THE EFFECT OF BIOMASS FUEL SOURCES ON BOILER REFRRACTORIES

Small Changes in Your Fuel Sources Can Mean Big Changes in Your Refractory Life. Biomass boilers are gaining in popularity due to their economics and renewable energy status. Changing the fuel source in some cases can have a negative effect on refractory linings. Using the correct refractory material can help to preserve the integrity of the refractory lining.

Biomass boilers utilize solid waste for fuel, which can contain a wide and variable amount of impurities as combustion ash. The ash chemistry typically includes silica and high levels of alkali. Biomass combusts at higher temperatures than petroleum, which can lead to the formation of alkali-rich silica slags. These slags are corrosive to standard refractories. In addition to the corrosion issues, alkali-related failure can be caused by phase transformations resulting from contact with alkali liquids and gases. In some applications, alternate refractory materials are needed. An alkali cup test is a good gauge for material selection. In alkali testing of synthetic mullite aggregates with various binders, reducing cement content improved alkali reaction and corrosion.

Experienced refractory experts from Plibrico can help determine the best refractory products to meet specific biomass boiler requirements.
Welcome to the Q1-2019 Plibrico Mixer.

As we described the last quarter, all indications were that the business activity in the 4th quarter would be strong, and that held true. During the 4th quarter alone we delivered 30% of the total company’s revenue and 32% of the total construction revenue for 2018 - My thanks to everyone for finishing the year so strong. While I was disappointed that revenues for the company came in at 4% below our plan, I am extremely pleased with our focused improvements across the business. In the fourth quarter alone, the Plibrico Team:

• designed, fabricated and brought online a new furnace for our Redi Shapes business in Salem, doubling our bake out capacity
• filled some key roles throughout the company
• completed documenting our standard work procedures in Oak Hill
• yes, after our long journey, we transitioned from our antiquated EcMs system to NAV and that’s just the 4th quarter alone.

While we still have plenty of work ahead of us, it’s exciting to see the continuous improvement activities throughout the business - people, processes and technology, to support our 2024 growth initiative and beyond.

While strong business activity has carried over into 2019, so has the tight labor market. Record unemployment rates continue to test our construction offices in their efforts to find qualified labor. Our Plipartners tell us this is not unique to Plibrico, but indeed a challenge for the entire industry. In areas particularly hit hard like the Southeast – Georgia, we came into 2019 with a huge backlog, and the team there has been exploring any and all options, including working with the Plipartner network to share available labor. We expect the tight labor market to challenge us through the remainder of the year.

Finally, our December Happy Cart project for St. Jude was a huge success. Over a 2 week period of time we had 95 volunteers put together 2,224 kits. We’ve organized all the kits and are scheduled to deliver in March. It was an awesome event and I hope everyone had fun. Special thanks go out to all who participated - the employees of Plibrico and our Plipartners – Empire Indy and Crawfordsville, and all four locations of F.S. Sperry.

It’s a pleasure to work with such a great team of people.

— Brad Taylor, President & CEO Plibrico Company, LLC

New Hires

• John Finch, Northbrook, IL - Southeast Territory Manager
• Michael McArthur, Allentown, GA - Warehouse Supervisor
• Radu Mihestean, Northbrook, IL – Staff Accountant
• Roger Smith, Northbrook, IL – Technical Manager
• Michael Woolery Northbrook, IL – Purchasing Manager

Congratulations

• Our best wishes go to Dave Gann in his retirement from Plibrico. Supporting the Omaha Mechanical Services group, Dave will be missed by coworkers and customers alike. We wish Dave all the best as he enters into the next stage of his life.
• Welcome to new Plipartner the Pli Group Europe GmbH, a highly experienced refractory distributor contractor in Vienna, Austria.
• A BIG thank you and congratulations go out to our Happy Cart participants, 2,224 kits assembled for St. Jude Hospital
In 2018, we saw a wide variety of projects in all sectors of the markets that Plibrico and our partners serve. Through the 2018 year, the department fielded 151 distinct inquiries for technical application support which consisted of heat loss requests, request for choosing a material for an application, bake-out questions and trouble-shooting particular end user problems.

In addition, we completed 68 individual engineering projects in which we offered engineering drawings, material take-offs, calculations or engineering support. Of this project work, 34 of these were to support our own Plipartner construction offices, 18 projects supported our various pli-partners, 14 were for direct customers and OEM’s as well as two projects to support our manufacturing operation in Oak Hill. Of these, 16 were contract jobs. Overall, our project work covered the following market segments: 25 projects for aluminum applications, 16 projects for steel applications, 8 projects for the thermal oxidizer applications, 3 projects in cement, 2 projects in boiler applications, and interestingly, 2 projects related to brass/copper applications, with the rest filling in miscellaneous.

