

## Success Story: Schramm, Inc.

**Market Served:**  
Mobile drilling

*"The amount and detail of information and support provided showed that the Eaton team took ownership of valve requirements for our T130XD drill rig that helped save human lives."*

*—Brian Brookover, Schramm Engineer*



## Eaton Products Have Role in Successful Rescue Efforts at Chilean Mine

**Location:**  
West Chester, Pennsylvania

**Segment:**  
Mining

**Challenge:**  
Optimize Eaton CMX 160 valve to withstand higher work-port pressure and pressure spikes

**Solution:**  
Product study to confirm an increased working pressure version could be configured

**Results:**  
Even with the increased pressure, the valve met performance requirements and maintained machine integrity

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**Background**  
October 13, 2010, marked a day of celebration at the San José Mine in Copiapó, Chile. All 33 miners trapped more than 2,000 feet underground in the copper-gold mine since August 5, 2010, were rescued safely.

The successful rescue involved extraordinary humanitarian effort and resourcefulness in pounding through rock without compromising the safety of the men trapped in the underground prison for 69 days—the longest known time that miners have survived a collapse.

Now nicknamed The Miracle, a powerful Eaton product-equipped drill made by Schramm, Inc., of West Chester, Pennsylvania, became the miners' lifeline. The high-powered T130XD hydraulic drill rig worked for over 30 days to pulverize rock in efforts

to widen a conduit line that became the escape route for the miners.

When the mine first collapsed, mining experts predicted that the miners could be trapped underground until late December. Recovery efforts were greatly accelerated, thanks in part to Eaton's response to Schramm's call for help.

**Challenge**  
Rob Ireton, senior product engineer at the Eaton Hydraulics Searcy, Arkansas, facility, was informed that in order to be confident that the T130XD could drill the escape hole, Schramm engineers wanted to increase the working pressure of the rig's Eaton Vickers® CMX 160 sectional valve. The valve enables the hoist to lift and lower drill pipe and facilitates hydraulic drilling.

"Our thought was that by optimizing the valve's performance, we could increase the rig's hoisting capacity," said Schramm Engineer Brian Brookover.

This meant that the CMX 160 wide-body valve would need to perform at an increased working pressure. Would the valve be up to the challenge? Would the valve be able to handle pressure spikes that could result from the increased pressure?



*An optimized Vickers CMX 160 valve helped speed up rescue efforts.*

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## Solution

Ireton and Eaton's mobile valve product engineering team took action with a thorough product study and determined that an increased working pressure version of the CMX valve could be configured. The results were conclusive. Even with the increased pressure, the valve would meet performance requirements and maintain machine integrity.

To guard against any pressure spikes, Eaton provided Schramm with new metering poppets, load-drop checks, and retainers with polyurethane seals for installation on the CMX 160 valve.

## Results

With the increased load rating, the Schramm T130XD completed its preliminary job responsibility of widening the initial bore hole from 5½ inches to 12 inches. Next up, crews surveyed the hole to make sure it was a direct route to the miners. This two-hour window gave Jeff Roten, Schramm onsite senior service technician, time to disassemble the valve to change the components

before the T130XD began enlarging the hole to 28 inches—large enough to hoist the trapped miners in a specially fabricated 21-inch diameter rescue capsule.

The final drilling phase required many drill bit changeouts, and Roten said the increased valve pressure helped to speed up tripping out—an industry term for the period of time required to remove the drill bit from the earth, change out components, and return the unit to the drill hole.

Eaton's responsiveness was instrumental in enabling the T130XD to do its job, Brookover said.

"The amount and detail of information and support provided showed that the Eaton team took ownership of valve requirements for our T130XD drill rig that helped save human lives."

Also equipped on the Schramm drill rig are Eaton's Char-Lynn® low-speed motors and Aeroquip® hose and fittings.



The towering Schramm T130XD drill rig took center stage outside the mine.



Workers add another piece of drill pipe to the Schramm T130XD.

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