When motorists get burned

J. Kent Emison

A person should not survive a crash only to be burned in a vehicle fire. When it happens, a fuel-system defect could be the cause.

Vehicle fire cases, particularly those resulting from the improper placement of fuel tanks, are among the most powerful to present to a jury. Some of the largest plaintiff victories in auto product liability litigation have involved fuel-tank defects.[1]

While fuel-tank-location cases continue to be compelling, two relatively new theories—involving siphoning and filler-neck defects—are emerging in this litigation. Virtually every jury that has considered the siphoning-defect theory has found the vehicle defective.[2]

Manufacturers concede that a vehicle occupant should not survive a collision only to burn to death in a fire caused by a fuel leak. But their actions over the past three decades have consigned thousands of motorists to this fate. General Motors (GM) engineers advised the company's management more than 30 years ago that fuel leaks should not occur in crashes that would not otherwise be fatal.[3] GM, as well as other manufacturers, failed to adopt this viewpoint and instead chose to comply with the minimum standards imposed by Federal Motor Vehicle Safety Standard (FMVSS) 301.[4]

Around the same time, the company prepared a "value analysis" that examined the cost of fire-related fatalities to GM. The analysis, prepared by GM advance-design engineer Edward Ivey, has become known as the "Ivey memo." Ivey concluded that the company could save $2.20 per new car if it could prevent fuel-fed fires in all crashes.[5]

The Ivey memo was admitted into evidence for the first time in *Baker v. General Motors Corp.*, which involved a vehicle fire that claimed the life of Beverly Garner, a passenger in a 1985 Chevrolet S10 Blazer.[6] Ronald Elwell, a GM engineer for over 30 years, testified at the trial and explained the significance of the memo as follows:

> Value analysis says all we have got is $2.20 to play with, if you will. We can either put that money in a fuel tank, put that money in a fuel pump, put that money in a fuel line, but, in our opinion, in order to save these people from dying, we can only put $2.20 into the new cars.[7]

Thousands of people have been killed and injured in vehicle fires as a result of management decisions that stressed profit over safety. A recent report by the National Fire Protection Association (NFPA) estimated that, over the past 20 years, 13,580 people died and 59,800 people were injured in vehicle fires.[8]

While safety developments and vehicle technology have improved dramatically over the past 30 years, the number of vehicle fires has remained relatively constant. NFPA estimated that between 1996 and 1998, an average of more than 295,000 fires occurred in "passenger road vehicles." These include automobiles, trucks, motor homes, all-terrain vehicles, and buses.[9]

Fires in which gasoline was the first fuel ignited accounted for 60 percent of deaths and 40 percent of burn injuries.[10]

Deaths and injuries from vehicle fires continue to occur because manufacturers are required to comply with only minimum standards for fuel-system integrity set forth in FMVSS 301.[11] That standard requires auto manufacturers to certify that their vehicles comply with specified impact tests at speeds of 20-30 mph without leaking more than one ounce of fuel per minute.

These tests—during which vehicles crash into barriers, not other vehicles—do not

J. Kent Emison is a partner in Langdon, Emison, Kuhlman & Evans in Lexington, Missouri.

simulate "real world" crashes at highway speeds. A study conducted by the National Highway Traffic Safety Administration (NHTSA) found that FMVSS 301 had resulted in no significant reduction of fatalities from crashes involving vehicle fires.

The siphoning defect

When a vehicle fire occurs after a crash, it is common to assume that there was a leak in the fuel tank. While leaks remain a major problem, an equally important defect is the siphoning of gasoline from the tank.

Siphoning is simply the flow of a liquid—in this case gasoline—caused by pressure between the source of the liquid (the fuel tank) and a discharge point, such as a break in the fuel line. Siphoning can result from either gravity or pressure in the fuel system.

The siphoned fuel can be ignited by a variety of sources. The most common ignition source is "sparks"—triggered by the vehicle's electrical components or metal contacting metal or roadway—that occur during or after the collision.[12]

Most vehicles manufactured after the early 1980s have three fuel lines: supply, return, and vapor lines. Siphoning occurs most often in the return line or supply line.

