



Engineering Ethics: The Collapse of the Willow Island Cooling Tower

An Online Continuing Education Course for Engineers

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In the 1970s, power companies began building many new, coal-fired electrical power plants in the Ohio Valley to feed the growing industry in that region. These power plants were close to coal mines, so the electricity they generated was less expensive than were nuclear or hydroelectric power.

One such new power plant was to be built on Willow Island, West Virginia. The cooling tower was one of two towers constructed by ResearchCottrell Corporation of Bound Brook, New Jersey, for the Pleasants Power Station, a coal-fired, electric power station owned by Allegheny Energy Supply Company. In business since 1907, ResearchCottrell was an environmental control company that designed and built air and water pollution control systems for utility companies. The tower design and construction for the West Virginia tower were handled by the ResearchCottrell's Hamon Cooling Tower Division, located in Bridgewater, New Jersey.

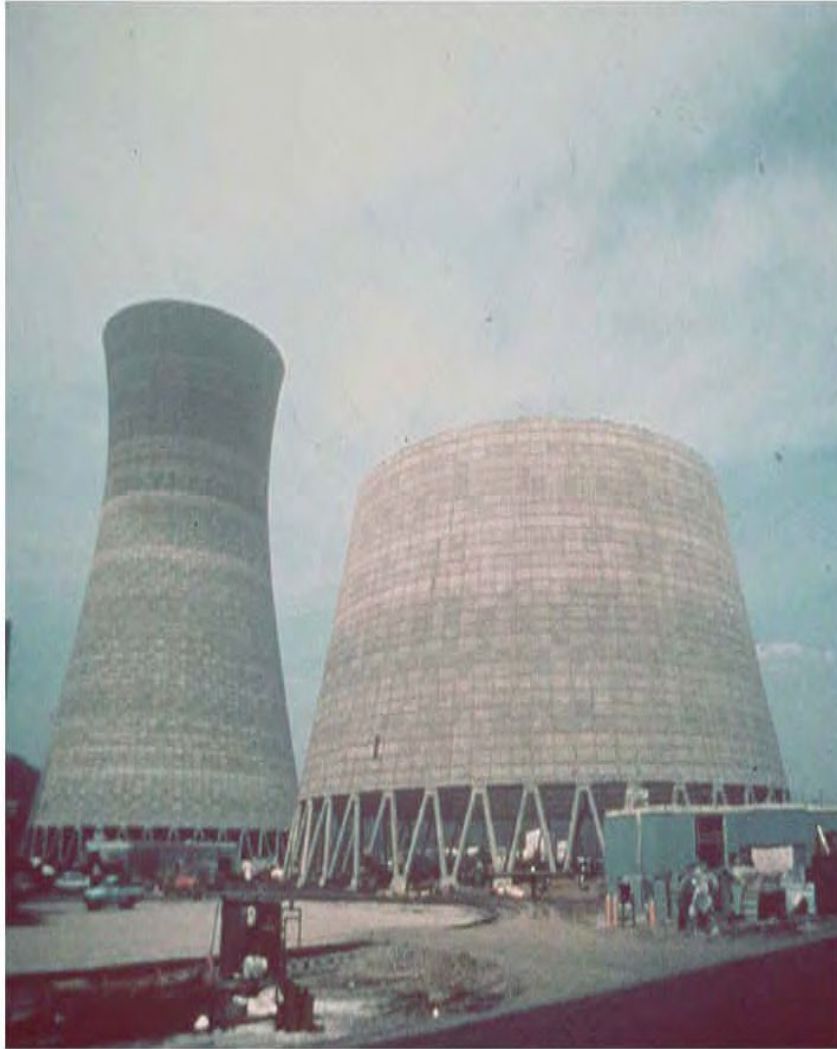


Figure 1 - The Willow Island Cooling Towers

The cooling tower, 360 feet in diameter at its base, was intended to be 400 feet high when completed. It was part of a \$660 million, 626-megawatt, coal-fired generating plant that was to draw water from the Ohio River a hundred yards away. The discharged steam from the turbines was to be cooled in two huge towers, the first of which had already been completed and stood nearby. (Peterson, 1978)

