

Energy Efficiency Projects at The Homer Laughlin China Company

Presented by
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The Homer Laughlin China Company was honored this year with the Governor's Award for Leadership in Industrial Energy Efficiency.

Thanks To:

WVU Industrial Assessment Center and The Manufacturing Extension Program

Governor Tomblin and
Secretary of Commerce Burdette

WV Division of Energy



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History of The Homer Laughlin China Company

- Founded in 1871 in East Liverpool, OH by Homer and Shakespeare Laughlin.
- In 1899 the company was sold to W.E. Wells of Steubenville, OH and Louis Aaron of Pittsburgh, PA.
- In 1904 the Company relocated to Newell, WV and completed the expansion in 1929.
- We continue to operate in the original buildings constructed in Newell.



History of The Homer Laughlin China Company

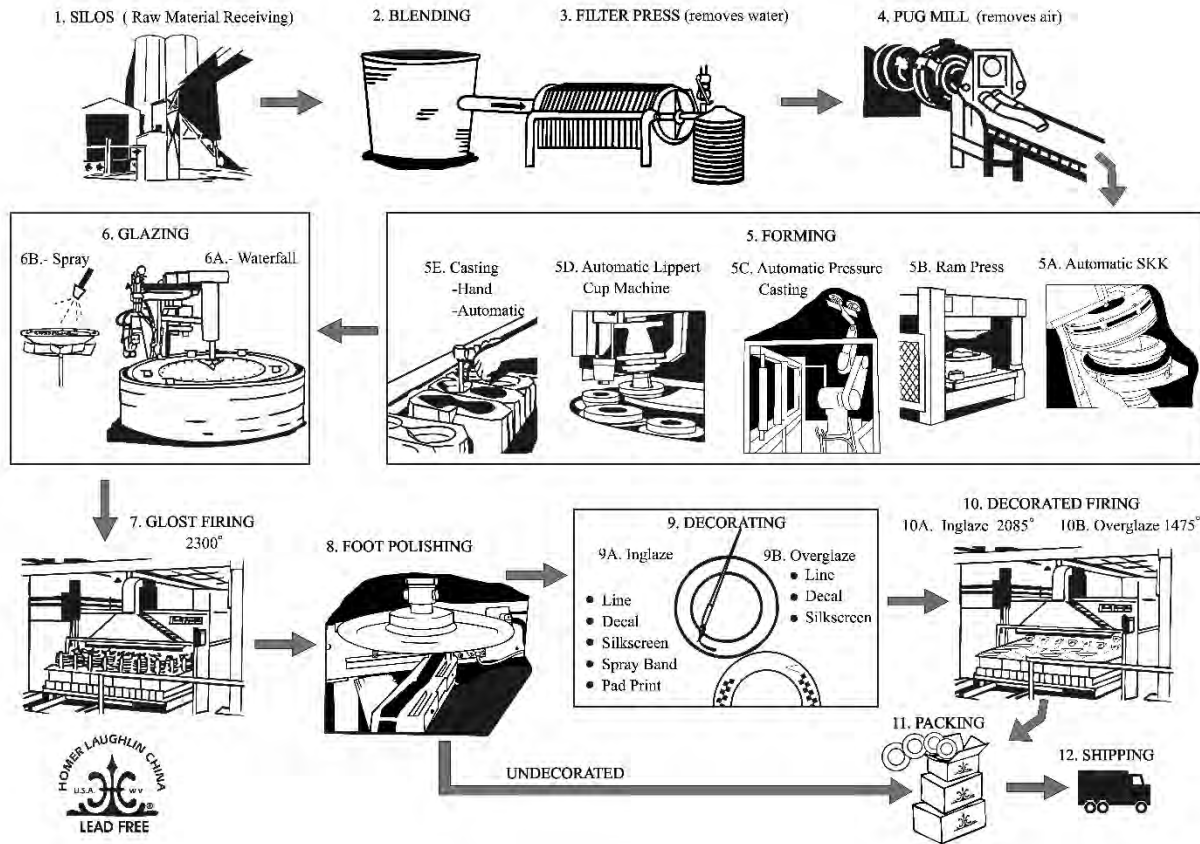
- The company remains family owned. President Liz McIlvain is the great-granddaughter of W.E. Wells.
- We currently have 900 employees and produce 1.4 million dozen pieces of dinnerware annually.
- Peak production was in 1948 with 10 Million dozen pieces of ware and 3000 employees.



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Process of Manufacturing Ceramic Dinnerware

The Homer Laughlin China Company Manufacturing Flow Chart



IAC Energy Assessment



In 2010, the West Virginia University Industrial Assessment Center conducted a plant wide energy survey.

Implemented Recommendations included:

- Vibration Analysis of Equipment
- Replacement of Lighting
- Repairing Compressed Air Leaks
- Replacement of Compressed Air Nozzles
- Use of Outside Air for Compressor Intakes



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Lighting Upgrades

- In 2013, we initiated an aggressive program to replace or upgrade lighting throughout the plant.
- The lighting in the plant was a combination of incandescent, T-12 florescent, and metal halide.
- Our electric supplier offers a rebate program that offset a large portion of the costs.
- To date, 2600 fixtures have been replaced or retrofitted with a combination of T-8 and T-5 Fluorescent and LED.
- Power consumption was reduced by 6.4 million kWh annually.
- According to a 2012 U.S. Department of Energy consumption study, that is enough energy to light 4000 average U.S. homes.
- In addition to the energy savings, the lighting quality in the plant was greatly improved allowing for increased quality and employee morale.



Inadequate and inefficient lighting in warehouse operation.

