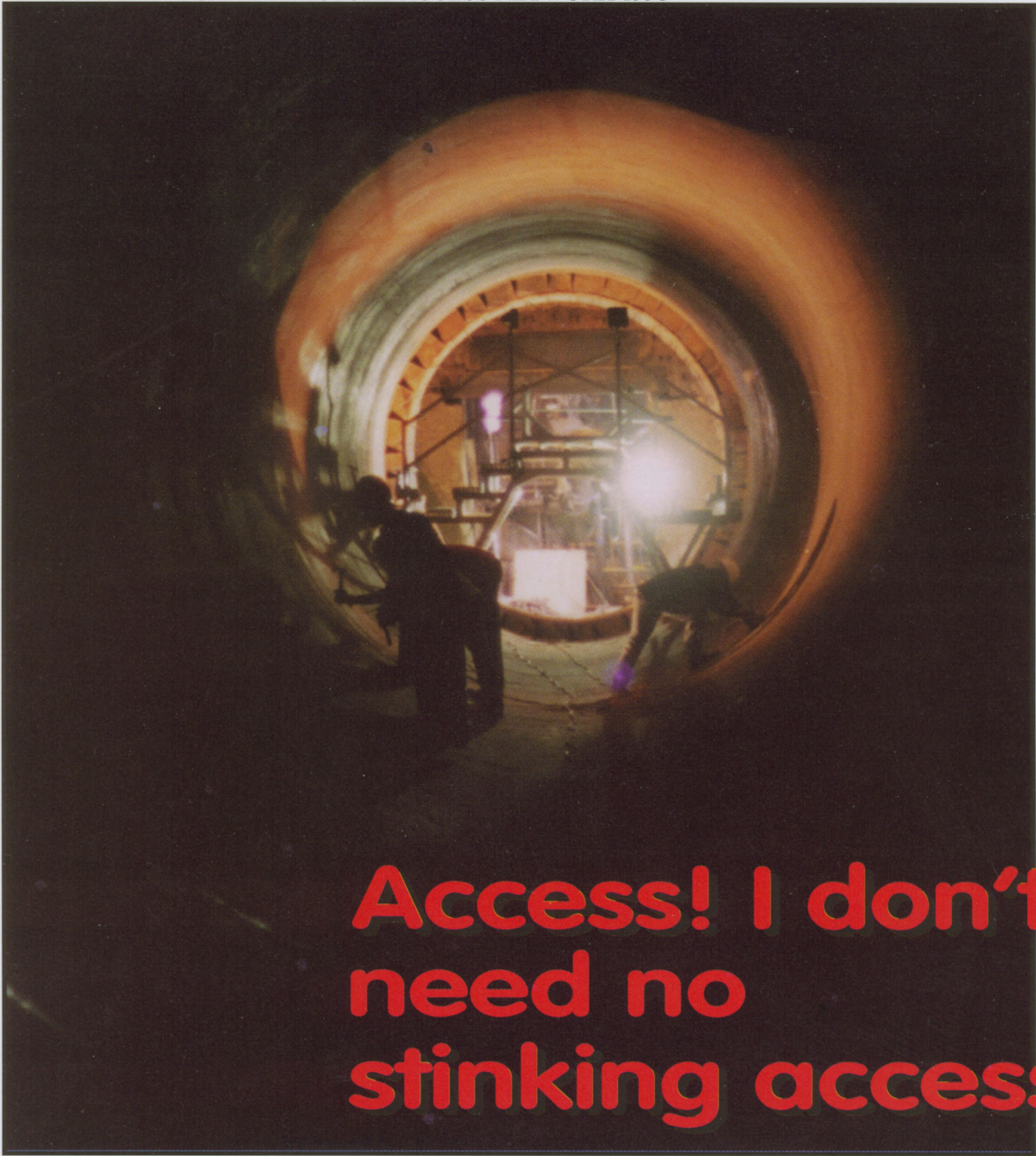


by Mike Martin,  
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## Access! I don't need no stinking access!!

The following article addresses an issue of great concern; plants with limited access into their vessel. I speak primarily of rotary kilns, but I have also seen many other types of vessels that have limited or near impossible access.

### Is That Mason or Magician?

A contractor typically travels with a large jar of Vaseline. Getting into these kilns can require the deftness of Houdini getting into a straight jacket. After one of these tight fits, and completing a job done on schedule, the contractor is sometimes asked to saw a laborer in half. In other words, they have become

magicians. I would like to see David Copperfield lay brick.

Discussions with major international plant suppliers have yielded some interesting answers. When I asked them why in the world would they build a kiln that requires a high level of maintenance and not include a large access door? Their response was that these items are typically lost in the owners budget cuts. I would like to know who is responsible for educating the owners and plant designers; I believe there are some important people being left out of the design loop. If the design engineers

and owners were to look at a maintenance template, and use the data of a vessel with access, and the data without access they would easily see that a vessel with a well thought out access design gives the owner a quick return on investment. In general, the costs saved during construction is minuscule compared to the long lasting effects that the limited access into vessel will cost in lost production, safety and aggravation to all involved. I would use the analogy that watching plant personnel do maintenance on a vessel with limited access is about equal to building a ship in a bottle.



