

# When This West Virginia Coal Mine Exploded, 360 Workers Died. What Went Wrong?



West Virginia and Regional History Center

Inside the worst mining disaster in American history



BY [ANDREW ZALESKI](#) PUBLISHED: JAN 3, 2024

**Hyre Stalnaker** was working in the carpenter shop at the coal mines of Monongah, West Virginia, when the explosion came. First he heard the blast; then he felt the tremor. Seconds later, as he rushed to the front door, he was

blown backward by a force so tremendous that it shattered every window of the shop and brought auger drills and other tools crashing to the ground. It was midmorning on Friday, December 6, 1907. Stalnaker couldn't have known it then, but he was one of the few survivors of the deadliest coal mining disaster in U.S. history.

For many of the miners working Monongah's No. 6 and No. 8, two connected [coal mines](#), that Friday morning had been just like any other. They walked along the bank of the West Fork River, which ran through the town, and then trudged down sloping entrances and into darkness lit only by their miner's lamps. Monongah's mines were some of the most productive in West Virginia, and these two in particular yielded a combined daily total of 2,500 tons of [coal](#), according to newspaper records from 1907. Both were operated by Consolidation Coal Company, one of the largest mining conglomerates in the world.

Just before 10:30 a.m., miner J.H. Leonard was monitoring 19 mine cars as they were pulled by wire rope from the No. 6 mine. Nearly 38 tons of coal were aboard. An iron coupling pin snapped, sending all 19 cars rushing backward. Moments later, the mouth of No. 8, its sister mine, was ablaze. "[E]xplosive forces rocketed out of the mine like blasts from a cannon, the forces shredding everything in their path," writes Davitt McAteer, a federal mine regulator during the 1990s and the author of *Monongah: The Tragic Story of the 1907 Monongah Mine Disaster*, a definitive history of what happened that day.

A wooden board containing the name tags for every man inside the mines was pulverized. Stalnaker's carpenter shop was ruined. Flying debris knocked down Leonard, smashing his ankles. A 15-year-old boy, Charles Honaker, was blasted from the opening of the No. 8 mine and into the river.

Consolidation Coal Company closed all of its mines in the area that weekend and dispatched 20,000 miners for a rescue operation, but it was too late. Rescue morphed into recovery, and when all the bodies that could be found were counted, 361 coal miners were pronounced dead.

In spite of the deaths of more than 300 men, federal safety precautions weren't legislated until 1969, following another mine explosion that claimed 78 more lives. It took another eight years for the Mine Safety and Health Administration to be formed. This federal agency enforces the provisions established by the Mine Act of 1977. The act has two key stipulations: that underground mines must conduct four safety inspections every year, and that

mine rescue teams are required for all underground mines—requirements that might have saved lives at Monongah.



West Virginia and Regional History Center





Before and after the disaster: Mine inspectors stand in front of the Mine No. 8 at Monongah, West Virginia (top); the aftermath of the explosion that killed more than 300 miners. Fairmont Coal Co. (shown in the signs above the mines) merged with Consolidation Coal Company in 1903.

### **West Virginia and Regional History Center**

Although coal mining might be thought of as a relic of the past, it was the backbone of American energy for much longer than most people realize, and it still makes important contributions to the country's economic might today. Demand for coal began to pick up during the 1950s and 1960s, when booming American towns needed a reliable, cheap fuel source and increasingly turned to [electric power](#). From the late 1970s through the opening decade of this century, coal accounted for more than half of all electric power in the United States. In fact, it was only 15 years ago that American coal mining hit its peak, with 1.2 billion tons collected in a year.

Yet while coal miners may be the original essential workers, they were often treated poorly. Safety considerations were overlooked for much of the industry's existence. These factors and others led to tragedies like the deadly mine blast at Monongah. Few had foreseen a tragedy on the scale that struck Consolidation's No. 6 and No. 8 mines.

**Turn-of-the-century** America couldn't get enough of King Coal—it was the fuel of choice to power [locomotives](#), steamships, and electric generators, and it

was a crucial ingredient in the smelting of steel, which was used to construct railroad lines and the [nation's first skyscrapers](#).

