



BRICKING SOLUTIONS

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Chinese Built Competitive Bricking Machines

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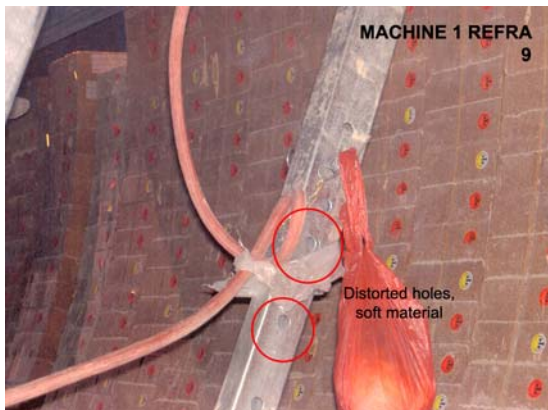
This report will discuss two different Chinese built bricking machines competitive to Bricking Solutions, Refratechnik, and RHI/ Didier bricking machines. I will designate these machines as – Machine 1 Refra and Machine 2 Hybrid. Machine 1 Refra is a direct copy of the Refratechnik's Refra rig and Machine 2 copies Bricking Solutions Frame, low boys (arch trolleys) and fixed arch concept, but copies Refratechnik's cylinder system on the arch.

Unfortunately my lap top computer has failed and I lost the majority of pictures that I received from HXD. I will request that they send me a full set on a CD so that I can have a complete file. I had put a few of the pictures on a thumb drive and will use them for this report.

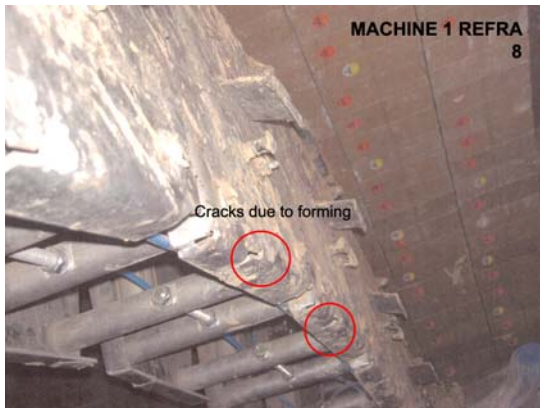
General Comments

Fit and Finish. My first comment would be to fit and finish both machines showed signs of some lack of workmanship, though there were areas that looked good. The thought here is that all of the machine must have top grade workmanship. The machine is only as good as its poorest area of quality. All parts must fit together as a designer intended, not only for aesthetics, but for structural soundness and to allow the masons using the machine to install bricks with precision. The weakest link on the machine can cause either a safety issue, costly loss of time during an outage or unplanned shut downs due to refractory failure caused by poor installation.

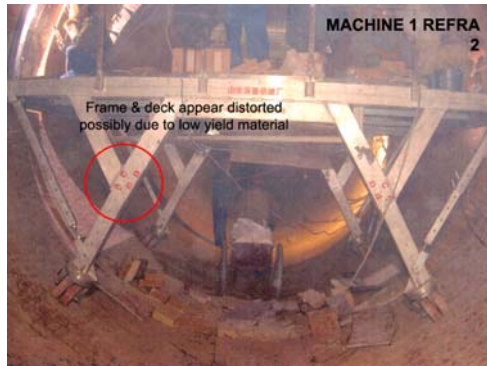
Material.



It appears from the photos that some of the aluminum is not solution heat treated. This would mean that the yield for this aluminum would be about 10,000psi as opposed to 40,000psi. This is evidenced by elongated holes and marks on the aluminum.



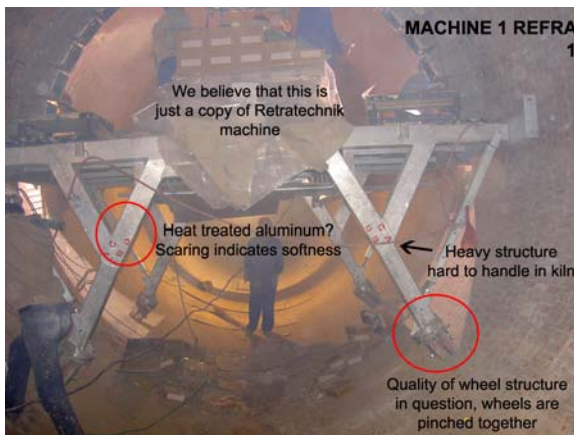
In contrast the panels of the arches for machine #1 are most likely fabricated from heat treated aluminum as stress cracks are seen at the bent parts on the panels. We would normally form these parts in an annealed state and then heat treat them.



