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The President Writes

The job of President is a joy, well most of the time anyway; I recommend it to all members. This month I had the pleasure of presenting Professor John Scully with the UR Evans award. Professor Scully is the Charles Henderson Chaired Professor of Materials Science and Engineering Co-Director of the Center for Electrochemical Sciences and Engineering Department of Materials Science and Engineering University of Virginia in the USA, impressive credentials and deservedly so. John is a worthy recipient of the UR Evans award which is a prestigious presentation made by ICorr for outstanding achievements in pure or applied corrosion science, the award consists of a long, very impressive, full size sword specially engraved, the award is made annually with the recipient selected by a panel from the corrosion science division (CSD) of ICorr, the recipient also receives an honorary life fellowship of ICorr.

The award preceded Professor Scully’s ICorr Evans Plenary Lecture, entitled “Some Advances and Challenges in Understanding the Influence of Micro-structural Heterogeneity on Corrosion” an impressive tour through the past, present and future of corrosion at the micro level. To be honest it is difficult to take in such learned and important work during the actual presentation; I have therefore since received a copy of John’s presentation for further reading. I am on my second read through and am making progress with my understanding, it’s only a matter of time. But bringing this work from the small to the macro this every day manifestation of corrosion is also a matter of time, and what happens at the micro level eventually arrives at the macro level in the form of visible corrosion damage, which is where many involved in the corrosion industry work. I recently had a discussion with a past President of ICorr who said that when paint films were perfected there would be no need for other means of corrosion control and all will be well, I look forward to that day, but the quest also needs to start at the micro level and possibly a better approach would be to produce low cost corrosion resistant alloys which do not need painting and do away with it altogether.

Putting all this one side the job of President is one which needs continuity and planning, i.e. some of what needs to be achieved, or that which must be changed due to development or new requirements, needs to be planned in advance and instigated over a much longer period than the two years available to me. In November I will have been in the post for one year and have but another year to go before the vice president takes up his tenure. It is through this succession process that we can plan and pass forward coherent courses of action to keep the ship on an even keel and course, and in doing so assist ICorr to meet changing needs to the benefit of all, be it at the micro, macro or some other level.

Trevor Osborne,
President of the Institute of Corrosion

NEW SUSTAINING MEMBERS PROFILE:
CORROSION CONTROL INCORPORATED

Corrosion Control Incorporated is a professional engineering and service company devoted to the field of corrosion monitoring and control. The cathodic protection related services offered include design, testing, troubleshooting, repair and installation of new systems. Related areas of expertise include corrosion failure analysis, mechanical integrity inspection of piping per API-570, external corrosion direct assessment (ECDA), coating selection and inspection, water treatment analysis, material selection, preliminary soil/water corrosivity studies, marine pile jacket designs, and above grade compliance evaluations relating to corrosion control. Our firm carries full insurance coverage including professional liability and we have a DOT compliant drug testing program in place. Each of our engineers and technicians are NACE certified and registered through ISN under the OPS rules. Our firm is registered as a Woman Owned Small Business with Central Contractor Registration and with the Women’s Business Enterprise National Council. Our staff is devoted to providing timely professional service on a personalized level.

The senior project engineers at Corrosion Control Incorporated are degreed, with National Association of Corrosion Engineers (NACE) certification and each have more than 25 years of practical field experience. This experience proves invaluable to our clientele in terms of expediently addressing corrosion problems. Each of our engineers have extensive experience in military, utility, government, petrochemical, power generation, pharmaceutical, food processing, airport, and marine facilities. We are capable of generating design documents, specifications and installation plans in any desired format. Because of our level of field experience, designs generated by our engineers are economical, practical and constructible. Our engineers are also fully capable of managing the installation of corrosion control systems, inspection of installations, conducting final commissioning evaluations, providing owner training, issuing O&M manuals and producing quality reports with as-built drawings. We are especially attuned to supporting petrochemical owner/operators, larger engineering firms, design-build projects and fixed base operators.

For further information contact: 494 Fairplay Street, Rutledge, Georgia 30663
Telephone: 706-557-9624  Fax: 706-557-7923  Email: engineering@corrosioncontrolinc.com
At the North West Branch AGM in May, Ken Dykes, became the new chairman.

It has become the tradition to combine the AGM with the annual Golf Day and this year was no exception being held at Heyrose Golf Club, Tabley, near Knutsford in Cheshire. A very enjoyable day was had by all, the weather stayed fine and warm and the day was rounded off with a very nice buffet. The golf day is open to anyone, so make sure you look out for the advanced notices so you do not miss out next year.

North-West Branch also have a close association with the Manchester Section of the Oil and Colour Chemist’s Association and have recently held two joint meetings, the 1st one was Brenda Peters’ presentation on Continuing Professional Development (CPD) and the Science Council Standards and the 2nd was Barry Windsor’s A-Z of Coatings. The latest one is a talk on Anti-corrosive pigments given by Halox on 7th October. It is hoped that a half day symposium will be held in the Spring on A-Z of Metallic Coatings, in addition to a programme of evening technical meetings usually held on the 2nd Monday of each month at the Woodthorpe Hotel, Bury Old Road, Prestwich, Manchester M25 0EG. The December meeting is a social event, when the Chairman choses the location for a Christmas meal and half the fun is actually finding the location as some have been quite obscure. Usually everyone finally arrives even if a little late.

North-West Branch are also very involved at a National level having provided several Presidents including Stuart Lyon, Brenda Peters, Paul Lambert and Bill Cox, Honorary Secretaries Laura Buckley and Jane Lomas. Currently on Council we have Stuart Lyon former MD of Correx Ltd. and now responsible for Science Council, Paul Lambert Chair of PAC, Brenda Peter, Inter-Institute Liaison and EFC, Jane Lomas Honorary Secretary. Bob Cottis Accreditation Committee and Ken Dykes.

North West Branch covers a large geographical area from The Pennines to North Wales and from Cheshire to the Scottish Border. Despite this we continue to hold successful meetings and have an active and dedicated committee.

Brenda Peters,
Hon Sec North West Branch

NEW SUSTAINING MEMBERS PROFILE:
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Have you remembered to pay your 2013/14 subscription?
The premier annual Corrosion conference in Europe is EuroCorr which this year took place at Estoril, near Lisbon, Portugal, home to the Estoril casino (visited at the Eurocorr in 2005 and famous for being the inspiration for the first James Bond novel, Casino Royale). The meeting was held in the conference centre opposite the casino and although conditions were unusually warm (daytime temperatures of 30°C+), it was a most enjoyable and well organised event (many thanks to Fatima Montemor and her team). There were over 870 delegates from 60 countries worldwide including 57 delegates from UK. ICorr Council was well represented with Brenda Peters, Douglas Mills, Nick Smart, Gareth Hinds, Bob Cottis and Stuart Lyon (accompanied by his wife, Karen and baby Alice). John Sykes, Neil McMurray, Don Harrop were also present.

The proceedings consisted of nine parallel sessions of twenty minute presentations, preceded each day by a forty minute plenary lecture held in the main auditorium. The first of these lectures was entitled “Molecular Studies of self assembled monolayers as corrosion inhibitors” and was given by the European Corrosion Medal winner C Leygraf from KTH, Stockholm.

The plenary on the Tuesday was “Innovative concepts for high temperature corrosion protection” by M Schutze from Dechema, Frankfurt.

On the Wednesday it was “Inhibitor containing coatings for active corrosion protection” by M Ferreira from University of Aviero near Lisbon.

On Thursday it was “Challenges and recent developments in aluminium corrosion resistant alloys for transport applications” by C Henon from the Constellium Research centre, Voreppe in France. About 300 other papers were presented. The main sessions were Coatings, Mechanisms and Methods, Corrosion in Oil and Gas, Nuclear and Microbial Corrosion all of which ran for two days or more. Corrosion in Concrete, Hot Gases and Environment Sensitive Fracture all ran for at least a day plus there were a dozen other half day sessions.

Some of the presentations were highly technical, some were updates on on-going research, some were of general interest, and some were overtly commercial. All in all a good mix. There was also a large (around 200 papers) and successful poster session. Most of the papers were on the CD ROM provided to all delegates. The exhibition was small and consisted mostly of Plant and Measuring Equipment. There were several fringe meetings including NACE and WCO (World Corrosion Organisation).
The Welcome Party on the Sunday evening was a good networking opportunity meeting old acquaintances and new people. The wine flowed freely and waiters circulated with trays of nibbles. Early evening on the Monday your correspondents represented ICorr at the well-attended General Assembly (GA). At this, modifications to the bye-laws were approved, bids were requested for Eurocorr 2017 which have to be in by 15/1/14 and a joint EFC / NACE conference in November (14th and 15th) at Frankfurt entitled “Bring on the Heat” which will “home in” on the subject of Corrosion Under Insulation was announced.

Juliet Ippolito who took over the Scientific Secretary position from our own Paul McIntyre now takes on the role of Public Relations Officer and the new Scientific Secretary is Roman Bender from Dechema. The Treasurer reported on the finances. Reserves have been built up to £163,000 which is three times the annual expenditure. There was some discussion about ways of supporting the smaller societies who are struggling with the Annual Subscription. Votes were taken for membership of the Board of Administrators (BoA).

The official UK member was announced as Trevor Osborne. Don Harrop was named as the UK member of STAC. There will be a new level of membership that of Honorary Fellow which will be given to people who have provided exceptional service to the EFC. Immediately after the GA we attended the Presidential reception held on the terrace of Estoril Casino. Again the drinks flowed freely and waiters came round with copious amounts of finger food, much to the relief of one of your correspondents who earlier had an unfortunate lunchtime experience (extremely tardy service meant he had to leave to get back to the conference before getting any food! - a small gripe was that Eurocorr this year did not provide lunches as previous EuroCorrs have generally done). It was a stand-up event (no chairs) so Brenda joined the lady Professor from Turkey, perched on the parapet wall.

On the Tuesday we attended the Coatings Working Party WP14, which was also well attended. The minutes of the previous meeting were discussed and expanded on. There was some discussion about ISO standards. The Germans announced that they are running a parallel ISO committee which is conducted in German, but, they invited anyone who was interested to join and promised that if anyone did they would conduct the meetings in English. A new working party has been set up, Corrosion in Aerospace and they are looking for input from BAE systems in the UK. They may also change the name to Corrosion Protection in Aerospace. They are hoping to work closely with WP14. This was followed by an enjoyable Poster party where the wine flowed and waiters circulated with small nibbles.

In relation to UK attendance at other working party meetings it was good that we were represented at this Eurocorr on Corrosion and Education (Bob Cottis), Oil and Gas (Gareth Hinds), Coatings (your correspondents) and Nuclear (Nick Smart). We have appointed delegates to about another five or six working parties but some of these were only recently appointed and could not make this Eurocorr. Hopefully they will be able to attend the next one. On Wednesday evening there was the Gala Dinner in a winery. This was very well attended with around 500 attendees. Brenda went to this and found herself again with the lady Turkish professor who turned out to be a valuable asset, being very good at getting to the front of the bus queue, homing in on trays of drinks and nibbles and getting into the winery just behind the VIP’s to get a good table. All this without appearing impolite or pushy. The final half day was lightly attended with many people having to leave early to catch flights home.

The next Eurocorr will take place in Pisa, Northern Italy from 8th-14th September 2014.
On the 27th of August, the ICorr Aberdeen branch hosted its Annual Corrosion Awareness Day at the Palm Court Hotel. The event coordinator, Dr Abdulmotaleb Suleiman introduced the course stating that the objective was to provide a basic introduction to various aspects of corrosion and encouraged active participation from delegates from all areas of industry.

Professor Paul Lambert of Mott MacDonald started the day with a lively introduction to corrosion and corrosion mechanisms. He explained the basic principles of corrosion and identified the various components of a corrosion cell. He went on to give illustrative descriptions of anodic and cathodic reactions presenting the relevant electrochemical equations and explaining the thermodynamics of corrosion reactions. After a coffee break, he covered the various options available in controlling and managing corrosion including an illustrative timeline of the history of corrosion showing how techniques used in managing corrosion have evolved over time.

Steve Tate of Stork Technical Services followed with an overview of corrosion monitoring, inspection and survey techniques with applications. He described techniques such as electromagnetic C-scan system, soil resistivity, pH measurement, CIPS, DCVG, TOFD, UT and radiography. He also explained the use of integrity management databases giving examples of various commercially available softwares. He went on to explain areas of intrusive monitoring focusing on the working principles of these techniques. He noted that positioning, access and interpretation of data were common problems encountered. Steve finished his talk with an explanation of transmission, trending and usage of data from monitoring devices.

After lunch, Alistair Kirkpatrick of Clariant Oil Services covered the selection and application of oilfield chemicals. He started with the classification and types of chemicals used for corrosion control. “Certain molecules have the ability to inhibit corrosion” Alistair noted as he explained the mechanisms and relevant properties of various types of chemicals. He described a typical evaluation process identifying key stages like health review, risk assessment laboratory testing, field trials, deployment and monitoring. He noted the value of monitoring devices in validation of the chemical performance.

Gozie Ikeagu of Subsea 7 covered various aspects of material selection for subsea pipelines and other assets. He started by identifying and explaining typical subsea facilities with a sample field layout. He presented the definition of material selection, explained the process and the considerations made during the process. He identified mechanical and corrosion resistance properties as important considerations outlining predictable and unpredictable failure mechanisms. He outlined various important design and operation parameters used in predicting material degradation, which he noted were essential to help the engineer select the right material for its intended service conditions and design life.

Questions and discussions on various aspects of corrosion were held throughout the day with positive feedback from attendees after the event.

The Aberdeen branch committee would like to use this opportunity to thank all the ICorr sponsors for their continued support and encourage new sponsors. Special thanks to the speakers for the day for their support. More information about the Aberdeen branch activities can be obtained from the ICorr Aberdeen branch committee secretary via ICorrABZ@gmail.com

Alternatively, a calendar of local events of interest to corrosion professionals in the Aberdeen area and the opportunity to sign up to the branch mailing list is available at https://sites.google.com/site/icorrabz/home

Professor Paul Lambert of Mott MacDonald started the day with a lively introduction to corrosion and corrosion mechanisms. He explained the basic principles of corrosion and identified the various components of a corrosion cell. He went on to give illustrative descriptions of anodic and cathodic reactions presenting the relevant electrochemical
**ABSTRACT**

The work reported in this paper correlates microstructure development after low temperature embrittlement heat treatments with pitting corrosion susceptibility in grade 2205 duplex stainless steel. Heat-treatments at 475°C for up to 255 hours were carried out and microstructures characterised using scanning electron microscopy (SEM) and micro-hardness testing. Local electrochemical measurements using an electrochemical micro-cell were carried out and the critical pitting temperature (CPT) determined. Short-duration heat treatments for up to 10 hours showed an increase in CPT, attributed to an improved electrochemical character of the ferrite. Long-term heat treatments (>50 hours) indicated a decrease in CPT due to the precipitation of other precipitates and the formation of elemental depletion zones.

**INTRODUCTION**

Duplex stainless steels (DSS) are prone to phase transformations when exposed to temperatures in excess of 250°C [1]. Microstructure changes are typically accompanied by embrittlement and the loss of corrosion resistance, affecting the endurance and performance of these alloys. 475°C embrittlement is related to the formation of Cr-enriched α’-phase and Cr-depleted α-phase, though other secondary precipitates such as G- and R-phase can also form [1-4]. Extensive work exists in the literature about the effect of ageing treatment on mechanical properties [5-8], however, the effect of low temperature embrittlement heat treatments and spinodal decomposition on corrosion properties of duplex stainless steels is not clear. In this paper microstructure development and hardness of 475°C embrittlement were compared to critical pitting temperatures in chloride-containing environment, determined using an electrochemical micro-cell technique.

**EXPERIMENTAL**

Solution annealed grade 2205 duplex stainless steel plate material was used for all tests with the chemical composition given in Table 1. Coupon samples with dimensions of ca. 15mm x 10mm x 10mm were heat treated at 475°C ± 5°C for 5, 10, 20, 50, and 255 hours, followed by a water quench.

Macro-hardness tests were carried out with a Vickers indenter (HV30), using the mean of 10 indentations. Micro-hardness measurements were performed on stress-free surfaces with a Struers micro-hardness tester (HV0.01). Ferrite and austenite microhardness values were measured and the mean of 20 - 25 indentations is reported. All micro-hardness indentation diameters were smaller than 9.1 μm, placed in the centre of a crystallographic phase region, with each indentation encompassing less than 75% of the area of each phase region. The results should, however, only be considered as a trend of the change in hardness for each phase, since an effect of the indentation size with respect to the finite phase region size cannot be excluded. A SEM was used to measure the dimensions of the indents, and errors are calculated as the standard deviation with respect to the mean.

The CPT of all coupon samples was probed with an electrochemical microcell as shown in Figure 1. The tip of the electrochemical microcell was a polymer tube (PE) with an area of 0.125 cm². The working electrode was placed onto a Peltier element for temperature control with a temperature control accuracy of ±0.1°C. The CPT was determined in 5°C temperature intervals, starting from room temperature (RT) up to the temperature where stable pitting was observed. A Gamry Reference 600 potentiostat with an Ag/AgCl reference electrode and a Pt counter electrode were used for all measurements. The electrolyte was a 3 wt-% NaCl solution. The Open Circuit potential (OCP) was measured for 3 minutes, followed by a potentiodynamic scan from -300mV to +1500mV vs. OCP using a scan rate of 1 mV/s. The CPT was defined as the temperature where the current density showed a steep increase of at least two orders of magnitude with respect to the measured passive current density (before reaching the trans-passive region). All tests were repeated three times to confirm repeatability.

**RESULTS**

Macro- and micro-hardness measurements are summarised in Figure 3. The increase in macro-hardness with aging times indicates changes in the microstructure; given the heat treatment conditions this can be attributed to the occurrence of 475°C embrittlement. A significant increase after 255 hours of ageing was observed. A similar trend was observed in the micro-hardness measurements. Aging of

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**Table 1: Chemical compositions of material used**

<table>
<thead>
<tr>
<th>Grade</th>
<th>C</th>
<th>Si</th>
<th>Mn</th>
<th>P</th>
<th>S</th>
<th>Cr</th>
<th>Ni</th>
<th>Mo</th>
<th>N</th>
<th>Fe</th>
</tr>
</thead>
<tbody>
<tr>
<td>2205</td>
<td>0.016</td>
<td>0.40</td>
<td>1.50</td>
<td>0.021</td>
<td>0.001</td>
<td>22.4</td>
<td>5.80</td>
<td>3.20</td>
<td>0.180</td>
<td>bal.</td>
</tr>
</tbody>
</table>

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**Figure 1:** Local probing electrochemical microcell (WE = working electrode, CE = counter electrode, RE = reference electrode) [9]
up to 50 hours at 475°C seems not to cause significant hardness changes, but an increase in the micro-hardness of the ferrite after 255 hours is noticeable. Interestingly, the austenite did not show an increase in hardness.

The CPT of all heat-treated samples is shown in Figure 2. The as received grade 2205 microstructure had a CPT of 40°C. A CPT increase from 40°C to 50°C with 5 and 10 hours aging was observed, with a slight drop after 20 and 50 hours aging to 45°C. The 255 hours heat-treated condition could only be tested in fully immersed conditions, and a CPT of 30±3°C was determined.

Micrographs of the surface attack after CPT testing of the as-received material is shown in Figure 5a-b, and the 5 hours aged sample in Figure 5c-d. In the as-received microstructure the austenite seemed to protrude in all micrographs, indicating a proportionally higher dissolution rate of the ferrite. Interestingly, after 5 hours of aging the opposite trend was observed, indicating a higher dissolution rate of the austenite. The EBSD map in Figure 5d confirms the protruding microstructural features in Figure 5c as ferrite. The dissolution behaviour of both phases seemed to be balanced after 20 hours ageing. After longer ageing times of 50 hours and 255 hours, larger attack on the ferrite is again observed, with the corresponding image of the 255 hours aged sample shown in Figure 4b. However, the austenite showed small pits which might be due to de-alloying effects [10]. In the microstructure after 255 hours ageing, the presence of a spinodal decomposition could even be observed at high resolution in the SEM, shown in Figure 4a.

**DISCUSSION**

The hardness increase indicates the occurrence of 475°C embrittlement with ageing in excess of 50 hours, well-possibly attributed to phase transformation reactions in the ferrite (Figure 4a). After 5 hours aging the corrosion behaviour of the ferrite seems to be enhanced as the micrograph in Figure 5 points to a lesser corrosion attack on ferritic sites, in parallel to an increase in the CPT (Figure 2). Tavares et al. observed comparable results in which the CPT of super duplex grade 2507 increased by 15°C from 72°C to 87°C in 1 M NaCl for samples aged for 8 hours, and the CPT then decreased after 12 hours aging to 63°C [11]. It is believed that spinodal
decomposition in the early aging conditions led to an improvement of the corrosion properties due to a better passivation behaviour, and precipitated secondary phases deteriorated the electrochemical properties. Seemingly, this effect reversed after 20 hours of aging, as the CPT decreased. SEM (and TEM investigations, not reported here) on the 5 and 20 hours aged specimens showed a spinodally-decomposed microstructure in the ferrite, and after 50 and 255 hours aging other types of precipitates were also observed (Figure 4), with the spinodal microstructure consisting of Cr-enriched α''-phase and Cr-poor α'-phase visible as fractal background contrast in the ferrite in Figure 4a. However, once more precipitates were formed with longer ageing treatments the corrosion behaviour decreased rapidly. TEM and SEM analysis could clearly show at least three different precipitates in the ferrite/ austenite interphase, ranging in sizes between about 40 to 250 nm. EDX measurements confirmed that some were enriched in Cr and Mo, with elemental depletions adjacent to their locations, which is believed to be the reason for the observed decrease in CPT. The size and number of those precipitates increased after 255 hours of aging, possibly causing micro-galvanic effects within the ferrite. The latter may also be augmented by elemental depletion adjacent to these precipitates, inducing an increased corrosion susceptibility of the ferrite.

CONCLUSIONS

Macro-hardness measurements (HV30) indicated microstructure embrittlement after 255 hours aging at 475°C. Micro-hardness measurements (HV0.01) showed an increase in hardness of the ferrite, with no significant change in the austenite.

An increase in CPT for short-term aging treatments up to 10 hours at 475°C was observed, followed by a drop after 255 hours aging.

The dissolution characteristics indicate that the ferrite is associated with the change in corrosion resistance for both short- and long-term aging treatments.

Spinodal decomposition is believed to enhance the corrosion properties for aging times up to 10 hours, with other precipitates affecting the corrosion resistance due to the formation of elemental depletions zones.

ACKNOWLEDGEMENTS

The authors are grateful for the provision of grade 2205 plate material by Rolled Alloys.

REFERENCES


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PRODUCTION CONTINUES TO INCREASE AT ELCOMETER

Manchester, UK – 6 years after doubling their UK manufacturing facility, Elcometer are pleased to confirm that in September 2013 work will commence to expand their production capability in Manchester, UK.

Elcometer’s additional 17,200ft² (1600m²) of manufacturing space will allow Elcometer to meet increasing demand for their coating inspection and ultrasonic NDT range of test equipment.

“In recent years Elcometer has launched a number of new products which have significantly increased the demands on our existing production facilities around the World,” commented Managing Director, Michael Sellars. “This expansion allows Elcometer to meet the growing demand for our test equipment and widen our product portfolio, enabling us to enter new markets ahead of our strategic plan.”

Over the past three years alone Elcometer have introduced a number of industry leading test instruments, including their new Elcometer 456 coating thickness gauge with scan probe – allowing users to inspect more than twice as fast as ever before; the lightweight and versatile Elcometer 280 pulsed DC holiday detector with internal jeep tester and the Elcometer 130 salt contamination meter which allows users to measure soluble salts up to five times faster than other Bresle equivalent methods.

This expansion to Elcometer’s Manchester facility is in addition to their existing production facilities in Liege, Belgium (manufacturing a wide range of test equipment for testing the physical properties of coating’s formulations) and in California, USA where Elcometer’s range of Ultrasonic thickness gauges and flaw detectors are designed and manufactured.

For more information on the Elcometer product range, contact Elcometer at sales@elcometer.com or visit our website at www.elcometer.com

STORK TECHNICAL SERVICES SIGNS AGREEMENT WITH SNAP RING JOINT

Stork Technical Services (Stork), the leading global provider of knowledge-based asset integrity management services for the oil and gas, chemical and power sectors has signed an agreement with technology development company, SRJ Limited, in relation to the distribution and installation of the company’s flagship products; the SRJ pipe connector and the TSRC pipe repair clamp.

The SRJ now has a full hydrocarbon rating for the range 1 ¼” to 16” outside diameter (OD), following a rigorous process of testing including the ISO 19921 fire test to achieve Lloyds Register Type Approval. During the testing process, the connector withstood burst pressure of nearly 17,000 psi.

The SRJ’s compact, lightweight configuration and its ability to withstand elevated working pressures make it ideal for offshore process pipework applications. No welding or bolting is required, making installation possible when the facility is live, without having to resort to ATEX-compliant equipment.

As part of Stork’s advanced asset integrity portfolio, the organisation is in a prime position to utilise their multi-skilled engineers in the installation of both technologies; further enhancing Stork’s innovative approach to asset lifecycle extension.

“We look forward to our collaboration with Stork Technical Services,” said Alex Wood CEO of SRJ Limited. “The company is growing in all regions and with its strong emphasis on safe delivery of services offshore, is an ideal partner to take our technologies to market.”

Fraser Coull, Operations Support Director for Stork Technical Services, said: “We are keen to introduce this highly innovative product range to the offshore market. The ability to deliver a weld-free connection in process pipework repair and modification workscopes will offer Stork’s clients significant savings in time, cost and resources.”
A stainless steel kitchen knife purchased ten years ago and regularly washed in our dishwasher now has a suspicious hairline mark across the blade, about 5mm from the handle, and a mark about 1mm diameter at the top of this line.

According to Thames Water our water has 38 to 67ppm chloride. We wash our dishes at between 30 and 70°C. In theory, this is enough to allow stress corrosion cracking of austenitic stainless steel, but as our knife is magnetic and sharp it is most likely martensitic, probably 13% Chromium.

What could cause this? Why isn’t the knife handle or blade corroding elsewhere? As the casual observer can see, the knife is ground across the handle and blade (vertical lines on photo). Yet there are some curving texture marks to the left of the row of pits. When we investigate at higher magnification we can see (etched over the years by the dishwasher) a weld!

Anyway, the knife hasn’t broken (yet), and bending it doesn’t seem to open up a crack.

At higher magnification one can see a row of pits, with one big one at the top, so it’s not a crack.

If you have an old Made In Sheffield kitchen knife, you will find in most cases that it is forged - but this cheap knife has had its blade welded into the handle. The dispersed nature of the pits (across the whole heat affected zone) indicates that this is not ‘knife-line attack’ (sorry) but ‘weld decay’.

Weld decay occurs in unstabilised stainless steel (no Niobium or Titanium added) so that when welded Chromium carbide forms across the heat affected zone grain boundaries, and pitting occurs because the area has insufficient Chromium. Knife-line attack occurs only in stabilised stainless steels, in a much tighter line along the fusion line, where the Ti and Nb carbides are redissolved at the high temperature of fusion.

**PREMIER COATINGS LTD OBTAINS CE MARKING FOR TWO OF ITS MEMBRANES**

Premier Coatings Ltd are delighted to announce that they have now obtained CE marking for two of their main membrane products, Premseal 100 for waterproofing and tanking and Premseal GMA for waterproofing and gasproofing. The achievement of the CE factory production control marking is further proof of the high quality of the Premier product range.

Founded in 1982, the company specialises in manufacturing and supplying a range of cost effective corrosion prevention and waterproofing systems. Based just outside Headcorn in Kent, their products are manufactured to ASTM, BS, BBA and DIN specifications and have gained a well earned reputation for consistent high quality. In 1997 the company was acquired by anti-corrosion and sealing specialist Winn & Coales International Ltd and has thrived as a subsidiary ever since offering an alternative range of products to the parent company’s global markets.

Supplying effective, affordable corrosion prevention and waterproofing solutions has led to a long list of very satisfied customers for Premier Coatings Ltd. All in all, a successful formula that has worked very well for the past 31 years and the new achievement of CE marking will only help emphasise their already enviable reputation in the membranes market.

For further information contact: Winn & Coales (Denso) Ltd., Chapel Road, London SE27 OTR
Tel: 020 8670 7511  Fax: 020 8761 2456  e-mail: mail@denso.net  website: www.denso.net
METALLISATION PROCESS IN AWARD WIN AT RHS SHOW

The Metallisation thermal spray process, usually linked with industrial and engineering projects, has enjoyed some unusual success at this year’s RHS Show at Tatton Park. Mike Russell’s ‘Star Gazer’s Retreat’ garden project was awarded the Gold Medal at the show.

Mike provides sustainable, bespoke garden and landscape design and build services using recycled and local products on all of his projects.

Mike’s RHS ‘Star Gazer’s Retreat’ design included a stargate, which formed the entrance to the retreat and it was this element that was given the Metallisation treatment. The circular gate was constructed from a steel frame, which was clad using recycled plastic eco-board and then coated with an alloy of zinc and aluminium bronze. The aim was to create a futuristic metallised finish to complement the star gazing theme.

Mike explains: “I wanted the stargate to appear old, but out of this world. I was thinking maybe a piece of a recycled rocket or a sci-fi prop that the star gazer had collected on his travels and wanted to use as the entrance to his observatory garden. In terms of creating it for real it had to be a solid structure, but light enough to transport. The finish I envisaged came from a piece of old water worn metal I had found on a beach, which I took along to Metallisation in the hope they could recreate it using this wonderful process I had heard about.”

The Metallisation arcspray process can be used to apply many different coatings in a diverse range of applications and industries. In this instance, Mike and the Metallisation team experimented with lots of coatings to identify the most appropriate finish to represent the futuristic vision Mike had for the gate. The team spent many hours experimenting and tried various mixes including copper / aluminium and copper / zinc and concluded that the most appropriate mix was zinc and aluminium bronze. The gate was initially sprayed with a solid layer of zinc, followed by an incomplete layer of aluminium bronze leaving the zinc exposed to the environment.

Once exposed to the elements the bronze and zinc reacted creating a mottled finish. As the zinc oxidised it also created a white silvery colour, which beautifully complemented the silver birch trees in the garden and delivered the futuristic finish Mike had envisaged. The ‘Star Gazer’s Retreat’ generated lots of attention at the RHS Show, with visits by celebrity gardeners, including Monty Don, and filming by the BBC for Gardener’s World. This level of attention is definitely a first for the Metallisation metal spraying process.

Mike continues: “I had great fun with the Metallisation team playing around with different metallised coatings to see how they reacted together and looking at the different coating finishes. I am thrilled with the final result. The gate looked great, we achieved the finish that I was looking for and I finally won the Gold Medal Award from the RHS, which is a first for me. I can’t thank the guys at Metallisation enough for their support, patience and enthusiasm in creating the finish I was looking for.”

Many elements of the award winning Star Gazer’s Retreat garden are now being used in school and community projects, which means this successful design continues to develop and grow. Mike and his team at Designs with Nature are always open to new ideas and are happy to help with all manner of garden design. For more information please visit www.designswithnature.co.uk

Metallisation has been providing thermal spray solutions, equipment and consumables to industries around the world for over 90 years. Metal or thermal spraying is a technology, which protects and greatly extends the life of a wide variety of products in the most hostile environments and in situations where coatings are vital for longevity. For Mike’s stargate project, the Metallisation arcspray process was used.

In the Metallisation arcspray process the raw material, in the form of a pair of metallic wires, is melted by an electric arc using the ARC 140 equipment. This molten material is atomised by compressed air and propelled towards the work piece. Upon contact, the particles flatten onto the surface, freeze and mechanically bond, firstly onto the roughened substrate and then onto each other as the coating thickness is increased. Coating thickness can range from around 50 microns up to several hundred microns or even millimetres for some metals.

For more information on the Metallisation processes or equipment, please contact Stuart Milton, Sales Director, on 01384 252 464 or visit www.metallisation.com

FLANGE PROTECTORS PREVENT HAZARDOUS PIPE CORROSION

Protecting pipelines from the damaging effects of corrosion is an essential requirement for many offshore or onshore oil and gas installations, where if left unchecked can cause leakage, failure and in extreme cases, result in expensive shutdown. Kleerband Flange Protectors, recently introduced by ALLISON ENGINEERING are an innovative solution to the problem as they provide a quick and easy way to apply protection and prevent corrosion.

Kleerband Flange Protectors offer clear benefits compared to traditional corrosion protection devices such as shrink sleeves, tapes and wax fillers.

For example, they are simple to install with a worm-gear connection, with no mess or special tools. They feature a positive loading relief valve vent and plug which ensures complete loading of flange cavities, whilst a transparent and flexible polyband allows for 360° uninterrupted inspection, without the need to remove the protector.

Kleerband protectors are designed to fit all DIN and ANSI flanges from ½” diameter up to 144” and are also available for non-standard sizes and Christmas-Tree applications offshore. In addition to being used on oil and gas installations they are also ideal for protecting flange faces, studs, gaskets and ring joints on pipelines in chemical plants, refineries, oil fields, metering stations, water and waste water plants, pump stations and underground pipelines.

For further information contact: Allison Engineering, Capricorn Centre Cranes Farm Road, Basildon Essex SS14 3JA Tel: +44 (0) 1268 526161 Fax: +44 (0) 1268 533144 website: www.allison.co.uk
WINN & COALES INTERNATIONAL CELEBRATE 130TH ANNIVERSARY IN 2013

Specialist anti-corrosion, sealing and waterproofing products manufacturer Winn & Coales International Ltd are celebrating their 130th Anniversary this year. The company is well known for its brands which include Denso, SeaShield, Archco-Rigidon, Protal, Densostrip, Premseal and Sylglas. These products have earned an enviable reputation over the years for their high quality, effectiveness and long service life. The products continue to offer an effective solution to corrosion prevention, sealing and waterproofing problems for buried, submerged or exposed steel or concrete pipes tanks and structures.

Winn & Coales International comprises seven subsidiary companies, two residing in the UK and one in the USA, Canada, South Africa, Australia and New Zealand. The global structure of the company enables it to supply its products to virtually anywhere in the world which is a major factor in its growth and success. The head office in London has been in the same location since 1950 and is a major employer in the surrounding area.

Established in 1883 the company has had two notable successes in recent years achieving a Queen’s Award for Enterprise in 2010 and again in 2013 which is particularly gratifying, occurring as it does in an important anniversary year. The 130th anniversary celebrations come to a head in September when the staff and special guests will enjoy a week long international conference, culminating in a special celebratory farewell dinner.

For further information contact: Winn & Coales (Denso) Ltd., Chapel Road, London SE27 0TR
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WINN & COALES INTERNATIONAL LTD MEET THE QUEEN - FOR THE SECOND TIME

On Tuesday the 23rd of July, both the Chairman and Non-executive Director of Winn and Coales International Ltd, David Winn OBE and John Burton attended a special reception at Buckingham Palace to meet Her Majesty The Queen. This special occasion was in honour of the company’s latest achievement winning the prestigious Queen’s Awards for Enterprise, for the second time.

Leading manufacturers of anti-corrosion and sealing products, Winn and Coales International, won the award again for International Trade. This award recognises the outstanding overseas trade, measured over the past 3 years. A fantastic achievement considering the worsening recessionary times the world is experiencing.

"It is essential that the credit for this award is shared by all who work for the company, from the factory to the sales offices, overseas subsidiaries and agents. Without everyone’s endeavours it would not have been possible to achieve it and the Board of Directors thanks and congratulations go to all for their continuing supreme team effort."

David Winn OBE - Chairman.

For further information contact: Winn & Coales (Denso) Ltd., Chapel Road, London SE27 0TR
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SPECIALY DESIGNED DENSO SEASHIELD SYSTEM FOR GRANGEMOUTH JETTY

Winn & Coales (Denso) Ltd solved a new challenge when Forth Ports issued a contract for refurbishments to one of their Grangemouth jetties on the Firth of Forth. The contract required Denso’s SeaShield 2000FD System to be applied within the splash zone from the underside of the jetty to 500mm below the low water level on 77 piles. Application was carried out by contractors Gareloch Support Services GSS Diving, with Consulting Civil Engineers, Wallace Stone, supervising the installation for Forth Ports.

Sixty-seven of these piles were regular Frodingham No.4 type octagonal piles, which the normal SeaShield 2000FD System is designed to accommodate.

However, the ten piles on the link to the shore were of the Larssen BP 2N Type which have an unusual ‘clutch type’ arrangement. Engineers at Winn & Coales therefore had to design a variation to the system to ensure that the SeaShield 2000FD System was suitable for the protection of these piles.

After inspection and measurement on site Winn & Coales carried out trials leading to the design of HDPE fillet pieces which were manufactured so as to form a profile on the piles ensuring a good fit of the subsequent SeaShield 2000FD System.

This project once again demonstrates Winn & Coales (Denso) Ltd’s ability and flexibility to supply systems which provide long-term anti-corrosion protection to marine structures.

The Denso SeaShield 2000FD system, now used globally in many marine structure protection applications, begins with the application of Denso Paste 105. This is followed by Denso Marine Piling Tape and then HDPE jackets which are put into place with stainless steel fixings. Denso Marine Piling Tape, a cold-applied petrolatum-based tape for application under water, is the primary anti-corrosion protection in the SeaShield system with over a 35-year proven record. The jackets will also give abrasion protection for the tape system.

DENSO STEELCOAT PROTECTS SCOTTISH WATER AQUEDUCTS

Scottish Water plc has recently completed a £7m project to upgrade aqueducts conveying water from Loch Katrine to Glasgow. The company says it was the biggest improvement to the aqueducts since they were constructed more than 150 years ago. The main contractors were George Leslie Ltd, with Jacobs being the Consulting Engineers.

Winn & Coales (Denso) Ltd’s Steelcoat 400 system was chosen to give long-life protection on the 48in diameter pipes used at three structures which were virtually reconstructed along the aqueduct system. These carry two twin pipeline sections conveying 450 million litres of water per day to 1.3 million people.

The Winn & Coales Steelcoat system, applied by sub-contractor Interserve Industrial Services Ltd, in each case comprised of: Denso Hi-Tack Primer, Denso Profiling Mastic, Denso Hi-Tack Tape, Denso Ultraseal Tape and a Denso Acrylic Topcoat.

Jim Clark, Senior Project Manager at Interserve, said: “Due to the remote locations and the change in weather patterns throughout the refurbishment of the pipes we had a number of challenges to overcome but we are highly delighted with the quality of the finished product. It was a pleasure being a part of the team whilst carrying out this project for George Leslie and Scottish Water.”

Over the combined length of the old and “new” aqueducts, there were more than 30 historic listed structures and planning permission for the repair work was conditional on full consultation with Historic Scotland.

Scottish Water’s project manager, Simon Renton, said: “Strict adherence to constraints and restrictions was necessary to ensure that the character of the historic structure was preserved. Reconstructed areas of masonry on every part of the structure had to match the existing stonework in terms of appearance and painting and protective coatings systems were carefully chosen to blend with the surrounding structure.”

For further information contact: Winn & Coales (Denso) Ltd, Chapel Road, London SE27 OTX Tel: 020 8670 7511 Fax: 020 8761 2456 e-mail: mail@denso.net website: www.denso.net
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</tr>
<tr>
<td>Specialist Blasting Services Ltd</td>
<td>Smiths Quay, Hazel Road, Woolston, S019 7GB</td>
<td>T: 023 80438901</td>
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<tr>
<td>Stamford Construction Limited</td>
<td>Barham Court Business Centre, Teston, Maidstone, Kent ME18 5SQ</td>
<td>T: 07912037033</td>
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<tr>
<td>Story Contracting Ltd</td>
<td>Burgh Road Industrial Estate, Carlisle, Cumbria CA2 7NA</td>
<td>T: 07730 764414</td>
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<tr>
<td>Taylor Engineering (UK) Ltd</td>
<td>Unit 7 &amp; 8 Curran Buildings, Curran Road, Cardiff CF10 5NE</td>
<td>T: 02920 371959</td>
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</tbody>
</table>

For all the latest news, events & debates join us on LinkedIn.
DIARY DATES 2013/2014

Thursday 10th October 2013
London Branch joint meeting with LMS
Speaker to be announced – details to follow on website.
Venue: Naval Club, 38 Hill Street, Mayfair, London17.30 for 18.00 start.

Tuesday 29th October 2013
ICorr Meeting & Presentation
Venue: Palm Court Hotel, 6pm for 6.30pm
Details can be obtained from ICorr Aberdeen Branch.
T: 01224 243360
E: ICorrABZ@gmail.com

Saturday 2nd - Wednesday 6th November 2013
19th International Corrosion Congress (19th ICC)
Venue: Jeju Island, Korea
Organized by The Corrosion Science Society of Korea (CSSK) and the International Corrosion Council (ICC)
Details can be obtained from: www.19thicc.com

Thursday 14th November 2013
London Branch joint meeting with W&J
Case studies in the field of corrosion by 4 teams of new entrant engineers.
Venue: Royal Over-Seas League, Park Place, St James’s Street, London SW1A (Not the Naval Club) 18.00 for 18.15 start.

Tuesday 26th November 2013
ICorr Cathodic Protection Certification Scheme
Venue: Palm Court Hotel, 6pm for 6.30pm
Presenter: John Thirkettle. Details can be obtained from ICorr Aberdeen Branch.
T: 01224 243360
E: ICorrABZ@gmail.com

Thursday 28th November 2013
Midland Branch ½ Meeting Day (Including the ICorr AGM)
Venue: Main Chamber, Birmingham Council Chambers, Birmingham B1 1BB
Details can be obtained from ICorr Midland Branch.
Please confirm to ICorr admin@icorr.org if you will be attending.

Thursday 12th December 2013
London Branch 25th Annual Christmas Luncheon
Venue: Royal Over-Seas League, Park Place, St James’s Street, London SW1A.
Contact: Mike Allen mike.allen9@btinternet.com

Tuesday 28th January 2014
Plant Integrity
Venue: Palm Court Hotel, 6pm for 6.30pm
Presenter: Steve Plant. Details can be obtained from ICorr Aberdeen Branch.
T: 01224 243360
E: ICorrABZ@gmail.com

Tuesday 25th February 2014
Development of a Corrosion Micelle Detection Method-A Review including Case Studies
Venue: Palm Court Hotel, 6pm for 6.30pm
Presenter: Emma Perfect. Details can be obtained from ICorr Aberdeen Branch.
T: 01224 243360
E: ICorrABZ@gmail.com

Tuesday 15th April 2014
Corrosion Related Failures for Downhole Chemical Injection Lines
Venue: Palm Court Hotel, 5.30pm for 6pm
Presenter: Dr. Eugenia Marinou. Details can be obtained from ICorr Aberdeen Branch.
T: 01224 243360
E: ICorrABZ@gmail.com

Have you remembered to pay your 2013/14 subscription?

London Branch publish a monthly Newsletter
Details of all Branch activities, dates and venues can be found at www.icorr.org

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