To feed the country's appetite for coal, mines had been established up and down Appalachia during the late 1800s. The region stretches from Canada to central Alabama, an area that contains 900 miles of coalfields—making it the richest deposit worldwide of the combustible black rock. By 1900, the coal industry employed some 300,000 people.

The history of West Virginia is intrinsically linked with the history of coal. In 1883, some 5,000 miners were pulling more than 3 million tons of coal out of the ground every year. By 1907, about 44,000 miners worked the coalfields of West Virginia, excavating more than 44 million tons annually.

Much of the coal mined in West Virginia in 1907 came from the state's northern counties. Monongah is a town in one of them. Known for hunting and farming before mining interests moved in, Monongah straddles the West Fork River and is about a 40-minute drive from Morgantown, the current home of West Virginia University. Although coal mining is a blue-collar profession, the town's mines were established by elite West Virginians eager for a slice of a lucrative business, including former senators and former governors as well as [John D. Rockefeller](#), the Standard Oil baron. As McAteer writes in his book, in less than a decade after the mines were established in the 1890s, Monongah became a bustling coal town, doubling in population to 2,000 residents, and boasted six general stores, a top-notch shaving parlor, and two ice cream establishments.



Workers stand inside the Monongah Mine, where they faced poor ventilation, the dangers of methane gas, and tunnel collapses, among other risks.

**West Virginia and Regional History Center**

The coal mining industry in West Virginia continues to this day, albeit on a much smaller scale. According to the state's Office of Miners' Health Safety and Training, as of 2023, just over 10,000 people are working in underground coal mines in the Mountain State. That's roughly a quarter of the total number of miners employed nationwide, based on figures in the latest Annual Coal Report from the U.S. Energy Information Administration.

What hasn't changed much is the design of underground mines. The deepest are shaft mines, which is the type of mining depicted in the 1999 film *October Sky*. Shafts are vertical tunnels that descend 200 feet or deeper and can sometimes reach depths of 1,000 to 2,000 feet. Separate elevators are used to lower miners down and bring up coal. These elevators look more like cages, with winches and hoisting appliances attached to the roof. Any faults in the apparatus would send a cageful of miners plummeting to the bottom. (In the

early 1900s, in fact, mine operators in Iowa insisted that no two family members take the same cage down, even if they worked the same shift, lest they both be killed.)

The No. 6 and No. 8 mines in Monongah were slope mines, in which slanted tunnels are dug into the outer rock to reach the underground coal. This type of mine often begins in the bottom of valleys, where coal is closer to the surface—a simple fact of geography that doesn't necessarily translate to safer mining. Monongah's miners collected coal via room-and-pillar mining, a method in which seams of coal are partially mined, leaving intact pillars that hold up the overlying ceiling of rock. This creates structural support inside the mine while pockets of coal are extracted. Once all the coal has been mined from the seams, miners go into "retreat" mode, pulling whatever coal they can from these pillars before allowing them to collapse, which brings the roof down gradually, effectively closing off that mine.

Modern room-and-pillar mining techniques require machines to shear coal from the faces of seams, and all the mined coal is loaded onto conveyor belts that transport it up the slope and out of the mine. Miners in 1907 lacked such tools, but they did have plenty of explosives. To extract coal, Monongah's miners would first use short picks to carve out slices from the bottoms of seams, creating a small opening where coal could drop. Space was tight in the tunnels, so they had to hunch over to work, and sometimes crawl on their sides.

"You spend your day bent over, in a dark world," says Paul Rakes, a former miner who now chairs the history department at West Virginia University's Institute of Technology. Most of his days, he says, were spent working in seams less than 45 inches high.

Once picking was done, the men used auger drills on the face of seams to bore small holes, into which they packed black powder held in place by clay plugs. They then ignited the powder and, if all went well, the explosion would blast coal from the seam. The newly dislodged fragments would collect in the openings below, where miners were ready to shovel the sooty substance into mine cars.

