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From President's Desk

A 'Seminar on Energy Efficiency & Waste Heat Recovery System for Glass Industry was organised concurrent with meeting of the Executive Committee at Sahara Star, Mumbai on April 19, 2014.

Presentations on The Energy and Resources Institute's (TERI) initiatives in Glass Sector, Waste Heat Recovery System & Energy Conservation by Qpunkt GmbH, and Financing Options in WHR Systems by Tata Cleantech Capital were made in the Seminar.

The program provided an opportunity to discuss energy efficiency techniques, project financing & how to generate power from flue gas by showcasing patented & proven highly efficient waste heat recovery systems.

In continued effort to protect the environment, Architectural Glass Panel of the AIGMF organised dealers meet in Mumbai (April 28) and Chennai (May 16) on Eco-Packaging of Float Glass, an initiative undertaken by Flat Glass Manufacturers.

Based on the inputs received from AIGMF Member companies, The Associated Chambers of Commerce & Industry of India (ASSOCHAM) has come out with a White Paper on Glass Industry. The White Paper talks about 'Challenges Faced by Indian Glass Industry along with Suggestions, which have been submitted to concerned Indian Government Ministries including Ministry of Commerce & Industry and Ministry of Finance. One of the most vital suggestions is the supply of Natural Gas at concessional rate to boost growth in Industry■

S C Bansal
President AIGMF

and Managing Director, Adarsh Kanch Udyog Pvt. Ltd./
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About The All India Glass Manufacturers' Federation

The All India Glass Manufacturers' Federation was founded in 1944. The Federation is made up of five Regional Associations viz.

Eastern India Glass Manufacturers' Association (EIGMA)-Kolkata

Northern India Glass Manufacturers' Association (NIGMA)-New Delhi

South India Glass Manufacturers' Association (SIGMA)-Hyderabad

Uttar Pradesh Glass Manufacturers' Syndicate (UPGMS)-Firozabad and

Western India Glass Manufacturers' Association (WIGMA)-Mumbai

The Federation was incorporated under the Companies Act, 1956 (No. 1 of 1956) as a Limited Company on 15-6-1970. The main aims & objects of the Federation are:-

- To encourage, promote and develop the manufacture of glass articles of all kinds and to safeguard and protect the interests of glass industry and glassware business in India.
- To form a common link amongst Glass Manufacturers' in India and thus develop a spirit of mutual help and co-operation with one another.
- To promote the study and research in Glass Technology.
- To consider all matters relating to the manufacture and marketing of glass articles in India and the question of export and import thereof.
- To devise ways and means for securing necessary supply of raw materials required for the manufacture of glass articles at comparatively lower prices and thus to decrease the cost of production and increase the national wealth.
- To collect necessary information and data and propagate it for the benefit of Glass Industry and trade in India.
- To make representations whenever necessary to the Union Government or any unit of the Union of India for the removal of difficulties that might hamper the trade of glass articles or for grant of special facilities for the Glass Industry.
- To draw Government or public attention to the difficulties in the way of Glass Industry and to solve other problems confronting it and to solicit their help and support through concerted action.
- To organise a united front on behalf of all glass manufacturers and thus strive to gain all those advantages which may not be possible through individual effort.

All those engaged in the manufacture of glass and glass articles are enrolled as 'Ordinary' members of the AIGMF and those associated with the Glass Industry are enrolled as 'Affiliate' members of the Federation.

Almost all glass manufacturers including many in the small Scale Sector are 'Ordinary' members of the Federation. Articles of Association of the AIGMF were amended in September 1992 to enroll foreign companies as Affiliate Members of the Federation.■

AIGMF Secretariat

Glass News INDIA

GORILLA GLASS MAKER, CORNING, EYES TIE-UP WITH INDIAN COMPANIES

Corning, makers of Gorilla Glass, used to cover touch screens in the most high-end mobile handsets, is looking at tie-ups with local device makers, with an aim to increase revenue from India, which is considered among the world's fastest-growing smartphone markets.

James Hollis, Director of Sales and Engineering at Corning, told that the company is keen to work with local manufacturers through the value chain, right down to contract manufacturing, which is done in China, such that the Indian handset makers use Corning Glass in most of their smartphones. He was speaking at the launch of its patented anti-microbial and native damage resistant glass versions in India.

"In emerging markets like India, local original equipment makers (OEMs) are moving from featurephones to smartphones. So we want to work closely with the manufacturer very early on, so that they choose Corning Glass as a glass for their smartphones," Hollis said.

The company is trying to analyse the requirements of Indian device makers and address problems faced by them as they try to innovate designs and bring out larger screen devices in short durations.

Corning India President Amit Bansal added that India was a critical market in terms of sales and manufacturing. The company set up a fibre optic manufacturing plant in India last year, which it closed with global revenues of $8 billion. The company spends about 10% of its annual revenue towards research and development.

VIKRAM SOLAR JOINS HANDS WITH DUBAI'S UNIDAAN TO SUPPLY SOLAR PRODUCTS

Kolkata-based Vikram Solar has entered into a distributorship agreement with Dubai-based Unidaan FZ LLC to supply solar products and services in the Middle East and North Africa or MENA region.

The two companies will work hand in hand to further foster the development of EPC (engineering, procurement and construction) and solar business in the MENA region, Vikram Solar said in a release.

The company specialises in manufacture of photovoltaic solar modules and EPC contracts for solar power plants. "In line with our aim to deliver uncompromising value to our customers across the globe, the agreement with Unidaan is a landmark development," said Gyanesh Chaudhary, Managing Director of Vikram Solar.

"Unidaan, with its rich experience and regional knowhow in the energy sector in United Arab Emirates, is the ideal match to promote Vikram Solar's products and services in the MENA region. We are very happy to have such a strong partner to cater to the requirements of this region and extend Vikram Solar's regional reach," he said.

MOTILAL OSWAL PE INVESTS RS 75 CRORE FOR STAKE IN GLASS WALL SYSTEMS

Motilal Oswal Private Equity has invested Rs 75 crore for a significant minority stake in Glass Wall Systems (India) that manufactures, supply and installs architectural glass facade system. The company that boasts of projects such as Mukesh Ambani's residence The Antilia, The Capital Bandra Kurla Complex, will use the capital to expand its manufacturing, company official said.

"Investment by Motilal Oswal PE will help us to set up a state of the art fabrication cum processing facility for facades in Mumbai. This facility will significantly increase our capacity by 3-4 times enabling us to cater larger number of projects," said Jawahar Hemrajani, co-founder of Glass Wall.

glasstec 2014 presentation in New Delhi

Messe Duesseldorf India organised an interactive session with Mr. Hans Werner Reinhard – Deputy Managing Director, Messe Duesseldorf GmbH, Germany and Dr. Bernd- Holger Zippe – President & CEO, Zippe Industrieanlagen GmbH, Germany over a presentation on glasstec 2014.

Mr. Reinhard gave an overview on glasstec 2014. Dr. Zippe spoke about new technologies to be showcased during glasstec show.

The program was held at The Imperial Hotel in New Delhi on April 3, 2014, which provided an opportunity to learn about the Industry.

Founded in 2002 by fabricators Jawahar Hemrajani and Kamlesh Chaudhari, the company installs glass facades and other building materials for residential and commercial complexes in India. The company has been growing at 23% CAGR in the last five years.

In India, wide usage of facade has been prominent only in the last decade and with high economic growth, focus on aesthetics, growth in income, people willingness to pay and growth in high rise construction will drive usage of facades in both premium residential and commercial segments.

GOEL SCIENTIFIC GLASS EYES RS 10-CR PE FUNDING

To diversify from industrial products to home décor glass products

Vadodara-based industrial glass products maker Goel Scientific Glass Works Ltd is planning to raise around Rs 10 crore through private equity funding. The company is embarking on the designer home décor glass products segment under the brand D'Boro.

"We are planning to have a private equity partner in the next 3-4 months. The company's valuation exercise is underway and we plan to raise about Rs 10 crore through a PE partner. For this, we are ready to give about 10-20 per cent stake to PE partner," Hemant Goel, Chairman, Goel Scientific Glass Works Ltd, said at a media briefing in Ahmedabad.

Goel informed that the additional funding will be required to strengthen its manufacturing as well as marketing of the home décor glass products.

The company, which had reported a turnover of Rs 16 crore in 2013-14, is eyeing Rs 25-30 crore turnover this fiscal with around 30 per cent of it coming from the home décor glass products. The company has a manufacturing facility in Vadodara.

Besides the scientific and labware glass products, the company has developed designer glass furniture in the categories of tables, partitions, display racks and jumbo vases. The company has obtained patent for its glass furniture, while it has six other patents in industrial products.

"Our target is to increase our business in glass furniture with innovative products. In the next 8-10 years, we expect to achieve Rs 2,500 crore turnover," Goel said, adding that initially the company will sell its products in Ahmedabad, Vadodara, Surat and Mumbai markets.

The company has export revenue of Rs 7 crore, which is likely to increase to Rs 12-15 crore this fiscal. "Initially, we will sell the home décor products in the domestic market, but we expect demand to come from overseas markets like the Middle East and the US," he added.

Diversification from industrial products to home décor is expected to help the company strengthen its brand as well as penetrate into the consumer segment. "In the next two years, we plan to cover the entire nation with our sales network," Goel said.

SCHOTT INDIA ACQUITTED OF ANTI-COMPETITIVE CONDUCT

The Competition Appellate Tribunal (CAT) has cleared SCHOTT India from all penalties and charges made under an Order of the Competition Commission of India (CCI) that had been initiated by Kapoor Glass Pvt. Limited. SCHOTT India was falsely accused of abusing its strong position in the glass tubes market and granting discriminatory pricing and other favorable terms to its affiliated entity, SCHOTT KAISHA as compared to other converters in the market.

In July 2010, Kapoor Glass Pvt. Limited (Kapoor), a converter and former manufacturer of Glass Tubes, filed information with the CCI in which it complained of alleged anti-competitive practices of SCHOTT India which affected the competition in the market for Neutral USP Type I Borosilicate Glass Tubes as well as in the downstream market for the Containers. After the CCI initially decided against SCHOTT India, the case was referred to CAT.

In the CAT judgment, it was pointed out that SCHOTT KAISHA was a vertically integrated subsidiary of the SCHOTT Group and that the quantity purchased by SCHOTT KAISHA by far exceeded the purchases of any other converter company. Better terms for SCHOTT KAISHA were therefore justified. The tribunal also clarified that there was no negative impact on the downstream market for glass tube containers and that the ultimate consumer did not suffer any damage as alleged in Kapoor's appeal.

The judges refuted CCI's argument that favorable prices of SCHOTT India for SCHOTT KAISHA had resulted in reduced profit margins for the other converters and deprived them of their chance to

grow. In addition, they rejected the allegations by Kapoor that SCHOTT's Standard Trademark License Agreement was unfair and restrictive to the detriment of other converters.

Finally, CAT clearly denied any obligation of SCHOTT India to make deliveries to Kapoor, which had been stopped in 2008. The special Tribunal established that Kapoor had once forged SCHOTT India's labels and thus committed a clear and unabashed breach of trademarks. It condemned such act of forging as the relevant products had a direct relation with human lives and serious consequences could ensue on account of usage of inferior quality of glass tubes. The Tribunal stated that it could not imagine the seriousness of the consequences if Kapoor could pass off inferior quality glass with the help of such faked labels.

DISCARDED BOTTLES BECOME BANGLES IN A STORY OF REUSE

Setting an example of the principle of "reuse and recycle", King George's Medical University is contributing to reducing the garbage burden on the environment.

The medical university provides an average of 2,500kg of glass material every month and supplies it to bangle making units in Firozabad. The glass material is a part of the 3,000 kg of biomedical waste that the hospital generates each day.

Around 85% of this waste is household waste while the remaining is infectious and needs to be incinerated. The non-infectious waste material is segregated in categories of plastic and glass. The sale of this scrap fetches Rs 1.25 lakh per month to KGMU.

Scrap dealer Mohd Imroz, the link between KGMU and Firozabad's bangle makers, said though the contribution was small, the message was very significant.

"As of now, we get glass from only two hospitals while there are more than a 100 big hospitals in the city," he said.

Mohammad Parvez, a faculty member in the department of anesthesiology at KGMU said hospitals in the city could contribute majorly in recycling and reusing their waste.

"Around a kg of biomedical waste is generated per bed per day. At this rate, Sanjay Gandhi Post Graduate Institute of Medical Sciences generates around 900kg of biomedical waste per day while Balrampur Hospital makes about 650kg biomedical waste in a day," he said ■

(News Source: AIGMF Research Team / World Wide Web)

List of Advertisers

Seminar on Energy Efficiency & Waste Heat Recovery System for Glass Industry

(April 19, 2014, Mumbai)

AIGMF organised a Seminar on Energy Efficiency & Waste Heat Recovery System for Glass Industry on April 19 at Sahara Star Hotel, Mumbai.

The Seminar was sponsored by M/s Oranje Kracht Engg. Pvt. Ltd., Mumbai who are representatives of ALSTOM & Qpunkt GmbH offering wide range of high temperature heat recovery products like recuperates, waste heat recovery (WHR) boilers along with a complete turnkey WHR system for glass industry.

Mr. Bernd Schatzler of Qpunkt Company Group gave a brief overview of Pilkington Glass & Euro Glass who are in Engineering & Supply of advanced and highly developed Float bath technology and complete Flat Glass Plants and Engineering and Supply of advanced Waste Heat Recovery and Unitlity Systems, etc.

Qpunkt Company Group worldwide supply key technological equipment upto complete production plants for the glass and insulation industry, as well as system for process optimization and reduction of primary energy demand – extra wide float batches for production of TFT glass, Float batches, Waste Heat Recovery Systems, EQM System for furnace pressure control optimization and primary energy savings, etc.

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audits of large industries, buildings, municipal water pumping installations and thermal power plants, promoting energy efficient technological solutions for small scale industry sectors and Baseline assessment studies under the PAT scheme of Government of India.

TERI has undertaken initiative for Energy Audits in six large glass manufacturing units, Energy conservation activities in Firozabad glass industry cluster and Sectoral study covering glass sector to explore the potential for inclusion

be installed to furnaces ranging from 100 to 1200 TPD with payback period of less than 2 years.

Mr. Girish Sethi, Director, Industrial Energy Efficiency Division, (TERI) The Energy and Resources Institute gave a presentation on 'TERI's initiatives in Glass Sector'.

TERI is an independent, not-for-profit research organization established in 1974. TERI pursue activities related to energy, environment and sustainable development

TERI's key activities are Energy

in the next phase of PAT cycle.

Mr. Arunovo Mukherjee, VP, Tata Cleantech Capital gave presentation on Financing Options in WHR Systems.

The program was attended by approx. 50 Industry participants, which provided an opportunity to discuss energy efficiency techniques and project financing options.

Complete presentations are available at http://aigmf.com/past-events.php#23 ■

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Strategic Management in Glass Industries

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ABSTRACT:

In March, 2013, AIGMF organized a very good one-day Seminar on "Competition Laws in India" and obviously its impact on different industries, particularly on glass industry, was also deliberated. AIGMF is an organization consisting of corporate entities, and also technical or commercial executives and scientists are the members. They regularly read the official journal of AIGMF, i.e. Kanch. Hence, it is quite natural to reflect on different issues of such seminars that are useful to the industry as well as to technical/ commercial personnel. In this article, the topic of "strategic management" that was also presented in the same seminar as: "Marketing Excellence & Systems" in terms of its role in competition. Here, it will be discussed and in subsequent issues, the other relevant topics will be dealt with including the main topic on competition.

I. INTRODUCTION:

In any business, the "strategy" is very important to make progress, even for the day-to-day operation or planning. The business in "Glass Industry" cannot be an exception. Among many other important things, here comes the strategic management in order. A viable model for strategic management has been developed for various businesses, which is obviously suitable for glass industry. This model is described in comparison to Mckinsey's **7S** model to better understand the customer angle with 'customer equity'. An in-built 'marketing audit recipe' is presented to monitor the general progress of the implementation of such a model in any glass industry.

The economic liberalization era started in India in the early 1991, wherein the pace of economic activity and hence the economic progress were quite slow compared to that in China, despite having some patches of good growth over 8% before 2008. Due to various policies in India, except for a few plants in some sectors, many plants are not on "economy of scale" and also there is not much "automation" exclusively for the purpose of improving the "productivity" level in a given industry. Without going to any debate, it could be safely said that India is not only investment-starved, but also its productivity (with some exception) is quite low in many sectors.

It seems difficult to emulate the 'Chinese strategic vision', unless there is a semblance or even parity of the economic activity levels in various industries, or in various sectors of the economy. Nevertheless, compared to previous periods (prior to 1991), we have come a long way in liberalizing our economy in various sectors giving us prosperity and some kind of progress in many fronts of Indian economy, except for the last 3-4 years. The basic tenets of this 'progress' is that we have opened the 'floodgate' of imports of hundreds or even thousands of products leaving the markets wide open to competition, thereby giving various options on quality, price and delivery to the customers. In this process, the Indian industry has also revived in terms of many desired parameters to make themselves ready for foreign competition. Some companies perish, but some companies do prosper to have adopted

a viable strategy in time. That's the buzzword for this success. This article is precisely to deal with this issue. The customer's choice is the name of the game today. No one could deny it and no one could by-pass this matter in India today.

