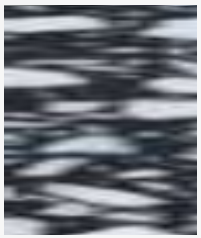
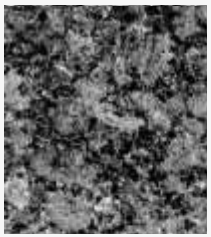


Systematic Dimension Stone Mining


Introduction

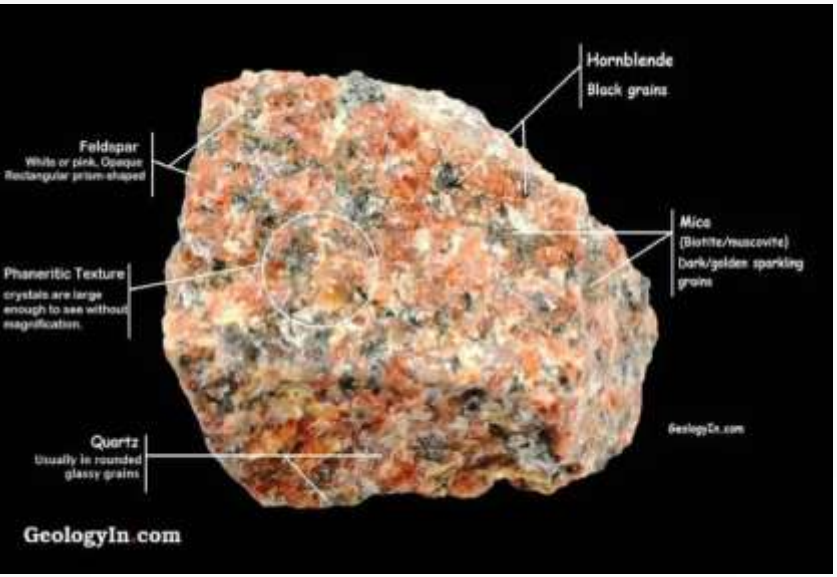
- Dimension stone is a collective term for various Natural stones used for Structural or Decorative purpose in construction and Monuments, defining features of dimension stone is that unlike other Mineral commodities which have mainly as result of their Physical properties
- The ultimate success in marketing a Natural Stone as a dimension stone lies firstly in its appearance and secondly in Quality and Quantity of rectangular blocks of suitable dimensions,

The extraction of dimension stones has been an integral part of human civilizations since ancient times.

Dimension Stone Extraction Methods

Advanced Technology

- The extraction of dimension stones using Advanced techniques entails the process of obtaining large blocks or slabs of natural stone from quarries through methods predating modern machinery and technology.
- These methods have been historically employed by ancient civilizations and traditional stone workers across different regions.
- Driven by the rapid technological advancements in recent decades. The natural stone extraction, including both traditional and mechanized approaches. The industry's shift towards state-of-the-art machinery



Granite is composed mainly of **Quartz** and **Feldspar** with minor amounts of **Mica**, **Amphiboles,Hornblende** and other mineral.

Granite is an intrusive **Igneous rock**, characterized as Dark /light colored & Fine /coarse grained Granite requirement is increasing with demands from rapidly growing infrastructural projects & housing sectors

Granite have a broad range of Physical and Chemical properties .The suitability of a granite for any purpose is decided by its properties which meet the specification established for the purpose .

Granite are mostly used because of their pleasing apperances and physical strength and the chemical properties are less important than the physical properties.

