

Engineering management case study ford rollovers

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Secondly, the vehicle's instability due to high center of gravity and weak suspension was another cause for the rollover likeliness. Within the first year, on February 12, 1991, the first lawsuit came against the two companies (Ford and Firestone). (Willis Law Firm) Within the first two years, another three lawsuits began to cause a flood of lawsuits aimed at the two companies, ultimately having over 60 lawsuits in a 10-year period (23 of which came in 1999). Because of the amount of publicity and number of injuries involved with the Ford Explorer Rollovers, the

National Highway Traffic Safety Administration (NHTSA) finally began investigating the vehicle ten years after the first rollover occurred. Since the tires appeared to cause most of the rollovers by falling apart, Firestone was initially thought to be at fault. Shortly after Firestone learned of the rollover problem with the Ford Explorer, John Lamp, the CEO of Firestone stated, "Firestone will no longer sell tires to Ford for use on the Explorer.

There is something wrong with the Ford Explorer. The testing and accident data we have done proves it, you can take our tires off the Ford Explorer and it would continue to roll over. (Willis Law Firm) This continued to cause friction between the two companies and eventually ended the 100 year relationship. Firestone was founded by Harvey Firestone in 1900 and produced pneumatic tires for wagons, buggies, and other forms of wheeled transportation at the time of the era. However, prior to 1900, Firestone had been supplying The Ford Motor Company with tires. The Firestone Tire and Rubber Company, a pioneer in mass production, majority of their sales went to Ford.

It is stated that roughly more than 50% of Ford's tires were supplied by The Firestone and Rubber Company.

Firestone came about because for a time Ford was producing tires in-house at one point. In 1900, Ford wanted to have a reliable supplier for the vehicles produced. Thus, a relationship was formed between Henry Ford and Harvey Firestone which would last for numerous years. The two entrepreneurs had even entered into a joint venture that experimented in rubber production, sharing knowledge with each other. The Firestone Tire and Rubber Company was originally based in Akron, Ohio where its competitor, Goodyear Tire and Rubber Company, was also stationed.

This is important to note because Goodyear will become a significant factor to the relationship of Ford and Firestone. (Wisped) During the 1970s, Firestone had major problems concerning their line of Firestone 500 tires. In 1973, only two years after the debut of the Firestone 500 tire, Firestone experienced a significant problem with tire separation. Thomas Robertson states, " We are making an inferior quality radial tire which will subject us to belt-edge separation at high mileage. (Wisped) Firestone quickly implemented quality control measures to fix the problems, but they were unsuccessful in totally eliminating all the faulty tires. In 1977, over 400,000 tires were recalled in the Decatur, Illinois plant.

After the National Highway Traffic and Safety Association's (NHTSA) investigation, Firestone quickly blamed the consumer on understating the tires and poor maintenance. Also, in 1978, Firestone recalled more than 7

million of its Firestone 500 tires which was the largest recall to date. Due to the defective tires, more than 34 deaths were recorded.

The NATHAN found out about the continuation of producing bad tires and fined Firestone \$500, 000 (Wisped). One will see later, this issue would have a severe impact on society as well as Ford. In March 1990, Ford released the 1991 Ford Explorer sport utility vehicle as a replacement for the dated Ford Bronco II.

This vehicle was aimed at competing against the Chevrolet S-II Blazer and Jeeps as a rugged family vehicle. To compete against these other vehicles, the Explorer would need to be large enough for five people, have ample cargo space, and be reasonably priced, without expensive engineering costs.

For these reasons, Ford decided to base the Explorer off of the very successful Ford Ranger pickup truck. The Explorer borrowed the Ranger's frame and suspension system, along with much of the body. With the additional row of seats and cargo area, the Ford Explorer weighed 600 pounds more than the Ford Ranger.

Weighing 600 pounds more than the Ranger, Ford decided not to modify the suspension or tires of the Ranger that would be used on the Explorer; this ultimately lead to a high center of gravity. (Rowel) Codenamed NOUN by Ford's engineering department, Ford began to test the prototype Ford Explorer in 1987.