In the case of the No. 6 and No. 8 mines, though, a geological idiosyncrasy complicated matters. The connected part of the Pittsburgh Seam, which extended from southwestern Pennsylvania into northern West Virginia, contained large quantities of methane gas, which is odorless, tasteless, and highly combustible. This raised the risk for Monongah's miners, especially if

the plugs covering their black powder weren't properly tamped down. The ensuing explosion, instead of sending coal to the floor, would blast the powder back into the room. Miners referred to this as a blown-out shot, says Rakes. The blast blows the clay plug from the rock face and, if there's any methane present, it can ignite that too.

While a blown-out shot was a safety risk, it rarely led to disaster. "Explosions like Monongah were kind of the exception rather than the rule," says Lloyd Tomlinson, education coordinator at the West Virginia Mine Wars Museum.

Out of thirty houses on one block, twenty-seven didn't have a man left in them.

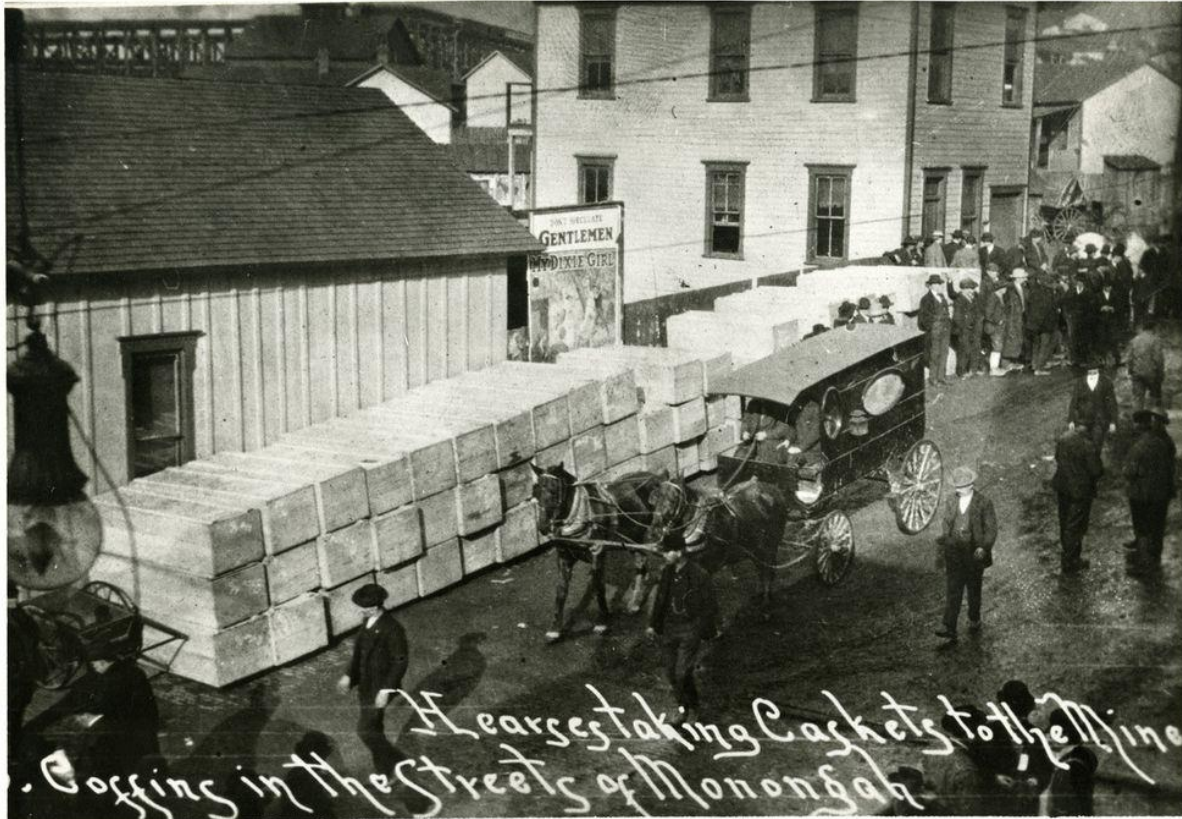
Most mining deaths of the times—and there were more than 70,000 between 1880 and 1923, the peak years of the Industrial Revolution in America—were not the unfortunate result of igniting methane or coal dust. Falling pillars, collapsing roofs, or machinery malfunctions accounted for the majority of mining injuries and fatalities. Even if a failure didn't occur, just being underground made coal mining a dangerous profession. The air of a mine is an unforgiving environment. In addition to naturally occurring methane gas, fine particles of coal dust accumulate simply through the act of mining—and, according to Rakes, the dust is just as much of a safety risk as methane. Miners routinely kept caged canaries with them to check for a buildup of toxic air gases: If the bird died, miners knew they had to get out quickly. (This is the origin of the "canary in a coal mine" metaphor.) Most mines used huge fans for ventilation in order to pull in fresh air while blowing out noxious fumes. But if those systems failed and miners couldn't get out in time, the workers could suffocate from a lack of oxygen.

Coal dust is also explosive when suspended in air. There it mixes with oxygen inside the confined space of a mine. All that is then needed for it to combust is an ignition source.

**No organized mine** rescue teams existed at the time of the Monongah explosion, but within 25 minutes, workers began rushing into the mouth of the No. 6 mine, which wasn't blocked off by fire and smoke, to begin rescuing miners. They found the wrecked mine cars about 300 feet down. They also discovered that every last canary was dead, a telltale sign that a poisonous mixture of coal dust and methane was still swirling about the air. Men who entered the mines to search for any survivors lacked equipment that would have allowed them to breathe fresh air; the United States didn't approve the use of respirators for mining until 1919.



“Imagine a handful of reckless, bedraggled men going into the cavern with lanterns with sulfurous fumes in their faces,” writes McAteer in *Monongah*, “and dragging out the charred bodies of men, some with their faces burned off. That is what Monongah looked like.”



West Virginia and Regional History Center



*Top:* So many miners died in the explosion that local undertakers ran out of coffins. *Above:* Wives waiting for their husbands—many of whom never returned—outside Mine No. 8.

### **West Virginia and Regional History Center**

The explosion had ripped the 10-ton, 30-foot-tall fan positioned outside the mouth of the No. 8 mine from its concrete moorings. That meant there was no possible means of getting fresh air to any of the miners trapped inside, and no way to pull poisonous gases out of the mine. As the *Washington Times* wrote later that day: “[T]he miners who are entombed in the mine will have to breathe into their lungs, if they are still alive, the gases that will soon make corpses of them.”

Corpses are what the volunteer rescuers discovered. One was holding a pencil and paper. Another, in the middle of a meal, was still grasping a spoon. Another was found with a handkerchief in his right hand, indicating that he may have been trying to cover his mouth and nose. Other bodies were found split open, having been ruptured by the force of the explosion.

“There were so many bodies that the local undertakers ran out of coffins,” says Tomlinson.

As McAteer recounts, the community of Monongah was dramatically reshaped in one blow. “Out of thirty houses on one block,” he writes, “twenty-seven didn’t have a man left in them.” What’s stunning is that the state legislature had passed mine safety laws as early as 1883. In 1905, the West Virginia Department of Mines was established. The state had seven mine inspectors, too. But Tomlinson says that enforcing inspections has always been a problem in the world of coal mining. Monongah’s residents, outraged by what happened, demanded better protections for miners. In 1910, the Bureau of Mines was created and housed within the U.S. Department of the Interior, but it lacked the authority to inspect mines.

Inquiries into the cause of the explosion swiftly followed. Several theories were raised. One posited that the runaway coal cars in mine No. 6 tore down electric power lines, the sparks of which ignited methane gas or coal dust. Another argued that the blast originated in mine No. 8, the result of improperly packed black-powder shots into the faces of coal seams. An article in the *New York Times* reported that the president of the coal company said the disaster was due to a coal dust explosion. An official company report released in 1909 blamed the explosion on a blown-out shot.

One single explanation never emerged, though. A report issued by the West Virginia Department of Mines attributed the cause, in part, to the quantity of coal dust hanging in the air. McAteer quotes George Harrison, a British-born mining engineer who led a team of investigators: “It is more than doubtful if ever the real or original cause will be known.”

The best guess of what occurred is that methane gases mixed with an overabundance of coal dust kicked up by the crashing mine cars. A single spark—even just contact with the open flame of a miner’s lamp—would’ve been enough to set off this volatile combo of underground gunpowder. And because the two mines were connected, the blast could travel, killing every miner, regardless of whether it originated in No. 6 or No. 8.

**The creation of** the Mine Safety and Health Administration drastically improved the safety of underground mining. Mining fatalities dropped in the ensuing decades. In the 1970s, Rakes says his chances of dying on the job were about one in 800; by the 1980s, those odds had improved to one in 3,000.





A survivor of the Monongah disaster looks on at the destruction.  
West Virginia and Regional History Center



Coal mining is still a dangerous profession, but the number of deaths per year dropped from hundreds in the 1980s to dozens by last decade, thanks in part to stricter federal safety protections for miners as well as the increasing mechanization of the coal industry. In the second half of the 1900s, fewer miners were required, even as production spiked.

For nearly 200 years, the United States relied on coal to meet its ever-growing energy needs. But by 2008, coal's dominance had begun to slip. Fewer than 1,600 mines were in operation by then, the majority of them being surface mines, where massive backhoes and bulldozers excavate coal by digging wide pits instead of boring vast and deep tunnels. In one type of surface mining known as mountaintop removal, miners clear tracts of trees atop mountains, blast away the topsoil, and then use large machines to dig down into the rock to expose coal seams. It's now the dominant form of coal mining in eastern Kentucky, western Virginia, and southwestern West Virginia.

Compared with digging tunnels, surface mining saves money and lowers the risks for miners, but it also brings a new set of problems: Blasting away at mountaintops releases particulate matter that pollutes air and sources of drinking water in downstream communities, according to research conducted by Michael Hendryx, a professor emeritus in Indiana University Bloomington's School of Public Health. What's more, the deforested areas are often unable to support new tree growth.

The natural gas industry is also driving the decline in coal mining. Costs of producing natural gas have dropped as [hydraulic fracturing—or fracking](#), as it's commonly called—emerged as a cheaper and more advanced way of accessing deposits of natural gas. While roughly 90 percent of the coal consumed today is for electric power, it accounts for just 19.5 percent of the billions of kilowatt-hours generated every year. Natural gas, on the other hand, accounts for almost 40 percent. And in 2022, for the first time, renewable energy—in the form of wind power, solar power, and hydropower—surpassed coal as a bigger fraction of American electricity generation.

Still, coal endures, even as countries are shifting to renewable energy sources. The demand for coal is much higher globally than it is in the United States. The International Energy Agency reported in summer 2023 that more than 9.1 billion tons of coal were consumed in 2022, with much of it being used by China, India, and other countries in Southeast Asia. And coal still has other uses in the United States: Over the summer, the *Kansas City Star* reported that one coal plant in Kansas that was marked for closure will remain open to generate a reliable source of power for Panasonic's new \$4 billion electric-

vehicle battery plant. According to the *Star*, the plant is expected to require upwards of 250 megawatts of electricity to operate smoothly.

And in West Virginia, more than 10,000 miners still work underground every day, lamps on, backs hunched, pulling from the ground the black rock that played a role in American industrial might—and still, at times, battling the same toxic gases that felled Monongah’s miners more than a century ago. The day after Easter Sunday in 2010, 29 miners died at the Upper Big Branch mine three hours south of Monongah. The cause was a familiar culprit: an explosion of methane gas.



ANDREW ZALESKI

Andrew Zaleski, a writer based near Washington, D.C., covers science, technology, and business.