



## The Circle of Refractory Maintenance

Joe Schuller, Bricking Solutions, USA, talks about the application of the 'circle of refractory maintenance' concept as part of an upgrade program at Holcim Cement in Holly Hill, South Carolina, USA.



Figure 1. The new kiln at Holcim in Holly Hill, South Carolina.



Figure 2. One of the older machines in storage.

### Introduction

Holcim Cement recently had to evaluate available bricking methods to install the refractory in its brand new 17 ft 9 in. (5.2 m) kiln, which replaced two wet kilns in the newly remodeled 6000 tpd clinker line at Holly Hill, South Carolina. Holcim turned to the company that provided the pneumatic bricking machines for the old kilns back in 1978, Bricking Solutions (a division of Brokk).

It was decided that Bricking Solutions' 'circle of refractory maintenance' philosophy met the cement manufacturer's priorities, which included safety, reduced installation time and of course, cost.

### Adjustable bricking machine

The new kiln needed an adjustable machine to handle the main tube of 17 ft 9 in. (5.2 m), and the conical taper down to 16 ft 4 in. (4.98 m).

With such a minor adjustment to be made, Bricking

Solutions recommended a newer technology: the Mult-O-Ring™ double arch pneumatic bricking machine.

Simpler to operate and adjust than the adjustable Expand-O-Ring™, the newer machine custom built to handle just the 8.75 in. (22.23 cm) diameter required, making the transitions between much smoother.

### Technological developments

A number of other technological improvements also been made in the pneumatic bricking machine since 1978. Non-skid, all aluminum planking, halogen lighting and new safety rails made the machine safer than before, and a new finger-tip controlled 'Long Stroke' for keying, longer stroke air cylinders, and quick release hose connections make the new machines easier to operate and maintain. Ergonomic improvements include improved jacking system for the arch, as well as a rigid arch.

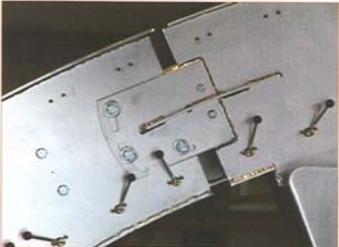


Figure 3. Adjusting the Flex Multi-O-Ring™.



Figure 4. The new MOR & RAMP.

## WORLD CEMENT

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# Upgrading at Holcim Cement in Holly Hill, South Carolina & *The Circle of Refractory Maintenance*

When Johnny Smalls, the Coordinator of the Pyro Area, at Holcim Cement considered bricking methods to install the refractory in their brand new 17'  $\frac{3}{4}$ " (5.2 M) kiln, which replaced two wet kilns in the newly remodeled 6,000 tpd clinker line in Holly Hill South Carolina, he turned to the company that provided the pneumatic bricking machines for the old kilns back in 1978, Bricking Solutions a division of Brokk.

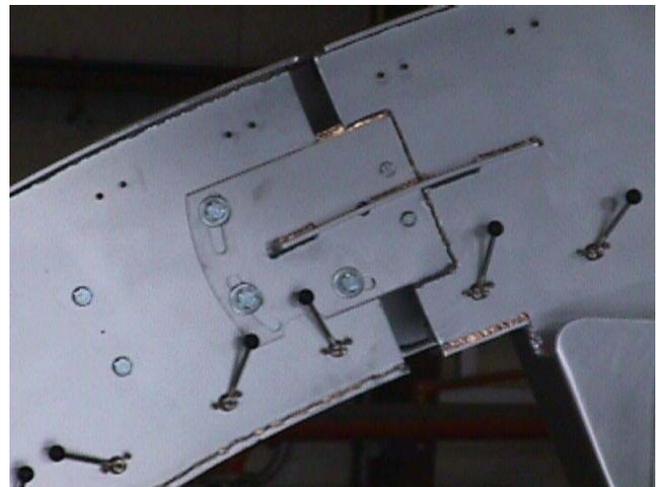


The new kiln at Holcim in Holly Hill, South Carolina

The new kiln needed a machine that would be adjustable to handle the main tube of 17'  $\frac{3}{4}$ " (5.2 M), and the conical taper down to 16' 4" (4.98 M).

With such a minor adjustment to make, Bricking Solutions recommended a newer technology in their fleet: The Flex Mult-O-Ring™ Double Arch Pneumatic Bricking Machine. Simpler to operate and adjust than their fully adjustable Expand-O-Ring™, the Flex MOR™ was custom built to handle just the 8 $\frac{3}{4}$ " (22.23 cm) adjustment required, making the transitions between sizes much smoother.

Bricking Solutions Circle of Refractory Maintenance philosophy met Johnny's priorities which included safety, reduced installation time and of course, cost.