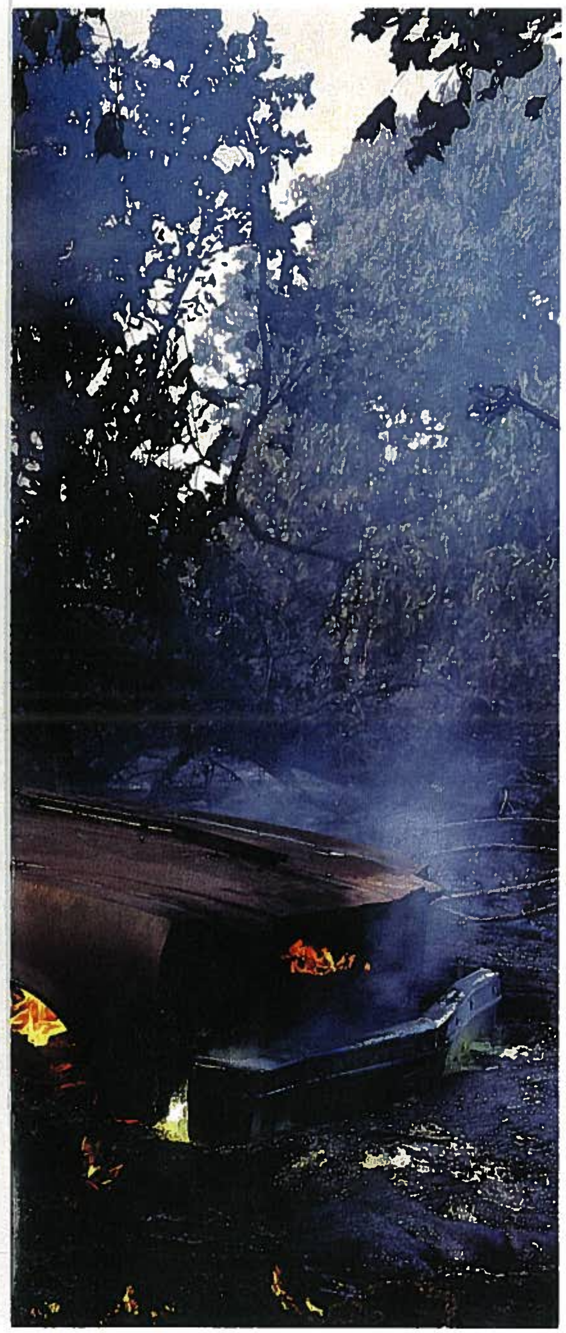
An attorney investigating a siphoning case must determine the location of the break in the fuel line, the fluid level in the tank, and the orientation of the vehicle at the crash scene. If the break is lower than the fluid level in the tank, siphoning will occur because of gravity. If the break is above the fluid level, there must be adequate tank vapor pressure to force gasoline to siphon upward.

Juries have been highly receptive to plaintiffs' claims of siphoning defects. One of the first cases that went to trial resulted in a record verdict in Maryland.[13]

Siphoning cases are so successful for three primary reasons. First, the defect is easy for the jury to understand. While the scientific principles of siphoning may be

somewhat technical, the concept is relatively simple. Most jurors will understand that gas will siphon from fuel tanks. Second, vehicle manufacturers have known how to repair the defect for many years. Finally, the cost of the safety device to prevent siphoning is minimal.

GM went so far as to develop a siphon test in 1988 for its fuel system, but declined to implement it.[14] The company had developed a mechanism to prevent siphoning, which simply consisted of a vent hole in the fuel-return line inside the tank, above the fill level for the gas. GM incorporated this device on a very limited number of models in the late 1980s. Some current vehicle components—including fuel pumps, reservoirs, and filters—incorporate valves that will prevent siphoning if there is a break in the fuel line.



Many inexpensive safety valves have been available for years, including "duckbill" valves; "plate-type" check valves; and ball-and-socket float-check valves. These devices are simple in design, and the attorney can easily demonstrate for a jury how they work.

Industry documents

The automotive industry has known for many years that siphoning can contribute to post-collision fires. GM documents dating back to the early 1970s establish that the company knew about the danger and evaluated the cost of incorporating a shutoff valve inside the tank.[15]

GM engineers discussed several "solutions" to prevent siphoning after it was discovered that a car siphoned fuel from its tank in a 50-mph crash test into a pole. These included shutoff valves inside the tank; check valves at the tank; various shutoff connectors; and a vent hole in the fuel line at the tank.[16]

Ford documents from the same period also discuss the hazard and various check or shutoff valves that would solve the problem.[17]

GM continued to discuss the siphoning problem in the mid-1980s, but it incorporated safety features into only a few of its models. According to minutes of a GM Fuel System Technical Communications Committee meeting in 1986, "GM 10 management continues to insist that an antisiphon feature is required on the 'fuel sender return line.'"[18]

GM 10 was a generic name GM used to describe a platform of vehicles that included the Pontiac Grand Prix, Chevrolet Lumina and Monte Carlo, and the Oldsmobile Cutlass. GM 10 management was in charge of the platform of vehicles, but GM's upper management rejected their conclusion.

