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I mentioned in my last President Writes about the joy of the job, well it just gets better, not only do we have a dedicated membership and close-knit community within ICorr, we are also well thought of and supported by other learned societies and bodies with similar aims. It has been my pleasure since I last wrote to have been invited to a number of events as ICorr President, these events have not failed to impress me, they all have an energy that seems to pervade the whole learned society community, much of which is operated by volunteers. I was recently at the Institute of Measurement and Control where their President, Lord Oxburgh, presented “Numbers and our energy supply – will we be able to keep the lights on?”, a comprehensive presentation on energy requirements now and in the future, a subject which is fast becoming a focus for scientists and engineers alike, and not least for ourselves who strive to control corrosion and prevent degradation whilst improving service life and lowering maintenance costs. I also attended a meeting of the Parliamentary Scientific Committee to listen on the subject of developments in smart buildings which covered many aspects of control and monitoring to further enhance our green credentials and reduce energy consumption and waste, this tied in nicely with the theme of energy conservation and future requirements.

More and more I am becoming aware of the move towards a general recognition of the issues around energy, energy generation, green energy and efficient use of energy. As you may imagine, my interest whilst being overarching, is concentrated in the area where we as members of The Institute can provide input, i.e. costly assets must be protected from corrosion and the degradation that occurs with time, this is nowhere more important than in the energy sector where failure can present serious problems resulting in loss of containment, power outage and worse, endangering life and our environment. Anyone who has worked in countries where power outages are common or where “load shedding” occurs will know only too well the inconvenience of such events, to personal and business life.

With these thoughts in mind and how we deal with such matters in the future brings me to something ICorr are doing of which all members and participants can be proud, I speak of the Entrant Engineers Programme being run by London Branch, chaired by David Mobbs, and broadly supported by many, in and beyond ICorr. The programme has been ongoing for over eighteen months with regular delivery of presentations on materials and corrosion by industry professionals to the group of young engineers, culminating in the delivery of case studies by those young engineers in a truly grand evening on Thursday 14th November at the Royal Overseas League in London. Here four groups of graduate engineers gathered to present their case studies, the hard work done by all was plain to see and an audience of over one hundred and seventeen strong gathered to listen to the proceedings, to enjoy an opportunity to meet with peers and also to network. The outcome of this was exactly what we had all hoped it would be, it showed there is a strong desire to move with the times and keep up with technology, it also reinforced the fact that there exists a strong cadre of capable young engineers coming into our industry but there is still work to do, however it all takes time and effort.

Let’s all work to “keep the lights on” by encouraging, training and supporting young people in engineering and highlighting the great satisfaction it can deliver, after all keeping the lights on is important and especially so with Christmas approaching.

I wish you all a Peaceful and Merry Christmas and a Prosperous, Healthy and Happy New Year in 2014.

Trevor Osborne, President of the Institute of Corrosion
The knowledge of the next generation of engineers was put to the test, as the Institute of Corrosion’s inaugural New Entrant Engineers Program culminated with a series of presentations at the Royal Oversees League in Mayfair, London.

Having enjoyed a course of lectures at Akzo Nobel’s Victoria offices throughout the year, employees enrolled from companies including Bechtel, KBR, CB&I, Wood Group Kenny, Saipem, Technique and Subsea 7, before presenting their findings to an audience of over 100 professionals.

Of particular interest was a video of pitting and crack initiation in 316L stainless steel using intense analysis by Focus Ion Beam (FIB); even the non electrochemists in the audience, and there were many, considered this video as amazing.

Towards the end of the presentation Dr Hinds described a newly developed NPL test cell, to measure pitting potentials which utilised high surface area rod specimens and cooling rather than dilution of the autoclave seal to ensure results were not compromised by crevice corrosion of the specimen. Importantly, this new test cell was able to replicate real environments, with high temperatures, high chlorides and sour conditions.

On behalf of the 40+ attendees, a vote of thanks was given to Dr Hinds by Charles May, Programme Secretary IOM, after which, all enjoyed the traditional hospitality of the London Branch.

The groups were judged on their technical understanding of the problem including the technical risk, business and commercial considerations, solution, lessons learned and presentation delivery from a technical, as well as management perspective.

The final New Entrant presentation focuses on Inspection on November 27, before plans for next year’s program are finalised.

The next Branch technical meeting will be on 14th November 2013, where case studies in the field of corrosion will be presented by 4 teams of new entrant engineers, held at ROSL (not The Naval Club), Park Place, St James’s SW1, at 18.00 for a 18.15 start.

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A NEW RESOURCE FOR COATING PROFESSIONALS

JPCL EUROPE is a new digital magazine providing the latest news and technical information about protective and marine coatings, available FREE to ICorr members. Written and edited by acknowledged authorities, JPCL EUROPE is delivered monthly in a user-friendly, interactive digital format. Read it easily on desktop computers, laptops and tablets without zooming. You can even download it to view offline!

The journal is published by Technology Publishing Company, celebrating 30 years in the industry. JPCL EUROPE serves protective and marine coatings contractors, specifiers, facility owners, and suppliers in EMEA countries, providing practical and objective technical information that can be used in day-to-day operations. You’ll also find product updates, market information, and Institute news and views.

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CONFERENCE SUCCESS FOR LONDON BRANCH

The first conference organised by London Branch, “Offshore Cathodic Protection, Structure and Pipelines”, was deemed a great success with 80 delegates attending on both days.

Focused exclusively on cutting edge engineering and technology related topics, the conference consisted of 13 papers and two plenary lectures presented by recognised world leaders in the field of cathodic protection. Presenters and delegates came from as far as the USA, and also took part in the panel discussions following each of the four sessions which allowed presenters and delegates alike to ask questions which led to some lively debates.

One of the most important things for the organisers was the excellent feedback from all the attendees on the day, including Brian Wyatt who noted, “Please accept my sincere thanks for your excellent Conference. Those of us who have done it before know how much hard work this all takes - very well done. I think it was a great success.”

Jim Britton also commented, “Please pass my congratulations to all the organizers in the London Branch, this was an unqualified success on all fronts. Thank you for inviting me to be a part of it. I think this success adequately demonstrates the interest in this market sector which goes largely unrecognized by NACE. Please let us know what we can do to support the next one, sponsorship, speakers etc. Thanks again London Branch great job.”

The event couldn’t have gone ahead without all the hard work and effort put in by the organising committee and the support of the sponsors. The President summed up the 2 days by saying that the conference had been a great success, which was due to the quality of the speakers, the numbers of delegates that attended and the smooth running of the event that was achieved by the diligence and professionalism of all involved. This is precisely the sort of event that we in ICorr want to provide for the membership and the wider industry covering all relevant aspects of corrosion engineering.

