Alimak raise climber

u/g metaliferous mining

Raise driving techniques

Conventional methods

Drilling and blasting

Open rise technique

Compartment Method

Problems

Long hours

Safety

High stress

Ventilation

Depth & length of raise

Fractured rocks

Rock bursts

Raise driving techniques

Alimak raise climbing

Drive very long raises

Vertical or inclined drive

Low power demand

Straight or curved drive

No raise angle limitation

Easier in operation

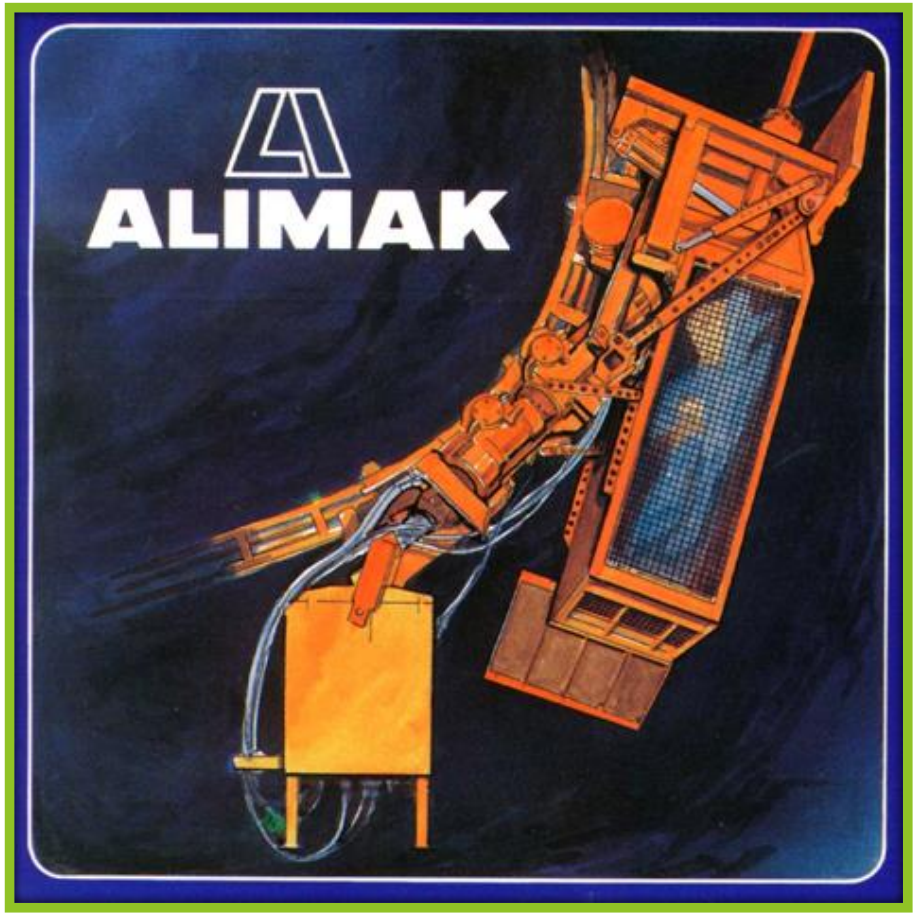
Drive very long raises

High safety

Flexible

No or low ventilation problem

Introduction



- The machine was manufactured by Alimak AB, a Swedish company in 1967. In India, it was first introduced in **Jaduguda uranium mine** in 1972.
- Alimak raise climber is one of the latest techniques of drilling a shaft from a low level to the surface. The machine is used for all the stages of unit operation: drilling, Blasting, ventilation and advancement (scaling).
- The method is based on rack-pinion drive with a guide rail bolted to the handing wall by expansion bolts.

Introduction

- The guide rail also include built in steel pipes for supply of air and water to drills and for ventilation at the face of the raise.
- A case for workers and a working platform attached to it climb along the guide rail and drilling, blasting, and charging of blast holes are carried out from this platform
- It runs on a guide rail anchored to the hanging wall. Using curved guide rail sections, the direction of travel can be changed at any time; forward, backward or sideways.

