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## SOLVING THE RESTAURANT KITCHEN FIRE MYSTERY

### HOW A SEEMINGLY MINOR DETAIL CAUSED A MAJOR LOSS

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With all the high-tech tools investigators use in today's fire scene origin and cause investigations, many times the most important technique is as old as time itself—attention to detail delivers results every time.





### THE CASE

Fire Investigator Russ Wilson, CFI, CFEL, received a call from a national insurance company to investigate a reported fryer malfunction resulting in a major kitchen fire at a national chain restaurant. Total damage was estimated to be over \$100,000. The fire occurred while workers were preparing food for the lunchtime crowd before the restaurant opened to the public. Upon arrival that same day, Russ talked to an employee in the kitchen area where the fire started, as well as his manager. The employee initially said he had turned on the fryer to warm it up, went to the other side of the kitchen, and then went into an office to answer a phone call. Shortly thereafter, the employee looked out to see heavy smoke and fire rolling from the fryer. The employee said he pulled the manual lever activating the fire suppression system mounted inside the hood above the fryer before leaving the burning building.



BURNED PLASTIC AND CARDBOARD

### LEAVING NO FRYER BASKET UNTURNED

Russ then examined the fryer and could tell right away that the fire did not come from the mechanical system of the fryer. He also observed that the kitchen's fire suppression system did not work properly. The system is designed to dump an extinguishing agent onto the fryer that would extinguish the fire, but no agent could be found anywhere near the fryer. Next up, a little detective work. Russ picked up the fry baskets still sitting in the burned fryer and discovered a partially burned label, similar to a label on a cardboard box, covering a plastic vat of oil employees pour into the fryer. As Russ used a fry basket to fish through the oil in the fryer, he discovered small pieces of white plastic and pieces of burned cardboard floating in the oil.

He quickly sought out the manager and told him the employee was not telling the full story. The manager talked to the employee again, and the real story soon unfolded. With the fryer turned on, the employee saw that it was low on oil. He grabbed a box of fryer oil and propped it upside down atop the fryer so that the residual oil would drain out. He took a phone call in a nearby office, and when he next looked out, the container of oil and the cardboard box covering it had caught fire. That explained how the fire started, but why hadn't the fire suppression system discharged the agent to put out the fire?



### LOOKING FOR MORE DETAILS

Russ next asked the manager how recent the suppression system had been serviced. Turns out, an annual service had occurred just days before the fire. Checking the service labels on the suppression system verified what the manager told Russ. He next took a closer look at the suppression system, pulling the panel off the system's control unit and exposing the control head mounted on the side of the ventilation hood over the fryer. His visual inspection determined that nothing had prevented the system's fusible links, cables, and conduits from performing properly. Russ also observed that a spring-tensioned striking arm had punctured a cylinder of CO<sub>2</sub> gas; yet, the suppression system still failed. If the system had worked properly, the carbon dioxide gas would have flowed through piping to a bottle head and opened a seal on the agent bottles. The agent would have flowed through the suppression system and dispersed via overhead nozzles to extinguish the fire.

### SEEKING AN ON-SITE JOINT EXAM

After taking video of what he observed, Russ contacted the insurance company's attorney and requested an on-site joint exam. In a joint exam, all interested parties, including attorneys, attend a meeting to look at all the fire scene evidence at the same time and conduct tests. This joint exam, which took place within a week of the original fire, also included the CEO of the national restaurant chain and a consultant specializing in kitchen fires and suppression systems that Russ had called to assist him.

During the exam, they tested two cylinders of CO<sub>2</sub> to see if the striking pen would work as designed to expel the gas that would trip the extinguishing agent to flow through the suppression system. The system is designed to expel the gas quickly, but during the test, the release of CO<sub>2</sub> occurred slowly. Those attending the joint exam determined that another test was warranted; only this time, it should occur in a controlled environment at a lab. Russ had a construction crew specializing in moving heavy equipment disassemble the system, crate it, and move it to a lab about five miles south of the loss site.



PUNCTURED CO2 BOTTLE AND STRIKER ARM



FRYER BEING MOVED TO JOINT EXAM LAB



## SECOND JOINT EXAM SOLVES THE MYSTERY

Flash forward a few months to when the second joint exam occurred, complete with photography and video to document the process. In this exam, Russ thoroughly examined all components of the fire suppression system. The exam determined that three O-rings were at the top of the CO<sub>2</sub> cylinder instead of one O-ring according to installation standards. The extra O-rings created too much space so that when the striker arm released, just the tip of the needle punctured the CO<sub>2</sub> cylinder. This resulted in not enough pressure to open the bottle head to release the extinguishing agent.

Why were three O-rings inside the CO<sub>2</sub> cylinder? Russ learned that human error at the annual service was the culprit. When the technician, a trainee, serviced the CO<sub>2</sub> cylinder, he did not check to see if an O-ring was already inside the control head. The technician doubled what the installation standards called for and installed two new O-rings. The errant installation of two O-rings, which cost about 20 cents, ultimately led to a \$100,000+ fire loss.

## FINAL THOUGHTS

Attention to detail, keeping an open mind, and insisting on a joint exam all led to determining the fire's origin and cause. "If I had been looking for a fryer malfunction, as originally stated, I wouldn't have discovered half of this," Wilson said. "You have to go in with an open mind. In fact, I like not having any information because it tends to steer some investigators into other areas. This was a thorough investigation. A joint exam with all the players being present found the issue."

### ABOUT THE AUTHOR

Russ Wilson has investigated over 1,800 fires and explosions in his 20-year career involving incendiary cause, large loss, commercial structures, heavy equipment, vehicle fires, fire death investigation, fraud, and subrogation. Wilson is recognized as a Certified Fire Investigator (CFI) through the International Association of Arson Investigators and a Certified Fire & Explosion Investigator (CFEI) through the National Association of Fire Investigators.

Founded in 1966, American Structurepoint is your single-source contact from notice of loss through incident resolution. Note: This case occurred prior to Wilson joining American Structurepoint.

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