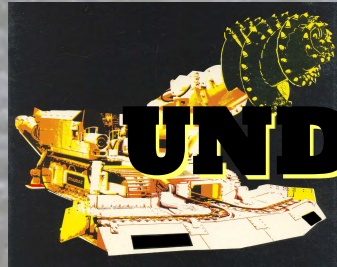


بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ







# **RECENT TRENDS IN**

# **UNDERGROUND MINING**

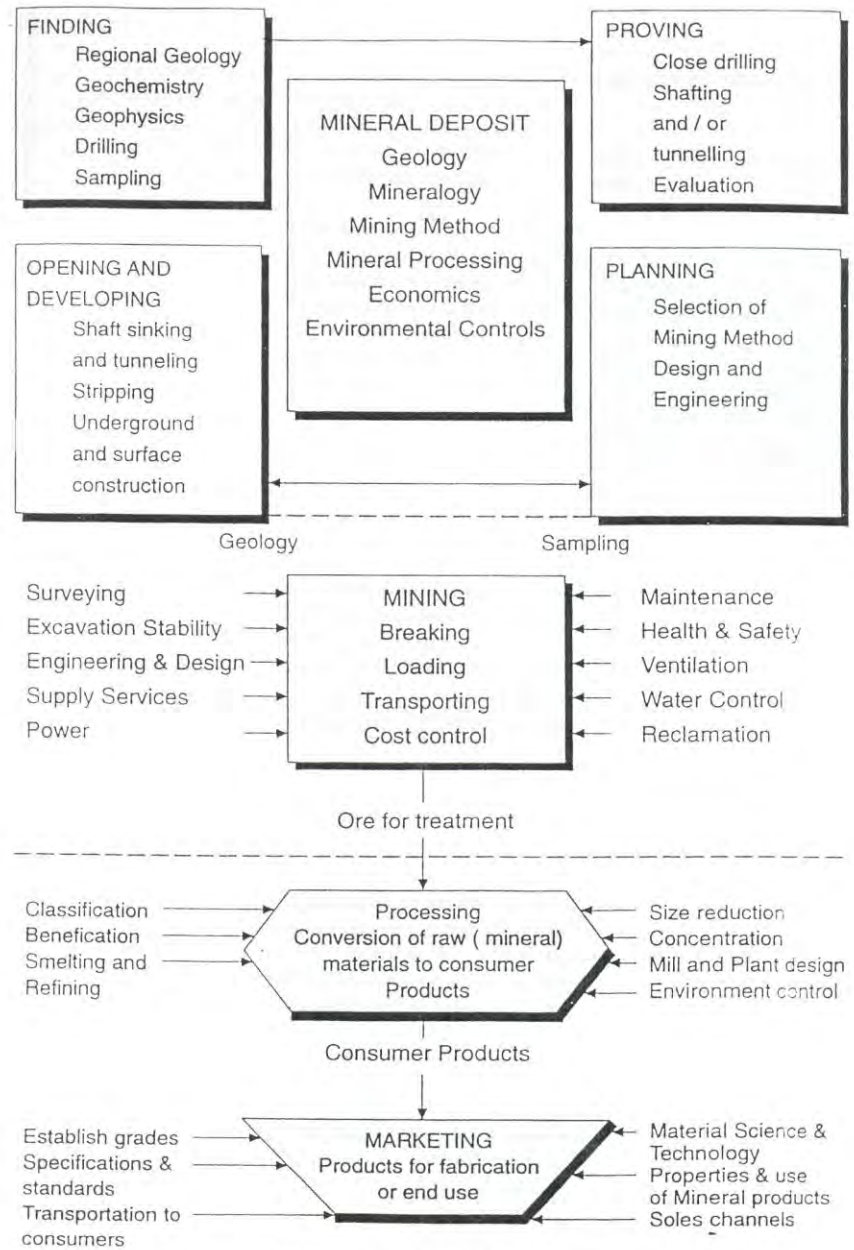
By

**Mohamed Elwageeh**

Prof. of Mining Engineering

Faculty of Engineering -Cairo University





Schematic Diagram of Scope of Mining Activities



# **NOVEL AND INNOVATIVE MINING METHODS**

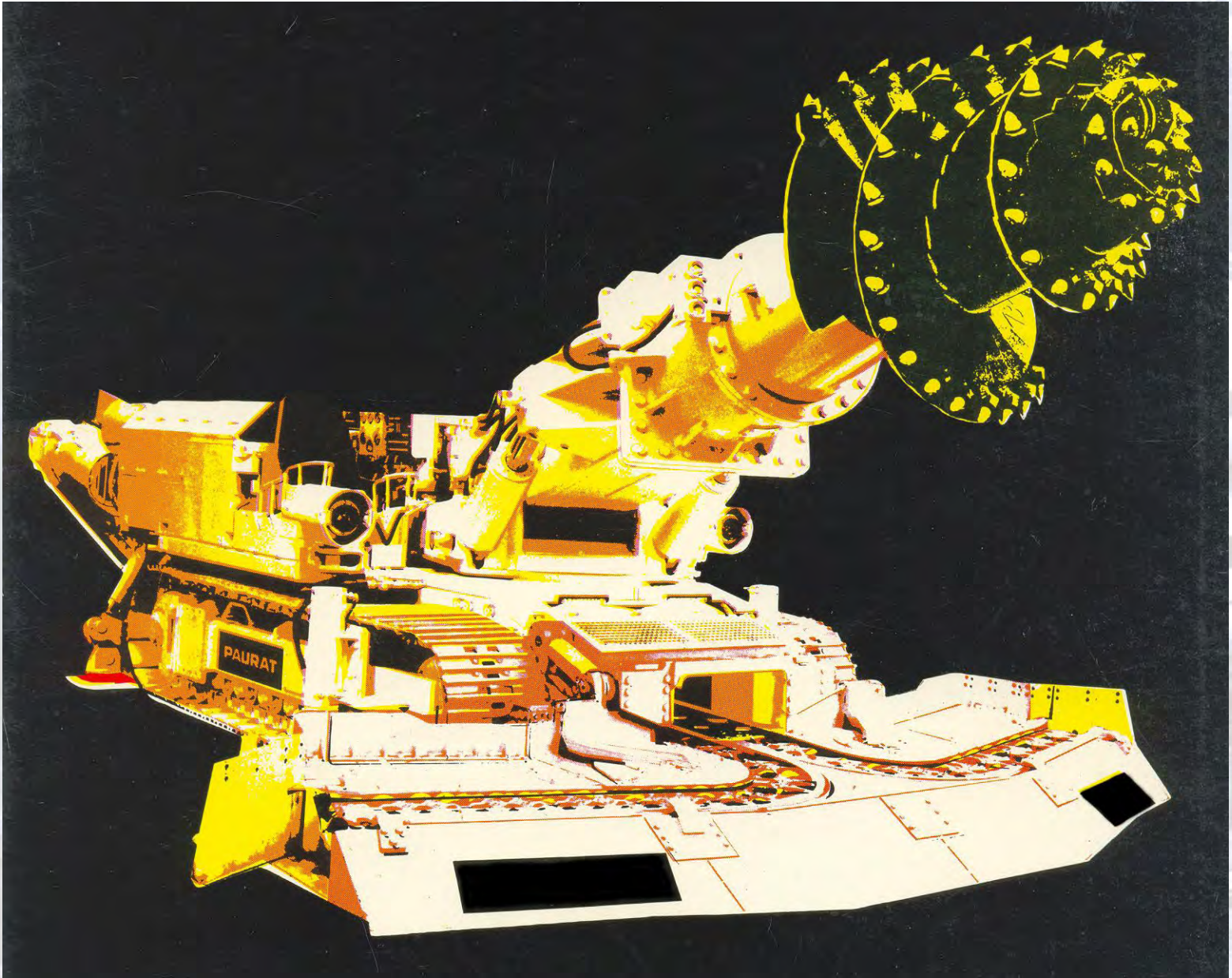
- **Rapid Excavation**
- **Automation and Robotics**
- **Hydraulic Mining: Jet-assisted Cutting**
- **Hydraulic Mining: Borehole Slurrying**
- **Methane Drainage**
- **In Situ Gasification and Combustion of Coal**
- **Underground Retorting**
- **Marine Mining**



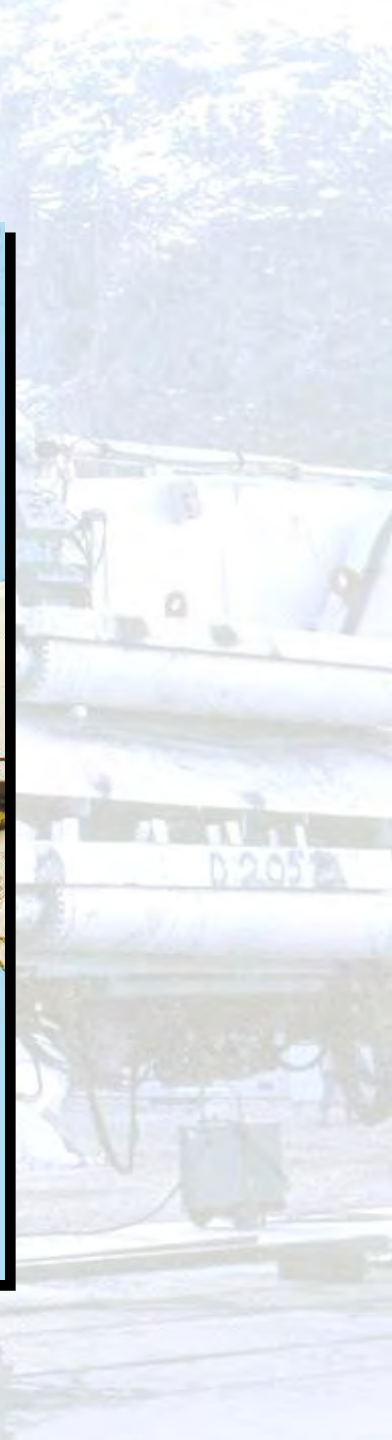
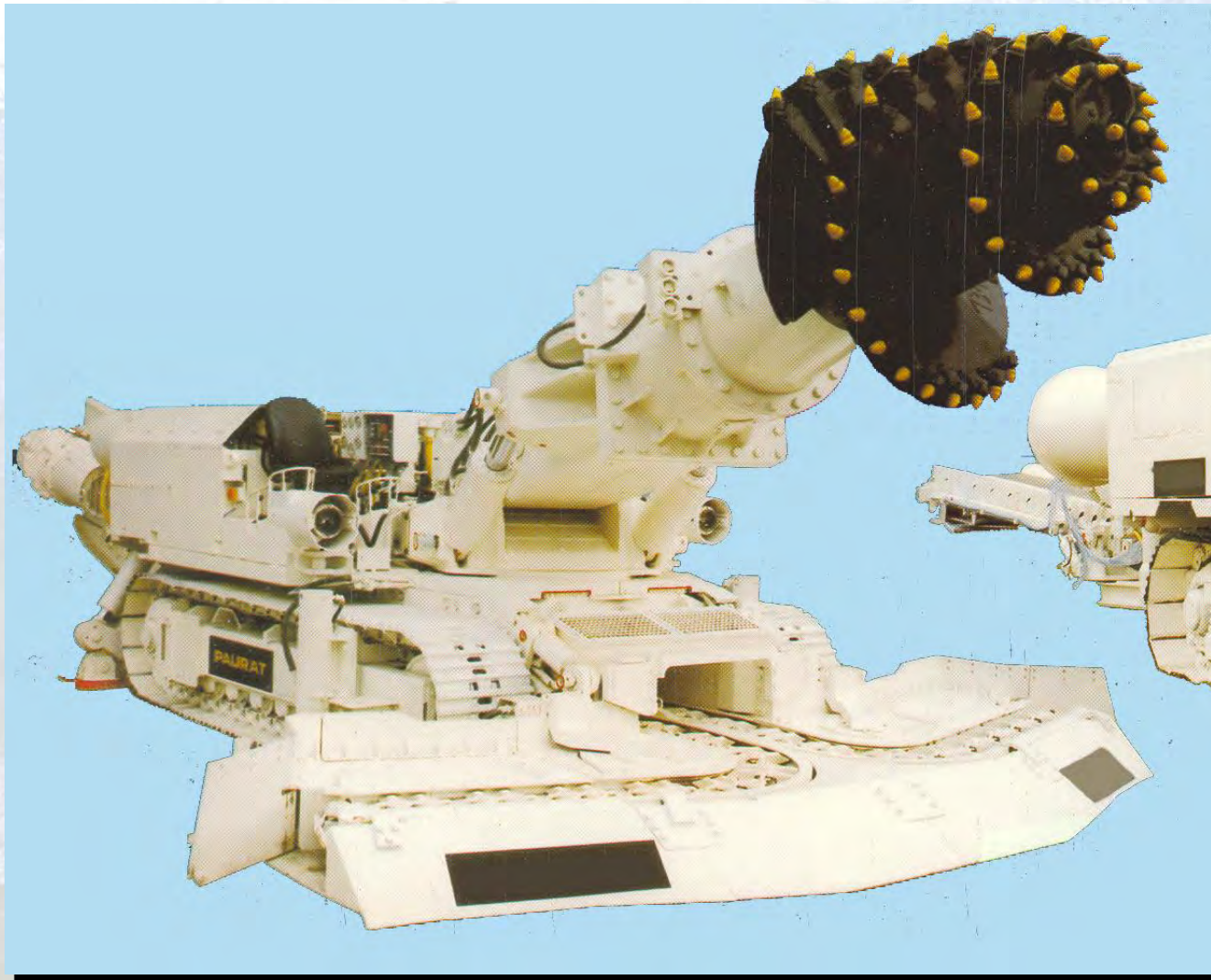
# **OTHER NOVEL MINING METHODS**

