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Pyrolysis - A Viable Recovery Theory

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Pyrolysis is the chemical decomposition of organic material caused by extended exposure to heat. When pyrolysis of wood occurs, the originally complex chemical compound degrades into more simple, but more volatile, chemical compounds. Further, the cracking and splitting of wood as it dries from exposure to heat increases the surface area exposed to oxygen, further aiding combustion. Pyrolysis explains why it may take years for a certain heat source to cause a fire. Many fire loss experts have relied on this theory in finding that wood can be ignited by long-term exposure to temperatures below the normal ignition temperature of the material. However, some subrogation professionals have been reluctant to rely on the pyrolysis theory after the decision of the U.S. District Court of Appeals for the 10th Circuit in *Truck Insurance v. MagneTek 360 F. 3d 1206 (10th Cir. 2004).* The good news is that pyrolysis is still a viable theory of recovery in spite of the *MagneTek* decision.

The MagneTek Case

In November 1998, a fire destroyed Sammy's Restaurant in Lakewood, Colo., causing more than $1.5 million in damages. Plaintiff's experts narrowed the origin to an area containing a fluorescent light fixture. The fixture was equipped with a thermal protector that was intended to shut off power if the fixture temperature exceeded 232° Fahrenheit, well below the 400°F generally believed to be the minimum temperature necessary to ignite wood. Although testing of the ballast component revealed that it reached 340°F before shutting off, this was still below the ignition temperature. Plaintiff's experts concluded that the defective ballast did indeed cause the fire, finding that ignition occurred as a result of extended exposure to the heat generated by the defective ballast. In short, the plaintiff's experts believed that the fire was caused by pyrolysis.

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MagneTek challenged the pyrolysis theory under the Supreme Court's four-part test in *Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993).* The district court agreed, finding that the expert's conclusion was not based on sufficiently reliable scientific theory. Summary judgment was granted in favor of MagneTek and was upheld on appeal. But why did the pyrolysis theory fail in *MagneTek*?

The plaintiff's experts and the public and private sector fire investigators who inspected the fire site agreed that the fire originated between the ceiling and the floor. They also agreed that the only source of ignition in the area of origin was a fluorescent light fixture and electrical wiring. The wiring in the ceiling exhibited no evidence of a short circuit or malfunction, but testing of the light fixture revealed the defective operation of the ballast component. Specifically, the defective

ballast could reach temperatures between 300°F and 340°F. An investigation further established that the adjacent wood structures had been exposed to these temperatures for a long time. From there, the plaintiff's experts relied upon a number of books and articles concerning low-temperature ignition of wood by the process of pyrolysis. However, they did not conduct their own physical testing to prove the pyrolysis theory. In upholding the lower court's decision to exclude the testimony of the plaintiff's experts, the 10th Circuit Court held that the books and articles relied upon were not an adequate basis for the experts' opinions.

Does this mean that the pyrolysis theory is dead?

Proving Pyrolysis

The decision in *Truck Insurance v. MagneTek* does not state a new rule of law eliminating pyrolysis as a viable theory of recovery. Instead, it puts all plaintiffs on notice that they cannot simply rely on existing books, articles, and research to successfully advance the theory. Different evidence could warrant a different conclusion.

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Between 1998 and 2003, there were several fires involving cheese melters in the kitchens of a particular chain of casual-dining restaurants. The cheese melters were all similar in design and were installed in approximately the same manner. The melting machines generally were wall-mounted with a bracket that was bolted to the wall. Typically, the wall was covered with a polished sheet metal backsplash. Mounting instructions for the cheese melter stated that it could be mounted directly against combustibles on the back side of the machine and even suggested that three-quarter-inch plywood could be used behind the metal backsplash for structural support.

Investigators concluded that these fires had originated in the wall behind the cheese melters. The company that owned these restaurants hired an engineer who removed the sheathing from the wall behind undamaged cheese melters at several other restaurants. The purpose was to examine the wood into which the mounting-bracket bolts were secured. This testing revealed charred wood at the undamaged locations.

While this testing was under way, another similar restaurant fire occurred, but this time, the fire was discovered and extinguished at a very early stage. An investigation revealed heavy charring where the mounting bolts for the cheese melter had been attached to the wood. It appeared that the fire originated at the points where the mounting bolts were secured to the wood. But does this prove ignition by pyrolysis?

Before being offered for sale, cheese melters had been tested pursuant to an accepted national standard. If temperatures recorded on the wall to which the cheese melter was mounted did not exceed approximately 200°F after eight hours of operation, the appliance was considered safe for mounting on a combustible wall. Unfortunately, when the manufacturer of the cheese melter conducted the tests for standard compliance, they did not consider the very common practice of wall-mounting cheese melters under commercial exhaust hoods and over other commercial cooking appliances. The heat from these other cooking appliances contributes to higher temperatures on the wall behind the cheese melter.

The engineer working for the company that owned the restaurants decided to repeat the manufacturer's test, but this time with other cooking appliances below the cheese melter. The seller of the cheese melter also decided to conduct the same test, and both obtained similar results. When the cheese melter is mounted over and near other cooking appliances, the cheese melter mounting bracket and mounting bolts can reach temperatures of up to 316°F. This testing further showed that the test wall began to smolder at temperatures well below the generally accepted ignition temperature of wood.

Several significant pieces of information came from the investigation of the cheese-melter fires. First, charring and ignition of wood was observed at the points where mounting bolts passed through the wood. Second, the testing performed by both the restaurant owner and the maker of the cheese melter provided solid data concerning the temperatures at the mounting bolts under normal operating conditions and, more importantly, the test data supported the theory that ignition will occur from extended exposure to heat at temperatures below the normally accepted ignition temperature of a material. Moreover, ignition under these circumstances could occur in a matter of days, not years. This is the sort of testing and research that goes beyond the scientific literature that the 10th Circuit Court found too weak to prove pyrolysis in the *MagneTek* case.

The Pyrolysis Theory: Alive and Well

In *MagneTek*, the plaintiff was unable to establish through scientific literature that ignition could occur from long-term exposure to temperatures below a material's ignition temperature. The trial court held that the plaintiff's experts' theory did not pass the four-part *Daubert* test and the 10th Circuit Court of Appeals held that the trial court did not abuse its discretion in reaching its conclusion. This does not mean that pyrolysis cannot be proven. It simply means that it was not proven in the *MagneTek* case.

In the cheese-melter cases, field testing and observation established that ignition could occur from extended exposure to temperatures below the ignition temperature of a material in a relatively short time period. This kind of evidence is much more likely to survive a *Daubert* challenge. The difference is opportunity, diligence, and effort. The existence of multiple restaurants with similar cheese-melter installations presented an opportunity. It allowed for examination and comparison of similar installations for wood charring. In the end, the diligence and effort of field testing further bolstered the pyrolysis theory in the cheese-melter cases to create a strong case for recovery.

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Pyrolysis is a challenging but viable theory of recovery. While subrogation professionals should not be reluctant to rely on the pyrolysis theory, they are cautioned to consider the implications of the cases and circumstances discussed here. ▲

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