A brief outline on Indian economy and industry are given above just to emphasize the point that where we stand. What about the glass industry? It is not good. As there is no real-time data on the inventory, it is often noticed that there is a massive inventory piling up in certain sectors, where despite good marketing efforts, things are not going the way as desired. There is some kind of invasion by foreign products by imports. No one needs to be scared of competition, if one adopts and follows the path of 'strategic management'. A clear focus is given here for the corporate world in general, and glass industry in particular, about the need and importance of strategic management **[1]** and this issue is coupled to the technology development as well that has been discussed in a number of technical articles in Kanch **[2-6]**. One similar article was written on the health of refractory industry with a 'strategic management' angle for the technical implementation **[7]**, as refractories are also important components in the glass and ceramic industry.

After describing McKinsey's 7S model of strategic management, let us describe our pragmatic **5C** model. We could adhere to this model or any other that is strategically fit. A strategy is something that one could drown oneself so that its implementation could be smooth. Also, there is no alternative to a situation that encourages 'continuous improvement' in evolving new strategy for better output. This effort very well serves the purpose of the organization and of course of all the concerned stakeholders – i.e. shareholders, employees, suppliers, and finally the customers. This aspect of "customer focus" is perfectly understandable in any business context **[1,8]**. A company with an ISO certification normally has a better understanding of all these factors, as a 'culture of quality', and a 'culture of customer care' has already been generated or absorbed within the system.

For certain glass plants, the cost-benefit analysis of a large process control system implementation was discussed a long time ago **[9,10]**, when it was almost inconceivable for any glass company to be able to invest a large sum of money for such a robust control process. Now, both for the sake of 'quality' and higher 'productivity', it is considered a viable strategy for many operations. In the present article, we will talk about the need and importance of a model in 'strategic management' in the particular context of glass industry.

II. STRATEGIC MANAGEMENT MODEL:

First of all, let us talk about good old model of Mckinsey that is called **7S** model, which is described with **S** as the first letter as:

Structure – which a company must have anyway,

Strategy – which a company must adopt,

Systems – which a company must evolve to run a business,

Skill – which is summation of employees' skill that a company possess,

Style – which a company must possess that usually evolves with time,

Staff – which a company do have to take care of the above – all these attributes having in possession or developed lead to the last item:

Shared values – that's a 'must' anyway.

The above descriptions sum up the entire **7S** model of Mckinsey. The peculiar thing to note in our comments on the right hand side – which all sound too obvious. Then, what is our problem? Everywhere, we write that "which a company must have" – which means that a 'company' do have some kind of 'structure', may be a stereo-typed 'strategy', some 'systems' in place, a degree of 'skill', a particular 'style' of management, and finally a company must have some 'shared values', whether the company runs on a so-called paternalistic pattern or in a professional manner. Somehow, the above model misses on something that we do not have or we do not do. A simple 'management audit' would reveal: who does what and what is the efficiency? Whatever the companies do, in the face of fierce competition in the marketplace (both internal and external), the results are not too good for all to see and judge. So, that brings us to our universal **5C** model, which has been seen to be used around the world in many companies. Here, an attempt is made in simply articulating the workable ideas on this **5C** model as follows:

Various components in the 5C model needs explanations as follows:

1) **Culture:** It is of utmost importance, since the culture could be visible

(e.g. the behaviour or attitude), or invisible (e.g. customer care). The CEOs must try to imbibe a good culture in the company which the other employees would emulate – so we need a strategy. However, would any glass company care to appoint a person to calculate how much money the company loses due to the "lack of culture" of the people involved in a particular job or operation, i.e. marketing, HRD, etc.

2) **Communication:** How many glass companies could boast of a good two-way communication between the employees for better quality, better marketing and even better receivables collection that matters a lot for the company for cash flow position. So, this needs to be encouraged with one condition – clarity, again from the top – so we need a strategy. Would any glass company care to meticulously calculate the cost involving the 'lack of communication' either to the suppliers or to the customers (two most important stakeholders). This could be the world of "information". This bit of information will already generate a lot of "cash" for the company by reducing the deleterious effects and helping the "dispute resolution" mechanism among various sections of the employees.

3) **Create:** Many people in some glass companies are creative., but how much of this creative activity is with a 'purpose' that has been fruitfully utilized, e.g. Indian glass companies still do not live upto the standards on colours in industrial and consumer glass articles sectors. Here is one field among many others, where the creativity could really work wonders – so we need to have a strategy on how to unleash the "creative energy" of a company. However, would any glass company care to calculate the loss incurred for not listening to good creative ideas ready for implementation due to a last-minute somewhat illogical or hasty (or, both) decisions.

4) **Consolidation:** There are myriads of examples, where glass companies like many others must have experienced that they could not hold out to the "gains" in the absence of any viable 'consolidation strategy' – so in this case, we also need to adopt a strategy for consolidation of our strategy – e.g. market gains, market penetration, market segmentation, HR training, HR output or productivity, prudent financial analysis, useful financial investment in incremental manners, etc. The list could go on and on. Then, how many glass companies would care to do a serious "audit" and eventual in-depth analysis of the "missed opportunities" due to the lack of 'consolidation' efforts, particularly in marketing.

5) **Customer satisfaction:** The positive side of all of the above will get washed away, if we finally do not pay a massive respect to our customers, listen to their problems, separate the problems and then tackle each one of them in a cohesive manner – eventually to serve them well with utmost care and concern. So, we need a viable strategy for 'customers in order to increase the 'customer equity'. The 'customer equity' will never increase unless the customers are really satisfied.. We could dwell on the complex issues of 'customer equity' in a separate article in the next issue of Kanch. But then why not initiate a series of serious efforts on the customer satisfaction by means of an 'audit' that is based on some well-known methodology. This effort should include an in-built refining approach for better efficiency of the audit system.

III. MODEL FOR IMPLEMENTATION:

Finally, a model of implementation is presented above, which is a modified version of 'management audit system' or 'strategic management system' that could be used with common sense, but with extreme care and care for refinement. So, it is basically a 'refining approach', which is described as follows:

1) Without the 'thought process', nothing can be started – as the famous dictum goes as – 'the action follows feelings'. Unless we feel for something, we cannot act on any issue or topic of interest within the company. So, CEOs would generally ask what we are thinking about an issue and then ask what we have done or what we are planning to do. This is the right approach. Hence, a glass company must encourage the "thought process". However, during a 'hasty' professional life, many such decisions appear to be unnecessary or people just do not have enough time to think on a day-to-day basis. Thus, it is suggested that CEOs start a weekly 'creative session' in a carefully designed 'creative room' so that some ideas crop up on a weekly basis – and then judge the possibility of implementation.

2) Based on the written down information list/idea list, choose the best possible opinions by the "option weighing mechanism" with some degree of consensus (not too much though).

3) Here, the real work starts – i.e. start

questioning every bit of 'information' list and suggest remedial measures – i.e. the 'pros' and 'cons analysis of the list.

4) The above helps to refine the approach and prepare a modified 'action plan' with clear guidelines with some minimal options, if needed, and the personal responsibility is clearly spelt out or pinned down on certain individuals.

5) The famous dictum goes like – "All is well, if that ends well". The idea is to simply follow the 'action plan' as rigorously as possible. There is no scope of dithering on any issue anyway, since some weighted options are already provided with implementation list or the original 'idea list'. Finally, if the implementation fails, we should review and then start at the beginning of the process of 'idea generation'. That's the price we must pay for the 'faulty' implementations – and the employees must learn. However, this 'learning curve' must be as short as possible, since no one has 'enough' time. In this manner, the life remains simple and we do not have to do too much 'fire-fighting'. The "Implementation Culture" should be taught, if not already learnt.

Does the above looks tedious or time-consuming? The answer is a big NO!! Once we see the ball rolling, and once the CEOs start the above process sincerely, the culture becomes 'ingrained' in the body and spirit of the employees. This is the reason why we first talked about "Culture" at the beginning of this article on our above 'strategic management model' that should be pervasive all over the concerned company. Someone has to bell the cat and somehow, somewhere, someone has to start it for the betterment of glass industry – which might be eventually helpful for the entire industry.

In the proverbial tone, we could say "nothing succeeds better than success". So, once the above model is successfully implemented – that success leads to do more and achieve a greater height. If that's not splendid – "What is Splendid in Business Management"?

Finally, it should be clearly pointed out that our model is applicable in any business situation and in any operation of any scale. From a complex delivery or shipment problem to a technical problem to fix a 'specification' or for offering a set of goods and services, just try this model – it will definitely work for the better.

IV. CONCLUSIONS:

The main problem in the **7S** model of Mckinsey is that there is no customer angle in the explicit form. Moreover, many aspects look too obvious, and the companies follow them in one way or the other. Our model on "Strategic management" looks simple and pragmatic in the sense that when successfully implemented, it directly and explicitly makes a contribution towards "customer satisfaction", which finally counts at the end of the day. This will definitely augment the 'customer equity', which will increase the 'profitability' of those glass companies, who clearly want to stay ahead in the fiercely competitive marketplace. The 'implementation angle' with a "refining approach" is a 'double dose' that is really necessary in today's business environment, which is intentionally highlighted as some kind of pessimism does not settle in the minds of the concerned people. More such practical models will be presented through Kanch in the future editions with the hope that they will be somewhat useful to the glass industry.

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Answers for industry.

Recovery for Global Photovoltaics Market on the Horizon:

Promising Outlook for Suppliers

The crisis of the photovoltaic industry is drawing to a close. While it is true demand for solar modules is dropping in Europe, demand in many other regions is rising rapidly. Even the producers of thin-layer modules which we had been almost "written off" are investing in new factories again. This is good news for the producers of solar glass and production equipment.

Photo: BELECTRIC Solarkraftwerke GmbH

Thin-layer in rows: solar project developer Belectric has built Europe's biggest photovoltaics power plant in Eastern Europe using cadmium-telluride modules by First Solar.

The solar industry has changed. As little as five years ago the manufacturers of solar modules were still announcing huge Gigawatt factories while research institutes were outdoing each other with ever new efficiency records. Thanks to abundant subsidies in many European states the total installed PV in Europe quadrupled to 70 GWh between 2008 and 2011. This huge demand made the sector brim with self-confidence.

Today, scarce evidence of this boom can be seen anymore. Many countries with feed-in tariffs for solar power have drastically curtailed subsidy tariffs due to the rapidly rising green energy subsidy costs involved. As a result, the build-up in Europe dropped by almost 40% last year. Subsequently, nearly half the European cell and module manufacturers disappeared from the market and production equipment suppliers started posting losses while solar glass producers and processors lost an important source of income.

However, those keeping their heads above water can now finally hope for better days. This holds particularly true for companies that are already multi-national players. "While Germany runs the risk of a further shrinking market, other countries are increasingly relying on the power of sunlight to make their energy supply safer and more eco-friendly," says Carsten Körnig, General Manager of the German Solar Industry Association (Bundesverband Solarwirtschaft).

And statistics support Körnig's view. In Japan and China demand for modules tripled last year and even in the USA it was up by 40%. China has announced it once again plans to considerably increase its targets for solar power build-up – by 2017 the total solar power output installed in the country is to more than triple. On a global scale demand for modules is expected to rise by at least 20% in 2014. At the same time, China continues to expand its market leadership in module production. According to a study by consulting firm Global Data, modules with a total of 40 Gigawatt will be manufactured in the Asia-Pacific region this year and of these 30 Gigawatt will be produced in China alone. As Global Data Analyst Ankit Methur explains, this means Asia now accounts for 90% of global production.

This development should play into the hands of solar suppliers. Many of them owe their economic success to the Chinese solar groups ordering equipment worth many billions of Euros for their huge factories in the boom years 2009 to 2011. Back then the export of cell and module manufacturing lines for the Far East accounted for some 80% of sales posted, for firms like Centrotherm and the Schmid Group. As the new capex cycle starts in Asia these companies could see a silver lining on the horizon.

At Centrotherm there are already clear indications of an upswing. After the company was forced to file for insolvency due to poor order levels at the end of 2012, it is now hoping to return into the black again in the current year thanks to new

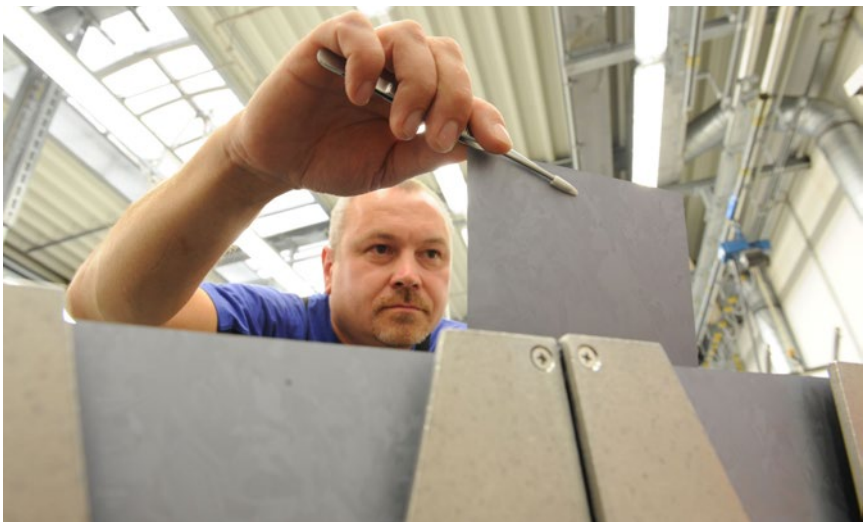


Photo: SolarWorld AG

Quality control: crystalline silicon cells are becoming ever cheaper. One reason for this is the improved properties of cell blanks, the so-called wafers.

orders from China and Taiwan. Florian Wessendorf, Managing Director of the Association Photovoltaic Production Equipment in the German Engineering Association VDMA, sees a similar development for the other suppliers. "The outlook has clearly improved." The expert thinks that German firms have clear advantages when it comes to automation and coating technologies. "In these high-tech areas plants made in Germany will also be highly sought after in future."

In the long term, photovoltaics could also become attractive again for the glass industry, says Timo Feuerbach, speaker at the "Forum Glastechnik" and adds: "At present the situation in the flat glass segment is difficult since producers are struggling with excess capacities. But solar energy is definitely a business for the future." At glasstec 2014 in Düsseldorf, the world's largest and most international trade fair in the glass sector, companies will demonstrate their continued focus on photovoltaics from 21 to 24 October 2014. They want to make their contribution to a further reduction in solar power prices, especially by means of thinner solar glass as well as more efficient production and coating techniques.

Innovations in solar glass and solar modules will also be centre stage at the Congress "solar meets glass" at the forthcoming glasstec. Here experts from the solar and glass industries will meet from 20 to 21 October 2014 in order to exchange ideas on the progress made in manufacturing, materials and costs. Experts hope for an even closer alliance between the two sectors. For the time being, solar power can only compete with conventionally generated power in a few regions with abundant sunshine. To change this, PV producers must urgently make further progress in cost cutting – and this is best achieved with help from their suppliers.

Thin-film producers, in particular, have ambitious targets. As the prices of customary silicon modules dropped over the past few years they lost sight of their original aim to oust the comparatively "clumsy" crystalline competitors from the market by means of thin and low-cost coated modules. But the technology, which had almost been discarded, could now be heralding a comeback – and, hence, boost demand for high-tech glass. For instance, thin-film manufacturer and former Q-Cells-subsidiary Calyxo has just put a new 60-Megawatt line for cadmium-telluride (CdTe) into operation in the Eastern German city of Bitterfeld-Wolfen. The company invested EUR 54 million to expand production capacity at the site to a total of 85 Megawatt.

Calyxo had every reason for this capital expenditure. "We will bring down production costs in the medium term to less than US$ 0.50 per watt. We will then be producing at the lowest costs worldwide," says company boss Florian Holzapfel. To compare: according to US market research company GTM Research, manufacturing costs for crystalline "China modules" currently stand at US$ 0.60 per watt.

Calyxo's optimism is based first and foremost on the ambitious announcements made by CdTe pioneer First Solar. In March the Americans announced new expansion and innovation plans triggering an immediate surge in their share price. By 2018 First Solar is planning to nearly double its capacity from its current 1.9 to 3.5 Gigawatt. Economies of scale thanks to higher capacities produced as well as the efficiency increase from 13.2% to 17.2% by 2017 are to "markedly bring down" manufacturing costs for CdTe modules, say First Solar.

The company sees its biggest sales market practically right on the doorstep. Agreed targets specified by the US federal states for renewable energies, the so-called Renewable Portfolio Standards, are forcing some American energy supply utilities to raise their green power levels drastically. The best option, particularly in the sunny south west of the USA, are large solar power plants. These can already produce a kilowatt hour for less than eight cents – cheaper than conventional coal and gas-fired power plants.

Also anticipating a significant rise in sales figures are the producers of CIGS-based, thin-film modules (copper, indium, gallium and

selenium). Solar Frontier, a subsidiary of the Japanese Showa Shell group, explained that its CIGS factory with 900 MW in the Southern Japanese city of Kunitomi had been running at full capacity all last year thanks to strong domestic demand. Now Solar Frontier is planning another 150-MW factory in Northern Japan. In Taiwan the Taiwan Semiconductor Company (TSMC) wants to implement 1 GW of CIGS production capacity. Korean firm Samsung has announced a new 200 MW factory for 2014, which is also to be ramped up to one GW in 2015. The Chinese energy group Hanergy even plans to build 5.25 Gigawatt of new CIGS capacities.