- **Ripper Miner**
- **Drill-Split Fragmentation with the Radial-axial Splitter**
- **Thermal Fragmentation and Excavation**
- **Shock Wave Rock Breakers**
- **Lunar and Planetary Mining**
- **Nuclear-assisted Mining**





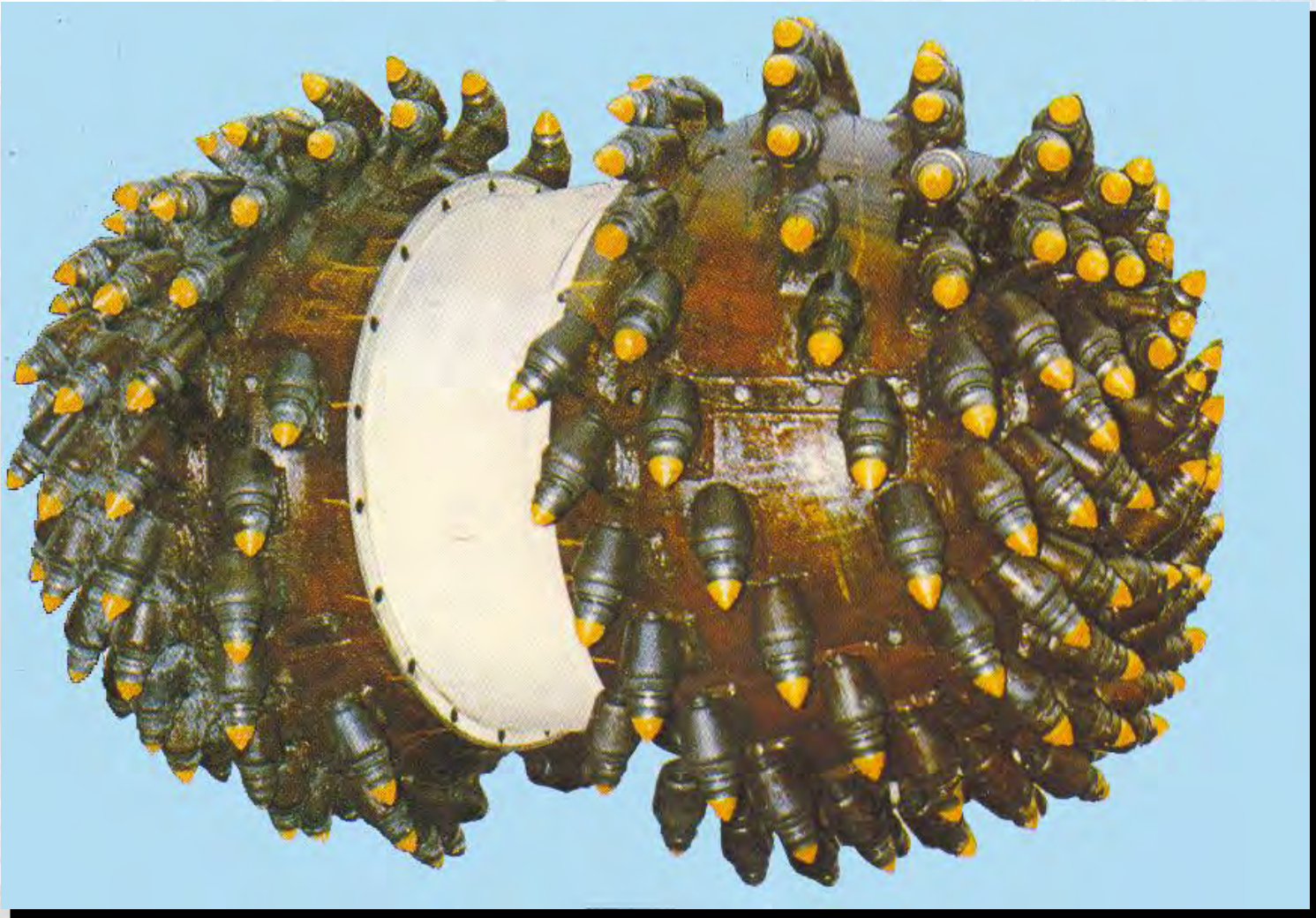








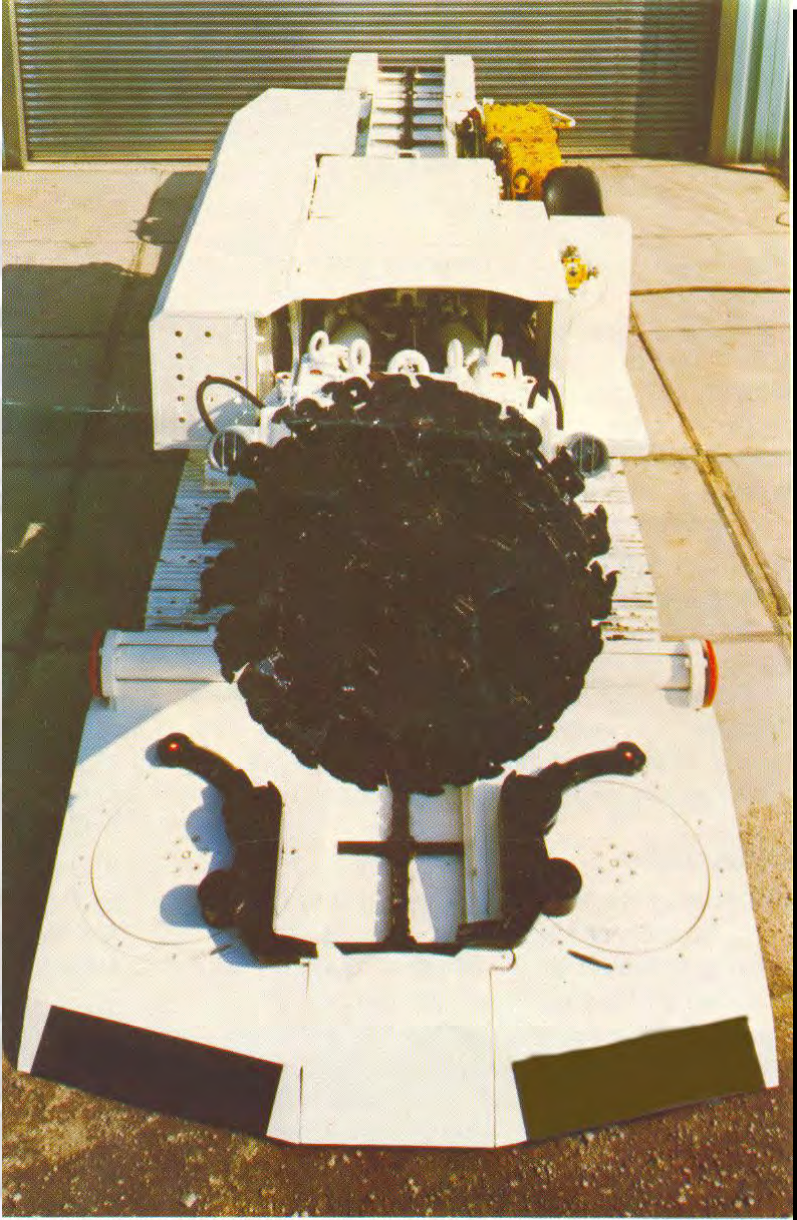
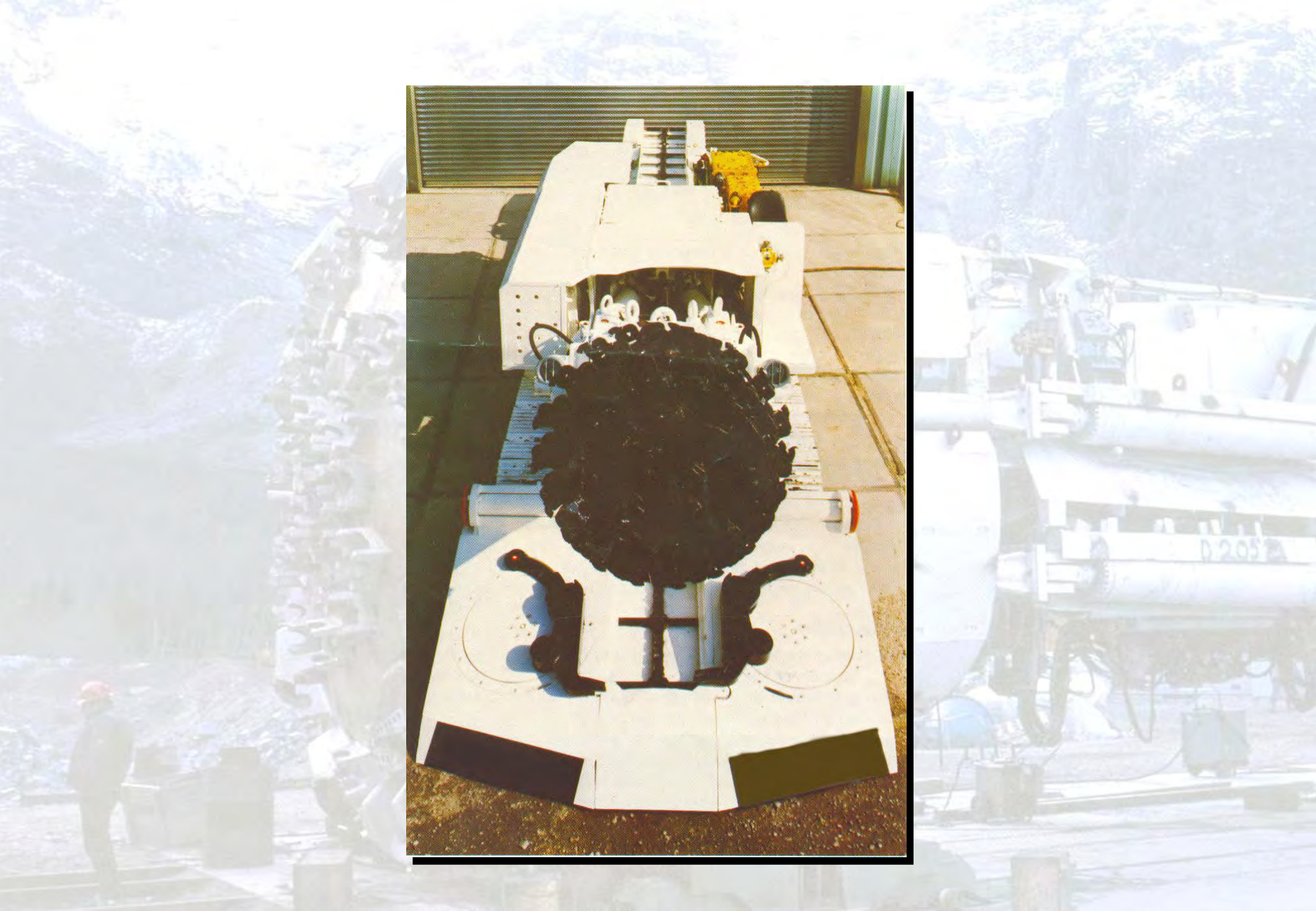