In May of that year, testing had shown that stability of the Ford Explorer prototype is worse than hat of the Bronco II. The Bronco II had previously

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been known for a few rollover incidents that were caused by a short track width (the width between left- and right- side tires). To alleviate the Ford Explorer's rollover potential, engineers stated in a memo on May 1, 1987 that the stability " can be improved by widening, lowering and using a smaller POP 5 tire. " Instead of redesigning key aspects of the vehicle, Ford decided to have Firestone redesign the tires: an attempt to keep Ford costs low.

One month later, on June 11, 1987, Ford met with the Firestone Tire Company and proved the Firestone ATX tire that would be used on the Ford Explorer. (Willis Law Firm) In ten Tall AT BIBB, a For a report AT ten Ann.'s rollover testing states Tanat ten For a Explorer demonstrated " performance issues" with the Firestone-recommended 35 SSI tire. (Willis Law Firm) A common practice for all auto manufactures is to reduce the tire pressures of trucks and sport utility vehicles to improve handling and stability, improving under steer and reducing maximum cornering capacity.

Ford proceeded with the tire pressure reduction, reducing it from the Firestone-recommended of 35 SSI to 26 SSI. Even further, Ford engineers noted that the vehicle experienced two wheel lift at 55 miles per hour due high center of gravity, tires and front suspension system.

(Rowel) Throughout the preliminary testing, Ford and Firestone had been in constant communication for building and testing tires that would help reduce rollover rates. Firestone tested the vehicle with tire pressures of 26 SSI for front tires and 35 SSI for rear tires.

Firestone stated that “...

Testing showed severe tread separation, but our testing used a more realistic procedure and we don't think it will be a problem. ” (Willis Law Firm , emphasis added) During a test known as a I-turn test, the vehicle is exposed to extreme cornering at relatively high speeds without braking. The vehicle is driven in a straight line at constant speed then steered into a 90-degree turn. During Ford's I-turn testing of the Ford Explorer, five of the twelve J-turn tests failed, I. E.

The Ford Explorer rolled over. Willis Law Firm) In comparison, it is noted that neither the Chevrolet Blazer nor Ford Bronco II rolled over during their respective I-turn tests. Ford engineer Jim Mason proposes eight design changes that would make the Ford Explorer as good as the Chevrolet Blazer. Specifics are not given as to what these changes are, but it is noted that some changes would delay production of the Ford Explorer. In February 1990, just a month before production, Ford's management decided to adopt as many changes as possible, but only the changes that will not delay production. Rowel) As the first generation Ford Explorer was released in March 1990, Ford Engineers were not only scampering to find a solution to the tire and poor design problems, but they were also looking into the future at the next generation of Ford Explorer for 1995.

Ford engineering began to move into designing the second generation Ford Explorer, taking into consideration the changes that Jim Mason suggested months earlier, that would have delayed the production of the Ford Explorer. Ford would eventually modify the front suspension of the Explorer to be an

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independent front suspension to better improve stability and resistance to rollover.

Even further, Firestone was being asked by Ford to produce a new tire for the next generation Ford Explorer that would have a low rolling resistance and a higher tire pressure to reduce tread separation issues. (Willis Law Firm) Ford also had another issue on its hand in regards to the rollovers. The thought of rollover is bad enough, but once the vehicle rolls, the Explorer's frame and body must be able to withstand the forces of the rollover. As the rollover instances increased, it became notorious that the Ford Explorer's roof was not strong enough to withstand the vehicle's weight during a rollover.

When the Ford Explorer began to roll over, it would become airborne for a moment as the two remaining wheels left the ground. When the Ford Explorer made contact with the ground, it would happen on the A-pillar - the piece of frame between the windshield and front door - and the a-pillar - the frame between the front and rear doors. This structure was so weak that Explorer's roof would collapse and strike ten occupants' heads, fracturing skulls, vertebrae, and causing severe brain contusions; some Explorer rollovers have caused paraplegia, quadriplegia, and even death due to the roof crushing.

Even worse, when the a-pillar collapses, the seat becomes loose (because the seat belt is anchored to the a-pillar) and the occupant is then free to be thrown into the collapsing roof. (Willis Law Firm) From the time Ford released the first generation 1991 Explorer to the time they leased the

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second generation 1995 Explorer, there were 6 lawsuits, containing several injuries and deaths (Willis Law Firm).

