Mine Rescue
Past, Present and Future

Gary Christensen
CMSP

John Barton CMSP

Utah Mining Association
136 South Main #709
Salt Lake City, Utah 84101
Tel.: 801-364-1874  Fax: 801-364-2640

“Everything Begins With Mining”
The Past
In the Beginning . . . The Early Days of Mine Rescue

During the early 1900s, while investigating mine disasters and their causes, it was important and necessary to examine conditions in a mine as soon as possible after an explosion or fire. This need led to establishing mine-safety stations and rail cars.

Although the original purpose of these stations and cars was to aid in technical studies and investigations, the courageous rescue work performed was so humanitarian and spectacular that the stations and cars soon were referred to as “mine-rescue” stations and cars.

Stations and cars were equipped with mine-rescue and first-aid equipment, much of which in the beginning came from England and Germany. The railroad cars were former Pullman sleeping cars purchased by the United States government. Interiors were remodeled to include offices, training and
The primary goal was to investigate, as quickly as possible, causes of a mine disasters, assist in the rescue of miners, and render first aid. Miners routinely trained in safety, use of rescue/ first-aid equipment and methods, examined safety conditions and recommended improvements.

When a mine disaster occurred, the employee in charge, with available help and equipment, proceeded by train or other transportation to the mine. When a rescue car was used, it was moved by a special locomotive or connected to the first train available.
CF&I Coal Mine Rescue Car
1923
Cross Mountain Mine
in Slatestone Hollow Briceville, TN

http://www.coalcreekaml.com/Legacy5.htm
Figure 22.—Map of explosion area, Cross Mountain No. 1 mine, Briceville, Tenn., December 9, 1911.
Figure 22.—Map of explosion area, Cross Mountain No. 1 mine, Briceville, Tenn., December 9, 1911.
Friends and relatives awaiting news of the rescue efforts after the Cross Mountain Mine explosion in Briceville, TN on December 9, 1911
Bureau of Mines Rescue Crew
The first hopes of men still being alive came when writing on a barricade wall was found that said, “Gone to 22 Right”. Unfortunately, no miners were found alive there.

Then, 58 hours after the explosion, a door was found open at the 18 Left entry that said, “Don’t shut this door, men in 16 Left”. Rescuers found that barricade walls had been built between 16 Left and 17 Left entries. They tore down the barricade wall and tested the air with one of their canaries. Inside, they found three men. One of them was crouched against a wall, smoking his pipe. The others were burned but alive. Later, two other men who had left the barricaded room to attempt escape were also found alive. One of the reasons they had selected their location to await rescue was because it was where tubs had been placed for mules to drink and provided the trapped miners with a source of drinking water.
Notice left on door by barricaded men advising rescuers not to shut them in
Barricade opened by rescuers from the Bureau of Mines 58 hours after the Cross Mountain Mine explosion (Note caged canary used to test the air)
"Air is not much now. All be good and I aim to pray to God to save me and all of you. Tell Clarence to wear out my clothes. Give Bessie Robbins a stickpin of mine. Tell her goodbye." (Clarence was his brother and Bessie Robbins was his girlfriend)
Although Cross Mountain was classified as a non-gassy mine, methane gas was detected during the subsequent investigation at 25 Left entry. Based on the evidence, a roof fall had occurred at that location which released the gas. The gas apparently ignited when one of the miners approached to examine the roof fall.

Cross Mountain was one of the first successful rescue operation led by the Bureau of Mines. They documented what they found, compiled lessons-learned, and developed methods to reduce the potential for future disasters. Their success at rescuing the 5 miners at Cross Mountain led to continued funding and allocation of resources which have resulted in safer working conditions for miners today. 84 miners perished.
Oxygen apparatus for use in mines after explosion.
DAWSON MINE RESCUE STATION. Equipped and maintained by the West Virginia Department of Mines. Station and station facilities provided by the Dawson Coal Company.
MINING DISASTER FACTS

The term “mine disaster” historically applies to mine accidents claiming five or more lives.

