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Pneumatic Bricking

Joe Schuller, Brokk Bricking Solutions, USA, looks at solutions to kiln maintenance problems, by describing a case study in a Canadian plant.

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The new 4,500 tpd kiln line

of Lafarge Cement Polska S.A.

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Polysius
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...th necessary and inevitable. The plans, how to reduce the number scheduled outages, and the time. This question became a serious one at St. Lawrence Cement in Lawrence Cement runs four 37' kilns. All four are identical in 12 ft (3.6 m) dia. The kilns are . (153 and 229 mm) bricks and ns.

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The Complete Brokk Bricking Solutions System consists of a lightweight aluminum kiln access ramp, the Brokk tear out machine, Muck-it-Bucket, Radialign Laser Refractory Alignment Device, Port-A-Track, and an installation machine such as the Multi-O-Ring Pneumatic Bricking Machine with a Trailer.

The solution

In November 2002, St. Lawrence Cement first employed part of the Brokk Bricking Solutions System during a scheduled shutdown. The old brick and



Figure 1. Old method of installation.



Figure 2. Typical kiln tear-out using a Brokk.

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State of the Art Refractory Installation at St. Lawrence Cement - Quebec Canada

Kiln maintenance is both necessary and inevitable. The age old question remains: "How can we reduce the number of scheduled and unscheduled outages, and minimize the time that the kiln is off-line?"

This question became a serious topic of discussion recently at St. Lawrence Cement in Quebec, Canada. St. Lawrence Cement runs four 37 year old kilns manufactured by Fuller Traylor in their plant in Joliette Quebec. All four are identical in size, 400 feet (122 M) long and 12 feet (3.6 M) in diameter. The kilns are lined with 6 & 9 inch (153 & 229 mm) brick and work as dry process kilns.

THE PROBLEM: The small diameter of their kilns made driving a forklift under a bricking machine scaffold impossible. St. Lawrence sister companies in Mississauga Toronto, and Catskill New York had made the move to Bricking Solutions Installation Machines a few years ago, but the problem of getting brick up-kiln past the scaffold had to be resolved. In late 1999 & early 2000, Jean-Guy Jacques, the Plant Engineering Coordinator, saw the Bricking Solutions Port-A-Track System at a Plant in Michigan. The method St. Lawrence Cement was using at that time employed a scaffold with an arch, developed 35 years ago and constructed by the plant to facilitate the refractory installation process (fig 1.). Once the bottom part of a ring of brick was installed, the arch was used to install the over-head bricks. Starting on each side of the arch and meeting in the middle, many 2 inch (5 cm) pneumatic cylinders on each side raised the ring of brick being installed by means of air pressure. Each ring of brick had to be installed individually, first the bottom then the top, which did not allow the bedding crew to work ahead. While this method, with its employment of air pressure, was less fatiguing on the masons than pogo sticks, it still left the masons feeling completely exhausted after their shift. Mainly, they were worn out from brick handling. Typical production rates ran at 5 feet (1.5 M) of brick installed per 8 hour shift.



ST. LAWRENCE CEMENT BRICKING SCAFFOLD (FIG 1)

Jean-Guy and St. Lawrence Cement decided to try a system of refractory installation developed by Brokk Bricking Solutions, of Monroe, Washington, USA, a subsidiary of BROKK, AB of Skelleftea, Sweden.

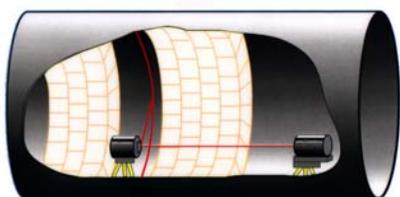
Founded by Maury Drenkel, and recently also known as Pneumat-O-Ring International, Brokk Bricking Solutions has been supplying refractory installation solutions worldwide to process industries since 1966.

The Complete Brokk Bricking Solutions System consists of a lightweight Aluminum Kiln Access Ramp, the Brokk tear out machine, BBS Muck-it-Bucket, BBS Radialign Laser Refractory Alignment Device, BBS Port-A-Track, and an installation machine like the BBS Mult-O-Ring Pneumatic Bricking Machine with a Trailer.

THE SOLUTION: In November of 2002, St. Lawrence Cement first employed much of the Brokk Bricking Solutions System during a scheduled shut down. The old brick and coating were demolished with a Brokk Demolition Machine (fig 2). Removing the debris was done with curved radius buckets mounted on skid-steers. This method of tear-out and debris removal, under the direction of Yard Superintendent Alain Tremblay, shaved 24 hours off of previous kiln outages. The kiln shell was marked using the Radialign Laser Alignment device (fig 3). Mr. Jacques reported that, while he would like to see improvements to make the marking line easier to apply and easier to see on the kiln shell, he would recommend The Radialign for precision brick alignment, and thought it was a great investment in prolonging refractory life.