Delegates taking in a Presentation
Presenter Charlie Barracough networking with MD of BAC Tony Gerrard
Tim Froome of Beasy Presents on Computer Modelling of CP Systems
Technical Topics No.43: 

SMART BUILDINGS

By Douglas J Mills, Technical Secretary

It’s a few months since my last TT, in which, inter alia, I discussed bimetallic corrosion. I got some feedback from Roger Francis, expanding on some of the points I had made (according to Roger some of my comments were a bit simplistic-contact him if you want more detail). This month I would like to discuss smart buildings. This was the topic of a recent (22nd October) Parliamentary and Scientific committee meeting attended by the President and myself. There were three speakers; two of them associated with Building Research Establishment. The topic was handled in more of a sociological than a technical manner. Most of the points made by the speakers were fairly obvious. Taking energy usage for example (Dutch study), knowing what energy you are using is not much help. The people in the building are not going to run around turning things off or whatever. There has to be feed back so that this is done automatically.

If I had asked a question I would have raised the level to suggest something more sophisticated; like how a building can be made to deal with possible corrosion problems e.g. in heating and ventilation systems. This could be achieved by sensors measuring parameters which will influence corrosion. The data from these can then be sent to a remote place using GPRS. These are then looked at by the people providing the service and then the building told (again using GPRS) to operate remedial measures (eg change the CP system, tip more inhibitor in). Or if that is not sufficient they would work with the maintenance people to effect a remedy (there is a company Midland Corrosion that offers this service). Trevor’s comment was, “Where are the trained technicians and building workers coming from to install, test and commission all this smartness? We lag behind when it comes to training and if it’s not installed correctly it will never work. Most of this stuff fails due to poor installation and operation and not obsolescence. So let’s get the level of skills where they need to be through training and investment and only then concern ourselves with inviting in self controlled, self securing and smart buildings.”

Directly on the corrosion side and relating to energy, if pipework and other components are allowed to corrode and corrosion deposits and scale accumulates in pipework and on heat exchanger surfaces then this will lead to increase in energy needed to pump water around systems. These deposits also decrease thermal efficiency of heat exchangers as well as increasing the possibly of valves ‘letting-by’ therefore giving poor temperature control. There are of course other possibly major environmental impacts if systems need to be remediated or replaced, e.g. water losses, use of additional chemicals (inhibitors/cleaners), replacement of pipework, boilers, chillers and other components. Apart from monitoring corrosion rate (note: this should be done in several places including places that could be identified as posing a pitting (non-localised corrosion) risk), oxygen level, pressure, temperature and even water flow are important. Re the latter whenever the system is partially refilled with water or there is a leak, fresh aerated water is brought in via the water make-up line. By placing a digital water meter on the water make-up line it is relatively easy to detect when this occurs. pH and conductivity are also fairly obvious parameters to check. In the UK, nearly all systems are dosed with corrosion inhibitors and, by measuring conductivity levels, it is possible to ensure there is sufficient inhibitor in the system to provide adequate protection. Regarding pH, while for steel and most other metals a moderately alkaline pH of 8.5-10 is beneficial, aluminium in boilers and elsewhere in the system are prone to corrosion damage if the pH exceeds 8.5. Therefore monitoring of pH is strongly recommended in these circumstances. The pictures show sophisticated monitoring equipment and a typical plant room.

An associated field is "smart coatings". It should be possible these days for the coating on a building that becomes damaged either to self-heal or to indicate that it needs remedial work (another coat of paint). There was a moderately large session at the recent EuroCorr self-healing coatings and I will discuss this topic in some detail in a subsequent TT.

I will finish with an anecdote about my ten year old Renault Megane. It recently failed its MOT because of corrosion: not of the body work (pretty good), but of the brake pipes. These are made of copper and there was some kind of coating on them. But this appears to have disappeared. I asked to have the old brakepipes and quite frankly (see picture) the degree of metal loss is not great, at most 10% of section. But ANY visible sign of corrosion is a MOT failure. I guess if my car had been smart enough it might have told me that the environment on the underside was causing corrosion (maybe if I’d been smart enough I would have washed the underside every year!). Anyway as usual any questions or comments feel free to contact me on: Douglas@harrbridge.freeserve.co.uk

Thanks are due to Phil Munn from MCS for two photos and the information about monitoring of buildings to prevent corrosion.
ICORR ABERDEEN BRANCH MEETING WITH THE WELDING INSTITUTE (TWI)- SEPTEMBER 2013

The first branch meeting of the 2013/2014 term was held as a joint meeting with The Welding Institute hosted by ICOrr Aberdeen Branch.

Eugene Ogosi (ICorr Aberdeen Branch Chairman) welcomed members and after a safety brief, he introduced the guest speaker of the night, Phil Dent of Exova stated that his presentation would cover sour service corrosion testing of girth welds and methods to assess the likelihood of failure by cracking.

Phil began with an overview of his presentation of the evening which covered sour service definition, cracking mechanisms, applicable international standards, sour service testing for carbon steel and CRA (Corrosion Resistant Alloys) girth welds respectively.

Phil described hydrogen entry mechanism as a key process that could lead to HIC (Hydrogen Induced Cracking), SOHIC (Stress Oriented HIC), SSC (Sulphide Stress Cracking) and other sour service failure modes. He outlined partial pressure, temperature, pH, chloride concentration, elemental composition and presence of contaminants as key factors that could contribute to sour service failure. Phil described the various mechanisms noting that SCC is an elevated temperature cracking mechanism and emphasised that material hardness plays a key role in determining if a material is sour service resistant. “H2S is the best hardness tester” Phil mentioned as he warned delegates that hardness testing is no guarantee that the material will not fail when exposed to service conditions.

Phil addressed a common misconception by stating that HIC and SOHIC will only affect Carbon Steel and can also lead to Girth Welds failure but not in CRAs. Phil stated that other mechanisms like SSC and HISC (Hydrogen Induced Stress Cracking) can lead to failure in CRAs giving the right conditions. Phil covered important international standards that are used for sour service material design and testing or carbon and CRAs. He touched on ISO 15156/NACE MR0175 and EFC 16 which are relevant international standard/guidance documents outlining sour service general requirements. He described the various regions of the ISO 15156 domains illustrating the relationship between pH, pH2S and hardness limits.

