VSI Crusher :

We have developed a VSI Crusher having capacity 30 Tons per hour to250 tons per hour, with a feed size up to 40 mm to 100 mm. Generally the grit below 6 mm size for Rotopactor is not available in ample quantity. To supply grit below 6mm, above 30 tons per hour capacity VSI crusher machine can be used for making grit. It produces about 50% of metal of 20mm size and 50% grit. 20 mm Metal is also having good demand. This avoides producing unnecessary slow moving metal (below 12mm etc).The Stone crusher can be set for 40 mm opening,so more production can be achieved from 16X10 crusher or bigger size. This 40 mm from Jaw crusher can be recrushed in our VSI Crusher and reduced to 20 mm cubical metal and remaing below 12 mm can be fed to Rotopactor for converting in sand.

The Jaw Crushers are generally used for crushing stone to make metal for concreting work. The capacity of the jaw crushers is the factor of RPM and the size of the crusher. Demand for different sizes of crushed product differs from time to time. For example, when a major new road is built, demand will differ greatly from the time when normal building construction or road maintenance is carried out. The worst situation is that it is not possible to sell all fractions that are produced. These must be either be sold at low prices or stocked in a dump pile with an environmental impact. Even a small per cent of surplus production will soon cause expensive problem. This material has been expensive to produce. The cost of drilling, blasting, transportation, etc are same as for the prime material. Much can be gained if the right amount of material could be produced to meet the actual demand, and also accommodate changing demand. For crushing bigger size metal, Jaw crusher should run at lower rpm. The main drawback is when the crusher is set for bigger size the finer crushed product is more flaky. (Read the advantage of Cubical metal over flaky metal) For getting cubical crushed product VSI crusher should be used as secondary crusher. Thus we can reduce the crushing ratio, so product is more cubical.First crushing the big rock to 40 mm size, and then again crushing it in VSI can give better quality of crushing. The fines can be reduced in VSI crusher. With this arrangement there is no unwanted material produced, the crushed material is only as per the demand, and other unwanted material is reduced to Sand. There for all the material can be sold out immediately, with out stocking it in piles. The production of prime material is also increased. In general a 20X12 crusher gives a out put of 20 tons per hour, Out of this only 35% is 20mm metal (having more demand). Remaining is unwanted material. With VSI crusher in series, 20 mm metal can be increased to 60 %. This gives a substantial reduction in unwanted material. Automatically there is saving in power lost in crushing.

One jaw crusher of 20X12 size and one VSI crusher can give more production than four Jaw crusher of 20X12 models, with a saving in overall cost of installation, and also saving in power.In addition the produced material is having very good cubical shape. V.S.I crushers are the best substitute for Jaw crushers for finer crushing. Crushed Product in V.S.I. crusher is cubical compared to Jaw crusher. The main draw back of Jaw crusher is when the Jaws of the crusher are worn out, the crushed product is more flaky. The V.S.I crusher excels at meeting today's specification sand production need. Complete cubical shape of the crushed product, gradation control, and high production yield per hp can be achieved. Variable production versatility can be achieved in making fine to coarse material. V.S.I. Crushers are unbeatable in making a consistence cubicle particle shape.

In Jaw crusher the crushing is due to compression and mainly by cleavage fracture. Cleavage fracture occurs when the energy applied is just sufficient to load comparatively few regions of the particle to the

fracture point. Some aggregates is highly planner, and when energy is releasedalong these planes a flatter product is produced. There is more wear of the liners. In VSI crusher crushing is due to impact. The stone is accelerated in a rotor. This material strikes on anvil sector, and gets shattered in uniform particles of more cubical shape. This reduces the power required for crushing. The jaw crushers or cone crushers can take larger feed size.

The feed material enters the machine through the feed tube, of the rotor. The material is thrown at a vigorous speed, due to centrifugal force, and the material strikes on the anvil sectors or the material previously accelerated. The residual kinetic energy of the material is utilized for making better surface texture. Thus full utilizing of the energy. It allows lower H.P. required with less wear, and gives high production yield.

