

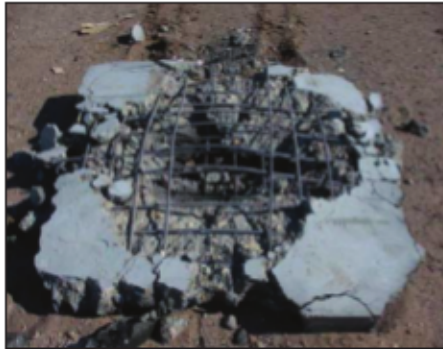
Improving Safety and Strength of Shotcrete Linings in Mine Tunnels using Helix Micro Rebar

Recent blast testing in Texas by a Global Security Company was conducted where concrete panels reinforced with Helix Micro Rebar was tested against the explosive shock wave from 10 pounds of C4 military explosives placed 15 inches from the test panels.

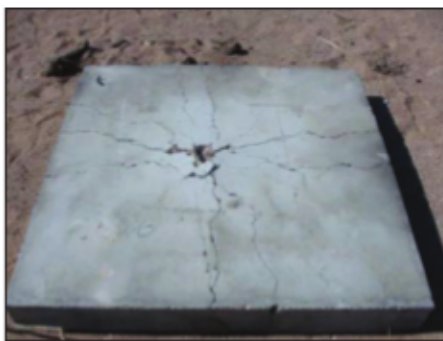
Helix prevented the concrete test panels from failing and spalling in these tests.

This example of Helix Micro Rebar strengthening concrete against shock and spalling shows that helix needs to be integrated into mine tunnel shotcrete linings in all mining operations. The benefits would be as follows:

- Reduce the safety risk of concrete spalling and cracking in shotcrete lined tunnels
- Vastly increase the structural strength of the shotcrete liners
- Increase the life span of shotcrete tunnel liners
- Reduce the maintenance cost of shotcrete tunnel liner repair and replacement due to cracking



This is the control panel – 6 inch thick, two mats of #3 rebar at 4 inch centers. NO HELIX MICRO REBAR IN THIS PANEL. Test included 10 pounds of C4 at 15 inches from the surface. Note the obliteration and large amounts of spalling normal concrete exhibited.



This is the Helix Micro Rebar panel – spider cracking is clearly the extent of the damage. Breach tests using 10 pounds of C4 explosive at 15 inches. 6 inch panel, 50 pounds of Helix Micro Rebar per CY and two mats of #3 rebar at 7.5 ocev (50% less rebar than in the control panel).

Hy Tech Products of Elko has been educating the general mining community about the many potential uses of Helix Micro Rebar for over a year. Clearly, specifying Helix as part of the tunnel shotcrete design will improve the safety of all shotcrete tunnel linings by reducing cracking due to ground vibration and movement. We would like to meet with your design and management staff to determine the most cost effective dose rate of Helix for your mine tunnel shotcrete. We look forward to working with you to increase safety and reduce costs.