Specification

Properties of Granites

Marketability

Colour

Texture

Granularity

Size

Water absorption

Porosity %

Hardness

Moisture content

Valued for Exploitation

Compressive strength Kg/cm²

Tensile Strength kg/cm²

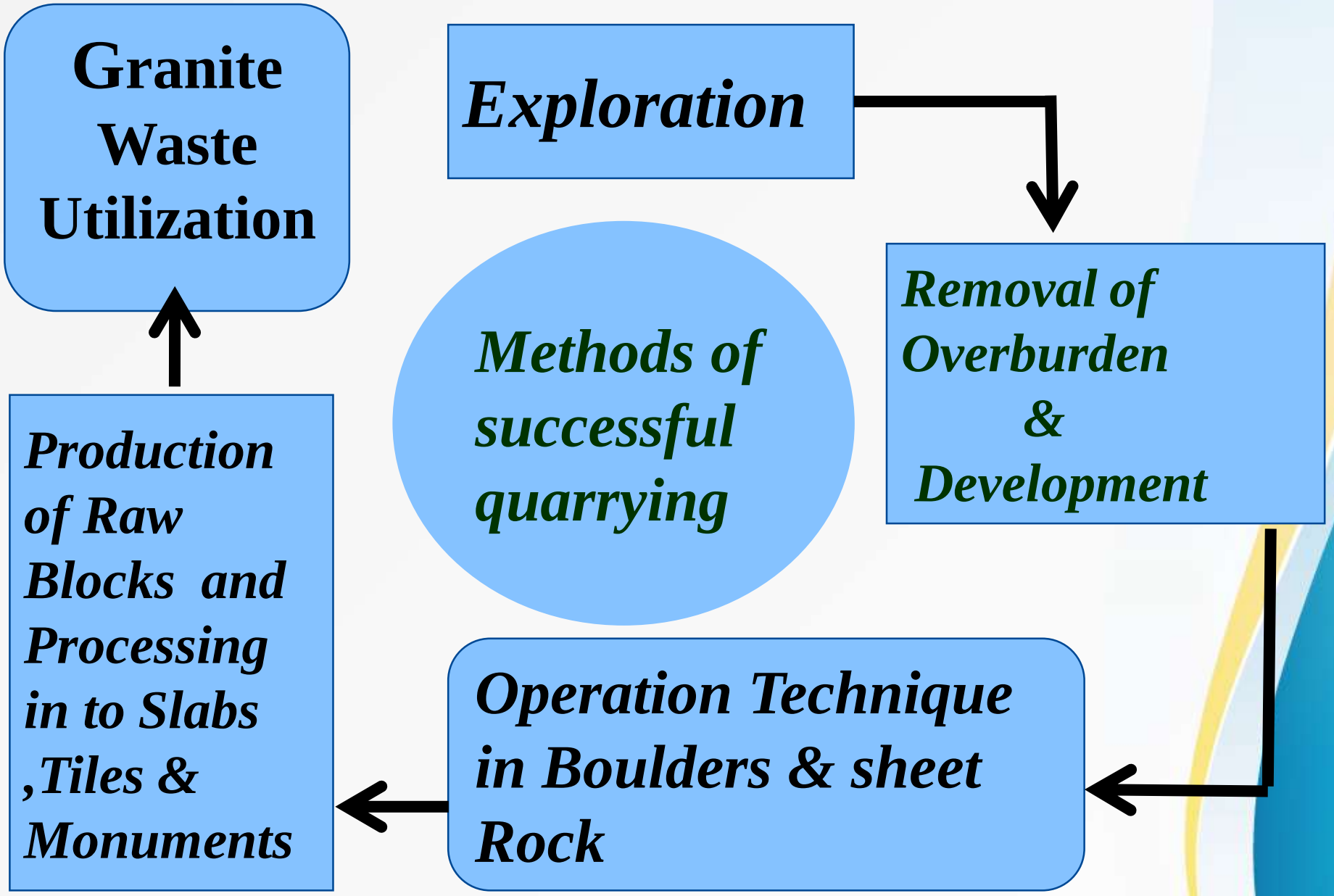
Density

P-Wave velocity m/s

Raw Blocks should be free from normal defects

Fractures,Joints , Shears,Hairline cracks,Segregation Veins etc

Methods of Successful Quarrying



ESTIMATION OF RESERVES
Granite Mining

Geological Resources ***in ROM***
excluding (Top Soil and Weathered)

Mineable reserves ***in ROM***
excluding (Safety distance ,Haulroad and benches)

Proposed Reserves ***(ROM)*** ***for five years and per annum and the Estimated life of the mine based on the Mineable Reserves and production Quantity & period.***

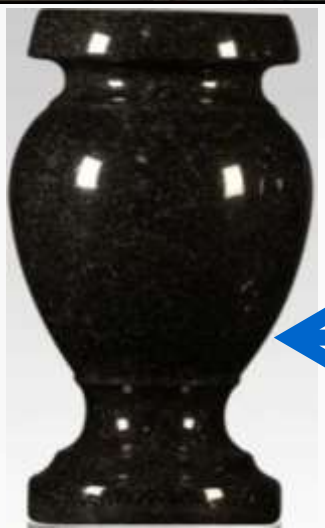













In Mining dimension stones, it is necessary to split or cut the stone in to successively smaller required sizes until the final desired blocks size is achieved and saleable blocks are produced.

