A MOVING TARGET

Conveyors & their components - it's the details that matter - particularly when you need to keep on rolling.

The following report contains a condensed excerpt from a technical paper written by Superior Industries Engineer Bob Domnick, P.E. Superior Industries is a single-source suppler of complete idler and pulley lines. Domnick is a veteran engineer who understands how vital each component is to overall reliability and cost-efficient material handling. In this report, Domnick focuses on the idler. As idlers are present along the entire length of a conveyor, certainly they demand a closer look.

Transporting bulk material from one point to another - it sounds simple. But as any manufacturer knows, just one small process on the line can delay the final product. Similarly, one element of a conveyor can delay material production. The idler (a roll or series of rolls that support the belt) is one vitally key component.

What affects idler life?

How long can an idler support and protect a belt? That can only be estimated after a careful examination of just what factors affect idler life and how these factors apply to a producer's application. Pertinent factors include: idler class, bearing style, seal type, lubrication, roll construction, maintenance and environment. Knowledge of each will greatly aid in choosing the best idlers for your operation.

It must be noted that although idler wear life is affected by many variables, laboratory tests have provided standard values for bearing rating alone. Therefore the Conveyor Equipment Manufacturer's Association (CEMA) uses bearing L10 life as a guide for establishing idler ratings. (CEMA also determines the four idler classes.) The L10 formula comprises the dynamic load rating of the bearing, the radial load, the rpm, and the bearing style. The allowable load and rpm are determined by CEMA. In many cases these ratings were based on tests performed many years ago and do take into consideration bearing advancements such as improvements in alloys, material processing techniques, design and tribology (the interaction of bearing surface topography with lubricants and debris).

But finally, it is very rare for an idler to fail entirely due to bearing failure. Other factors must be considered.

Bearing style & impact and speed

Primarily, there are two bearing styles: tapered roller and ball bearings. Their advantages and/or disadvantages depend upon the application.

The tapered roller bearing has rolling elements that result in uniform load distribution. Long line contact gives the tapered roller bearing a high load carrying capacity for both radial and thrust loads. Taper roller bearing idlers are recommended under crushers and transfer points.

The ball bearing has components that result in point contact. As such, its load capacity is lower than a tapered roller bearing of the same size. All other conditions being equal, this results in the ball bearing having a lower L10 life than the tapered roller bearing.

It is imperative to consider the affect of speed on the idler bearing. There is a limit to the speed at which a bearing may be operated. Operating tempera-

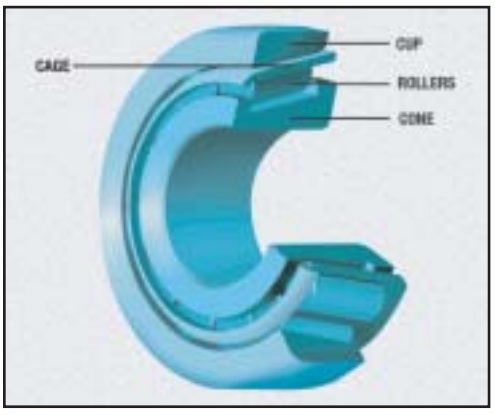


Illustration of a tapered roller bearing

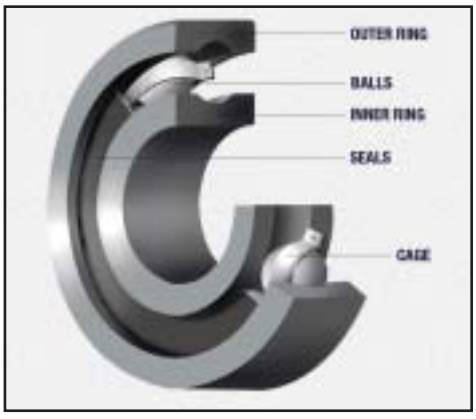
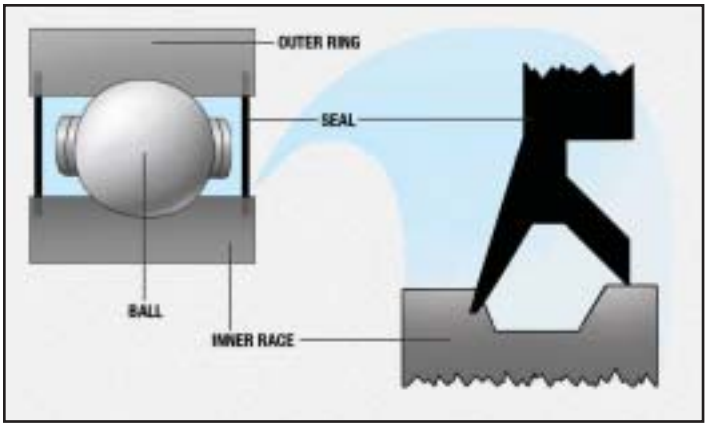
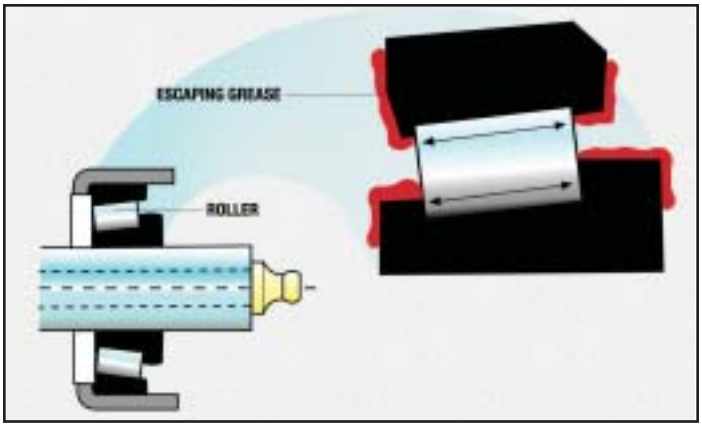


