



REMco NEWS

APRIL 2009

Tips, Techniques, Products and Information to help you
Get the Most from Your REMco Crusher

SAND DEMAND

Texas Sports Sands relies on VSI crusher technology to turn pea gravel into white sand.

BY RODNEY E. GARRETT

Those fortunate enough to be mining white rock for manufacturing sand know its value in the marketplace. There are others, however, who have access to such rock but do not have the knowledge to process it cost-effectively into sand. Needless to say, there is little to no incentive to make sand if it is not profitable. So cost-effectiveness is key.

Some sand-production companies have taken a significant step by turning pea gravel that had no resale value into sand products that command a premium price. To illustrate, Texas Sports Sands Inc. of Kosse, Texas, is mining sand in a four-acre pit on a 225-acre mining site. The bottom of the pit is currently 100 ft. below grade. Since the pit is covered with 20 ft. of ground water, a floating dredge is being used for mining and pumping the sand and gravel to grade, where it is screened.

Challenge

To crush unsaleable pea gravel into saleable white sand.

Solution

A REMco SandMax VSI crushing plant.

Tip

The new product line added \$2.5 million to the company's bottom line.

A major change has been made to the sand-producing plant by Texas Sport Sands with the addition of a Rock Engineered Machinery Co. Inc. (REMco) SandMax VSI crusher. Before the VSI crusher addition, salable sand was limited to 75 percent of all the materials mined. The rest of the stone was classified as pea gravel (oversize) so it was stored in great mounds with no marketable use for it.

Meeting the concern

Mining sand annually at a rate of 200,000 tons since 2001, Keith Blair, president of Texas Sport Sands, was becoming concerned about the ever-increasing stockpile of nonsaleable gravel.

He says, "I would have gladly given it away if anyone could have used it, but that never happened. I could not find a market for the pea gravel and I was concerned about the storage area it was taking up at the site. The more I dredged, the higher the storage..."

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SAND DEMAND *Continued*

piles were becoming."

Last year, Blair contacted REMco to find out whether one of the company's VSI crushers could cost-effectively reduce the pea gravel to saleable sand. He sent a barrel of the gravel (which is 99-percent silica) to REMco so the engineers could test crush it in the laboratory for its feasibility. "We test a client's rock or gravel through our test plant where we use a full size REMco SandMax unit," says Damian Rodriguez, general manager of REMco. "That way we achieve a representative performance that is the basis for our crusher recommendation. The testing determines how REMco manipulates the crusher design variables to achieve a custom effect to meet the producer's needs."

For Texas Sport Sand, the test results were positive. Not only could a REMco VSI crush the gravel, it could do it efficiently and at a low cost. The VSI crusher recommended by REMco was the Model 200 SandMax VSI crusher powered by a 200-hp electric motor.

Marketable product

With this VSI added to the sand-processing line, 100 percent of the materials mined could be converted into various marketable sand products. All the mined materials are still run through a wet 6 x 16 double-deck screen for separating the useable sand from the 25 percent (pea gravel), which had no marketable worth.

The scalped pea gravel is now sent through a 36-in. dewatering screw and scrubbed to remove the clay balls. From there it goes to a surge bin for supplying the VSI crusher. Depending on the coarseness of the pea gravel, the crusher's throughput ranges from 100 to 150 tph. The VSI crusher is in a closed circuit for returning the oversize gravel to be re-crushed to wanted size. Blair says 60 percent of the gravel fed through the VSI crusher meets the sand specifications after the first pass.

Accordingly, here is the bottom line: Fifty-thousand tons of additional white sand is annually produced by the VSI crusher that previously was being stockpiled as worthless pea gravel. The revenue brought in by Texas Sports Sands



Ease of maintenance

Another sand-production company who is using a SandMax VSI crusher with excellent economical results is Arkansas Decorative Stone LLC of Sheridan, Ark. Dale Hayden says he replaced his existing VSI crusher with a SandMax Model 5500.

The crusher change was designed to reduce crusher-operating costs. Consider the following: Wear parts for the SandMax VSI crusher are only \$2,000 per month as compared to \$5,000 per month for the original VSI crusher. The original VSI crusher required changing the crusher parts every 40 crushing hours and took two men up to three hours of work.

The tips for the SandMax VSI need to be changed every 80 crushing hours, which takes one man five minutes. Every 800 crushing hours, the plates and rotor must be changed. This procedure takes two men two to three hours. Thus, for every 2,400 hours of crushing, the original VSI requires 480 man-hours vs. 21 man-hours for the SandMax VSI. Crushing interruption time is 240 hours vs. 10 hours.

All the sand manufactured by the SandMax VSI is sold for three applications: golf course bunker sand, swimming pool rock carpet and white decking sand for primarily patio and swimming pool construction. However, the most prestigious project that the company's sand has been used for is the newly built William J. Clinton Presidential Library in Little Rock. All the sand used for this concrete structure was supplied by Arkansas Decorative Stone.

on this extra sand is \$50 per ton, with most of it being marketed in Texas, Oklahoma and Louisiana. That is a \$2.5-million increase in annual sales resulting from adding the SandMax VSI crusher to the sand production line.