Improved lighting designed to warehouse operation standards.



Lighting Upgrades

Inadequate lighting quality with low uneven lighting and disorganized appearance.

Improved lighting quality and appearance.



Lighting Upgrades

Compressed Air Control

- In 2008, a computerized compressed air management system was implemented.
- Power consumption is reduced by 2.4 million kWh annually. According the U.S. Department of Energy, that is enough energy to power 2000 homes in the U.S.
- The system automatically controls the operating status of the plant's eight(8) 125 HP air compressors.
- System pressure is monitored in real time and compressors are switched from loaded, unloaded, or off as demand changes.
- Plant air pressure is maintained at a constant level as production demand changes.
- Compressors are no longer running during low demand time periods reducing wear and maintenance costs for compressors.
- The system also allows tracking of operating hours, maintenance schedules, and real time monitoring of key operating parameters of each compressor.



Compressed Air Control

ManagAIR® v6.5.16 by Air Technologies

File Setup Paging/Email Tools Reports Isolate/Integrate Sequence Change System Start/Stop Alarm Reset Notes Help

LOADED UNLOADED STOPPED COMM ERR SERV WARN SHUTD WARN SHUTDOWN WAITING OUT OF SERVICE

Annual Data Diag Data Tech Data Current Data Commands Elek Settings Paging Disabled Email Enabled Alarm Reset Quick Chart Service Time Set Events System Info View N2 Sys

GD125_1@4 UNLOADED W125HP_2 STOPPED GD125_3 LOADED GD125_4 LOADED GD150@8 LOADED GD125_2@8 LOADED GD150_7A UNLOADED GA125_7B UNLOADED

1 2 3 4 5 6 7 8 9

Paging Disabled Paging Disabled Paging Disabled Paging Disabled Paging Disabled Paging Disabled Paging Disabled Paging Disabled

94 RSI 0 Dewpnt -1 RSI 0 Dewpnt 94 RSI 0 Dewpnt 93 RSI 0 Dewpnt 97 RSI 0 Dewpnt 97 RSI 0 Dewpnt 91 RSI 0 Dewpnt 82 RSI 0 Dewpnt

GD125_7C LOADED

Paging Disabled 94 RSI 0 Dewpnt

AIR TECHNOLOGIES

Load Sharing Sequencing On: 5:3:9:6:8:4:7:2:1

Pressure	92	Total KWh	796677.8	Spare10	
Flowrate	2740	KWh/MCF	3.12	Spare11	
Dewpoint	84	Spare6		Spare12	
Spare1		Spare7		Spare13	
Spare2		Spare8		Spare14	
Total KW	509.1	Spare9		Spare15	

System Messages: <http://www.aircompressors.com> Clients: ■■■

GA125_7B Command Acknowledged
 GA125_7B Unload Command Sent 14:06:33
 GA125_7B Command Acknowledged
 GA125_7B Remote Command Sent 14:06:22

ManagAIR® Energy Savings: Cost Not Set Cost Not Set
 Communications: ■■ 5/12/2016 2:08:56 PM

05.12.2015 14:13

Kiln Waste Heat Utilization

- In 2003, several projects were initiated to utilize waste heat from our kilns to provide heat to other processes.
- The cooling exhaust system brings fresh ambient air to rapidly cool the kiln car and ware so it is a clean source of heat.
- Project costs were also minimized by utilizing as much existing duct work and fans from old equipment.
- In total, the project saved 54,000 MCF natural gas annually.
- That is enough fuel to heat 800 homes in the northeast according to the U.S. Department of Energy.



Example of a burner package eliminated with the waste heat project.

Duct work that was reused and example dryer that is supplied with waste heat.



Kiln Waste Heat Utilization

Off Spec Product Recycling

- In 2010, HLC partnered with a local refinery to use scrap fired product as aggregate in countertops.
- Since then the amount recycled has grown from 17 Tons to over 343 Tons of material that would have been disposed of in our landfill.



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Off Spec ware and other material disposed of on our onsite industrial landfill.



Example of finished countertop in our factory outlet.



Off Spec Product Recycling

Glaze Reclaim

- In 1999, HLC began reclaiming clear glaze from the spray booth clean up process.
- Wash down water was collected and transported to a central location for processing.
- In 2006, scaled down versions of the reclaim systems were installed on all nine(9) glazing lines.
- HLC now reclaims 775 tons of glaze that saves \$1.2 million annually.



Clear glaze processing area



Scaled down color glaze units



Glaze Recycling

Clay Recycling

- Fourteen (14) tons of clay is blended back into our formulation daily.
- Annually 3600 tons of clay is kept from landfill disposal.
- Over \$1 million in material costs are saved annually.



Scrap Clay Staged for Reprocessing



Clay Prepared for Production



Sludge Extracted from IW Waste Stream



Clay Recycling

VFD Motor Control

- In 2014 we began using VFD to control motors for efficiency.
- Our first project was installing 5 VFD's on three (3) clay extruders.
- The VFD eliminated expensive variable speed gear reducers and air clutch engagement.
- Energy savings were 149,000 kWh annually based on a one shift operation.
- In addition to energy and maintenance savings, the control, quality, and reliability was improved.



Kiln Technology Improvements



#5 Straight Kiln
Circa. 1940's

#7 Eisenmann
Circa. 1992

#8 Eisenmann
Circa. 1998

Importance of Energy Efficiency to The Homer Laughlin China Company

- HLC strives to be a responsible manufacturer and minimize impact on environment.
- Energy efficiency makes the company more competitive in a market full of low cost imports.
- Customers are concerned with the environmental impact of the goods they purchase.



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