Kinds of climber

- Pneumatic
- Electric
- Hydraulic(Diesel)

The process

Constructional Features

Drive units

- Air/Electrically/Diesel/Hydraulically driven
- It depends upon: energy source, ventilation, rock conditions and length of raise

Compressed air hose pipe and expansion shell type roof bolt

Platforms

- 1.6m x 1.6m or 2.4m x 2.4m standard
- Protection canopy
- Any shape or size(on request)

Remote control system

Constructional Features

Safety equipment

- Safety roof
- Breakers
- Rescue apparatus
- Telephone

Preparation works

- Raise station
- Initial guide rail section

Constructional Features

It consists of a base developed at the base of shaft to be driven.

There is provision of air, water and electricity at the bottom along with accessory services.

The ladder runs parallel to the shaft walls, alongside these are hose pipes for compressed air and water used for flushing and applying pressure while loading explosive.

In case of electric drill, electricity, is also supplied to the working height. The ladder and the attachment is fixed to sidewalls of shaft by means of rock bolts

At the top of the set up there is a working plat from on which a seat is these with a canopy

Constructional Features

The worker stands on the platform and does the operations of drilling and blasting. The canopy protects the workers from rock and other debris.

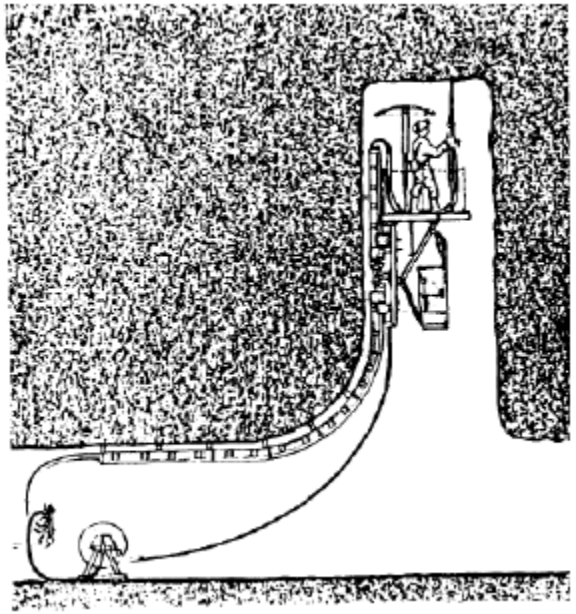
Alimak Raising does not require directional drilling due to the high degree of accuracy provided by the mining method.

Confirmation of ground conditions is not required with Alimak Raising. This method can drive accurately and productively through any ground type first time installing ground support as you advance the raise.

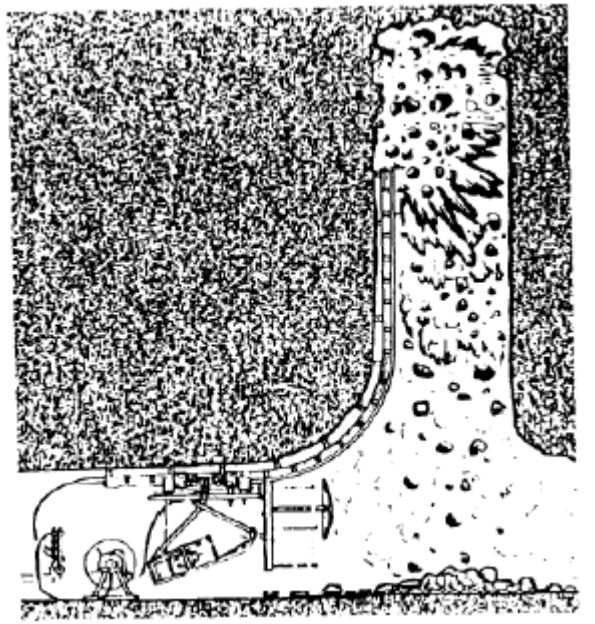
This is a drill and blast method and does not require expensive drilling consumable

