M-sand.
Creating stronger skyscrapers
and a greener environment.

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Creating smarter cities and impressive infrastructure does not necessarily mean one has to give up on eco-friendly living. At Tavara, we make it our mission to create products that promise unprecedented quality, while protecting nature as well.

Manufactured sand or M-sand, as it is popularly known, is an effective, eco-friendly and economical alternative to river sand. Due to its ready availability and reliable strength, M-sand has become widely popular for use in construction across all segments - from mega infrastructure projects to private residences.

What is manufactured sand?

M-sand is crushed, fine aggregate produced from suitable hard stones and designed for use in concrete and other construction processes. At Tavara, we take particular care in choosing only the best source materials with suitable strength, durability and shape characteristics.

The phases of production

The production process is highly specialised involving crushing, screening and washing, followed by separation into discrete fractions, recombining and blending.

Our quarrying process typically begins with drilling and blasting the rock into smaller pieces, which are then transported to the plant. At the plant, there are five major processes involving Primary jaw crushers, Secondary cone crushers, VSI 3rd stage crushers,VSI 4th stage crushers, washing plant & screening unit.

An 800 mm downsize granite rock brought from the quarry is fed into the Primary jaw crusher,which sizes down the rock to produce 120mm down size aggregate. This 120 mm rock is fed into the Secondary cone crusher to produce an output measuring 0 to 40mm. VSI (Vertical Shaft Impactor) 3rd stage and 4th Stage crushers are fed with 6mm, 21mm and 25 mm pieces to produce chips, dust and sand of varying sizes. The particles are further sent to the washing unit and screening unit for cleaning and separation. The main products are concrete sand, block work sand, plastering sand and slurry.

There are strict quality-control mechanisms in place to ensure that the product is free fromclay, silt and other impurities. Consistent quality is maintained throughout the construction cycle, complying with BIS specifications.

• M-sand for concreting: Manufactured sand with a granule thickness of 0 - 4.75 mm is suitable for concrete preparations required for construction purposes.

• M-sand for plastering: A granule thickness of 0 - 2.36 mm is ideal for block masonry and plastering. Tavara plastering m-sand need not be filtered again at site and can be used directly to prepare the mortar, thus saving precious money and labour time.

• M-sand for Block work: Measuring 0 - 3.55mm

• Aggregates for Concrete: Measuring 20mm (13mm - 21mm)

• Aggregates for Concrete: Measuring 12mm (8mm - 13mm)

• Crusher dust for block making: Measuring 0 - 6mm

• For PCC bottom or road work: Measuring 25mm to 45mm

Environmental factors and shortage of good quality river sand has led to the invention of Manufactured Sand Also known as M Sand.

Parameters	M-Sand	River Sand
Process	Manufactured in factory. Artificially manufactured	Naturally Available on river banks
Shape	Angular and has rougher texture. Angular aggregates demands more water. Water demand can be compensated with cement content.	Smoother texture with better shape. Demands less water
Moisture Content	Moisture is available only in Water washed M-Sand.	Moisture is trapped in between the particles which is good for concrete purposes
Concrete Strength	Higher concrete strength compared to River sand used concrete	Lesser compared to M Sand used concrete
Slit Content	Zero Slit	Minimum permissible Slit content is 3%. Anything more than 3% is harmful to the concrete durability. We can expected 5-20% slit content in medium quality river sand
Over Sized Materials	0 % . Since it is artificially manufactured	1-6% of minimum oversized materials can be expected. Like Pebbles stones
Marine Products	0%	1-2% Like grass, clay lumps, tree barks etc..
Eco Friendly	Though M-Sand uses natural coarse aggregates to form M-Sand, it causes less damage to environment as compared to River Sand.	Harmful to environment. Eco imbalances, reduces ground water level and rivers water gets dried up.
Price	M-Sand Prices ranges from Rs 35-Rs 45 Per Cubic Feet in Bangalore	River sand prices ranges from Rs 60-80 Per Cubic Feet in Bangalore.
Adulteration	Probability of Adulteration is less. Since supply is more than the demand	High probability of adulteration since filter sand (a type of prewashed sand which contains high slit contents) are mixed together. As a rule, supply shortage always brings adulterer products to the market.
Applications	Highly Recommended for RCC Purposes and Brick/Block Works.	Recommended for RCC, Plastering and Brick/Block Work
Quality	Better quality control since manufactured in a controlled environment	No control over quality since it is naturally occurring. Same river bed sand can have differences in slit contents