Phil discussed various girth weld qualification testing methods such as the Four Point Bend Method, C-ring method, full ring test (OTI 95 635) and tensile testing. He also covered some techniques used specifically for sour service testing of CRA girth welds and clad pipe. Stresses, surface considerations, reeling were some of the factors he noted that affected sour service performance as the session drew to a close. Questions from the audience were relating to the ISO 15156 domain diagram, application CRAs in sour service and HISC testing. Phil answered the questions suggesting the ISO website as a useful resource location.

The chairman thanked the speaker for his presentation, acknowledged TWI North Scottish branch committee members and reminded members of upcoming events. Corrosion Management magazines and continuous professional development certificates were distributed to members immediately after the meeting. For information about the Aberdeen branch activities please contact our branch Secretary, Frances Chalmers, 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.
PRESENTATION TO UNIVERSITIES-
ABERDEEN BRANCH

On the Friday 27th September 2013, the Aberdeen branch took advantage of the induction week at the local Aberdeen Universities to give presentations to new and returning students.

The University Liaison introduced students at both Universities to the Institute of Corrosion covering its core objectives, the various regional branches, benefits of membership, how to apply for membership and a calendar of local Institute activities.

As part of the presentation Adedamola Adelusi also provided a brief introduction to corrosion, its control and various professional career options available to students in the field of corrosion. Questions on membership, chartership and local events were asked after the presentation.

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ABSTRACT
Preferential weld corrosion (PWC), enhanced by changes in flow conditions, has been reported in water injection and oil and gas production systems, resulting in the risk of premature failure. The aim of this work was to investigate the suitability of the submerged jet impingement method for the study of flow enhanced preferential weld corrosion and inhibitor evaluation in a typical offshore production system.

The novel aspect of the work was the construction of the jet impingement target, which was made of sections from different weld regions, machined from welded X65 pipeline steel. The galvanic currents flowing between the weld segments in each hydrodynamic region were recorded simultaneously using zero-resistance ammeters and their self-corrosion rates were evaluated from linear polarization resistance measurements. The role of hydrodynamics and the influence of typical oilfield corrosion inhibitors on this form of corrosion are discussed.

Key words: carbon-dioxide corrosion, corrosion inhibitor, electrochemical measurements, preferential weld corrosion, submerged jet impingement

1. INTRODUCTION
Figure 1 shows an example of severe PWC in a carbon steel process flowline which failed after 15 months in service (1).

Flow-accelerated PWC is concerned with localised dissolution at welds in conditions of high turbulence and mass transfer. In some cases, corrosion inhibitors have been shown to inadvertently promote PWC by providing less effective protection on weld metal and the heat-affected zone (HAZ) (2, 3).

2. EXPERIMENTAL PROCEDURE
The flow accelerated corrosion (FAC) test that has been used for this study of PWC and inhibitor evaluation in typical field service is the jet impingement test. This test is amenable to the use of electrochemical methods in a wide range of environments (4, 5). It has the significant advantage over the widely used rotating cylinder electrode (RCE) of having no moving parts, thus avoiding the need for specialised low-noise contacts to conduct the electrochemical signals.

MATERIALS
All tests were carried out on samples machined from welded X65 steel pipe with the composition shown in Table 1. The steel had been thermo-mechanically controlled rolled to give a 32mm thickness. The submerged-arc welding process was used to weld a double-vee joint preparation. The composition of the weld metal was similar to that of the parent material, except for higher Ni (0.68%) content.

<table>
<thead>
<tr>
<th>Key</th>
<th>C</th>
<th>M</th>
<th>Ni</th>
<th>Cr</th>
<th>Mo</th>
<th>Si</th>
<th>Al</th>
<th>Cu</th>
<th>V</th>
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<td>1.6</td>
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<td>0.02</td>
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<tr>
<td>Weld</td>
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<td>0.4</td>
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DESIGN AND CONSTRUCTION OF JET IMPINGEMENT TARGET

The apparatus consisted of a plastic flow loop, chemical pump, glass corrosion cell, flow orifice and sample target. The novel aspect of the work was the construction of the target, which allowed simultaneous electrochemical measurements of the three weldment sections in each hydrodynamic region. It was made up of samples of weld metal, heat affected zone and parent material, cut by wire electrical discharge machining (EDM) from the X65 carbon steel pipeline weld in ratio 2:1:8, respectively. Figure 2 shows the machined samples. Each weld section was attached to a wire to form an electrode, assembled in position and mounted in non-conducting resin. A set of electrodes prepared from the three weld regions was located in the centre of the target, directly under the jet nozzle (5 mm in diameter), where the flow met the surface and was momentarily brought to rest. The other two sets of three electrodes were positioned at radial distances of 15 mm (high turbulence hydrodynamic transition region) and 25 mm (low turbulence wall jet region), as shown in Figure 3a. The electrode positions corresponded to the hydrodynamic zones in Figure 3b [6, 7].

EXPERIMENTAL CONDITIONS

The target was wet-ground to 1200 silicon carbide abrasive paper, rinsed with distilled water, degreased with iso-propanol, and air dried before each experiment. All tests were performed in both static conditions and with a flow rate of 5 m/s in artificial seawater saturated with CO$_2$ at 1.0 bar. Some tests were carried out with the addition of 30ppm of a typical oilfield corrosion inhibitor (CORRTREAT 10-569). Prior to starting the experiment, the brine solution was deaerated by sparging with oxygen-free nitrogen for 2 hours, followed by CO$_2$ for 4 hours to achieve saturation. CO$_2$ was bubbled into the system continuously throughout the experiment.

ELECTROCHEMICAL MEASUREMENTS

Galvanic currents: The galvanic currents between each weld region were recorded every sixty seconds during the test using a multi-channel zero resistance ammeter connected to a data logging PC. The currents from the parent material to the HAZ and from the weld metal to the HAZ were recorded on two channels and their individual galvanic currents were established from the following relationship:

\[
I_{PM} + I_{HAZ} + I_{WM} = 0
\]
Self-Corrosion Rates: The galvanic measurements were continued for approximately 18 hours and then linear polarisation measurements were carried out on each electrode in turn to determine their self-corrosion rates. Total corrosion rates for the three weld regions were evaluated from the sum of their galvanic and self-corrosion rates.

RESULTS AND DISCUSSION

A brief overview of the results is outlined below for weldment regions positioned in the high turbulence transition zone (radial distance $r/ro = 3$) of the jet impingement target. The wall shear stress on the surface of the target at this zone, evaluated for a jet flow rate of 5 m/s, was 72 N/m$^2$. As the test proceeded the seawater temperature stabilized at 52°C, due to Joule heating in the recirculating pump, making the test conditions representative of typical oilfield conditions.