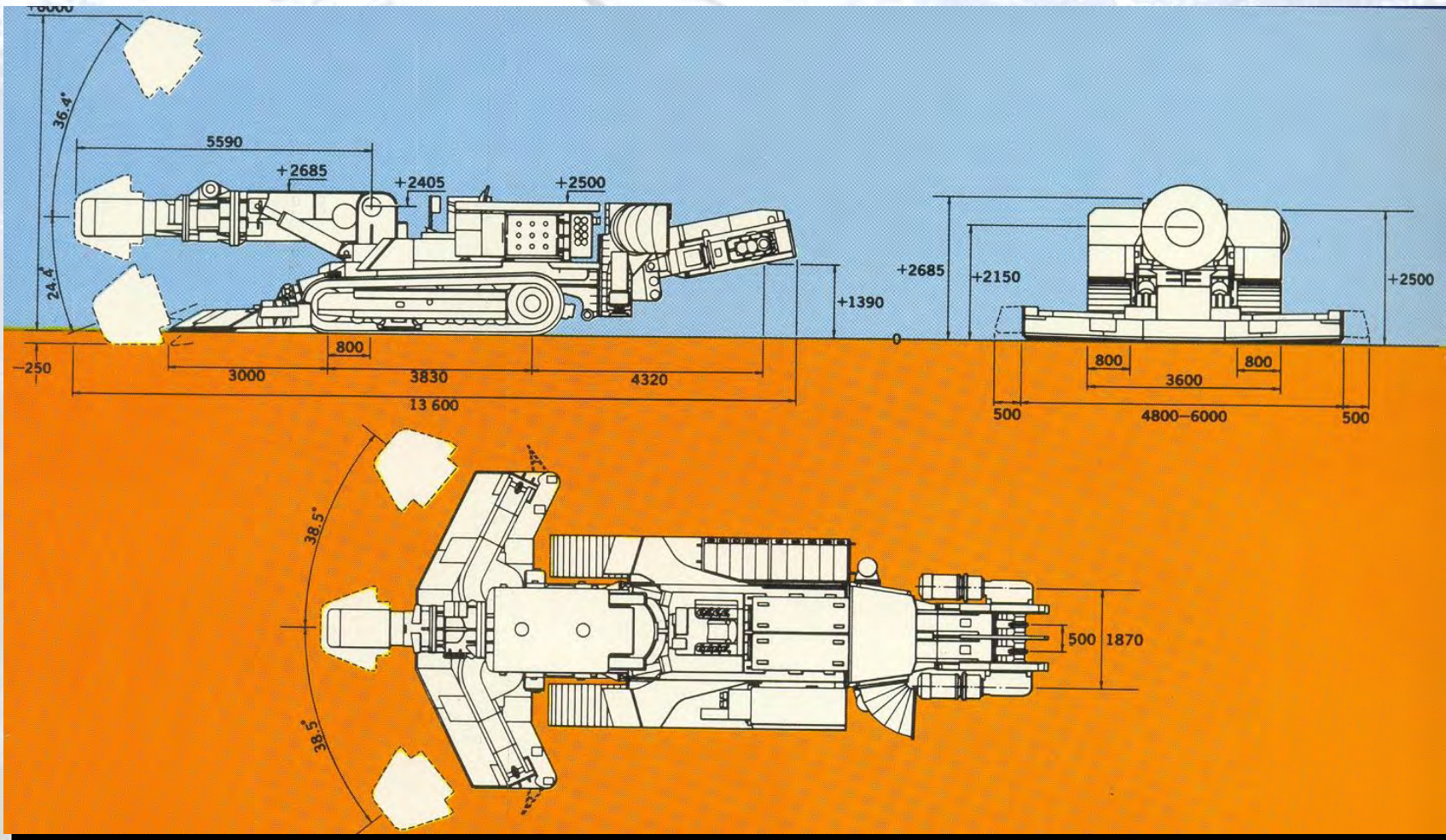




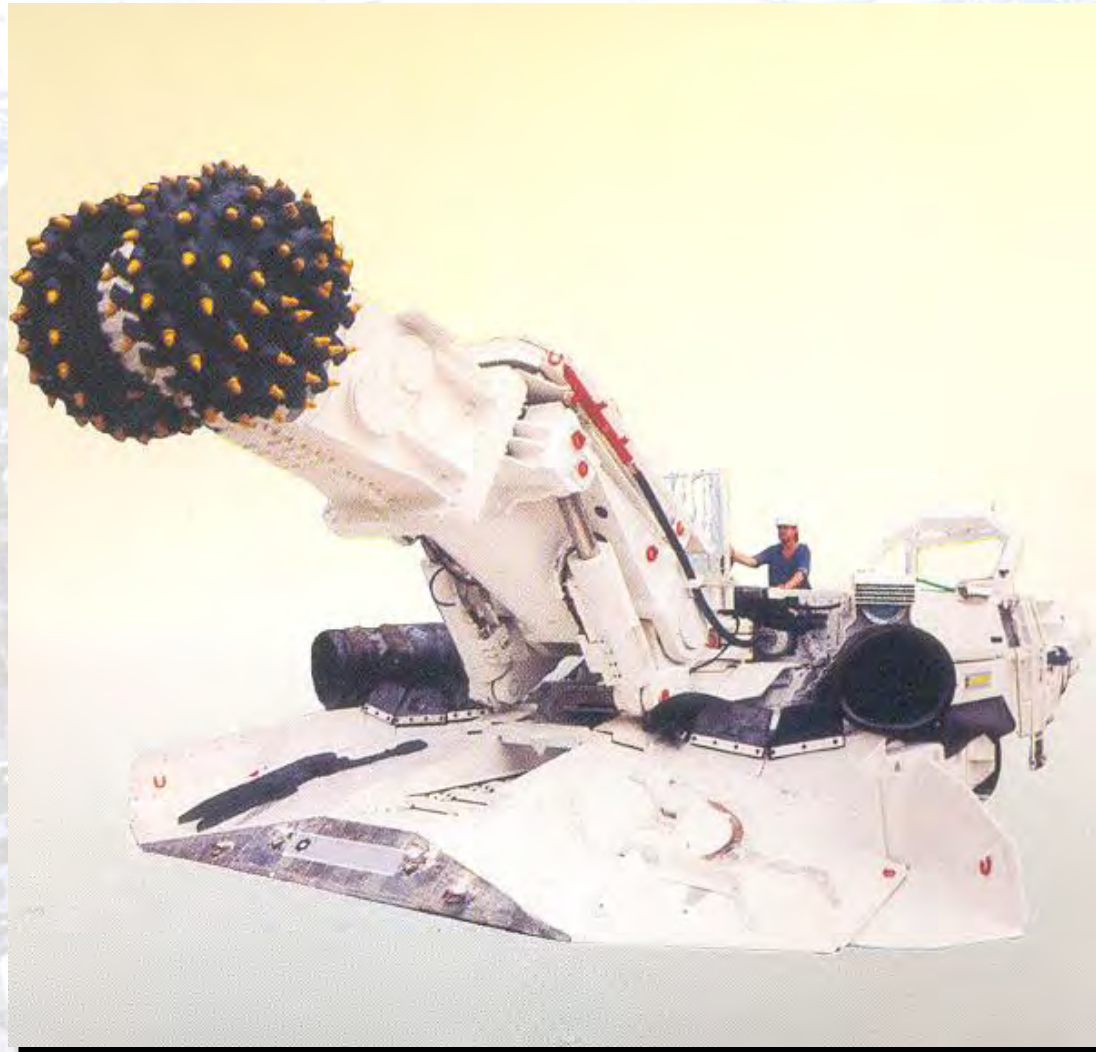








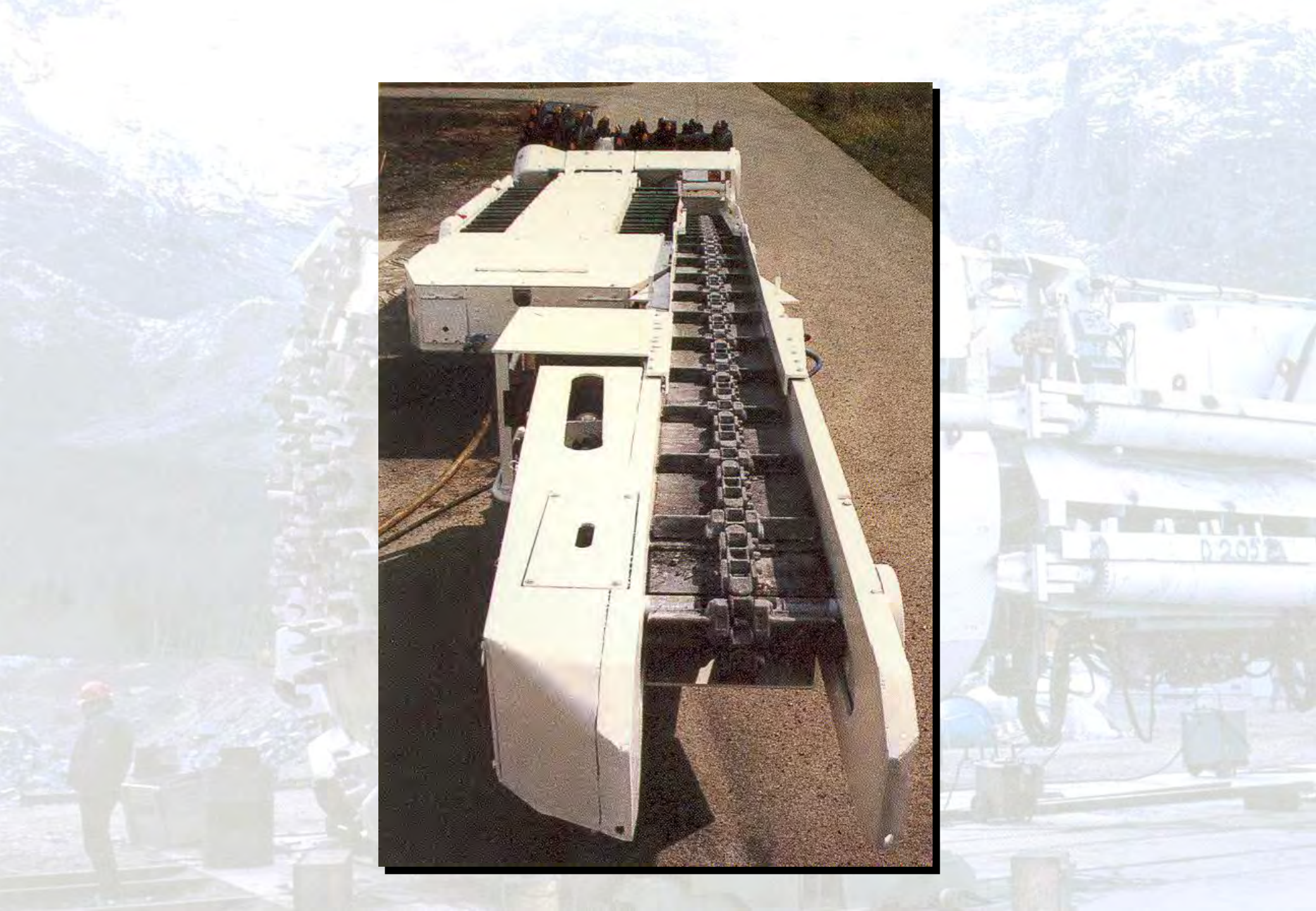
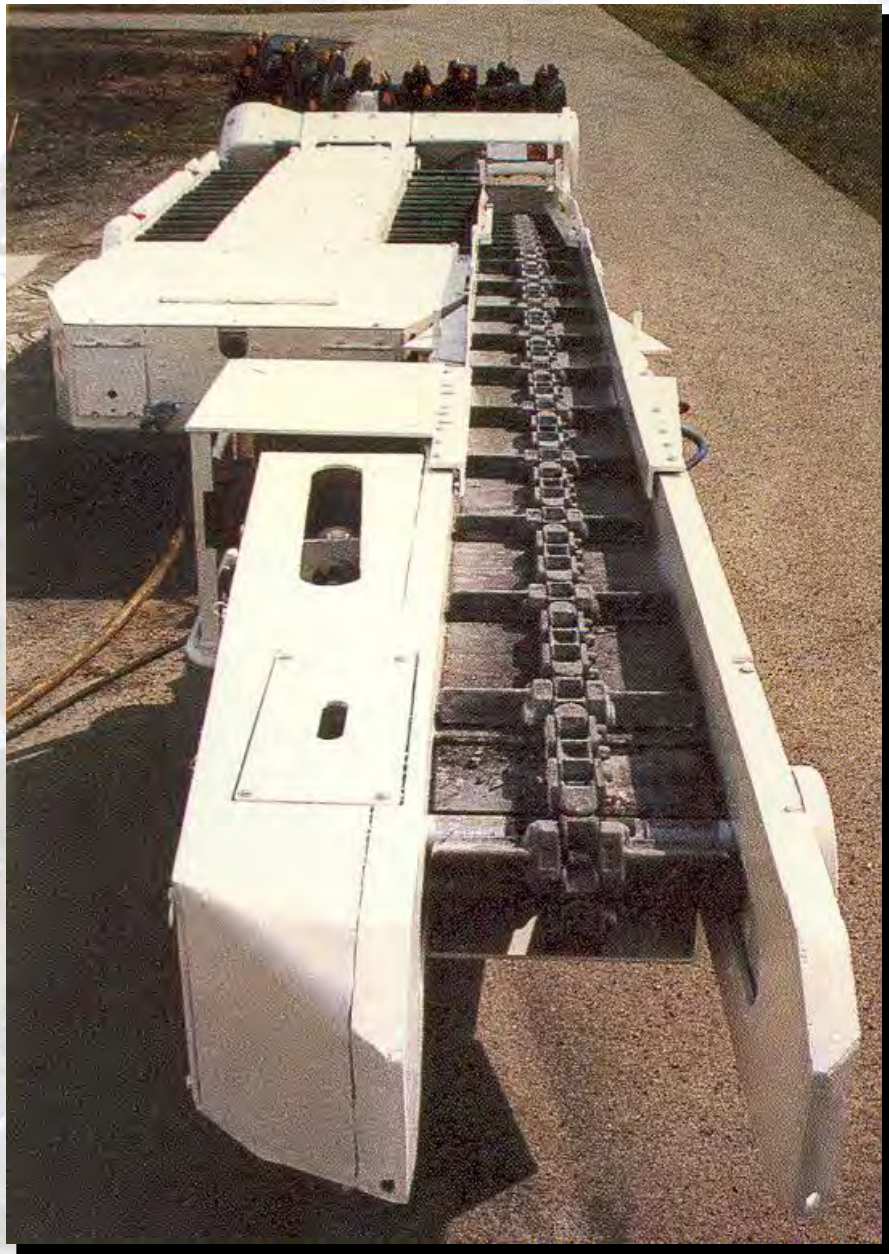