The mining methods utilized in the extraction if dimension stone range from relatively simple and low technology methods to some quite technologically advanced methods, extracted using relatively advanced non-explosive cutting technologies and is even quarried in underground situations

*Granite Quarrying operation are opencast Semi Mechanized / Highly Mechanized by formation of benches, compact high wall are maintained without loose boulders /weathered Rock, Rock stability study are frequently done.

Granite blocks are removed from disinterred geologic deposits, on the basis of density, Fractures /bedding planes as the depth increases the operation technique to be changed.

*Quarry faces opening at the right location with sufficient provision for development o working faces, haul road, expansion of benches is important.

Splitting becomes easy when prominent loose joints are present in vertical and horizontal planes, inspect the jointing patterns and confirm its nature.

*Double Blade Cutting Machine can be deployed in a sheet rock with even with more joints, advisable in Black Granite and Color hard Rocks formations .

No Drilling and Blasting required in the Exposed Sheet Rock

(Double Blade Cutting Machine- Diamond Wire saw – Air bags - Front End Loader- Chain Saw Machine)

Policy

Granite is categorized as 'Minor Mineral' under the clause (e) of section 3 of MMDR Act ,1957.

-The Mines &Minerals (Development and Regulation)Act1957-

The grant of various mineral concessions for granite is,therefore administered underthe MINOR MINERAL CONCESSION RULES of the respective state Government As per section 15 of the MMDR Act ,1957 the state government have been empowered to make rules for regulating the grant of mining leases.

The GRANITE CONSERVATION AND DEVELOPMENT RULES ,1999 has been framed by the central Government which aims at bringing uniform rules for conservation , Systematic Devlopment and scientific exploitation of granite resources.

Cycle of quarrying Operations

The decision to buy dimensional stone from a particular quarry is made by the buyer (Marketing) Quality, Quantity & defects free blocks Value addition with systematic and scientific method of operation.

Three important stages of operation

1. ***Prospecting***
2. ***Granite Blocks production by quarrying***
   a) *Removal of Over Burden*
   &
   b) *Operation Technique in Boulders & sheet Rock*
3. ***Blocks processing in to Slabs, Tiles & Monuments***

Conventional Techniques

Non Conventional Mining Techniques

Conventional Techniques

Conventional techniques involve the use of Explosives for Splitting the blocks from the granite mass, drilling with improper angles and Manual Shaping of blocks lets to less recovery and low productivity

*Drilling the holes manually by compressed Air with improper angle and charged with D-cord result inner cracks

*Splitting of blocks without proper Free faces causes uneven shape, cost of drilling increases unable to produce bigger size blocks (Gangsaw)

*Handling of blocks by Excavators results breakage lets to re dressing of blocks in to small sizes further increases in processing cost and No value in international market. More Manpower required.

Non Conventional Mining Techniques

Minium Drilling and Blasting

Heavy Earth Moving Machinery are deployed

- *Excavator / Dumpers for development works.*
- *Front End Loader 50Ton to handle the Blocks.*
- *Double Blade Cutting Machine*
- *Diamond Wire Saw cutting Machine.*
- *Chain saw Machine*
- *Sandvik Drilling Machine*
- *Commando and Ranger*
- *Air Bags*
- *Derrick Crane 50 to 75 ton*
- *Hydraulic Splitter Less Manpower*