Illustration of a deep groove ball bearing



Elaborate ball bearing closure



Grease retention - Tapered roller bearing

ture, relative to the lubricant and the materials of the bearing components, will most often determine that limit. The highest speeds can be achieved by deep groove ball bearings. The tapered roller bearing can also operate at higher speeds, but the higher operating temperature requires close attention to maintenance, idler seal design, and grease quantity and type.

Cost considerations

Power consumption is an important cost consideration when selecting idlers. The friction caused by rolling resistance increases the amount of power required to move the conveyor belt. The CEMA Ai value is the force required to overcome frictional resistance and rotate the idlers. Ball bearing idlers have a significantly lower Ai value than tapered roller bearing idlers. On long horizontal conveyors this can represent noteworthy savings as well as increased life of associated drive components.

What about the bearing price tag itself? Typically, a ball bearing can be purchased at a lower cost than a tapered roller bearing. Additionally, a ball bearing is easier to assemble and requires less labor. A sealed-for-life ball bearing can provide an excellent cost savings by eliminating maintenance labor, grease expenditure, and grease piping for single-point lubrication.

Tapered roller bearings are usually more cost effective in terms of dollars per L10 hour. This measure becomes less meaningful considering less than five percent of bearings reach theoretical life. However, designers often specify increased idler spacing for tapered roller bearing idlers, thereby reducing capital costs. The tapered roller bearing idler can withstand the increased load and still have an L10 life equal to a ball bearing idler. Therefore, the entire system must be explored to determine which idler will provide the greatest cost advantage.

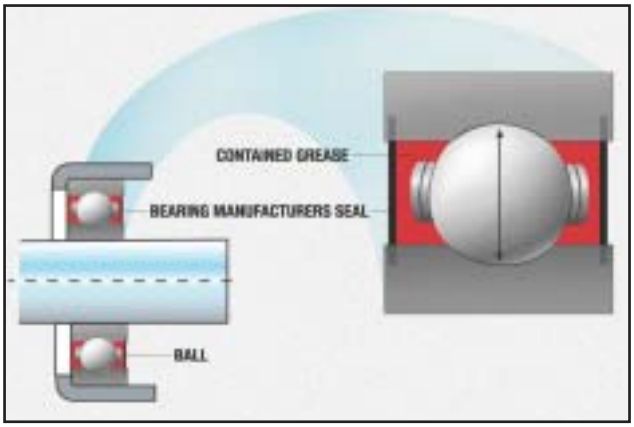
Seal effectiveness

Idler roll seals are responsible for retaining grease in the bearing cavity, excluding contaminants, maintaining low roll resistance, and maximizing wear life. Ball bearing idlers rely on the seal attached to the bearing itself as well as the seal configuration provided by the manufacturer. Tapered roller bearing idlers rely only on the idler manufacturer's seal.

Idler manufacturers have developed an assortment of labyrinth seals to aid in excluding contaminants. Labyrinth seals are non-contact seals that do not limit the speed of the bearing.

On the other hand, lip seals are contact seals that are often incorporated into the seal configuration of an idler. Lip seals often have a shorter service life. There are applications in which the use of lip seals is imperative. Also, recent developments in design have resulted in certain lip seals that work longer and more effectively with narrow contact bands and minimal radial loads that are uniform over time.

