

Ford's Cruise Control Deactivation Switch: A Pressure Cooker Waiting to Explode

It has been described as a ticking time bomb, a deadly defect, a trip down the road to disaster. It is a tiny component part, no bigger than a sparkplug and shaped very similarly. It is Ford's cruise control deactivation switch. And it is burning down homes across the country.

What Is It?

The cruise control deactivation switch, also known as the brake pressure switch, sits just above the master cylinder of the braking system under the hood on the driver's side. Its purpose is to turn off the cruise control when the driver applies the brakes. In the latter half of the 1990s, Ford was faced with an abnormal number of car fire complaints arising from these switches. Cars were catching fire while parked in garages and parking lots, unattended with no key in the ignition. Homes were burning down.

The First Recall Campaign

In May 1999, Ford issued a recall on the switch in conjunction with the National Highway Traffic and Safety Administration (NHTSA). However, the recall was limited to the 1992-93 Lincoln Towncars, Mercury Grand Marquis, and Crown Victoria models - the "Panther Platform" series of vehicles. No recall was issued on any other model or year, even though the same switch had been installed in numerous Ford models. Indeed, Ford continued to install the same switch in future lines of vehicles all the way up through 2004.

The Second Recall Campaign

Then, in January 2005, faced with numerous instances of other vehicle fires, Ford issued another recall on the switch, also in conjunction with NHTSA, for an entirely different line of vehicles. Again, however, Ford limited the recall to a small set of models and model years. The new recall included about 800,000 vehicles in the following categories:

- 2000 model Ford F-150 truck;
- 2000 model Ford Expeditions
- 2000 Lincoln Navigators;
- Some 2001 Ford F-Series Supercrew Trucks (built through Aug. 7, 2000)

The "Expanded Investigation"

Only two months later, however, CNN broke the story that NHTSA was re-opening its investigation to include more models and more model years. In a March 23, 2005 report from CNN, it was revealed that NHTSA was investigating 1995-1999 and 2001-2002 F-150s and 1997-1999 and 2001-2002 Expeditions and Navigators. As of that date, the agency had identified at least 218 cruise control deactivation switch failures and related engine-compartment fires. CNN's investigative producer Pia Malbran led the investigation and followed up with a series of additional reports, each story further exposing the seriousness and breadth of the problem.

The Media Campaign

In a stunning report of June 17, 2005, CNN reported the discovery of a Ford document showing that the same or similar switch was installed in a total of 16 million vehicles. Those vehicles include:

Lincoln Mark VII/VIII from 1994-1998
Ford Taurus/Mercury Sable and Taurus SHO 2.3 L 1993-1995
Ford Econoline 1992-2003
Ford F-Series 1993-2003
Ford Windstar 1994-2003
Ford Explorer without IVD 1995-2003
Ford Explorer Sport/Sport Trac 2002-2003
Ford Expedition 1997-2003
Ford Ranger 1995-2003

The exposure brought Ford into damage control mode. In a highly unusual move, Ford released its own media campaign in the form of a public video announcement. It can still be viewed on the internet at <http://www.ford.com/en/innovation/safety/CruiseControl.htm>. The clip is of Ford's in-house engineer, Ray Nevi, dressed in suit and tie and reading from a script. Nevi begins by claiming that news agencies are disseminating "misinformation." He does not identify any incorrectly reported facts or attempt to make any corrections. He explains the lack of an expanded recall by stating, "We have been asked why we have not expanded the recall. The last thing we want to do is make an important safety decision on incorrect or incomplete information." The primary message is that of percentages: "Underhood fires are occurring at a very low percentage. That percentage in fact is point zero, zero five or, put another way five one-thousands of one percent. That's out of a population of nearly four million vehicles." The clip does not state how many fires occurred to reach that percentage.

CNN and other news organizations did not relent. In a nationally televised report of June 27, 2005, CNN reported that NHTSA had "received 559 complaints of spontaneous fires, 253 of them in unrecalled models, and its latest investigation includes the 1995 model years of the F-150, Expedition and Lincoln Navigator vehicles." The report quoted Ford spokeswoman, Kristen Kinley, repeating the script, "We have been asked why we have not expanded the recall. The last thing we want to do is make an important safety decision on incorrect or incomplete information." Kinley also stated, "In those populations with an increasing fire report rate, we stopped using the switch through the recall process.... The switch has performed well in many models for many years." In other words, Ford pulls the switch when enough fires happen, but not before.