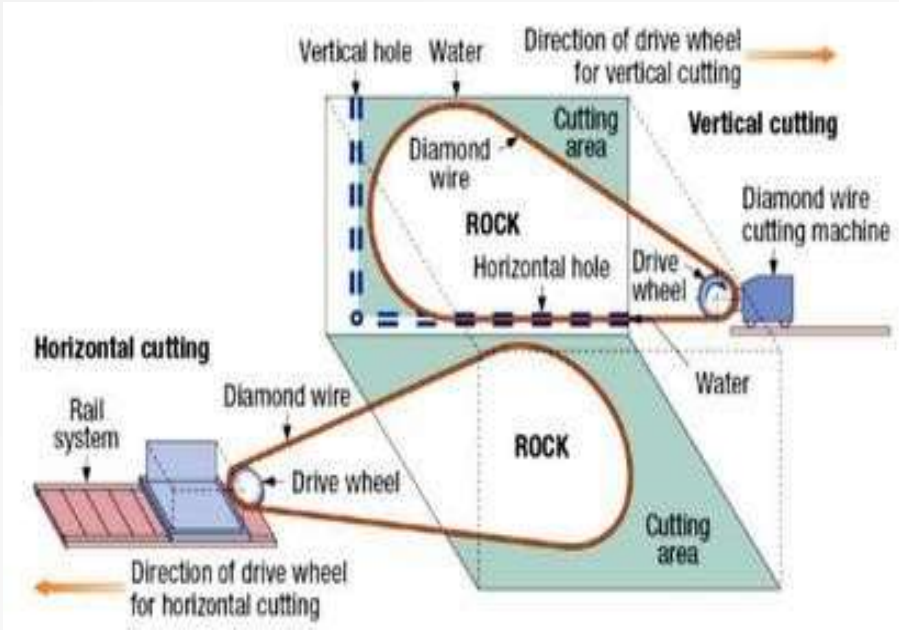

90% Non Conventional Mining Techniques
Minimum Drilling and Blasting

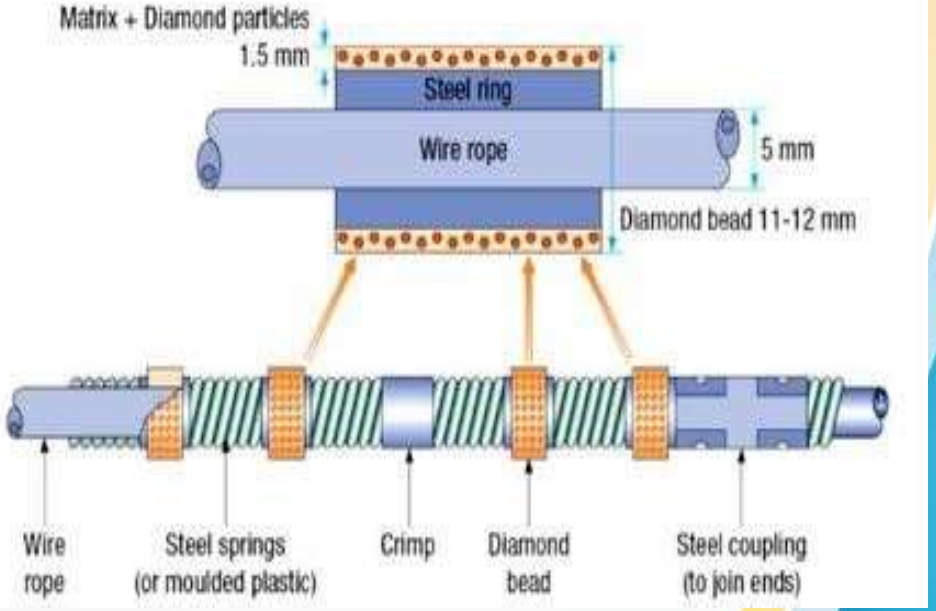
UPDATED & SCIENTIFIC TECHNOLOGY MACHINERIES
DEPLOYED IN THE DIMENSIONAL STONE MINING

Drilling Machine with dust collector and wet drilling

Front -End Loader

DIAMOND WIRE SAW CUTTING MACHINE





Design of Diamond Wire saw Machines and Diamond Rope And Operation and Maintenance & Safety Provisions