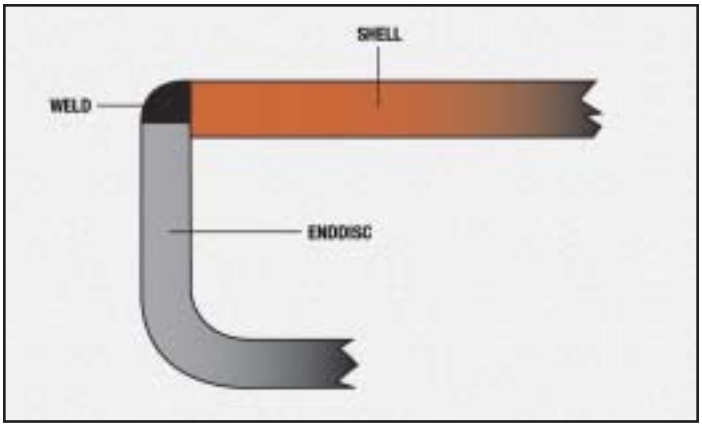
Ball bearings are often manufactured with seals, called closures, integrated directly into the bearing. Closures can be simple trash shields or rubber lipped contact seals. Elaborate closures incorporate multiple lip seals and a grease-filled cavity that protects the inner lip seal. The idler manufacturer's labyrinth seal configuration with the closures creates a formidable barrier against contaminants.



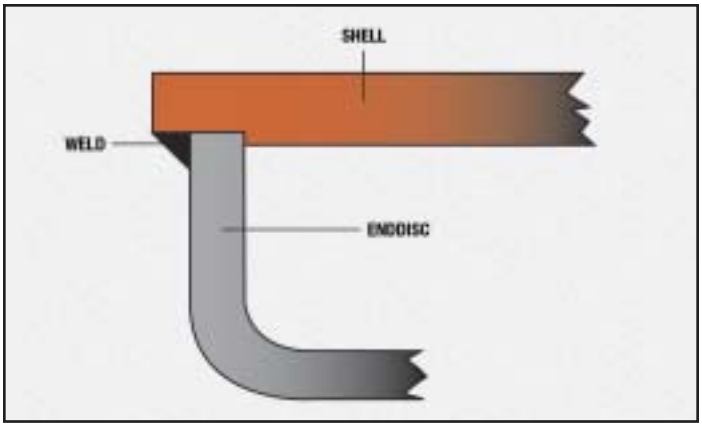
Grease retention - Ball bearing

Lubrication

The use of grease lubrication is prevalent in the idler industry. Up to thirty percent of all bearing failures are a result of marginal lubrication. Over-greasing forces the rolling elements to push through excess grease leading to temperature rises. Under greasing will allow the direct contact of metallic surfaces. Chemical attacks or thermal conditions can decompose or break down the lubricant. Low temperature greases or the mixing of incompatible greases may not provide adequate viscosity.



Exposed fillet weld



Inset fillet weld

The use of factory-sealed, non-relubricated ball bearings in idlers is growing in popularity. Even when tapered roller bearing idlers are required, there remains the desire for the sealed-for-life idler. This demand has prompted the use of factory-sealed tapered roller bearing idlers where effective grease retention is critical, yet difficult to attain.

Grease selection is important. A wide temperature range, mineral oil-based grease is required for a standard idler application. High or low ambient temperatures, or the presence of chemicals may necessitate special grease.

Roll construction

There are no CEMA standards for roll construction other than the roll diameter. The diameter of a roll and its shell thickness can drastically affect idler life. Selecting a larger diameter roll reduces the rpm of the bearing as well as increases the wearable surface are of the roll. For abrasive materials a thicker shell will provide longer life at only slightly higher costs.

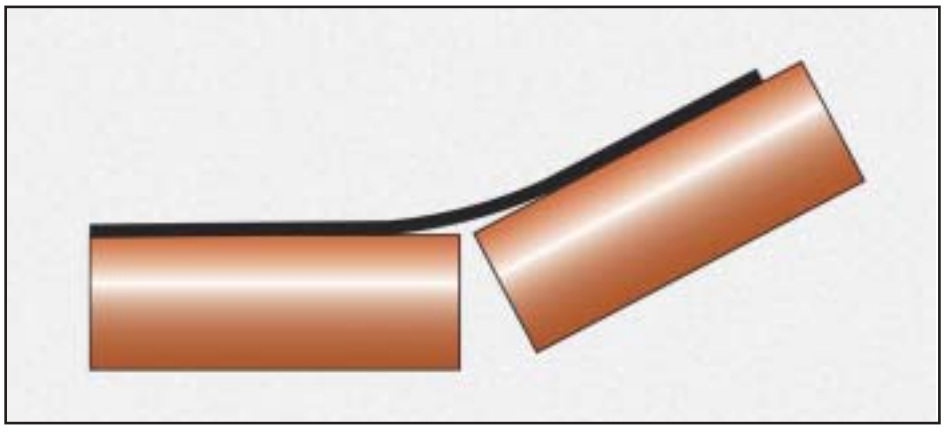
A very controversial issue in the industry is the method of attachment of the end-disc to the shell. Some idler manufacturers butt the end-disc up against the roll end and weld a fillet weld around the roll. Other manufacturers counter bore the end of the roll, inset the end-disc inside the roll, and weld a fillet weld around the roll. Companies that manufacture the inset end-disc purport that the belt will abrade the exposed fillet weld and cause the end-disc to separate from the shell prematurely. They also claim that the exposed fillet weld will wear the bottom cover of the conveyor. These allegations have initiated much marketing hype that has needlessly confused idler consumers.

