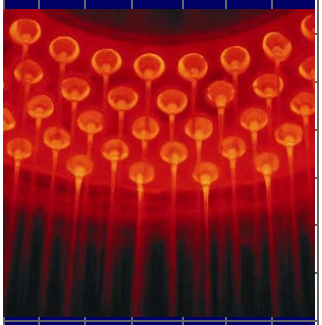
Temperature Control for Fiberglass Forehearths



Previous Forehearth control systems have relied solely on PID feedback control for glass conditioning to the bushing. ACSI has optimized this control by using advanced Model Predictive Control to achieve exceptional stability and control right at the point of entry to the bushing. The model uses both feedback and feed forward strategies. Customers who have applied the ACSI solution have realized significant benefits including improved production efficiency and excellent temperature stability. The solution has been applied to both new and older forehearths using existing control systems with excellent results.

FEATURES

- Model Based Control of Zone Temperatures
- Feed Forward and Feedback Control
- The Model Adapts to Process Changes

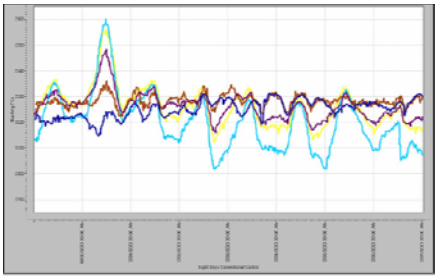
BENEFITS

- Improved Temperature Stability
- Disturbance Rejection
- Increased Production
- Reduced Breakage

ACTUAL CUSTOMER RESULTS

200% reduction in temperature variation
50% less time to achieve stability over PID
2% improvement in Pack
20% reduction of Bushing breaks per hour

Eight days of forehearth zone control before applying ACSI optimization



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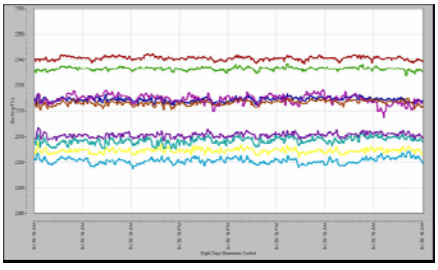

Application Strategy

ACSI brings an additional level of control to the existing melter, forehearth, and bushings control system using Model Predictive Control. The ACSI Model Based Control System has the ability to track process dynamics, predict actions, and drive temperature quickly to set-point while avoiding overshoot making Model Based Control more efficient than traditional PID. The controller learns process transfer function, adapts to process changes, understands dead time and never requires tuning. With tighter control, deviations from setpoint are greatly reduced which in turn leads to increased product consistency and quality.

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Quarterly Newsletter Company Survey Question

What is the coolest cell phone/smart phone application?

Pandora...The music app is great! ~ Steve Nixon

The 89x Radio app. When I go onsite, I can still listen to Dave and Chuck the freak in the morning during my drive to the plant... although... it is a lot less of a drive than my normal hour. ~ Josh Kline

Words With Friends. It's great. I play Scrabble with my sister in Florida. You can play at your own pace whenever you have time. ~ Jon Nash

Wireless File Pro... You can transfer files between your phone and laptop wirelessly! ~ Jory Peterson

The Net Flix app is my favorite! ~ Joel Helbig

Shazam can identify a song playing on the radio and tell you the name and artist! ~ Brad Bowe

Google Maps ~ Diana Davis

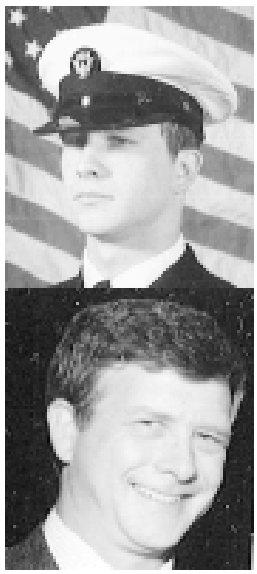
Remembering Tom Dixon

Sadly, one of our project engineers, Tom Dixon, passed away on August 18th, 2011 after a long battle with cancer. Before coming to work at ACSI, Tom proudly served in the United States Navy and then worked as a Computer Technician at Libbey Glass. Tom began working at ACSI in 1997 as a project engineer and was involved in numerous projects.