The second generation, even with its modified front suspension and 5 years of reengineering, did not help the rollover cause.

The high center of gravity in the Explorer, which is one of the main causes of rollovers, was not lowered but raised in the new model (Willis Law Firm). The second generation Explorer was produced between 1994 and 2001. Over the course of those years, there were 54 lawsuits against Ford and/or Firestone in regards to Ford Explorer rollover incidents: 23 of which were in 1999 alone. This finally sparked an investigation by the National Highway Traffic Safety Administration (NATHAN) in 2000. It took ten years of rollovers, tire blowouts, injuries, and deaths for the government to step in and investigate the tragedy of the Ford Explorer.

In May 2000, the NATHAN opened an investigation of 47 million Firestone tires with 90 complaints reporting 33 crashes including 4 fatalities and 27 injuries; unbeknownst to the NATHAN, at that time there were lawsuits and notices of intent to file that involved at least 35 fatalities and 130 injuries. (Willis Law Firm) The NATHAN focused initially on Firestone due to the revives, nearly identical, incident in the sass. The NATHAN asked Ford and Firestone to reply to the investigation request by June, but both companies filed extensions and never gave proper responses until later that year. Firestone voluntarily recalled 6. Million tires in August 2000.

(Willis Law Firm) Six months after the beginning of the investigation, the NATHAN was now reporting 148 deaths and 525 injuries attributed to crashes involving the Ford Explorer and Firestone Tires. A year after the investigation, the Wall Street Journal reported that the government has linked 203 deaths and over 00 injuries to the Ford Explorer and Firestone tires. In October 2001, Firestone again recalled another 3.5 million tires. Although the Firestone tires were found faulty, the bulk of the blame was on Ford because of its decision to go below the Firestone recommended tire pressures.

This in turn caused the overheating in the tires which led to the tread separation. John Lamp, the CEO of Firestone stated, " Firestone will no longer sell tires to Ford for use on the Explorer. There is something wrong with the Ford Explorer. The testing and accident data we have done proves it, you can take our ire's off the Ford Explorer and it would continue to roll over. "

(Willis Law Firm) Throughout the investigation, Ford didn't miss a beat, continuing to manufacture the Explorer. By 2002, shortly after the investigation, Ford released the third generation Explorer (2002-2005) that was completely redesigned.

The Explorer no longer used the Ford Ranger frame, and the Explorer had a completely redesigned body, much like a car. In addition, the Explorer sported both front and rear independent suspension. This overhaul of the Explorer reduced the rollover rate tremendously, to a rate comparable to other Subs on the market. Effectively, the rollover problem was solved. In 2006, Ford redesigned the Explorer with a newer Day Ana toner

enhancements released in 2010. (Wisped) In current generation, ten T n generation, was Lawsuits against car companies have been popular for quite some time.

They are so common today that companies actually have their own private team of lawyers that are strictly responsible for fighting cases against their company. Some believe that if the company designed the car, they should be responsible for anything that goes wrong. However, that idea is not always a good method. In some cases, the driver is to blame. Many people drive recklessly, or just go around a curve way too fast, causing their car to crash or tilt.

Also, everyone needs their car fixed. Therefore, the person who fixed the car could also be responsible.

Whether the driver or the mechanic is truly to blame, car owners usually end up blaming the company who designed the car. Some of these court cases end in huge settlements. The person who sues the company often ends up receiving millions of dollars, but money does not always fix everything.

If the car is truly faulty by design, car owners can end up dead or severely injured. One of the most popular cars Ford has ever designed has cost them millions in settlements. The Ford Explorer sport utility vehicle is one of the most recent examples of a car company being held responsible for death and injury due to faulty design.

Instability in the Ford Explorer created by a faulty design has been the cause of hundreds of deaths and injuries in the US. Ford Explorer rollovers and

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rollover safety concerns have been in the public spotlight almost daily since 2000 when the Ford Explorer - Firestone tire tread separation rollover accident problem as revealed.

This problem has resulted in many drivers being unable to control the vehicle in emergency situations. It caused many tire blowouts and deflation from a tire tread. The Ford Bronco II, formerly known as the rollover king, was replaced by the Explorer which was marketed as a safe passenger friendly replacement.

