorer Program Manager, Ford Motor Company [11-14-00].

⁹ The Blazer was found to perform superbly in the maneuver when equipped with OE P205/75R15 tires in that the wheels of the vehicle would not lift off the ground. Ford’s finding was consistent with independent testing previously conducted by Roger McCarthy of Failure Analysis. Mr. McCarthy had undertaken deliberate tip-up testing for Suzuki in an effort to prove that all SUVs regardless of design, could be made to lift wheels on flat, level surfaces when driven by expert drivers. The McCarthy testing revealed that the Chevy S10 Blazer, Jeep Cherokee and Jeep Wrangler could not be made to lift wheels in the CU maneuver regardless of steering input.

¹⁰ Deposition of Don Tandy, Engineer, Ford Motor Company [3-20-00].

¹¹ Deposition of Don Tandy, Engineer, Ford Motor Company [3-20-00].

¹² Lawyers representing victims of rollover crashes involving the Explorer have been unable to independently evaluate Ford’s contention that it met the internal rollover standard because Ford claims that the key documents surrounding the test – the wheel lift charts, both input and output – were destroyed, allegedly shortly after the simulations were conducted.

¹³ Deposition of Roger Simpson, Explorer Program Manager, Ford Motor Company [11-14-00].

¹⁴ Deposition of Roger Simpson, Explorer Program Manager, Ford Motor Company [11-14-00].

¹⁵ Deposition of James Burdette, Fuel Efficiency Engineer, Ford Motor Company [12-21-00].

¹⁶ Deposition of James Burdette, Fuel Efficiency Engineer, Ford Motor Company [12-21-00].

¹⁷ Deposition of James Burdette, Fuel Efficiency Engineer, Ford Motor Company [12-21-00].

¹⁸ Deposition of James Burdette, Fuel Efficiency Engineer, Ford Motor Company [12-21-00].

¹⁹ The chart below the text containing the footnote shows design specifications for the years listed. According to deposition testimony, however, the 1994 change in design specifications included tolerances of 27.1 to 28.9 lbs. These tolerances allowed tires in that weight range to be considered within specification. At the low end of the tolerance range, the change in weight constitutes 10 percent of the previous weight of the tire: $30.1 - 27.1 = 3$ lbs. or approximately 10 percent of 30.1.

²⁰ The January 2, 1991 and July 8, 1992 detail sheets were never approved by Ford due to the wheel lift problem referenced in the text of the report. These are included as part of the historical overview of the attempts at modifying the tire to accommodate the fuel economy problem/concern.

²¹ Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

²² A chronology of significant events in the 12-year history of the Ford-Firestone tire defect is included at Appendix A.

²³ Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

²⁴ Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

²⁵ Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

²⁶ Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

²⁷ Document made available to Congress during Ford/Firestone hearings.

²⁸ Deposition of Thomas Baughman, head of the Critical Concern Review Group, an internal Ford quality oversight committee. While Ford has previously taken the position that these problems were highlighted much later, subsequent discovery of internal documents and deposition testimony of Ford employees charged with responsibility for the oversight of the problems in Venezuela have shown that these problems actually came to light in 1997, not in 1999 as previously disclosed. Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

²⁹4 Q. Now this particular document, and this was the interesting
5 part, to me at least, it says in July 1997 FOV, that means
6 Ford of Venezuela, correct?

7 A. Correct.

8 Q. In July 1997 Ford Venezuela representatives were called to
9 a meeting in Caracas with a group of independent lawyers
10 representing Ford customers."

11 Did I read that correctly?

12 A. You read it correctly.

13 Q. You didn't join the Explorer situation until when?

14 A. Well, this gets a little more complicated now. I did not
15 start working on Explorer and tire related-issues until,
16 you know, the first quarter of 1999.

17 Q. So in July of 1997 you were not involved nor were you made
18 aware of the meeting between Ford of Venezuela
19 representatives and the lawyers in Caracas about these
20 tread separation rollovers of Explorers?

21 A. No, I was never made aware of it.

³⁰ Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

³¹ Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

³² Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

³³ See, e.g., <http://www.safetyforum.com>.

³⁴ Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

³⁵ Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

³⁶ Q. There is no information you can give us today about
14 how that change came about or why it came about?

15 A. Only from what I can briefly recall as to why that
16 change was made and I believe the main reason, if
17 I'm recalling correctly, is that we had been seeing
18 a lot of large P metric tires that were normally
19 used on passenger tires before were now in fact
20 being used on light truck and as such they were
21 being subjected to different stresses and loads than
22 a normal passenger tire.

23 So a decision was made and I'm not sure of
24 the testing involved to go to the thicker wedge that
25 we in fact use on all light truck radials, but I
1 believe that was the main reason to make this
2 change?

3 Q. What you just told me if I heard you correctly was
4 that as you understood it, people were beginning --
5 consumers were beginning to use passenger tires on
6 light trucks?

7 A. Yes, that's correct. We were seeing larger metric
8 tires especially.

9 Q. Like 235s or 245s or 255s or what?

10 A. Yes.

11 Q. Those are good examples?

12 A. Those are very good examples, and even larger tires

13 than that.

14 Q. People used to use those on their cars and now they

15 were putting them on their light trucks and so this

16 change was being made in order to reflect the

17 changing use of those kinds of tires?

18 A. Yes, as I recall, that is the main reason that we

37 did this wedge change. Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

38 Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

39 Deposition of Brian Queisar, Design Engineer, Firestone [12-20-00].

40 Deposition of Brian Queisar, Design Engineer, Firestone [12-20-00].

41 Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

42 Deposition of Robert Martin, Vice President Quality Assurance, Firestone [11-27-00].

43 Statement of Christine Karbowiak, Vice President of Public Affairs of Firestone [8.13.00].

Robert Martin, Firestone's Vice President of Quality Assurance, recently testified that the Decatur plant's tires were more heavily represented among claims because of Firestone's and Ford's distribution patterns. Firestone tires made in Illinois are more likely to be shipped for installation on Explorers made in St. Louis, Mo., which supplies the SUVs to hot climate states in the Southwest, where the problems surfaced earlier, due to the combination of speed and higher ambient temperatures. According to Firestone, tires made elsewhere were more likely to end up in Ford's Louisville, Ky., plant, which supplies Explorers to the more temperate eastern states. Deposition of Robert Martin, Vice President Quality Assurance, Firestone [11-27-00].

44 Design "robustness" has been defined in a desposition to include the following:

18 Q. What is a robust tire design?

19 A. A robust design would be a design that meets the

20 objectives of the customer and assures the customer

21 satisfaction for whatever it may be and robustness

22 is associated with tire wear and tire durability and

23 a lot of other things with respect to the tire from

24 when it's new to when it's worn out and discarded.

25 Q. For the life of the tire?

1 A. For the life of the tire.

12 Q. Does robustness include the ability to perform

13 safely and appropriately given the loads to which

14 the tire was designed?

15 A. Yes. Deposition of Brian Queisar, Design Engineer, Firestone [12-20-00].

45 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

46 Firestone internal document 74 as submitted to Congress.

47 Deposition of Michael Reep, Design Engineer, Firestone [12-13-00].

48 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

49 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

50 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

51 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

52 Deposition of James Gardner, Product Analysis Engineer, Firestone [12-13-00].

53 Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

54 Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

55 Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

56 Deposition of Thomas Baughman, Chief of Engineering, Ford Motor Company [12-21-00].

57 A chart describing this litigation may be found at Appendix B.