"*When Tom came to work here he immediately fit into the ACSI family*" said friend and colleague Rob Snider. "*He had a quiet confidence, a great sense of humor and was someone you just liked to be around. If you were ever out with Tom you will always remember the call for a "final final" His passing has left an emptiness that will never quite be filled.*"

Hernando Martinez echoed Rob's sentiments by sharing the following memories:

"The thing about Tom was that he was absolutely unflappable. The day that I discovered this fact happened like this: He and I were in the control room of a plant in the middle of a furnace heat up. Suddenly, there was a thump, the lights went out, the computers went blank, and all of the combustion fans started to wind down. To borrow a phrase, "general chaos and various hijinks ensued." Tom turned to me and said, "you know, I think that the Big Boy up the street has one of those all-you-can-eat shrimp specials for lunch."



Later, when he was sick, he would come into the office between chemotherapy sessions when he could. I saw him come in one morning and wandered over to his desk. I asked him how he was feeling and after a bit of prying on my part, he told me about the latest round of treatments he was undergoing and the doctor's prognosis. As with many people in this situation, the good news didn't come often enough. So, after he told me how things were going, I stood there for a second not knowing quite what to say. He smiled, and said "you know, bud, it's just one more thing to get through." He had no intention of giving up. That's when I realized that Tom was the bravest person you were likely to ever meet. I think maybe that's why he left us - I think that God has a special place for souls like his."

Tom is survived by his wife Laura and two children Kerry and Tommy.
He will be greatly missed by all of us at ACSI and we all feel blessed to have known him.

2011 and 2012 Events

October 18-19, 2011
The Glass Problems Conference
The Fawcett Center
Columbus, Ohio

October 23-26, 2012
Glassstec
The Dusseldorf Fairgrounds
Dusseldorf, Germany
www.glasstec-online.com

We look forward to seeing you at the upcoming shows!

The ACSI Glass Optimization Series

The ACSI Glass Optimization Series provides organizations with a range of tools and services to bring existing and/or new operations to peak performance. Designed on a building block basis, each step delivers quantified returns. The series starts with an assessment of existing instrumentation and control structures then culminates with an automatic control system of the process. Steps taken by ACSI will insure operation within the highest production/lowest energy cost window. Optimization is accomplished using existing control systems coupled with advanced model-based control and a rule based inference engine. Results are measured by using the key performance indicators that really matter: %Pack, Job Change Time, Defect Loss, BTU/ton, etc. Most of our customers find that each phase pays for itself within 6 months.

The ACSI approach utilizes best practices and continuous improvement concepts to assess and correct sources of variability. At the regulatory level, model based control is applied to key control loops in order to remove temperature variability by an astounding 300% on average. By utilizing a model based control approach instead of traditional PID, the ACSI solution provides additional advantages beyond just adherence to setpoint.

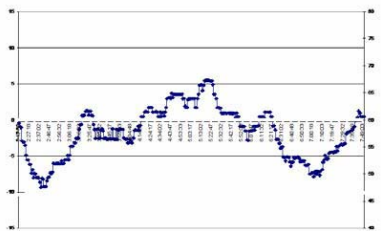
The ACSI Glass Optimization Series is designed for the specific type of glass being produced.

Container Glass
Gob Temperature Control

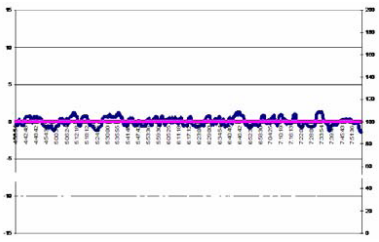
Fiberglass
Forehearth and Melter Temperature Control
Bushing Control

Float Glass
Glass Level Control
Canal Temperature Control
Melter Crown Temperature Control

Glass Level Before Optimization



Glass Level After Optimization



Note: Parameters shown in "before and after" graphs for Glass level are the same

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improving performance through advanced control solutions

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