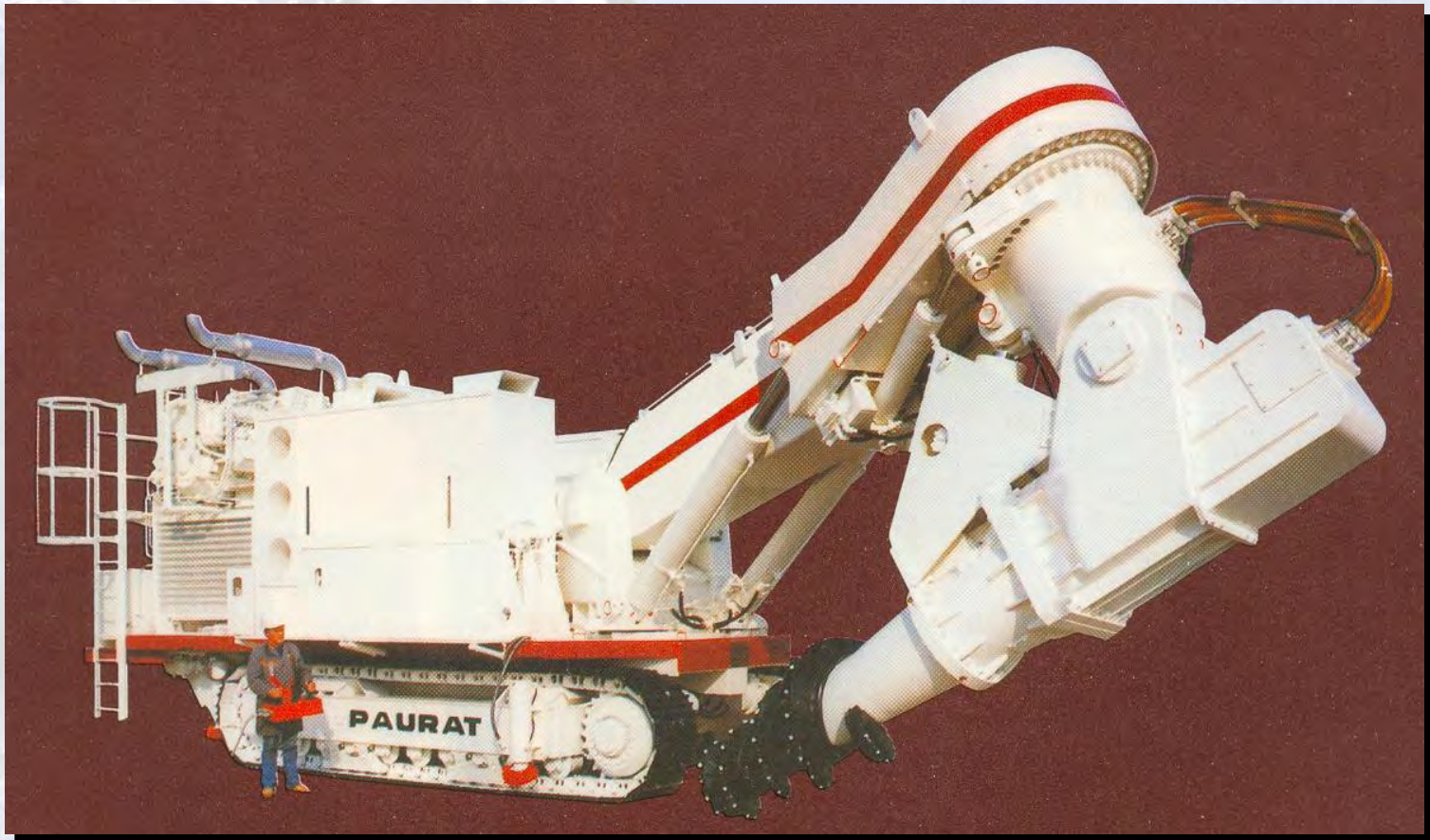




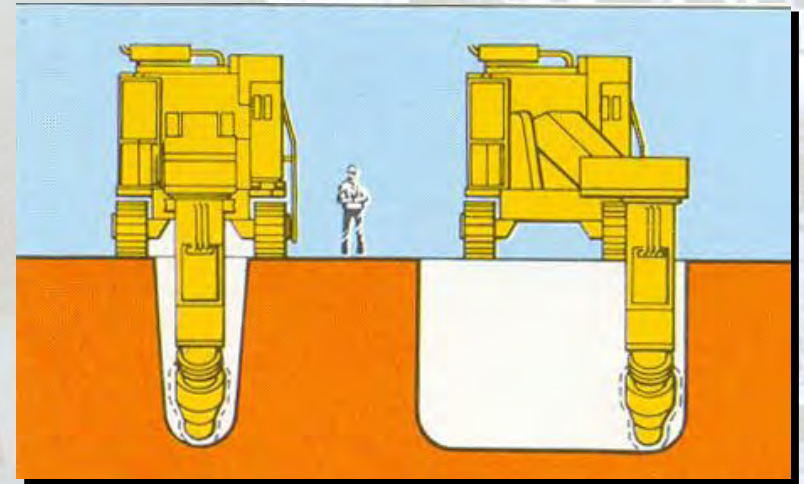
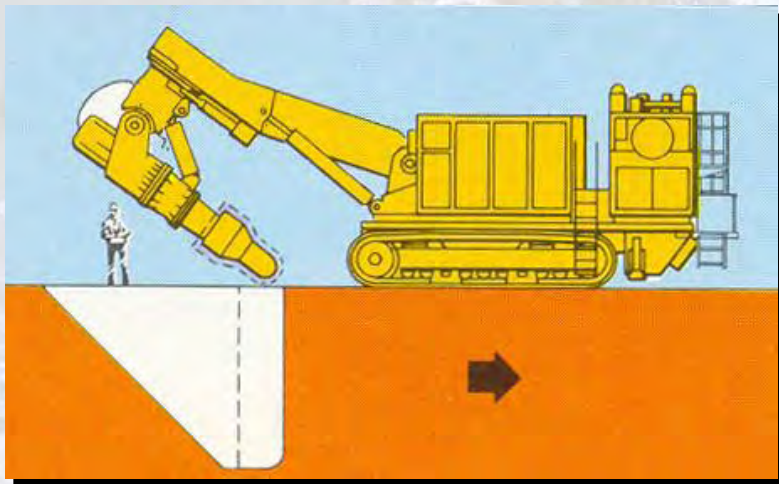
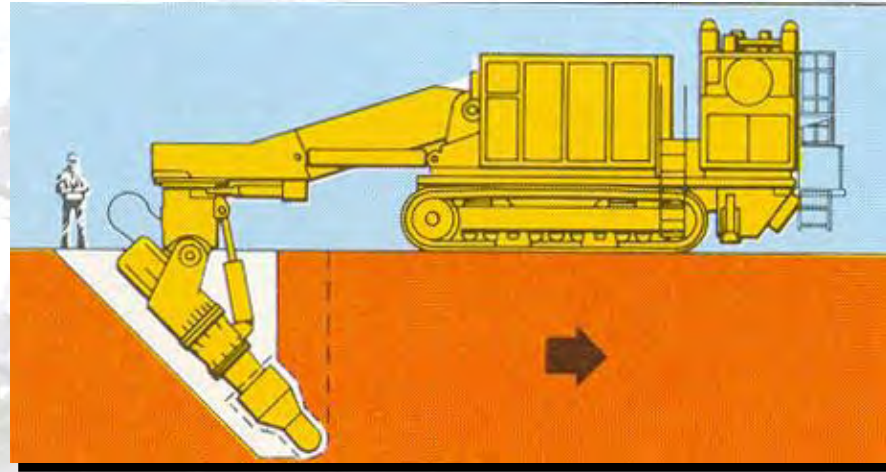