On April 27, 1978, tower #2 had reached a height of 166 feet. Just after 10:00 a.m., as the third lift of concrete was being raised, the cable hoisting the bucket of concrete went slack. The crane that was pulling it up fell toward the inside of the tower. The previous day's concrete, Lift 28, started to collapse. Concrete began to unwrap from the top of the tower, first peeling

counter-clockwise, then in both directions. A jumble of concrete, wooden forms, and metal scaffolding fell into the hollow center of the tower. Witnesses described the accident as “Sounding like a train derailment” and happening “in a matter of 30 seconds.” (Fleegle, 1978)

“Construction workers are a pretty tough bunch of guys, but the looks on some of their faces . . . well, I’ve never seen anything like it,” said Phil Corvino of United Engineering and Construction, who was on-site at the time of the collapse. (Peterson, 1978)

According to Corvino, the first anyone in the other parts of the job knew of the accident was when a message came over the loudspeaker requesting all available help at cooling tower #2. Men in the immediate area, many of whom saw the scaffolding fall, were at the scene instantly, hunting for their co-workers and friends.

Tony Galkus, an electrician from Baltimore, Maryland, said he was in a trailer near the tower when he heard the noise. He and other men in the trailer rushed out to help, but Galkus said when he saw the debris, he was afraid of what they might find. Another worker in the area said he ran inside the tower to offer help and then began to wonder if the rest of the structure would come down. (Peterson, 1978)

Men responded from all parts of the job site to offer their assistance in rescue operations, and at one point, so many men were trying to help that they were getting in each other’s way. Some began pulling at the steel and concrete with their hands and, according to Galkus, moving the debris with a strength he had not believed possible.



Figure 2 – Cooling Tower Collapse Aftermath

Sam Smith of Newport, an operating engineer, was getting ready to move some heavy equipment at the southernmost end of the plant when he heard the call for help. Smith took a truck with a cutting torch to the scene, but was unable to use it immediately because of the possibility of leaking acetylene in the area. Cutting torches were used later in the rescue operations along with cranes and cherry pickers. (Fleegle, 1978)

“I didn’t realize how much weight there was up there,” Smith said, “until it was down there.” When he saw what had actually happened, Smith said he knew no one could be alive. He worked until nearly noon before he left for home. “When I walked out, I had already seen enough,” Smith said grimly. “It was a hell of a sight, and I don’t want to see anything like it again.” (Fleegle, 1978)

George Pepper was 50 feet away from the tower when the men fell. “I heard a sound like a train derailment, turned, and looked up at the tower. But the only thing I saw was a pile of dust,” he recalled. (Peterson, 1978)

“I heard the sound of steel plugs coming out and the top two layers of blocks and mortar started falling like dominoes,” another worker said. He said he saved himself by rushing underneath a truck ramp at the bottom of the tower. (Peterson, 1978)

Another worker, John Peppier said, “The first thing I heard was concrete falling ... I looked over my left shoulder and I could see it falling. I could see people falling through the air and everything falling.” (Peterson, 1978)

Lee Steele, from nearby Shultz, lost 11 members of his family in the tower collapse, including four sons. His surviving son, Robert, was also a member of the construction crew, but he had not been on the platform at the time of the collapse. (Peterson, 1978)

Immediately after the disaster, the site rushed to dig for their colleagues. Fire departments were called in to assist in rescue efforts, and many were taken to a temporary morgue. Many of the workers were killed, and one of their pockets, and one of the workers was found at the time of the collapse suffered in.

The resulting disaster represents one of the industry's history. (U.S. construction

ResearchCottrell the previous decade without any major accidents with the Occupational Safety and Health on Willow Island from all along the Eastern Seaboard. There is speculation that the topmost layer concrete had not been allowed to harden thoroughly before the scaffolding was attached to it. One expert said he had “never seen anything like” this accident in many years in the business.

So, exactly why did the tower collapse?

The Investigations

There were multiple investigations after the disaster. The Governor’s Commission focused on the safety culture, noting the lack of worker training as well as the lack of management and technical supervision. An investigation by the Occupational Health and

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