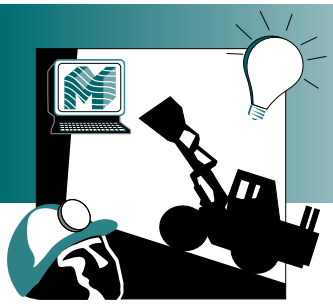
MINING

Project Fact Sheet



RAMEX TUNNELER

BENEFITS

- Significant energy savings, ranging from 25% to 65%, compared to using explosives
- Reduced air emissions and pollution
- Improved safety and control of tunneling process
- Reduced danger of roof collapse
- Hazards of transporting and handling explosives are eliminated
- Can be used in inhabited or built-up areas

APPLICATIONS

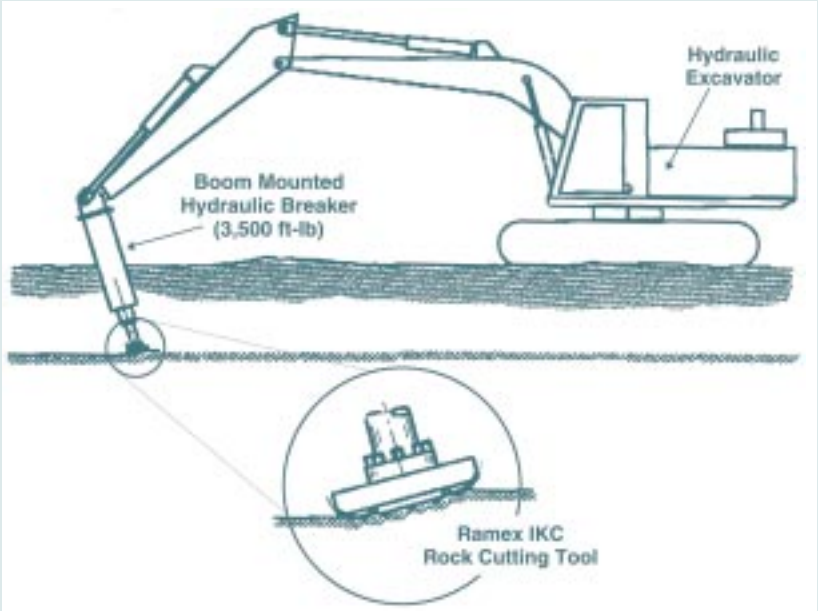
While the Ramex tunneler is suitable for use in nearly all mining applications, it is especially suited for use on hard rock strata in inhabited or built-up areas where use of explosives might cause structural damage to buildings or pose other risks.

IMPACT, THE OLDEST ROCK BREAKING TECHNIQUE, TEAMS UP WITH NEW TECHNOLOGY TO REPLACE EXPLOSIVES IN MINING THROUGH HARD ROCK

Cutting through hard rock has meant using labor-intensive, dangerous, and difficult to control explosives until now. A new method of rock cutting has been developed by the Ramex Group that uses the ancient technology of impact to fracture and create slots in hard rock. The Ramex IKC cutting tool is as easy to use as a hydraulic breaker, it produces larger rock cuttings for easier handling and allows the energy efficient mining of any shape opening in rock. In addition, Ramex slot cutting eliminates the costly and energy intensive use of drill holes needed to place explosives.

The diesel-powered cutting head has an injector that combusts fuel, creating an explosion that drives a piston forward in a bounce chamber. This forces the cutting head against the rock face at the rate of eight or nine times per second.

RAMEX TUNNELER



Foundation and/or trenching excavation system used to field test the Ramex IKC rock cutting tool.

Project Description

Goal: The goals of this project are to further develop the Ramex Tunneler to the demonstration phase and to arouse the mining industry's interest.

The tunneler is attached to a caterpillar-type chassis that is currently widely used in mining. The chassis is well equipped to navigate rough terrain, position the tunneler quickly, and maintain pressure with the rock face.

Ramex Systems, Inc. is developing this new technology with the help of a grant funded by the Inventions and Innovation Program through the Department of Energy's Office of Industrial Technologies.

Progress and Milestones

- The first generation cutter was field tested on a free-piston, diesel driven, impact ram developed by Ramex. The ram developed 3,200 foot-pounds force (ft-lbf) at 460 blows per minute (bpm) and excavated hard rock at a rate of over sixteen cubic yards per hour (16 cu. yds./hr.) (i.e., 36 tons/hr.).
- In the spring of 1995, working with the University of Washington, Ramex conducted a series of drop tests at the U.S. Bureau of Mines Pittsburgh Mining Research Center.
- Testing determined the impact and force reactions on a selection of concrete and rock samples. The results provided information vital to the final design. The testing clearly demonstrated that the concept could work as well on a conventional hydraulic breaker as it did on the proprietary Ramex ram.
- Recent full scale field tests for foundation excavation in the hard granites of North Vancouver, B.C., Canada have verified the capability of the IKC cutter operating on a conventional breaker mounted on a hydraulic excavator.

Industry of the Future—Mining

In mid-1998, the National Mining Association reached an agreement with the U.S. Department of Energy's Industries of the Future Program to join in creating research and development partnerships to develop and deploy new technologies that will improve environmental performance and enable the industry to meet increased global competition. The mining industry supplies the minerals and coal essential to the infrastructure of virtually the entire U.S. economy: glass, ceramics, metals, and cement for buildings, bridges, roads, and equipment, and coal or uranium to generate more than 70% of the nation's electricity.

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The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and conduct early development. Ideas that have significant energy savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

Project Partners

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