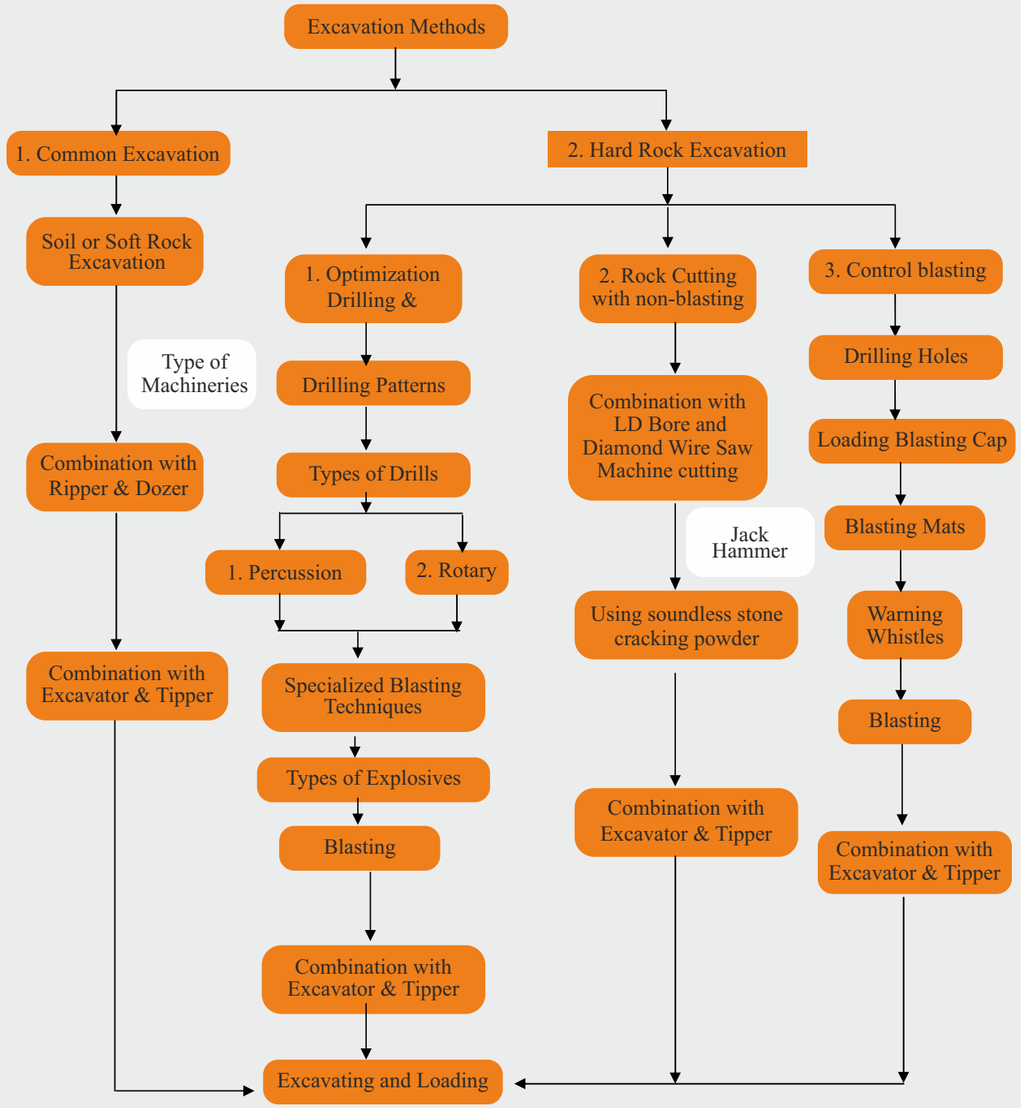
Comparison of River Sand and Manufactured Sand

Properties	**River Sand**	**Manufactured Sand**	**Advantages of Manufactured. Sand**
Shape	Spherical particle	Cubical particle	Higher Cohesion and Compressive Strength
Gradation	Cannot be controlled	Can be controlled	Reduction in Voids and Higher strength
Particle passing 75micron	Up to 3% (IS:383-1970)	Up to 15% (IS:383-1970)	Refer Note below
Clay and Organic impurities	Likely to be present (retard the setting & comp. strength)	Absent	Better Concrete Quality
Grading zone (IS-383)	Likely to be present (retard the setting & comp. strength)	Manufactured to conform to Zone II	Zone II ideal for Concrete

Comparison between M-Sand and Crusher Dust

SL. NO.	M-SAND	CRUSHER DUST
01. Colour	Grey	Grey
02. Particle Shape	Cubically Shaped	Flaky
03. Product	Manufactured as per IS, BS, ASTM Standards	Elongated (Shapeless) a) It is fractured dust of jaw crusher b) A waste product in production process of stone crusher
04. Manufacturing Process	Internation technology controlled manufacturing process through imported machines	No controlled manufacturing process as it is the by-product of stone crusher
05. Gradation	As per IS 383 - 1970 Zone-II	Does not adhere to IS 383 - 1970 or any other standards
06. Suitability for Concreting	Recommended for usage in concrete & masonry works worldwide by the concrete technologists. Confirms international standards	Not recommended for use in concrete or masonry works. Does not have quality.

Excavation Flow chart

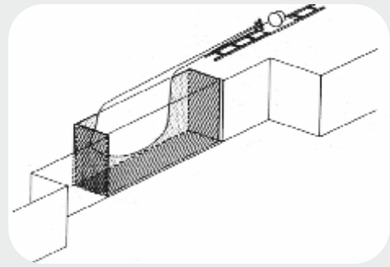


Procedure for hardrock cutting using multi purpose Diamond Wire Saw

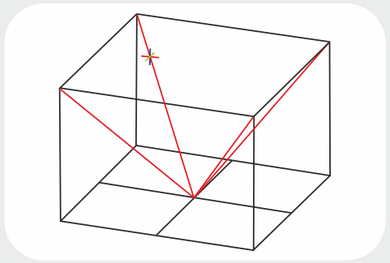
Required Pneumatic Machineries.

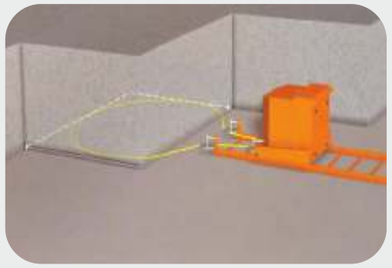
- 90mm Dia Drilling machineries.(LD 04 -150PSI – 450CFM)
- 32mm Drilling Equipments (100 PSI)
- 60HP Multipurpose Diamond wire saw machine. (Horizontal and Vertical)

A Diagram showing Taper cutting of hard rock using with Diamond rope with necessary tools and plants.



A Diagram showing horizontal cutting of hard rock using with Diamond rope.





B picture showing Vertical Cutting of hard rock using Diamond rope.

When compared to river sand, m-sand has the following distinct advantages:

Unmatched durability
The physical and chemical properties of M-Sand are such that it can withstand adverse environmental and climatic conditions, thereby ensuring durability.

Excellent strength
As M-sand is custom-made for construction purposes, it promises unmatched strength owing to its superior shape, proper gradation of fines, smooth surface texture and consistency. Compared to river sand, it has higher compressive strength, flexure bond strength and better water retentivity as well.

Better workability
The flaky and angular shape of crusher dust, along with the absence of plasticity, make it a difficult material for masons to work with. The cubical shape with grounded edge and superior gradation of M-sand gives good plasticity to mortar, providing excellent workability.

Nullifies construction flaws
M-sand is of such excellent fineness that it offers optimum initial and final setting time. This, in turn, helps overcome deficiencies of concrete such as segregation, bleeding, honeycombing, voids and capillary.

Reduced cost
Zero wastage and absence of impurities is guaranteed with M-sand, bringing down construction costs considerably. M-sand gives superior strength and has the desired cubical shape that significantly reduces the need for cement in concrete, furthering the cost advantage.

Eco-friendly alternative
The exclusive use of M-Sand goes a long way in saving our rivers, which are getting depleted by excessive river sand mining. This causes environmental disasters like ground water depletion, water scarcity and is even a threat to the safety of bridges and dams. With the government contemplating a ban on quarrying river sand, M-sand will soon be the only alternative.

About Tavara

TAVARA

Mines & Minerals

Tavara Mines & Minerals is a Bengaluru-based company providing a wide range of mining-related services. Established in 2011, the company has been providing outstanding services to customers all over Karnataka. Our services include Controlled Blasting, Drilling and Blasting, Granite Quarrying, Major Earth Works and Mine Development, to name a few. All activities are completely legal as per the rules and regulations formulated by the Ministry of Mines.

We have amassed laudatory expertise and experience in managing projects, big and small.
We are supported by a strong team of professionals and safety parameters are strictly followed to ensure smooth delivery of services to our customers.

We take all necessary measures to ensure on-time completion of projects and to maintain quality as per the specifications. We also work towards meeting various national and international standards. Our vision is to be a global player in the mining services industry.