Stimulating winning innovation partnerships

Vice President of Engineering, Terry Hartman continues a longstanding culture of engineering innovation at global tableware specialist, Libbey Glass. The company’s close relationship with PaneraTech and their successful introduction of SmartMelter, a furnace life planning and risk mitigation solution illustrate the glassmaker’s forward-looking culture.

INNOVATION INCUBATORS
Terry Hartman has a strong passion for Libbey’s long history, people communication and a core engineering innovation development that reaches out to suppliers and networks to create innovation incubators. Innovation and networking represent a core competency at Libbey Glass, which was created in 1818 as the New England Glass Co. Edward Libbey relocated the business to Toledo in 1888, his first priority being to appoint an expert with a strong understanding of manufacturing/engineering. This original engineer was Michael Owens, whose well-documented developments at Libbey and Owens helped to establish Toledo as a glass capital in the USA.

During his development years at Libbey, it was clear to Terry Hartman that the company’s heritage was one of innovation and development sharing. The main O-I technical centre was located adjacent to the University of Toledo, where all divisional engineers were part of the group’s central glass technology function. The divisions in specialty glass included tableware, laboratory glass, television glass and glass ceramics, together of course, with glass containers. Technical knowledge transfer and sharing between divisions was expected and engineers shared knowhow across all divisions. As a young engineer, this innovative culture appealed to Terry Hartman.

ENGINEERING VALUE STREAMS
Now VP of Engineering, today Mr Hartman serves as technology leader and a member of Libbey’s executive leadership team, ELT. “My main role is aligned directly to the team’s matrix of sharing business knowledge and leadership with the Libbey supply chain, plant operations, enterprise risk and safety, marketing, finance, sales and long range business planning” he explains. “A secondary role is to lead our global engineering teams and set directions to support our operating business plans.” Engineering alignment is critical to long range business plans, which include applied R&D and innovation study globally. Engineering at Libbey has four distinct value streams:
• R&D - Innovation and new products as a voice of Libbey’s consumers.
• Manufacturing performance and reliability - Continuous improvement, safety, TPM, voice of the facility and risk mitigation.
• Facility operation - New processes, adjacencies, new products to production state.
• Knowledge transfer mapping - People development, talent growth and sustaining tribal knowledge.
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identify and hire candidates. I am pleased to say that the start-up was
and we utilised an extensive interviewing process with testing to
clearly the biggest task. Engineering took the lead in technical transfer
explains. “Training and development of people for the operations was
in particular, from numerous local Langfang suppliers” Mr Hartman
we received good support from contractors in the USA, China and
years later. “Our challenges for this endeavour were significant but
local market in 2005. The factory came on stream with first glass two
developed options for sites and construction for expansion into the
Langfang, China. A team including Terry Hartman as technical leader
value streams was its greenfield design and construction of a plant at
A key example that utilised all four of the glassmaker’s engineering
A furnace is being created and constructed through the
co-operation of Libbey, Praxair and SORG to create a high
efficiency glass melter. “Designing the furnace and installing
Praxai’s OPTIMELT system requires a collaboration of the best
teams and will result in a state-of-the-art furnace system” says Terry Hartman. “We believe in innovative processes to help lead change as a global company.”
INNOVATION IN ACTION
Innovation and development have represented a core
competency since the company’s origins, Libbey and Owens
helping to revolutionise the technical side of glass manufacturing
and products that consumers needed and wanted. The benefits
of this legacy have been realised in sustaining the company’s
base of processes and products for nearly 200 years. Today,
Libbey’s total tabletop solutions have moved a portion of its
growth and success to consumer-based company activity. Libbey
supplements its supply chain sources /products globally and
works hard to understand the evolution of consumer trends. “As
a company, we are moving quickly to where it will be, as well as
reacting to today’s needs” says the VP of Engineering. “Products
and adjacencies are being tested constantly with consumers to
help us understand these needs.”
Another important part of Libbey innovative approach is
finding adjacent technologies that gain or add positive value
indirectly to the operating and supply side of the business.
Examples include key suppliers who are willing to work with
the glassmaker to develop the latest ideas. Among these is the
company’s successful relationship with PaneraTech.
A start-up at The Ohio State University six years ago,
PaneraTech was a group with considerable experience in the
development of radar-based solutions for advanced defence
applications, who wanted to leverage its radar imaging
and mapping technology for industrial applications. Libbey
was associated with the group via its links with the Glass
Manufacturing Industry Council and the annual Conference on
Glass Problems. Having reviewed the team and its technology,
PaneraTech was engaged to initiate several ongoing projects.
According to Terry Hartman, the steps of the project are
set up in a stage gate format to help define and establish team
goals and KPIs for success. Each step of the process needs to
have clear goals and deliverables and once successful, the team
moves to the next challenge towards the goal. “In this case,
Libbey clearly had a need to improve the risk mitigation of glass
furnace operations” Mr Hartman explains. “A glass furnace
contains a refractory liner that erodes over time proportional to
operating temperature and glass pull. Traditionally, we can only visually inspect above the glass line in melters and react to sidewall wear through furnace visual inspection and hot spot detection. Glass furnaces with a historically good database and records can offer production engineers insight to past repair areas and rebuild details of the furnace at major rebuild occurrences. Tribal knowledge of furnaces and repairs becomes essential to each factory and its technical resources as a furnace moves through campaigns of major rebuilds. Glass manufacturers know too well the problems furnaces risk in the last year of predicting its life, mitigating glass leaks and business interruption. Further complexity on this issue is the lead time and spend to have materials on-site ready for the furnace rebuild, which can be anywhere from 12 to 18 months’ lead time."