This is designed to efficiently mine through the hardest of rock types

Working

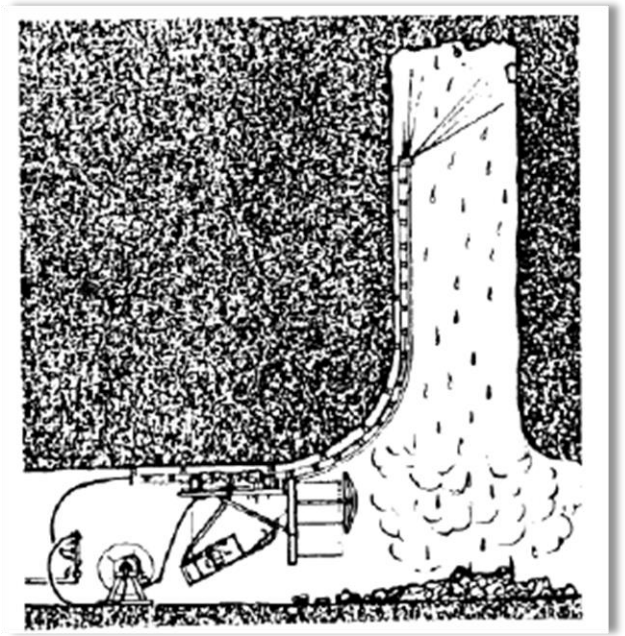


1. Drilling

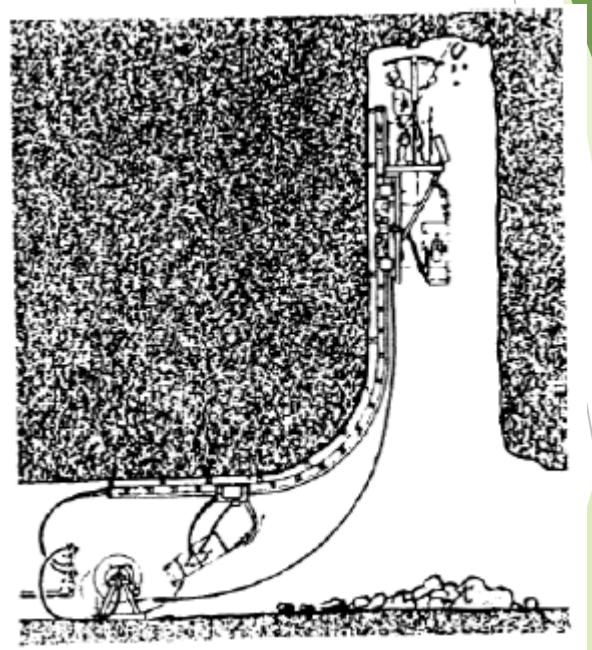


2. Blasting

Working

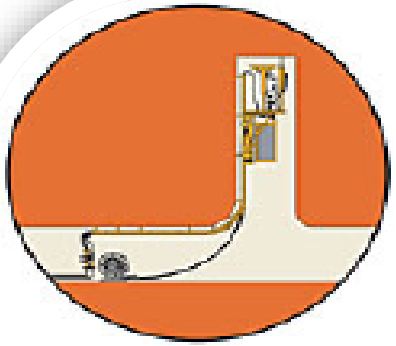


3. Cleaning



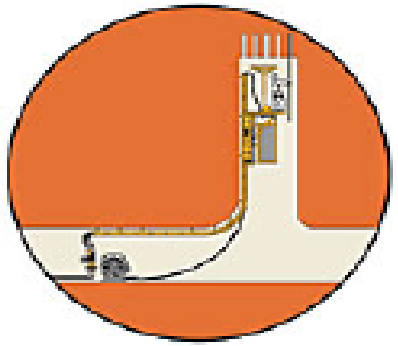
4. Climbing

Working



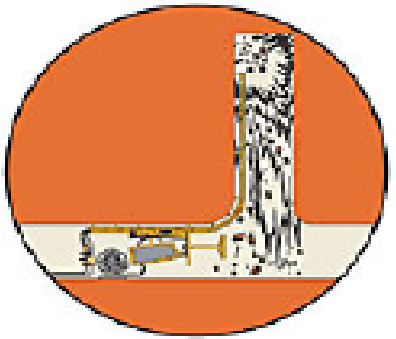
[1] Drilling

Drilling is undertaken from the drill deck on top of the raise climber, which is sized to suit the size, shape and angle of the raise.



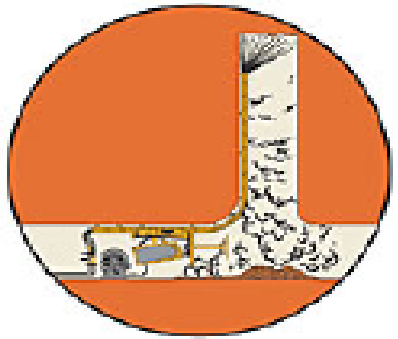
[2] Loading

When drilling is completed the face is charged with explosives.