We are not positive but think that many of the structural components are not standard mill formed components but individually fabricated structures. In one picture the frame and deck beams appear to be distorted. If so this would confirm the use of low yield strength material.



The grate decking on machine #1 is fabricated and hand welded rather than formed by machine or welded by an automatic welding robot. This is labor intensive and leaves opportunity for inconsistent welds and possible failure.



Quality Control. We do not see any evidence of quality control that would indicate a record of material certifications, quality control inspection and buy off, certification of welders, and parts, operation and maintenance manuals.

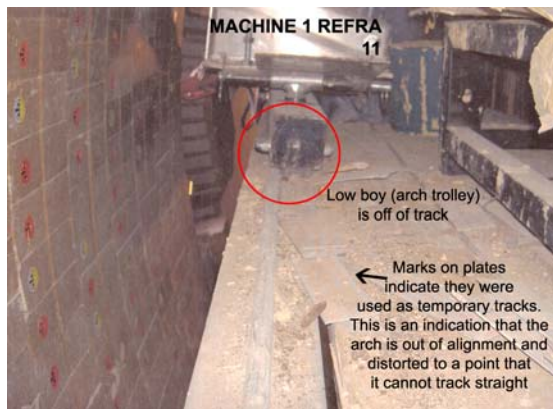
We cannot stress enough the importance of the knowledge of where and how to weld on high strength aluminum. Again, we must point out that welds and heat affected zones have yield stress strength reductions of as much as 75%! Equipment copies that just look the same may produce a finished product that is bent on failure.

Specific Machine Comments

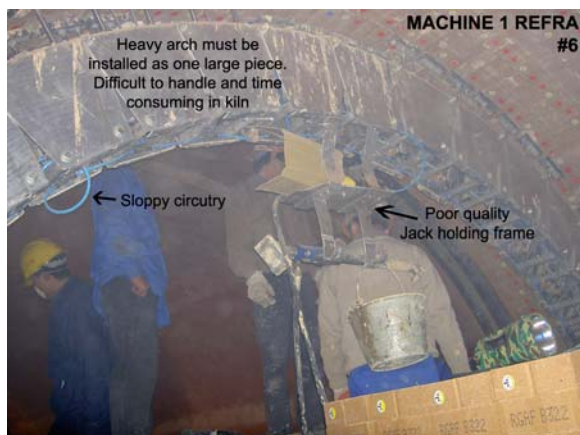
Machine # 1



This appears to be a direct copy of Refratechnik's Refra-rig. I could not say whether or not it is an authorized copy, but seriously doubt it as it does not have the look and quality usually demanded by Refratechnik.



Other than fit and finish, the main indication of a problem with this machine is the picture that shows the low boy (arch trolley) off of the track. This is not only a potentially dangerous situation; it also creates poorly installed brick that eventually will result in an unscheduled costly outage.



Like the Refra-rig this machine would be heavier and take longer to erect in the kiln when compared to our machine. The arch would be the most difficult as it must be handled as a complete double assembly. It would take a special erection beam to raise the arch into position on top of the platform.



In addition maintenance and speedy repairs would be difficult due to the buried cylinder design. The buried design may be nice aesthetically to some, but the main purpose of protecting the cylinders from contamination is not effective as the most critical part to protect (the cylinder rod) is exposed.



This machine also employs only one master valve and no valves on the up kiln arch. This short cut and probably cost cutting effort means the machine is more difficult to operate and slows the installation of refractory during a costly outage.

We have included a comparison flier between this copy of the Refra-rig and our units with this report. The comparison would include some of the items above in addition to load capacity of the machine frame etc.