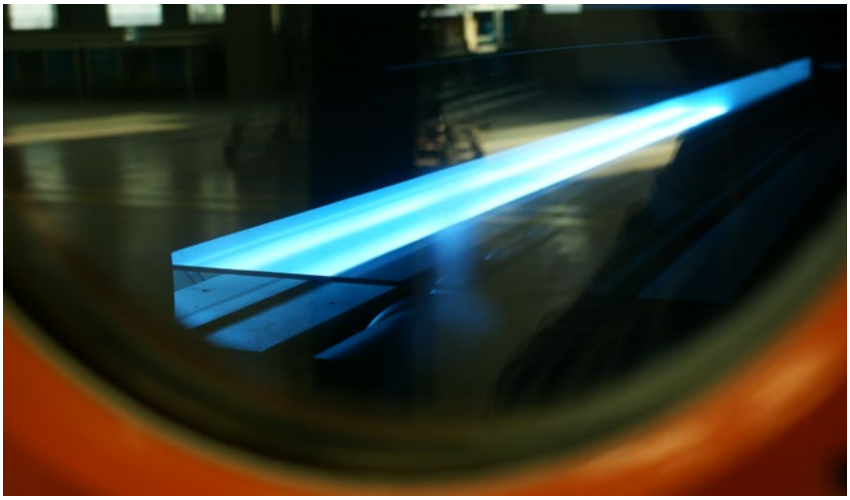


Photo: F-Solar

View into the furnace: flat glass production requires plenty of power. Therefore manufacturers aim to use less of this expensive energy.

To Bernhard Dimmler, thin-film expert at the Swabian machine manufacturer Manz, companies are pursuing these expansion plans for a good reason: "CIGS hold great potential." Dimmler refers to "CIGSfab", a turn-key production line that Manz has offered since 2010. This 150-MW standard factory, he explains, now makes it possible to produce modules with an average efficiency of 14% and production costs of EUR 0.41, i.e. $ 0.57 per Watt. By 2017 Manz intends to optimise its CIGSfab to such a level that modules with up to 17% efficiency can be produced and production costs can be cut again by at least 10%. "This would give us more than a level playing field with crystalline producers," says Dimmler.

However, market observers believe the catch-up race for thin-layer modules might prove more difficult than its protagonists assume. "You have to take their optimism with a pinch of salt. The race with competitors from the crystalline silicon segment is far from over," feels analyst Johannes Bernreuter of Bernreuter Research. The fact is, producers of silicon modules are also keen on making rapid progress. February saw Kyocera from Japan and Ja Solar from China announce the production of multi-crystalline record cells with 18.6 and 19% efficiency. On the module level these new cells allow for over 16% efficiency. Both corporate groups already wanted to start commercial production as early as this summer.

Thin but rugged: solar glass is only two millimetres thick these days. This saves material costs and makes it possible to build robust double-glass modules.

Photo: F-Solar

In the revised edition of the International Technology Roadmap for Photovoltaics (ITRPV) published in spring, crystalline cell and module producers are outlining approaches for further efficiency increases. According to this information, higher crystal qualities, optimised electrode processes as well as improved charge carrier/conductive emitter and barrier layers can ensure that incident light is used even more efficiently.

At the same time, crystalline manufacturers expect production costs to come down even further. On the one hand, these result from material savings in the wake of efficiency increases and on the other from falling production costs with the advent of new processes helping to reduce cutting losses in silicon wafer production and more sensitive processes allowing the processing of ever thinner wafer and grid fingers/bus bars.

Experts also see further optimisation potential for solar glass. Today, manufacturers are capable of making glass sheets as thin as 2 millimetres while the PV industry is still using solar glass of four millimetres as its standard. In addition, these sheets are also easier to process further thanks to new coating machines. In future, photovoltaic success will increasingly depend on exploiting cost-cutting potential – and the glass industry and equipment will play a key role here ■

Emerging Glass India Pvt. Ltd.

A Company Profile

Industrial growth is a key to the national development. Glass is very important component of the industrial and national growth. It is used in various forms and shapes in large number of areas e.g. real estate, infrastructure, retail, automotive, food and beverages etc. The market demands are most dominantly fulfilled by the organized glass sector like; Asahi India Glass Ltd, Hindusthan National Glass & Industries ltd, Piramal Glass, Saint-Gobain India, Gujarat Guardian, Gold Plus, Triveni Glass, Borosil, and Gujarat Borosil and demand gaps are fulfilled by imports. Any plan for establishment of new glass industry will certainly contribute to the progress of the nation and is indicative of good economic prospects in the respective area.

Emerging Glass India Pvt. Limited has been incorporated under the Companies Act, 1956 on 20.09.2013 having CIN No. as U26100DL2013PTC 258260. The Registered and the Corporate Office of the Company is at 2 E/7, Jhandewalan Extension, New Delhi-110055. The Company has been established with an objective to manufacture all types of glasses including sheet and float glass, figured glass, reflective glass, mirror glass, tinted glass, lacquered glass and toughened glass. It is a part of renowned Alstone Group of Companies which was established in 2004.

Member Editorial Board of Kanch, Prof. Devendra Kumar and Mr. K. K. Sharma interacting with Mr. Sumit Gupta, Managing Director, Emerging Glass India Pvt. Ltd.

Emerging Glass India Private Ltd is setting-up a most modern Green Field Glass plant at Keshwana Rajput Industrial Area, Tehsil Kotputli, Distt., Jaipur in Rajasthan. The company has entered into a contract with China Triumph International Engineering Co. Ltd (CTIEC) in November 2013 for the purpose of setting up of Glass manufacturing unit. Under the contract CTIEC would provide Plant and Machinery, Technical Know-how and various designs and drawings, manuals and assist in implementation of the project. The proposed project has two manufacturing lines:

- 210 TPD Horizontal Drawing Glass Production Line and
- 130 TPD Rolled Glass Production Line

The All India Glass Manufacturers' Federation (AIGMF) is actively engaged for promotion and growth of business and production in glass manufacturing sector. To elaborate on technical and business issues of Emerging Glass India Pvt. Ltd. and to make its prospects known to glass world, it arranged a meeting among persons from academia, industry and AIGMF with important person from EGIPL. Prof. Devendra Kumar, Department of Ceramic Engineering, I. I. T. (BHU) Varanasi and Member Editorial Board, Kanch represented Academia, Mr. K. K. Sharma, President NIGMA, Member Editorial Board Kanch and Plant Head, HNG Neemrana, Rajasthan represented Industry and Mr. Vinit Kapur represented AIGMF met Mr. Sumit Gupta, Managing Director, Emerging Glass India Pvt. Ltd. The meeting was held on 18th June 2014 at their registered and corporate office at 2 E/7, Jhandewalan Extension, New Delhi-110055.

When Mr. Sumit Gupta was asked the question "What is the motivation for establishing a glass industry of its

Signing of contract with China Triumph International Engineering Co. Ltd. (CTIEC)

kind?" he said that it is a part of expansion program of their group of companies. They are already established in production and business of building materials for real estate and infrastructure.

Their market overview revels that the organized glass sector dominated by large players has been in the manufacturing and business of float glass having thickness of above 2.5 mm. There is a huge gap between demand and supply of sheet glass having lower thickness ranging between 1-2 mm. The current demand for this lower thickness flat glass (1mm to 2.5 mm) is around 500 TPD, whereas the existing sheet glass manufacturer feed only about 60 TPD. The balance demand of about 85% is met entirely through imports from other countries.

The promoters identified this wide market gap & decided to get into the production of sheet glass of 1mm to 2.5 mm thickness so that the demand is just replaced from import to a locally manufactured product. Besides the above vast niche market, the company has also the option to produce higher thickness glass sheets above 2.5 mm and can feed the respective market. He further added that sheet glass with lower thickness has a different market segment and application areas. These application areas are;

1 mm Sheet Glass (Micro slides):- The main use of 1mm Sheet Glass is in **micro slides**, which is used in Blood Testing, etc. In India there is no manufactures of this Product and entire demand is met through imports.

Usages of products	Thickness
Microscope slides	1 - 1.2 mm
Wall clocks	1.5 - 2 mm
Photo frames	1.5 - 2 mm
Mirror	1.5 - 5 mm
Household windows & other applications	3 - 4 mm

1.5 - 2 mm Sheet Glass: - This thickness is primarly used by **Wall clock and Photo frame** industry. The demand of these articles is increasing in India and abroad, this industry is major user of this thickness sheet Glass.

3 - 4 mm Sheet Glass: - This thickness of Glass is mainly used in Building material for household windows, Partition, Interiors and Furniture, Automobile Industry etc.

Mirror Glass: A forward integration by way of further processing a part of sheet glass production to convert it in mirror glass gives huge value addition to the product. Mirror Glass is gaining a more prominent place in architecture for important functional reasons as well as for the aesthetic effect.

Figured Glass : with thickness in the range of 3 - 10 mm thickness has multiple applications right from kitchen, bathroom, furniture, partition, staircase railing, shower cubical and interior decoration of any restaurant & hotel industry. It is a wonderful product for those applications where light is desired without losing the privacy.

The application/allocation of the products having different thicknesses are given in the table:

Mr. Sumit Gupta was asked about the technology being used for the manufacture of smaller thickness sheet glass. He said that EGIPL has selected **upgraded Colburn Technology** to manufacture Sheet Glass. The selected technology can produce 1mm to 12 mm thick flat sheet glass. It is the only technology through which one can produce ultra thin flat glass of even 1 mm thickness. Firstly company will entirely focus on lower thickness ranging from 1mm to 2.5mm as this market remains untouched by the float glass manufacturers. The float glass plants are not capable to produce lower thickness of below 2.5mm due to much higher production cost.

It has been reported that, the quality of existing figured glass manufacturers does not meet the required standards so the demands for those applications which are met through imports.

Most of the figured glass produced by existing manufacturers are not toughenable, because of which it cannot be used in certain application like shower cubical, furniture etc.

Moreover, the width available with current manufacturers is 1220 mm which again restricts its application in certain areas.

With the selected advanced latest Technology, the quality of figured glass produced by the company will be of high quality figured glass which can be **toughened**.

On the technology front of the company it was added that the company would also like to introduce latest technology of using **Pet coke as fuel.** They will be the first flat glass company to introduce this technology of firing the furnace by using pet coke in India. Till now, there are few container glass manufacturing companies namely HNG & AGI, which are switching to this technology. China has been using pet coke for their large flat glass plant for many years and it is a matured technology and has now been widely accepted by glass manufactures in China. The cost of pet coke powder is comparatively lower than that of heavy oil/natural gas. The EGIPL Plant will use State of Art Plant & Machinery and other Equipments with world's best technology.

Regarding marketing strategy and distribution network it was informed that EGIPL will get the benefit of existing marketing network of the Group concern Alstone International. The Promoters of the Company are already into the similar kind of business activity. They have got pan India presence through its wide 150+ dealer distributors network, sale- offices cum ware-houses across India and well trained and professionally managed marketing team. The existing dealers and distributor of the Company also sells the Glass products. This marketing network will act as backbone for its Glass Product as well. Sale- channels, which will be used to market the products are- Channel Sales, Institutional Sales and Exports. **Channel Sales will cover** range of products Sheet, Figured, Tinted, Wired and Mirror Glass. It will not only create immediate business for the company but also will help the company to spread its product in entire country. For **Institutional Sales** the company is in the process of appointing a team of

Bhumi Poojan (Ritual Ceremony) of EGIPL Site Plant

experienced Institutional Sales staff with relevant experiences. The segment covered in Institutional Sales are; **Microscope slides and Wall clock glass**. The company is already in touch with the important institutional clients and is getting positive response from them. The company will also **export** its products in neighbouring countries (Sri Lanka, Bangladesh, Myanmar, Nepal etc). Europe, USA & African continents. The company has already conducted its survey in some of the countries and plans to export its 15-20% of its glass products to those countries.

It was informed that civil work for establishment of Glass manufacturing unit at Keshwana Rajput Industrial Area, Tehsil Kotputli, Distt., Jaipur in Rajasthan is going on full swing. It is expected that production will start approximately within 15 months i.e. by September 2015.

PROMOTERS EXPERIENCE IN THE LINE OF ACTIVITY

The promoters are already in manufacturing business of Aluminum Composite Panel (Building material product) with brand name 'Alstone' since 2004. Alstone has established a strong brand in the market. The Company is not only the largest manufacturers of Aluminium Composite Panel in India but also has got Pan-India presence with 12 warehouse-cum-offices along with chain of over 150 dealers/ distributors all over India in Delhi, Noida, Rajasthan, Ahmadabad, Indore, Bangalore, Chennai, Hyderabad, Kochi, Kolkata, Raipur, Ranchi, Lucknow, Pune etc. It is on the way to expand its network in neighboring SAARC region.

Promoters of Alstone Group :

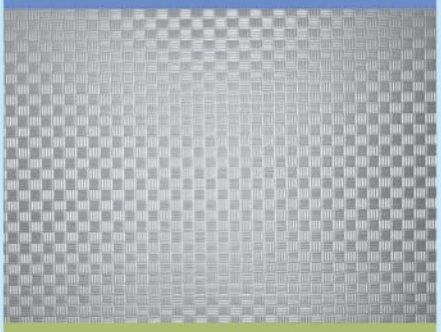
Mr. Sumit Gupta is young talented person with vast 10 years experience of business development and management. He belongs to a business family and has imbibed business understanding and acumen from his father Mr. Vijay Gupta, Chairman of Orris Group. He is a MBA and his vision, deep rooted industry knowledge, expertise and business acumen has helped the Alstone Group in achieving great heights and business goals. He has shown courage and unflinching commitment in creating value and setting superior standards. Owing to his spectacular endeavors and support of his Partner, Mr. Pawan Garg, the Alstone Group has ventured into setting up industrial units for products which are in great demand and are not having adequate indigenous production facilities. He understands the right pulse on the industrial sector. He is a harbinger of novel and innovative ideas in the industry. He has always believed in achieving a balance between economic, social, and ecological concerns within the context of the Alstone Group's responsibility for the environment and society.

Mr. Amit Gupta is young and energetic and has studied business management. He has sharpened his business acumen and diplomacy over the years through his skills and training in India and abroad. He is partner in Alstone International and Managing Director of Orris Infrastructure Private Ltd. He is actively involved in Real Estate business under the leadership of Mr. Vijay Gupta, Chairman of the Orris Group. He combines the wisdom of his lineage with the new-age mantra of business leadership. He has first-hand and hands-on-experience of several Real Estate projects in Gurgaon, National Capital Region and elsewhere in the country ■

Ongoing Civil Work of EGIPL Plant at Keshwana Rajput Industrial Area, Tehsil Kotputli, Distt., Jaipur

Note: *The profile is based on Company information as provided by Emerging Glass India Pvt. Ltd. to the AIGMF.*

DYNAMIC



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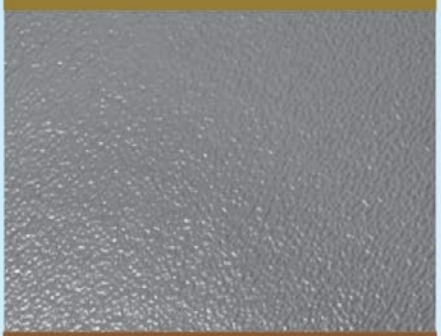

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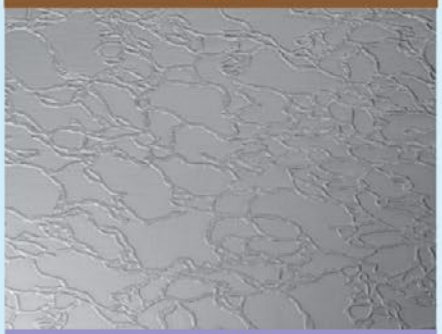

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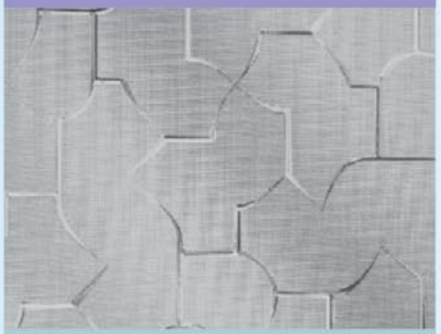

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Focus on Efficiency and Quality

The innovative power of glass machinery and equipment builders is a crucial factor for the performance of glass manufacturers and processors. These days their development efforts focus on maximum production efficiency, high product quality and, increasingly, on energy efficiency.

Photo: sedak GmbH & Co. KG / Photographer René Müller

Modern glass finishing machines must deliver the best product quality in shortest cycle times and blend perfectly with the company's production workflow. The photo features the new XXL flatbed printer from glass finisher sedak in operation.

The requirements made of glass machinery and equipment manufacturers are more comprehensive and challenging than ever before. The increasing international competition in the glass sector, the associated price pressure, the growing number of different glass products and the strongly diverging batch sizes mean many glass converters are looking to high-performance technologies. To stand their ground against competitors the production of these enterprises must be highly efficient and they must consistently deliver the best possible product quality and ensure maximum flexibility. Another challenge is the rising weight of construction glass. Large-format glazing units are in fashion and the proportion of laminated toughened glass is also continuously on the rise. To efficiently manufacture these heavy large-format sheets processing machines and in-house and external logistics need to be modified. Moreover, the greater variety in types of glass requires a faster changeover between glass types – one prerequisite for this being optimised storage.

HIGH PROCESS SPEED AND TOP QUALITY

In view of the excess capacities prevailing on the glass market cutting production costs is often a matter of survival for glass-processing companies, especially in Europe. With a view to optimising the ratio between input and output, companies increasingly focus on consistent automation concepts, which are based on a holistic view of the operational environment and production workflow. Machine producers gear their machinery specifically to their customers' needs. This applies to both stand-alone machines and to turn-key manufacturing lines.

To achieve maximum efficiency extremely short cycle times are needed in industrial glass processing and finishing. However, this high treatment speed must not come at the expense of product quality and dimensional tolerances. It is not only automotive producers who expect absolutely precisely produced glass units – architects also require high precision. In April this year Franz Hauk, representative of the Technical Committee of the German Fachverband Fenster + Fassade e.V., demanded smaller tolerances for construction glass at the annual congress of the German Flat Glass Association (Bundesverband Flachglas e.V.). Due to their highly modern systems window and façade builders only had a very small tolerance area, said the fenestration and façade specialist, and added that exceeding it would lead to massive problems.