The trend here, for us, is in keeping with last year, seeing aluminum and steel as our primary focus of project work with thermal oxidizers also making a strong showing. I would expect this trend to continue into 2019, as we seek to build upon a still strong economy.
Where do you work? “I work in Northbrook, IL.”

Where do you live? “My family lives in Gerald, Missouri, outside of St. Louis. I am currently looking for an apartment near Northbrook.”

What do you do in your free time? “I enjoy shooting sports, and am a big fan of NASCAR.”

What do you like about your job? “I enjoy working with ceramic materials. I like finding new ways of putting things together to get specific properties. I enjoy working with installers and end-users to identify materials that best fit their specific situation.”

The Plibrico Company and two of its PliPartners, F.S. Sperry and Empire Refractory Services, collaborated in assembling over 2,200 craft kits to stock the Happy Carts at St. Jude Children’s Hospital in Memphis, Tennessee.

The St. Jude Happy Cart is a volunteer initiative at the hospital. The Happy Cart goes around to inpatient rooms several nights a week to provide the children, and their parents, with essential playtime in arts and craft-making that speeds the grueling passage of hours, and soothes the soul while it offers enjoyable, creative distraction.

Ninety-five Plibrico and PliPartner associates came together in 11 offices from Arkansas, Florida, Tennessee, Indiana, Illinois and Ohio to prepare the kits. Each craft kit consisted of carefully selected hobby components with assembly pictures and instructions. The resulting projects included colorful and comical beaded animals, fire breathing dragons, dream catchers, spinners, pipe cleaner snakes, bug clothespins and race cars.

Together we will touch over 2,000 children and families at St. Jude Children’s Hospital. That’s right, we assembled 2,224 kits that will be given to children and their families during their stay. We had set a goal of 2,000 kits and we exceeded that goal – an amazing accomplishment! A BIG “Thank You!” to all the participants.
Plibrico Launches New Products

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Plibrico Launches New Products

Plibrico launches two new products, each designed to meet specific needs in the refractory industry:

**Plicast® Al Tuff Floor Guard HT**
- **Product Number:** 3247
- **Overview:** New upgrade to protect plant floor from molten aluminum
- **Advantages:** Preventing aluminum penetration increases the service life of the floor “HT” stands for High Temperature, price / value ratio maximized
- **Best Target:** Primary, Secondary, and Foundry Aluminum
- **Available Internationally As:**
- **Guard hT Plicast**

**Pligun® MW 110**
- **Product Number:** 3256
- **Overview:** Can be used wherever a strong, abrasion resistant, medium weight product is needed
- **Advantages:** Unique combination of insulating properties, quick installation, and abrasion resistance
- **Best Target:** Petrochem: Reactor, Regenerator, Risers, Overhead Lines
- **Available Internationally As:**
- **Plico Gun Mix MW 110**

Technical data sheets and SDS sheets have been posted and can be found online in the PliPartner site under Technical Library. If you have any questions or would like to try the new products please reach out to your territory managers.

Also, if you have a new product recommendation please contact your territory manager or login to the PliPartner site and fill out an online request form at - https://plibrico.com/plipartners

The Safety Spot: Cold Weather Dangers

In our refractory construction careers we can be exposed to many extremes in temperatures. For those of us located in the northern parts of the country, the winter months can be especially challenging. Refractory rebuilds and repair work can take us from just recently idled furnaces with an internal temperature well into the 100°, to the sub-freezing weather outside where we are fighting to keep ourselves and our refractory material warm. In these extremes, our crew members need to be extra cautious:

- **Melting work boots**
- **Exposed and freezing hands and fingers**
- **Pinch-points from handling large diameter heavy hoses filled with refractory material**
- **Back strains from cold stiff muscles while bending, turning and lifting bags of product materials needed to feed mixers**

In the past our refractory construction crews have done a great job of being extra vigilant, and keeping these types of dangers at bay. As a reminder, here a few important safe work practices to remember during the winter months to continue to keep everyone protected:

- Outdoor walkways, should be inspected regularly to identify the ruts, slippery conditions, and other uneven ground on the worksite. Also, identify holes and trenches on the site, cover them and rope them off with caution tape to prevent access to the area.
- Keep exposed skin areas covered. Dress in layers to help regulate body temperature quickly by adding or removing outerwear.
- Identify potential pinch points before starting work by conducting a pre task inspection
- Condition muscles prior to work activities, our bodies muscles tend to tense-up during periods of rest, such as shift starts, breaks or lunch periods. Stretching and flexing, helps increase flexibility and blood flow to our major muscle groups to alleviate soft tissue injuries while working in the cold

Make sure you incorporate these cold weather tips on your refractory job sites and in warehouses to help protect against the harsh winter season. Much appreciate, and very well done - As always be SAFE!