In truth, the drawback to the inset weld is that some wear surface is removed in the counter bore process. If the shell did wear in this area it would reach the end-disc more swiftly than the exposed fillet weld roll. Ultimately, either design is effective since the wear at the end-disc attachment is minimal.

Maintenance and environment

Poor conveyor maintenance can lead to idler failures. If idlers are not lubricated at correct intervals, it can accelerate bearing failure. If a failed roll is not replaced, the adjacent idler may be overloaded. If material spillage has not been cleared away from the idler it may suffer additional wear. Idlers that are out-of-square are subjected to more friction and additional wear. Idler installation resulting in idler misalignment can cause premature bearing failure.

Some environments are detrimental to idler life. Dusty applications present more frequent contamination problems. Wet applications can severely reduce bearing life since most seals cannot exclude water. Acidic material can corrode and rust the frame, roll and bearings. High ambient temperatures can significantly increase bearing operating temperature and reduce bearing life and lubrication viscosity. It is important to know the environment of the application in order to select the proper idler options that maximize idler life. **AMJ**



Center and outer roll junction

FOR INFORMATION

Contact Bob Domnick at
Superior Industries
(800) 321-1558
E-mail: bobd@superior-ind.com

BIG IMPACT SMALL-PACKAGE

OSBORN'S NEW COMPACT CRUSHER IS IDEAL FOR HIGH-CAPACITY PRODUCTION IN SPACE-LIMITED APPLICATIONS.

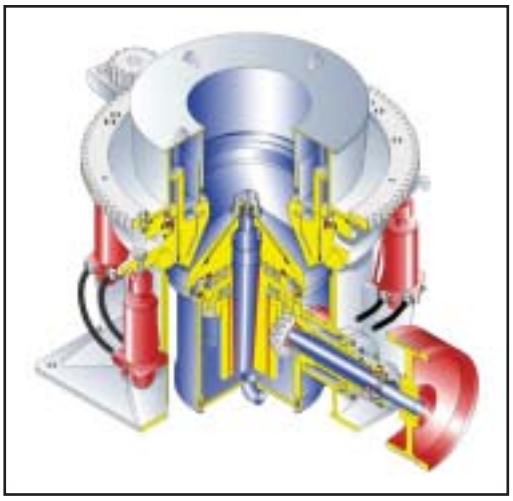
Osborn, an Astec company, was a first-time exhibitor at the recent ConExpo/Con-Agg 2002 exhibition. The Johannesburg-based bulk materials handling and minerals processing specialist displayed its new 27H Gyrasphere cone crusher at the show. A small, lightweight powerhouse, this machine embodies the innovation and technology visitors expected to see at the Astec booth, with its "Experience Astecnology" theme.

The 27H was developed by Osborn to fill a gap in the crusher market for a small, high capacity machine for use in applications where space is limited. It is fully manufactured at Osborn's factory in Elandsfontein, Johannesburg.

Weighing in at just 6500 kg, and with a head diameter of 686 mm (27"), it is set to be a sought-after addition to Osborn's crusher range. Explains Osborn managing director Alan Forsyth: "Since the successful launch of the H series Gyrasphere some four years ago, we have had many inquiries for a smaller machine to complete the range of cone crushers. The 27H fits the bill."

The machine's features include a taper-head capable of producing a more cubical product; a capacity of more than one-and-a-half times that of the 24 Gyrasphere; hydraulic relief and release; and hydraulic locking of the upper frame, concave support bowl and locknut threads that prevent movement during crushing.

"The hydraulic relief and release cylinders are mounted around the outside of the main frame, and protect the Gyrasphere from crushing chamber overload," Forsyth explains. The hydraulic relief and adjust system follows the H series design with external relief. However, the upper frame lock is the Johnson Crusher patented internal hydraulic cylinder where the upper frame itself houses the piston ring locking system.