[3] Blasting

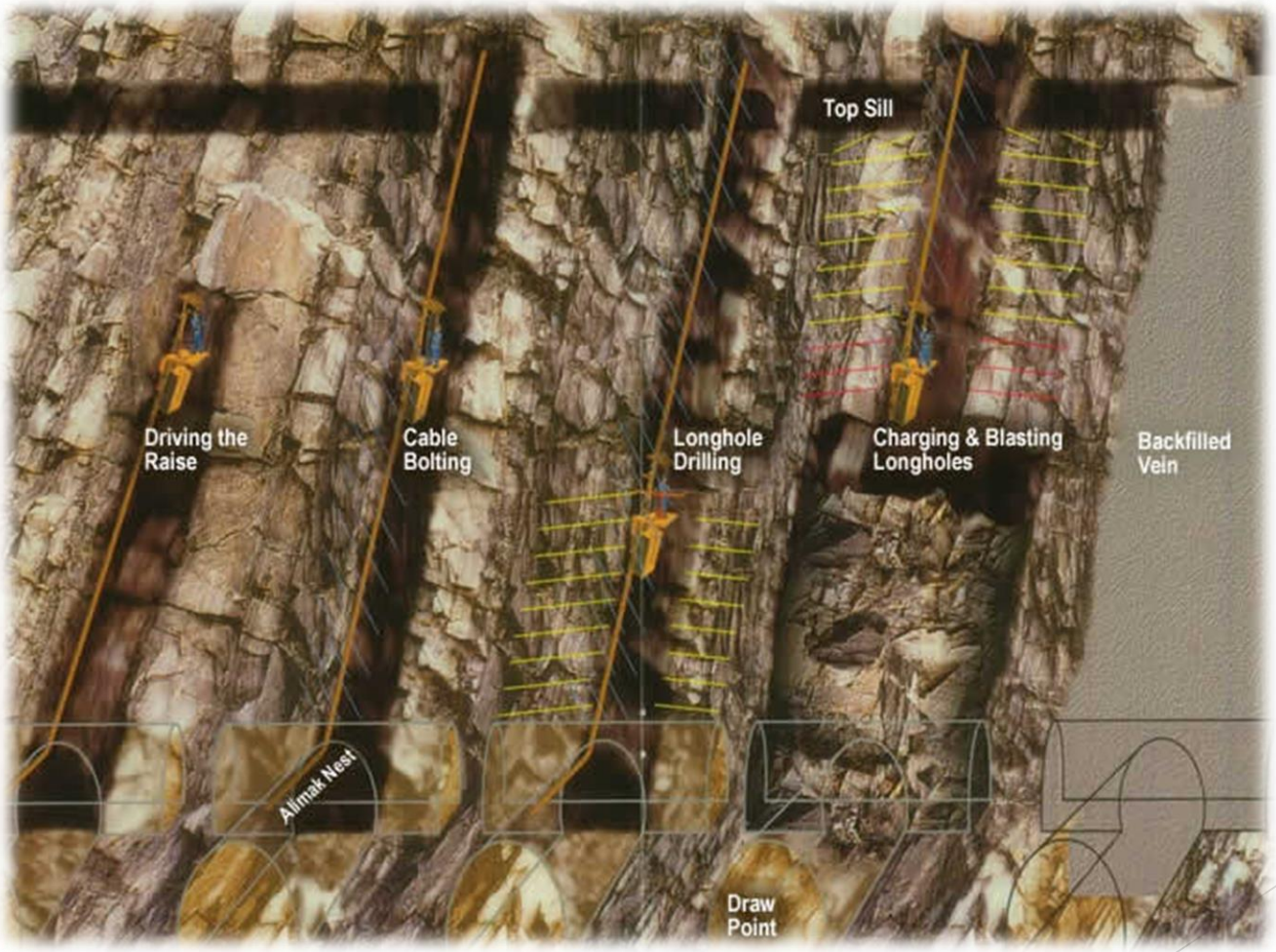
The Alimak climber is then lowered to the bottom of the raise and into a station for protection before the blast is triggered from a safe location.



