Bricking Solutions

A DIVISION OF BROKK®

2006 PUBLISHED ARTICLES

Refractory Installation: The Forgotten Costs of Plant Outages

By R. Daniel Chavis, International Sales Manager
Bricking Solutions

International Cement review December 2006

Cement plants worldwide will spend millions of dollars and resources to fit or upgrade their plant with the latest technology including the best refractory materials available. Yet these same plants tend to overlook the potential savings of technologically advanced refractory installation methods.

Many of today's cement plants choose to stay with antiquated refractory installation methods, such as jack and timber, iron and bolt, and pogo sticks, to name a few. Since the invention of the rotary cement kiln in 1885 by Frederick Ranson, there are still approximately forty-five to fifty percent of the kilns throughout the world using installation methods of his day.

> "…the introduction of products with improved thermal shock and pinch spalling resistance compared to traditional direct bonded magnesia-chrome and improved dolomite brick has lead to a steady increase in kiln burning zone refractory campaign lives.
>
> "The influence of operating conditions, lining design (which includes material selection **and installation techniques**) however, will still continue to be predominant factors in refractory performance in all industries, now and in the future. **Technology that addresses these factors has the potential to bring about significant reductions in refractory maintenance cost and an increase in operational security**" *Glyn Cox, AG Refractory Services, Australia*

Don Coates, Production Manager, explains the use of the Radialign

Why then, the hesitation to move into the twenty-first century with the most modern installation methods and bricking machines available? Many plants seem quite comfortable introducing the most modern kiln scanning equipment, computers to monitor and follow up refractory performance, **but still don't see the connection in refractory problems and failures and brick installation methods**.

The average loss of revenue is $12,500 per hour during an outage. Is it possible that some factors that affect this are over looked? With state-of-the-art bricking machines, cement plants have documented savings of 96 hours of downtime during an outage. That's $1.2 million of lost revenue saved to the bottom line. Not only is plant downtime reduced with the use of modern bricking machines, but refractory life is also extended, increasing kiln run time.

Even with the best refractory products, poor installation will lead to more frequent and

unplanned outages. With forty-five percent of all kiln downtimes due to refractory related problems, shouldn't cement plants look at the installation part of refractory maintenance? Plants go to the experts for new refractory materials, so why not go to the leading experts in pneumatic bricking machine technology?

Flat Deck Easy Flex in production and in use at Monsanto

State-of-the-art bricking machines should be user friendly and engineered precisely to kiln specifications. In addition to bricking machines, complete solutions for all aspects of refractory installation, such as kiln access, proper retaining ring and brick alignment, tear out, clean out, material handling, etc. should be considered as part of quality installation.

An example of the latest technology in bricking machine is Bricking Solutions' FDEF (Flat Deck Easy Flex) adjustable bricking machine. The FDEF has the largest work platform in the industry, with more then enough room for two pallets of brick, masons, and their tools. The frame will support 10,000 lbs. net. The adjustable version FDEF will work for a plant with more then one size kiln or for kilns with conical sections. Though other bricking machines are adjustable, most adjustments have to be done outside the kiln with the arch having to be taken apart then reassembled. With Bricking Solutions' FDEF adjustments are done in less then ten minutes inside the kiln. The sister machine, the FDMOR, is designed for a fixed size kiln yet still has the ability to make minor adjustments for kiln distortions.

The FDEF adjustability was showcased at Monsanto in Soda Springs, Idaho. This plant had a bell shaped kiln that required a bricking machine to adjust from 16 ft (4.88 m) through a taper to 18 ft (5.49 m) and then back down through a taper to 15.6ft (4.75 m). Previously using an adjustable bricking machine, each of the four adjustments through a taper took 45 minutes. The FDEF adjustments took less than 10 minutes each, directly saving an estimated total of 3 days outage. To further reduce outage time, the plant had a kiln access ramp, conveyor, bedding cart, and utilized the Radialign laser to mark the kiln.

FDEF adjusts easily in less than 10 minutes inside the kiln

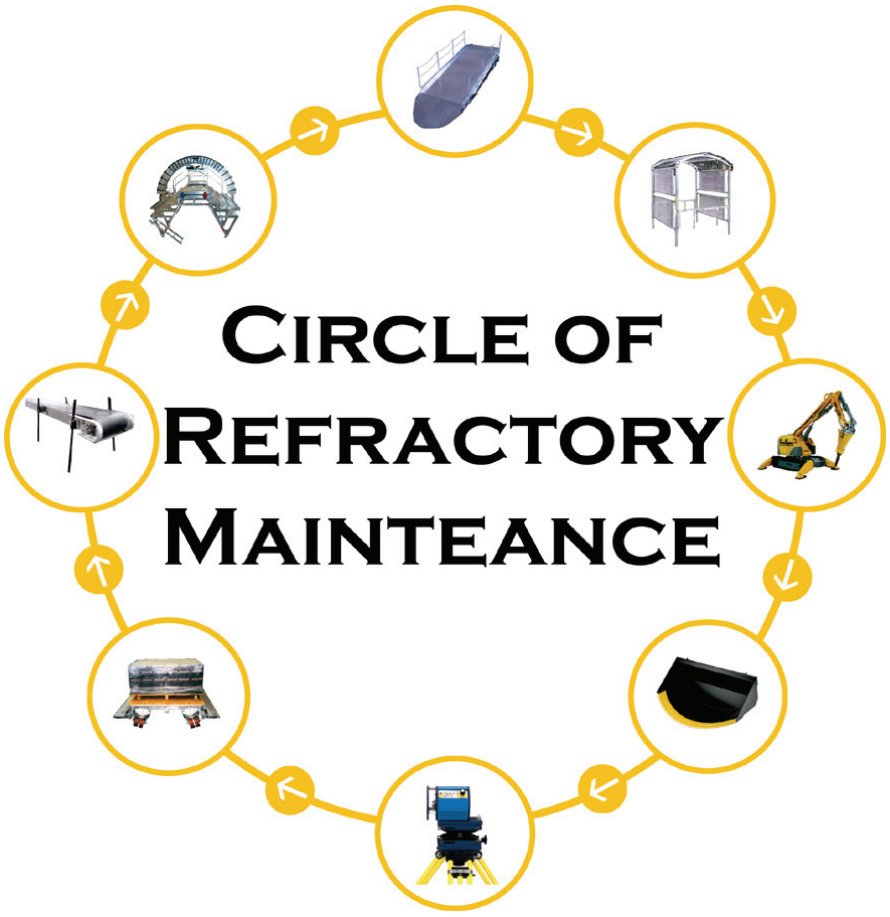
Monsanto is just one of many examples where The Circle of Refractory Maintenance is being applied to reduce forgotten costs of plant outages. Anders Karlgren, of refrAK Bricking Systems S.A, who has installed over 10,000 m of brick in over 100 kilns since 1974, provides further insights in to how modern refractory installation systems and equipment can significantly reduce refractory expenses.

"Looking back at nearly 30 years of installing Refractories in rotary kilns is to look back at a very turbulent period, with technological development as never seen before. Thirty years ago, people filled bags with cement, today production managers fill airports on their way to company seminars on automated bagging technology or meet their colleague in airport lounges to discuss a seminar on energy saving technology or milling technology.

"However, company seminars on refractory installation technology are unheard of. Refractories together with energy represent the main cost of clinker production, and although the cement industry is good at following up the performance of different refractory qualities, it pays very little attention to how the refractories are installed. Refractory materials have enjoyed an enormous development over the years, as has installation technology , but while no cement plant should consider using yesterday's refractory materials, 90% of them stick to outdated methods of installation" claimed Anders Karlgren.

Mr. Karlgren has documented examples of the hours saved by cement plants that moved their tear out and installation methods into the twenty-first century utilizing Bricking Solutions' Circle of Refractory Maintenance method. With the use of a Brokk, Cement Melon (Lafarge Blue Circle) reduced tear out by 72 hours. The plant's old method of installing refractory was completed at 4m per 24 hours and using a Bricking Solutions bricking machine they averaged 14m per 24 hours, with a high of 17m in 24 hours. Overall, Cement Melon reduced its outages by 75%, increased the kiln usage factor from 94% to 96.9%, and reduced consumption of 770 grams per ton of clinker to 330 GPT of clinker. St Lawrence Cement of Quebec reduced its tear out by 24 hours, increased installation from 1.5m in an 8 hour shift for both tops and bottoms to 6.1m for tops per 8 hour shift and 9.15m for bottoms per 8 hour shift, saving 80 hours of installation time. CMP Santa Fay, a lime sludge plant, reduced their over all outage by 96 hours.

All three plants made these improvements by using the latest technology in refractory tear out and installation available through Bricking Solutions' Circle of Refractory Maintenance. While all improvements to cement plants cost money, reducing forgotten outage costs by utilizing state of the art technology found in The Circle of Refractory Maintenance will reduce the bottom line while paying for itself.



References
Cox, G. (2000). Selecting refractory materials. *World Cement*, *30(3)*, 49.
Karlgren, A. (1999). Reducing refractory costs. *World Cement*, *27(1)*

1144 Village Way, Monroe, Washington 98272
800-621-7856 360-794-1277
www.brickingsolutions.com