In the design of the new crusher, Osborn focused on maintenance simplicity, and with this in mind, it is underdriven (with the gear above the pinion) for easy stripping of the machine from the top.

The steep angle of the taper head, together with manganese liners - also with a steep angle - are features that contribute to this machine's increased capacity, Forsyth says. Another noteworthy feature is its new large-diameter thrust bearings, which with ample capacity, absorb the crushing forces produced.

Shipped to the U.S. in January, Osborn's 27H arrived six weeks later, in good time to make its debut at ConExpo/Con-Agg 2002 in Las Vegas. After a coat of touch-up paint and polish, it was ready to be viewed by all of the 100,000 visitors to this year's show. Swing-out steps were fitted to the sides of the machine for visitors to look inside at the workings.

Based in Elandsfontein, Johannesburg, Osborn Engineered Products SA (Pty) Limited (trading as Osborn) is a leading manufacturer of bulk materials handling equipment and specialist turnkey materials handling contractor for mobile and fixed crushing and screening plants and conveyor systems.

Osborn has long-established license agreements with major international principals - such as Telsmith and American Pulveriser (USA), Mogensen (UK), and IFE (Austria); and, in association with them and its network of agents and distributors, supplies local and export mining, quarrying and industrial markets across Africa. **AMJ**

FOR INFORMATION

Contact Sandy Van Zyl at
Osborn Engineered Products SA
(PTY) Limited
+27 11 820-7631
E-mail: svanzyl@osborn.co.za

Achieving maximum production and profitability in the washing and classifying process allows little room for error. Whether a producer is erecting a new operation from scratch or fine-tuning a current process, it's best to examine one's options through the eyes of veteran product managers and applications experts. After all, just the proper sizing of hydraulic sand classifying equipment can be a complicated job. And, arguably today's business climate demands not only that tighter specifications be met, but also that they be achieved far more cost-effectively. One without the other could lead to a failing operation.

This report examines what it takes to cost efficiently process a greater variety of in-spec products. Kolberg-Pioneer, Inc. (KPI) Product Manager Alan Egge and KPI Applications Engineer Jeff Wendte share valuable tips backed by some key producer success stories.

Sizing strategies for a hydraulic sand classifying tank

"A common, yet major error when sizing a classifying tank is working solely with the tons-per-hour (tph) of feed," says Applications Engineer Jeff Wendte. "This can be misleading because you may not be able to produce the desired specification product at the desired rate, unless you first address the amount of water required in the tank for proper classification."

Wendte explains that in hydraulic classification, water does the work. If the tank is the wrong size for the amount of water required, then not only will production rates fall, but also the production of a specification product may be next to impossible. With insufficient water to produce the correct dilution rate, the sand and water slurry may be too thick, causing hindered settling. Under these conditions, he stresses, the feed material may never get classified or separated, making it difficult to reblend to the proper specifications. "Correct water requirements are imperative particularly when sizing equipment for a high-fines feed material and high-fines products," says Product Manager Alan Egge. The amount (gpm) of water slurry fed to the classifying tank or dewatering screw determines the velocity of the liquid portion of the slurry as it moves through the tank. This velocity is very important, Egge points out. Assuming that all the sand particles have the same density, each particle in the slurry feed settles at a rate particular to its size.

"We can easily produce over a half-million tons of aggregate with only a four-man production team," says Elliott. "Other similarly-sized plants in the area are getting less tonnage with much larger crews. At an estimated cost of $50,000 per man, per year, the immediate savings are obvious."

Egge shares that a reliable and conservative rule-of-thumb for water requirements for classifying tanks is to have approximately 10 gpm of water for every 1 tph of total feed, or 100 gpm of water for every 1 tph of silt (minus 200-mesh) in the sand feed, whichever is greater. This allows for proper dilution of the sand so that the material will settle correctly in the tank for proper classification.

"Once you have correctly sized the classifying tank, you've won much of the battle in selecting equipment to produce a specification sand," says Wendte. "However, determining a correctly sized dewatering screw is also important."

Many of the factors that affect classifying tank sizing also apply to the sizing of a dewatering screw. The following information is required to properly size this equipment:

- Feed rate in tph to the tank or dewatering screw.
- Feed material gradation or sieve analysis.