PLIBRICO IN THE NEWS

Catch up on the latest Plibrico news by visiting our expanded News section at www.plibrico.com.

RECENT NEWS

How to Choose the Best Refractory Contractor - 7 Tips from the Plibrico Refractory Pros to Minimize Risk

Plibrico Welcomes John Finch as New Territory Manager

Plibrico Establishes New Partnership to Support European Refractory Customers

Lockout/Tagout Shutdown Procedures – Your 10 Steps For Preventing Maintenance Injuries

Plibrico Featured Biomass Magazine

With increasing energy demands and heavy dependence on fossil fuels, renewable energy has been gaining attention and viability. As an environmentally friendly fuel, biomass currently accounts for 6 to 8 percent of the world’s energy consumption, and is becoming an increasingly popular option. Companies investing in biomass as an effective alternative to traditional coal, petcoke or oil and gas should be aware they must incorporate changes in their refractory linings due to differences in fuel chemistry.
Employee Spotlight: Mike Winkelmann

Plibrico Mechanical Services has a new GM – Mike Winkelmann. A veteran in the Omaha mechanical services field, Mike has excelled in several different industrial and commercial roles in the HVAC world. He really enjoys working with customers and is looking forward to establishing Plibrico as the “Go-To” mechanical services resource in the Omaha area. People have said that, “Mike sets the standards by which his competition attempts to achieve.”

Plibrico Mechanical Services is the trusted partner of many power and process industry customers. From installations to replacements, including repair, maintenance and consultations, it provides solutions that enhance facilities and keep them running – Reliably!

Department Updates from page 3

MANUFACTURING
The last 2 months of the 4th quarter saw production volume softened as we headed into the holidays. January has continued to be similar to the 4th quarter of 2018. Continuous improvement initiatives include:

- Continued developing and implementing SOPs for plant wide operations
- The Oak Hill plant completed the 4th quarter of 2018 with no accidents or LTIs. This completed another year for the Oak Hill plant with no accidents or LTIs
- All employees completed Understanding GHS labels, Confined Space Awareness, and Hazards of Asbestos training
- The Oak Hill plant completed 503 craft kits for the Happy Cart project for St. Jude Hospital in December.

SAFETY
We’re off to a great start to this New Year because of a good ending from 2018. Spring-boarding from our low accidents success in 2018, I believe we have a shot at completing the year, accident free. Safety Meetings are being scheduled each month as we have in the past. Frontline tools such as “Daily Tool Box Talks”, “Monthly Safety Meetings” and our “Supervisors Safety Manual Reviews” bring a constant level of safety awareness to our Supervisors and Crews at each of our project sites over the year that reduces risk, hazards and accidents to our fellow worker. In 2019 we have our aim set on Zero Accidents and with everyone pulling together as a team, like we have in the past, it will surely happen!

CONSTRUCTION
Plibrico SE operations, Bartow FL and Allentown GA, recently completed a total refurbishment to our HTC integrated mixer/pump rig. In the past month, we have successfully pumped over 100,000 lbs of Plicast HyMOR 3000 into two biomass boiler superheater and economizer roof sections as well as shot-creted 50,000 lbs into an aluminum furnace. Over the next two weeks we will also be pumping 80,000 lbs into two boiler front wall sections. Our base of rig operators will continue to grow, so reach out if we can assist with your next pump or shot-crete application.

MECHANICAL SERVICES
Following thru on our commitment to invest in our employees, Jon Anderson, service technician in our Omaha location, will be attending Webster Burner Training April 11-13th increasing his base knowledge in boiler services and maintenance.

SALES
The sales department had a busy 4th quarter. We continued to focus on Commercial Excellence, finishing and finalizing our 2024 Commercial Roadmap, which details our plan to double our sales by 2024. We also continued to rebuild the department from a talent perspective, onboarding John Finch as Southeast Territory Manager. We’re excited to have John on the team to help us grow our business in 2019.

Other highlights from Q4 2018 include:

- Reconnected with our Partners and articulated our Go To Market Strategy at Succeeding Together Conference in Nashville in October
- Re-engaged with Gold Coast, a former Partner who has shown renewed interest in Plibrico. We hope to add them as a new Partner in early 2019

In 2019, we will be focusing on expanding our Partner network to fill unserved and underserved territories, so stay tuned - it’s going to be an exciting year.

FINANCE
We are pleased to welcome Radu Mihestean as a new Staff Accountant. Radu has experience in financial accounting and analysis with his BS in Accounting from the University of Illinois of Chicago. His responsibilities primarily include general ledger accounting, bank reconciliations, account analyses and preparing journal entries for month-end closings. He is also responsible for working with our construction offices to process, select and issue vendor payments.