Despite the admitted problem with the recalled vehicle, Kinley stated, "We have not determined at this time that there is a defect with the switch, but for reasons we still do not understand the switch is failing ... and we are trying to understand why."

Why the Switch Fails

The \$20.57 cruise control deactivation switch, or brake pressure switch, works to turn off the cruise control automatically when the driver steps on the brakes. Such a brake-pedal feature is a required item in any car with a cruise control system. Cruise control is required to be turned off in three ways: (1) a manual switch on the steering wheel, (2) a switch that is connected to the rear brake light fuse, and (3) the brake pressure switch. The first two operate independently of the brake pressure switch. The brake pressure switch is required in the event that a fuse should blow, rendering the manual switch or the brake light switch ineffective to turn off the cruise control in the event of an emergency while driving. The brake pressure switch works by applying 5-10 pounds of pressure to the brake, which pressure then transfers to this switch which is mounted within the braking system.

The problem with this particular type of switch has to do with its positioning, its particular component parts, and the fact that it is constantly energized - or "hot." The switch, which is manufactured by Texas Instruments, is positioned just above the brake master cylinder and within close proximity to dripping brake pressure fluid. Its exterior consists of a plastic housing. Inside the switch are delicate, tiny items including a pin, disc, gasket, washer, converter, movable terminal, stationary contact, and tiny sheets of plastic to separate the exterior brake pressure fluid from these components. The tiny sheets are supposed to seal off the switch cavity from the brake fluid and other environmental agents that are all around it. However, if cracks develop in the seal that is between the gasket and the washer, these agents can enter the switch cavity through what is called the "Hexport area," and then attack the components of the switch.

This seal is made of Kapton and Teflon, materials developed and manufactured by Dupont. The seal, known interchangeably as a connector seal or Kapton seal, is composed of three square pieces of what looks like cellophane-type material. These three pieces are then crimped into position to form the seal.

The Kapton material only has a certain longevity and then begins to degrade. Once the connector seal or Kapton seal degrades to the point of perforation, contamination enters the switch cavity. Because the movable terminal and the stationary contact are always energized, if corrosion enters a switch cavity, it can cause the movable terminal to come into permanent contact with the stationary contact. Alternatively, corrosion can develop between the stationary contact and the movable terminal to create a constant contact between the battery and ground. As the material builds up, the current increases. Heat then builds up and, when it gets hot enough, the plastic housing of the switch cavity begins to melt. The melting opens the switch to external air causing ignition of the switch housing and connector. The fire then attacks the wiring harness located above the switch and spreads throughout the engine compartment.

In sum, the switch has the following design problems: (1) all the contacts in the switch cavity are constantly energized; (2) the switch is oriented in such a way that brake fluid can drip downward through the Hexport area into the switch cavity; (3) the Hexport is grounded; and (4) the container of the switch is made of plastic as opposed to ceramic or some other non-combustible material. Other factors that lead to the fire are heat and humidity, which explains the predominance of fires in during the Summer the Southeast and other states with high heat and/or humidity.

The Symptoms

In Ford's first recall, that of May 1999 on the Panther Platform series, it identified certain "vehicle symptoms" and other signs indicative of a switch problem:

[S]uch as: speed control not functioning, could not shift out of park, battery loads charge, brake lights not functioning, brake warning lamp illuminated, blown fuse number 12 and/or improper fuse in number 12 position. Laboratory analysis of switches returned from service found internal brake fluid leaks. Laboratory experiments demonstrated that internal leaks could result in internal corrosion in the switch which could create a conductive path to ground, ultimately resulting in sufficient internal heat to result in a fire. Some of the reports indicate visible flames were observed at the speed control deactivation switch while the vehicles were in for repair.

In addition, witness accounts of the fires indicate that the fire first appears in the front driver's side wheel assembly. The fire spreads from there, eventually consuming the hood and combustible material surrounding the car.

Judicially Declared Defect

Ford has denied in the media and in litigation that the switch is defective, despite the two sets of recalls. In at least one lawsuit, however, the issue of the defectiveness of the switch has been decided as a matter of fact and law by the court. In the case of *State Farm Mutual Automobile Insurance Company v. Ford Motor Company*, ___ So. 2d ___ (La. Ct. App., First Circuit, June 15, 2005), the Louisiana Court of Appeals announced:

The trial court found that a defectively designed and manufactured speed control deactivation switch, utilized in the vehicle's cruise control system, had caused the vehicle fire and resultant damage. We affirm on the basis that the switch is unreasonably dangerous in design.