Premium price

The premium price paid for this sand is paid by those using it for golf course bunker sand because of its whiteness and its penetrometer-value rating. The lower the ball-lie rating, the higher the penetrometer value, which is expressed in kg/cm². Any value greater than 1.8 is considered acceptable by most golf courses so it is easy to understand why Texas Sports Sands crushed-sand penetrometer value of 3.2 is outstanding and sought after. "We sell much of the crushed sand because of its high value for bunker sand. Our crushed sand is the highest-rated bunker sand in Texas. The mined/screened sand has a value of only 2.2 and does not bring the same premium price," says Blair.

The reason the VSI crushed sand has the more desirable low-ball-lie rating is because of its angular shape when compared with the mined/screened sand that is more rounded in shape. Simply, the golf ball sinks deeper into the sand when the sand grain shape is round (as opposed to angular). ☉

The VSI-produced sand has an angular shape that is superior for golf course sand.





REMco TECHNICAL CENTER

CHECKING CRUSHER PERFORMANCE

With the ever-increasing attention to crushing plant efficiency, checking individual crusher performance becomes a key step in maximizing productivity and lowering crushing costs.

Why It's Important...

In all crushing plants, it's the crushers that actually impart change to the material being processed. Simply, rock crushers are the main converters of the raw rock, gravel or mineral to saleable size and suitable quality for the sale of all construction materials. Without knowing how well the crushers are performing (ideally to their design capacity), it is impossible to achieve optimum crushing plant efficiency, resulting in maximum production and lower costs.

How To Do It Right...

All crushers have design limits for tons per hour, size of feed, connected drive power and operating cycle. Typically, the two most readily measured areas are volumetric capacity and amperage draw on the drive motor. The objective is to achieve the most material through the crusher while drawing the desired power level. The basic testing method provides an instant determination of the crusher's performance at a point in time during plant operation. It is not always easy to achieve because of variation in a plant's operation. Testing of the crusher can be done manually or with a properly functioning automation system that records the operating factors of the crusher.

All rock plant automation/management systems have their own logic and specific function. These systems vary widely and REMco offers its own version, the **SmartBox**. To do the testing manually involves the following steps:

1. Make sure that the crusher is mechanically sound and has been regularly maintained.
2. Adjust all crusher drive belts to their proper tension.
3. Confirm that the feed control method can provide sufficient feed to satisfy the crusher's design feed rate capacity.
4. Check all crushing circuit conveyors to have the capacity to feed the crusher at the designed feed rate and take away the discharge.
5. Record the feed and discharge conveyor's speed in feet per minute (a belt tachometer is helpful here).
6. Run the crushing circuit for a period of time (normally 15 to 30 minutes) to insure that the closed circuit has achieved mass flow balance. (When new feed and product out low is the same and circulating load is consistent and all components are operating satisfactorily without any blockage or interruption.)
7. Confirm that the electrical interlocks are functioning in order to minimize spill points and stalling.
8. When the crusher has achieved a steady and continuous power consumption level of at least 90% of drive motor FLA, stop the feed belt, stop the crusher discharge belt, keep the crusher running, stop the rest of the circuit, shut down the crusher.
9. Following your companies lock-out / tag-out procedures take a three foot belt sample from both the feed and discharge belts. This sample is used to determine the tons per our and is also used for sieve analysis.

Ex. Belt cut tonnage calculation

$$\text{Belt speed in ft/min} \times \text{weight of a 3foot sample} \div 100 = \text{tons per hour.}$$
$$300\text{fpm} \times 62 \text{ lbs} \div 100 = 186\text{TPH}$$



10. By comparing sieve analysis of the feed and discharge you can determine the percentage of yield and screening efficiency. With a little more work you can also determine horsepower per ton ratio for tons throughput and finished tons.

Ex. For HP per ton throughput

$$250\text{hp} \div 186\text{TPH} \text{ through the crusher} = 1.3\text{HP per ton throughput}$$