GM experts testifying in court have consistently denied that siphoning can occur in a collision. However, in a recent case, the company stipulated to this fact: "If a split in the fuel-supply line occurred as alleged by the plaintiffs, gasoline would siphon out of that split when the vehicle came to rest following the collision."[19]

If a vehicle fire occurs but the fuel tank is intact, the attorney should determine whether gas could have siphoned from the tank. Siphoning is a common occurrence if no safety features are incorporated into the fuel system.

The filler-neck defect

Manufacturers have known since the 1960s that check valves or other safety devices should be incorporated into the filler necks of fuel tanks to prevent the escape of gas during a collision. However, with only a few exceptions, automakers have failed to equip vehicles with these valves, and this defect has led to unnecessary injury and death in collisions.

The U.S. Department of Transportation (DOT) and the National Highway Safety Bureau (NHSB)—the predecessor to the National Highway Traffic Safety Administration—issued a report in 1967 concerning performance standards for fuel-tank protection.[20] The agencies found that it was common for fuel to spill from the fuel-filler pipe in a rollover or other type of crash and concluded that check valves located in the pipe would eliminate spillage:

> Information received from accident data reports indicate[s] that the rollover type of accident accounts for the highest incidence of fatal burn injuries. In a rollover accident, fuel is often spilled from a virtually intact system. Separation of the filler pipe from the body shell or from the tank opens a large exit for the fuel. Also, the vent pipe of the tank can spill during and following an overturning accident.
>
> Check valves located at the filler-pipe and vent-pipe openings of a fuel tank would eliminate spillage during rollover or upset. These check valves might be gravity operated, spring loaded, or operated by vacuum from the engine. There is at least one source of a check-valve assembly which may be purchased for installation in stock cars used in NASCAR-sponsored races.[21]

The Sports Car Center, a racing organization, advised NHSB in 1968 that check valves effectively prevented fuel spills because the one-way filler valve is open only during refueling.[22]

A 1969 DOT report acknowledged the filler-neck problem, calling it the source of post-crash fires. The report said the integrity of the filler pipe and its connection to the fuel tank after the crash depends on many variables. For example, the filler cap might be near the vehicle's external body metal or completely exposed. The short, flexible hose connections in many passenger vehicles can split open if the filler pipe is displaced.[23]

In 1970, General Motors identified the solution to the problem in a memorandum that discussed a proposed modification to FMVSS 301, the fuel-system-integrity standard:

> The rollover problem is two-fold. [N]ot only must the system not leak as designed, but it must survive severe front and rear impacts. Due to the usual poor repeatability of crash tests, it may be necessary to put emergency no-flow devices in each line emerging from the tank.[24]

The concept of a check valve for the fuel-filler pipe is nearly as old as automobiles themselves. Patents dating back to the 1930s refer to these devices. The early patents discuss "flapper valves," which were originally designed to prevent intentional siphoning of gas from the tank. These valves were later designed to stop the flow of gasoline out of the fuel tank in a collision.

In more recent years, the government has issued numerous patents for filler-pipe check valves.[25]

Manufacturers are slowly beginning to incorporate these valves into vehicle designs, but currently, they are featured in only a few models: the 1993 Toyota Cressida four-door wagon, the 1983 Volkswagen Jetta, the 1993 Chevrolet Geo Tracker 4X2, the 1996 Chevrolet Geo Tracker 4X4, the 1998 Saab 900SE, the 2000 Chevrolet Malibu LS, and the 2000 Pontiac Sunfire two-door coupe.

While safety developments and vehicle technology have improved dramatically over the past 30 years, the number of vehicle fires has remained relatively constant.

An attorney handling a vehicle-fire case should investigate whether a fuel spill from the filler neck led to the blaze. If so—and if the car was not equipped with a check valve—the plaintiff should argue that the filler neck was defective and that a simple, well-known safety device could have prevented the car's occupants from suffering injury or death from the fire.

Vehicle fires remain a significant auto safety problem. While fuel-tank-location cases might continue to be common, attorneys should always consider whether the case involves a siphoning defect or a defect associated with the filler neck of the fuel tank. ❒

Notes

1. *See* Grimshaw v. Ford Motor Co., 174 Cal. Rptr. 348 (Ct. App. 1981); Gen. Motors Corp. v. Moseley, 447 S.E.2d 302 (Ga. Ct. App. 1994); McGee v. Gen. Motors Corp., No. 92-2358227 (Fla., Broward County Cir. Ct. May 18, 1998); Anderson v. Gen. Motors Corp., No. BC 116926 (Cal., Los Angeles County Super. Ct. July 9, 1999).

2. Wasilik v. Ford Motor Co., No. 95264025 CL202371, (Md., Baltimore County Cir. Ct. Nov. 13, 1996); Kibler v. Gen. Motors Corp., No. C94-1494R (W.D. Wash. Feb. 4, 1997); Iracheta v. Gen. Motors Corp., No. 97-CVE-01382-D1 (Tex., Webb County Dist. Ct. Nov. 3, 2000).

3. RONALD E. ELWELL, ET AL., ABSTRACT OF PRESENTATION ON FUEL SYSTEM INTEGRITY (May 19, 1972) (on file with author).

4. 49 C.F.R. pt. 571.301 (2001).

5. Memorandum from Edward C. Ivey, Advance-Design Engineer, General Motors Corp. (June 29, 1973). The Ivey memo and related documents can be found at www.safetyforum.com/gmft.

6. Baker v. Gen. Motors Corp., No. 91-0991-CV-W-8 (W.D. Mo. Aug. 18, 1993).

7. *Id.* Trial testimony of Ronald E. Elwell, at 418-19.

8. MARTY AHRENS, NAT'L FIRE PROTECTION ASS'N, SELECTIONS FROM U.S. VEHICLE TRENDS & PATTERNS, PASSENGER ROAD TRANSP. FIRES 5 (Aug. 2001).

9. *Id.* at 12.

10. *Id.*

11. 49 C.F.R. pt. 571.301. The regulation was first enacted by NHTSA in 1967 to apply only to passenger cars manufactured after Jan. 1, 1968. Initially, FMVSS 301 only applied to frontal impacts. Between 1975 and 1977, the standard was revised to apply to rollovers, side and rear impacts, and light trucks and school buses.

12. *See* THOMAS E. GREEN, AUTOMOTIVE FUEL LINE SIPHONING: CAUSES, CONSEQUENCES AND COUNTERMEASURES (Soc'y of Auto. Eng'rs Paper No. 980561, 1998).

13. *Wasilik*, No. 95264025CL202371.

14. General Motors Fuel System Technical Communications Committee Meeting Minutes, Feb. 9, 1988.

15. General Motors Experimental Laboratory Report L-71091, Project No. 1045, Jan. 1971, GM 1973 Truck Program (Jan. 19, 1971) (on file with author).

16. General Motors Meeting Minutes, Mar. 23, 1972 (on file with author).

17. Ford EED-PEO Memo: 198X Electric Fuel Pump Systems (Oct. 31, 1979) (on file with author).

18. General Motors Fuel System Technical Communications Committee Meeting Minutes, July 8, 1986.

19. Taylor v. Gen. Motors Corp., No. 4:98-CV-467-CEJ (E.D. Mo. filed June 1, 2000).

20. U.S. DEP'T OF TRANSP. & NAT'L HIGHWAY SAFETY BUREAU, INVESTIGATION OF MOTOR VEHICLE PERFORMANCE STANDARDS FOR FUEL TANK PROTECTION (1967).

21. *Id.* at 4-28.

22. RICHARD V. STANLEY, SPORTS CAR CENTER, RESPONSE TO FMVSS 301, DOCKET 3-1, FUEL TANKS (Mar. 6, 1968) (on file with author).

23. FAIRCHILD HILLER, U.S. DEP'T OF TRANSP., FUEL TANK PROTECTION: FINAL REPORT 3-10 (1969).

24. General Motors Internal Memorandum, Proposed Fuel System Standard Docket 70-20 N1, FMVSS 301 (Sept. 9, 1970).

25. U.S. Patent No. 5,590,697 (Jan. 7, 1997). The author has, on file, more than 50 patents that discuss or refer to fuel-tank check valves or similar devices, dating back to 1936.