SIZING WORKSHEET FOR CLASSIFYING TANK		
1.	Material feed rate (tph)	= 235 tph
2.	10 gpm x material feed rate (tph) (10 x #1 = ?)	= 2,350 gpm
3.	Percent passing #200 mesh seive	= 12.5 percent
4.	100 gpm x tph passing a #200 mesh sieve (100 x (#1 x #3) = ?)	= 2,938 gpm
5.	Gpm entering tank with feed material (eg. from a dredge, etc.)	= 4,100 gpm
6.	Minimum gpm for classifying tank (900 gpm in an 8-ft. wide tank or 1,200 gpm in a 10-ft. wide or 12-ft. wide tank)	= 1,200 gpm
7.	Pick the largest water volume from #2, #4, #5, and #6 above	= 4,100 gpm
8.	Sieve size to retain within the classifying tank	= #150 mesh
9.	Choose tank size using #7 and #8 above and the table below	= **12 ft. x 48 ft.**

Size	Water Capacities (gpm)			Number Of Discharge Stations
	#100 mesh	#150 mesh	#200 mesh	
8 x 20 ft.	2300	1200	700	6
8 x 24 ft.	2800	1400	800	7
8 x 28 ft.	3200	1600	900	8
8 x 32 ft.	3500	1800	950	9
10 x 24 ft.	3500	1800	950	7
10 x 28 ft.	4100	2100	1100	8
10 x 32 ft.	4700	2400	1250	9
10 x 36 ft.	5300	2700	1400	10
10 x 40 ft.	5900	3000	1550	11
10 x 48 ft.	8100	4200	2150	11

- Bulk density of the material.
- Amount of water in gpm entering the tank or screw with the feed.
- Gradation or sieve analysis of the product to be raked.
- Whether the material is natural sand or manufactured sand.
- Type of material to be processed.
- Material feed system (conveyor, wet screen, dredge, etc.).
- Desired plant layout (portable, skid or stationary).

Up sizing

At the Ennstone, Inc., Morie Quarry facility near Fredericksburg, Virginia, the market dictated the need for products used in pre-cast concrete, asphalt and ready-mix. "Around 70% of our sales are in sand," says Mark Elliot, company president.

In designing a new sand classification operation for Ennstone, KPI engineers examined all of the company's individual criteria and conditions. "Our engineers do not take a boilerplate approach to plant design," says Wendte. "In fact, we prefer to make a recommendation after examining a sample gradation from the site in question. We assist the customer in maximizing an equipment investment by converting as much of the deposit as possible into saleable material."

A perfect case in point is Ennstone's classifying tank. At the outset, all the other manufacturers in the bidding process were specifying a 10' by 40' classifying tank for a 300-tph feed to the tank. "When we sized it," says Wendte, "we recommended a 12' x 48' tank. It was a tough sell initially but we eventually helped Mark see that going with the larger tank meant he could retain a good deal more saleable fines. While initially, going with a smaller tank would have saved dollars, over the long term it would have meant a significant increase in the amount of fines going to the settling pond. Excess fines can be a huge problem in some operations."

To achieve optimum production and gradation requirements, Ennstone has enhanced its classifying function with Kolberg's proprietary Spec Select™ III control software. The touch-screen-driven program allows the operator to quickly and accurately proportion the amount of material discharged from the valves at each station of the classifying tank, thereby easily keeping material in spec. "This has been an excellent tool for us," says Elliott. He adds that their increased production rate (averaging about 125,000 tons per production person, per year) is almost entirely attributable to their plant's design for efficiency and ease of operation.

"We can easily produce over a half-million tons of aggregate with only a four-man production team," says Elliott. "Other similarly-sized plants in the area are getting less tonnage with much larger crews. At an estimated cost of $50,000 per man, per year, the immediate savings are obvious."

Sieve Size	Cumulative % Passing
#4	100 %
#8	92.6 %
#16	76.5 %
#30	47.0 %
#50	28.4 %
#100	16.9 %
#200	12.5 %

Sizing for product flexibility & future growth

Arkansas-based North Little Rock Materials (NLRM) began its permitting process in 1996 on 585 acres containing a rich deposit of sand and gravel. It has built its business on specialty products. By the year 2000, more than 50% of its revenue came from non-traditional products - golf-course construction, top dressing sand, and high drainage filter sand and recreational sand. "There is always strong local competition for concrete, masonry and asphalt sand," says Owner and President Charles Tankersley. "Our specialty materials offer the opportunity to go beyond the typical 100-mile radius of a sand and gravel operation." As to beginning this new business venture, Tankersley says, "We were new to permitting, material analysis, equipment sizing and multiple product production. I needed a knowledgeable manufacturer."

Kolberg Product Manager Alan Egge was key to the evaluation process. Tankersley wanted to know the impact of deposit changes to his production, and what size tank and sand screws would accommodate the markets he planned to capture. Much of the discussion centered on a plant layout that would accommodate growth. "Kolberg-Pioneer application and design engineers have a lot of experience," says Tankersley. "Their knowledge helped me evaluate the potential for my deposit while minimizing our start up costs."

NLRM Plant Manager Steve Hackmann credits the tank design for a large part of the NLRM success. "I'm glad I listened to Alan Egge's recommendation regarding tank size," he states. "Our 12' x 48' tank with 11 settling stations is the key to our material quality." Hackmann emphasizes that KPI proposed a rising-current manifold. "After seeing the split our classifying tank can produce, I wouldn't buy a tank without it," he adds. Hackmann says that with the rising-current manifold, his operation maintains a very coarse split for concrete sand while sending the fines downstream to the last station for high quality mason sand.

Due to their need for multiple product production, NLRM also outfitted its operation with Kolberg Spec Select III controls. "I can change the program and be making a new product in just 10 seconds, " says Hackmann. "We have complete flexibility. To us, a days notice for new product is more than adequate," he says. "In fact, with this equipment and technology, we can have a stockpile in under an hour if a customer demands it." **AMJ**

SIZING WORKSHEET FOR FINE MATERIAL WASHER / DEWATERING SCREWS

1.	Material feed rate (tph)	= 150 tph
2.	Feed: percent passing #50 mesh sieve	= 21.2 percent
3.	Feed: percent passing #100 mesh sieve	= 6.8 percent
4.	Feed: percent passing #200 mesh sieve	= 3.2 percent
5.	Gpm of water entering the screw with the feed material	= 450 gpm
6.	Product: percent passing #50 mesh sieve	= 20 percent
7.	Product: percent passing #100 mesh sieve	= 6 percent
8.	Product: percent passing #200 mesh sieve	= 1.5 percent
9.	3 - 5 gpm x material feed rate (tph) (3 x #1 = ?)	= 450 GPM
10.	50 gpm x tph passing a #200 mesh sieve (50 x (#1 x #4) = ?)	= 240 gpm
11.	Finished product (tph) (#1 - (#1 x (#3 - #7)) = ?)	= 148.8 tph
12.	Spiral speed (percent of full speed) #6 vs. speed chart #7 vs. speed chart #8 vs. speed chart	 = 75 percent = 75 percent = 75 percent
13.	Finished product (tph, from #11)	= 148.8 tph
14.	Slowest spiral speed (from #12)	= 75 percent
15.	Mesh split desired, based on fines retention in product (reference #6, #7, and #8)	= 150 - 200 mesh
16.	Maximum gpm of water fed to the screw (reference #5, #9, and #10)	= 450 gpm
	Select fine material washer / dewatering screw based on meeting all above criteria (#13 - #16)	= 48 in. S or 36 in. T

PERCENT SCREW SPEED VS. PERCENT FINES IN PRODUCT

% Screw speed (rpm)	% Passing #50 mesh	% Passing #100 mesh	% Passing #200 mesh
100%	15	2	0
75%	20	5	0
50%	30	10	3
25%	50	25	8

FOR INFORMATION

Contact Alan Egge at
Kolberg Pioneer
(800) 542-9311
E-mail: alanegge@kolbergpioneer.com

PEP to attend 2002 Plant Operators Conference & Expo

PEP will be attending the NSSGA 2002 Plant Operators Conference & Expo in Milwaukee, WI, June 15-18 at the Hyatt Regency. The conference is a three-day event that features educational seminars, plant tours of Milwaukee-area operations, committee meetings and manufacturers exhibits to provide "nuts and bolts" information for plant operations personnel. Equipment from PEP will be showcased at the plant tours at Payne & Dolan's facilities in Waukesha & Franklin Quarries. PEP will also have an exhibit to show its many screening capabilities.

For more information call Brooke Sights of PEP at (800) 545-2125, or e-mail: marketing@pepscreen.com

AMJ announces ConExpo grand prize winner

For its show issue, the Aggregate & Mining Journal sponsored a contest to win an Alaskan cruise or Hawaiian getaway valued at $5,000. The lucky winner was Jim Shaw, Equipment Division Manager for Greeley, Colorado-based Hall-Irwin Corporation. Jim and his wife Joanne chose the Alaskan cruise and will enjoy their trip in mid-July. Says Shaw, "I've never won anything before. I don't even know other people who win anything."

Hall-Irwin operates a diversified group of subsidiaries including Aggregate, Bestway Concrete, Construction and Golf Divisions. Over the last four decades, Hall-Irwin has participated in the construction of more than 1,500 commercial and residential subdivisions. Congratulations to Jim & Joanne!

For a free subscription to Aggregate & Mining Journal contact Jim Lincoln at (800) 542-9311 or e-mail: jimlincoln@kolbergpioneer.com

Superior Industries FD Series Axle assembly delivers increased efficiency

Superior Industries offers its exclusive FD Series Axle Assembly for use on existing or portable radial stacking conveyors. This patented axle assembly dramatically reduces transport and onsite setup time. With its 22' footprint, the FD Series Axle Assembly provides maximum stability and increased safety for conveyors with lengths up to 150-feet. Its hydraulic stacking wheels can be lowered into working position swiftly. The conveyor main frame can be raised and lowered while on the transport wheels, eliminating the need for high maintenance undercarriage compensation. With its totally enclosed hydraulic power travel package, there is no need to connect or disconnect chain drives.