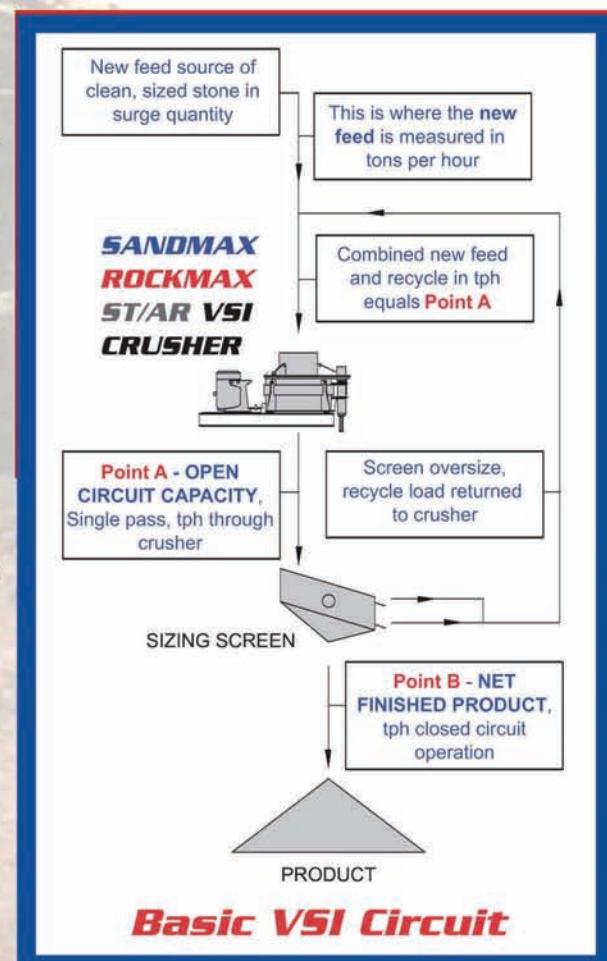
Ex. For HP per ton finished product ton

Our example above shows a throughput tonnage of 186TPH, and if our sieve analysis showed that there is 38% passing the No. 4 mesh sieve and we are making minus No. 4 mesh sand our finished tons available for screening would be:

$$186\text{TPH} \times .38 = 70.68\text{TPH}$$

$$250\text{hp} \div 70 \text{ tons finished product} = 3.6 \text{ HP per ton}$$

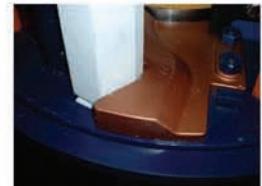
Armed with this kind of information you can determine screening efficiency or in-efficacy, product splits and other factors for given crushing circuit or individual crusher.



Basic VSI Circuit



REMco Rotor Revolution!!!



New and Improved SuperMax Rotors - Available in 30-4-12 and 30-4-14 Rotor Bodies

Announcing the next generation in rotor technology, **REMco SuperMax** series rotors. **Super** because they provide the best crushing performance and production while providing **MAX** service life. This gives you lower crushing cost and the best product quality.

The new **REMco SuperMax** series is designed to work in all existing **SandMax**, **RockMax** and **ST/AR** VSI crushers.

Easy, Drop in fit. These new rotors drop in and bolt on to REMco VSIs with no additional modifications to the machine.

Extended Service Life. These rotors will work longer with fewer shutdowns for service, 10% to 15% LONGER Service Life.

Less Power, More Production. New improved field proven rotor geometry provides for more efficient rock flow, cutting power demand by 5% to 8%.

Superior Application Versatility. The **SuperMax** series is designed for all types of rock-on-rock or anvil chambers. Wet or dry, no rotor works better.

Fewer Parts, Lower Cost. Size for size and ton for ton, **SuperMax** rotors have the fewest primary wear parts. The parts are less costly than older rotors and new unproven designs.

Trade in Your Old Rotor. Your old REMco rotor is valuable. Trade it in on the new **SuperMax** series. It may be worth as much as \$1,500.00.

New High-Tech Tungsten Tip (U.S. Patent #7,427,042) along with all New High Chrome Wall Plates and an all New Over-Lapping Inner Wear Ring that eliminates the gap between the inner and outer wear rings, all provide longer service life which means less down time and lower costs \$\$\$

New Interlocking "blade style" Back-up Tip assembly provides redundant protection and Eliminates Premature Back-up Tip Wear. It is also now impossible to inadvertently install the primary tip backwards, even the plant rookie can do it...

The new design geometry of the **SuperMax** rotor series provides for more Accurate Slip-Fit of all the parts for reduced slip-streaming and longer part service life Easier and Faster Balancing. This reduces the operating vibrations and crusher stresses improving the operating life of bearings, shafts and drive motors.

TO OUR READERS



WE WANT YOUR TECHNICAL QUESTIONS, JOB STORIES and CRUSHER CHALLENGES!!!

This newsletter is produced for REMco users and its intent is to make your life easier! Our success depends on your success. We really do want to hear what's been happening with your REMco crusher in your plant. Send your questions, comments, and job stories to the email addresses below. If you don't like email, drop us a line by snail mail or give us a call. Who knows? Maybe you'll see your question or story in print...

HOW WOULD YOU LIKE TO GET IT?

In today's fast paced world, it's difficult to balance tradition and technology. Traditionally, newsletters are done in print and mailed to the recipient. However, technology makes it possible for you to receive your newsletter electronically and skip the trip to the mail box. So the question is simple... **How would you like to get it?** If you would like to receive your monthly newsletter in a format other than the way you are reading this information right now... or if you would like to NOT receive a newsletter at all, contact:

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