Machine #2

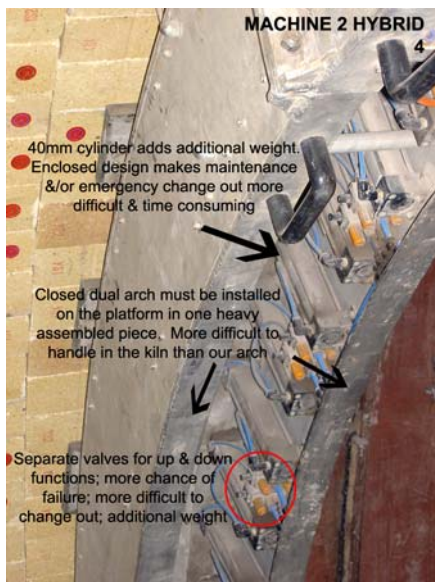


We strongly believe that the frame, low boys (arch trolleys), low boy rails, and keying jack were built by us in the late 1980's or early 1990's and used with the hybrid arch system on the rig. The frame, low boys, rails and jack probably came from another location or cement plant that originally purchased a Bricking Solutions (Pneumat-O-Ring) rig. The original arch probably was scrapped. Bricking Solutions has made many significant design changes to our bricking rig support frames since the 1980's & 1990's.

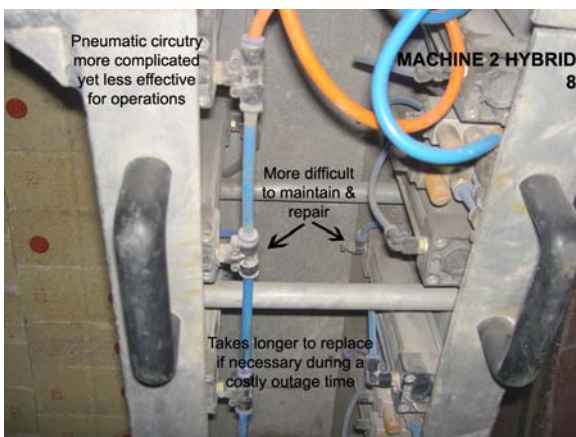
These changes have drastically improved our weight to strength abilities and we don't see any of these changes in the copies.



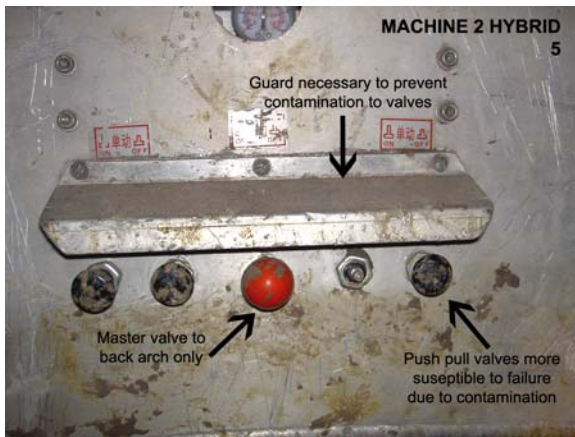
The arch system is a hybrid in that it uses the Refratechnik cylinder system with a fixed (non adjustable) arch. The fixed arch system is an enclosed system similar to the Refra-rig and has the same concept flaws in our opinion



The arch must be installed in one heavy double arch assembly, which slows down the erection of the machine in the kiln.



The enclosed cylinder design makes emergency repairs and general maintenance more difficult and time consuming. The enclosure does not protect the most critical cylinder part the rod, which is exposed to contaminates.



The up kiln arch cylinders do not have valves and this machine employs only one (instead of two) master valves slowing down the installation of brick.

This arch design does have some merit in that it is rigid and if manufactured with precision would be more likely to stay in alignment for uniform brick installation.

We have included a comparison flier with this report that compares our fixed arch machine to this Chinese hybrid.

Summary

When the tools you use on a job are critical to you and your company's ultimate performance and bottom line profitability whether it is the automobile for the taxi driver, the computer for the office worker or the hammer for a carpenter, reliability and performance are critical. We do not think a cement plant should compromise on a bricking machine, which is used to work on the heart of the cement plant any more than they would compromise on the computer system they use for control, accounting, etc. A cement plant should purchase a machine from a company with experience, longevity and a good track record with references. The worst circumstance is to experience a short coming in this below standard equipment, whether it be a structural limitation or failure or an operational malfunction during bricking maintenance. Extended downtime required to repair failures or malfunctions is far more costly than the difference in initial price between High Quality Equipment provided by an experienced reputable manufacturer and a low cost substandard copy.