MORE ENERGY EFFICIENCY

Another crucial aspect of state-of-the-art glass machinery production is their increased energy efficiency. Optimised

Photo: Bystronic glass

Highest speed: All components in Bystronic glass' speed'line are designed for the highly efficient production of triple glazing units. This line allows triple insulating glass to be manufactured in the same time as double insulating glass on other lines.

workflows, the use of highly efficient engines and the latest radiator and convection technology in the manufacturing of safety glazing can all bring down companies' energy consumption substantially. Process water preparation also plays a prominent role in view of ever stricter waste water regulations. The latest purification technology allows firms to save the environment and natural resources, reduce costs and improve machine performance.

INNOVATIVE INSULATING GLASS MANUFACTURING

One example of modern high-speed manufacturing technology is speed'line from the Swiss-German group Bystronic glass. In this insulating glass production line the process steps are geared optimally to the production of triple glazing units so that fastest cycle times are achieved. Thanks to speed'line's triple glazing, units can now be produced in the same time that other lines take for producing double glazing units. The complete system includes two consecutive tps'applicator components for applying the thermoplastic spacers, the speed'assembler for quick assembly and gas-filling of the insulating units as well as the automatic speed'sealer.

Only recently the company introduced new simulation software to the industrial working party Research & Technology of "Forum Glasstechnik", the professional Association of Glass Machinery Builders in the German Engineering Federation (VDMA e.V.). This software allows engineers to precisely calculate the cycle times and costs for each individual glass pane while also displaying optimisation potential on existing production lines.

At that same meeting Leopold Mader of the Austrian glass machinery producer Lisec presented the latest production technologies, market potential and application benefits of triple glazing units from two-millimetre thin glass. Apart from reducing glass weight, using thinner glass also cuts primary energy needs in manufacturing by 30%, Mader reported adding that the changeover from previously customary 4-millimetre glass to 2-millimetre thin glass would result in substantial energy savings considering that in Germany alone 30 million square metres of insulating glass are produced every year. He said an additional value added was the smaller footprint for warehousing in addition to a higher light transmission of the insulating glass.

NEW BENCHMARK

A new benchmark concerning the size of glass-processing machinery possible

Optimised residual sheet storage: Thanks to Hegla's SGG-ReMaster any glass sheets left over after cutting, breaking and parting can be stored without the need for any additional space and can be automatically re-introduced into manufacturing on demand without interrupting the production process.

Photo: Hegla GmbH & Co. KG

Photo: sedak GmbH & Co. KG/Fotograf Hubertus Hamm

Big is trendy. Spring 2014 saw German glass finisher Sedak GmbH & Co. KG commission the world's largest digital flatbed printer for ceramic inks. It can print complex, multi-coloured pixel designs in high-resolution, photo quality onto glass sheets as big as 3.21 x 15.00 metres. The photo impressively shows the dimensions now possible.

today was recently created by the German company Sedak GmbH & Co. KG. These multi-national glass finishing specialists are able to print complex, multi-coloured pixel designs in a high-resolution photo quality on extra-large format sheets measuring up to 3.21 by 15 metres with their new digital flatbed system for ceramic glass printing, which was commissioned in spring 2014. "With a resolution of 720 dpi we not only produce excellent prints. Our digital printing process also makes for a significantly thinner ink layer than obtained through screen or roller printing. This allows us to produce translucent prints and to design flowing transitions," explains Bernhard Veh, CEO of Sedak. The ceramic ink is sprayed onto the glass sheets by means of a plotter. After burning in the furnace the ink is permanently linked to the glass and scratch-resistant. These printed glass sheets can be processed further into insulating glass and laminated toughened glass and are even suitable for cold bending (lamination bending) during the lamination process.

TREND TOWARDS VERTICAL MACHINES

A current trend in finishing glass surfaces and edges of glass doors and textured glass, for instance, is the use of vertical machinery. Their advantage: they have a markedly smaller footprint than machines with a horizontal layout. An example of this new type of machinery is the vertical drilling and grinding machine Vertmax made by Italian glass machinery manufacturer Intermac, a company of the Biesse Group. By company accounts, the new machine scores not only with its new user-friendly operator software but also with its finishing for float and laminated glass. Furthermore, the system, it is said, requires only minimal set-up times and it ca drill, mill, grind and polish glass for a multitude of applications quickly and with highest precision in an automated working process.

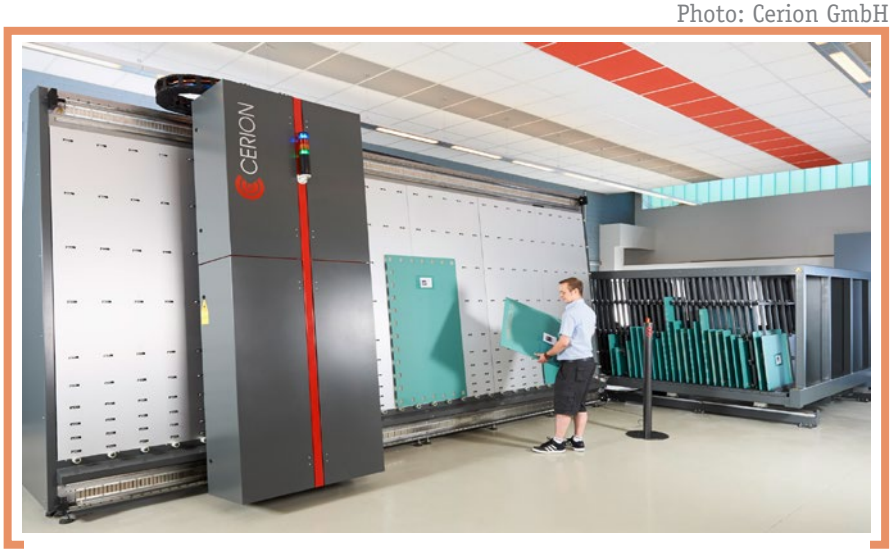
HIGH-POWERED LASER TECHNOLOGY

The sector feels that laser technology also holds great potential for flat glass finishing. Here the German firm Cerion GmbH is among the pioneers on the market. This company has continuously developed its plant technology and now offers machines that can perform internal or external engravings – depending on the layout – or even both using solid state and/or CO_2 lasers. The company's c-vertica series comes in various sizes and configuration levels. From

The latest trend – the vertical glass grinding and drilling machine Vertmax from Italian machine builder Intermac is very efficient, multiple-purpose and has a smaller footprint than horizontal systems.

Photo: Intermac

Photo: Cerion GmbH



Flat glass can now be finished efficiently and largely automatically with the help of state-of-the-art laser systems. Depending on version, Cerion GmbH's c-vertica makes it possible to engrave the surface or the inside of flat glass, even in very large formats. A combination of both finishing options is also available.

small systems for finishing door-sized formats all the way up to laser machines for sheet formats as big as 6,000 x 3,300 x 100 millimetres. Add-on modules allow the format to be enlarged by 3,000 mm each. With laser machines made by Cerion, float and laminated toughened glass can be treated as well as mirrors and other coated glass. Even surface engravings on TSG no longer pose a problem. Additionally, laser technology is suitable for de-coating flat glass or applying transparent anti-skid textures (certified according to R9 and R10). Thanks to the high degree of automation, entire product series can be processed with minimum personnel intervention.

RELIABLE QUALITY ASSURANCE

A key issue to be addressed in glass production and processing still is quality assurance. Here state-of-the-art scan systems provide ultimate assurance for glass manufacturing and processing. To Ulrich Bauereiß, Sales Manager of Dr. Schenk GmbH, a specialist for industrial measuring technology, the "true benefit" of automatic surface inspection in glass manufacturing lies in process optimisation. By evaluating the data furnished by these systems flaws in the manufacturing process can be identified and eliminated. Anything else was "purely sorting out" to him, as Bauerreiß explained last year in the Industry Working Party Research and Technology of the VDMA Glasforum.

Rainer Feuster, Sales Manager at Viprotron GmbH, a manufacturer of visual quality inspection devices for flat glass finishing, mentions three categories of flaws typically found in the visual quality of construction and insulating glass during inline inspections: flaws with clear contours such as scratches, inclusions and bubbles, defects with a low contrast such as roller waves, hairline scratches and impurities and lamination defects such as brush marks, deposits and surface damage. With its various high-quality scanner products Viprotron offers inspection systems that are specifically geared to the various flat glass processing segments and take the special requirements of each process into consideration. The latest generation of this scanner technology reveals even the smallest of defects.

What other technological innovations glass machinery and equipment producers from throughout the world currently have in store for glass producers and processors will be showcased in Düsseldorf at glasstec 2014 from 21 to 24 October. This the most important international trade fair for the glass sector will present the entire spectrum from glazier-crafted to industrial glass processing for the areas of flat glass, hollow glass, solar glass as well as various types of special glass. Efficiency and quality will play a pivotal role at the trade fair. The latest technology trends in machine and equipment building will be centre stage at the VDMA Symposium held on 22 October as part of the Special Show "glass technology live" at glasstec. The event will focus on plant engineering for processing and finishing glass. Special emphasis will lay here on quality and process control.

SUSTAINABILITY GAINING IN IMPORTANCE

The sustainability theme is gaining more and more importance for glass machinery and plant builders. Here, too, German machine builders are at the forefront. In 2011 the German Engineering Association (Deutscher Maschinen- und Anlagenbau e.V.) founded the sustainability initiative "Blue Competence". This network now counts over 400 enterprises including renowned glass machinery and plant manufacturers such as Grenzebach, Hegla, Isra Vision, Bohle and Zippe. As members of this initiative the companies pledge compliance with a total of eight criteria. These cover all relevant aspects of sustainability ranging from in-house production to awareness-raising amongst customers. By joining the Initiative, which is open to all European machine builders, enterprises make a clear statement on environmental protection and CSR matters. Once they boast the Blue Competence Label they can stake a strong "sustainability claim" against competitors ■

Computer animation-aided IS machine operator training

Using a field report at IPGR member company Vetropack Austria, Dr Christian Roos, General Manager at IPGR and Joachim Witt, Production Manager at Vetropack Holding discuss how a training tool can be used efficiently in the off-line training of recently appointed operators, as well as a direct-at-hand causes and remedies compendium at the IS machine.

Container glassmaking is a complex process and significant effort is undertaken to assure high quality and defect-free production via various cold end and hot end inspection measures. Human inspection, immediately after forming (and cooling down) of the container is a fast and reliable method to determine many forming defects. An early identification of a defect allows for fast correction, often directly at the forming sections, performed by the IS machine operator.

A mandatory condition is the proper recognition of a defect and the subsequent knowledge of the respective causes and remedies for that defect. Every glass container manufacturer has its own collection of containers with defects for training. Added to that, when training operators on the causes and remedies of defects, different manuals are available, updated in varying degrees.

Figure 1a: Protruding blow mould seam.

Figure 1b: Improperly aligned finish.

More expedient and viable, however, might be the in-depth training of operators, flanked by direct access to a defect causes and remedies library at the IS machine. Higher customer quality requirements, higher process speeds and more complex container shapes bear the danger of lower yield and more container defects. In this light, better educated operators and well-established operator training are more important than ever, especially when educating new employees as operators on IS machines.

INITIAL STATUS AND MOTIVATION

It is likely that every forming instructor knows the difficulties associated with compiling suitable training material for IS machine operators. Most material or process descriptions are collected from various sources or are self-made. Various causes and remedies books are consulted, defect pictures are taken or collected and defect remedies are compared and discussed, often leading to different opinions on the defect cause and its respective cure. From this conglomeration, a presentation is compiled to teach and train (new) IS machine operators.

The aim of such training should be the teaching of glass container defects and their respective remedy in a sustainable way. However, training takes place in a training room. The 'real world' is outside at the IS machine. Consequently, to make this undertaking 'sustainable' is by no means easy to accomplish.

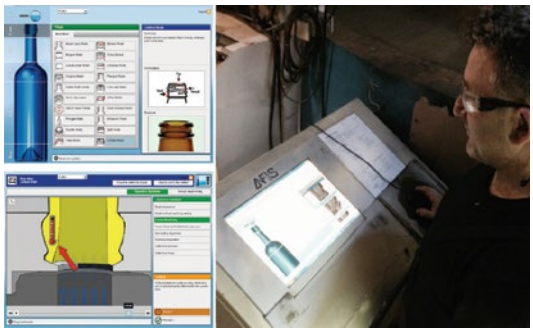


Figure 2: Example of a defect causes and remedies description, with respective animation integrated in the AFIS line information system.

Among IPGR member companies, this problem has been recognised for a long time, yet the effort to create a 'full-size' solution to this issue was avoided (although - at least theoretically - this is a problem that is much easier to solve than many other problems in glass container manufacture).

Eventually, based on the knowledge of all IPGR member companies, it was decided to compile a computer-animated causes and remedies compendium, which allows training everywhere a computer or a tablet PC is available. The advantages of such a computer animation are obvious:

- Process steps are visible by computer animation and are not hidden within a machine.
- Updating and implementation of new defects in such a system is much easier.
- Processes can be viewed in slow motion and there is no need to wait for a certain process to take place.
- Processes show directly how a defect is generated, what remedies are available and how they work.
- The same information is available for all production sites and is plant comprehensive.
- The way of learning is more sustainable, similar to 'games-based' learning.

REALISATION AND IMPLEMENTATION

When starting such a task, nobody fully foresaw the effort to be made. A simple calculation shows the volume of

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such a collection. Just considering the 60 main defects that are most common in container manufacture, these defects have different details and occurrences for each of the three forming processes, namely narrow-neck-press-blow (NNPB), blow-blow (BB) and press-blow (PB). If an average of 10 causes (and therefore 10 remedies) for each defect is considered, each cause and respective remedy should be shown individually in an animation. This adds up to 3600 computer animations that have to be made and structured.

Furthermore, when dealing with an international group of glass container manufacturers, different languages and philosophies for defect correction need to be taken into account. And by the way, having two different plants speaking verbally the same language does not necessarily mean they 'speak' the same language in defect training (or even name the same defect in the same way). For example, a protruding blow mould seam (figure 1a) can be named among others as a 'prominent blow mould seam', a 'strong blow mould seam', a 'ridge seam' etc… or an improperly aligned finish is named differently as a 'tilted finish', a 'crooked finish', sometimes (wrongly) as an 'off-set finish' or – if not so strongly visible as in figure 1b - even as a 'plane-parallelism error', which might lead to confusion between different machine operators on suitable remedies.

So, after overcoming these obstacles in a three year learning process and after having the first positive experiences with such a training tool available, the idea quickly grew to extend such a system and to implement it directly at the hot end, eg integrated within the line information system itself (figure 2). This means a defect causes and remedies compendium is available at a moment's notice to IS machine operating personnel, supported by an animated explanation. Importantly, this compendium is available in different languages.

From the experience of the first installation at Vetropack, it can be said that such a tool helped new operators especially to understand much better the connections between influencing variables and their interactions, which lead to glass container defects. The learning and understanding of defects and their respective remedies is more palpable due to the computer animations. It is also more sustainable. Using a computer-based compendium for checking a certain defect is easier and more efficient. Furthermore, it initiates discussions on possible causes and remedies between experienced and new machine operators and possibly can question factors that in the past might have been conducted in a certain way due to old habits.

Defect analysis and defect correction can be performed directly at the IS machine with the help of such a compendium. Also, such a tool serves as a constant form of training for hot end staff, helping to refresh the knowledge gained. For the example given, the tool used by IPGR was accepted so well that it has been translated up to now into five languages, including Japanese, Turkish and German, with more to follow.

The next logical steps are to integrate such a system into a (closed loop/hot end) inspection system to reduce workload for IS machine operators and to make a container defect correction faster and hence more efficient in terms of yield.