The PaneraTech project goal with Libbey was to develop tools that could map hot operating sidewall wear of the furnace blocks and map remaining thickness real time. Studies and tests conducted at Libbey were performed on a test furnace with molten glass inside. The first phase offered PaneraTech and Libbey engineers a real life environment to test and develop tools and software to visualise hot sidewall thickness variations with glass contact.

After successful demonstration of the technology on the test furnace, the project moved into phase two, developing and use with real world hazards and construction complexities on two existing and operating furnaces at Libbey. The tools had to work in the real world of hot operating furnaces.

The technical tool development has now moved into phase three of deploying the furnace sidewall thickness mapping technology to new furnaces from beginning of life to end of campaign life. “We have accomplished these goals” Mr Hartman confirms “and the results are viewed as a breakthrough for adding a new level of data reliability and insight to the sidewall thickness remaining on the operating furnace.”

PaneraTech’s solution – the SmartMelter – has evolved into a larger solution than initially envisaged. In addition to mapping furnace wall thickness, the technology is evolving into a solution where entire furnace overall health, audit reports, furnace health history, maintenance records, endoscopy and other audit reports are kept and maintained by SmartMelter software.

Libbey’s quarterly review of all furnaces includes the company’s traditional database of historic data including electric boosting KW, bottom temperatures mapping, glass pull data and visual inspections. Now, the glassmaker’s ongoing best practice is to integrate historic data into the SmartMelter solution to offer a visual understanding to map rate of change and remaining life for the furnace. The goal is a more predictable and data-driven solution.

According to Terry Hartman, from a global operations support perspective, SmartMelter adds a significant value by enabling Libbey to implement standard furnace inspection and management policies across all of its plants globally. “It helps us to visualise the overall health of Libbey’s global furnace portfolio and make important financial decisions for maintenance and furnace rebuild schedules. Furnace rebuilds are multi–million dollar investments, so operating with more knowledge of your variability can be a financial and risk positive gain.”

Libbey has leveraged this technology to help better plan its overall business from end to end. Recently, for example, for one of the glassmaker’s furnaces at its Shreveport plant, SmartMelter indicated better than expected wall thickness, which resulted in delaying the overcoat for a year and also extending the planned rebuild by 12 months.

“Glass furnace life planning and risk mitigation is essential to successful operation in glass manufacturing” Terry Hartman concludes. “Our success to date with the PaneraTech team and the added value of the system is helping us to target best-in-class risk of furnace operation, recognition from our risk underwriters for these investments and a new level of technically-driven performance of our melter lifecycles… a truly winning partnership of innovation!”

FURTHER INFORMATION:
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