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Increasing safety during kiln maintenance, Bricking Solutions

Bricking Solutions a division of Brokk AB Sweden, has developed a "Portable Protection Tunnel" (PPT) along with independent inspection cages to allow for the safe passage under coating to areas needing inspection and or repair. The Protection Tunnels and Safety cages cover a wide range of kiln sizes and individual plant circumstances. These tunnels and cages have not only passed manufacturers strict R&D tests and industry standards; they have worked in practical applications.

Bricking Solutions (Pneumat O Ring International) has been making 'safety cages' since the early 1970s. Recently they decided to redesign and upgrade the cages to improve the strength while at the same time reduce the weight. Though the old style cages had been known to be used to form a tunnel by placing them end to end Bricking Solutions had never intended for the cages to be used in this way.

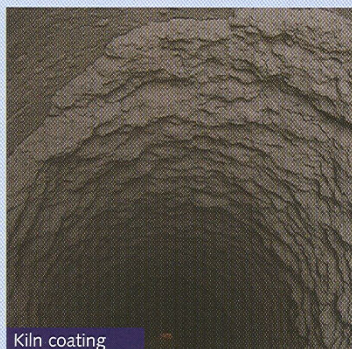


Old style cage

Essroc case study

When Bruce Springer, safety manager for Essroc, approached Bricking Solutions for safety specifications on their safety cages he further indicated an interest in a safety tunnel. This tunnel would allow the safe passage of men and material under coating to effect repair or inspection in the upper transition zones of its kilns. Essroc's Picton plant agreed to a joint effort to design and build a safety tunnel that could be erected in a manner that would provide protection for personnel erecting the tunnel in the kiln. Tom Van Cott from the plant was put in charge of the project.

The PPT (Portable Protection Tunnel)

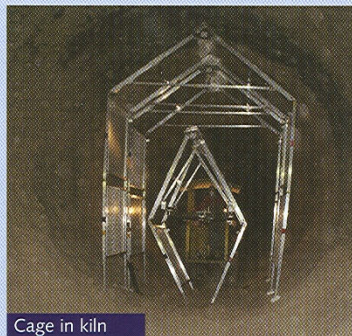


Kiln coating

was designed and tested in Bricking Solutions Monroe facility. Tom visited the plant and made suggestions for changes on the proto type (test unit). The unit was built and sent to Picton. The PPT was designed to be adjustable to fit both of Picton's Kilns (4.15m and 5.5m shell diameter). It consisted of a 10' set up cage and 6 of 5' tunnel cages for a total length of 40' (12m). Another criterion was that the tunnel had to be disassembled to individual parts that could fit through an access door of 406mm by 559mm (16" by 22"). In addition one section of the cage could be separated from the rest of the tunnel and used as an independent 'Safety/ Inspection Cage' if necessary. The machine has been successfully used since being shipped in October of 2003.

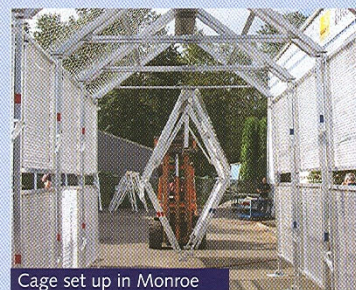
Holcim Obourg Belgium

Bricking Solutions next PPT challenge was to build a Safety tunnel for a 6.25-meter shell diameter Holcim Kiln in Obourg Belgium. The tunnel had to be tall enough to set up close to the coating to reduce the momentum force generated by distance from the coating to the cage. In addition the tunnel had



Cage in kiln

to be wide enough and tall enough for mobile equipment like the Brokk tear out machine pass through. This presented a problem in that tunnel for this size of kiln would be too difficult to handle manually. This resulted in another joint effort between Bricking Solutions and a plant. Holcim Obourg would supply a protected fork truck with safety hut carried on the end of its forks. Bricking Solutions would design a cage that would collapse to fit through some restricted access points and that would be able to be expanded from the protection of the hut by a manually operated fixture that would attach to the hut and would allow for the maximum protection from falling debris during installation.



Cage set up in Monroe

The cage and loading fixture were designed and tested in Bricking Solutions Monroe Facility and shipped to Holcim for use during an outage slated for the end of October.

Summary

Though some minor modifications and suggestions for future cages were made, the installations described above are deemed a success and Holcim and Essroc now have a tool that should not only provide safety for their workers, but a way to reduce refractory usage and outage time, thus adding profits.

In addition Bricking Solutions has designed a line of independent inspection cages that can be manually carried into kilns from 3m to 5.5m by two men for inspection and or minor repair purposes or alternatively used as operator safety cages for the operators of Brokk AB remotely controlled tear out robots.