Adjusting the Flex Mult-O-Ring™



One of the older machines in storage



The new MOR & RAMP at Holly Hill

Johnny also liked other technological improvements in the pneumatic bricking machines since 1978. Non-skid, all aluminum planking, Halogen lighting and new safety rails made the machine safer than before. A new finger-tip controlled Long Jack for keying, longer stroke air cylinders and quick release hose connections make the new machines even easier to use and maintain.

Ergonomic improvements include a better jacking system for the arch as well as a more rigid arch. The familiar stair-step design that ergonomically matches the kiln remained. The new machine also



Setting the Long Jack



Double Arch Mult-O-Ring™ with Trailer

Bobby Compton of Industry Services Company, Inc., the refractory installation contractor out of Mobile, Alabama that Holcim selected to do the installation work, reported that he was duly impressed with the way that the trailer enhanced the effectiveness of the machine. Bobby said that he had used many pneumatic bricking machines, but this was the first time he had seen the trailer option. He reported that the machine fit well and was easy to use through the size transitions it was designed to accommodate. The trailer, combined with the 2-cart pallet system, made staging two shapes of brick simple. The 15,000 lb (6,810 kg) load limit made staging two full pallets safe.

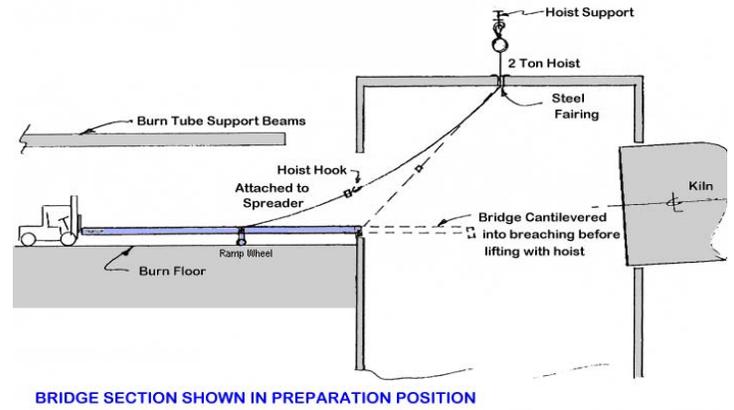
Even with the Trailer attached and in place, the crew could still easily pass underneath with a forklift to feed the bedding crew, another feature that Johnny wanted.

has a standard net live load capacity of 10,000 lbs (4,540 kg) compared to the old machines and current competitors at just 6,000 lbs (2,724 kg), a nice improvement, especially when coupled with a 10% reduction in overall weight. This higher weight capacity allows the masons to safely stage 2 full pallets of brick on the deck of the machine. Johnny also purchased an optional Machine Trailer which, when attached to the Flex MOR™, extends the working deck by 48 inches (122 cm) and increases the weight capacity to 15,000 lbs. (6,810 kg).



Part of the Refractory Installation Crew

Getting the forklift under the bricking machine was facilitated by the ability to get it and the rest of the tools and equipment into the kiln at all. The obstacle was an extra-large, 30' 10" (9.4 M) cooler span that needed to be bridged. The engineers at Bricking Solutions solved this problem with a custom built, Aluminum Kiln Access Ramp consisting of 3 pieces: Lead Up, Bridge and a Nose Piece with a curved radius that matched the curve of the kiln, totaling 43' 6" (13.26 M) in length. The longest piece, the 30' 10" (9.4 M) bridge, having to be slung into place using an overhead hoist air winch for support and a fork lift for guidance.



BRIDGE SECTION SHOWN IN PREPARATION POSITION

Installing an extra long Kiln Access Ramp

Bobby Compton of Industry Services Company said that the Aluminum Kiln Access Ramp was easy to install, despite its length, using the Overhead Sling method. He also said that while one would expect a long aluminum bridge to have more flex than steel, what flex there was while the ramp

was in use was minimal, and certainly not of concern.



Spanning the Cooler at Holcim in Holly Hill

In the past three years Bricking Solutions has fulfilled the kiln access portion of the circle of refractory maintenance for over 50 plants world wide. The ramps are manufactured out of 6061 NT-6 Aluminum for weight efficiency without sacrificing strength. The 3-piece assembly and light weight construction make for easy handling and storage. The Kiln Access Ramps are each unique in design to satisfy each customers unique access requirements. Some, like Holcim in Holly Hill need to span an extra long cooler. Some, like the one shown below require extra strength for heavy loads and extra safety.



An Access Ramp Designed for Heavy Loads and Extra Safety

Access is the first step in the Circle of Refractory Maintenance, and Bricking is the last. The Flex Mult-O-Ring and the Custom Aluminum Kiln Access Ramp are just two of the components of the complete circle, which also includes things like tearing out the old brick and properly aligning the new.

Whether employing the complete Circle or just some of the components, the key to kiln maintenance remains quality tools in the hands of skilled people.