ACKNOWLEDGEMENT

The support of IPGR member companies in this development is greatly appreciated. ■

web: www.ipgr.com

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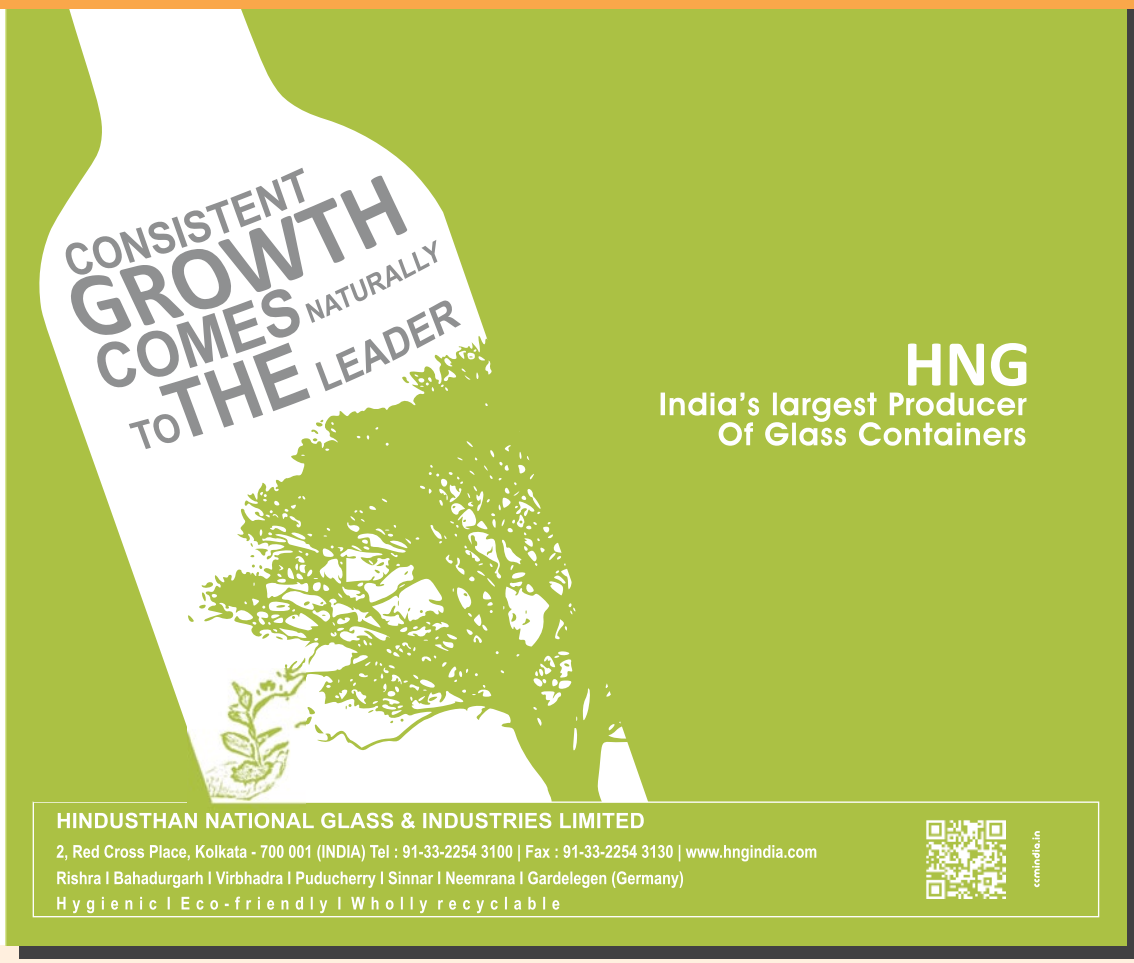

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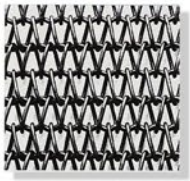
Belts



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Glass Manufacturing – Part III: Fluid Flow in Glass Fabrication

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ABSTRACT:

In the process of glass manufacturing, there exist various features. Normally, it is dependent on the type of glass and the manufacturing method. Practical knowledge comes out of a good understanding of the theoretical aspects. It is very important to have a full theoretical understanding of the glass-fabrication through different processes. These aspects are heat-transfer and fluid flow, particularly a study of the interaction between them is very interesting indeed. The heat transfer process in the glass tank furnace and the heat transfer in the glass fabrication have already been discussed in the previous issue of Kanch in two parts. In this article, the third part will deal with the fluid flow that is also a very interesting subject in a glass tank furnace with an important influence on the glass fabrication.

I. INTRODUCTION:

There are various branches of core engineering fields, such as mechanical, electrical, electronics, robotics, etc. related to glass fabrication that encompasses a whole gamut of applications. The glasses are made by first melting and refining at high temperature involving radiative heat transfer within a glass tank furnace. Then, the glass products are fabricated at lower temperature to attain the required higher viscosity or lower fluidity so that the fabrication of the right size or shape can be performed. It is the fluidity at the fabrication temperature that is really important in the glass technology. For example, if the fabrication temperature is lowered, then the viscosity will increase or fluidity will decrease making the process quite difficult. Therefore, at this lower temperature range, the heat transfer process is also important. As discussed below, this has also been described earlier **[1,2]**.

A large variety of fabrication processes are used in different glass plants for different range of products. For container glass manufacture, the products are made by pressing in contact with metal moulds. As the glass first comes in contact with the mould, its temperature is around 1000-1100C (i.e. lower viscosity), while the surface of the mould is at much lower temperature, i.e. at 400-500C (i.e. higher viscosity). For the metal moulds, the surface temperature is of utmost importance, as it determines not only the smooth heat-transfer process, but also fixes the quality of the glass products.

For example, if the temperature is too high, the viscosity of the glass will be such that it will stick to the mould increasing the rejection losses. However, if it is too low, the glasses will have poor surface finish that will be less appealing to the customers of the particular product items. This is a serious "quality control" problem, but it should be also viewed by the knowledge of the "glass technologists" regarding viscosity-temperature relation that is fundamental to glass making. The curve of viscosity falls exponentially with temperature, i.e. viscosity increases sharply with decreasing temperature,

i.e. an inverse relationship between temperature and viscosity. A higher temperature at the mould surface will prevent the heat-transfer between the glass and the mould, thereby increasing the glass temperature, or rather the temperature does not fall enough to give rise to the required viscosity for fabrication. This in turn actually decreases the viscosity so that the fluidity of the hot glass is enough to give rise to "sticking" problem during the fabrication of container glasses. On the other hand, a lower surface temperature (i.e. higher viscosity) will enable a faster heat transfer, but in that case the "glass surface" will be affected.

Ultimately, the temperature difference in the "glass-mould" interface is of interest to glass fabrication. If the initial temperature difference at the interface is large, then there will be correspondingly larger heat flux across this interface, which is of primary importance. The magnitude of such heat flux depends upon the thermal resistance of the interface, which finally depends on the "intimacy" of contact between the mould and the glass. So, for container glasses, the nature of heat-transfer is conductive. In other processes, such as the manufacture of glass tube (i.e. for lighting) and glass fibres (i.e. for insulation purpose), the moulds are not used. In such cases, the glass looses heat by radiation and convection to the surrounding atmosphere. However, in such processes, the "heat flux density" of the surface is much less than that of 'container glasses' involving the physical contact with metal moulds.

As the temperature is reduced, its viscosity increases, i.e. the fluidity decreases that tend to be more like a solid. Hence, the distribution of temperature in a glass at any moment of time obviously determines the viscosity distribution, i.e. it decides on the way the glass will flow in relation to the force applied to the glass. Therefore, one has to understand the factors controlling heat transfer during the fabrication process, which is a very important component for a thorough knowledge of the process.

During the past several decades, there have been a lot of newer interesting developments in field of glass technology, counting all the small but incremental developments. One of them is a more or less adequate knowledge or clarifications on the 'role of radiation' as a mechanism of heat-transfer process in glass. This can occur at high temperatures (1250 – 1600C) inside the 'glass tank furnace' for melting as well as at relatively lower temperatures (620 – 1100C) encountered in the different fabrication processes. Heat is transferred from one body or system to another by three different means – viz. conduction, convection and radiation. The latter is very important in relation to the other two mechanisms that depend on certain factors. The process of radiative transfer of heat flux at higher temperature that occurs in the glass tank furnace has already been discussed. However, the process of heat transfer at lower temperature that occurs during the fabrication of different glass products assumes special importance.

Compared to ceramics manufacture, where shapes are made first and then the firing is done, for glass manufacturing, the raw materials are first homogeneously mixed and then melted and refined at high temperature. The refined melt is then used to shape different products, including special type of glasses **[3,4]**. This is true for batch type of operation, i.e. for optical glasses, as well as for continuous operation of float glass, container glass, etc. **[5,6]**. Depending on whether the glass melting is batch type or continuous type, the fabrication technique could be continuous, and hence heat-transfer in the glass fabrication process also assumes importance. As viscosity or fluidity is intimately connected with the fluid flow or fluid mechanics in glassy materials, the interaction between fluid mechanics and heat-transfer is an important study that is being attempted in this article.

II. FLUID FLOW IN THE GLASS FABRICATION:

For modelling of fluid flow in a given system, the simple geometry has to be considered in order to easily calculate temperature distribution in the glass for many steady-state as well as time-independent problems. Despite the calculation of such a distribution involves certain simple assumptions, there is a good correspondence between experimental and calculated values, whenever comparisons are possible to be made in the field of glass technology. In any given glass plant, there should be a set of values for various physical parameters so that the glass technologist could do a series of calculations or computation on a range of data. In this manner, one could get valuable ideas about the "main factors" controlling heat transfer as well as temperature distribution for a given glass system.

As described above, the temperature distribution is important only due to the fact that it determines the viscosity-distribution in the glass. In turn, the viscosity determines the way in which the glass will flow in response to the forces applied to it. It is a matter of convenience first to consider the problems of glass-flow calculation in a tank furnace. As the

geometry is simple and the boundaries of tank furnace are stationary, it is quite easier to deal with this issue. It also emphasizes that the treatment of boundaries is easily tackled. The flow of glass during the fabrication process, say, for a container glass, is obviously much more difficult as in case of 'metal moulds', as there is moving free boundaries to deal with.

2.1 Glass-Flow in a Tank Furnace:

In a tank furnace, we are concerned with melting different components and refining the glass, but the flow pattern is also of considerable practical importance. A mixture of powdered raw materials when melted gives rise to rather viscous melt. This happens due to the chemical reactions between different raw materials gives rise to the formation of several complex silicate phases with different melting points. As such the melt is quite inhomogeneous and contains several bubbles with varying sizes, when the last part of solid material has gone into the melt. This inhomogeneous glass needs to be refined to get rid of such bubbles, or even some unmelted portion of the solid mixture. However, it can be sufficiently homogeneous only by some type mixing action, which is provided by the "pattern of flow" in the tank. Here, there is a play between heat diffusivity and fluid velocity showing important relation between heat transfer and fluid mechanics.

There are mainly two factors that determine the flow: (a) Throughput Flow – this has to be understood by the drag force of drawing glass for the machine and the feeding rate of raw materials mixture. As this 'feeding rate' has to cope with the 'drawing rate' to maintain the level of glass inside the tank furnace, say, about 1 meter depth, the glass flows at a particular rate; and (b) there is the "complex pattern of re-circulating" natural convection flows that are driven considerably by the temperature gradients, which exists in the horizontal direction in the glass melt. At the bottom of the tank furnace, the temperature is always lower than that in the surface, where the fluid flow is more apparent. It is the reason why ultimately the whole ensemble of glass melt comes to some kind of equilibrium that is driven by glass temperature and consequently by glass viscosity with the help of "flow" as the molten glass tends towards 'refining zone' and then towards the 'working end'.

Here, a little bit mention could be made on the relation between drawing and feeding rates and their near-equalization. In our common knowledge, we know that as the drawing rate is faster than the feeder rate when some 'urgent demand' of a particular glass for a day or two has to be satisfied, then the level of glass inside the furnace "goes down" from its usual level of 1 to 1.2 meters. However, if the drawing rate (i.e. rate of production at any given moment) is slower than the feeder rate, then the glass level will "go up" from its usual level to about 1.4 meters or higher thereby creating distortion in the fluid flow. It is a debatable point that in order to maintain the quality level, whether the glass technologist in a given plant will encourage such a scenario, or rather maintain it within a closed range, as the glass level going higher or lower (than stipulated) might disturb the heat distribution along the depth of glass and consequently the 'flow patterns'. In the case of ISO certification, it is not known whether the 'glass level' with a strict small range is clearly specified, or simply a larger range is noted as per the particular furnace design. Nevertheless, its importance in the day-to-day running of the furnace and maintaining the quality of glass cannot be seen as a trivial matter.

The 'flow patterns' within the tank furnace is quite complex due to a variety of reasons. Trier **[7]** has studied this complex pattern within a glass tank furnace, which mainly shows the radial flow starting from a centre towards the wall of a tank. The mixture of raw materials is actually fed onto the surface of the molten or semi-molten glass through the feeder chamber. The refined/finished glass is fed to the machine through three or more channels (depending on the design) that radiate from the semi-circular compartment, i.e. working end of the tank furnace. Due to highly viscous nature of the glass and also due to the relatively lower applied forces, the velocities of the glass flow are also quite low, i.e. typically around a few meters/hour. The velocity gradients that are created are responsible for proper mixing. This occurs due to 'shear' and modification in the adjacent regions which are initially of different compositions. In particular, the distortion due to 'shear' has relatively more effect by the increasing concentration gradients. This accelerates the homogenization process by chemical diffusion that is again dependent on temperature of the melt. One has an impression that the entire glass melt is of uniform composition from the very start (from the feeder chamber). But it is the fluid flow that ultimately brings this 'uniformity' or rather homogenization of the glass that has a strong bearing on the ultimate quality of the glass. Therefore, to understand defect-free glass, one has to study 'fluid flow' very carefully in terms of chemical diffusion, as also emphasized by several workers, such as Geffcken **[8]** and Cooper **[9,10]**.

In a tank furnace, as the glass is very hot and also inaccessible, it is not generally possible to do any direct measurement of fluid flow by any suitable technique. One could do experiment with liquids at room temperature by taking care of certain useful parameters by somehow upscaling or downscaling them, as needed or found convenient for calculation. Transparent plastics or polymeric materials (having different viscosity characteristics) have been used for this purpose to simulate the melting conditions, based on certain mathematical equations. While this kind of modelling has certain drawbacks and draws criticism, it is also sensitive to the design parameters of the tank furnace. However, it is still useful to do some kind of simulation experiment to have some ideas about 'flow patterns' inside a glass tank furnace, as the acquisition of knowledge is not always worthless.

In the distant past, a tremendous amount of work has been done into this field by various workers, particularly on the investigation of 'flow patterns' by computer simulation of differential equations of fluid flow and heat-transfer. Some of these works were published, notably by Wright & Rawson **[11]** as well as by Austin & Bourne **[12]**. Recently, however, a lot of work has been done in the general field of "computation fluid dynamics (CFD)", notably by Roach **[13]**. There are many methods available for solving problems, such as 'flow patterns' in a tank furnace, involving viscous incompressible fluid and natural convection of heat. For this purpose, simultaneously several equations have to be solved and satisfied throughout the whole ensemble of glass melt in the tank furnace. These equations are: the famous Navier-Stokes vector equation, the continuity equation and the energy equation respectively. These equations indicate that there is an interaction between heat transfer and fluid flow by showing a strong temperature dependent relation between thermal diffusivity and vertical component of the fluid velocity. With the proper boundary conditions in different equations, one could compute the flow pattern by a numerical approach, as developed by Noble et al **[14]**. These computer simulation results were compared with those of the room temperature experiments with plastics, as mentioned above, and fairly good correspondence was obtained.

III. CONCLUSIONS:

In the previous two articles, heat transfer processes in both during melting and during fabrication of glass products have been discussed. Heat-transfer process has a strong influence on the viscosity of the glass melt and hence on the flow patterns. In this article, the importance of heat transfer and its interaction with the flow patterns has been elaborated. Various other related issues, such as the glass level in terms of glass drawing rate and the feeding rate of raw materials mixture as well as homogenization of the melt through chemical diffusion, are also mentioned as relevant topics of interest for the ultimate quality of glass products. A comprehensive view on the fluid flow has to be taken into the consideration by the glass technologists based on the relation between the heat diffusivity and vertical component of velocity of molten glass following Navier-Stokes equation and other related equations. Some computer simulation methods through improved software development have to be adopted by different plants to suit different designs of glass tank furnaces. These fluid flow models involving computer simulation techniques have to be refined to ultimately predict and maintain a consistent quality of a given glass product.

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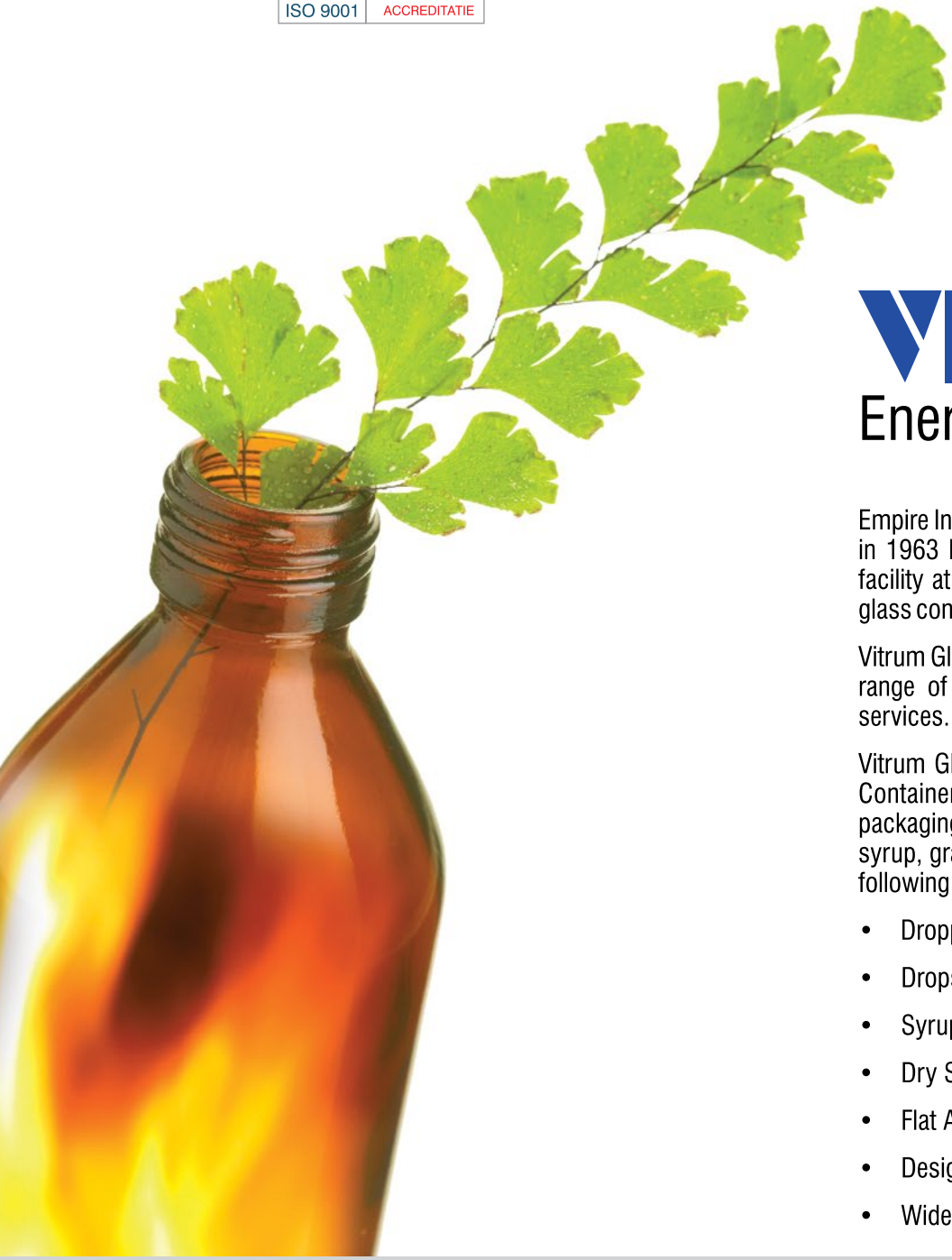

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Hollow Glass Industry: Innovations in a Difficult Environment

The Hollow Glass Industry is faced with intensive international competition. To secure their future, manufacturing companies are developing new, innovative products and are building highly efficient, energy-saving production facilities.