DGMS CIRCULAR

DGMS(Tech) Circular /02/2019 Dhanbad ,dated 29.11.2019

AIR BAGS FOR PUSHING THE ROCK MASS

DOUBLE DISC BLADE CUTTING MACHINE

SOP: *Safety Operating Procedures in /Local Language displayed in Mines*

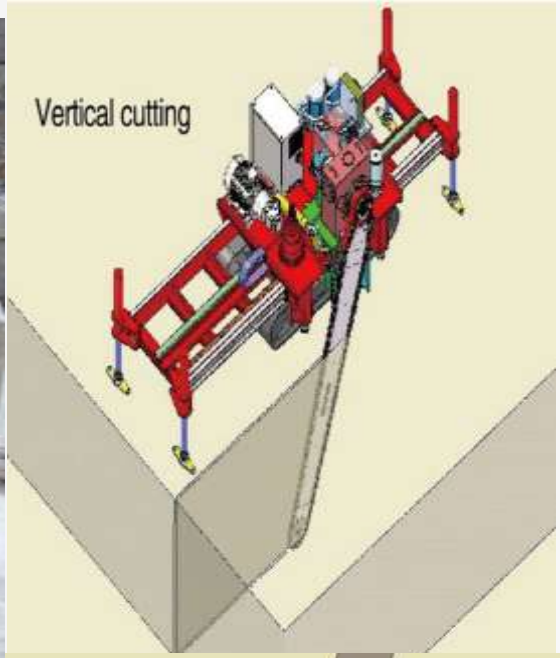
EXCAVATOR & TIPPER

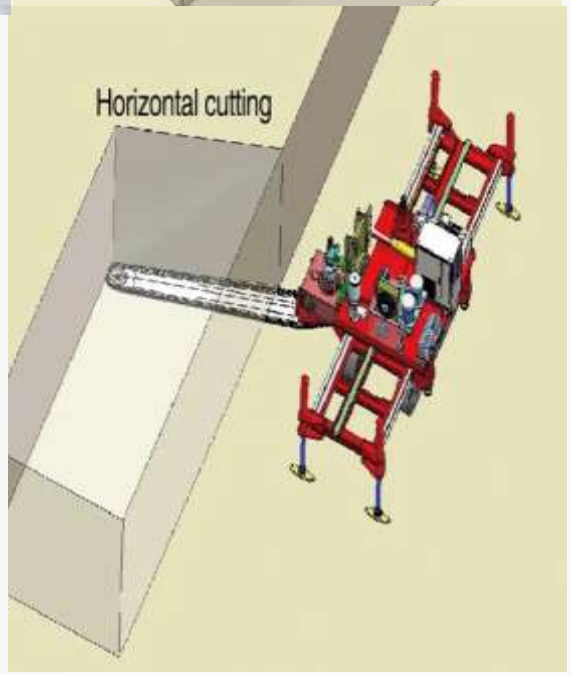
DGMS CIRCULAR

No ,DGMS (Tech) Circular No 6/ of 2020 Dhanbad, Dated:27/02/2020

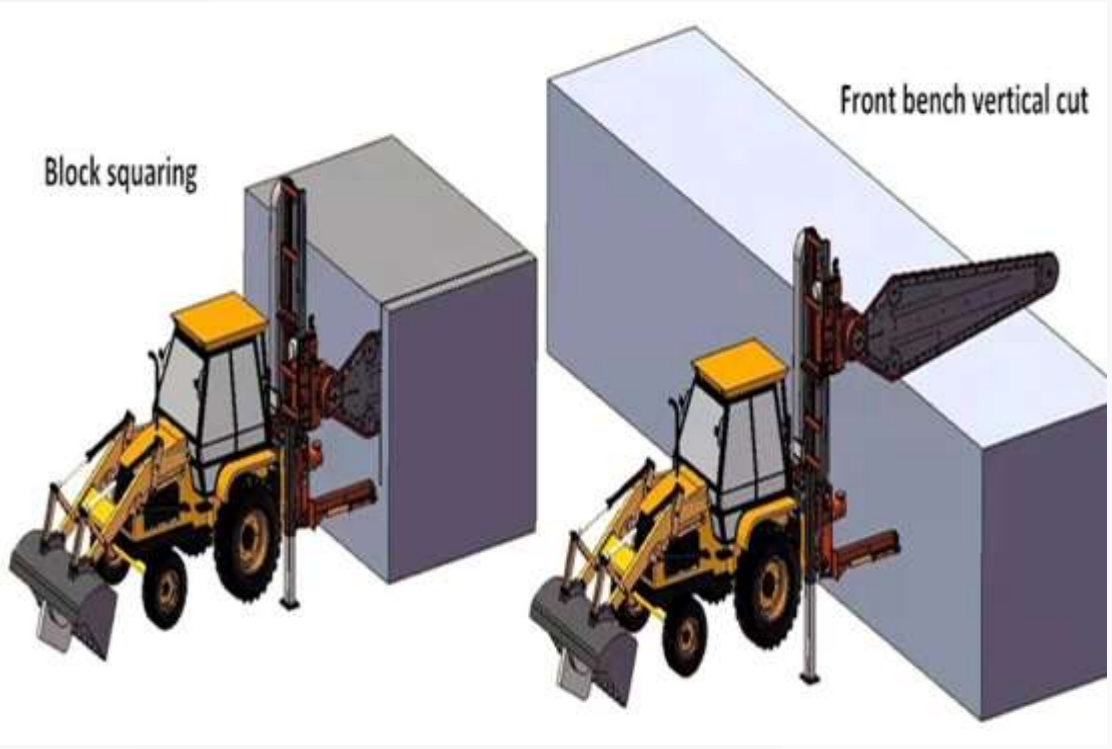
Guidelines in Respect of Provisioning of Safety Features to be incorporated for use in HEMM & Light Vehicles in Opencast Mines

CHAIN SAW GRANITE ROCK CUTTER





Latest advanced Technology in Dimensional Stones (Granite and Marbles) Non Conventional Method of Mining Operations with very Less Manpower and ***No Dust ,Noise and Vibration Water cutting and Dust Collector Systems***



The mining industry plays a crucial role in the extraction of natural resources including *Granite Chain Saw Machines* are essential tools used in the mining process to cut and shape granite blocks into usable forms . understanding the products knowledge of these machines is vital for operators to ensure efficient and safe operations ,This article aims to provide an overview of the essential product knowledge required for operating granite chain saw machine

Recovery in Granite Quarrying

Granite Waste in Dump

Recovery Percentage in Black Granite is 5-8% and Colour Granite the Recovery may vary from Shade To Shade @ Max 20-30%

The natural defects present in the rock mass play vital role in deciding the recovery of quality blocks and profitability of operations.

Low recovery poses a serious threat of uneconomic mining operation

The scientific way of operations and exploitation improves the recovery

The percentage of recovery of granite is quite low and it varies from Shade to Shade, there are more than 150 to 200 shades

The Conventional drilling operations were carried out without scientific and professional as result. the rock mass suffered damages by unwanted cracks. result low recovery.

Majority of the quarries adopt unscientific method exploitation leading to very low recovery and productivity in terms of saleable blocks/slabs.

The recovery of saleable granite blocks is very low and the waste is mostly in the form of granite rocks having defects, these wastes could be used in manufacturing Cubes, M-Sand and Aggregates.

The most important aspects in determining the recovery percentage depends on buyer in Non-Captive Mines the recovery is about 5% to 30% depend on the shades and deposits and marketing. In Captive Mines with cutting and polishing units by exporting the quality finished products and all other sizes are sold in the local market conservation of materials are around 60 to 75%.