The case involved a fire of September 1999 to a 1992 Lincoln Towncar owned by Emery Stephens with approximately 91,000 miles on it at the time of the fire. Even though the damages were under \$10,000, both State Farm (Stephens' subrogated insurer) and Ford treated this as a test case with much at stake in its outcome. The case was hotly litigated. The lengthy opinion details a classic "battle of the experts" between State Farm's expert, Ted Kaplon, and Ford's inhouse electrical engineering expert, Mark Hoffman. The court accepted both Kaplon and Hoffman as experts in the field of electrical engineering and fire cause and origination. Kaplon testified that the switch caused the fire. Hoffman testified that the switch did not cause the fire but that, instead, an after-market alarm system cause the fire. After a lengthy discussion of the opinions of the two experts, the court concluded:

Considering Stephens' testimony and the two permissible views in the testimony of the engineering experts, we find no manifest error in the trial court's conclusion that the speed control deactivation switch failed and caused the fire. Stephens testified that his vehicle had displayed warning signs identified by Ford

as problems that might affect the vehicle operation in the case of a defective switch. Stephens had noticed the illumination of his brake-warning lamp, and his speed control system had become inoperative prior to the fire. Although Kaplon [Plaintiff's expert] and Hoffman presented contrary views regarding the cause of the fire, the trial court found that Kaplon's testimony was more consistent with the physical evidence than Hoffman's testimony. The trial court further stated that while Kaplon had convinced him "beyond any doubt" that the switch had caused the fire, Hoffman had not convinced him that the alarm system had "anything to do with [the] fire."

The court went on to affirm the finding regarding defective design as follows:

Kaplon testified that Ford had designed the electrical system in the 1992 Town Cars such that the vehicle's battery provided twelve volts of power to the speed control deactivation switch whether the ignition switch was turned "on" or "off." He explained that the Stephens' Town Car fire would not have occurred if the switch had not been energized, and that the switch could "most definitely" have been designed so that it did not remain constantly energized when not in use. Kaplon described the speed control deactivation switch as an exemplar switch with two sides, one side being hydraulic and one side being electrical. He explained that Ford's investigation of the underhood fires revealed there was a crimping problem in the band that secured the two portions of the switch together. The design was susceptible to brake fluid leaking from the hydraulic side into the electrical side of the switch, which contaminated the electrical side of the switch and caused a corrosive ground fault and a conductive path within the switch. Kaplon explained that over a period of time, the switch generated sufficient heat to ignite the switch enclosure and the wiring harness surrounding it. Because the switch failure occurred over time, he explained that the mileage and age of the car were significant factors. Kaplon explained that the switch design was inherently dangerous due to its potential leakage problem and because it was constantly energized. He explained that the constant energization expedited the switch failure.

Kaplon further opined that a speed control deactivation switch should be designed such that it will last safely for the life of the vehicle. Alternatively, he stated that the switch should have been designed to fail in such a way that would not cause a fire. He further testified that a mechanical switch, used subsequently by Ford, presented a safer alternative. He explained that Ford's more recent design does not allow for brake fluid leakage; it is a mechanical switch activated by the brake pedal, which activates an electrical switch.

According to Hoffman, prior to using the hydraulic/electrical switch, Ford had used a vacuum-actuated speed control system in its Town Cars that preceded the 1992 model line. He explained that that speed deactivation in this previous system was accomplished by opening a valve, and the system did not involve electricity. He described it as being "very unlikely" to have caused a fire.

The record before us establishes that the constantly-energized hydraulic/electrical switch presented a risk of fire that Ford could have easily prevented. At the time

Stephens' 1992 Town Car left Ford's control, there existed one or more safer, alternative designs for the speed control deactivation switch which were available and could have been implemented by Ford and which would have prevented the risk of fire. Hoffman, Ford's own expert, testified that a vacuum-actuated speed control system, which had been previously implemented in earlier model Town Cars, did not present a risk of fire. The danger of the risk of fire and the serious damages that might result clearly outweighed any benefit any benefit that may have resulted from the use of the constantly energized, hydraulic/electrical switch in the vehicle's speed control system. The evidence revealed no adverse effects that might have resulted from the use of an alternative design. Accordingly, we find that the trial court reasonably concluded that Ford should have employed an alternative design for the switch and that the switch was unreasonably dangerous in design.

The Switch Task Force

With a judicially declared defect, the task of proving the defect would now seem easy. But it is not. Ford will not roll over. Each case must stand or fall on its own merit. Proving each claim requires thorough and diligent determination.