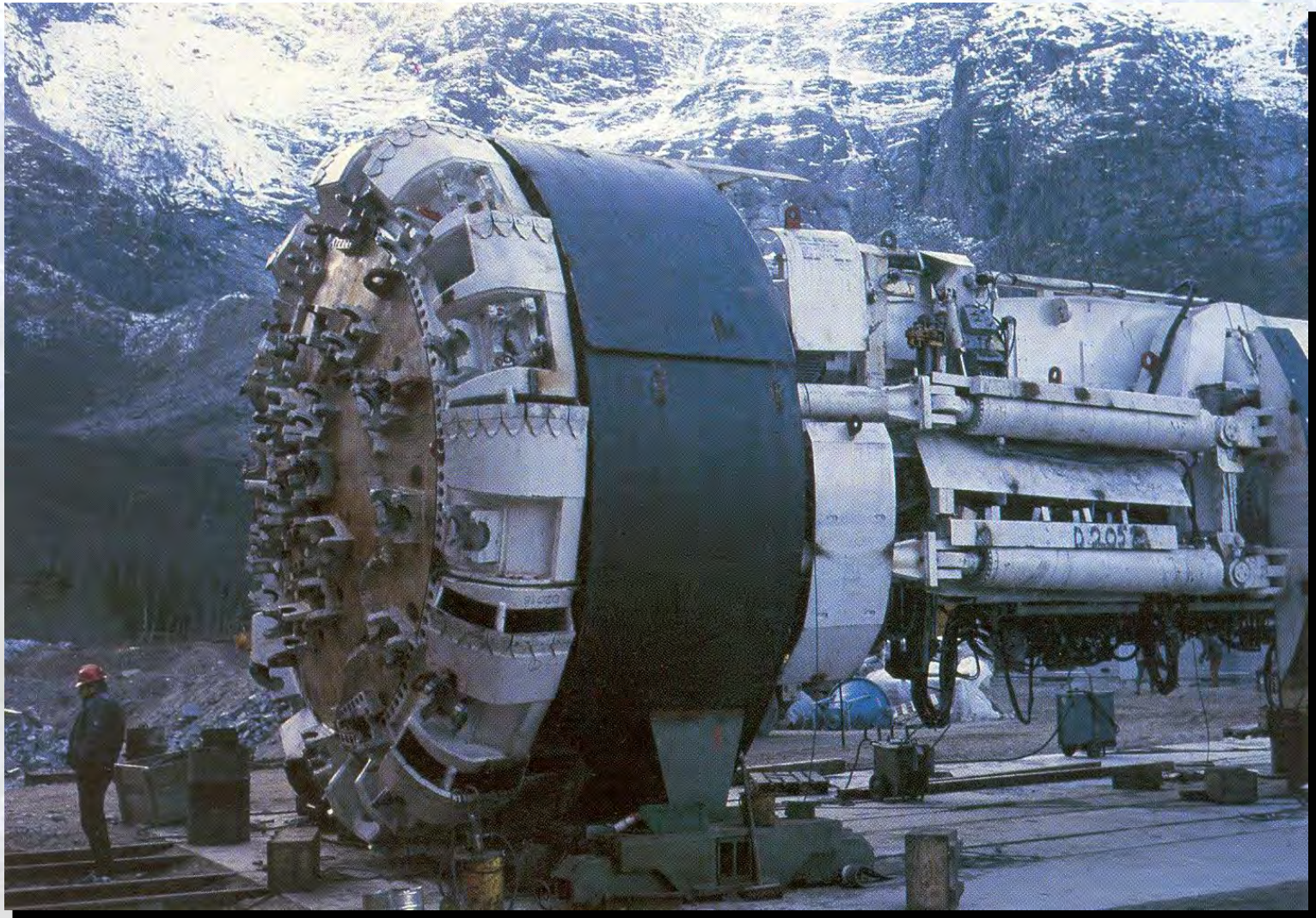
















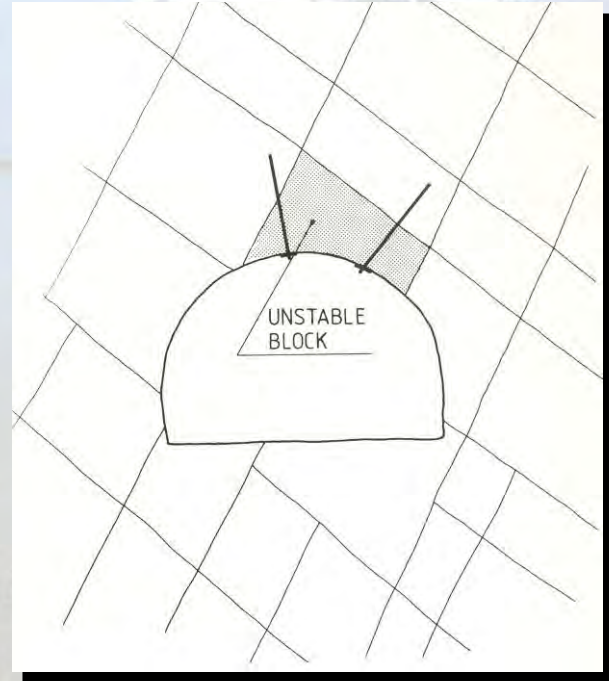
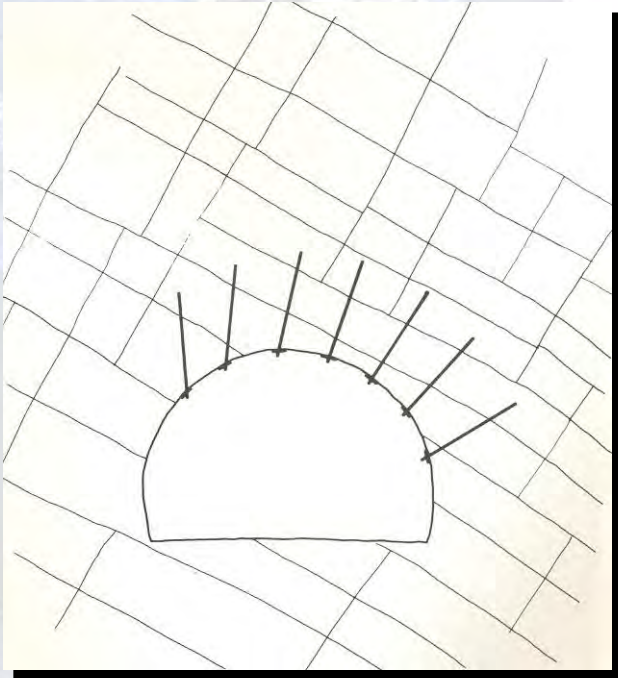








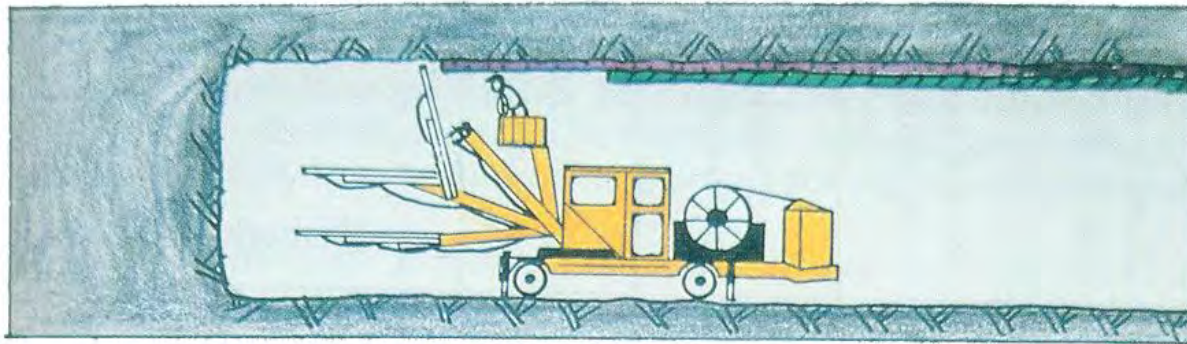






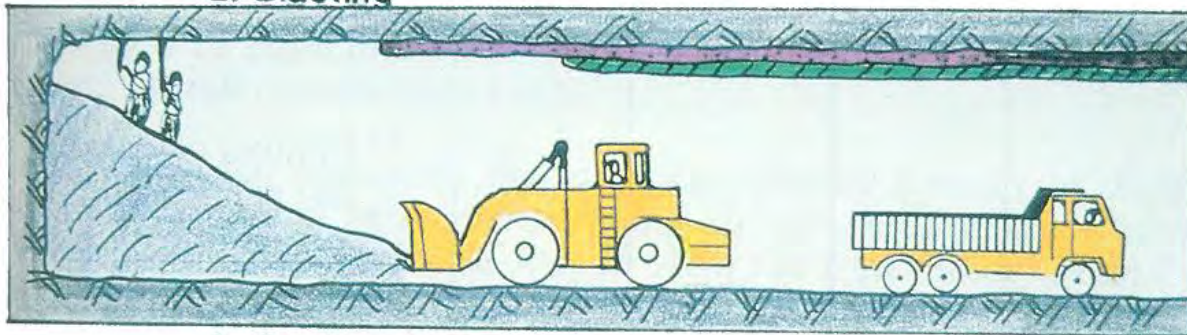




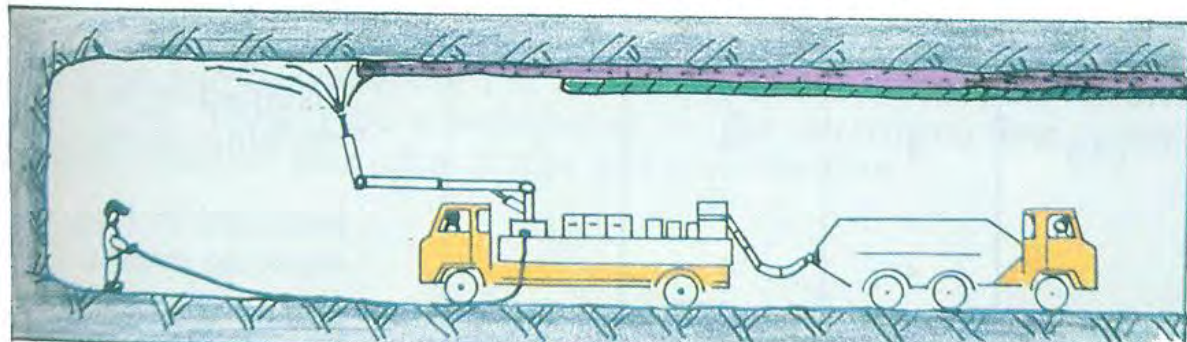


1. Drilling for rockbolt and the next round

2. Blasting



3. Scaling and mucking out the last round



4. Shotcreting the two previous rounds





**Lee-Norse Top Dog<sup>®</sup> roof bolters**—Single and dual-boom bolting machines on low wheel mountings, with rotary drill or new all-hydraulic HARD-4 percussion drill. Boom cradle raises for tramming, lowers for drilling; vertical drilling thrust is transmitted to ground, not to chassis.

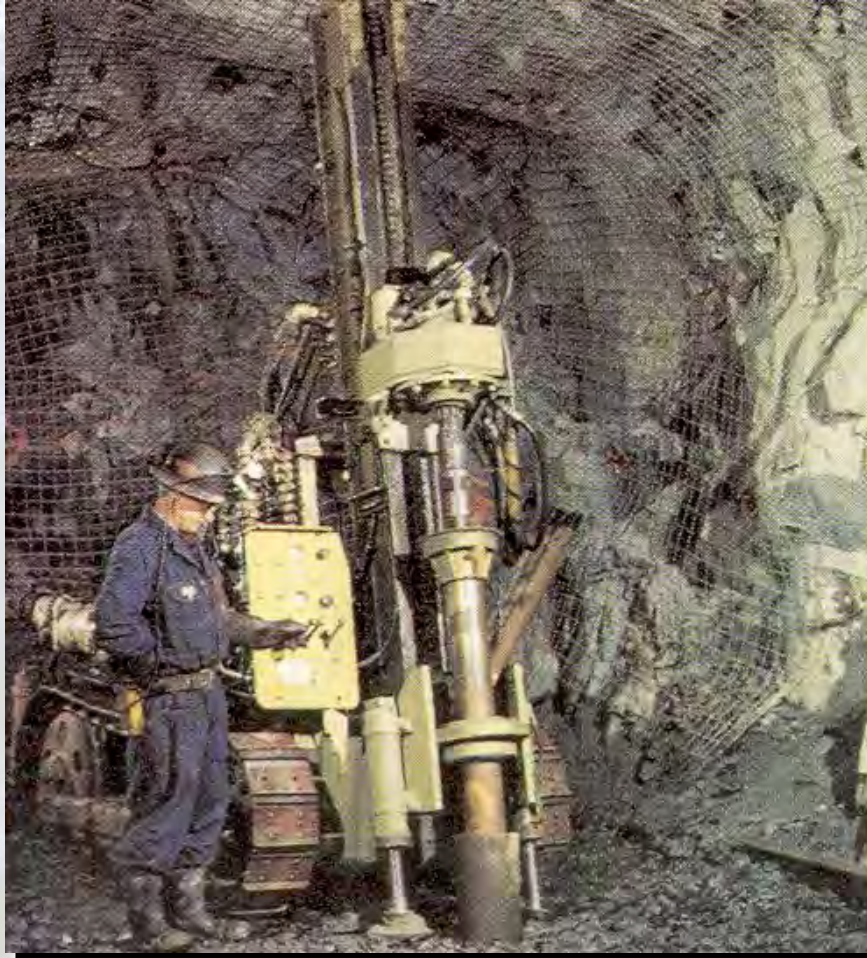




## **Raise borers and heads**

**RBM raise boring machines are available in 150- and 200-hp sizes, featuring variable speed and torque control, solid-state DC motor drive, and easy pushbutton control. RBH cutter heads have spherical profile to spread load evenly for longer life; make larger chips to bore much faster, use less power.**





## **CMM Downhole drill jumbo**

**Blast hole stoping methods can now be made to pay, thanks to the new CMM crawler jumbo with our DHD Downhole drills. Compactly designed to go down a cage in one piece, this rig will drill holes in the 4 to 6 1/2-inch diameter range, to depths up to 600 feet (depending on rock conditions). Exceptionally quiet, with hydraulic propulsion, positioning and rotation.**

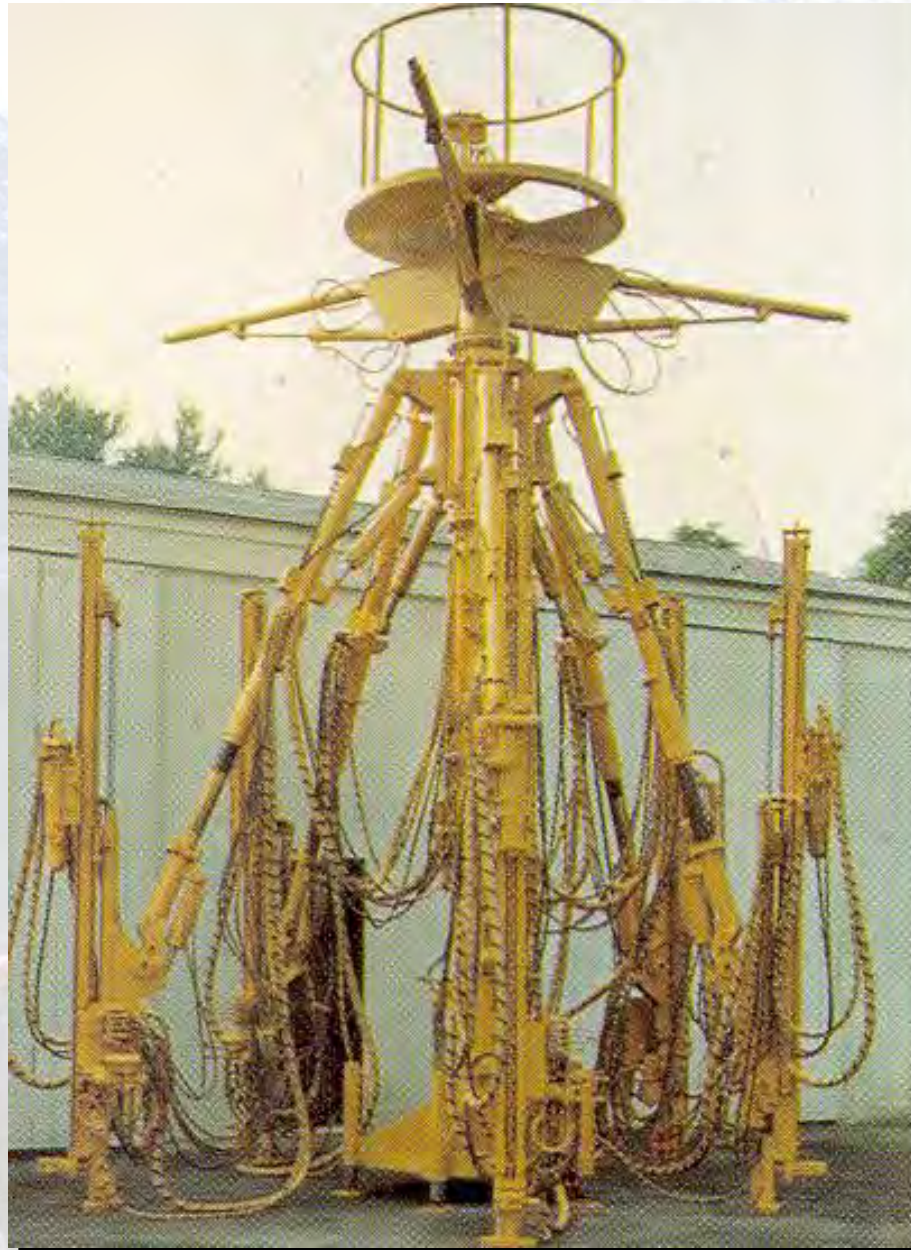




## **RockPick miner**

This crawler jumbo mounts a powerful hydraulic-impulse breaker, for high production in soft or hard rock. It can eliminate conventional mining cycles; it's available with muck disposal system for continuous mining. Hammer sizes from 500 to 3100 ft.-lb. blow energy.