UTILIZATION OF GRANITE WASTE

Quarry Granite Waste Dump

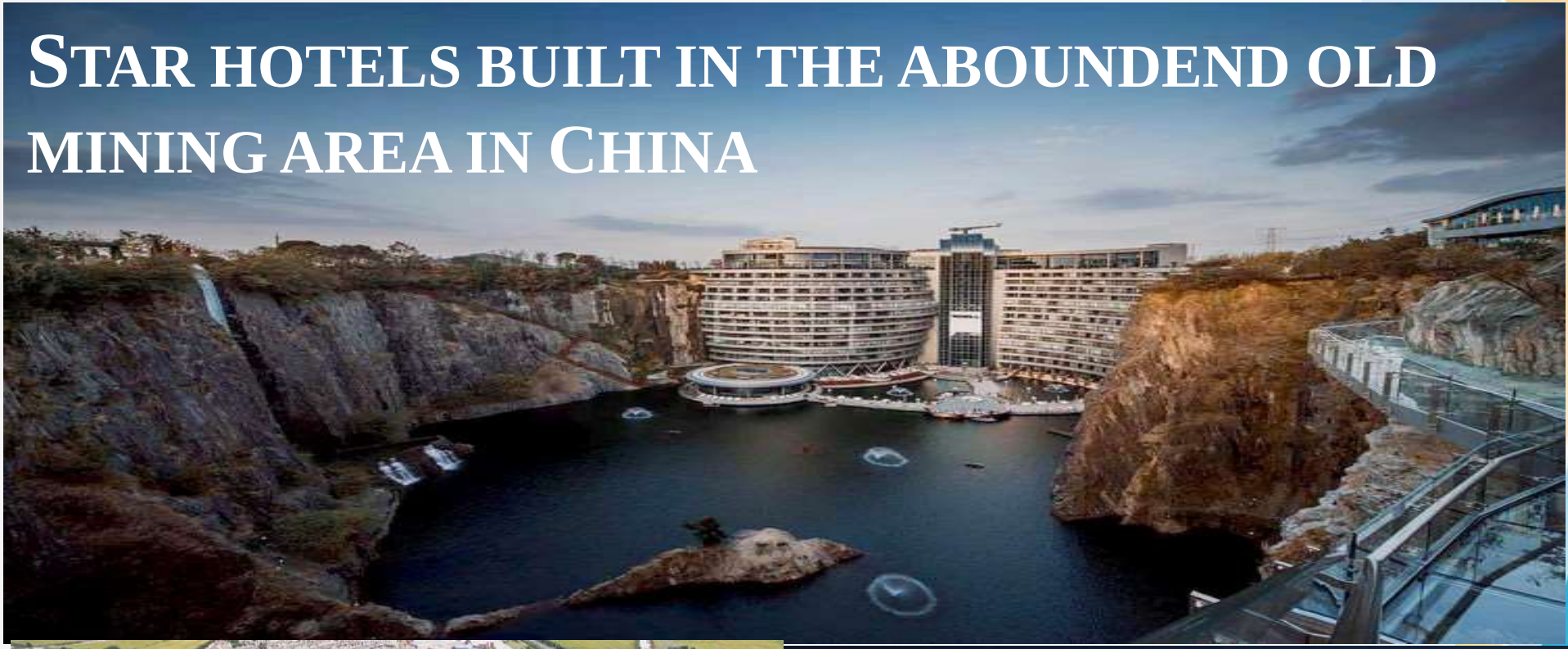
Cubes Stones

Aggregates

M.SAND

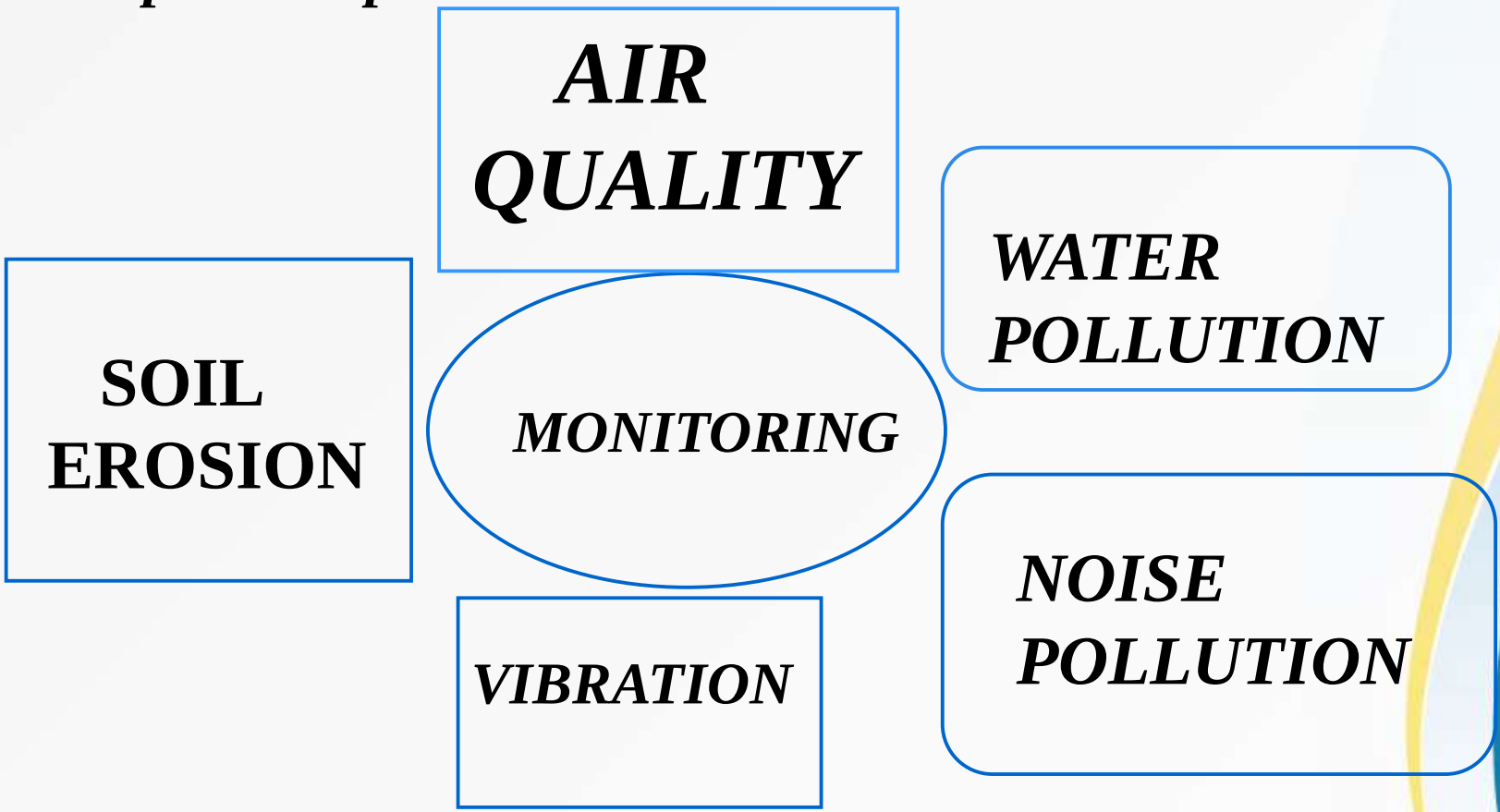
P.SAND

STAR HOTELS BUILT IN THE ABOUNDEND OLD MINING AREA IN CHINA



ENVIRONMENT & POLLUTION

*Monitoring of **AIR ,WATER AND NOISE QUALITY** as per the Norms recommended by the Central Pollution Control Board - Compliance Report and Environmental Impact of Granite quarrying Monitoring Reports Once in every six month are submitted through online **parivesh portal.***



G*ranite waste can be converted into Tiles, Cubes, Aggregates, M Sand & P Sand . Minimum Royalty should be fixed by the Government. Granite dumps can be utilized and land can be saved for aagriculture and other purpose.*

P*resent Quarry technique has changed in scientific and systematic way of operations and also in Safety and Environmental point of view.*

U*niform Government Policy to be implemented throughout India for Minor Mineral (Dimensional stone quarries)*

M*ining leases should be more than 5hec for adopting Modern Quarrying Techniques with Scientific way of operation –Improves Safety, Productivity and Safe Environment.*

GCDR**-1999 are applicable for all Granite quarries and **respective state Government have framed a separate rules.

Separate Mining Zone to be formed like other industries

***O**ur suggestion to the **Directorate General of Mines Safety** a separate Regulation ,Rules Act etc Should be Implemented for Granite ,Marble and (Aggregates Rough Stone Quarries.*

G**ranite Quarry are all unorganized Sectors compare to last 20-30 yrs lot changes been happened in safety point of view, employment of statutory personals all most all quarry have come under a shadow of DGMS lot of workshop been conducted by **Mines Safety Associations of Karnataka and Mining Engineering Associations of India –BANGALURU Chapter.

OUR GOAL ZERO HARM

Thank You

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