The FD Axle can be retrofitted to any new or existing conveyor undercarriage design and is available in a variety of sizes.

For more information call Mary Erholtz of Superior at (800) 321-1558, or e-mail: marye@superior-ind.com

Osborn offers idlers to South African market

South African plant engineers are increasingly selecting Osborn as a supplier of choice for SABS-approved conveyor idlers. Osborn Engineered Products SA (Pty) Limited is a leading manufacturer of bulk materials handling equipment. The company produces idlers of every type, to meet any specified application.

For more information call Sandy Van Zyl of Osborn at +27 11 820-7631, or e-mail: svanzyl@osborn.co.za

Breaker Technology, Inc. (BTI) offers new series of boxed housing breakers

BTI offers new benefits with their recently introduced TB-XC Series of boxed housing breakers, new features and benefits include:

- 20% narrower front head, allows for trenching in more confined spaces.
- 10% reduction in weight, while pro viding exceptional structural integrity and impact energy.
- Suspended boxed housing design reduces noise and vibration to carrier.
- Breaker body is suspended on all sides using compressed polyurethane isolators, absorbing and protecting the carrier boom from recoil energy. This feature provides the unique benefit of preventing tie rod strain during blank firing.
- The nose of the breaker is surrounded with abrasion resistant plating for long life.
- Front head support allows minimal movement, leaving cylinder and gas head free without stressing the tie rods.
- The narrower profile on the XC models allows more visibility and better access when working in tight quarters.

The TB-XC Series of breakers are available from the TB725XC (2,000 ft lb class) up to the TB2580XC (13,500 ft lb class). BTI will continue to offer the TB-X version of side plates for operations that prefer its "open" style.

For more information call Tom Witt of BTI at (909) 369-0878, or e-mail: twitt@rockbreaker.com

New facts & figures book from Kolberg-Pioneer and JCI

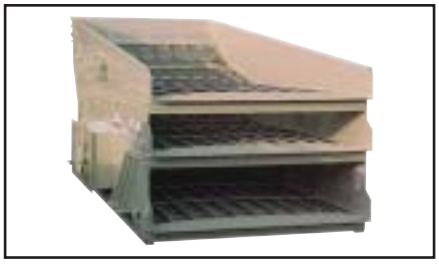
A new combined Facts & Figures book is available from Kolberg-Pioneer, Inc. and JCI. This 240-page booklet contains engineering data, calculations, capacities and specifications for equipment related to the aggregate, recycle and bulk material handling markets. Many contractors worldwide have found this booklet valuable for their use in application layouts, calculating production rates, capacities and gradation control methods applied to fine aggregates.

For more information call Curt Peterka of Kolberg-Pioneer, Inc. at (800) 542-9311, or e-mail: curtpeterka@kolbergpioneer.com

Telsmith Silver Bullet™ Series cone crushers

The Silver Bullet™ Series Cone Crushers by Telsmith, Inc., specialize in product cubicity, minimizing 200 mesh, and maximizing coarse and fine aggregate. Telsmith developed the Silver Bullet Series with the objective of improving cone crusher performance in secondary and tertiary applications by incorporating on the fly adjustments and worry free operation.

For more information call Bob Meyers of Telsmith at (800) 765-6601, or e-mail: bmeyers@telsmith.com



JCI announces new multi-angle vibrating screen

JCI announces the release of its new "multi-angle" vibrating screen called the "COMBO"™. This combines the advantages of both an incline and horizontal screen and is available in both standard duty and finishing duty with 3-deck configurations. The top deck of the screen is equipped with incline panels that begin with a 20-degree slope, transcending to a 10-degree slope and then to a horizontal position. The second deck begins at 15-degrees, transitions to 7.5-degrees and then to horizontal. The bottom deck is horizontal.

The new COMBO screen can be fitted with standard wire cloth or urethane deck panels. JCI has also designed a punch plate section into the feed plate, increasing the total screening area by an additional 10%.

This design removes a high percentage of fines before they are even introduced to the actual screen deck, which allows for increased production rates.

The JCI COMBO is the only multi-slope screen that features a triple-shaft drive configuration. Other features include the ability to adjust stroke length, stroke angle and RPM to best suit the conditions of the application.

For more information call Paul Smith of JCI at (800) 314-4656, or e-mail: psmith@jcieug.com

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