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In order to succeed in the quickly evolving and highly competitive steel industry, a company's operations must be innovative, efficient and cost-effective. To provide the customer with the highest quality products and on-time delivery, down time and unexpected outages must be kept to a minimum.

At ISG's Burns Harbor facilities, contractor Kvaerner Songer, Inc. is a key partner in that effort. For the past 30 years, Kvaerner Songer has been responsible for Burns Harbor refractory maintenance and repair, serving as both the general and masonry contractor.

Located along the shore of Lake Michigan in northern Indiana, the five square mile Burns Harbor steel-producing complex encompasses Coke Ovens, Blast Furnaces, a Sinter Plant, 80" Hot Strip Mill, 160" Plate Mill, Vacuum Degasser, Batch Anneal and Submarine Car reline facility. To serve their customer with the highest quality craftsmanship and management possible, Kvaerner Songer maintains on-site offices and utilizes a workforce of skilled, union workers representing a variety of crafts.

Bricklayers from BAC Local #4 IN/KY make up approximately 18% of Kvaerner Songer's on-site workforce. Working under

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REFRACTORY MAINTENANCE PROJECT Burns Harbor, Indiana



OWNER: International Steel Group (ISG)

GENERAL/MASON CONTRACTOR:

Kvaerner Songer, Inc.
Portage, IN Regional Office

MASONRY PROJECT MANAGER: Bill Uporsky

LOCAL UNION: International Union of Bricklayers and Allied Craftworkers, Local #4, Indiana/Kentucky, Merrillville Chapter

PROJECT COST: Annual refractory maintenance contract exceeding \$6.5 million, with masonry encompassing more than 75,000 man-hours.

AREA: ISG Burns Harbor, IN Plant - multiple furnaces and buildings within a five square mile facility.

the direction of masonry project manager, Bill Uporsky, Local #4 craftworkers conduct a variety of daily maintenance and repair tasks at the site's various facilities.

At the Sinter Plant, daily work includes making cyclone tile repairs, gunite and tile repairs in the windmains, gunite repairs in damaged windboxes, and miscellaneous repairs in the screening station chutes.

In the coke ovens, any damaged refractory must be removed, cleaned and rebuilt with new refractory castable. Because coke ovens are intricately designed, with thousands of specially shaped units, it takes experienced and skilled bricklayers to place the refractory shapes precisely so the ovens will work efficiently.

At the vacuum de-gasser facility, the snorkels (devices that transfer metal from the



For BAC Local #4 craftworkers, daily maintenance tasks include making gunite repairs at the Vacuum De-Gasser facility (shown above) and at the Sinter Plant (below).



ladle to the bottom of the de-gasser vessel) undergo intensive wear from the combination of abrasion and intense heat. For the Local #4 craftworkers, daily maintenance tasks include repairing the lining in the operating bottom, and relining the spare upper units and bottom components as needed. The units must also be grouted every two days.

The Plate and Hot Strip Mills contain numerous furnaces that require ongoing maintenance and repair. Much of this work is accomplished during weekend down time and includes applying gunite to furnace doors and jambs, making pedestal repairs and patching hearth blocks. Individual furnaces within the mills are cooled and taken off line on a regularly scheduled basis to allow for a complete inspection and more intensive repairs.

While much refractory maintenance and repair can be completed during scheduled down times or planned outages, certain jobs require that the bricklayers perform “hot work,” which refers to making repairs inside the furnaces while they are still in operation. Wearing special heat-resistant suits, crews work in 10 to 15 minute shifts, making patches and applying gunite to damaged areas.

In addition to their daily maintenance work, the bricklayers are often busy with larger scale repair and replacement projects at the various Burns Harbor facilities. These projects include relines of the submarine ladle rail cars, replacement of damaged furnace hearths in the mills and brick relines of battery oven furnaces. All jobs must be completed within strict quality and time constraints in order to reduce down time and maximize production.

Kvaerner Songer successfully meets these challenges by executing carefully devised project plans and using skilled craftworkers (Local #4 refractory masons at Burns Harbor have an average of 22 years experience). In addition, many of the refractory components installed during repair projects are fabricated at Kvaerner Songer’s on-site shop facilities. This greatly reduces inventory lag time and allows for tighter control of product quality.



Above: BAC Craftworkers perform a complete brick reline of the #1 BOF vessel.



Local #4 Bricklayers replaced four furnace hearths in 2003. The one shown above is located at the 80” Hot Strip Mill.

ISG Burns Harbor, Inc.



As the steel industry rapidly evolves in Northwest Indiana, steel management and operations procedures are also changing. Kvaerner Songer, Inc. attributes its longevity at Burns Harbor to its project team's ability to be innovative and proactive in its response to these changes. Careful planning and scheduling, a commitment to safety and training, and the utilization of an experienced workforce, all have been vital to Kvaerner Songer's success at meeting its customer's needs.

The International Masonry Institute offers a refractory training program at its National Training Center in Fort Ritchie, Maryland. The two-week course covers a range of job site conditions, including domes, pipe connections, oven linings and gunite application. Participants are introduced to different refractory products, specific safety concerns, and learn solutions and tricks of the trade from veteran refractory bricklayers.

For more information on IMI's Refractory Training Program, call 1-800-JOBS-IMI.

For additional information on the project detailed in this IMI Case Study, contact:

*Dave Collins, Indiana Area Director of Market Development and Technical Services
6801 Lake Plaza Drive, #A107, Indianapolis, IN 46220
Ph: (317) 845-2949 Fax: (317) 585-0812 dcollins@imiweb.org*

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**International
Masonry Institute**

42 East Street, Annapolis, MD 21401
800-IMI-0988
Fax 301-261-2855
www.imiweb.org

The International Masonry Institute is a labor/management cooperative serving the interests of the International Union of Bricklayers and Allied Craftworkers and the contractors who employ its members.

The International Masonry Institute presents programs in four broad categories: apprenticeship and training, market development and technical services, research and development, and labor/management relations.

To reach the IMI office nearest you in North America, call 800.464.0988.