Figure 4 shows the galvanic currents of the X65 steel weldment sections in inhibited (30ppm of CORRTREAT 10-569) brine saturated with CO$_2$. For the first 12 hours of the test the conditions were static. Initially the HAZ was anodic and corroded preferentially to the weld metal and parent material. However, the currents decreased and stabilized within 3 hours as an effective inhibitor film developed on the metal surfaces. The onset of flow at 5 m/s resulted in a substantial increase in the HAZ anodic current, accompanied by several sharp current reversals. This reversal behaviour was attributed to selective removal of the inhibitor film from first one and then another of the regions of the weld [2]. The inhibitor was generally beneficial in that the average galvanic current exchange between

Figure 3: a) Fully assembled target and b) hydrodynamic zones of the jet impingement target showing the positions of the electrodes (adapted from previous studies [6, 7]).

Figure 4: Galvanic currents in the high turbulence transition zone in inhibited (CORRTREAT 10-569) artificial seawater

Figure 5: Galvanic currents with inhibitor 10-569 displaying current reversals at 4000 and 5000 rpm (2, 8)
the electrodes was shown to be less than the value in flowing uninhibited solution. However, the results indicate that preferential corrosion of the HAZ would occur over long periods of exposure.

The galvanic current reversal observed in this work (Figure 4), using a jet impingement flow rate of 5 m/s (corresponding to hydrodynamic shear stress of 72 N/m²) was comparable to results from previous studies on the same material using a rotating cylinder electrode with rotational speed of 5000 rpm (corresponding to a shear stress of 70 N/m²), as shown in Figure 5 (2, 3, 8).

3. The results obtained with the jet impingement target compare favourably with those reported for the same steel weldment measured using a rotating cylinder electrode.

ACKNOWLEDGEMENTS
The authors acknowledge the support of the Nigerian government and Clariant Oil Services.

REFERENCES


WINN & COALES INTERNATIONAL LTD CELEBRATED THEIR 130TH ANNIVERSARY WITH A VISIT FROM HRH THE DUKE OF YORK, KG

Winn & Coales International Ltd, specialist ‘Denso’ anti-corrosion and sealing product manufacturers based in West Norwood, London, celebrated their 130th Anniversary with a visit on Wednesday 16th October by HRH The Duke of York.

Also in attendance were Deputy Lord Lieutenant Major David Hewer OBE and the Mayor of Lambeth, Councillor Mark Bennett.

During the visit, His Royal Highness unveiled a commemorative plaque specially commissioned for the occasion and congratulated the company on its success over 130 years of trading due to a combination of innovation, commercial nous and sound manufacturing practices, all resulting in continuous growth both in the UK and worldwide.

Deputy Lord Lieutenant, Major David Hewer followed by presenting the company with a Queen’s Award for Enterprise: International Trade 2013. This achievement was for the second time running as the company had previously gained the very same Queen’s Award in 2010.

Denso’ corrosion prevention and sealing products are well known and used all over the world for the protection of steel and concrete and are also manufactured by subsidiaries in the USA, Canada, Australia, New Zealand and South Africa. The company’s other well known brands include SeaShield, Protal, Archco-Rigidon, Densostrip and Sylglas.

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Metallisation’s 28E ARCTEC NON-SLIP COATING

Metallisation’s durable non-slip coating, 28E ARCTEC, is a reinforced aluminium based non-slip coating. It is ideal for use in pedestrian and industrial flooring areas, bridge decks, escalators, steel floors and panels across a range of diverse industries.

Untreated steel surfaces can become very slippery, especially in wet conditions, and are prone to corrosion. To ensure safe walking and industrial operating conditions, vital to personal safety and corporate productivity, 28E ARCTEC coating provides a durable non-slip anti corrosion coating.

Traditionally, steel structures are hot dip galvanised, or painted, to protect against corrosion. The disadvantage of hot dip galvanising is that the surface can become slippery and it does not easily accept paint without the need for special primers. Painting this type of surface, which is sometimes applied with grit inclusions, also has its disadvantages. The surfaces can degrade quickly in heavy use, resulting in corrosion and an increased slip hazard.

Many large steel structures, including oil platforms, refineries and bridges, have been routinely protected against corrosion by thermal spray aluminium (TSA), zinc or an alloy of the two. While providing unrivalled corrosion protection in very aggressive corrosive environments, pure TSA is not durable enough to prevent long term wear on floor plates. Ideally, steel structures need a durable coating that protects against both slip and corrosion and that’s exactly what the Metallisation 28E ARCTEC coating does.

28E ARCTEC coating is a thermally sprayed coating that can be applied with a rough texture and has excellent non-slip properties, while being extremely hard and resistant to wear. The coating provides:

- A suitable level of grip, to avoid personal slips or industrial skidding
- Comparable corrosion protection to aluminium, as used in aggressive environments
- Easy application by a long-standing process, covered by international standards

The resultant coating is corrosion resistant and because of its durability, site owners can be confident that once applied, they can forget about rust or slipping for many years.

28E ARCTEC is applied using the Metallisation arcspray process with the ARC 140 system. In the arcspray process the raw material, in the form of a pair of metallic wires, is melted by an electric arc. This molten material is atomised by a cone of 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. Typically, metal sprayed corrosion protection coatings vary from 100 to 350 microns.

There have been a number of recent successes with 28E ARCTEC and there are many trials being conducted to evaluate the effectiveness of the coating against more traditional non-slip surfaces. A local UK Council has opted for 28E to coat 150 of its manhole covers. The covers were metal sprayed with 100 microns of aluminium before being coated with 300 microns of 28E. This is the standard specification for external applications, offering unsurpassed corrosion resistance and durable grip to ferrous items.

28E ARCTEC has also been used on a pedestrian loading platform at a UK airport, as part of its drive to prevent trips and slips in the workplace. The airport has chosen 28E to replace the current chequer plate surface to improve grip, particularly in the wet. As this is also an external application the platform was arcsprayed with 100 microns of aluminium before being coated with 28E.

There are two significant trials of 28E ARCTEC currently being undertaken around the UK. The first is on a very busy ferry terminal roadway. 28E is being trialled to check its durability and wear for this arduous application. To avoid disruption to the ferry service and its passengers, the coating was applied during the early hours and is now being tested on a daily basis.

The second trial of 28E is being undertaken at an industrial site where it is being considered as a replacement for the traditional GRP non-slip plates. 300 microns of 28E has been applied to both the steps up to the access platforms and the platforms themselves. Safety is paramount in this instance due to the size and height of the access platforms. The risk of slipping must be reduced to an absolute minimum, making 28E an ideal solution. As this is an internal application the aluminium base is not required, as corrosion is not an issue.