TYPICAL KILN TEAR-OUT USING A BROKK (FIG 2)



USING A RADIALIGN TO MARK A KILN SHELL (FIG 3)



The diameter of the kilns did not allow for passage of a fork truck under the bricking machine to feed brick to the bedding crew working up-kiln from the installation machine. The solution was to employ a BBS Port-A-Track. Jean-Guy reported the investment in the Port-A-Track Pallet mover to be “perfect”, as it kept the flow of brick constant to the bedding crew and gave them the opportunity to keep ahead of the over-head crew working on the Bricking Machine scaffold.

The Port-A-Track (fig 4 & 5) consists of sections of modular, light weight aluminum track, which moves up kiln along with the progression of both crews. The Port-A-Track uses a two cart system to run full pallets of brick under the scaffold. The masons were required to shift the outside top-most rows of brick on the pallet to the center of the top in order to fit a full pallet of brick under the scaffold legs (fig 6). This did not take much time and it allowed full pallets to move efficiently under the bricking scaffold. Using the two cart system facilitated the use of two shapes of brick. 1 or 2 men can push the carts with full pallets along the track, however St. Lawrence Cement opted for an electric winch to move the carts (fig 7).

With good planning and support from Yard Superintendent Alain Tremblay, and an uninterrupted flow of both shapes of brick under the bricking machine scaffold supplying the bedding crew, and a similar 2 cart system (fig 9 & 11) supplying both shapes of brick to the overhead crew, a friendly competition developed between the crews as they tried to out-brick each other. Mr. Jacques also commented on the masons pride in completing the bricking tasks before the mechanical maintenance was completed, which was a first for the plant.



ST. LAWRENCE CEMENT PORT-A-TRACK (FIG 4)



ST. LAWRENCE CEMENT PORT-A-TRACK (FIG 5)



ST. LAWRENCE CEMENT PORT-A-TRACK WITH BRICK PALLET CART (FIG 6)

Mr. Jacques reported that by using the Brokk Bricking Solutions System, including the Port-A-Track and The Mult-O-Ring Bricking Machine, production rose to 20 feet (6.1 M) complete in a 12-hour shift, along with the 30 feet (9.15 M) of bedding required to stay ahead of the scaffold, and this from a crew using the system for the first time!



ST. LAWRENCE CEMENT ELECTRIC WINCH PORT-A-TRACK (FIG 7)

Any method, from old-fashion jack & timber to muscle-building pogo sticks will benefit from proper kiln access, laser assisted aligning techniques and materials movement equipment that keeps the brick flowing to the masons. However, with 1,200 feet (366 M) of total brick in 4 kilns to worry about, Mr. Jacques and St. Lawrence Cement were also concerned about the quality of the installation.

While speed is an important factor in refractory installation, more importantly, the pneumatic bricking machine facilitates consistent installation which results in a longer refractory life.

Consistent, quality installation was accomplished by using The Bricking Solutions Mult-O-Ring, a pneumatically driven brick installation machine and scaffold. Because they use 2 shapes of brick in their installation process, St. Lawrence Cement also used an MOR Machine Trailer, which is an optional component to the brick installation machine and increases the working surface, as well as raising the load capability to 9,000 lbs. (4,086 kg) (fig 8).



ST. LAWRENCE CEMENT MULT-O-RING WITH TRAILER & BRICK PALLET CART (FIG 8)

The Mult-O-Ring Bricking Machine, a dual arch machine, is designed for speed. The second arch allows the wing masons to begin bricking the next course of brick while the key mason is finishing the last course (fig 9). The limiting factor is usually how fast support personnel can stage the brick.

A 10-ton, finger-tip controlled spreader jack, standard equipment on the MOR, was used to facilitate keying the rings with consistent pressure (fig 10).



ST. LAWRENCE CEMENT WING & KEY MASONS USING DUAL ARCH MOR (FIG 9)

The biggest return on investment from the MOR is the increase in brick life due to both laser alignment and quality, consistent installation by the Pneumatic Bricking Machine. Using the MOR allows the masons to keep the installation consistent from the first brick to the last ring of the final shift. Mr. Jacques reported that the masons at St. Lawrence Cement were joking and in good spirits during the installation process (fig 11).



PART OF THE CREW AT ST. LAWRENCE CEMENT (FIG 11)



TYPICAL SETTING OF THE FINGER-TIP CONTROLLED JACK PRIOR TO MOVING THE ARCH AND KEYING THE COURSE (FIG 10)

CONCLUSION: The solution for St. Lawrence Cement was quality tools and equipment, in the hands of trained, skilled craftsmen. Mr. Jacques also indicated that he was very pleased that they received factory training as a part of the new equipment purchase from Brokk Bricking Solutions, saying that their representative, Mr. Don Coates, was very familiar with both the equipment and its use in the installation process.