Due to patented geometric design of the crushing chamber, the surface texture of the crushed product is much better, and requires less R.P.M. of the Rotor.

A special designed Rotor, gives a very long wear life. Stone lining is formed on the wearing surface by stone, reduces the wear cost. A specially designed wear tip (patented), gives four times more life, then the tip plates used in other make.

Increase your profitability by installing V.S.I Crusher in series to your crusher :

Our machines are innovation , it is not a copy of any other make machine. The main principle is Vertical Shaft which is common in other make machines. The Design of the Rotor, Anvil sectors, the material used is entirely different than any other make. Our machine is very efficient in operation. The wear out parts can not be the only criteria to compare any two make machines. Some other things also should be considered.

The efficiency of the machine, Energy required per ton of crushing, overall life of the bearings, and other parts, general breakdown, and time required for it's maintenance, Cost of wear parts, and replacement time, daily lubrication cost and time required for the same should also be considered. The Total Manufacturing Cost of Crushing is Explained in Details. Here with we will cover all the points for your reference.

Due to special floating design of the bearing in a Capsule, the wastage of energy in friction loss is reduced to a minimum. The ejection angle of the particles from the Rotor is also a important thing which reduces the energy loss in friction with the sides of the rotor. Proper angle of ejection and it's striking on anvil sectors or on other stone particles is also very important for giving more production per unit of the Electrical Power. Our machine requires 2,26 KWH to 2.5 KWH for crushing per ton of stone, where as other make requires 2.7 KWH to 2.86 KWH for similar model of the machine. Which gives minimum net saving of 12 % in power. Power charges for Crusher is about Rs 2.25 per ton. For V.S.I crusher comes to Rs 12.5 Energy required per ton of crushing 2.5 KWH = Rs 14.75/ ton……………………..(1)
(This will include the power required for Conveyors and grading Screen.)

Life of the bearings in our machine is not less than 10,000 working hours or even more. This is a estimated life. After running of about 2500 hours we have checked the bearings condition, and found them as new as they were fitted with out any mark of wearing. (Design of the bearing is given by SKF Bearing Co design department and they have estimated much more. But on safer side we tell much less, We have fitted still heavier bearing than their recommendation) . Bearings in our machines are only of SKF make, Best available in the market. As per our watch on other make machines the general failure of the bearings is much higher, and more frequently requires to change the bearings. Forced oil lubrication, in our machine gives the floating of the total vertical load, and gives perfect lubrication film on the bearing surface. Specially designed and manufactured Vee seals and oil seal gives very long life.

The main shaft of our machine is made from special steel, and no failure or breaking is recorded. The fitment of the shaft is also special, and is not directly connected to the bearings. Shock load if any, due to any reason is soaked by the shaft it self and very less chances for it's transfer to the bearings.

Wear parts are the main thing for the economical running of the machines. All other make use tip plates, In our Rotors it is Round Diverting Bush, Which gives four times life than tip plates, cost may be two and half times. The major portion of the shoe is having stone lining so no wear cost. Only tips bush are subject to wear.

A very special design of anvil sectors, particularly for Rotopactor utilizes the residual energy of the particles and makes the edges rounded and gives good surface texture Due to rolling and rubbing action. A cascade flow is also maintained, and the stone coming out of the rotor strikes these particles and breaks again, thus reduces the wear of the anvil, and results in full utilization of the energy. Fitting of these sectors is also very easy and those are self locked. No extra locking ring is required, Thus reduces the weight while changing, No Vaulted Anvil ring or Stob Anvil Ring is required to fit the sectors. More over our anvil sectors are reversible, so can be used twice by putting upside down.

(It is based on the reading taken on a particular machines, this is for the guidance, should not be taken as binding upon us)

• Wear cost of stone crusher is about Rs 2.88 say Rs 3 per ton

Rotor :
• The end Bush each set : Life is not less than 2000 hours, or 100000 Tons Cost Rs 7300.00 each set. Such three sets are fitted in the machine.
• Bottom wear plates: Life is as above, Cost is about 15,800 each (Requires Six numbers)
There fore total wear cost of the Rotor parts is **(7,300+ 15,800) X 6 = Rs 1, 38,600.00 for 1,00,000 tons**
So average wear cost of Rotor will be Rs 1.39 per Ton. It may vary about 20% to 25% with the abrasive stone.

