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News Story

Mechanic Awarded \$2.25M For Exploding Battery

Accident Occurred As He Checked Front-Loader

By Aaron Brown

A 37-year-old mechanic who was blinded in one eye when a battery exploded has won \$2.25 million in his Jackson County products liability case.

Kevin Knifong, who worked at a concrete plant, was trying to fix a stalled front-loader when the explosion occurred. He sued Caterpillar, which made the front-loader, together with the manufacturer of the battery and the battery's casing.

After the other parties settled, the case went to trial against Caterpillar.

Knifong claimed that the accident occurred because of a design flaw in the battery. Instead of allowing potentially explosive gases to dissipate harmlessly up and away, he said, the battery's vent caps directed the gases in a stream down towards the battery. A spark, presumably from the battery's terminals, ignited the gas, which led to the explosion.

Caterpillar argued that Knifong improperly removed a vent cap, which created an opening for the spark to reach the inside of the battery. The company also said Knifong should have been wearing safety glasses.

After an eight-day trial, the jury assessed Knifong's damages at \$2.5 million and allocated 10 percent of the fault to him, for a final verdict of \$2.25 million. According to Grant L. Davis of Kansas City, attorney for Knifong, the award exceeds \$3.25 million with pre-judgment interest.

"This explosion occurred because of a very poor design," said Davis, who was assisted by Scott Bethune of Davis, Bethune & Jones, and by Margaret Dean of Kansas City. "Even their expert agreed it was a design he had never seen before, and he had been in the battery industry forever.

"And Caterpillar's corporate representative admitted that when he saw the vent-cap design, it scared him to death. He said he definitely thought it was unreasonably dangerous."

Davis added that the case was complicated by language barriers — depositions taken in France of the battery manufacturer required interpreters.

Caterpillar's attorney did not respond to a request for comment on this case.

Accident

The accident occurred on Oct. 30, 1996, when the mechanic, Kevin Knifong, was working for the Lafarge Corp. at a ready-mix concrete plant in Blue Springs, Mo.

Knifong was asked to take a look at a front-loader manufactured by Caterpillar that would not start. The

vehicle was about 1 year old at the time.

Knifong first checked to confirm that the battery was charged, and removed one of the battery's vent caps to see whether it needed to have water added. After replacing the cap, he attempted to replace the rubber boot on the negative terminal, when the battery exploded, sending acid "with the force of a roman candle" into his face and eyes, Davis said.

Knifong suffered burns to his face, and initially was unable to see from either eye. Within two weeks he recovered the sight in his left eye, but never was able to see with his right eye again.

Damages

In addition to losing his eyesight, Knifong continues to suffer from headaches and dizziness, Davis said.

Although the jury was told that Knifong would suffer a reduction in future wages as a result of his injuries, the main damages case focused on the effects of his loss of depth perception on his daily activities, Davis said.

Before the injury, he was very active as a hunter, and also rode and roped horses in shows, Davis said. He also played basketball and helped his children in their sporting activities.

Little of that is now possible without the vision in his right eye, he said. "This is a guy who, if you toss him his keys, he can't even catch them. He certainly can't hunt anymore, or rope horses, or pass and shoot in basketball.

"And he's become a very poor driver now, too. He runs off the road, and he can't pass a Department of Transportation physical for his commercial driver's license. This has profoundly changed his life."

Light Gases

The most likely culprit in a battery explosion is the hydrogen gas that is produced as a natural result of the chemical reactions inside the battery, combined with sparks that frequently occur inside an engine, Davis said.

"One of the main issues in battery design is creating a way for the gas to get out without creating a way for sparks to get in," he said. "And sparks happen all around a battery — it's a given of the engine environment.

"So you need a kind of one-way valve to let the gas out without letting the sparks in."

The task is made a bit easier by the fact that hydrogen gas is so light, Davis said. When vented upwards from the top of the battery, the gas will move up and away from the battery, dissipating harmlessly into the surrounding air.

But a serious problem with the design of the battery in the front-loader was that the vent caps sent the gas downward, toward the battery.

Even worse, the caps sent the gas downward in a concentrated stream from a single small hole, rather than allowing the gas to be dispersed from a broader area through a series of holes.

"Most vent caps have many holes around a ring," he said. "This allows the gas to emerge without much force or direction. It's like the difference between allowing water to bubble from a garden hose, and having the water shoot from the hose when you partly close it off with your finger."

The single downward-facing hole in the battery's vent caps acted just like a partly covered garden hose, sending a stream of gas down towards the battery casing, he said.

Light the gas with a spark and you have the beginnings of a Bunsen burner effect, Davis said. Once a continuous flame had begun, it was only a matter of time until the case was melted through and the battery

exploded.

"If the gas had been vented as normally occurs with vehicle batteries, the gas would have drifted out, and there would have been, at most, a puff rather than a sustained flame," he said. "But this design allowed a sustained flame to develop, leading to a melted casing, a compromised seal, and ultimately contact between the flame and the hydrogen inside the battery."

Davis noted that the most likely source of the spark was the battery terminals, but that other possible sources in the engine compartment were plentiful. "It doesn't really matter where it came from," he said. "It could have been from a guy on the tractor turning a key. The point is, it's a reasonably anticipated use for the battery to be around sparks. It's supposed to be able to survive sparks without exploding."

Company's Theory

The company's theory claimed that Knifong took a vent cap off to check the water levels, then left the cap off, exposing hydrogen in the battery to sparks from the engine.

"This was not a maintenance-free battery, so you needed to check the water levels now and then and replenish the water as needed," Davis said. "But his testimony is that he replaced the cap after he checked the battery, and there's no reason to believe that he wouldn't have replaced it."

And even more troubling for the company's theory, Davis said, was the fact that there was very little chance that an explosion would have occurred even if Knifong had left the cap off. The reason is the very tendency of hydrogen gas to dissipate quickly when given an upward path to follow and more than a pinhole through which to migrate.

"If he had left the vent cap off, the hydrogen would have dispersed too quickly to cause a large explosion," he said. "At most, there would have been a small explosion that would have cracked the case. But there wouldn't have been the contained energy for an explosion like the one that occurred."

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