Hollow glass for the storage of oils and ointments has been in use for a long time, with evidence dating back three and a half thousand years. The unique properties of this material were valued greatly at the time and are still among its major quality characteristics today. Glass is made of natural raw materials, can be moulded into an infinite number of shapes and is inert, i.e. the material does not react with its content. This means that there is virtually no interaction between the container and the product, and it is therefore an excellent packaging material – not just for food and drinks, but also for cosmetics, pharmaceuticals and numerous chemical products. Bottles, jars and flacons are produced by the container glass industry, which forms the "hollow glass" market segment together with the domestic glass sector (drinking glasses, tableware glass, gift items, etc).

TWO SUCCESS FACTORS: REDUCED WEIGHT AND QUALITY DESIGN

One of the most important innovations in hollow glass over the past few years has been the development of lightweight glass. Without sacrificing strength, the industry has gradually succeeded in reducing the weights of different glass packages by up to 60 per cent. This has produced benefits in the handling and transportation of products while also leading to substantial savings in raw materials and energy. Apart from the weight, another increasingly important element is the product design. Anyone wanting to stand out among the crowd of competitors must produce high-quality products that appeal to the consumer. It is therefore very much worthwhile investing in the development of innovative packaging and suitable production facilities. According to the Glass Packaging Action Forum, an initiative of the German container glass industry, there has been a 39 per cent European-wide increase in the consumption of products packaged in glass. This upward trend is partly due to a reduction in weight and partly to the positioning of glass as an environment-friendly and trendy form of packaging.

Photo: Messe Düsseldorf

A glass container does not interact with its content. Bottles, jars and other glass packaging therefore warrant the highest standards in product quality for drinks, food, cosmetics, etc.

ECOLOGICALLY SOUND AND SUSTAINABLE

One factor that is providing the hollow glass industry with a positive outlook is the increasingly important aspect of sustainability. Glass is essentially made from raw materials that are available in abundance and which occur naturally, i.e. quartz sand, soda, lime and dolomite. It is 100 per cent recyclable and can be turned into new products. This makes glass products resource-efficient, eco-friendly and sustainable. Recycled glass has in fact come to be the most important input material for glass packaging. Its share in newly made packaging is 60 per cent on average. Another important benefit is its reusability. Within a reusable glass system a glass bottle, for instance, can be used up to 50 times before being recycled.

Photo: Glass Packaging Action Forum

Glass can assume almost any shape and allows a wide range of finishing options. Glass design plays a major role in drinks, food and cosmetics packaging and has a decisive impact on its acceptance by end customers.

ENERGY AS A COST DRIVER

Despite the unique benefits of its products, the container glass industry is very much in competition with alternative packaging materials, such as metal and, above all, plastic. But even within the glass industry the market is highly competitive. Companies face fierce international competition and steadily increasing pressure from imported goods, e.g. from East Asia, so that the situation on national markets is often quite difficult. Within the EU, in particular, glass manufacturers are subject to strict legal requirements concerning environmental protection, safety at work, compliance with legal regulations and above all rising energy costs – competitive factors which are clearly more difficult than in countries with lower standards.

This applies especially to German container glass manufacturers, because they must also bear the burden of Germany's renewable energy levy (under the German Renewable Energies Act), a measure which was introduced to help usher in the energy turnaround, as envisaged by the country's political decision-makers. According to Dr. Hans-Joachim Konz, President of the German Association of the Glass Industry (BV Glas), only 13 per cent[1] of all companies in the German glass industry (about 400 in all) were exempted from this charge – an exemption that was granted to safeguard the economic future of an area and which was intended for energy-intensive enterprises, so that they could pay a much lower price per kilowatt hour of electricity. After the EU Commission had classified this practice as an illegitimate subsidy, the German Government now wants to either reduce the number of energy-intensive companies exempted from the levy or restructure the system of discount ratios. When the agreement with the EU Commission was announced on 8 April 2014, it was still difficult to see how this might impact glass manufacturers.

MORE STRINGENT CARBON EMISSION CERTIFICATES

Another burden for the glass container industry is the cost of carbon emission certificates. The decision whether Europe's glass industry is to be put back on the so-called Carbon Leakage List will not be available until the end of 2014. Carbon leakage means that greenhouse emissions are outsourced to non-EU countries in cases where manufacturers are no longer able to operate competitively in their own region and where they would otherwise have to cease production. Sectors that are included on the list are given the relevant certificates for free. Dr. Johann Overath, CEO of BV Glas, emphasises in this context, however, that "for free" does not mean that it "incurs no costs": "Thanks to extremely high benchmark figures and the cross correction factor, it is estimated that 65 per cent of certificates will be given to German glass manufacturers for free." However, as there will be an upper limit to allocation, all glass manufacturers – including those of container glass – will still need to

The melting of glass is highly energy-intensive. Using state-of-the-art melting and filter technology, glass manufacturers have substantially reduced their energy consumption and their emission of pollutants over the last few years.

Photo: Schott AG

Photo: Messe Düsseldorf

Efficient production engineering is indispensable for container glass manufacturers wanting to maintain their competitive positions on the international market.

purchase emission rights.[1]

Moreover, Brussels will be adding further complications, as the EU Parliament has now agreed to the practice of backloading whereby carbon certificates are removed from emissions trading in order to create an artificial scarcity on the market and to increase prices. The increase in cost pressure is intended to promote environmental protection. BV Glas, however, believes that this is setting a wrong signal. The association maintains that backloading misses the mark, as it is precisely the energy-intensive glass industry that has invested more and more technology in greater efficiency over the last few years, so that its potential has now largely reached its limits.[1] Not only has the industry achieved substantial reductions in carbon emissions, but it has also made considerable progress in minimising NO_x (nitrogen oxide) emissions, particularly through measures that interfere directly with the combustion process in a melting furnace (primary measures).

SUCCESSFUL ENERGY-SAVING MEASURES

According to cost structure statistics published by the German Federal Statistical Office in 2013, the share of energy costs in the gross output value of hollow glass production was 14.9 per cent in 2011, while this value was on average 8.6 per cent for the entire industry, i.e. comprising glass and glass product manufacturers.[2] In view of high energy costs, hollow glass manufacturers can only remain competitive if they use innovative, energy-saving production methods. This is another area where the industry has made great progress recently. According to the Glass Packaging Action Forum, the use of energy in melting equipment went down 77 per cent between 1970 and 2006. The biggest share of these savings was due to greater efficiency in production facilities (-32%). Other savings were achieved through weight reductions of glass products (-25%) and the addition of recycled glass (-20%). The required melting energy is reduced by 3 per cent for every 10 per cent of broken glass that is used in this process. The European hollow glass industry therefore benefits substantially from its high recycling rate, which – according to latest reports from the Glass Packaging Action Forum – was 83 per cent in Germany in 2012. The European Container Glass Federation FEVE reports an EU-wide value of 70 per cent for the same period.

Two important partners of Germany's container and industrial glass manufacturers in the implementation of the latest technologies are the Research Association of the German Glass Industry (HVG) and the German Glass Engineering Society (DGG). Both organisations have supported developments in the glass industry for many years. HVG and DGG promote research at the interface between academia and industry, maintain laboratories, offer a wide range of advisory services to answer comprehensive questions on glass technology and provide information through publications and training events on the latest developments and findings in research.

GREATER PRODUCTION EFFICIENCY

High energy costs and the influx of cheap imported products require the use of highly efficient technology. This is especially true for Germany as a country with high wages. "What it means is that companies in the glass industry must have the best available technology, energy-efficient and largely automated facilities and machinery as well as a suitably efficient and motivating organisation of work routines," says Dr. Jürgen Dispan from the IMU Institute in Stuttgart in his analysis "Glass Industry in Germany", published in January 2014.[3] It is apparently not a matter of process speeds but also of ensuring a high level of flexibility. One major operational issue, particularly in the container glass industry, has been the

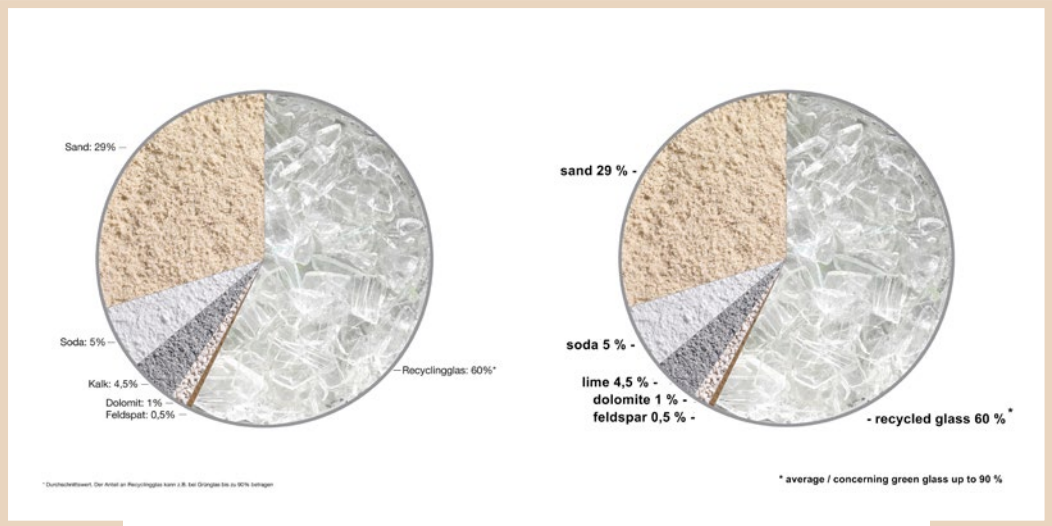

Photo: Glass Packaging Action Forum.

Glass protects the environment and natural raw material resources. The proportion of recycled glass in the raw material mixture of container glass is currently about 60 per cent.

question of conversion flexibility due to frequent changes in glass types, and Dispan anticipates another significant increase in retooling over the next few years.[3]

He describes the glass industry as investment-driven. Unless there is sufficient investment, he says, companies are likely to suffer greatly in their future viability. According to Dispan, as well as having to conduct the necessary cold repairs to optimise melting tanks, the glass industry is engaged in a competition for innovation to secure unique selling propositions and technology leadership. The strategy towards this goal, he says, involves not only the development of innovative products but also, among other things, innovative methods and processes to improve the efficiency of operational routines.[3]

LATEST TECHNOLOGIES AT GLASSTEC 2014

The extent to which any existing potential can be realised largely depends on the innovative strength of glass machine and plant manufacturers. They can provide the industry with more breathing space through forward-looking technologies. Dr. Bernd Holger Zippe, Chairman of the Glass Engineering Forum within the German Engineering Federation (VDMA), said in a press release published in November 2013: "There is a good level of demand from the speciality and hollow glass industry. Many German companies have therefore opted for special applications and for the solution of technically demanding challenges. Other business sectors with good prospects are apparently the engineering of customised plants and machinery and the provision of services. In 2014 the industry is mainly expecting new investments in the hollow glass sector."

glasstec 2014 will be showing forward-looking production and handling solutions provided by glass machine and plant manufacturers – solutions that can help towards further improvements to the performance of the hollow glass industry. The leading global trade fair for the glass industry will be held in Düsseldorf from 21 to 24 October. As well as showing the entire spectrum of innovative glass products and applications, the trade fair will focus, in particular, on machinery and plants for the processing and treatment of hollow and sheet glass by both small-scale and industrial-scale enterprises. As on previous occasions, a symposium will be held, accompanying the special exhibition glass technology live. At this symposium information about the latest developments will be provided by Hüttentechnische Vereinigung der Deutschen Glasindustrie (HVG), Deutsche Glastechnische Gesellschaft (DGG) and the Glass Technology Forum within VDMA.

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USA glass recycling update

Lynn Bragg, President of the Glass Packaging Institute, discusses a recent study that identifies an optimised recycling and recovery model for beverage containers.

Lynn Bragg, President, Glass Packaging Institute.

Recycling and recovery are of critical importance to the glass container industry but despite recycling efforts today, thousands of tons of glass are lost to USA landfills each year. It is well known that when glass plants can increase the levels of post-consumer glass as part of the overall batch mix, they can reduce furnace temperatures, resulting in reduced energy use and lower greenhouse gas emissions. For glass, one ton of carbon dioxide is reduced for every six tons of recycled cullet used in the manufacturing process. Energy use at the glass plants also drop about 2-3% for every 10% recycled glass used.

That is why the Glass Packaging Institute was one of a small group of stakeholder organisations that recently commissioned a study aimed at providing USA decision makers with information on the total costs for various beverage container redemption approaches. Resource Recycling Systems (RRS), a leading consulting firm in the solid waste and recycling fields, conducted this research.

Broadly, the study determined that a stronger network of recycling depots and curbside collection programmes will yield increased rates of recycling and material recovery of beverage containers. The researchers examined different scenarios for a redemption system that is both cost-effective and works collaboratively with other collection systems, including curbside recycling.

RRS gathered and evaluated data from various existing curbside and redemption programmes to develop recommendations for an 'Optimised Bottle Bill' (OBB) system that includes the following elements:

- A network of convenient container recycling depots, in addition to retail locations, where consumers can redeem their containers.
- A provision to compensate curbside collection programmes and/or material recovery facilities to keep them cost neutral.
- Retention of the unclaimed deposits and the material values within the system to create a sustainable funding mechanism.

FINDINGS

Key findings of the study include:

- OBB systems result in increased recovery of materials: OBBs are estimated to increase state-wide recovery by at least 11% over a comprehensive single stream system and recovery of bottle bill materials by 162%.
- OBB systems offer cost comparative structures: OBBs can be comparable in cost to single stream if material revenues are kept by the operator and in some cases even if unredeemed deposits are not kept in the system.
- Redemption centres reduce pressure on retailers: Redemption centres reduce the material returned to retail by an estimated 50%-80%, depending on population density.
- OBB systems employ sustainable funding mechanisms: If unredeemed deposits are reinvested into the recycling infrastructure, OBBs may increase recovery, while also creating a sustainable funding source for recycling.

Despite recycling efforts today, thousands of tons of glass are lost to USA landfills each year.

The OBB study offers a roadmap for an optimised system that would yield significant material recovery and lessen landfill waste. Over the coming months, GPI and its member companies will be engaging state and local legislatures and other stakeholders on the study and its findings as a means to improve the manner in which glass is recycled and recovered in the USA.

MATCHING CONSUMER DESIRE

The industry's efforts to improve recycling practices align with consumer desire. A survey released by GPI in 2013 found that a growing number of people (75%) say recycling is important to them and significantly impacts their food and beverage purchasing decisions. When asked whether or not using packaging that is made with renewable or recycled resources influences their choice of brands, products or services, consumers overwhelmingly indicated that it did, with more than 65% stating that it was either an extremely or very positive influence over their choices.