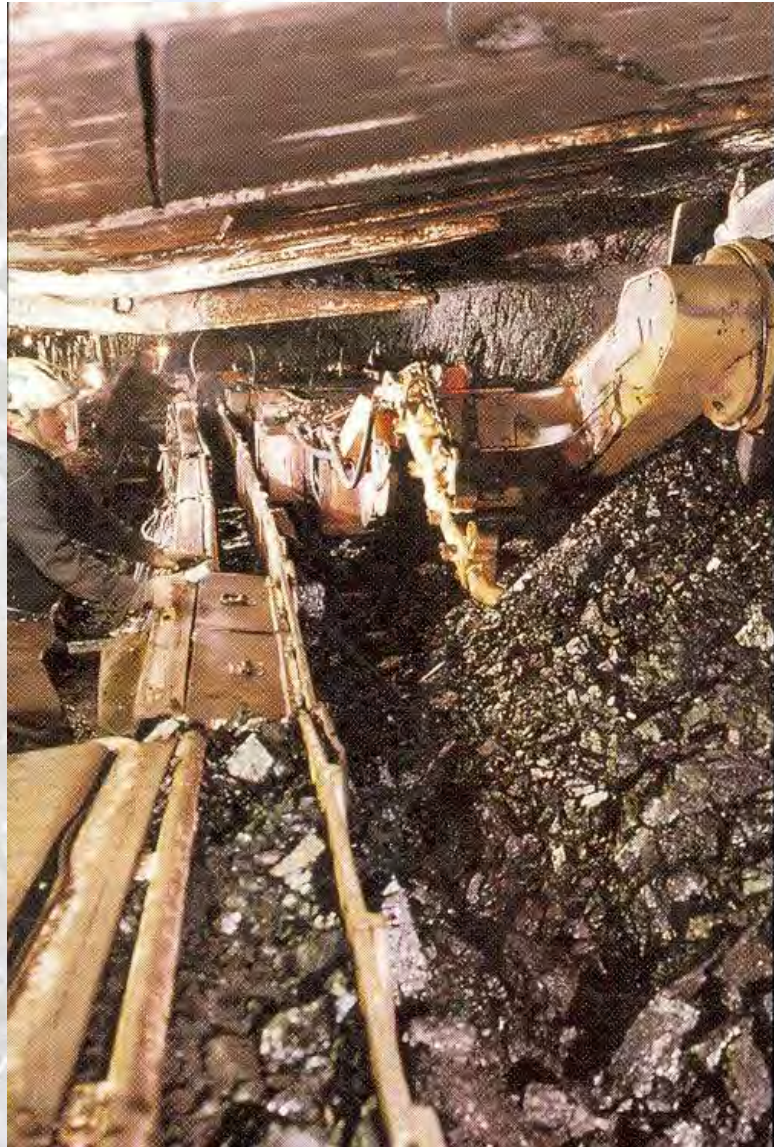
## **Shaft jumbos**

**This shaft jumbo mounts five hydraulic booms with sturdy chain feeds and air drifters, and has hydraulic jacks and stabilizers. Fixed or extendible booms are available, in combinations for shafts to 30 feet in diameter.**

