MULTICRETE™

RAISE ROBOTIC SHOTCRETEING

OUR EQUIPMENT, PRODUCTS, PEOPLE: SUPPORT *YOU* CAN COUNT ON!

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www.multicretesystems.com

MULTICRETE RAISE ROBOT™

For Remote Shotcrete Spraying Raises up to 400 Meters Deep

The Multicrete RAISE ROBOT™ is a remotely controlled robotic assembly for the spraying of shotcrete; used in shafts and raises of subterranean excavations. This robotic unit is designed for use in mines and on large civil construction projects.

Multicrete Raise Robot™ at top of Raise Shaft

Standard Multicrete RAISE ROBOT™ is de-signed for use in raises a minimum of 1.5 meters diameter up to a max-imum of 5.5 meters diameter. Spring-loaded retractable arms stabilize the Multicrete RAISE ROBOT™ and allow for undulations along the interior surface of the raise.

In 2008 Multicrete™ completed a 3.5 meter diameter X 300 meter raise. A second raise, over 400 meters in depth was completed in 2009.

OPERATING PRINCIPLE:

The Multicrete RAISE ROBOT™ is lowered by means of a heavy-duty incremental winching system. This system allows for variable speeds from 5 cm/minute up to 6 m / minute. During its descent, the Multicrete RAISE ROBOT™ washes (hydro-blasts) the interior surfaces. On its return, the unit commences spraying shotcrete in a uniform single pass. The eletric motor on the spray head allows for 360° non-stop rotation.

Multicrete Raise Robot ™ Completing Top Meter of 3.5 m x 300 m Deep Raise

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MULTICRETE RAISE ROBOT™

For Remote Shotcrete Spraying Raises up to 400 Meters Deep

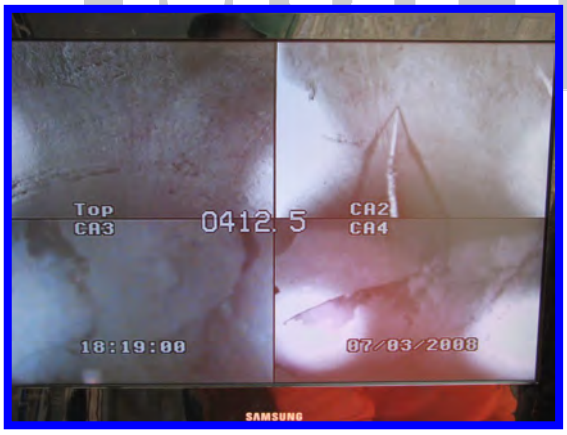
Setting up the Multicrete Raise Robot ™ over the Vent Raise

Bulk Bags of Dry Pre-Blended Shotcrete Suspended over Predampener Hopper

APPLICATION OF SHOTCRETE:

The Multicrete RAISE ROBOT™ is used in conjunction with the **AL 257** electric powered shotcrete machine mounted on a **Multicrete™ Integral Predampener.** Predampened material is conveyed through 50 mm. diameter heavy duty hose for the remote application of shotcrete via the Multicrete RAISE ROBOT.™

At surface level, technicians monitor the progress of the Multicrete RAISE ROBOT™ via video display. This allows for the rate of application to be modified without personnel entering the raise.



Split Screen Viewing of Shotcrete Application

SHIPMENT:

All the required equipment, spares and accessories can be compacted for shipment into a 20' sea container.
The Multicrete RAISE ROBOT™ collapses to just 1.8 meters in height, 2.7 meters in length and 1.8 meters in width for ease of transport.

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RAISE ROBOT

Successful projects utilizing this Specialized Technology

CLAVOS RAISE LINING

CUSTOMER: St. Andrew Goldfields

LOCATION: Matheson, Ontario (East of Timmins, Ontario)

PROJECT: To line a 3.3 m (11 ft) diameter raise 121 m (400 ft) deep with an angle of decline at 87^0.

CHALLENGES:

- Mobilizing to a remote location with limited access.
- Portable systems were required to supply air and water.
- Providing a sheltered work area 12m x 24m over the raise culvert.
- Applying shotcrete 5 cm (2 in) thick uniformly along the raise and protruding rock bolts posed hazards for robotic spraying equipment.
- Poor visibility within the raise.

PROJECT PLAN:

- Place two sets of 40 ft. containers parallel to each other and 12 meters apart.
- Erect a 'cover-all' shelter to span the containers and enclose the open work are between.
- Engineer a 'structural frame' above the raise culvert to support the hoist system, remotely operated 'Raise Robot', material delivery hoses and electrical cables.

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RAISE ROBOT

Successful projects utilizing this Specialized Technology

NEW AFTON RAISES

CUSTOMER: New Gold

LOCATION: Kamloops, British Columbia

PROJECT: To line two separate vertical raises, each 3.5 m (12 ft) in diameter and two unique depths of 300 m (**950** ft) and 420 m (**1430** ft). (which held the record for the deepest raise lined to date in the world)

CHALLENGES:

- Immense weight, (due to depth), of all the infrastructure on the support frame.
- Portable systems were required to supply air and water.
- A winch and cable rating that would accommodate the system.
- Applying shotcrete 5 cm (2 in) thick uniformly and being able to record & view proof of application.

PROJECT PLAN:

- Engineer a enhanced 'structural frame' above the raise culvert which would support the immense loads of the 'raise robot', hose, cable, and material delivery systems.
- A multi-camera system to visually inspect and ensure delivery of the correct amount of shotcrete.