## Three Big Steps

There are three important factors that need to be included in the design of any new plant or modernization of existing plant. These factors will allow the owner to run a safe and successful maintenance plan. 1) A large clear area outside of the vessel's burn floor (**ILL.A**). This area needs to be large in order to move material and equipment in and out of the kiln. This area is used primarily for staging of the material and equipment. 2) Straight access into the vessel to accommodate the largest piece of maintenance equipment (**ILL.B**). This door must be made to open easily and all supporting equipment (burn pipe) must be easy to remove or roll out of the way. 3) A lightweight ramp that can be easily assembled and span over the discharge area (**ILL.C**). The ramp must be made with a special lip that makes the transition from the ramp to the vessel floor smooth and safe when carrying a heavy load. The ramp should be engineered with a factor of 4 safety allowance. This will ensure safe passage of a fork lift, loader or de-bricking equipment.

## The 120 Ton Question

The above three factors are critical to analyze by any plant who is trying to find ways to speed up the maintenance cycle. The most important thing to remember when analyzing is that the average 60' repair on a 14' diameter vessel will require your personnel to remove and replace an estimated 240,000 LB or 120 tons of material. This figure alone is astounding. I have a tremendous amount of respect for any crew who does this type of work and can keep coming back even when the plant keeps asking them to find ways to increase production. After thinking this through, my thoughts go back to the hard workers who constructed the pyramids in Egypt. Of course they were highly motivated - - move this heavy monolith or you will be killed. In today's world I would like to believe things have changed. I would hope to believe that common sense and quality long-term thinking have, and will, take the place of exposing people to the hazards of their job. In other words, if there is equipment and product available to do a job more efficiently

and safer, let's make the appropriate changes to incorporate this in the plant's philosophy.

## Benefit of the Investment

Let us look at the benefits of the three factors presented earlier: 1) burn floor area, 2) kiln access, and 3) kiln ramp. The burn floor area during a shutdown is prime real-estate. Managed correctly, this area could save hours by giving the masons a staging area for their equipment and material. Remember, 120 tons of material are moving through this area, so proper organization can save a tremendous amount of time. The hood door access is critical for speeding up the maintenance process. The access will allow the following to happen: Opening up the kiln doors and rolling back the burn pipe will give the plant the opportunity to use the latest equipment and concepts available. First on the list after installing the kiln ramp is to remove the coating build up and removing the brick in need of replacement. This is done by using a remote controlled tear out machine like the