Since the first month it was sold, the Explorer has been killing its occupants and injuring many. While the blame was shifted toward Ford for defective design, Firestone turned out millions of sub-standard and potentially defective tires, and was the initial cause of loss of control of many Explorer Firestone tire tread separation rollovers.

Rollover study analysis of national Florida crash statistics found that when Explorers are fitted with tires other than Firestone, they have a higher rate of tire-related accidents than other Subs.

As a result of shared blame between many parties, lawsuit settlements involving Ford Explorers were sometimes shared. At other instances, Ford took full blame, and was responsible for the whole settlement. There are many lawsuits involving Ford Explorers. For example, a California couple was seriously injured when their 1994 Ford Explorer rolled over in the Californian desert, a Texas woman who was paralyzed in an accident involving a Ford Explorer mounted on Firestone tires, a man killed in an auto rollover accident

involving Bridgetown/Firestone tire, and a family of two teenagers killed when the Explorer they were riding in rolled over.

Willis Law Firm) The lawsuit involving the California couple seriously injured in their 1994 Ford Explorer was settled for a total of \$14.9 million, including \$9.4 million against the dealer that sold them the sport utility vehicle.

Catherine Ozark, who as pregnant at the time of a 1997 accident, lost her baby and was left paralyzed. Her husband GOP suffered severe injuries to both legs. According to the Karakas, their Explorer began vibrating immediately after they purchased it in 1997.

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The case was settled days after. The Jury reached a verdict that the Explorer was defective by design, and held the dealership, the state of California, and a road construction company liable for the damages- but not Ford. After finding the accident was caused by faulty repair work and not the Explorer's design problems, which included a high center of gravity, faulty suspension, and narrow width that combined to make it vulnerable to rollover problems. Although Ford was not blamed, the case threatened to put them back at the center of a new public relations nightmare over the Explorer, the company's best-selling sport utility vehicle.

The attorney for the Ozarks, said that while Ford was not held liable for the damages in the case, the Jury still found for the first time in a product liability case that the Explorer was defective. He said " what this verdict means is

that it's very clear now that the Ford Explorer as it is designed is defective and has a high propensity to roll over" After being found defective by design, many other owners of the popular sport utility vehicle had the same problems, and filed lawsuits of their own. (Willis Law Firm) Ford and Bridgetown/Firestone Inc. Reached an out-of-court settlement with Bailey, a Texas woman who was paralyzed in an accident involving a Ford Explorer mounted on Firestone tires. Her case was one of more than 200 personal-injury cases filed that alleged manufacturing defects and design flaws in both the Ford Explorer and Firestone tires.

An enthusiastic mountain climber and a mother of two, Bailey's spinal cord was damaged when the Explorer she was riding in flipped several times because the tread of the right rear tire began to tear from its casting. After the accident, she was confined to a Houston hospital and now a ventilator-dependent quadriplegic. (Willis Law Firm) Ford and Bridgetown/Firestone Inc. Reached an out-of-court settlement with Bailey. The high-profile case was scheduled to begin with pretrial motions but negotiation between the companies and Bailey intensified and the settlement was reached.

Financial terms of the settlement were not disclosed by any of the parties involved but it is believed to be among the largest pretrial settlement of a product-liability case involving the auto industry. The settlement covered Bailey's medical bills for the rest of her life, but she will never have a normal life again.

No amount of money will be allowed her to get back to mountain climbing, and her kids will probably need to help her the rest of her life. This case also

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required that Ford made public all Firestone tire and Explorer documents previously made available to federal investigators and congressional committees. Amongst other things, the companies were required to analyze 300 tires linked to Explorer wrecks.

Findings from the analysis were to be made public within fifteen days after completion. This case was believed to help speed up other cases against Ford that involved the same issues. Willis Law Firm) Not only did Ford take a hit for faulty design, the tire manufacturer did as well. Bridgetown was forced to recall 6.5 million tires, which were mostly on the Ford Explorer. These tires were blamed for killing 148 people in the United States, and caused over 500 injuries.

Ford was later forced to place 13 million tires, and was no longer supplied Ford Explorer tires from Bridgetown. However Bridgetown immediately blamed the Ford Explorer problems on Ford. They proved that if their tires were taken off the Explorer, it would still rollover.

This helped many prosecuting lawyers prove that Ford was responsible for injuries AT tenet client. I en lawyers argued Tanat ten center AT gravity on ten For a Explorer was too high.

In a 1992 case, the Explorer rolled over on a Chicago highway and four teenage girls were thrown out of the car. Two of the girls died, and two of them were seriously injured. Their Explorer did not have the Bridgetown tires on it, and their accident was not due to losing tire tread. It is concluded that the accident was caused from the center of gravity being too high, and their

settlement was worth \$22 million. Willis Law Firm) Although most of the blame is directed toward Ford and Bridgetown, other companies have been involved in lawsuits involving the Ford Explorer as well. For example, Sears Roebuck and Co.

Was told that they need to pay 35 percent of a \$29 million Texas injury case. In this case, the tires lost tread and was forced to drift off the road. The driver died from the accident, and his family decided to sue Ford, Bridgetown, and Sears. Sears was held responsible because they sold and put the Bridgetown tire on a vehicle that was involved in a rollover accident. They also later repaired the tire.

Sears ended up appealing the case, because they believe it was the car manufacturer's responsibility because the center of gravity was too high. The Ford Explorer was truly a badly designed vehicle, and it affected many other companies in a negative manner. (Willis Law Firm) Overall, lawsuits against car companies can be very expensive to a company. As a result, Ford, and many other car manufacturers, are making sure that their cars are safer before putting them out for sale. Not only does this save the companies millions of dollars in lawsuits, it also helps limit the amount of deaths and injuries in car accidents.

This results in safer roads and highways for everyone.

The Ford Explorer has proved to be poorly designed, and it is one of the most expensive mistakes in car manufacturing history. It not only brought up lawsuits, it caused death and injury to hundreds of people. Although these

deaths could be the driver's, or even the mechanic's fault, Ford took cost of the blame because they designed this faulty vehicle. Overall, the Ford explorer proved to be one of the most popular, yet most dangerous, sport utility vehicles in history, and will continue to have issues until they are all off of the road.

Even prior and during the Ford Explorer rollover situation discussed earlier, management and their decisions had significant outcomes.

At Ford, the problems first arose when they decided to develop a design similar to the Bronco II. Ford knew very well the issues that were associated with the vehicle. The Bronco II cost the company \$2. Billion in damage settlements from handling and stability problems. The Explorer, which the design was based off the Bronco II, also had handling and stability issues. One would think that a prior vehicle's design with concerns would be avoided.

However, Ford's upper management decided to disregard the tests.

Jim Mason, a Ford engineer, came up with eight different design proposals to improve and solve the problems concerned with the Explorer, but upper management even ignored the engineers request to redesign the Ford Explorer. Ultimately, upper management wanted the engineers to find alternative cheaper ways to redesign the Ford Explorer. According to Wisped. Org, in 1989, Ford engineers came up with the idea to reduce the tire pressure from to Pepsi.

This tire pressure reduction conflicted with Firestone's recommended tire pressure of 35 psi which was stamped directly on the tire.

Ford informed Firestone that there would be no risk of tire separation unless the tire pressure decreased beneath 35 psi (Willis Law Firm). Referring to the tire as "impious," Ford had a cellar to use Firestone titles as tenet MEMO supplier. Ford explored despite earning a "C" grade for high temperature deterioration. Ford stated that as long as the tires meet the standards of the Explorer, then they are not concerned with the ratings.

The past relationship between Ford and Firestone could have been the factor that led Ford to decide to pursue Firestone's tires.

Although, the relationship would wear away as controversies heated up between the two organizations and future contracts would not be negotiated. Later, Ford sacrificed their relationship with Firestone and chose to use a different set of tires for their Explorer. Ford decided to use a set of tires produced by Goodyear. These tires were specifically designed for the Ford Explorer. Ford engineers gave their input to Goodyear and developed a tire with an extra liner to safeguard against tire separation.

With recommendations from Ford engineers, led to the tires to have a clean track record.

There were many questionable managerial decisions made at Ford. Many of the consequences suffered by these decisions could have been avoided if the correct decisions were to have been made. For instance, the design of the Explorer should not have been based off of an existing vehicle when the

construction of the vehicle had issues. Even tests with specific data revealed a new design should be considered.

Also, Ford hurt their relationship with Firestone because of the same issue. Firestone was developing a new tire design when Ford decided to use a set of tires from Goodyear.

Ford could have avoided ruining a 100 year relationship with Firestone if they chose to use an alternative blueprint of the Explorer as well as numerous lawsuits soon to follow. Now, Ford will have a reputation resulting from the occurring situation. On the other hand, Firestone had the same if not more management problems compared to Ford. Just like Ford had issues with the Bronco II, Firestone had problems resulting from tire separation in their tires.

The Decatur, Illinois plant developed Firestone's line of 500 tires, which were prone to tire separation resulting from high speeds.

Over 7 million tires were recalled due to deaths recorded from tire separation of the tires. The company lost millions of dollars due to compensation and even the public lost respect for the Firestone name.

(Wisped) The situation at the Decatur plant would be significant due to management/labor unions during April 1994 to December 1996.

Management demanded that the union were to work 12 hour work days shifting between day and night and the plant would be operational on a 24/7 basis in order to meet production requirements.

Also, new hire pay would be cut by 30 percent, hourly workers were required to contribute to their health care costs, and pay is based on piece rate performance.

The union was not pleased, and once their contract expired, they went on strike. To fill the void of empty workers, Firestone hired replacement workers. These workers were untrained and lacked supervision, so quality issues became more of a significant factor. As the strike continued, the labor union witnessed depleting funds and decided to work even without a contract. In May 1995, some workers were hired by Firestone.

Although, Firestone only hired workers when the need arose and the newly hired union workers were put into the filthiest positions in the plant and were treated poorly by supervisors.

In December 1996, an agreement was made between Firestone and the labor union and a contract was made. The contract promised better wages and Localisms ten ay/knelt isn't Tort ten same worker. However, ten 12 nor work cays still remained. (Wisped) On the other hand, management at Firestone had other issues to address besides dealing with the labor union.

It was suspected that outdated rubber had been used in the Decatur plant for the production of Firestone tires, plant conditions caused moisture to seep into the rubber linings, and processes to create the imprints on the tires worsened. Combined, the issues resulted in higher quality control problems and higher rates of failure of the tires produced in the Decatur plant compared to similar plants.

If management had addressed the working conditions and cycling the crewing to meet production requirements, then Firestone could have easily avoided the situation described above. Wisped) To love the tire separation concerns, Freestone's purchasing department at the Decatur plant should not order so much rubber so it is not out of date. Obviously, the plant had too much in inventory and the rubber could only sit in the facility rather than be utilized. Also, engineers should have worked to improve the processes of the plant, and by doing this tires will be shipped at a faster rate and employees will not have to be paid per tire made. As a result of the poor managerial decision making described, many outcomes were generated in the upper management departments in both Ford and Firestone.

From the rollover issues, a total of three Coos were terminated and replaced due to the investigation of the National Highway Traffic and Safety Administration (NATHAN). For example, Jacques Nausea, the CEO at Ford who was replaced by Henry Ford's great grandson William Clay Ford, Jr. , and Mastoid Non, the CEO at Firestone who was replaced by the American CEO John Lamp. Aside from the mess of various Coos coming and going, the Decatur, Illinois tire production plant was announced by Firestone on June 27, 2001 that it will close its doors for good. Prentice-Hall) Today, under new management, both Ford and Firestone have improved from the issues described in this report and have ultimately learned from their pasts.

According to Wisped, for example, Ford has redesigned the Ford Explorer 2011 from a truck-like frame to a car-like frame. Therefore, the center of gravity is significantly improved. Despite from the publicity of the rollovers

and tire separation, Ford decided to keep the Explorer name. Reasoning is from a marketing standpoint, the Ford Explorer had sold 6 million units!

As this case study and report has pointed out, almost all the issues can be traced back to poor decision making made by management. One should note, taking easy or cheap cost alternatives are not always the correct approach.

Even though mistakes were made by upper management at Firestone and Ford, the Ford Explorer has remained to be the most popular SUV and is still an integral and profitable product of Ford's line of vehicles. As of now, Ford and Firestone are no longer working. As a matter of fact, Firestone initiated the break-up of the relationship between the two organizations.