28E ARCTEC is also not only used on steel substrates. Aluminium manhole covers for roadways in New Zealand are also being trialled with the coating just for its grip and wear properties.

For more information on the 28E ARCTEC wire and coating, contact Stuart Milton, Sales and Marketing Manager, +44 (0) 1384 252 464 or visit www.metallisation.com
WEAR ISSUES DURING THE MANUFACTURING OF TITANIUM DIOXIDE

For many years the chemical industry has had an in depth understanding of corrosion protection and the range of wear resistant lining systems available, due to the extreme negative effects corrosion can have on capital plant and equipment. The costs of none or incorrect action can lead to, plant degradation; Unplanned shutdowns, Costly repairs, Potential spillages leading to a breach of environmental legislation.

The industry introduced best engineering practice leading to formal code of practices (ACoP) which need to be adopted for the storage and handling of chemical substances hence compliance is now mandatory.

Early intervention of ensuring the process is protected using various wear resistant lining systems and technologies is the key to successful corrosion prevention, the abrasive powders and bulk solid material handled throughout the chemical processing of operation, be it the processing of activated carbon, silicon, soda ash or titanium dioxide to name but a few. Wear resistant lining specialist Kingfisher Industrial have successfully improved the performance and extended the service life of capital plant and equipment used to store, convey or process minerals in either a mechanical, pneumatic or hydraulic state.

A well known global manufacturer of titanium products were experiencing high levels of production down time and unforeseen maintenance costs, Wear resistant lining specialists Kingfisher have been supplying the UK plant since the late 1980’s the investment was made in the re-engineering of pneumatic conveying pipe work system used to inject recycled ore and coke into a fluidized bed chlorinator.

The process itself uses chloride to convert rutile or ilmenite into titanium tetrachloride which when purified, scrubbed and then oxidized creates pure titanium dioxide (TiO₂). The process depends on the correct balance of mineral and chemical additives and as such the pneumatic injection lines must be active throughout the chlorinator’s operational campaign. Thus protecting the pipe work from the rigours of conveying ore and coke is of utmost importance. Over the years various grades of wear resistant steel tubes and refractory grade ceramic linings were used to combat the amount of degradation that occurred within the pipelines. These systems albeit achieving improved longevity were not achieving the life expectancy the engineers and operators desired and the requirement to replace pipe work mid campaign was becoming common practice. This replacement activity was having a detrimental effect on the operation of the chlorinator alongside the risks associated to undertaking mechanical activities within a hazardous area therefore engineers turned to Kingfisher in an attempt to improve the life expectancy of the process.

From many years of experience gained through combating the cyclical effects of abrasive minerals conveyed in pneumatic pipe systems, Kingfisher sought to rectify the problem by using their range of ceramic resistant liners. These systems vary from cast basalt, high alumina oxide, silicon carbide and zirconium and all have wear resistant properties that counter a range of abrasive minerals of certain shapes and sizes. Likewise they each perform differently dependent on the operational characteristics of the system, therefore the temperature, velocity; volume per hour needs to be factored into the review to ensure the right system solution is offered.

From the outset Kingfisher worked in conjunction with the plant reliability engineers to ensure the system matched the customer expectations with regard to quality, cost and delivery. Within 2/3 years of trials and inspections, Kingfisher supplied various grades of ceramic liners for testing and upon review of the data associated to the results it was clearly evident what systems suited what parts of the application. It was decided and supported by factual real time evidence that the optimum system consisted of the straight pipes and bends up stream of the safety shut valves, positioned to prevent blow backs from the chlorinator, being protected using our 6 mm thick 92P K-ALOX high alumina ceramic liners and downstream of the valves being protected with our 6mm thick K-SIL RB silicon carbide liners. With the pipes being fabricated in accordance with the pressure equipment directive (PED) they are subject to stringent compliances of NDT on all welded parts & hydrostatic – pressure testing up to 15 bar being held at 220 PSIG. This endorses the integrity of the system and meets the customer’s safety and compliance features associated with chemical plants. In all, this system gave the best performance v investment ratio taking all factors of product, process and safety into consideration.

The resulting situation is now that this system has been adopted by the company as best engineering practice, the plant have benefited from the wear resisting lining systems. The pipe work after the shut-off valve is changed routinely regardless of the condition and is replaced to guarantee the plant’s 18 month life expectancy between campaigns, it is imperative they achieve this due to the operation of the chlorinator and forms part of their standard operating procedures when replacing the pneumatic pipe work system. Likewise, this technology has evolved to protecting other areas of the process that suffer from material degradation such as cyclones, driers, mills and micronizers.

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Cape House, 3 Red Hall Avenue, Paragon Business Village, Wakefield, WF1 2UL
T: 01224 215800

Checmc Scotland Ltd
Wester Crosshill, Avonbridge Road, Falkirk FK1 3DF
T: 01324 851987

Cleveland Bridge UK Ltd
Cleveland House, Yarm Road, Darlington, DL3 5JE
T: 01325 502345

Coating Services Ltd
Partington Street, Mumps Bridge, Oldham, OL1 3RU, UK
T: 0161 665 1998

Collins Engineering Railway Contracts
Salcombe Road, Meadow Lane Industrial Estate, Alfreton, Derbyshire, DE5 3RG
T: 01773 833255

Community Clean
11 Old Forge Road, Ferndown Industrial Estate, Ferndown, Wimborne, Dorset, BH21 7RR, UK
T: 0845 6850133

Corrocoat
Forster Street, Leeds, LS10 1PW
T: 0113 2760760

D&D Rail Ltd
Time House, Time Square, Basildon, Essex SS14 1DJ
T: 01268 520000

Denholm Industrial
21 Boden Street, Glasgow, G40 3PU
T: 0141 445 3939

Donyal Engineering Ltd
Hobson Industrial Estate, Burnopfield, Newcastle Upon Tyne NE16 6EA
T: 01207 270909

Drynal Engineering Ltd
Holborn Industrial Estate, Burnopfield, Newcastle Upon
T: 01207 270909

DRH Coatings Ltd
Suite 5, 3 Shawcross Industrial Estate, Ackworth Road, Portsmouth PO3 5JP
T: 023 9266 6185

Dyer & Butler Ltd (Rail)
Mead House, Station Road, Nursling, Southampton, SO16 0AH, UK
T: 02380 667549

ENC (Yorkshire) Ltd
Unit 3B Rotherham Road, Dinnington, Sheffield, S25 3RF
T: 01909 567860

E P Painting Ltd
Rossfield Road, Rossfield Trading Estate
Ellesmere Port, Cheshire CH65 3AW
T: 0151 355 8141

Excel Contractors Ltd
11a West End Road, Wittering, Southamton SO18 6TE
T: 02380 444420