To meet the likes of the Ford "Switch Team," Cozen O'Connor has developed a team of its own: The Switch Task Force. The Force consisted of a select attorneys armed with specialized knowledge from having litigated innumerable car fire cases.

The current recall campaigns may only be the tip of the iceberg, or the fire before the firestorm. The switch is substantially **similar in** millions of vehicles, yet less than one million are under **recall**. The claims may roll in for years to come. Cozen O'Connor stands ready to meet them as early as possible.

Ford recalling 3.8 million vehicles

Trucks and SUVs recalled for switch that could **cause** fires. Also, Toyota **issues** service bulletin.

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NEW YORK (CNN) - In **one of the largest recalls in automaker history**, Ford Motor Co. said Wednesday **if is recalling 3.8 million pickup trucks and SUVs for a cruise control switch that has caused engine fires, even with the vehicle parked and the engine off.**

The recall includes 1994-2002 model-years of F-150 pickup truck, Ford Expedition, Lincoln Navigator and Ford Broncos.

Ford had already recalled more than 1 million year 2000 vehicles in two separate recalls to replace the cruise control switch.

CNN launched an investigation into the fires earlier this year after receiving complaints from numerous Ford owners who said their vehicles caught fire when their engines were off and the keys weren't in the ignition. And in March, the National Highway Traffic Safety Administration opened an expanded investigation into the 3.8 million vehicles, after receiving 660 complaints of spontaneous fires.

The switch, which costs about \$20, shuts off the cruise control when the driver firmly steps on the brakes. The switch is located under the hood of the vehicle and is attached to the brake master cylinder on one end and wired to the cruise control on the other.

On most of its models, Ford designed the switch to be powered -- or "hot" -- at all times, even when the vehicle is off. Inside the switch, a thin film barrier separates brake fluid from the switch's electrical components.

Investigators say fires can occur when the film cracks and brake fluid from the master cylinder seeps into the electrical side of the switch, corroding it. In its statement Wednesday, Ford said its investigation found that to be true.

"In rare cases, the corrosion in the electrical components can lead to increasing resistance and higher electrical current flow through the system," the company said. "Together, these conditions could lead to overheating and, possibly, a fire at the switch. This system interaction is the result of the close proximity and orientation of the speed control components in the recalled vehicles."

Ford said to fix the problem it will install a "fused wiring harness between the speed control deactivation switch and the speed control mechanism of the affected vehicles."

"This will act as a circuit breaker, eliminating the electrical current to the switch in the rare event of increased current flow through the switch," the company said.

Ray Nevi, the assistant director at Ford, said, "Our customers can be confident that this action will prevent a speed control deactivation switch fire."

He added, "Our investigation was complex because the root cause turned out to be a system interaction rather than a single component and we had very few confirmed incidents to analyze. Despite this complexity, our solution effectively addresses the cause."

The company **said that until the replacement parts are available, customers driving the vehicles in question "are instructed to take their vehicles to a Ford or Lincoln Mercury dealership to have the speed control deactivated."**

Ford said it would be notifying owners by mail. More information is available on the Web at **www.genuineservice.com, or via a hotline at Ford's Customer Relationship Center at 1-888-222-2751.**

Also, Toyota announced Tuesday that it will issue a voluntary "Special Service Campaign" in co-operation with NHTSA. The campaign involves certain power-steering equipped 1989-1996 4Runner SUVs, compact pick-ups and T-100 pick-ups.

In these vehicles, a crack can develop in the steering relay rod if the steering wheel is turned repeatedly under conditions requiring extreme force, such as when the vehicle is stopped. In the worst possible case, the company said, the rod may fracture causing a loss of steering control.

Owners of these vehicles will be notified by mail, Toyota said, beginning in mid-September. Customers with questions are directed to contact Toyota customer service at 800-331-4331.

NHTSA spokesman Rae Tyson said the Ford recall is the fifth largest auto recall in the nation's history. The four **other top recalls of cars:**

- In 1996, Ford recalled 7.9 million vehicles for faulty ignitions -**
- In 1971, GM recalled 6.7 million vehicles for engine failure**
- In 1981, GM recalled 5.8 million vehicles for a rear axle problem**
- In 1972, Ford recalled 4.1 million vehicles for a shoulder-belt problem**

A Wider Inquiry on Fires in Ford Trucks

By JEREMY W. PETERS

DETROIT, July 22 - As Ford Motor faces numerous lawsuits and tries to determine why hundreds of its trucks have burst into flames, federal authorities have widened their investigation into whether a faulty cruise control switch is causing the fires.

