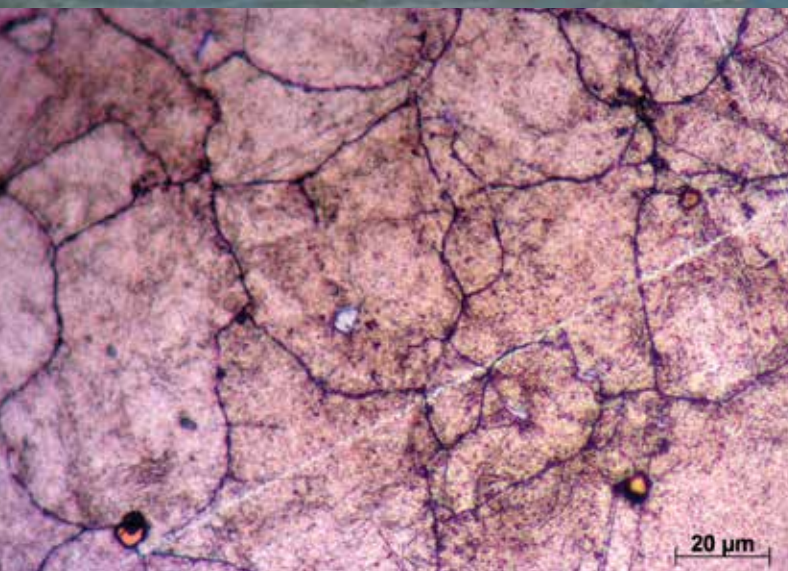
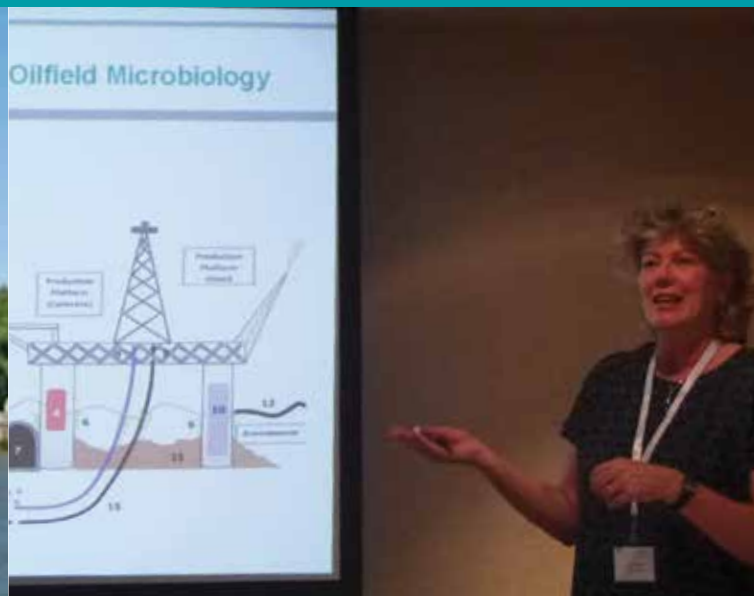


CORROSION MANAGEMENT

A JOURNAL OF THE INSTITUTE OF CORROSION

July/August 2015 No. 126



In this issue:

ICorr members help protect historic warship – Page 7

CED Working Day and Symposium – Pages 8-10

Technical Article – Pages 14-19

Company News – Pages 20-22

APPROVED COURSES FOR ICORR CERTIFICATION

Institution of
**MECHANICAL
ENGINEERS**

Argyll-Ruane Ltd
Learning & Development

Argyll-Ruane Ltd offers training courses that are approved by the Institute of Corrosion:

- Painting Inspector (Level 1, 2 & 3)
- Pipeline Coatings Inspector (Level 2)
- Cathodic protection of re-inforced concrete structures (Level 1 & 2)
- Insulation Inspector (Level 2)
- Hot Dip Galvanising Inspector
- Fire Proofing Inspector (Level 2)
- Cathodic protection of buried and submerged structures (Level 1 & 2)

For more information and to book a course:

www.imeche.org/arl

Contact:

T: +44 (0)17 0956 0459

E: arl@imeche.org

F: +44 (0)17 0955 7705

ARL is delighted to announce its acquisition by PEP Ltd, a wholly owned subsidiary of the Institution of Mechanical Engineers, the fastest growing professional engineering institution in the UK. Our mission is to provide the best quality training, consultancy and certification services to our clients and members worldwide.

Technical Services Engineer **CORROCOAT LTD**

Ideally the successful candidate will:

- Have relevant experience within an industrial coating or a corrosion related area of work.
- Excellent presentation and communication skills.
- Experience of training staff
- The candidate will provide technical assistance to Corrocoat UK and overseas personnel.
- Candidates with some knowledge of chemistry and corrosion preferred.

The role is mainly based at our Leeds office, but will involve travel both in the UK and Overseas. Full training in Corrocoat's products and technology will be given.

Corrocoat offers a basic salary of up to £30,000 dependent on experience and qualifications; we operate a group personal pension scheme, and offer a generous holiday allowance.

Please Apply including a CV, a cover letter and salary details to Monika Dziedzic
Email: monikad@corrocoat.com
Telephone: 01132 760760

TO ADVERTISE IN CORROSION MANAGEMENT

please contact
**Jonathan Phillips or
Debbie Hardwick at:**

Square One
+44 (0)114 273 0132
enquiries@squareone.co.uk

CORROSION MANAGEMENT

A JOURNAL OF THE INSTITUTE OF CORROSION

July/August 2015 No.126



Published on behalf of the Institute of Corrosion

Square One Advertising and Design Limited
84 Queen Street, Sheffield S1 2DW,
United Kingdom.

Publisher and Managing Editor

Debbie Hardwick
Tel: 0114 273 0132
Fax: 0114 270 0422
Email: debbie@squareone.co.uk

Technical Editor

Prof. Robert Akid CEng, FIMMM, FICorr
Email: robert.akid@manchester.ac.uk

Design

Square One Advertising & Design
www.squareone.co.uk

Advertising Manager

Jonathan Phillips
Tel: 0114 273 0132
Fax: 0114 272 1713
Email: jonathan@squareone.co.uk

**Editorial copy date for September/October 2015
issue is: 11th September 2015**

Subscriptions

UK	£70.00
Europe	£80.00
Outside Europe	£90.00 airmail £80.00 surface mail

*Enquiries and subscriptions to the Institute of
Corrosion at the address below*

The Institute of Corrosion

President

John Fletcher

Immediate Past President

Trevor Osborne

Vice President

Sarah Vasey

Hon. Secretary

Dr. Jane Lomas

*The Newton Building, St George's Avenue
Northampton, NN2 6JB*

Tel: 01604 893883 Fax: 01604 893878

Email: admin@icorr.org

Website: www.icorr.org

*All rights reserved Reproduction without written permission from the
Institute of Corrosion is prohibited. Views expressed in editorial text or
advertising copy are the opinions of the contributors/advertisers and
are not those of the Institute or the Publisher.*

ISSN: 13 55 52 43



www.icorr.org

CONTENTS

Institute News

The President Writes	4
Midlands Branch News	5
North West Branch News	5
Yorkshire Branch News	6
ICorr members help protect historic warship	7
CED Working Day and Symposium	8-10
New President for CEOCOR	12
Aberdeen Branch News	13

Technical Article

Pitting and Crevice Corrosion Resistance of a Ni-based alloy in artificial seawater	14-19
--	-------

Company News

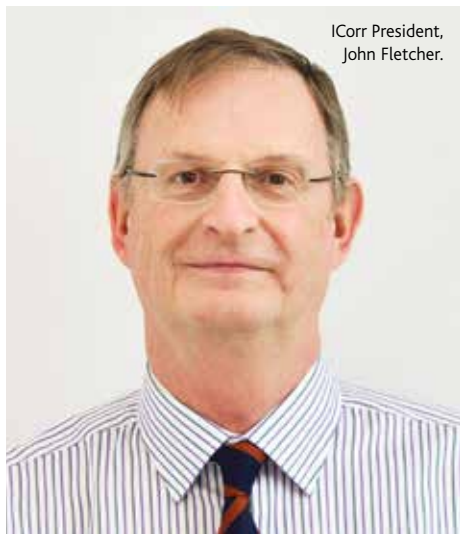
Westcott Group Ltd	20
Winn & Coales (Denso) Ltd	21
Alfred Bagnall & Sons Ltd	21-22

Sustaining Members 23-31

ICATS Registered Companies 32-35

Diary and Branch Contacts 36

The President Writes



ICorr President,
John Fletcher.

We have now arrived in what passes for summer here in Manchester. We have had some warm and sunny days but I note that my barbeque has not yet seen the light of day this year. Many of our members are taking the opportunity to take well-earned holiday and a break from the never ending task of preventing or mitigating the effects of corrosion. However, as you all know the corrosion process never sleeps and its demand for attention is always at hand.

Since my last article in Corrosion Management the joint ICorr/NACE Knowledge Transfer – Corrosion Matters Workshop was held over two days in June. The event was a significant technical success and resulted in a small financial surplus, which will be shared with NACE.

This is a very good result given the difficult times being experienced by our target market due to the continuing low prices for oil and gas. However many of the technical objectives were achieved and much credit is due to George Winning and the organisational team, particularly the ICorr members that "got the

show on the road". It is hoped that when the dust settles that another similar event can be organised for 2016, perhaps in a location outside London.

The contributions to the Workshop were many and varied and we are grateful to all the contributors and it was noticeable that the discussion sessions were both intense and lengthy showing that the attendees were getting good value from the event.

It should be noted that one of our former Presidents, Brian Wyatt, has become President of CEOCOR. Founded in 1956, CEOCOR is an international scientific non-profit association dealing with corrosion and protection of pipes and pipeline systems. Having Brian as President will encourage more collaboration between CEOCOR and ICorr and we are now seeking an ICorr member to replace Brian as the UK representative. More information on CEOCOR including contact details can be found on the ICorr website at <http://www.icorr.org/news/343/index.phtml>

Our relationship with the Australian Corrosion Association continues to develop and I am pleased to report that my paper on Pull-Off Adhesion Testing of Coatings – Improve Your Technique has now been accepted for presentation. The planning for my visit to Adelaide in November is now underway.

Although the summer is normally a quiet period in terms of corrosion related events there are activities at which ICorr will be represented. For example, the Eurocorr 2015 Congress will be held in Graz, Austria from the 6th to the 10th September. The theme is **"Earth, Water, Fire, Air, Corrosion happens everywhere"** and there will be a small but significant ICorr presence at the event.

Other initiatives that are progressing through the summer are the discussions with the

Marine Corrosion Forum on how more young people can be encouraged to study STEM subjects and be attracted to work in the "Corrosion" industry. I am planning to send a short questionnaire to the ICorr Sustaining Members to try and get some information on recruitment practices to aid the deliberation of this group and determine some action points to make a difference.

There is also an initiative to improve contacts with the Water and Sewage Handling industry to raise awareness of corrosion prevention methods that are available for pipelines and storage tanks, as it is clear that interest in corrosion science has declined in this area and there is an opportunity for ICorr to provide some assistance in raising awareness again.

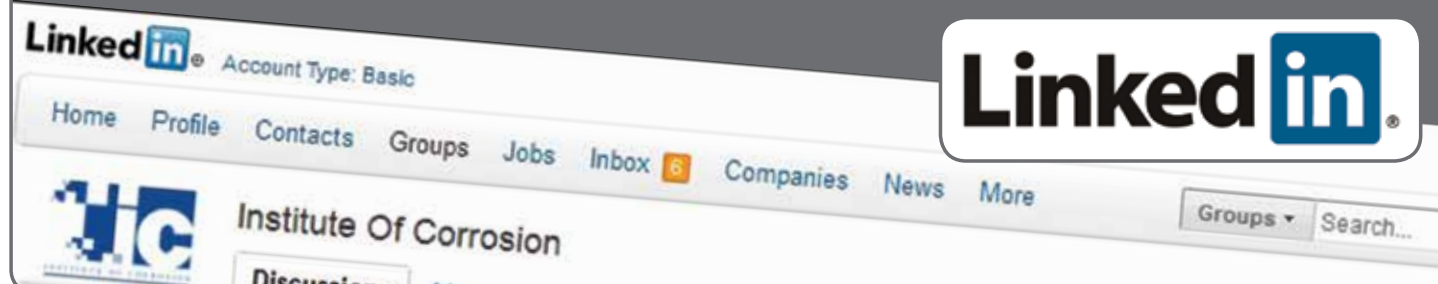
Looking forward, the autumn is the time when ICorr Branches start to hold their evening events and I hope to find time to attend some of these in my target of visiting all the active branches during my time as President. I did manage to attend the North West Branch AGM and Golf Day and I have the mark to prove it.

I would like to take this opportunity to encourage all ICorr members to get involved with your local branch. Make contact and seek out the upcoming events that are of interest and if the diary of events does not contain anything of interest to you make contact with the branch secretary, they will be interested to here of any event you would like to see included in the planning.

I hope you all have a pleasant and restful time during your vacations this summer and that you will all be refreshed for more corrosion activity in the months to come.

John Fletcher
President of the Institute of Corrosion

For all the latest news, events and debates join us on



MIDLANDS BRANCH NEWS

INDUSTRY VISIT TO VECTOR CORROSION TECHNOLOGIES, CRADLEY HEATH

On the 9th June 2015 the Midlands Branch had a site visit to the recently established offices and laboratories of the UK arm of Vector Corrosion Technologies, now based in Cradley Heath in the West Midlands.

George Sergi of Vector welcomed members to the premises and gave a tour of their new facilities. Vector is specialist in the production of anodes for installation into concrete structures to prevent reinforcement corrosion and the research facilities have been set up to assist in the development of new anode products.

George explained that product development work was undertaken in both the UK and at the parent company headquarters in Canada, but that fundamental research was undertaken and new product ideas put to test here at the

Cradley Heath site. Nikita Rathod presented some of the testing that she is presently undertaking in the laboratory. This will then be transferred to Canada for large scale testing and validation trials.

After the laboratory tour visitors were treated to a fish supper and a presentation by George on the subject of 'Extending Residual Service Life of Steel Reinforced Structures by the Use of Galvanic Anodes'. The history of use of galvanic anodes in concrete, now with a track record of over 15 years was explained and some service data from UK sites, including current outputs, current density measurements and polarization data for the reinforcement were presented.

George then looked at some interesting future developments in the field of galvanic



Samples under test in the laboratory.



George Sergi explaining to members the work undertaken in the laboratory.

anodes for concrete. These are based on the ability to passivate and maintain as passive reinforcement in concrete, and this was explained by the use diagrams showing the areas of pitting initiation, propagation, instability; and areas of immunity to corrosion and re-passivation on plots of potential versus chloride content. It was explained that the level of charge required to passivate reinforcement will be dependent on the level of chloride contamination and on the applied current density.

Several Midlands Branch members have field responsibility for corrosion control of highway infrastructure and a lively and informed discussion ensued around the presentation.

Branch chairman Ali Sharifi thanked Vector for their time and hospitality. The next Midlands Branch meeting is hoped to be a sustaining members day to be held at Ironbridge in September.

NORTH WEST BRANCH NEWS

THE PRESIDENT WEARS ONE FOR THE NORTH WEST BRANCH

The North West Branch Golf Event ended prematurely for the President when I was hit a glancing blow from a golf ball coming from the group of players who were following the ICorr foursome round the course.

This happened on the 10th fairway and so the rest of the group were spared my terrible golf in the blustery wind, as I chose to retire to the Club House to get some ice on the injury.

As my son said later in the evening, "just a flesh wound" so no real damage done but I must learn to duck away not in to the flight of the ball.

By the time the rest of the ICorr players had completed the course the bleeding had stopped and we were able to carry on with the North West Branch AGM as though nothing had happened. I think that the incident did not even get a mention in the minutes.



YORKSHIRE BRANCH NEWS

ICORR YORKSHIRE BRANCH VISIT TO ELCOMETER LTD

Thursday 21st May saw a great turnout of 18 ICorr members and prospective members for an afternoon visit to Elcometer Ltd in Manchester.

The purpose was 2 fold; to gain an insight into the history and product range of Elcometer Ltd and also to reform the Yorkshire Branch committee as there had been many retirees over recent years.

The meeting got off to a good start with networking over coffee and refreshments which lead into a presentation by John Fletcher, ICorr President and Technical Support Manager for Elcometer Ltd of the range of test instruments and markets that Elcometer supply.



Attendees networking with John Fletcher, ICorr President.

The presentation was followed up with an informative tour of the manufacturing and testing areas.

Attendees then returned to view many of the instruments in the demonstration area.

The tour of Elcometer was then followed up with a meeting regarding the history, current position and future of ICorr Yorkshire Branch.



Attendees browsing the range of test instruments at Elcometer Ltd before the Yorkshire Branch meeting.

There was constructive discussion about previous historic events and where members wished to hopefully see the Branch evolve to. One of the recent inhibitors to Yorkshire Branch moving forward was the retirement or career changes of many of the existing committee members and it was proposed to form a new committee to regain momentum.

Several attendees showed interest in election to the new committee to move things forward and Nigel Peterson-White the current Yorkshire Branch Secretary will help this by coordinating a programme of future events.

Graeme Manning proposed that Richard Green of IMechE for the position of Chairman and Dave Griffiths of ARL/Griffiths Associates seconded this. Unfortunately Richard could not attend due to overseas commitments.

The meeting rounded off with suggestions for meetings, events and technical talks and it was proposed to meet late summer at a venue to be confirmed to move Yorkshire Branch forward. It was also suggested that

the Sustaining Members of ICorr Yorkshire be contacted and followed up with a visit to strengthen ties and gain an understanding of what these valuable members would like from The Institute of Corrosion.



Thank you to John Fletcher (2nd from right) : ICorr President and Technical Support Manager for Elcometer Ltd for an enjoyable presentation, tour of the facility and meeting from student members of ICorr Yorkshire Branch.



visit the new ICorr website
www.icorr.org

INSTITUTE OF CORROSION MEMBERS COMBINE RESOURCES TO HELP PROTECT HISTORIC WARSHIP

HMS Wellington was built at Devonport Dockyard in 1934. She was one of 13 Grimsby class warships built for service in the Commonwealth and Dependencies and from 1936 to 1939 she patrolled the waters around New Zealand and 2.5 million square miles of the western Pacific visiting and policing the Island chains and Possessions then under British rule.

At the outbreak of World War Two HMS Wellington was recalled to perform convoy escort duties in the Atlantic. During six years of wartime service she rescued over 450 Merchant Navy seamen and was active at Dunkirk and the North African landings. She also shared the credit for sinking a U-Boat. Shortly after the end of the war she was retired and laid up at Pembroke Dock.



HQS Wellington.

The Honourable Company of Master Mariners had been looking for a livery hall since 1939. After the war the chances of building a livery hall in London were remote. In 1947 HMS Wellington was made available by the Admiralty and the Company decided to buy her and convert her to a floating Livery Hall. HQS Wellington arrived at Victoria Embankment in 1948.

In 1991 major refurbishment was carried out over three months in dry-dock at Sheerness. In 2005 ownership was transferred to the Wellington Trust, a charitable trust established to ensure the preservation of this historic ship. The ship relies on income from functions and exhibitions and charitable donations to assist with maintenance and is moored in the Thames close to Temple tube station. HQS Wellington had a coating system applied during the refurbishment in 1991 but did not have any cathodic protection system.

In 2014, six corrosion professionals, a number of whom are Institute of Corrosion members had combined resources to provide a CP system to protect the ship's hull and persuaded their respective companies to provide free of charge the various constituent parts of a marine CP system.

Dr Paul Chess, Mr Frits Gronvold and Dr Peter Vagn Nygaard of FORCE Cathodic Protection in Denmark provided one of their latest switchmode cathodic protection power sources, Dr Patrick Lydon of IACS Corrosion Engineering Ltd designed the CP system and assisted with its installation and commissioning, Mr Mike Moffat of Corpro Companies Europe Ltd provided the impressed current anodes with IACS Corrosion Engineering Ltd contributing to part of the anode cost and Mr Robert Britton of Silvion Ltd provided the Ag/AgCl/seawater reference electrodes used for the control of the CP system and routine monitoring.

The four organisations FORCE Technology, IACS Corrosion Engineering Ltd, Corpro Companies Europe Ltd and Silvion have all contributed to the application of CP to extend the vessels life and contribute to the preservation of the Nation's Naval Heritage by reducing the rate of corrosion of the ships hull.

The ship's management team have provided invaluable assistance during the work particularly the Chief Engineer, Martin Brownjohn and the Commanding Officer, Commodore Angus Menzies have contributed to the overall success of the work. They have also allowed the Wardroom to open to provide welcome refreshment when any work took place.

MITIGATE INDUCED AC VOLTAGE

Zone 1 and Zone 2 products certified to ATEX and IECEx requirements

- Isolate cathodically protected structures from grounding systems or other equipment
- Ground cathodically protected structures for lightning & AC faults
- Products featuring solid-state, maintenance-free construction
- Third party certifications



Contact our UK based agent:

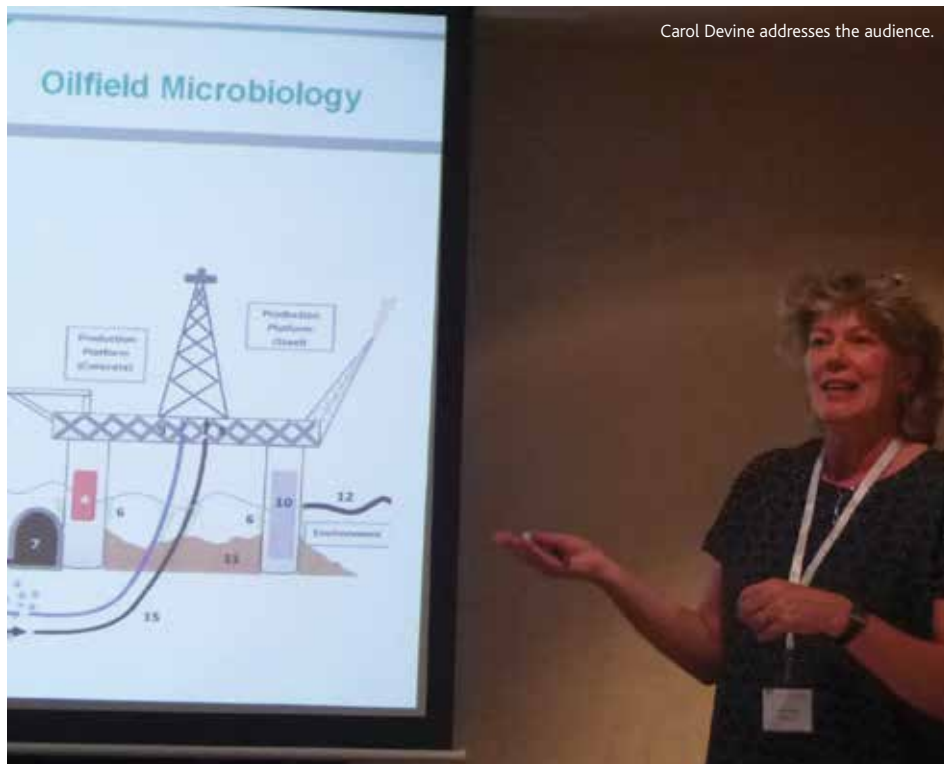
DC Materials Supply • +44 (0)1798 860975



DAIRYLAND
ELECTRICAL INDUSTRIES

www.dairyland.com • marketing@dairyland.com

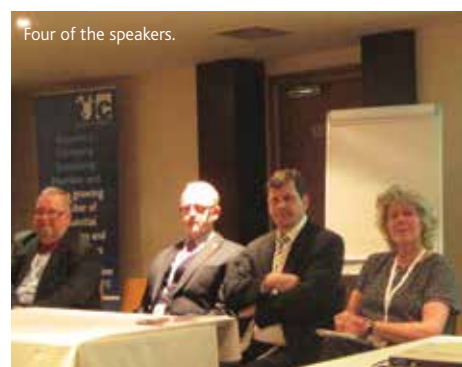
CED WORKING DAY AND SYMPOSIUM ON CORROSION ASPECTS OF ASSET INTEGRITY MANAGEMENT AND LIFETIME EXTENSION, PALM COURT HOTEL, ABERDEEN, 26TH MAY 2015



Carol Devine addresses the audience.



A cross-section of the members.



Four of the speakers.

A total of 45 delegates attended this Working Day, organized jointly between the Corrosion Engineering Division and the Aberdeen Branch of the Institute of Corrosion. It was held at the Palm Court Hotel in Aberdeen, the usual venue for Aberdeen branch meetings (in fact a joint NACE/Aberdeen Branch meeting was held the same evening - see separate report). There were seven exhibitors including the ICorr stand. One purpose of this meeting was to bring the Aberdeen branch more into the fold. They are a strong and dynamic branch but their geographical position rather mitigates against attendance by them at other ICorr events and vice versa. In this aim the meeting was successful. Also another aim was to allow networking with other corrosion professionals from different industry sectors, to learn about some of the latest developments in the field of lifetime extension and asset management. This was also achieved. Normally all of the CED working groups (monitoring, