Corrosion is causing a loss of over $5000 bn USD to global economy every year.
INSIDE THIS ISSUE

INNOVATIONS WITH STAINLESS STEEL

COVER STORY
STAINLESS STEEL – “The Metal with Great Resistance to Corrosion”

CSR INITIATIVES

JSL NEWS

2-5
6-10
11-15
16-17
A SIX-METRE tall temporary art piece that doesn’t know if it’s coming or going is the first of many conversation starters bound for Moonee Ponds. The stainless steel sculpture is the first piece in Moonee Valley Council’s new public art program, which will show at the former fountain outside the Clocktower Centre on Mt Alexander Rd. Newport artist Robert Hague completed the piece this year, naming it Tenjen, the archaic translation for an obelisk, which a monument is normally considered a protector. Hague, 46, said wings were added to the obelisk as part of a series of works he had completed dealing with the idea of “flying and falling”. “Depending on (someone’s) view, it is either an object falling or an object flying, so it can be either a positive monument of an object flying or a warning,” he said. “If you look at something and you understand it completely, it’s boring and it hasn’t a life of its own. If it’s open-ended, (it) can have a longer life intellectually.” The sculpture took about 12 weeks to complete and has been exhibited in Lorne. Moonee Valley Mayor Jan Chantry said it would show as part of the pilot Mt Alexander Road Public Art Initiative, which would run for 24 months and make better use of the area.

“We hope the installations will stimulate discussion in the community and engage residents in understanding the importance of and the role art has in inspiring creativity and fostering well being.”

Fine stainless steel MicroEtch screens are manufactured using photo etching technology. Photo etching enables designers to specify a straight hole or a tapered hole, which facilitates liquid filtration and back flow cleaning. Hole sizes range from .003 in. and up. Unlike stamping, photo etching yields a burr-free product resulting in cleaner more efficient screens with greater material integrity. MicroEtch screens feature a tighter tolerance on hole sizes and greater dimensional stability than woven wire mesh, making them ideal in applications requiring frequent cleaning or in devices where there is mechanical contact. Unlike woven wire mesh screens, the fixed photo etched openings will not change through use.

Typical applications of MicroEtch Screens are particle separation and sizing, hydraulic valve screens, fuel filters, laser light filters, extruding screens, as well as filters used in the medical market. These tight tolerance screens are primarily produced from stainless steel, but other materials are available. Tech-Etch, Inc. offers a standard line of screens with holes in a 60° or 90° pattern that are available with a maximum guaranteed perforated area of 18” x 21”. Other sizes and custom shapes are also available.

It is an understatement to say that Burj Khalifa represents the state-of-the-art in building design. From initial concept through completion, a combination of several important technological innovations and innovation structural design methods have resulted in a superstructure that is both efficient and robust. Over 45,000 m³ (58,900 cu yd) of concrete, weighing more than 110,000 tonnes were used to construct the concrete and steel foundation, which features 192 piles buried more than 50 m (164 ft) deep. Burj Khalifa’s construction will have used 330,000 m³ (431,600 cu yd) of concrete and 39,000 tonnes (43,000 ST; 38,000 LT) of steel rebar, and construction will have taken 22 million man-hours.

Exterior cladding of Burj Khalifa began in May 2007 and was completed in September 2009. The exterior cladding is comprised of reflective glazing with aluminum and textured stainless steel spandrel panels and stainless steel vertical tubular fins. Close to 26,000 glass panels, each individually hand-cut, were used in the exterior cladding of Burj Khalifa. Over 300 cladding specialists from China were brought in for the cladding work on the tower. The cladding system is designed to withstand Dubai’s extreme summer heat, and to further ensure its integrity, a World War II airplane engine was used for dynamic wind and water testing. The total length of stainless steel bull nose fins used on Burj Khalifa is 293 times the height of Eiffel Tower in Paris. In November, 2007, the highest reinforced concrete corewalls were pumped using 80 MPa concrete from ground level; a vertical height of 601 metres. The amount of rebar used for the tower is 31,400 metric tons - laid end to end this would extend over a quarter of the way around the world.

Backed by an exceptional increase in sales, consumer durables major, LG Electronics India is flying its water purifier consignments by air, in order to meet the high sales requirements of its product which the company calls India’s first dual protection stainless steel tank RO water purifier. The newest entry into LG’s home appliances segment, the Industry’s first stainless steel tank range is seeing increasingly high demand, heralding a changed consumer perception wherein consumers are looking at value proposition over price sensitivity in making purchases. Rajeev Jain, sales head, Home Appliances, LG India said, "LG’s True RO water purifier has been witnessing roaring sales since its launch in the Indian market. We have received very positive responses from our consumers for the True RO Water Purifiers which include a unique dual protection stainless steel tank for hygienic water preservation.

Understanding the need for purified and safe drinking water, this room temperature based RO stainless steel water purifier range is designed with RO filtration system that provides the most purified RO water. A separate airtight sealed stainless steel tank prevents the formation of bacteria and germs. The ‘Ever fresh UV Cycle’ keeps water fresh for a longer period, ensuring hygienic preservation. With the digital sterilizing care system, the purifier offers an eco-friendly, hassle free and automatic method of maintenance. These water purifiers promise purity till the last pristine drop of water you drink, said LG. He added that Indian consumers are value conscious and are looking forward to water purifiers that provide safe and clean drinking water free of impurities. Apart from low priced water purifiers, a high end market is also thriving with extensive innovative features being provided for higher prices. Consumers nowadays are more interested in these extended features as a compromise with health is totally unacceptable for them.

Source: http://article.wn.com/view/2014/07/04/LGs_True_Water_Purifier_witnesses_surge_in_sales_supply_incr/
Jindal Stainless Limited organized the second edition of ‘Stainless Masters’, in the first week of September in Bali, Indonesia. The idea behind the golf tournament was to connect and grow the bond stronger with JSL’s customers. Chairman & MD, Mr. Rattan Jindal, personally greeted and welcomed all the guests and participants from various countries. Besides the tournament, JSL also organised cultural evenings that were adorned with entertainment activities including singing, dancing etc.
Jindal Stainless Limited participated in the second edition of the world’s leading construction and infrastructure congregation – “The Big 5 Construct India”, held in Mumbai from 11-13th September’14. Jindal Stainless Ltd showcased its best-in-class stainless steel products and solutions for the construction sector. To promote stainless steel in Architecture, Building & Construction (ABC) sector, JSL participated in the seminar and workshop to address people from all over the world. The Big 5 Construct India 2014 offered exhibitors the most effective B2B platform to connect with architects, consultants, contractors and developers during the three day event.
JSL Technical tie with IIT-Roorkee & IIT-Kharagpur

JSL has initiated a technical tie up with two of the premier engineering Institutes: IIT, Roorkee and IIT, Kharagpur. This technical tie up is a major step towards strengthening the Industry-Academic relationship and to bring value added relationship amongst the two entities which will benefit each other in future.

In collaboration with these two Institutes, JSL will be rolling out below mentioned Initiative:

(A) **Summer Internship & Final Placement**

JSL will participate in Campus placement at these Institutes for Summer Internship and Final placement. The selected students will be placed at JSL’s Hisar & Jajpur plant in Metallurgical and Mechanical fields.

(B) **Student and Faculty Exchange program**

As a part of the student & faculty exchange program, students from these Institutes will undergo 2-3 days Orientation program at JSL’s Hisar & Jajpur unit to understand the processes & products being manufactured at these plants. Also, senior executives of JSL will visit these Institutes to interact and share their experiences with the students of these institutes.

(C) **Short term courses for JSL Employees**

JSL, in collaboration with Faculty of Roorkee & Kharagpur, is in a process of developing 2-3 months short term module including development program (covering both technical and managementaspect) for JSL employees which will be covered through classroom sessions, visit to the campus, case studies and projects.
Functional and efficient toilets are an indispensable part of any construction that is built for people. JSL's modular toilets are the answer for all portable sanitation needs, with modern and sleek designs made with the purpose to provide an extremely hygienic and comfortable environment. Our toilets are resistant to water corrosion and microbial growth, making them the optimum solution for India's diverse climatic conditions.

### SALIENT FEATURES OF STAINLESS STEEL MODULAR TOILETS

- From the house of Jindal Stainless
- New Design more Production friendly with minimum wastage
- Eco friendly and 100% recyclable
- Competitive in pricing vis à vis Fibre/Plastic or brick and mortar toilets
- Completely Stainless Steel with PVD coated interiors
- Completely Modular in Design can be transported in knock down condition and can be assembled at site in minimum time to save transportation cost.
- Can be upgraded to a fully Automated Bio – Toilet
- Ideal for outdoor atmosphere as Stainless Steel is not subjected to variant weather conditions

### COMPARISON BETWEEN STAINLESS STEEL, FIBRE/PLASTIC, BRICK AND MORTAR TOILETS

<table>
<thead>
<tr>
<th>Key Parameters</th>
<th>Stainless Steel</th>
<th>Fibre/Plastic</th>
<th>Mild Steel</th>
<th>Brick Mortar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Strength</td>
<td>Excellent</td>
<td>Very Poor</td>
<td>Prone to Rusting</td>
<td>Medium if Maintained</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Nil</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Product life</td>
<td>25 years/Unlimited</td>
<td>Less than 1 year</td>
<td>3-5 years</td>
<td>8-10 years</td>
</tr>
<tr>
<td>Hygiene of usage</td>
<td>Excellent</td>
<td>Very Poor</td>
<td>Very Poor</td>
<td>Very Poor</td>
</tr>
<tr>
<td>Recyclable</td>
<td>100%</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Environmental</td>
<td>Yes (Green Material)</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Scrap Value</td>
<td>Excellent</td>
<td>Zero</td>
<td>Very Poor</td>
<td>Zero</td>
</tr>
</tbody>
</table>

For more details click: [http://jslarc.com/campaigns/stainless-steel-modular-toilet-from-jindal.html?gclid=Cj0KEQiAkdajBRCJC7_j6sCck7wBEiQAppb2iwOpIhkuSHqEWw2Gc4JyVGWbqsvP3_g3P803SxSDXqwaAjqX8P8HAQ](http://jslarc.com/campaigns/stainless-steel-modular-toilet-from-jindal.html?gclid=Cj0KEQiAkdajBRCJC7_j6sCck7wBEiQAppb2iwOpIhkuSHqEWw2Gc4JyVGWbqsvP3_g3P803SxSDXqwaAjqX8P8HAQ)
JSL participated in the biggest steel exhibition, Metal-Expo, in Russia. It was the 20th Jubilee International Industrial Exhibition with 650 exhibitors from 35 world countries and was held on November 11-14 in Moscow. Around 30,000 users of ferrous and non-ferrous products from different industry segments including construction, heavy engineering, fuel & energy, transportation & logistics, steel trading, research etc. visited the event. Major steel plants of Russia including Severstal, Mechel, Magnitagorsk Metal Factory and Red October have also participated in the exhibition.

JSL’s stand was one of the major attractions of the event and was visited by over 250 companies. The participation in Metal Expo proved highly productive providing enough opportunity to connect with customers in CIS countries.
Humans have always strived for the betterment of life and its existence. From the earliest chapters of history, the ‘life-graph’ depicts heavy reliance of humans on their surroundings, the discovery of resources that can help and support the ‘living’ became inevitable. Steps towards unearthing such resources led to the discovery of Metals of Antiquity, upon which the whole civilization was based. These included metals like copper, gold, silver, lead, mercury followed by the subsequent entry of iron, the game changer.

Stone Age begins with the first production of stone implements and ends with the first use of bronze. In a given region, the Bronze Age is considered to begin when it was found that the blend of two metals, or alloys, were much stronger than the individual metals. The discovery that adding tin alloy to copper strengthens the metal was the crux of Bronze Age and the casted metal in this process was no other but Bronze. Bronze had opened the avenues for the next step forward in metallurgy and soon became a much-used material for practical objects (i.e. tools and weapons). People realized that a bronze blade will take a sharper edge than copper and will hold it longer and bronze ornaments and vessels can be cast for a wide variety of purposes.

Production of iron was not realized until the Middle Bronze Age till people discovered that a high temperature coal fire could be used for the extraction of iron from iron ore. It further took hundreds of years for the metal to become prominent throughout the world. Gradually, iron became so popular that the phenomenal growth of its use was held responsible for the transition from the less developed Bronze Age to the more advanced, Iron Age. However, the ‘fruit of knowledge’ so explored had still to go a long way and the humans continued to explore the endless benefits of this metal.
With the beginning of industrialization and the breaking up of religious institutions, the enlightenment age flourished in reason and science. The technological trigger was pushed to direct new discoveries and inventions. The popularity of ‘Science’ was not only creating labs and industries but flourished even socio-culturally with a fascinating eye towards the future of mankind, as sketched in the popular literary genre of that time, science fiction. In 1855, Henry Bessemer introduced Bessemer’s process to produce mild steel, soon after which Iron started playing second fiddle. In early twentieth century the ‘push’ reached to produce fascination with metals, hence the science of metallurgy gained significance. Needless to say, it was the preparation for the grand entry of Modern Age.

The struggle to actualize the blueprint created by human brain of an ‘ideal metal’ remained intact. There was a need to find a metal powerful enough to resist decay/rust caused by unfavorable environmental conditions. Since neither Iron nor steel won over rust, search for a metal that could emerge as a bellwether continued up till a number of scientists explored the excellent corrosion resistance of chromium alloyed steels. But the quest continued until Harry Brearley, in the race of many other claimants, patented the first martensitic stainless steel in 1913.

Brearley named his invention ‘Rustless Steel’ which was later renamed by Ernest Stuart as Stainless Steel. History says that before Brearley hit the ground running, many other scientists had experimented with steel by adding chromium to it. However, these early experiments botched due to either higher or lower levels of chromium than the needed percentage to create stainless steel. Chromium, at levels of 10-27 percent, in conjunction with carbon content less than 0.2 percent, formed a layer on the surface of steel as it reacted with oxygen in the air. This layer acts as a protective film that resists oxidation and heat, giving stainless steel its non-corrosive, rust-resistant qualities. It was Brearley who first developed a grade of stainless containing 12.8 percent chromium which stood absolutely resistant to corrosion. Realizing the potential of such a high strength, rustless metal, Brearley, right off the bat, introduced stainless steel to the cutlery industry in Sheffield, England.
Few months later, NY Times published an article on January 31, 1915, stating, "The price of this steel is about 26 cents a pound for ordinary sizes, which is about double the price of the usual steel for the same purpose. It also costs more to work up, so that the initial cost of articles made from this new discovery, it is estimated, will be about double the present cost; but it is considered that the saving of labour to the customer will more than cover the total cost of the cutlery in the first twelve months." This announced the dawn of Stainless Age- The debut of Our ‘Wonder Metal’. Today, the only disconcerting thing about this metal is its name!! A metal with multiple qualities can just not be labelled with one of its virtues. Though it opens a vindication that, had Stuart known the calibre of this metal to outperform in many other applications, he wouldn’t have tagged it with just ‘stainless’. However, for instance, let’s talk about the very feature of this metal that marked its beginning-“its ability to resist corrosion”.

The sight of a reddish brown stain on a metal will immediately awake your conscious mind towards the decay of that material which is nothing else but corrosion. The word corrode is derived from the Latin word ‘corrodere’, that implies “to gnaw to pieces.” The common definition of corrode is to eat into or wear away gradually, as if by gnawing. In reference to our topic of discussion, corrosion can be defined as a chemical or electrochemical reaction between a material and its environment that produces a deterioration of the material and its properties. One can easily recognize corrosion on automobile body panels, charcoal grills, outdoor furniture, and metal tools. A major reason to replace automobile radiator coolant every 12 to 18 months is to replenish the corrosion inhibitor that controls corrosion of the cooling system. Of far more severe upshot is how corrosion affects our lives during our everyday travel. For instance, the corrosion of steel reinforcing bar (rebar) in concrete can proceed unnoticed and suddenly (or seemingly so) result in failure of a section of highway, the collapse of electrical towers, and damage to buildings, parking structures, and bridges, etc., resulting in significant repair costs and endangering public safety.
For example, the sudden collapse because of corrosion exhaustion of the Silver Bridge over the Ohio River at Point Pleasant, OH in 1967 resulted in the demise of 46 people and loss of millions of dollars. Perhaps most dangerous of all is corrosion that occurs in major industrial plants, such as electrical power plants or chemical processing plants. Plant shutdowns can and do occur as a result of corrosion. This is just one of its many direct and indirect consequences.

Corrosion can be highly insidious to economy. Industry estimates have indicated that the annual direct cost of corrosion to an industrial economy in the past 30 years is approximately 3.1% of the country’s Gross National Product (GNP). In the United States, this amounts to over $1 tn per year. It is startling that corrosion is causing a loss of $5000 bn USD to the global economy every year. The Department of Defence in US alone has corrosion costs of $20 bn because of the significant economic, safety, and historical impact of corrosion on society.

According to a recent report (NACE, India chapter) the corrosion cost in any developing country is predicted by 5% of the GDP. For India the cost of corrosion is estimated to be 36,000 Crores INR in 2008. This is about half of our defence budget and perhaps double of our total annual expenses on education. This is, therefore an enormous sum, which needs immediate attention and future strategy to minimize it and make our industry safer and accident-free. Some common economic losses occur in our everyday lives include the replacement of corroded equipment, preventive maintenance like painting, overdesigning, shutdown of equipment due to corrosion failure, contamination of a product, loss of valuable product, inability to use otherwise desirable materials.

Social consequences of corrosion can involve safety, for example, sudden failure of an equipment due to corrosion can cause fire, explosion, release of toxic product, and construction, health, for example, pollution due to escaping product from corroded equipment or due to corrosion, collapse, depletion of natural resources, including metals and the fuels used to manufacture them, an unpleasant appearance etc.
The beauty of stainless steel lies in its amazing ability to form a transparent, self-healing protective layer of chromium oxide on its surface, which makes it resistant to corrosion. As PBS (Public Broadcasting Service) reported in its special "The Streamliners"...“Stainless steel, with its sleek, shiny surface and tremendous strength, is a marvel of technology. It has revolutionized most modern industries, including food, medicine, and transportation. The non-corrosive and rust-resistant properties of stainless steel have made it essential in the preparation, delivery and storage of food. Stainless steel is a standard in modern restaurant kitchens since it can be easily cleaned and dried. The surface of stainless steel resists oxidation at high temperatures, making the sterilization of medical instruments possible. Its light weight and durability allowed the development of streamlining in transportation. The streamlined design of new trains, planes, and automobiles allowed for less wind resistance, and trains such as the Zephyr helped spark a new design movement. Everything from toasters to vacuum cleaners emulated the new vehicles. Stainless steel paved the way for modern technology and continues to influence our lives every day.”

With greater attention being made to achieving low and long term maintenance costs, less environmental impact and greater concern with life cycle costs, the market for stainless steel continues to improve.

Where the global economy is suffering immense losses every year due to corrosion, the use of stainless steel can resolve and reduce some of the common glitches caused by this severe 'disease', corrosion. Thus, solution lies in promoting its usage as much as possible!!

Today, our society is heavily dependent on metals, and, the science of metallurgy is now one of the most widely documented and researched materials sciences. A glimpse of the history of mankind explorations in metallurgy highlights adaptation to newer and more advanced methods in metallurgy science, and we should progress towards appropriating the best and moving forward.
The philosophy of women empowerment as a part corporate social responsibility at JSL has taken long leap since JSL signed the UN's Women's Empowerment Principles in 2010. JSL has been engaged actively in women empowerment initiatives around its plant locations in Jajpur and Hisar. The entire thought of this initiative is to entrust women to become self sustainable that gives an equal dignity, rights and voice in the society. To enable this, JSL is engaged with women to make them financially independent, develop skills and to shape their entrepreneur skills. All these initiatives and hard work since past years has resulted in plethora of women empowerment activities by JSL. Today self help groups (SHG) and its women members are living a life of self-esteem by various income generating activities. This has brought a landmark thought change in the community as women have started to earn more respect and treated with deference.

Brief of initiatives taken up at JSL.

Self Help Groups (SHG)

JSL currently has approximately 200 SHGs in Jajpur and Hisar where we are reaching out to over 3000 women. A number of SHGs have been liked to nationalized and local banks. Major activities under SHG are: (i) Saving and inter loaning (ii) Engagement with banks and disbursement of loans (iii) Supporting entrepreneurship and IGP Programs – making agarbattis, papad making untis, dal processing, food processing, phenyl and detergent making, Paper Lanterns, Diyas and mushroom cultivation. What is critical is there is a linkage between various SHGs i.e. one group of SHGs does the sourcing and product aggregation, the second procures the aggregated products from these SHGs and makes a different product and after a QC, there is a different set of SHGs which do the marketing of the product. Such a method has given a lot of confidence to the group members and they have to some extent become inter-dependent.

Loan by SHG is being given to group members for some IG activity like setting up petty shops, purchasing cattle and starting goatery projects, etc. Loan is also available for marriage, education, house repairing and agricultural needs. This is leading to sustainable development and is helping them raise their economic levels. This will go a long way to make women self reliant as all these women are making forays into becoming entrepreneurs in their area of expertise.
CSR INITIATIVES

Skills Development

Various courses are being run at the Vikas Kendra with the help of SHGs to develop the skills of young girls and women. In partnership with Usha International, Diploma courses are being offered in Dress Designing and Fashion Technology. Further, Basic and Advanced trainings are provided on beauty culture, Mehendi, Stitching, tailoring and embroidery in collaboration with JIIT. Computer Literacy programs are also being provided in collaboration with NIIT.

Entrepreneurship Development

At Jajpur, Asmita center is being run by 20 girls trained in home furnishing and apparels with the aim of making them not only employable but to make them entrepreneurs and cater to the demands of the Company. The requirement ranges from school dresses for the schools to cushion covers etc. The production centre is currently receiving orders from ‘Fabindia’, JK Handlooms and other export houses. These women, having given the opportunity and training, have shown their entrepreneurship skills. Efforts are being made to scale up the activities through a process of regular up-gradation of equipment and making the entrepreneurial activity sustainable.

Leadership Skills

Literacy classes and adult education classes are being run for women in both Jajpur and Hisar. Further, Women Sarpanch in Jajpur are involved in all the developing projects that are being planned with the SHGs, young girls and various other programs focusing on health care and awareness.

Broad Outcomes of the project on Women Empowerment:

- SHG members and women involved in small scale entrepreneurship and IGP are making reasonable profits. They are financially independent to a great extent.
- The income that they generate is being used for education of children and access to improved health care for women.
- SHG members are giving out loans for encouraging small scale entrepreneurship amongst women.
- Women feel more confident as a result of the income that they earn through various programs.
- Women now feel more respected at home and have a say in the decision making at home, even if it is monetary decision making.
- Women realize the importance of education and are taking keen interest in literacy classes.
- This is also giving a boost to the education of girls in the community.
- Women are realizing the need to access health care as an equally important part of the family.
- Women are getting market exposure and are learning the trade. They are able to bargain and feel confident enough to expand their entrepreneurship.
CORROSION is causing a loss of over $5000 bn USD to the global economy every year

Increase in usage of stainless steel can play a significant role in reducing this enormous loss. Stainless steel by virtue of its composition is highly resistant to corrosion and erosion which makes the metal an ideal choice for every industry. Stainless steel offers its users the most economical solution over time on account of its durability and ease of maintenance.

To know more about stainless steel and its applications, log on to www.jindalstainless.com