The families of two people killed in fires that the families say erupted from the trucks have sued Ford, and a third family is expected to file a wrongful-death suit next week. The National Highway Traffic Safety Administration has also stepped up pressure on Ford, expanding its investigation to include more than 3.7 million Lincoln Navigators, Ford Expeditions and F-150 pickup trucks, the nation's best-selling vehicle.

The investigation centers on a switch in the trucks that disables the cruise control when the driver steps on the brake pedal. The safety administration is investigating the possibility that flammable hydraulic fluid, is somehow leaking into the electrical component of the switch and sparking the fires.

The agency has received reports of 512 fires across the country that may be tied to the switches. Lawyers representing the families of three people who died in fires linked to the trucks say the switches are to blame.

In addition, property damage law-

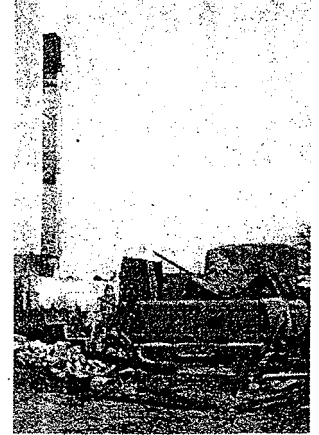
suits have been filed in several states where houses have burned to the ground, with residents blaming truck fires in adjacent garages. However, questions remain about exactly how the fires erupt.

Circumstances surrounding some of the fires make it difficult to determine whether Ford is to blame. In one case, Earl Mohils and his wife, Dolly, were asleep in their home in Westgate, Iowa, when their house caught fire on May 2. According to the lawsuit the Mohils family filed last month, the fire started in their 1996 F-156 pickup and soon consumed the garage and then the entire house. Mr. Mohils made it out alive but Dolly, his wife of 34 years, did not. The family's lawyers say evidence points to the truck, but Ford



Photographs courtesy of Willis Law Firm

A fire May 2 in Westgate, Iowa, that destroyed the home of Earl Mohils, at left, and killed his wife, Dolly, began in the couple's Ford truck, the family's lawyers say. Ford says the fire started elsewhere in the garage.



More than 3.7 million pickups from model years 1995 to 2000 and 2002 are suspect.

asserts that the fire began somewhere else in the garage.

"My wife is dead," Mr. Mohils, 76, said in a telephone interview. He said he has breathing problems from inhaling smoke during the fire and is still suffering from his wife's death. "I don't know what's the matter with me. I got the blues. Everything is wrong."

The safety administration opened an investigation late last year into certain 2000 models of the F-150, Expedition and Navigator after owners began reporting fires. It tabled that

inquiry once Ford agreed to a voluntary recall of the trucks, a total of about 736,000.

But the fires continued to erupt, this time in different model years of the same trucks. Just a few weeks af

ter the agency called off its first investigation in March, it opened up an expanded inquiry into more than 1 million F-150's, Expeditions and Navigators from model years 1995 through 2000 and 2002. All those trucks have the switch suspected to be causing the fires. In addition, the switch has been installed in 16 million Ford vehicles but appears to be malfunctioning in only the F-150, Ex-

pedition and Navigator.

Ford says it does not have any proof that the switches are part of the problem.

"We don't know if these switches are an issue and that's part of our investigation," a Ford spokeswoman, Kristen Kihley, said.

In some Ford models, the switch is always receiving power from the car battery, even when the engine is off. Investigators are considering the possibility that the constant flow of electricity increases the risk of fire.

In Royal, Ark., the family of Jonnie Pope believes that a faulty cruise control switch is to blame for his death: In November, 2003, Mr. Pope, who was 55 when he died, and his brother Gary, now 49, were on their way to their grandmother's house when they stopped for gas. As Jonnie was pumping gas, a fire started in the front of the truck and spread toward the rear. He got into the truck and tried to drive it away from the gas station but burned to death before he could get out.

"Everything seems to indicate that the fire started in the Ford F-150," said Bradley L. Leger, a law-

yer in Houston representing the Pope family. Mr. Leger said that once investigators finish examining the truck, he expects to file a wrongful death lawsuit against Ford. That could happen as early as next week.

Completing the federal investigation, and a decision from the safety administration about whether to order a recall, could require more than a year.

Rae Tyson, a spokesman for the safety administration, said, "This one is as complicated as they get."