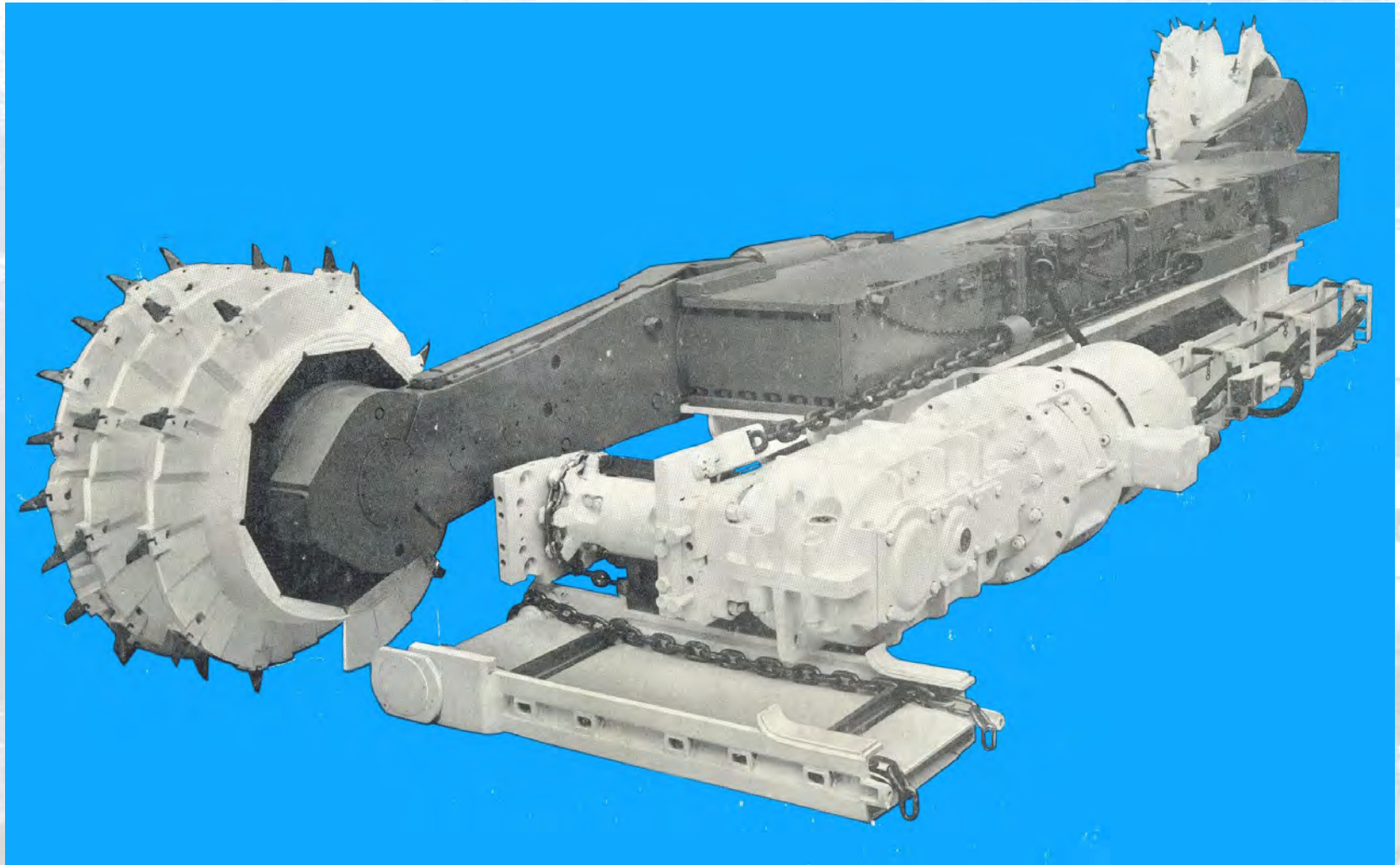




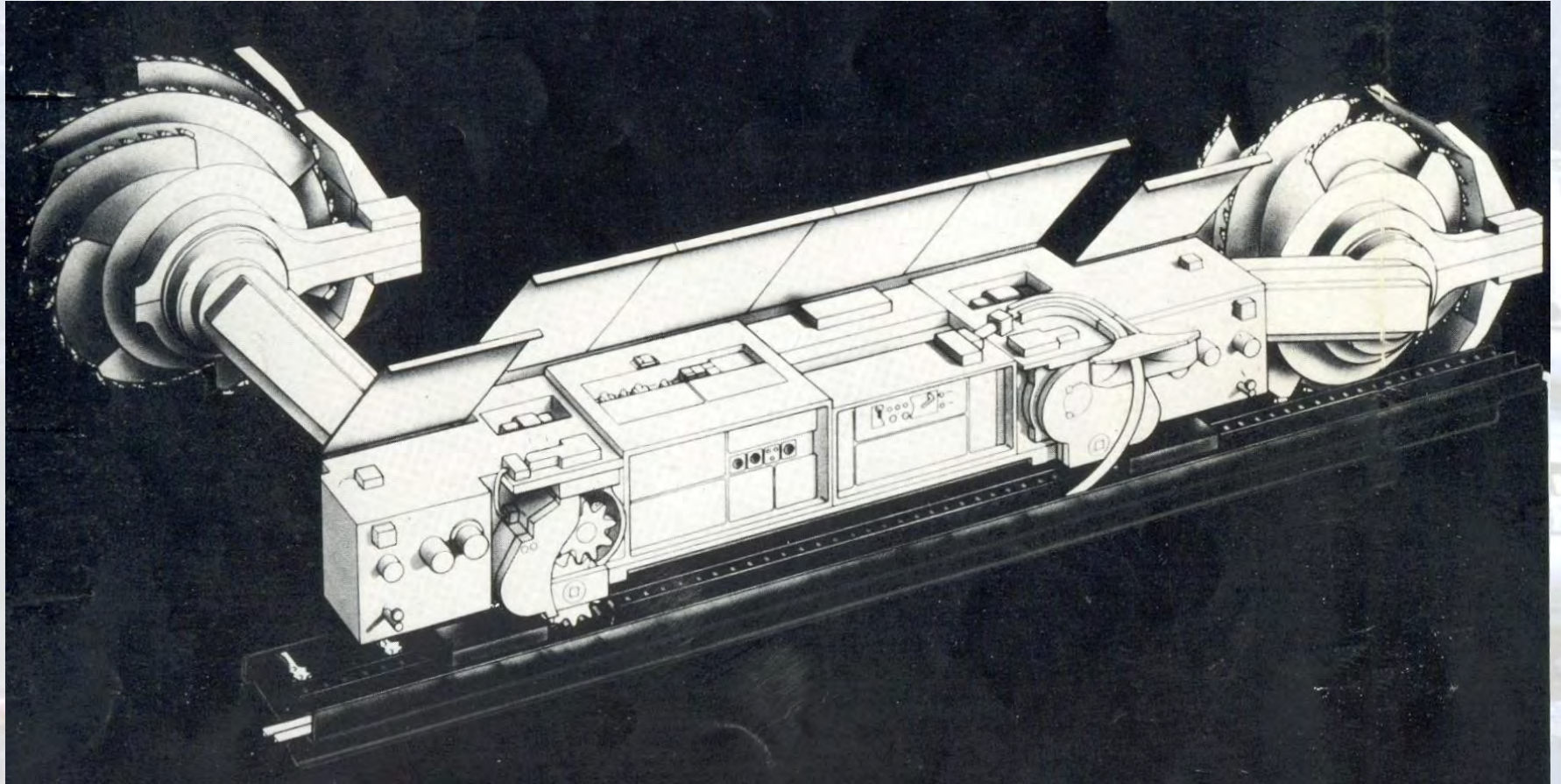




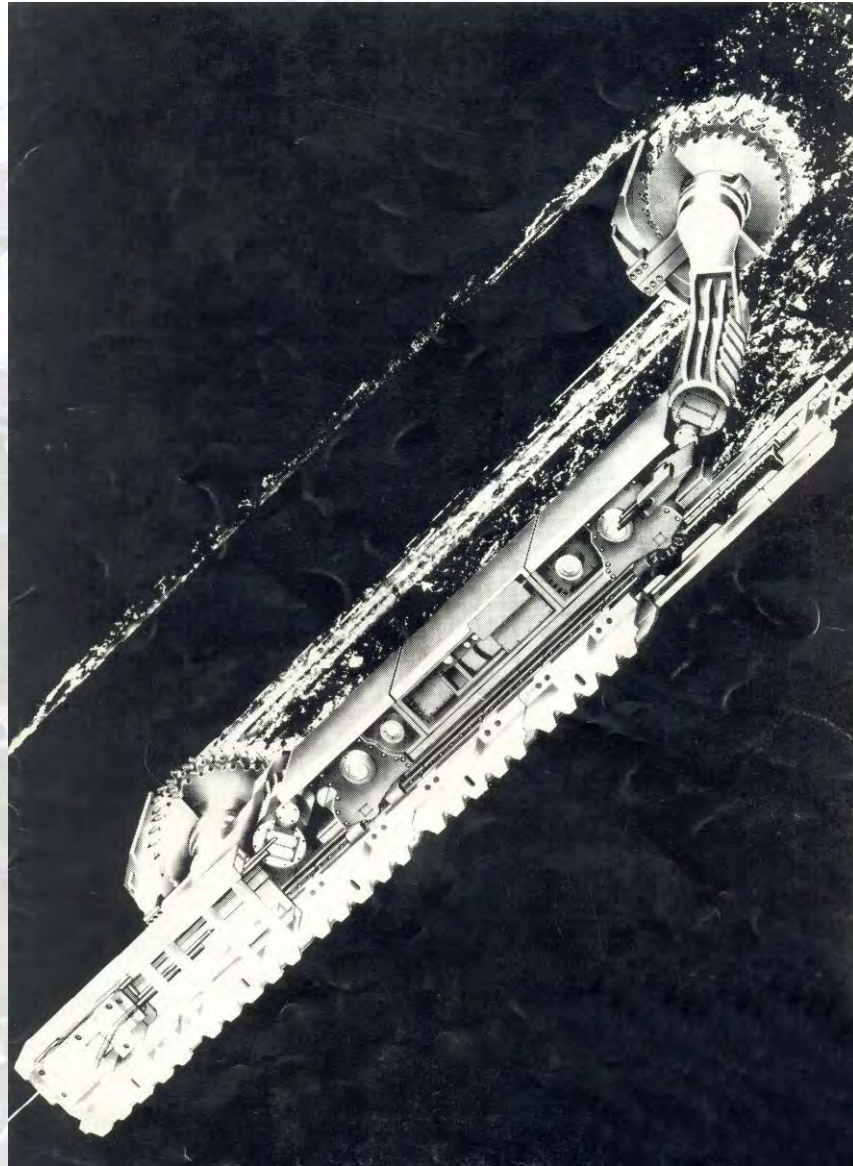




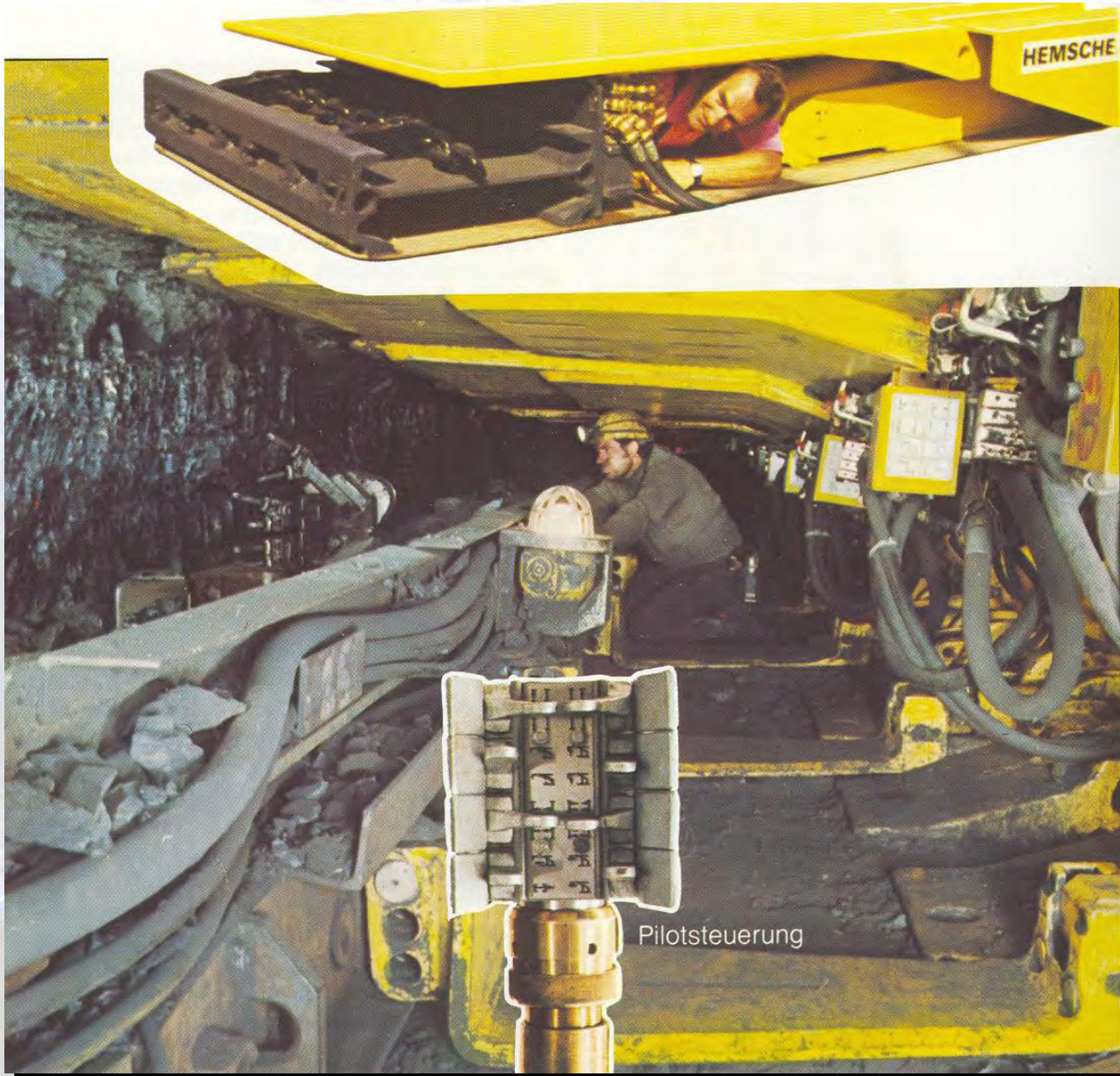












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Pilotsteuerung

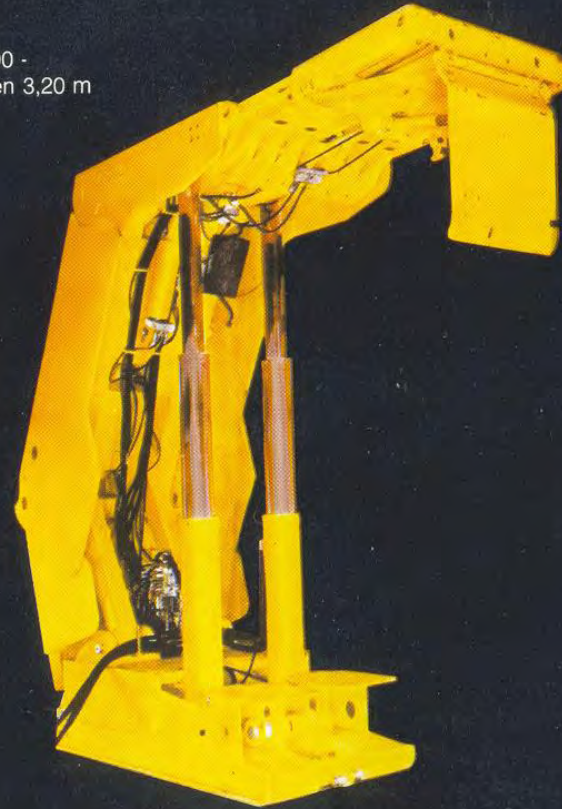




Vier-Stempel-Schildausbau 4800 -  
eingefahren 1,30 m/ausgefahren 3,20 m



Schildausbau G 320 -  
eingefahren 1,70 m/ausgefahren 3,50 m



Schildausbau G 440 -  
eingefahren 2,20 m/ausgefahren 4,80 m





Bockausbau 4100 für Firstkohलगewinnung -  
eingefahren 1,90 m/ausgefahren 2,80 m



Schildausbau G 520 -  
eingefahren 1,20 m/ausgefahren 2,75 m



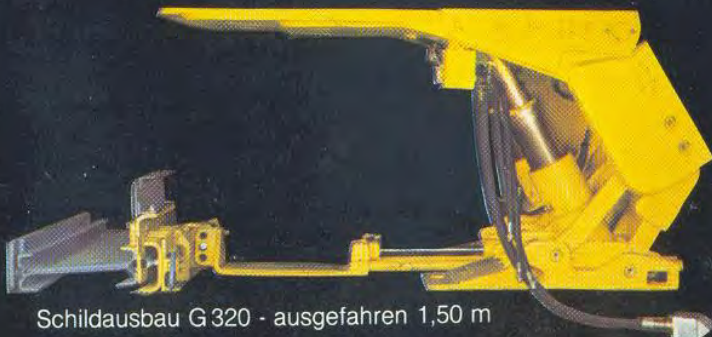
Schildausbau mit Schiebekappe G 320 -  
eingefahren 2,00 m/ausgefahren 3,10 m



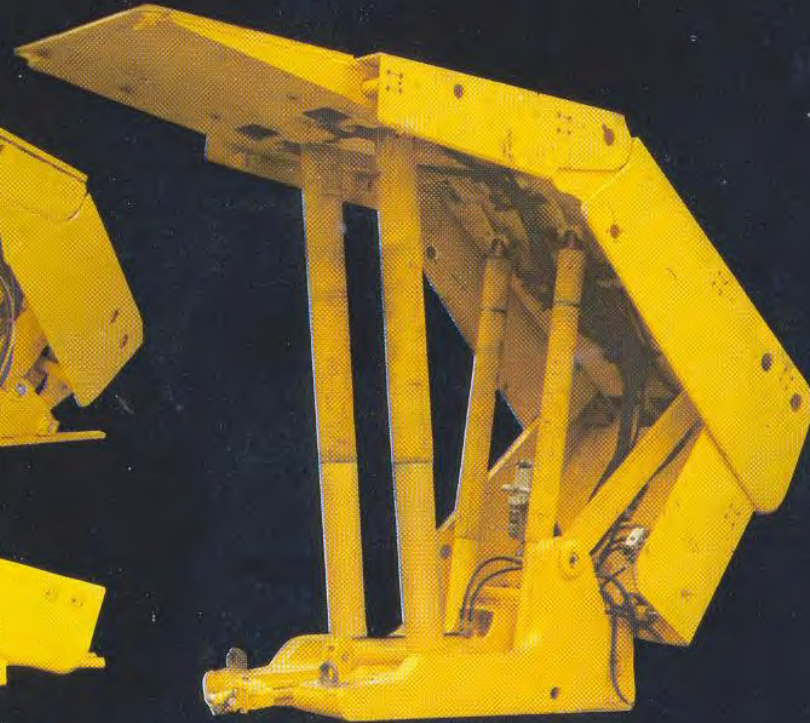
Schildausbau System Troika®  
eingefahren 0,75 m/ausgefahren 2,10 m



Schildausbau G 320 - eingefahren 0,50 m




Schildausbau G 320 - ausgefahren 1,50 m



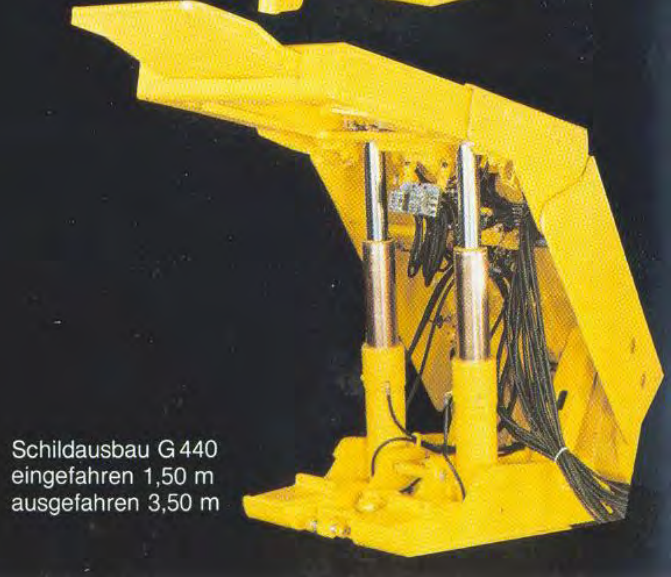
Vier-Stempel-Schildausbau 4600 -  
eingefahren 2,20 m/ausgefahren 4,20 m





Schildausbau G 320  
eingefahren 1,30 m  
ausgefahren 3,20 m

The image shows a yellow hydraulic shield extender, model G 320, in its retracted position. It features two vertical hydraulic cylinders and a top-mounted platform with a safety railing. The device is mounted on a base with various hydraulic connections and hoses.



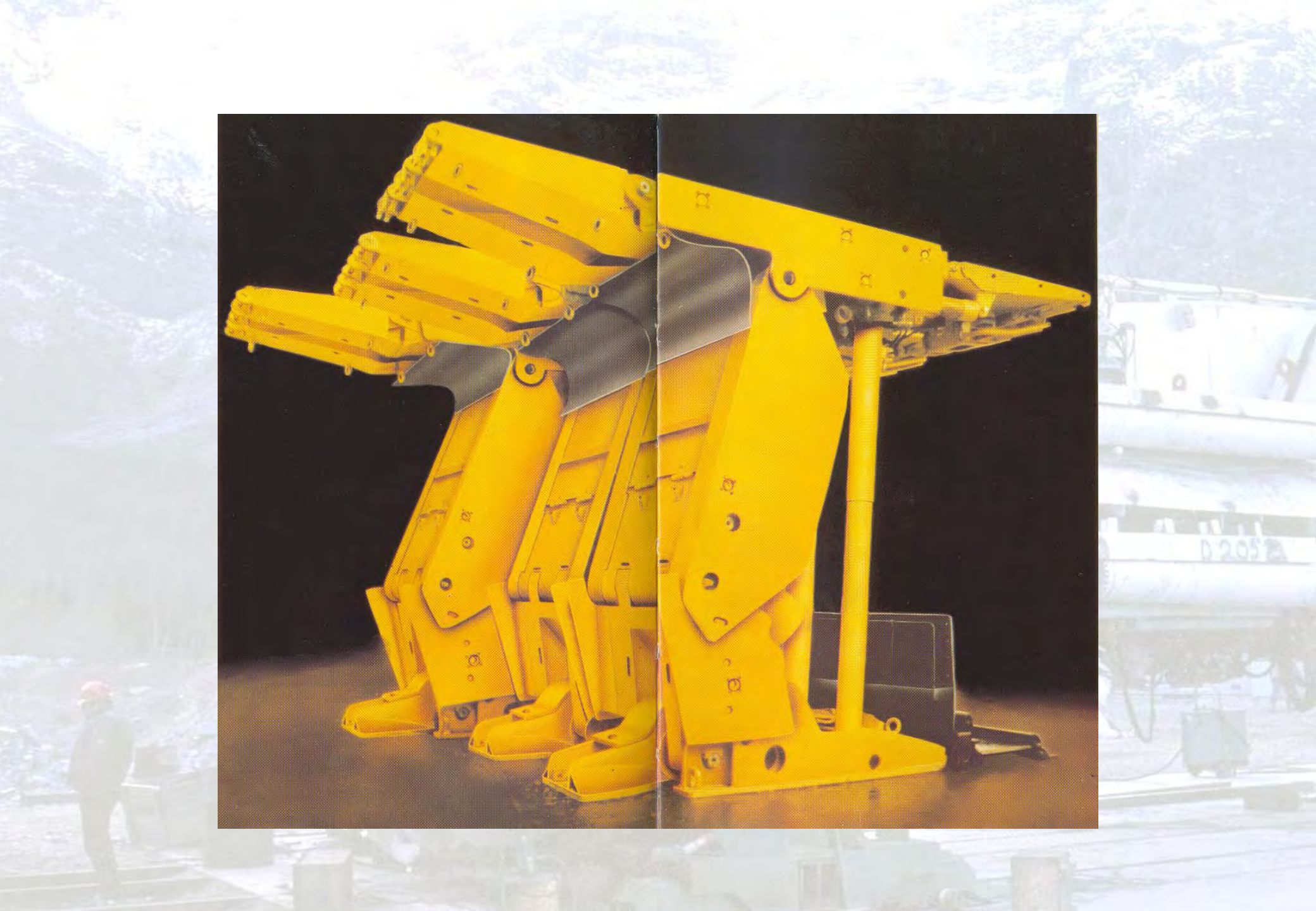
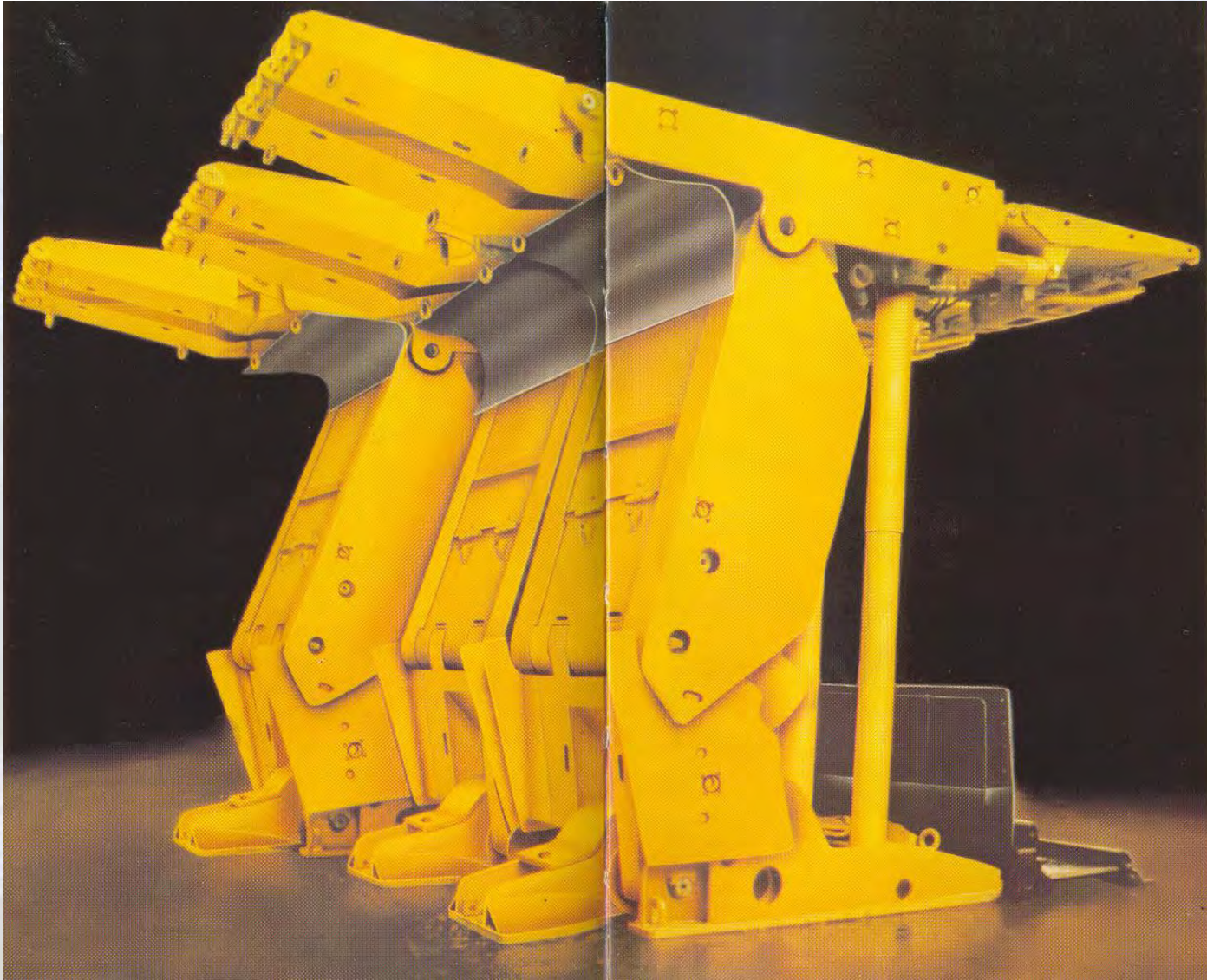
Schildausbau G 440  
eingefahren 1,50 m  
ausgefahren 3,50 m

The image shows a larger yellow hydraulic shield extender, model G 440, in its retracted position. It has a similar design to the G 320 but with a larger top platform and more complex hydraulic wiring. It is also mounted on a base with various hydraulic components.

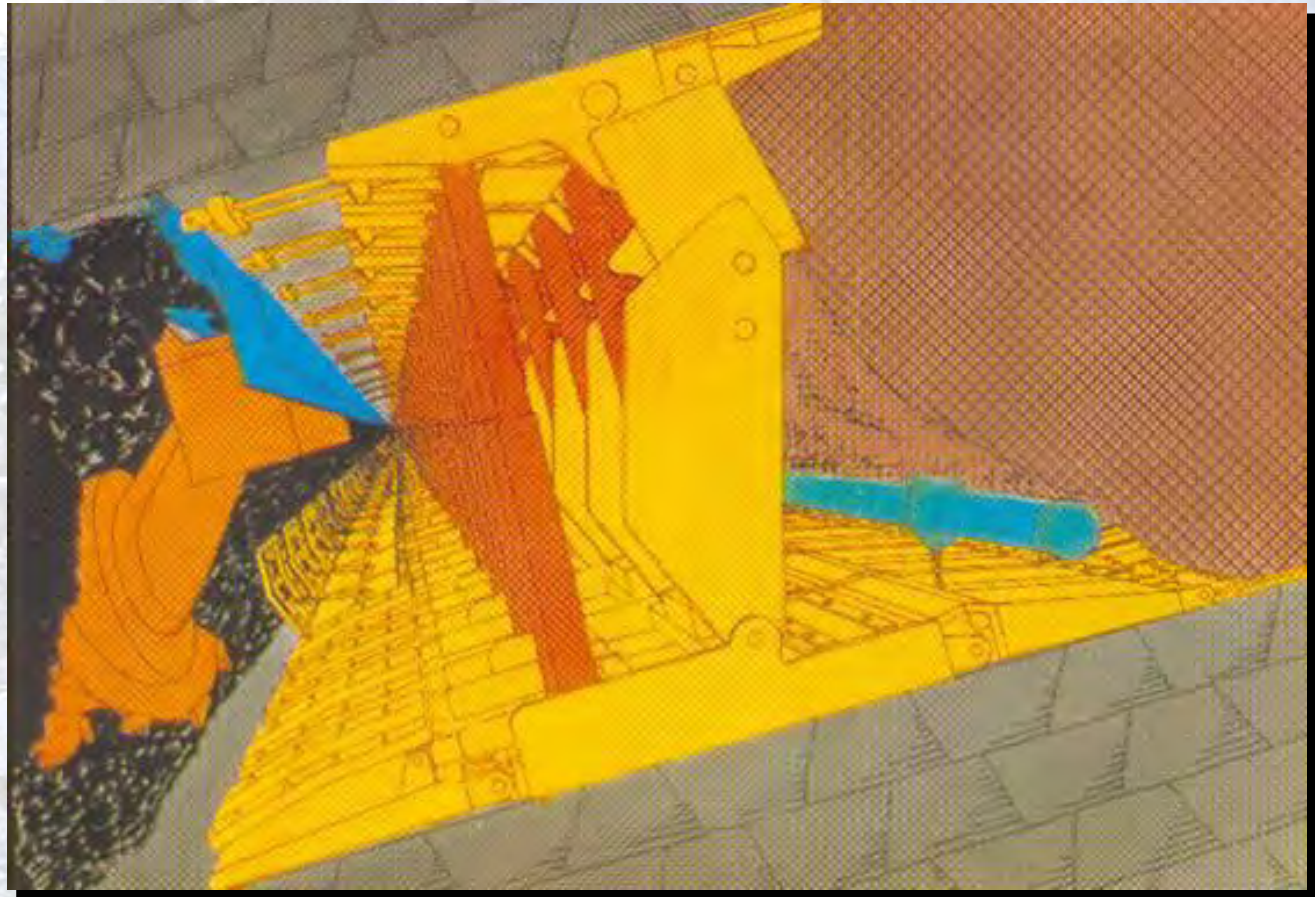


















A large, complex industrial machine, likely a tunnel boring machine (TBM) cutterhead, is the central focus. It features a large, circular cutting wheel with numerous cutting tools. The machine is mounted on a heavy-duty frame. In the background, a worker wearing a red hard hat and dark clothing stands on a platform, providing a sense of scale. The scene is set in an industrial environment, possibly a factory or a construction site. The text "THANK YOU" is overlaid in the center of the image.

**THANK YOU**