Our industry is committed to the environmental and economic benefits of using recycled glass, both to consumers and in the manufacturing process. Consumers of glass products want to recycle and to purchase products in glass packaging that contains recycled content; we want to help them do so. ■

glass packaging institute

Glass Packaging Institute, Alexandria, VA, USA email: info@gpi.org web: www.gpi.org

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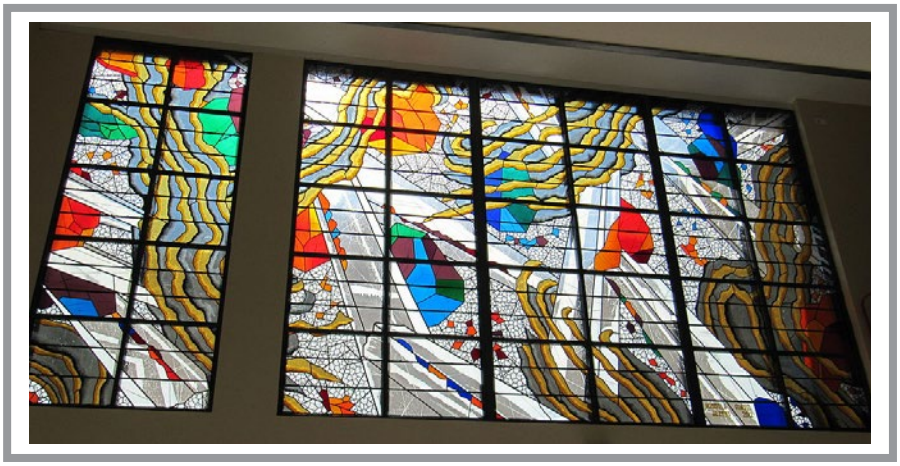
अभिरंजित काँच

अभिरंजित काँच (अंग्रेजी में 'स्टेंड ग्लास/ **Stained glass**) से साधारणतः वही काँच (शीशा) समझा जाता है जो खिड़कियों में लगता है, विशेषकर जब विविध रंगों के काँच के टुकड़ों को जोड़कर कोई चित्र प्रस्तुत कर दिया जाता है। यूरोप के विभिन्न विख्यात गिरजाघरों में बहुमूल्य अभिरंजित काँच लगे हैं।

अभिरंजित काँच के निर्माण में तीन प्रकार के काँच प्रयोग में आते हैं:

1. काँच जो द्रवण के समय ही सर्वत्र रंगीन हो जाता है।
2. इनैमल द्वारा पृष्ठ पर रँगा काँच।
3. रजत लवण द्वारा पीला रँगा काँच ।



अभिरंजित काँच

प्रांरभ

अभिरंजित काँच का कहाँ और कब प्रथम निर्माण हुआ, यह अस्पष्ट है। अधिकतर संभावना यही है कि अभिरंजित काँच का अविष्कार भी काँच के अविष्कार के सदृश पश्चिमी एशिया और मिस्र में हुआ। इस कला की उन्नति एवं विस्तार 12वीं शताब्दी से आरंभ होकर 14वीं शताब्दी के शिखर पर पहुँचे। 16वीं शताब्दी में भी बहुत से कलायुक्त अभिरंजित काँच बने, परंतु इसी शताब्दी के अंत में इस काल का ह्रास आरंभ हुआ और 17वीं शताब्दी के पश्चात् इस कला का प्रायः लोप हो गया। इस समय कुछ ही संस्थाएँ हैं जो अभिरंजित काँच विशेष रूप से बनाती हैं।

कैंटरबरी गिरिजाघर की खिड़की में लगा मध्यकालीन अभिरंजित काँच

अभिरंजित काँच का प्रयोग विशेषकर ऐसी खिड़कियों में होता है जो खुलतीं नहीं, केवल प्रकाश आने के लिए लगाई जाती हैं। इसी उद्देश्य से गिरजाघरों के विशाल कमरों में विशाल अभिरंजित काँच, केवल प्रकाश आने के लिए दीवारों में लगाए जाते हैं। इन काँचों पर अधिकतर ईसाई धर्म से संबंधित चित्र, जैसे ईसा का जन्म, बचपन, धर्मप्रचार, सूली अथवा माता–मरियम के चित्र अंकित हैं और इन काँचों में से प्रकाश भीतर आता है उसे शांति और धार्मिक वातावरण उत्पन्न होने में बहुत कुछ सहायता मिलती है। कुछ अभिरंजित काँचों में प्राकृतिक एवं पौराणिक दृश्य और महान् पुरूषों के चित्र भी अंकित रहते हैं।

प्रविधि

आरंभ में उपयुक्त रंगीन काँच के टुकड़े एक नक्शे के अनुसार काट लिए जाते हैं और चौरस सतह पर उन्हें नक्शे के अनुसार रखा जाता है। तब जोड़ की रेखाओं में द्रवित सीसा धातु भर दी जाती है। इस प्रकार काँच के विविध टुकड़े संबंधित होकर एक पट्टिका में परिणत हो जाते हैं। सीसा भी रेखा की तरह पट्टिका पर अंकित हो जाता है और आकर्षक लगता है।

यदि किसी विशिष्ट रंग का काँच उपलब्ध नहीं रहता तो काँच पर इनैमल लगाकर और फिर काँच को तप्त करके अनेक प्रकार का एकरंगा काँच तथा चित्रकारी उत्पन्न की जा सकती है। आरंभ में तप्त करने के पूर्व इनैमल को खुरचकर चित्र अंकित किया जाता था, पर बाद में अनैमल द्वारा ही विभिन्न प्रकार के चित्र अंकित किए जाने लगे। इनैमल लगाने की क्रिया एक से अधिक बार भी की जा सकती है और इस प्रकार रंग को अपेक्षित स्थान पर गहरा किया जा सकता है अथवा उस पर दूसरा रंग चढ़ाकर उसका रंग बदला जा सकता है।

रंगरहित काँच पर रजत का लेप लगाकर और तदुपरांत काँच को तप्त करने से काँच की सतह पीली से नारंगी रंग तक की हो जाती है। यह रंग स्थायी और अति आकर्षक होता है। इस प्रकार के काँच को भी अभिरंजित काँच और इस क्रिया को 'पीत अभिरंजकी' कहा जाता है। नीले काँच पर इस क्रिया से काँच हरा दिखाई पड़ता है। इस प्रकार का काँच भी अभिरंजित काँच चित्रों के प्रयोग में आता है। पीत अभिरंजित काँच का आविष्कार सन् 1320 में हुआ।

भारत में अभिरंजित काँच की माँग प्रायः शून्य के बराबर है ■

Glass News Worldwide

ERIK BOUTS FROM O-I EUROPE ELECTED PRESIDENT OF THE EUROPEAN CONTAINER GLASS FEDERATION

Erik Bouts

Erik Bouts, President of O-I Europe – one of Europe's leading glass packaging companies - has been elected President of FEVE – the European Container Glass Federation - at its Annual General Assembly in Venice on June 6.

The European container glass manufacturing industry is the largest glass producer in the world and an important sector of the EU economy, creating jobs and wealth in local regions where more than 160 plants are operating across Europe.

"I look forward to working closely with FEVE members, staff, and the national associations to further develop the circular economy model which highly contributes to the competitiveness of the EU manufacturing sector. Glass is a material that has unique properties: we need to play our winning cards and continue to be the reference packaging material," says Erik Bouts. "FEVE members have been a key driving force behind the European circular economy agenda, and I firmly believe that container glass is uniquely positioned to bring solutions to the big challenges of Resource Efficiency."

Erik Bouts succeeds Stefan Jaenecke, CEO of Verallia Deutschland, who led the association for the previous two years.

"Stefan has done a great job in bringing the association to a new level and boosting the industry's focus on promoting the benefits of glass as a reference packaging material," says Erik Bouts. "I hope to build on this legacy and work with colleagues to prepare the next steps in the future of the European Container Glass Industry."

GTS EXPANDS TESTING REMIT FOLLOWING CONTINUED AUDIT SUCCESS

Independent research and design specialist Glass Technology Services Ltd (GTS) has further expanded its extensive product testing and chemical analysis services for the glass supply chain as it continues to achieve independent audit success.

Scoring highly across technical (ISO 17025), administrative (ISO 9001) and environmental (ISO 14001) performance audits, the company has also successfully achieved Notified Testing Laboratory status and has made seven extensions of scope to its comprehensive technical UKAS accreditations.

GTS Systems Manager, Heather Marsh, comments: "This continued audit performance success is testimony to our whole team. It gives our technical experts

the opportunity to further expand the scope of our laboratory in the coming year as we respond to increasing demand across the glass supply chain. Our continuous improvement is enabling us to meet the stringent demands of a wide variety of industries including food and drink, biotech, medical and pharmaceuticals as well as construction and design."

The specialist team's testing remit now extends to include various methods of ICP-OES (inductively coupled plasma optical emission spectroscopy) – allowing trace elements to be detected in the parts per billion scale.

GTS has also been awarded Notified Body status for glass products under the Construction Products Regulation (CPR), following auditing by the United Kingdom Accreditation Service (UKAS) and recommendation to the Department for Communities and Local Government - the UK designating authority.

As a Notified Testing Laboratory, GTS now provides initial type testing (ITT) for manufacturers, tougheners and processors of flat glass construction products. This ITT data contributes towards Attestation of Conformity (AoC) in order to allow these companies to CE mark their products and enable them to place these products onto the European marketplace for use throughout the construction industry.

GTS works across the glass supply industry both in the UK and internationally - providing analysis, consultancy, testing, quality assessment and research and development support across the glass, food and drink, construction, retail, medical, pharmaceutical, defence and biotech sectors.

glasstec 2014 WELL ON TRACK

Exhibitor registration numbers on par with prior year, despite ambivalent economic situation in the sector

Once again glasstec will live up to its role as the leading international trade fair for the glass industry in 2014. The number of exhibitor registrations is on par with those of the previous event in 2012. Last time, 1,175 companies representing glass engineering, glass manufacturing and glass crafts participated, 66% of which came to Düsseldorf from outside Germany.

"We're delighted by the great response to glasstec 2014, especially with the economic situation in the flat-glass sector and partially even in the mechanical-engineering sector being rather tense at the moment. The fact that businesses continue to count on glasstec, particularly in challenging times, underscores the event's extraordinary significance," said Hans Werner Reinhard, Deputy Managing Director of Messe Düsseldorf.

The future of glass in coming years: glass technology live in addition to the uniquely varied exhibitor presentations, the special show "glass technology live" (gtl) helps to bolster glasstec's status of industry trendsetter. Organised by Prof. Stefan Behling and his team at the Institute for Building Construction at the University of Stuttgart, it shows products about to emerge in coming years - usually including highlights from the various fields of application and always with a focus on architecture. For example, one of the eye-catchers from the 2012 "Façade and Construction" theme was a window integrated into glazing without any visible framing.

In 2014, the highlighted themes at this special show, which covers about 2,500 square metres, will fall under the rubric "Intelligent Glass" and include the areas Intelligent Building Envelopes, Façade + Energy (Solar), Innovations in Glass, and Glass Design + Interior. Consequently, some of the innovative exhibits awaiting visitors will represent segments such as light directing, translucent glazing, composite elements in façades, glass and OLEDs as well as light and thin glass for architecture and displays.

A high-calibre trade symposium will accompany "glass technology live." Embedded right in gtl's exhibition space, a series of lectures on cutting-edge topics will be presented there. All trade fair visitors may attend this event free of charge. Recognised presenters from leading research institutes, associations, companies and architecture firms will discuss in-depth a range of topics. Just like the special show, the symposium will hone in on the future of the glass industry. The gtl Symposium programme will be dedicated to a different theme on each day of the trade fair, with the content designed by these partner organisations: the colloquium of the Hüttentechnische Vereinigung der deutschen Glasindustrie e.V. (the research association of the German glass industry - HVG) and the Deutsche Glastechnische Gesellschaft e.V. (German Society of Glass Technology - DGG) (topic: Glass Melting and Forming, Tue); the Verband Deutscher Maschinen- und Anlagenbau e.V. (German Engineering Federation - VDMA) (Processing and Finishing Technology, Wed); the University of Stuttgart (Architecture and Technology, Thu); and the Bundesinnungsverband des Glaserhandwerks (German Federal Association of Glaziers Trades - BIV) (focal theme: Crafts, Fri).

Besides "glass technology live" and the associated symposium, additional

items on the agenda enhancing the extensive supporting programme will include the "Crafts Center" with the new hands-on "Glass Crafts LIVE" area, the "Autoglass Arena" and the "glass art" exhibition. Directly adjacent to "glass technology live," glasstec visitors will find the Façade Center with the "Professional Center Glass + Façade." The congress programme of glasstec consists of the scientific conference "engineered transparency" focussed on structural uses of glass, the "Architectural Congress" and the "solar meets glass" conference on topics at the intersection of the glass and solar industries.

SPECIALISTS LAUNCH FREE WEBSITE TOOLS TO CALCULATE GLASS PERFORMANCE

Glass Technology Services Ltd (GTS) has launched two online calculators to help professionals across the flat glass supply chain work out the energy balance value - or 'Effective U Value' - and weight of their products.

Designed to aid with specifications and highlight some of the important factors that should be taken into account when considering the options and benefits for different types of glazing products, the tools have been provided by GTS amidst growing debate over double and triple glazing.

The energy performance calculator, based on EN ISO 14438:2002, *'Glass in building. Determination of energy balance value. Calculation method'*, helps to determine average rates of heat loss and heat gain by solar radiation entering a building through glazing. Importantly, it considers the location and orientation of an insulating glass unit to provide this effective insulation value.

The weight calculator works out the approximate weight of glass components based on the nominal thickness, shape, size, type and number of glass panes being considered, with options available for annealed, toughened and laminate ■

(News Source: AIGMF Research Team / World Wide Web)

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Environment

ECO-PACKAGING INITIATIVE BY ARCHITECTURAL GLASS PANEL (AGP), AIGMF

New Delhi

As part of the Corporate Social Responsibility, Architectural Glass Panel of the AIGMF is in the process of adopting new Eco-Packaging measures for packaging and transportation of Float Glass.

A series of meetings were organised with Dealers of the Flat Glass on Jan 31 at New Delhi, April 28 at Mumbai and on May 16, 2014 at Chennai.

Mumbai

Dealers of Float Glass were briefed on Eco-Packaging measures, which was attended by the following: *Saraf Glass, Lakshmi Float, S. Kumar Glass Works, Ajay Glass, Om Glass Co., Superior Glass, Mehr Image Pvt. Ltd., Pooja Enterprises, Vidhi Enterprises, Ambika Glass, Jay Mata Glass, Kanakia Glass & Allied Products, Glassiers Ent Pvt. Ltd., Evershine Glass Traders, Eastern Glass, Super Glass Centre, Fishfa Glass Centre, Pioneer Glass Trader, Sri Mookambikai Glass, Sri Mookambikai Glass, Garuda & Co., Sri Narasimha Enterprises, Sakti Sai Safety Glass India, Mr. Rajendra Glass House, Manchu Toughend Glass (P) Ltd., Manchu Toughend Glass (P) Ltd., Chennai Glass Corporation and LN Float Glass (P) Ltd.*

Chennai

An expert committee was constituted to explore solutions for turning in to green packaging and to arrive on a common solution for entire industry.

MoU FOR TAPPING SOLAR ENERGY AT AAI AIRPORTS

As a part of the series of efforts of Airports Authority of India (AAI) in tapping alternative sources of energy, the organization is going to establish solar power plants at its airports to meet not only its own requirements but also to feed the surplus power generated to the local grid. An MoU between AAI and Solar Energy Corporation of India (SECI) was signed in the presence of Mr. Ashok Lavasa, Secretary, Civil Aviation , Mr. Alok Sinha, Joint Secretary, MoCA & Chairman, AAI and Mr. Rajendra Nimje, MD, SECI for the establishment of solar power plants at AAI Airports. The MoU was signed by Mr. Sudhir Raheja, Member (Planning), AAI and Mr. Rakesh Kumar Director, SECI from Solar Energy Corporation (SECI) at Rajiv Gandhi Bhawan, Safdarjung Airport, New Delhi.

On this occasion, Mr. Ashok Lavasa, Secretary, Civil Aviation, highlighted the importance of tapping solar energy through various outlets including storage of power generated in rechargeable batteries. He also emphasized to use the full potential including roof top surfaces as large areas are available at airports. He stated that utilization of stored energy in an efficient and effective manner is very important and as such AAI shall identify the outlets where the tapped energy can be channelized including other applications of renewable energy for various establishments at airports. He said that projects shall be accomplished in a time bound manner and the airport-wise specific timelines shall be worked out and followed up for effective implementation.

AAI's plan includes installation of 50 MW capacity plants (cumulative capacity in Phase I) which will be enhanced to 150 MW (cumulative) over a period of time. The plants will be installed on surplus land available with AAI and at large roof tops of AAI's structures. In all about 30 Airports have been identified by AAI for establishment of solar power plants. Setting up of solar plants will not only achieve significant savings in power bills over a period of time but also result in relief in significant saving in carbon emissions apart from making airports self sustainable so far as energy requirement is concerned.

GERMANY NOW PRODUCES HALF OF ITS ENERGY USING SOLAR

Germany has set a new record, with solar power providing 50.6% of its electricity in the middle of the day on Monday June 9th. Solar production peaked that day at 23.1 GW. Three days earlier it was 24.2 GW between 1 and 2 pm, but on the 9th demand was down for a public holiday, allowing the breaking of the psychological 50% barrier.

Reporting of the achievement has been quite inaccurate in some cases. Coverage has often confused electricity demand with total energy consumption, which properly includes heating and industrial uses of natural gas, although these would have been low on a warm public holiday. Headlines have often implied that the 50% threshold was exceeded for over a fortnight, rather than a single hour.

Nevertheless, the scale of the achievement is considerable. Germany is not a sunny place. Indeed more than 90% of the world's population lives in countries with substantially more sunlight.

The shift to solar energy in Germany has not come cheap, with €16 billion of subsidies in 2013. However, by creating a level of demand that spurred mass manufacturing, Germany has played a large part in bringing the cost of solar panels down by 80% in five years, allowing other countries to follow in its footsteps for a fraction of the price, particularly those with more sunlight.

Moreover, where the initial stages of the move to wind were driven by government subsidies, solar power in Germany can now compete with fossil fuels on price alone, and continues to expand, albeit at a slower rate than a few years ago.

German solar production is up 34% compared to the same time last year as a result of both better weather and increased installations. While the first is unpredictable, increasing quantities of panels ensure that the 50% record will be breached again, probably this year.

DLF FOLLOWS GUJARAT MODEL, TO INSTALL SOLAR PANEL ON COMMERCIAL BUILDINGS

DLF is set to become the first real estate developer in the country to generate power by installing solar panels on top of its office buildings, a move similar to the experiment in Gujarat, where the state government has installed such panels on top of government buildings in capital city Gandhinagar.

The developer has signed a build-and operate agreement with UK-based Aniron Solatricity and Azure Power India to install solar panels on top of commercial buildings owned by DLF as an initial pilot project to produce 3 mw of power. The solar power generated will be routed to the buildings and combined with the main power source.