A V.S.I. Crusher as secondary crusher increases your profit:

The demand of 20 mm metal is more. While crushing more fines are generated by jaw crusher. The yield of 20 mm metal is only 30 to 40 %. Other products say 60 % is having less demand. The shape of the 20 mm metal is some what flaky and more angular. It can be rectified by Installing one VSI crusher in series to Jaw crusher. The 40 mm metal may be crushed in Jaw crusher and fed to V.S,I. Crusher. It will reduce the size. The yield of fast moving metal (20 mm) can be increased up to 60%. The over all crushing is increased to 3 to 4 times, and percentage of fast selling 20 mm metal is doubled. The shape of the metal is more cubical, so can fetch more demand. The wear cost of the Jaws for jaw crusher is also reduced to substantial. There is saving in power charges also.

Results in substantial saving in the cost of Raw Material.

Increase your profit ratio by 40% For more details Contact

Metal crushed by Jaw crusher is flaky and have more corners. Out put of V.S.I. crusher is Cubical. Cubical material is having less surface area compared to flaky material. Flaky material have approximately 16% more area then the cubical material for the same volume/ weight of the particles. For Asphalting or Page3 In cement concrete, the overall surface of the metal required. So again more surface area, so more consumption of Cement or Asphalt. Or in other words we can say the strength of the concrete increases for the same cement/ asphalt consumption.

This can be proved with the help of following example. Flaky material means chip of the stone having more length and width compared to thickness. Let us take a piece of stone having length 2 units X 1unit X 0.5 unit So the Volume of this particle will be 2 X 1 X 0.5 = 1 cu unit. At the same time the surface area of this particle will be 7 sq. unit. (2 X 2 X 1 + 2 X 2 X 0.5 + 2 X 1 X 0.5 = 7 sq unit.) For the Same volume if we select a cubical particle it's length breath and height will be 1 Unit. So the Volume comes to 1 X 1 X 1 = 1 Cu unit. And surface area is 1 X 1 X 6 = 6 Sq. Units.

Thus for the same volume the surface area of the particle is increased by 16% approximately. Crushed metal from Jaw crusher is generally flaky, and from V.S.I. Crusher is cubicle. There fore there is 10 to 15% more strength for the same cement or asphalt Consumption. There is also a problem with flaky material while rolling it gets break and the broken surface do not have any coating of asphalt, makes the section weak. Hence more life of the road can be achieved by using the cubicle metal. Again less voids in the cubical metal so more dense concrete, so more strength.

For Crushing 6,000 cft (aprox. 250 tons) of 20 mm metal per day requires minimum for crushers of 20X12 or 24X10 size. The unwanted material produced is about 65% . Total H.P. required to run four crushers is about 120 H.P. (Excluding Conveyors and Grading Screen etc) ×

Above can be replaced by One Jaw Crusher and One VSI crusher, So the total H.P. required is only 90. It can give same production, and unwanted material is reduced to 40%. If in addition to this unit a Rotopactor is installed, which can convert unwanted material to sand. It will require 40 H.P. Thus total H.P. will be 130 H.P.

Total cost of this set is same, but the raw material cost is reduced by 40% (due to unwanted material not produced). And as all material produced is have immediate demand, the profit increases by 40%. The storing cost and selling at low rate is avoided, and with no environmental impact. The cost of production is also reduced to a substantial (wearing of Jaws and other parts of Crusher).

• Less power consumption per ton of Crushing.
• Very simple mechanism, so can be operated by any unüskilled worker.
• Final crushing can be adjusted by changing the speed of the machine. Any gradation can be achieved. Perfect control of output size can be achieved.
• reduction of finer product (unwanted)
• Suitable for any type of stone.
• More cubical crushing compared to any other machine.
• In our machine if trap iron enters the machine, there is no harm. It will not break any part.
• Very less wear cost compared to any other machine.
• Bearings are forced oil lubricated, so least failure of bearings. Heat generated while in operation is taken out by oil. So no rise of bearing temperature
• Due to special design of rotor and anvil bigger material can be fed to the machine. And crushing is with less power.
• In our Rotopactor (specially designed for making sand) with closed rotor, feed up to 20 mm can be accepted. Means it can easily crush 12 mm material with less power supply.

Life is about 20000 tons and Cost is Rs 80,000.00 So the Cost is per ton Rs 4.00 per Ton. Wearing of the anvil depends upon the feed size. More wear for bigger feed, and less wear for smaller feed size. Value is given for below 40 mm feed assorted. It may change with the density of the stone, More density means more wearing. It may vary about 30% plus or minus as per density of the stone.

Other items such as feed tube, top liner plate, etc cost is very negligible and it have much more life. Due to it's special design there is no wear of the feed tube. Cost of Feed tube and assembly is Rs 6,000.00. It have Very less Wearing Say negligible, and feed guide ring is Rs 1200.00. A special design of feed tube develops stone lining so no wear. Thus the total wear cost will be about Rs 3+ 1.39 + 4.00= Rs 8.39 per ton . Say Rs 9.00 per ton. Considering 30 % more for hard and abrasive stone it may be Rs 12.00 Maximum. We hope this is much less then any other make. (it may be around Rs 20 per 100 cft of metal) These figures are the result of our observation with a particular stone, it may vary with other stones as per the density and hardness. This is given for your reference, and should not be treated as binding upon us in every respect.

Wear Cost per Ton …………………………..Rs 9.00………….(2)

This plant should be made fully automatic, feeding, and Conveying must be with the help of conveyor belts. For a 50 tons per hour machine, Only one operator per shift, and 3 or 4 helpers per shift will be sufficient to run the machine.
Operator Salary (One operator)…………………..Rs 4000 per shift

Helper Salary (four Helpers)……………………Rs 10,000 per shift
This comes to total 14,000 Maximum. Which will come to
Rs 1.4 per Ton.
Labor Cost per Ton………………………..Rs 1.4 ……..(3)

The V.S.I Crusher is oil lubricated, the oil is required to be changed approximately 6 to 8 months. About 70 ltrs of oil is required each time. Which cost about Rs 4500.00 Which will come< out per Ton Rs 0.08 (Very negligible.) will be about Total will be about say Rs 0.08 per Ton.

Lubricating Cost per Ton comes to Rs 0.08 .... (4)

Saving in Oil Lubrication Cost Compared to Grease Lubrication systems is about
Rs 1,15,000.00 per year. (Detail of this comparison is given on separate sheet) 3

Thus the total Cost of Crushing one ton Metal comes to total of 1+2+3+4 items. = Power Charges + Wear Cost+ Labor charges + Lubricating Charges = Rs 14.75+ Rs 9.00 + Rs 1.4 + Rs 0.08 = Rs 25.23 per Ton. Say Rs 25.5
Weight of One Cu Mtr metal is about 1600 Kg So Crushing Cost per Cu Mtr will be Rs. 40.8 say Rs. 41.00

If the cost of Stone is added to this cost, it will give the production Cost of the Metal. (This figure is given for general idea, There may be some variation for place to place and stone to stone, so should not be taken as binding upon us in every respect.)

Break even point (for a 15 tons per hour Rotopactor):

Minimum manufacturing of Metal is required to overcome the fixed Charges Rs 63,675.00 per Month. Break Even point can be find out by dividing Fixed Expenses by G. profit. (G.P. » average Sellling Cost — manufacturing cost= Rs800- Rs356). G.P. Comes to Rs 444 per Brass. B.E.P. Comes to 144 brass. Hence per day production should be say 5.75 brass to overcome the fixed Expenses. (a production of two hours per day may over come all the expences) For bigger models B.E.P. can be achieved earlier.

Important Note:

An alternative Power supply arrangement, by a generator set of proper capacity, for uninterrupted power supply is recommended.