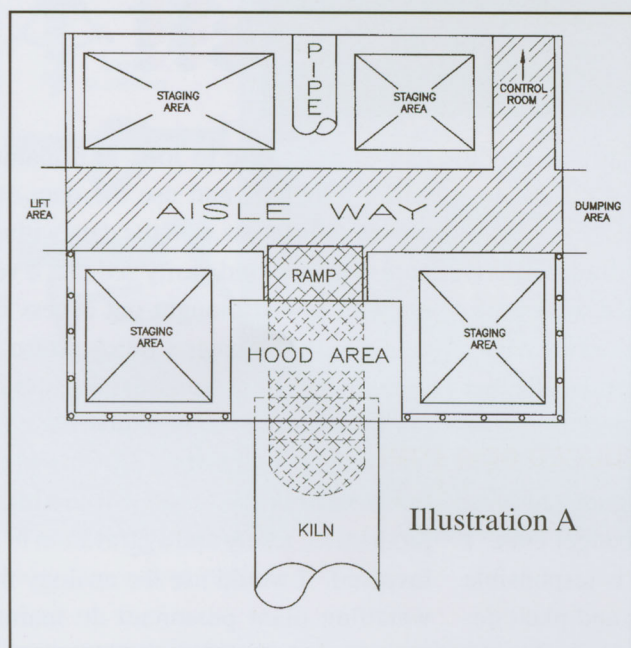


Illustration A

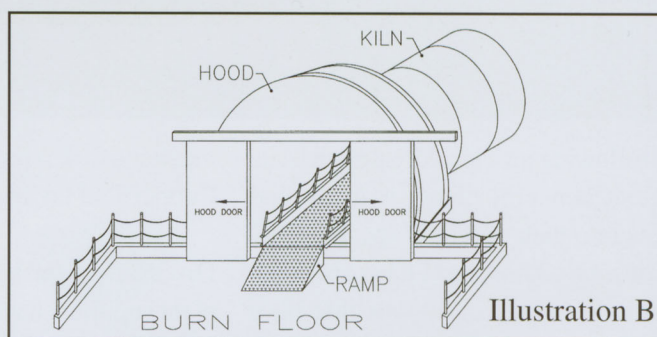


Illustration B

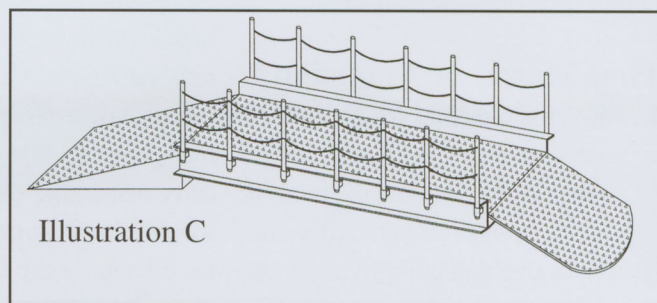


Illustration C





Brokk 250 or Brokk 150. This machine can remove approximately 60' - 80' feet of coating and brick in one shift. Typically, if there is coating build up (no person should ever have to stand under coating), this is first removed with a Brokk machine so the brick can be examined to determine if it needs to be removed. The brick thickness can be measured by using a non-destructive device called the Line-O-Meter. Once the

brick that has been determined to be removed has been marked, the Brokk can return and tear out the brick. To expedite the removal of the brick, a skid steer loader (Bobcat style) with a radius bucket can be used to scoop the debris and removed to the dump site. Now that the vessel has been cleared and cleaned, a laser device, such as the Radialign by Pneumat-O-Ring can be used to ensure that the brick to be installed is perpen-

dicular to the axis of the vessel. By marking the radial laser light as it is moved intermittently up the vessel, the mason can use these markings to accurately measure from. The radial installation of brick will ensure the life span, the quality of installation and impede premature brick failure due to improper alignment. The brick material and equipment can begin to be staged inside the vessel.

The best way to move brick is to use a fork truck. The use of a pneumatic bricking

machine like the Mult-O-Ring, in conjunction with supplying brick with a fork lift, allows the masons to install 60 feet of tops and bottoms while taking no more than three shifts. Understandably, there are many time saving advantages to proper kiln access. These are only a few of the important advantages of proper access. Each plant will list different items as the reason they have invested into kiln access. I believe the best

way to judge the advantages is to talk with a contractor to find out the plants that they work at who have adequate access. Contact these plants to see if they can supply good numbers. The best plants to talk with are the ones who have recently upgraded the access area; they should be able to supply many reasons for why and how quickly the investment was recovered. My guess is the average plant produces 2,000 tons per day at \$60.00 per ton. This equals \$120,000.00 per day of product. If you are to compare the time it currently takes to get your vessel back



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on line, to the above example, it seems safe to say this investment would only take 1-2 shutdowns to recover the cost of the upgrade.

## Is the Cellar Full of Water?

I firmly believe that anyone who decides to make this investment will wonder why they had not done so years before. Look at all of the safety risks inherent at your plant and see if there is a way to reduce your exposure by taking the necessary steps in modernizing this maintenance area.

The best advice I ever read was from a plumber who stated the best time to talk price was when the cellar is full of water. In this case, the best time to invest in change is before a serious injury occurs. With that being said, look at the return of thousands of dollars being saved during maintenance downtime. Before asking your personnel or a contractor to find ways to expedite the relining process, suggest instead to get together with your personnel and/or contractor and discuss what could be done to improve this area of maintenance. This is the first step toward the safe and efficient relining of your vessel for years to come.

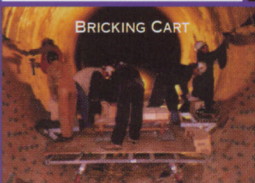
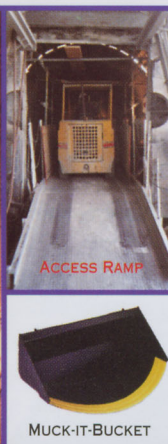
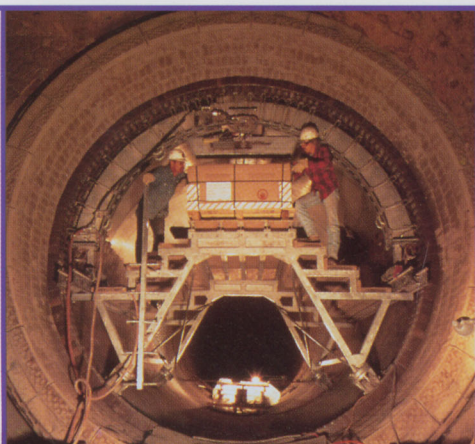
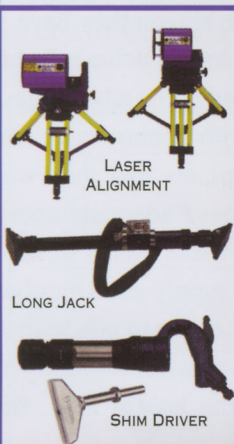
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