"It will help us use the unused terrace spaces of our buildings for generating power from environment friendly sources," said Amit Grover, National Director-offices business at DLF. The developer's office buildings in Gurgaon, Delhi, Kolkata and Chennai are being used for this project. DLF had earlier installed a 100 mw captive power plant in its DLF Cybercity in Gurgaon that runs on gas. This plant provides an uninterrupted power supply to offices in Cybercity.

According to estimates, 33 km of Delhi's total area of 1,483 square km can be used for rooftop solar photovoltaic projects to install 2,557 mw of capacity. "At the moment rooftop solar power is still more expensive than grid power. Grid parity is a few years away but it is catching up," said Amit Kumar, Executive Director at consulting firm Pricewaterhouse Coopers ■

(News Source: AIGMF Research Team / World Wide Web)

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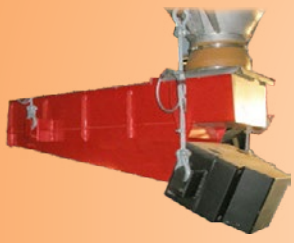

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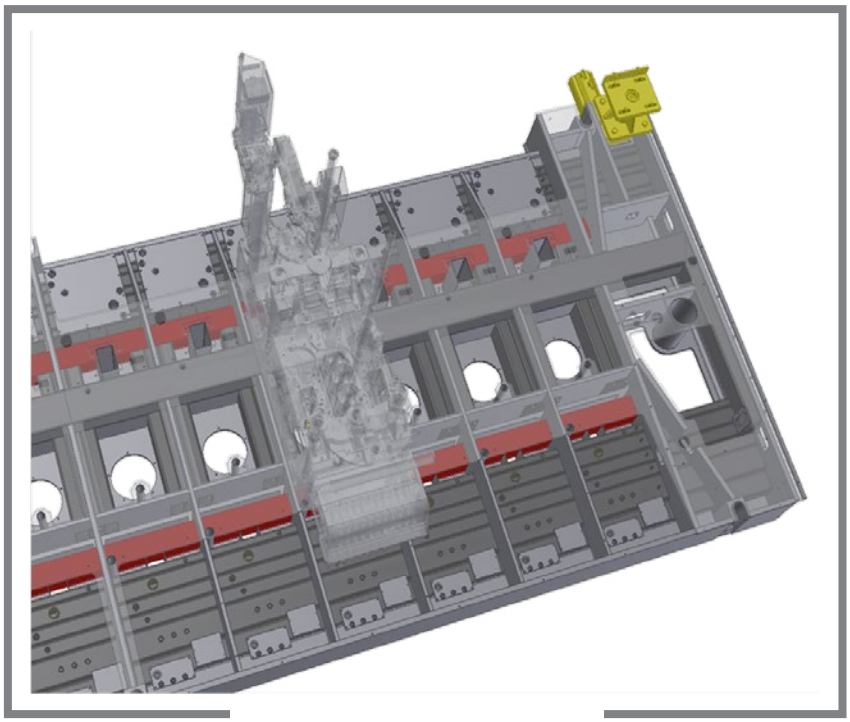
Heye SpeedLine: Evolution in IS-Machines

Dr. Benedikt Felgenhauer, Manager Machine Technology
Wilfried Seidensticker, Product Manager Hot End

Heye sees four major requirements in the IS-Machine segment: High safety in every respect, an optimum cleanliness and user-friendliness, all this at high quality and speed. Safety and clean design are two factors that belong together, because both, staff and equipment, need to be protected. Machine downtimes decrease, the quality of the products and the profit increase. Integrated control features mean to know permanently which state the equipment has. This reduces the number of errors, avoids a wasteful troubleshooting and causeless exchange of components. Finally, top quality of the machine ensures high speed - for many years. Important to mention: Heye took care of making an evolution -not a revolution- to ensure that the plants can still use the existing mechanisms and variables.



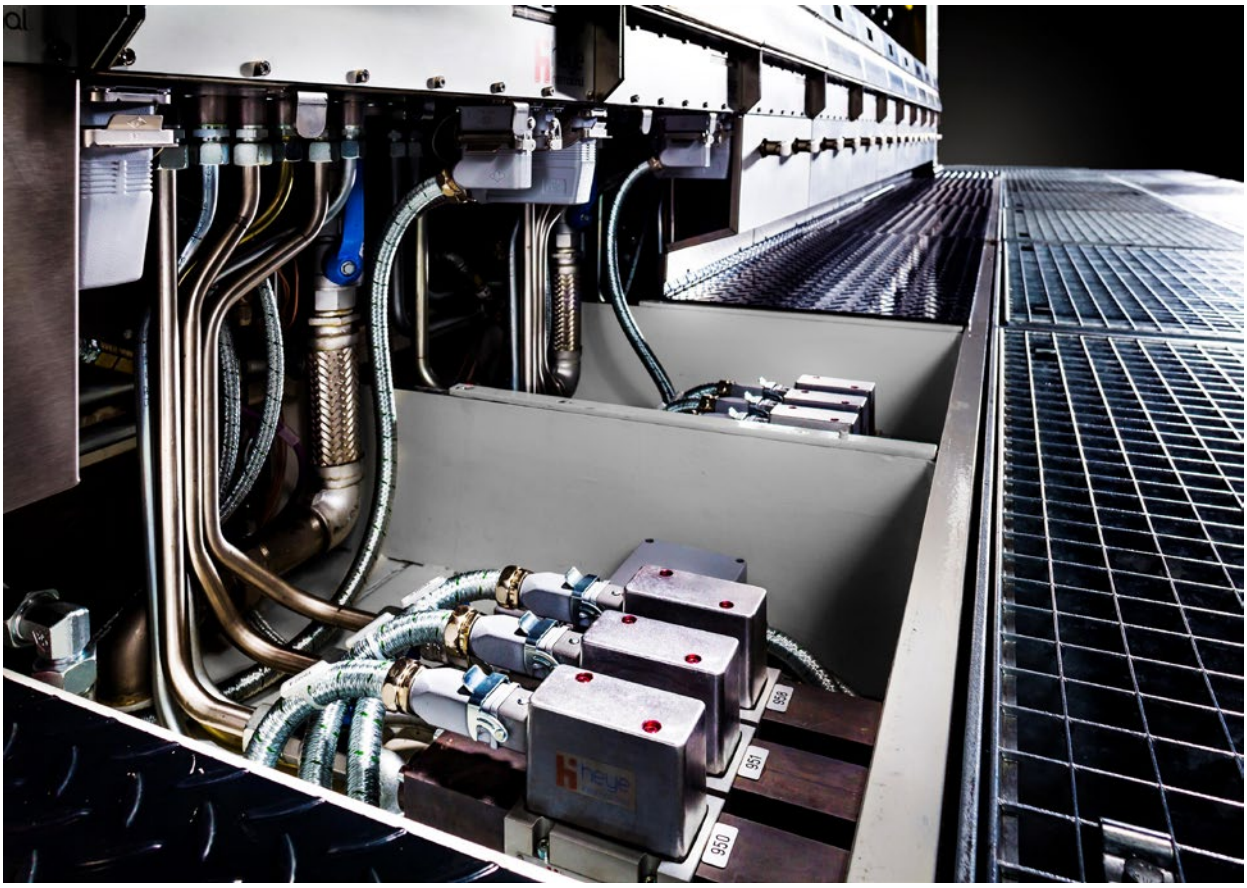
Machine bed

In the past the variety of possible options within the machine led to a variety of individually customized solutions. By functional integration the modular concept of the SpeedLine is a contribution to implement the most important options in one common structure. With this background Heye has decided to design a new machine concept to be well prepared for the future. An excellent example for the functional integration is the machine bed. It is not only the backbone of the machine; all air distributors and tanks are integrated. That means an optimally prepared bed also for retrofitting the Heye Process Control and proportional valves. Let's have a closer look into the different features and technical solutions, to see how the market requirements have been implemented.

HIGH SAFETY AND USABILITY

Safety and usability come in one hand. A good usability reduces the risk of potentially dangerous human errors. High safety is for example a result of the integrated cable channels in the machine bed: The development of integrated cable ways on the blank and blow mould side is very important for the increasing number of servo- and control electronics. Thus, the cables are protected in an optimum way against mechanical influences and hot glass and the fire risk is eliminated.

Besides the optimum protection of the cables, the structured cable ways enable even a cabling during the machine mounting phase in the Heye workshop. For the installation at the customer on site and for a later exchange of cables it is important to have defined interfaces. Another feature is that the machine conveyor is equipped with a rail system so that a movable heat protected ladder can be moved along the sections. Thereby, the operator can work safe on the blow mould side and the machine can be kept in operation.



Proportional valves: "By the defined distance between air distributor and box a fixed stainless-steel piping is simple to carry out"

CLEAR INTERFACES

One important interface is the connector board in the uprights for connecting the servo- and valve block cables. For a later installation or a section-wise exchange Heye designed cutouts from the bottom of the cable duct into the cellar. So it is possible to lay the cables section wise into a separate duct underneath the bed. Defined interfaces for air and water underneath the machine bed allow precise planning of medium supply and quicker installation during commissioning.

USABILITY THROUGH EASY CONTROL OF THE PROCESS

The upright was redesigned due to the increasing amount of servo- and control technology. Furthermore, the development of the housing was executed in such a way that all components can be accommodated and that the clean design could be maintained. Besides the integration of various control cabinets, the housing also contains a human machine interface (HMI) in order to control all important functions and to make settings. This HMI ensures a quick access on the most important information. By the introduction of new monitoring functions the information does not only cover the Heye servo components but also a query and adjustment possibility for the operating pressures, the optional dead plate monitoring and a central messaging system. Monitoring of the valves for functions like final blow is a big step towards process monitoring, preventive maintenance and job safety. The operator does not need take a risk when accessing difficult areas in order to control the pressure functions. The pressure check can be done without losses resulting from switching-off the section. However, it is not only monitored whether the valve works but also how exactly.

All valves are electrically controlled so that the extensive cascade via the valve block is omitted. For it, the structure contains cable ducts that guide the cables to the upright. The adapter plates are prepared for the use of proportional valves.

CLEAN DESIGN

HACCP is the abbreviation for the Hazard Analysis and Critical Control Points concept and is required by all major fillers. This is a preventive system that ensures both, food and consumer safety. Besides a high article

quality clean design also means that the equipment can be cleaned in an optimal way. This reduces the time needed for repairs and maintenance. Cleanliness increases the life-time of your equipment.

For the new design the individual air distributors of the cross structure were grouped together. Thus, a clear and clean design resulted which is not only easy to clean but also offers the operator a clear view through the entire machine from the blank to the blow side. By flange plates process air can directly be fed into the beam via the upright. Thereby, an external piping is not needed anymore.

On the blank side the clean design continues. By arranging the injectors above the valve block the air pipes are not crossed anymore by the injector rack and its pipe work underneath the block. Furthermore, the new injector generation is now compactly arranged in the operator's field of vision. Additionally, a rapid interchangeability and an exactly pre-adjusted capacity that is matching with the lubrication point size are ensured.

Also in the area of the machine conveyor functions were integrated on a large scale. Conveyor cooling, cable ways and dead plate cooling are now installed in the conveyor body, whereby the cables are optimally protected and guided the shortest possible way.

Caption: Functional integration in the machine belt:

(A) Belt cooling

(B) Air supply for dead plate cooling

(C) Channel for pusher cable

(D) Chain return

For better cleaning and as protection against dirt and heat the pushers are surrounded by casings. Furthermore, they offer the option of active pusher cooling by the machine conveyor body via the cable channel. By directly positioning the pusher socket at the machine conveyor in front of each section, the pusher can be exchanged very easily as it is possible to remove the plug to uplift the unit with the cable tail.

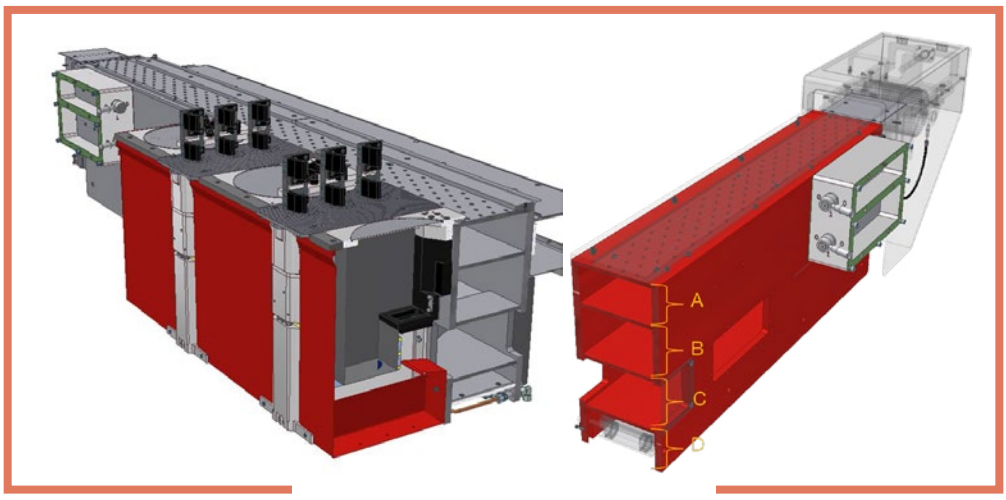
The dead plate position for each cavity can optionally be monitored by an infrared sensor underneath the dead plate over the whole cycle run of a section. If the heat radiation is abnormal or does not exist at a certain time a failure in glass handling or demoulding has occured. In that case the following gobs for this section will be rejected. This minimizes downtimes and avoids wasteful maintenance.

Beside the bed, the manifolds and the conveyor, the scoop beam is an additional example for the functional integration. Both hollow profiles are used to guide compressed and blast air. In between the cable duct is embedded.

There are modules for the scoop cooling and pneumatics on the profiles. The modules are optimally protected against environmental influences by easy to remove hoods, however, they are still easy to reach by flaps.

HIGH SPEED

The increasing production speed also requested an optimization of the flow paths. For this reason - when carrying out the design of the new bed – the flow paths were kept very short and straight. In addition the exhaust air for the plunger cooling and valve block is guided directly into the atmosphere. Thus, the flow resistance could be decreased and the cooling efficiency of the plunger hence increased. By omitting the exhaust air manifold the back pressure into the valve block could be eliminated as there are no more interactions possible. A straight design, combined with high quality for all parts and mechanisms means high speed production of high quality containers for many years to come ■



Machine bed and pusher casings

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World Soda Ash Conference

(September 16-18th 2014, Shanghai, China)

IHS CHEMICAL 2014 WORLD SODA CONFERENCE TO HIGHLIGHT THEME OF 'CONSUMERISM, SUSTAINABILITY & SODA ASH'

The world soda ash market is poised for an improved year in 2014, with demand at last set to see some real growth. A recovery in construction and auto sales, will fuel flat glass and in turn soda ash demand, particularly in developing economies such as China and India.

Consumerism to some extent drives soda ash demand. But demand is also driven by sustainability as flat glass plays an increasing role in both energy conservation and energy generation.

Soda ash (sodium carbonate, Na_2CO_3) is an important industrial chemical. Global annual consumption is more than 55 million tons, with the glass industry the single largest consumer. There are no economical substitutes for soda ash in flat glass for construction and automotive applications, although container glass has lost market share to bottle-grade polyester. Detergent and chemicals are other major market segments that consume soda ash.

Plenty of opportunities to network with more than 200 attendees

The developments of Turkey's deposits of the soda ash mineral trona is one natural resource that is proving disruptive to the long-established European chemical industry. It may well prove to be their defining competitive threat over the next 5-10 years. Eti Soda began production in 2009 and has plans to produce 4 million tons annually by 2018. Turkey has excellent logistics for transporting its soda ash to European markets. It is also conveniently located to markets in North Africa and the Indian Subcontinent.

Since Eti Soda's commencement of production and allied with the devastating effects of the recession on demand, three synthetic process plants closed in 2009, and two more closed recently—Solvay at Povoa de Santa Iria, Portugal, and Brunner Mond at Winnington, UK— for a reduction in capacity from 2009 of 2 million tons. Soda ash capacities in other regions have also come under pressure. A synthetic plant was permanently closed in Australia last year. Tata Chemicals has just announced plans to idle half of its natural soda ash capacity in Kenya. In addition, a synthetic plant

Deep analysis from industry and IHS experts at the soda ash conference

is scheduled to permanently close in Japan by mid next year.

The Chinese soda ash industry faces problems of its own, due to an excess of capacity locally, lower than expected demand growth and high production costs. In many respects, the Chinese capacity is stranded as high costs prevent the local producers from exporting their surplus to other regions. Some Chinese soda ash plants also face environmental challenges and this month a large synthetic plant was permanently closed as a result of the heavy pollution problems in Hebei Province.

The IHS Chemical 2014 World Soda Ash Conference will offer deep analysis from 16 industry and IHS experts from these developments on the soda ash market. It is expected to draw more than 200 attendees worldwide for discussion and non-stop networking opportunities over two days on 16-18 September 2014 at the Portman-Ritz Carlton in Shanghai, China. The conference will be preceded by a full-day Soda Ash Training Workshop on 16 September. Almost 250 industry participants from more than 40 countries attended the last World Soda Ash Conference in 2012.

Some of the topics to be covered at the conference are:

- Global soda ash overview
- Soda ash production in China
- The Hou process & ammonium chloride
- Growth opportunities for soda ash demand in Sub-Saharan Africa
- Outlook for soda ash demand/supply in India
- The future of soda ash in Europe
- Progress with Turkish soda ash supply
- Impact of energy and raw materials on production costs
- Sodium bicarbonate and flue gas treatment in China

For a full agenda and latest updates, please visit the World Soda Ash Conference website at http://www.ihs.com/info/events/wsa ■

If you would like further information or have any questions about this conference, please contact:

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