- THE WORST COAL DISASTERS OF THE PAST 55 YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Mine</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>Explosion</td>
<td>Pond Creek Mine, WV</td>
<td>91</td>
</tr>
<tr>
<td>1940</td>
<td>Explosion</td>
<td>Willow Grove Mine, OH</td>
<td>72</td>
</tr>
<tr>
<td>1943</td>
<td>Explosion</td>
<td>Smith Mine, MT</td>
<td>74</td>
</tr>
<tr>
<td>1947</td>
<td>Explosion</td>
<td>Centralia Mine, IL</td>
<td>111</td>
</tr>
<tr>
<td>1951</td>
<td>Explosion</td>
<td>Orient No. 2, II,</td>
<td>119</td>
</tr>
<tr>
<td>1968</td>
<td>Explosion</td>
<td>Farmington, WV</td>
<td>78</td>
</tr>
</tbody>
</table>

- THE THREE WORST COAL MINE DISASTERS IN U.S. HISTORY

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Mine</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1907</td>
<td>Explosion</td>
<td>Monongah, WV</td>
<td>362</td>
</tr>
<tr>
<td>1909</td>
<td>Explosion</td>
<td>Cherry Mine, IL</td>
<td>259</td>
</tr>
<tr>
<td>1913</td>
<td>Explosion</td>
<td>Stag Canon, NM</td>
<td>263</td>
</tr>
</tbody>
</table>

- THE FIVE WORST METAL AND NONMETAL MINE DISASTERS OF THE PAST 50 YEARS

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Mine</th>
<th>Product</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1942</td>
<td>Explosion</td>
<td>Sands Eddy, PA</td>
<td>Limestone</td>
<td>31</td>
</tr>
<tr>
<td>1943</td>
<td>Explosion</td>
<td>Foyd Mine, TN</td>
<td>Copper</td>
<td>9</td>
</tr>
<tr>
<td>1943</td>
<td>Explosion</td>
<td>Cane Creek, UT</td>
<td>Potash</td>
<td>18</td>
</tr>
<tr>
<td>1972</td>
<td>Fire</td>
<td>Sunshine Mountain, ID</td>
<td>Silver</td>
<td>91</td>
</tr>
<tr>
<td>1968</td>
<td>Fire</td>
<td>Cargill, Belle Isle, LA</td>
<td>Salt</td>
<td>21</td>
</tr>
</tbody>
</table>
• THE THREE WORST METAL AND NONMETAL MINE DISASTERS IN U.S. HISTORY

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Mine</th>
<th>Product</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1917</td>
<td>Fire</td>
<td>Granite Mountain, MT</td>
<td>Copper</td>
<td>163</td>
</tr>
<tr>
<td>1926</td>
<td>Flood</td>
<td>Barnes Hecker, MI</td>
<td>Iron</td>
<td>51</td>
</tr>
<tr>
<td>1972</td>
<td>Fire</td>
<td>Sunshine Mountain, ID</td>
<td>Silver</td>
<td>91</td>
</tr>
</tbody>
</table>

• RECENT MINE DISASTERS

<table>
<thead>
<tr>
<th>Year</th>
<th>Type of Disaster</th>
<th>Mine</th>
<th>Product</th>
<th>Killed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>2 Explosions</td>
<td>Scotia Mine, KY</td>
<td>Coal</td>
<td>26</td>
</tr>
<tr>
<td>1979</td>
<td>Explosion</td>
<td>Belle Isle, LA</td>
<td>Salt</td>
<td>5</td>
</tr>
<tr>
<td>1980</td>
<td>Explosion</td>
<td>Ferrell No. 1, WV</td>
<td>Coal</td>
<td>5</td>
</tr>
<tr>
<td>1981</td>
<td>Explosion</td>
<td>Dutch Creek No. 1, CO</td>
<td>Coal</td>
<td>15</td>
</tr>
<tr>
<td>1983</td>
<td>Explosion</td>
<td>McClure Mine, VA</td>
<td>Coal</td>
<td>7</td>
</tr>
<tr>
<td>1984</td>
<td>Fire</td>
<td>Wilberg Mine, UT</td>
<td>Coal</td>
<td>27</td>
</tr>
<tr>
<td>1989</td>
<td>Explosion</td>
<td>William Station, KY</td>
<td>Coal</td>
<td>10</td>
</tr>
<tr>
<td>1992</td>
<td>Explosion</td>
<td>Norton No.3, VA</td>
<td>Coal</td>
<td>8</td>
</tr>
</tbody>
</table>

• DISASTERS INVOLVING WOMEN IN THE MINES

On October 2, 1979, Marilyn McCusker was killed while working inside a deep coal mine in Pennsylvania. She was the first woman coal miner killed on the job. It had taken her 2 years and a sex discrimination suit in federal court to get a job as a coal miner. She was one of 144 fatalities in the mines that year. In later years, women perished in both the McClure and Wilberg disasters.