F A Clover & Son
Bardolph Road, Richmond, Surrey, TW9 2LH
T: 0208 948 6321

Forth Estuary Transport Authority
Forth Road Bridge, Administration Office
South Queensferry, EH30 9SF
T: 0131 319 1699

GABRE (UK) LTD
9 Holme Road, Dromore, Omagh
T: 02882 897950

H&H Painting Contractors Ltd
Unit 3 Bell Park, Bell Close, Newnham Ind Est
Plymouth PL7 4TA
T: 07837 382619

Harso Infrastructure Services Ltd
Unit 5 Manby Road, South Killingholme, Immingham, North Lincolnshire, DN40 3DX
T: 01460 553800

Harrisons Engineering Lancashire Ltd
Judge Wilmye Mill, Longworth Road
Billington, Clitheroe, Lancashire, BB7 9TP
T: 01254 823993

HBS Protective Coatings Ltd
40 Mansie Road, Belfast BT8 6SA
T: 028 90708280

Herrington Industrial Services Ltd
Crown Works, Crown Road, Low Southwick, Sunderland SRS 2BS
T: 0191 5160634

Hi-Tech Surface Treatment Ltd
Unit B, Deacon Trading Estate, Chickenhall Lane, Eastleigh, Hants SO50 6RP
T: 023 80611789

Hyspec Services Ltd
Unit 3 Meadowfield Industrial Estate, Cowdenbeath Road, Burntisland, Fife, KY3 0LH
T: 01592 874661

Industrial Coating Services
A1 House, Rolling Mill Street, Norton Canes, Cannock
WS11 9UH
T: 0845 474 0007
<table>
<thead>
<tr>
<th>Company Name</th>
<th>Address</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial Painting</td>
<td>48-49 RCM Business Centres, Sandbeds Trading Estate, Dewsbury Road, Ossett, WF5 9ND</td>
<td>T: 01924 272606</td>
</tr>
<tr>
<td>International Energy Services Ltd</td>
<td>94 Axolowo, Ikoyi, Lagos State, Nigeria</td>
<td>T: 01698 156286</td>
</tr>
<tr>
<td>Interserve Industrial</td>
<td>Unit 2, Olympic Park, Poole Hall Road Ellesmere Port, Cheshire, CH66 1ST</td>
<td>T: 0151 3737660</td>
</tr>
<tr>
<td>J Murphy &amp; Sons Ltd</td>
<td>Hiview House, Highgate Road, London NW5 1TN</td>
<td>T: 020 7267 4366</td>
</tr>
<tr>
<td>Jack Tighe Coatings</td>
<td>Sandall Lane, Kirk Sandall, Doncaster, DN3 1QR</td>
<td>T: 01302 880360</td>
</tr>
<tr>
<td>Jack Tighe Ltd</td>
<td>Redbourne Mere, Kirton Lindsey, Gainsborough, Lincs, DN21 4NW, UK</td>
<td>T: 01652 640003</td>
</tr>
<tr>
<td>JPV (Painters) Ltd</td>
<td>Unit 8 Prospect Way, Hutton Industrial Estate, Brentwood, Essex, CM13 3XA, UK</td>
<td>T: 01277 201515</td>
</tr>
<tr>
<td>KAEFER Opus Ltd</td>
<td>Ethan House, Royce Avenue, Cowpen Industrial, Estate, Billingham, TS23 4BX, UK</td>
<td>T: 01642 371850</td>
</tr>
<tr>
<td>Lanarkshire Welding Co.</td>
<td>82 John Street, Wishaw, Lanarkshire, ML2 7TQ</td>
<td>T: 01698 264271</td>
</tr>
<tr>
<td>Mabay Bridge Ltd</td>
<td>Station Road, Chepstow, Monmouthshire NP16 SYL</td>
<td>T: 01291 623801</td>
</tr>
<tr>
<td>Maclean &amp; Speirs Blasting Ltd</td>
<td>Unit D, East Fulton Farm, Darlulth Road, Linwood, Paisley PA3 3TP</td>
<td>T: 01505 324777</td>
</tr>
<tr>
<td>M&amp;G Decorators Ltd</td>
<td>26 Jail Lane, Bign Hill, Westerham Kent TN16 3SA</td>
<td>T: 0770 2051729</td>
</tr>
<tr>
<td>MCL Coatings Ltd</td>
<td>Pickering Road, Halebank Industrial Estate, Widnes, Cheshire, WA8 BXW</td>
<td>T: 0151 423 6166</td>
</tr>
<tr>
<td>NSG UK Ltd</td>
<td>Fourth Avenue, Deeside Industrial Park, Deeside, Flintshire CH5 2NR</td>
<td>T: 01244 833138</td>
</tr>
<tr>
<td>N L Williams Group Ltd</td>
<td>Westside Industrial Estate, Jackson Street, St. Helens, Merseyside WA9 3AT</td>
<td>T: 01744 265267</td>
</tr>
<tr>
<td>Northern Protective</td>
<td>16 High Reach, Fairfield Industrial Estate, Bill Quay, Gateshead, Tyne &amp; Wear, NE10 0UR</td>
<td>T: 0191 438 5525</td>
</tr>
<tr>
<td>Nusteel Structures</td>
<td>Lympne Industrial Estate, Lympne, Hythe, Kent, CT21 4LR</td>
<td>T: 01303 268112</td>
</tr>
<tr>
<td>Offshore Marine Services Ltd</td>
<td>Brumby House, Jalan Bahasa, PO Box 80148, 87011 Lubuan F.T. Malaysia</td>
<td>T: +356212444410</td>
</tr>
<tr>
<td>Orrmac Coatings Ltd</td>
<td>Newton Chambers Road, Thorncliffe Park Estate, Chapeltown, Sheffield, S35 2PH</td>
<td>T: 0114 246 1237</td>
</tr>
<tr>
<td>Over Rail Services Ltd</td>
<td>Unit 10 Millhead Way, Purdys Industrial Estate, Rochester, Essex, SS4 1ND</td>
<td>T: 07976372866</td>
</tr>
<tr>
<td>Paintel Ltd</td>
<td>Trianon, Westover, Ivybridge, Devon, PL21 9JH</td>
<td>T: 01752 719 701</td>
</tr>
<tr>
<td>PCM Nigeria plc</td>
<td>99 Rivoc Road Trans Amadi, Port Harcourt, Rivers State, Nigeria</td>
<td>T: +2348055297828</td>
</tr>
<tr>
<td>P H Shotblasting &amp; Spraying Services</td>
<td>43a Drumaigne Road, Castlecaulfield, Dungannon, Co Tyrone, BT70 3NY</td>
<td>T: 028 8776 7722</td>
</tr>
<tr>
<td>Pipeline Induction Heating</td>
<td>The Pipeline Centre, Farringdon Road, Rosendale Rd Industrial Estate, Burnley BB11 5SW</td>
<td>T: 01282 415323</td>
</tr>
<tr>
<td>Port Painters Limited</td>
<td>Unit 3, Ringside Business, Hoel-Y-Rhosog Cardiff, CF3 2EWx</td>
<td>T: 029 220 77707</td>
</tr>
<tr>
<td>PPC Ltd</td>
<td>Unit 2, Oyster Industrial Estate, Jackson Close, Drayton, Portsmouth PO6 1QN</td>
<td>T: 023 9221 5957</td>
</tr>
<tr>
<td>Pyroy Limited</td>
<td>Kirkstone House, St Omers Road, Western Riverside Route, Gateshead, Wear, NE11 1EZ</td>
<td>T: 0191 4932600</td>
</tr>
<tr>
<td>Roy Hankinson Limited</td>
<td>Alexander House, Monks Ferry, Birkenhead Wirral, CH41 5LH</td>
<td>T: 0870 7892020</td>
</tr>
<tr>
<td>Severn River Crossing Plc</td>
<td>Bridge Access Road, Aust, South Gloucestershire, BS35 4BD</td>
<td>T: 01454 633351</td>
</tr>
<tr>
<td>Shutdown Maintenance Services Ltd</td>
<td>Kingsnorth Industrial, Hoo, Rochester, Kent, ME3 9ND</td>
<td>T: 01634 256969</td>
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<tr>
<td>Solent Protective Coatings Ltd</td>
<td>Tredegar Wharf, Marine Parade Southampton, Hants, SO14 5JF</td>
<td>T: 02380 221480</td>
</tr>
<tr>
<td>South Staffs Protective Coatings Ltd</td>
<td>Bloomfield Road, Tipton, West Midlands, DY4 9EE</td>
<td>T: 0121 522 2373</td>
</tr>
<tr>
<td>Standish Metal Treatment Ltd</td>
<td>Potter Place, West Pinmo, Skelmersdale, Lancs, WN8 9PW, UK</td>
<td>T: 01695 455977</td>
</tr>
<tr>
<td>Stobbarts Ltd</td>
<td>Tarn Howe, Lakes Road, Derwent Howe Industrial Estate, Workington, Cumbria CA14 3YP</td>
<td>T: 01900 870780</td>
</tr>
<tr>
<td>Tees Valley Coatings</td>
<td>Riverside Park Road, Middlesborough, Cleveland TS2 1UT</td>
<td>T: 01642 228141</td>
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<tr>
<td>T I Protective Coatings</td>
<td>Unit 6, Lodge Bank, Crown Lane, Horwich, Bolton, Lancs, BL6 5HU</td>
<td>T: 01204 468080</td>
</tr>
<tr>
<td>TEMA Engineering Ltd</td>
<td>5-6 Curran Road, Cardiff, CF10 5DF, UK</td>
<td>T: 020920 344556</td>
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<tr>
<td>Vale Protective Coatings Ltd</td>
<td>Building 152 - Langar North Industrial Estate, Harby Road, Langar, NG13 9HY</td>
<td>T: 01949 869784</td>
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<tr>
<td>Walker Construction (UK) Ltd</td>
<td>Park Farm Road, Folkestone, Kent, CT19 5DY</td>
<td>T: 01303 851111</td>
</tr>
<tr>
<td>Wardle Painters Ltd</td>
<td>Unit 5, Wimborne Building, Atlantic Way, Barry Docks, Glamorgan, CF63 3RA, UK</td>
<td>T: 01446 748620</td>
</tr>
<tr>
<td>W G Beaumont &amp; Son</td>
<td>Beaumont House, 8 Bernard Road, Romford RM7 0HX</td>
<td>T: 01708 749202</td>
</tr>
<tr>
<td>Company Name</td>
<td>Address</td>
<td>Telephone</td>
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<tr>
<td>William Hare Ltd</td>
<td>Brandleholme House, Brandleholme Road, Bury, Lancs, BL8 1J</td>
<td>0161 609 0000</td>
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<tr>
<td>Xervon Palmers Ltd</td>
<td>331 Charles Street, Royston, Glasgow G21 2QA</td>
<td>0141 5534040</td>
</tr>
<tr>
<td>ICATS REGISTERED COMPANIES</td>
<td></td>
<td></td>
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<tr>
<td>Abbey Gritblasting Services</td>
<td>Unit 13, Clifton Commercial Park, Clifton, Woodbridge, Suffolk, IP12 3TP</td>
<td>0191 262 0510</td>
</tr>
<tr>
<td>Advanced Construction and Eng Resources Ltd (ACER)</td>
<td>5th Floor, Horton House, Exchange Flags, Liverpool L2 3PF</td>
<td>0161 408 0155</td>
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<tr>
<td>A McKay Building &amp; Engineering Ltd</td>
<td>19 Kyle Road, Irvine, Ayrshire, KA12 8JX</td>
<td>01294 279586</td>
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<tr>
<td>BSM Consulting</td>
<td>11 Kingsmead, Nailsea BS48 2XH</td>
<td>01275 854708</td>
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<tr>
<td>BAM Nuttall Ltd</td>
<td>St James House, Knoll Road, Camberley GU13 3XW</td>
<td>01782 5798440</td>
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<tr>
<td>Celtic Specialist Treatments Ltd</td>
<td>Rosedale, Carelliken Lane, Langstone Newport, Gwent, NP18 2JZ</td>
<td>01633 400194</td>
</tr>
<tr>
<td>Centregreat Engineering Ltd</td>
<td>11/12 Wyndham Close, Brackla, Brackla Industrial Estate, Bridgend, CF31 2AD</td>
<td>01656 650481</td>
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<tr>
<td>Coastground Ltd</td>
<td>Morton Peto Road, Gapton Hall Industrial, Great Yarmouth, Norfolk, NR31 0LT</td>
<td>01493 650455</td>
</tr>
<tr>
<td>Corroless Eastern Ltd</td>
<td>Greens Road, Greens Industrial Estate, Dereham, Norfolk NR20 3TG</td>
<td>01362 691484</td>
</tr>
<tr>
<td>Darcy Spillcare Manufacture</td>
<td>Brook House, Larkfield Trading Estate, New Hythe Lane, Larkfield, Kent ME20 6GN</td>
<td>01622 715100</td>
</tr>
<tr>
<td>E G Lewis &amp; Company Ltd</td>
<td>Suite 5, 3 Shawcross Industrial Estate, Ackworth Road, Portsmouth PO3 5J</td>
<td>01792 323288</td>
</tr>
<tr>
<td>Farbuild Ltd</td>
<td>Trelawny Lodge, Vicarage Road, Wingfield, Diss, Norfolk IP21 5RB</td>
<td>01379 640670</td>
</tr>
<tr>
<td>Forward Protective</td>
<td>Vernon Street, Shirebrook, Mansfield Notts, NG20 8SS</td>
<td>01623 748323</td>
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<tr>
<td>Gemini Corrosion Services</td>
<td>Brent Avenue, Forties Road, Montrose, Angus, DD10 9PB</td>
<td>01674 672678</td>
</tr>
<tr>
<td>Galldriss Construction Ltd</td>
<td>Galldriss House, Pavilion Business Centre, Kinetic Crescent, Innova Science Park, Enfield BN3 7FJ</td>
<td>01992 763000</td>
</tr>
<tr>
<td>GEJ Project Services Ltd</td>
<td>118 Holly Lane East, Banstead, Surrey SM7 2BE</td>
<td>01737 202271</td>
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<tr>
<td>Hempel UK Ltd</td>
<td>Llantrarn Park, Cwmbran, Gwent, NP44 3XF</td>
<td>01633 874024</td>
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<tr>
<td>JB Specialist Refurbishments Ltd</td>
<td>The Old Village Hall, Sawtry, Huntingdon, Cambridgeshire PE28 5SZ</td>
<td>01536 266607</td>
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<tr>
<td>Kaefer C&amp;D Ltd</td>
<td>Riverside House, Rolling Mill Road, Viking Industrial Estate, Jarrow, Tyne &amp; Wear NE32 3DP</td>
<td>0191 428700</td>
</tr>
<tr>
<td>Keep Protective Coatings Ltd</td>
<td>Unit 4, James Park, Mahon Road, Portadown, County Armagh BT62 3EH</td>
<td>02838 338151</td>
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<tr>
<td>Livis Ltd</td>
<td>Livis House, 50 Victoria Park Dartford, Kent, DA1 5AJ</td>
<td>01322 222058</td>
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<tr>
<td>Malakoff Limited</td>
<td>North Ness, Lerwick, Shetland, ZE1 0LZ, UK</td>
<td>01595 695544</td>
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<tr>
<td>Matthew James Services</td>
<td>Unit 4, Shibdon Business, Cowen Road Blaydon, Newcastle-Upon-Tyne, NE21 5TX</td>
<td>0191 414 5700</td>
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<tr>
<td>Moore Steel Developments Ltd</td>
<td>Station Road, Thorney, Peterborough PE6 0QE</td>
<td>01733 270729</td>
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<tr>
<td>Paint Inspection Ltd</td>
<td>Milton House, 7 High Street, Fareham PO16 7AN</td>
<td>01345 4638680</td>
</tr>
<tr>
<td>Parks Fabrication Ltd</td>
<td>Park Farm, Holme-upon-Spalding-Moor, York, YO43 4AG</td>
<td>01430 861628</td>
</tr>
<tr>
<td>Possilpark Shotblasting Co Ltd</td>
<td>Dalmarnock Works, 73 Dunn Street, Glasgow, G40 3PE</td>
<td>0141 556 6221</td>
</tr>
<tr>
<td>R.L.P. Painting</td>
<td>Heathfield House, Old Bawtry Road, Finningley, Doncaster, DN9 3DD, UK</td>
<td>01302 772222</td>
</tr>
<tr>
<td>SCA Group Ltd</td>
<td>Woolbridge Ind. Park, Three Legged Cross, Dorset, BH21 6FA</td>
<td>01202 820820</td>
</tr>
<tr>
<td>Sherwin-Williams Protective &amp; Marine Coatings</td>
<td>Tower Works, Kemstor Street, Bolton, lansc, BL2 2AL</td>
<td>T: +44 (0)1204 521771</td>
</tr>
<tr>
<td>Shirley Industrial Painters &amp; Decorators Ltd</td>
<td>Smiths Quay, Hazel Road, Woolston, SO19 7GB</td>
<td>023 80438901</td>
</tr>
<tr>
<td>Stamford Construction Limited</td>
<td>Barham Court Business Centre, Teston, Maidstone, Kent MW18 5SB</td>
<td>017912037033</td>
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<tr>
<td>Story Contracting Ltd</td>
<td>Burgh Road Industrial Estate, Carlisle, Cumbria CA2 7NA</td>
<td>07730 764414</td>
</tr>
<tr>
<td>Taylor Engineering (UK) Ltd</td>
<td>Unit 7 &amp; 8 Curran Buildings, Curran Road, Cardiff CF10 5NE</td>
<td>02920 371959</td>
</tr>
<tr>
<td>Tinsley Special Products</td>
<td>Enterprise House, Durham Lane, Eaglescliffe, Stockton-on-Tees TS16 0PS</td>
<td>01642 784279</td>
</tr>
<tr>
<td>Wescott Coatings &amp; Training Services Ltd</td>
<td>The Quadrus Centre, Woodstock Way, Boldon Business Park, Boldon NE35 9PF</td>
<td>0191 5197380</td>
</tr>
</tbody>
</table>

For all the latest news, events & debates join us on [LinkedIn](https://www.linkedin.com)
DIARY DATES 2013/2014

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

Thursday 9th January 2014
London Branch Meeting
Speaker to be announced – please see website for details
Venue: Naval Club, 38 Hill Street, London 17.30 for 18.00 start.

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

Thursday 13th February 2014
London Branch Meeting
Speaker to be announced – please see website for details
Venue: Naval Club, 38 Hill Street, London 17.30 for 18.00 start.

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

Thursday 13th March 2014
London Branch Meeting and AGM
Speaker: London Branch Chairman, John O’Shea on ‘The past, with a viable future’.
Venue: Naval Club, 38 Hill Street, London 17.30 for 18.00 start.

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

Sunday 2nd - Thursday 6th November 2014
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

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Terry Hinds (Chairman)
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Email: info@galcosteel.ie

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Email: brenda.peters@analysis-scientific.co.uk

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MIDLANDS BRANCH:
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Email: jim@corrosion-prevention.co.uk

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Tel: 01422 356752
Email: nigel@specialisedcoatings.co.uk
Young ICorr Chairman:
Oliver Lewis
Email: oliver.lewis@shu.ac.uk

CSD Division:
Nick Stevens
Tel: 0161 3063621

CED Division:
Nick Smart
Tel: 01635 280385

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