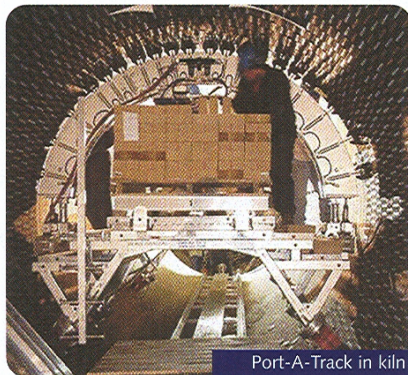
Maintenance down the line

by Bricking Solutions

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, 122m long and 3.6m in diameter. The kilns are lined with 153 and 229mm 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 and 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. 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 5cm pneumatic cylinders on each side raised the ring of brick being installed



Port-A-Track in kiln

Kiln maintenance is both necessary and inevitable. However, the age old question remains: how can we reduce the number of scheduled and unscheduled outages, and minimise the time that the kiln is off-line? This question became a serious topic of discussion recently at St Lawrence Cement in Quebec Canada and Bricking Solutions, a division of Brokk® were called in to solve the problem with a state-of-the art installation.



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 1.5m of brick installed per eight hour shift.

The solution

In November of 2002, St Lawrence Cement first employed much of the Brokk Bricking Solutions System during a scheduled shut down. 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. Mr Jacques reported that, he would recommend The Radialign for precision brick alignment, and thought it was a great investment in prolonging refractory life.

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 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. 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



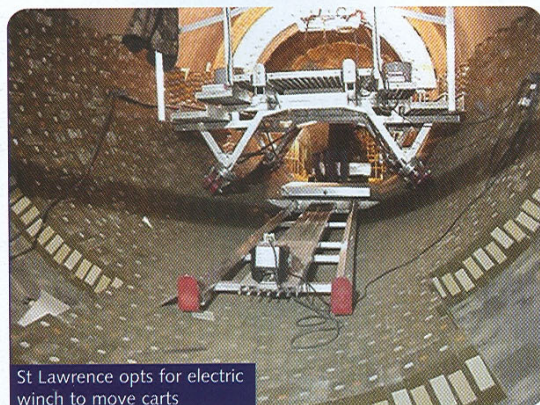
brick. One or two men can push the carts with full pallets along the track, however St Lawrence Cement opted for an electric winch to move the carts.

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 two cart system 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.

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 6.1m complete in a 12-hour shift, along with the 9.15m of bedding required to stay ahead of the scaffold, and this from a crew using the system for the first time.

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



St Lawrence opts for electric winch to move carts

Flex Mult-O-Ring with trailer

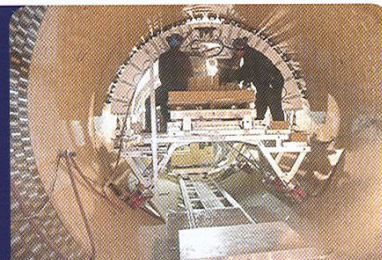
The F-MOR is a dual arch bricking machine and is the fastest machine available (averaging approximately four to six rows per hour). The second arch allows masons to begin bricking the next row of bricks while the key masons is keying out the prior row of bricks.

The heavy duty scaffolding is stair stepped to allow for easy movement and placement of refractory by the masons. The Flex MOR can be built to any kiln size and has a flex range of up to 20" (500mm) diameter. There are many who have calculated the benefits our machines have in their businesses.

Cemento Melon installed brick at daily rates three times faster than the traditional installation methods — with a record 17.4m in 24 hrs. Most important was the improved quality of installation, kiln service factor improved from 89 to 96.9 per cent and refractory consumption dropped from over 770g/t of clinker to 330g/t. At Juan Minetti with minimal training on newly purchased bricking machine the plant masons managed to install 12m in 24hrs compared to 8m using their old bricking machine.

CMPC— Santa Fe-Chile, reduced their outage time by 96hrs. The team of masons easily keyed 16 to 20m running in 24hrs.

Using the trailer increases safety and increased productivity within the kiln. The trailer facilitates the handling of two pallets of brick with increased frame capacity, work space and efficient refractory handling on two pallet carts.



FMOR w/Trailer and Port-A-Track

driven brick installation machine and scaffold. Because they use two 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 4086kg.

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. The limiting factor is usually how fast support personnel can stage the brick.

A 10t, finger-tip controlled spreader jack, standard equipment on the MOR, was used to

facilitate keying the rings with consistent pressure.

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.

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, Don Coates, was very familiar with both the equipment and its use in the installation process.