• DECLINING MINING ACCIDENTS

Over the years, the annual numbers of mining deaths and rates of injuries (measuring numbers of injuries against hours worked) have declined. Today and in the future, preventing mine accidents and disasters remains the utmost priority of management, labor, and government.
1972  NIOSH  You Are My Sunshine
Setting the scene

Nine men escape, nine men are trapped and rescuers must work aggressively yet cautiously to avert tragedy.

At the time of the breach, both groups of miners are about 8,000 feet from the exit.
The mine begins to flood
Saxman mine is breached. Millions of gallons of water begin to pour into neighboring Quecreek mine.

Intended escape route

- Entrance/exit
- Site of breach: One other miner is trapped between water and a wall.

One group of nine miners escapes as water rushes in.

The instinct to survive
Water from the Saxman Mine fills the lowest parts of the Quecreek Mine first.

- Entrance/exit
- The miners who get out fight through flooding shafts to make their way to safety.

The peril
If a “super drill” trying to reach the men enters the shaft too rapidly, the miners’ life-sustaining air pocket could be destroyed.

- Entrance/exit
- Trapped air would be released through escape shaft. Water would fill mine shaft.

The safe haven
The stranded men retreat farther, rescue the ninth miner and begin building walls to hold back the water.

- First group of nine escapes.
- Miners move through neck-deep water to find a small section of the mine that is not submerged.

The solution
Rescuers pump water from the mine. Water recedes and pressure is relieved as air pocket expands. The drill can now continue without fear of flooding the shaft.

The situation
Nine miners are trapped 246 feet underground in a flooded shaft, but breathing because air is being pumped to them.

- Entrance/exit
- Air pumped in
- Water pumped out
Nine men out

How a crew of Somerset County coal miners became trapped in a flooded shaft, then hung on for 78 hours while the world rooted for their rescue.
The Present
How Teams Might Train
Where Can Teams Go For Training?

Certainly, their own mine's, neighbors, contracted etc...

Or
The Edgar Experimental Mine
Mine Rescue Training Facility in Idaho Springs, CO
Edgar Mine Map
Problem
Lake Lynn Pennsylvania
The Lake Lynn Laboratory is a sophisticated underground and surface facility for conducting large-scale explosion trials and mine fire research. Underground workings are located in a massive limestone deposit. Entries are sized to match those of commercial mines, making them authentic, full-scale test galleries. Movable bulkheads permit the setup of single-entry, triple-entry, and longwall face configurations for experiments. The underground test areas are amply instrumented and coupled to a remote control center at the surface. Research conducted at this laboratory includes large-scale gas and coal dust explosion studies, conveyor belt flammability trials, and evaluations of explosive materials and mine stoppings. Several of the unique research facilities at Lake Lynn include 1) the Fire Suppression Gallery, which is used to evaluate the effectiveness of mine fire suppression systems; and 2) the Hydrostatic Mine Seal Test Chamber, used to conduct full-scale mine seal tests.
The Safety Research Coal Mine and Experimental Mine complex is a multi-purpose underground coal mine research facility used to test new procedures and technologies. A full time staff of miners provide technical and physical assistance to in-house and contract researchers.
Mine Rescue teams train here often as well
MSHA Academy
Simulated Mine
And soon to be mandatory

Local Contests
Or National Contests
Today and Yesterday's Difficulties

And Still Tomorrow!
Beliefs are Hard to Dismiss

Almost to a person, mine rescue team members become committed quickly, due to many factors but mainly due to the dedication they discover which exists on the team they are allowed to join*. Almost every team member I have known has had to DEFEND their intent, interest and passion to remain on mine rescue in regards to their normal working crew at the mine. You understand this right? Mine rescue isn't really necessary! You guys just go to the bars!
The Future

Mine Rescue or Mine Recovery?
Perhaps...
Or perhaps controlled exhaust from...
Most Likely More Injection of Inert Gases $\text{CO}_2$ and $\text{N}_2$
Mine Rescue Will Still Exist

It Is The LAW!

but...
By MSHA/NIOSH estimates, 50% of today's miners will retire by 2012...where will tomorrows miners turn for help?

We have work to do!
My Final Question

Why, do you think, someone would join mine rescue today?
So Others May Live
For Family,
For Life
Questions?

Who Else Can We Call?
Mine Rescue Matters!