THE SLAG RUNNER

THANK YOU!

A special thanks to those who attended the NSA 98th Annual Meeting!

UPCOMING MEETINGS

2017 Leadership Planning Meeting

Tuesday, March 7, 2017

12:00 PM – 5:00 PM

Tropicana Hotel

(Exclusive for NSA Committee Chairmen & Task Group Chairmen only)

Spring Plant Operator, Safety, & Purchasing Committee Meetings

Co-Hosted by Volvo Construction Equipment North America & Titan International

Wednesday, March 8, 2017

8:00 AM – 1:00 PM

Las Vegas Marriott Hotel

To register, go to www.conexpoagg.com

Open Letter to the NSA

As 2017 begins our industry is presented with many challenges, and our association is perfectly situated to address these challenges head-on and offer real-world solutions. However, the key ingredient is you.

The association needs your voice, your concerns, your ideas; essentially your involvement.

The men and women who chair each committee make up a tremendous team who work very hard to keep the association's members informed and prepared.

But it takes more than a single individual or a committee pair to continue the success of our association. It needs **you**.

Our committees organize meetings throughout the year with our Allied members, giving everyone the opportunity to get involved in the topics, discussions, and more importantly, the solutions. The spring and summer meetings also give our Allied members the opportunity to showcase their services and expertise.

Our association is so much more than the annual meeting in a sunny destination. I urge our members to attend the spring and summer meetings, get involved, and share the passion you have for your company, our industry and our association.

Industry News

New & Improved Slag Presentation

In an effort to stay up to date and relevant, the Marketing Committee, in collaboration with the Education Task Group, has taken on the project of modernizing the long standing PowerPoint presentation "Slag A Green Material". This presentation has been available on the NSA website for many years. The newest version is called "Slag A Sustainable Product" and is available for members of the Association to use in their own education and marketing efforts. This presentation is the centerpiece for Association efforts to gain traction in college and university curriculums teaching about sustainable aggregates. Members who choose to use this presentation can pick and choose which slides best aide in their own particular marketing or education strategy. Please take a look if you haven't seen it.

News from PEWAG

“There are many ways to transact business and there are hundreds of ways to lose money, but there are two basic paths to making money: Increase Income and Reduce Costs.”

Your haul trucks generate income. How much depends on keeping the truck moving, and continually reducing costs. Off the road truck tires are tough and keep your haul truck moving, and retreading those tires is the most effective way to reduce costs. These are simple truths that operations understand. So for the operations that never have down time due to tire sidewall damage, and you’re able to recap your tire casings 2, 3 or more times, you don’t need to read any further.

If your site is incurring costly downtime and unable to retread your haul truck tires due to sidewall damage, contact your local Pewag representative. A Flank Protection Chain can put you back on the path to increasing income and reducing costs.

It is with deepest sympathy that we must announce the passing of three of our members.

Bob Willoughby was President of ACS Industries in Kent. His entire career was in the steel business. Should friends desire, memorials may be made to the Susan G. Koman for the Cure for Breast Cancer, 26210 Emery Road, Suite 307, Cleveland, OH, 44128.

Howard Patterson was a dedicated employee of the Edward C Levy Company. Should friends desire, memorials may be made to the Alzheimer's Association or the American Heart Association. To share memories, please visit vermeulenfuneralhome.com.

Bill Bourke was devoted employee of Harsco New Zealand, from which he retired from. Bill was a historian and loved English History. He also enjoyed English classic comedies such as "Are you being served? And "Blackadder". His hobbies included building model planes and watching sports, especially rugby. Bill's contagious enthusiasm, continuous efforts at innovative industry research, humor, and warmth will be greatly missed.

Slag Recycler Uses Dust Supression Cannon to Meet Air Quality Regulations

[Rancho Cucamonga, CA] -- A Canadian environmental solutions firm operating a slag recycling plant in California is using industrial atomized mist technology to contain fugitive dust emissions and control runoff to satisfy strict state air quality regulations. Tervita Corporation was tasked with controlling dust while conserving water in an area known for high winds, Rancho Cucamonga, CA. The firm accomplished that goal by integrating a tower mounted DustBoss® DB-60™ with a modified shipping container in an innovative design that stabilizes the unit and protects electronics. The result is a drastic reduction in fugitive dust emissions, improved regulatory compliance and better community relations.

In 2012, the Gerdau Corporation chose Tervita to take over operations of the slag processing plant, servicing the company's long steel mill located approximately 0.25 miles away. Facing a transition that required updated equipment in a strict regulatory environment, Tervita managers worked closely with the South Coast Air Quality Management District (SCAQMD) and local leaders to create an air quality management plan that made the operation compliant and more efficient.

Tervita receives approximately 300 tons of material a day in 10 to 14 "heats" (dump truck loads), which are offloaded into a 200-foot-deep by 100-foot-wide storage area separated into two sections. Nearly a third of the temperature of the surface of the sun, newly delivered slag -- approximately 2500º to 3000ºF -- is wetted, cooled, mixed and cured by a combination of water, front loader and time.

"When we installed the new state-of-the-art crusher, we streamlined the recycling process into a faster operation that is dust-free because of the bag house filtration system," said Carson Swartz, Operations Supervisor for Tervita. *"But the storage and cooling area was a big issue. Whether offloading, churning or moving the slag to the crusher, it's constantly being disrupted, causing a lot of dust."*

Prior to installing the DB-60, the company tried using the moveable sprinkler irrigation system left in place by the previous operators. Tervita found that the sprinkler system only saturated the surface material, which caused large amounts of runoff and did not properly address the fugitive dust.

Managers at Tervita heard from colleagues in the steel industry about the use of atomized mist technology at another slag recycling operation.

The company strategically placed a 20-foot-long by 8-foot-wide by 8.5-foot-tall shipping container in the storage and cooling area.

Working with DCT technicians, the container was reinforced with a heavy-duty steel frame and modified to mount a 12-foot tall steel tower topped by the DB-60 equipped with a 359º oscillation system, making the total height from the ground approximately 28 feet.

Inside the container, a touch screen panel is mounted on the wall that allows operators to control the elevation, oscillation arc, booster pump pressure, fan output and water volume. Many of these functions can also be modified outside the container by remote control.

Since the water used by Tervita for dust suppression is non-potable, it is first sent through an in-line 30 mesh, 595-micron filter before being delivered to the booster pump, where the water pressure is raised from 10 PSI up to 160 PSI with a potential maximum of 250 PSI. Pumped through a 1.5-inch hose to a circular brass manifold, the water is forced through 30 atomizing spray nozzles, which fractures it into millions of tiny droplets. The mist is then propelled by a powerful 25 HP electric fan that produces 30,000 CFM of airflow through a specialized cylindrical barrel design. Atomized droplets are launched in a 200-foot-long cone at an adjustable 0 to 50° angle, covering a total area of 125,000 square feet when using the full 359º oscillation.

Atomization introduces more droplets into the air than hoses or sprinklers, using a fraction of the water volume. Because the mist is propelled by a fan rather than water pressure, the DB-60 uses only about 25 GPM to cover the area, as opposed to an industrial irrigation sprinkler system that can require up to 500 GPM to adequately service the same area. Not only do the atomized droplets capture airborne particles, once they land they also quench the storage piles, offering surface suppression with far less runoff and product loss.

Due to the use of atomized mist, the facility has dramatically reduced the volume of water needed for dust management, making more water available for other parts of production in the plant, thus promoting sustainable overall usage for the entire facility. With fugitive dust levels compliant to SCAQMD regulations, Tervita achieved the goals set for the project and successfully applied a new technology that could be used in other locations and applications.

"As much as we run the machine, we've been impressed by how well it's held up," Swartz added. *"Since the installation, the couple of times we've called DCT, they were very responsive and even came out to visit just to see the setup. Their service matches the quality of the equipment."*

North America's First Brokk 800P Hits Two-Year Anniversary

MONROE, Wash. – Brokk Inc.'s first Brokk 800P demolition machine in North America completed its second year of operation at one of TimkenSteel's Ohio steel plants. The Brokk 800P is a sister product to the Brokk 800S and made specifically for the metal process industry. It is the manufacturer's most powerful demolition machine on the market. Built with a heat-protected three-part arm with continuous 360-degree rotation, the Brokk 800P effectively performs hot ladle and converter cleaning or whole refractory renovations in metal processing industries. TimkenSteel purchased the 11-ton unit in December 2014 to dig ladles at its Faircrest Steel Plant in Canton, Ohio.

TimkenSteel produces high quality alloy steel bars and tubes used in automotive, industrial and energy applications.

"Adding the Brokk 800P to our tool belt gives us considerable flexibility," said Thomas Sellari, TimkenSteel's manager of steel making at Faircrest. "Its remote-controlled operation reduces risk of injury from hazards such as high temperatures and falling debris. Plus, it has a tracked wheel system, allowing us to easily move and position the machine to efficiently remove the refractory."

Sellari was interested in Brokk after seeing its machines at AISTech 2014, the Iron & Steel Technology Conference and Exposition. His factory needed new equipment to effectively remove refractory brick in its ladles. After the conference, he scheduled a demonstration of the Brokk 400 and 800P at his facility in August 2014.

"We were interested in purchasing the Brokk 400 before the demonstration," Sellari said. "However, during the demonstration we saw firsthand the benefits of the larger unit. Its size and extended reach is crucial in cleaning the ladles effectively."

TimkenSteel purchased the Brokk 800P in December 2014. To work with its hot ladles and furnace, the company paired it with a heat-protected Atlas Copco SB302 hydraulic breaker, which generates 450 foot-pounds of force at the tip of the solid-body hammer. TimkenSteel uses the machine to clean out its 175-ton ladles, which hold liquid steel. During full production, the ladles require relining approximately every 50 heats.

Beyond its work with ladle clean-outs, TimkenSteel uses the Brokk 800P to clean ladle covers and lids, as needed, and to remove refractory lining from its electric arc furnace.

"Forty years after revealing our first demolition machine, we continue to improve the efficiency and safety of steel mills with our remote-controlled machines," said Peter Bigwood Brokk Inc.'s vice president of sales and marketing. "The grueling application increases the risk for injury and heat exhaustion. Fortunately, Brokk's remote-controlled capabilities and unmatched power-to-size ratio nearly eliminate that risk, taking the strain off of the crew and keeping them out of harm's way."

Like any Brokk demolition machine, the Brokk 800P uses a variety of attachments, including scabblers, buckets and breakers with extended bits, to effortlessly tackle challenging applications. It's powered by a 98-horsepower diesel motor for use on remote locations where electricity is not readily accessible or it can be equipped with a 60-horsepower electric engine, which provides safe, emission-free operation in confined areas.

The Brokk 800P's three-arm system extends 31 feet and rotates 360 degrees to reach challenging angles with precision. Plus, the machine features Brokk's signature compact design and high power-to-weight ratio for effective work in small, restricted spaces. Brokk also incorporated heat shielding on its arm system to help prevent high temperatures from damaging hydraulic lines and electrical systems.

Noble County Highway - Partial Depth Reclamation Zack Smith – County Highway Engineer

Noble County Highway Department utilizes partial depth reclamation as a cost effective road reconstruction technique. We reconstruct roads that are rated a three on worse on our Annual Pavement Inspections (PASAR), see below for an example. This process focuses on drastically improving a roadway's base strength as oppose to improving the surface through a traditional reconstruction. The base is strengthened through the addition of new high quality aggregate and chemical modified using Calcium Chloride and Lime Hardening. Other reclamation processes utilize asphalt or cementitious materials; however, we have found calcium chloride to be significantly more cost effective and easier to install. The year before any reconstruction project all drainage (culverts and ditches) are brought up to current standards.

The first step in our process is to layout additional aggregate on the roadway as seen below. We use a steel slag aggregate called Duraberm, supplied by the Edw. C. Levy Company. Duraberm is a heavy aggregate that contains natural lime (CaO) from the steel production process. Duraberm has a gradation similar to INDOT No.53 / No. 73 aggregate (see below) and is ideal for a road base material. An average of 2.5" of aggregate is tailgated over the desired roadway width and graded to a uniform cross section. During this process, the road can be widened up to 1' to 2' on each shoulder.

Target Gradation 1" X 0 - Duraberm	
Sieve	**Percent Passing**
1"	100
3/8"	50-85
#4	35-65
#8	20-40
#16	12-30
#50	5-20
#200	4-15

Next, the Duraberm is treated with Calcium Chloride (42%) at a rate of 0.5 gal per square yard. The hygroscopic and deliquescent properties of Calcium Chloride allow the base to absorb moisture from the air and resist evaporation. This results in long-term ideal moisture content which provides a denser, stronger base due to higher surface tension and retention of fine aggregates. Additionally, the moisture from the Calcium Chloride activates the lime in the Duraberm resulting in lime hardening ($CaO + H_2O > Ca(OH)_2$.) See below the typical Triaxial Strength Data. Noble County uses 2.5" of slag per 8" of reclamation, which is ~30% blend. High percentage slag blends may have expansion issues and are not as cost effective as the 30% blend.

Triaxial Data	Unconfined Compression	
	No Aging	28 Day
Existing Roadway	23.0 psi	46.5 psi
W/ 30% Blend	26.4 psi	80.9 psi
W/ 40% Blend	39.5 psi	85.3 psi
W/ 50% Blend	57.5 psi	90.3 psi
W/ 60% Blend	61.8 psi	96.0 psi

Next, the material is recycled into the road base at a Depth of ~8" using a Bomag MPH125 Recycler, see below. Core samples or historical data should be reviewed before recycling to ensure that the subbase is not punctured during the process. Following the recycler, a Bomag BW213PD Sheepsfoot Roller is used for initial compaction.

Next, a grader sets rough grade on the road, followed by a pneumatic rubber tire roller. This is followed by another grader that sets final grade and a steel drum roller. Once final grade is set, the surface is treated with Calcium Chloride (42%) at a rate of 0.25 gal per square yard. This is to aid in the curing process and also acts as dust control by retaining fine aggregate. The road is left to cure for 28 days, while open to traffic. Following this period, any required maintenance is addressed and a surface treatment is applied. Noble County uses either a triple chip and seal with fog seal or 1.5" HMA surface course.

Take Away's

We have chosen to use a partial depth method vs. a full depth method because it provides the required strength needed for county roads without the risk of punching through the sub-base and is significantly more cost effective than full depth reclamation.

We have chosen to go with Calcium Chloride and Steel Slag modification because they work extremely well in tandem, are easily applied and provide significant cost savings when compared to cement or asphalt injection.

The reason this method works so well is the combination of creating a road base with ideal gradation from the added aggregate, recycler and triple compaction, ideal moisture content from Calcium Chloride and chemical lime hardening from the steel slag. There is also the added benefit of a lower road base frost temperature, dust control and evaporation resistance.

We complete all construction using in-house labor and equipment. We rent the specialty recycler machine and the sheepsfoot roller. The base reconstruction process was completed at a material and rental (no labor) cost of
$29,442 per mile for a 22' wide road. With a triple chip and seal with fog seal the total cost is $67,323 per mile. With a 1.5" HMA over lay, the total cost is 90,774 per mile. These cost are significantly less than full depth reclamation (using cement or asphalt) ~$200,000 -$300,000 per mile plus surface or traditional reconstruction
~$300,000 - $500,000 or more.

By: John Yzenas