[4] Ventilation and Scaling

The Alimak system provides for efficient post blast ventilation and a powerful air/water blast effectively dislodging loose rock from the freshly blasted face making ready for re-entry.

Working



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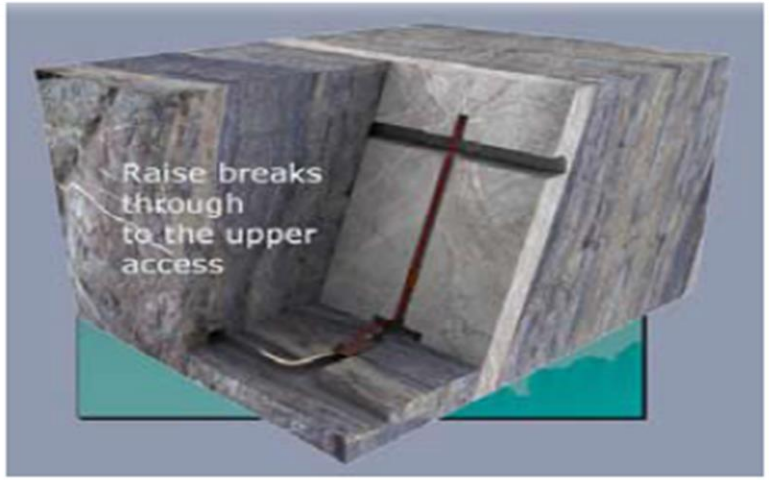

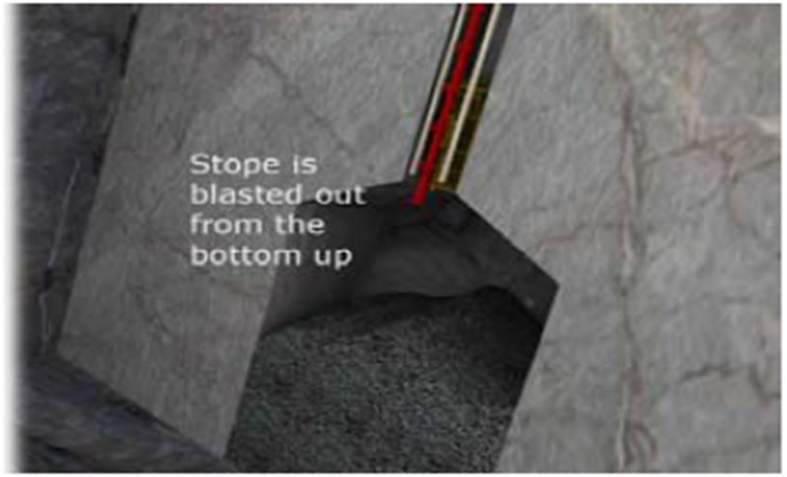

Alimak vs. Raise boring

RAISE BORING	ALIMAK RAISING
Expensive directional drilling is required causing significant delay and additional costs with no guarantee of practical completion.	Alimak Raising does not require directional drilling due to the high degree of accuracy provided by the mining method.
Where ground conditions are unknown diamond drilling must first be undertaken to determine if the hole can be drilled and will remain open in unstable ground conditions.	Confirmation of ground conditions is not required with Alimak Raising. This method can drive accurately and productively through any ground type first time installing ground support as you advance the raise.
Unfavourable ground conditions can cause the loss of valuable rod strings and reaming tools.	Alimak Raising is a drill and blast method and does not require expensive drilling consumables.
Cost of reaming significantly increases as harder than expected ground conditions are encountered.	The Alimak Raising method is designed to efficiently mine through the hardest of rock types.
Raise drills require massive reinforced concrete foundations to support the raise bore machine which means significant additional costs.	Alimak raises do not require concrete collars and Ventilation fans do not require massive concrete foundations.
Raise boring cannot be undertaken at any angle hence additional underground development is required increasing capital development costs.	Alimak Raising can be undertaken at any angle reducing underground capital development costs significantly.
Large diameter Raise bored shafts can only be constructed in a straight line.	Alimak shafts and raises can be constructed to virtually any angle, shape or size or configuration.
Raise bored shafts often are subject to deterioration due to a lack of ground support.	Alimak raises are supported and maintained as the face is advanced.