

# UNDERGROUND PRODUCTION Don MacLean



Don Maclean, who founded his namesake company MacLean Engineering in 1973, has been in the mining equipment business since the early 1970s. He is a professional mining engineer who early in his career worked for Inco in Sudbury. Although not a mechanical engineer, Don brought ideas and concepts that could be turned into useful products. He spearheaded drawpoint obstruction clearance machines, known as Blockhole Jumbos, in the late 1970s that, although a very

simple concept initially, became dependable and irreplaceable tools for underground bulk mining. It was his belief in the importance of ore flow conditioning at the drawpoint and his willingness to foster and adapt new technologies that enabled his company to go from being a regional manufacturer to one having an international impact on the underground mining equipment scene.



In the late 1990s, Rio Tinto, Anglo American and Palabora went in search of a machine that would ensure that drawpoints and drawbells at the conceptual Palabora block cave mine could and would be kept free of obstructions. Drawbells were initially designed at a 16 m height and subsequently increased to 20 m. The major global manufacturers all passed on the request but MacLean stepped up and developed the High Reach Rig (HRR), a diesel-powered mobile unit that could reach up 20 m, drill multiple 75 mm

holes, charge them with re-pump emulsion explosives and arm the holes with a detonator. The operator controlled the machine via radio-remote controls from outside the drawpoint, sitting in a detachable track-mounted unit that docked with the mother rig for transport around the mine. The operator had seven cameras from which to guide his work. Palabora purchased two such rigs. The HRR line has also been very successfully used in the South African diamond mines to bring down hang ups in the 12 m range. The largest machine built to date had a 21 m drilling capability and the ability to load explosives - all under remote control. MacLean subsequently developed the Ro-Bust rig which was implemented to break drawpoint boulders

below the brow by utilising high-pressure water impulses, a technique that licensed a technology from South Africa munitions manufacturer Denel. Palabora strongly encouraged Tamrock to develop a very similar machine so they would have two sources of supply, thus mitigating their own risk, and since the acquisition of Tamrock, Sandvik has sold a number of these units worldwide.

In addition, MacLean was the first to build the Medium Reach Rig (MRR), a simplified version of the HRR. It could drill one 75 mm hole and reach 12 m up from the sill of a drawpoint from its position at the brow. The MRR is credited with enabling Palabora to achieve its nameplate capacity faster than was expected in rock that some said would never cave with the adequate amount of comminution to enter the processing stream.

The machine was conceptualised by Robert Rennie in 1999 with the input of David Penswick at Anglo American Technical Services and impetus from the Board of Rio Tinto who wanted assurance that the broken ore asset of the overlying cave would not be blocked from extraction by a major fall of ground that might cover an entire drawpoint bell mouth. Key stakeholders from the Rio Tinto and Palabora teams were Alan Moss and Keith Calder.

In recent years, MacLean has positioned itself as a bulk mining equipment specialist with a growing ore flow equipment portfolio and development equipment suite to support mine development. Today, MacLean's specialised Ore Flow Facilitation equipment includes the bulk mining essentials of a Blockholer Drill and a Water Cannon; with more innovations being developed.

To date, MacLean's company has commissioned over 100 Blockholer Drills around the world. The Blockholer Drill is effectively a self-contained jumbo drill with integrated radio-remote control (RRC) and equipped with a highly versatile drill feed and boom arrangement to allow the operator to drill holes and place explosives in order to blast oversize ore in stopes, or bring down hang ups in cave mines.



One of the first marketed Blockholer Drills was the MEM-811, or Boxhole Jumbo as it was known back in 1981. The 811 was a Massey Ferguson tractor conversion designed to handle drawpoint oversize and hang ups. Since the 811, MacLean has developed seven iterations of Blockholer machines with the most recent offering being the popular BH3 Blockholer and all-new BH2 Blockholer. The BH2 and BH3 Blockholers can be equipped with explosive loaders to allow operators to tram the machine into a stope, drill a hole, and load the hole with explosives, retreat, and then blast; effectively and efficiently eliminating oversize and hang ups.

The WC3 Water cannon is a machine based off the MacLean Mine-Mate carrier which is capable of delivering high volumes of water to effectively facilitate the movement or wash-down of broken ore in a drawpoint or stope.

Headquartered in Collingwood, Ontario, MacLean Engineering now manufactures its products in three Ontario-based manufacturing facilities as well as sells and supports its global

fleet of equipment with offices throughout Canada, Mexico, Peru, South Africa, and Australia; also with an extensive global dealer network throughout the US, Chile, and Mongolia.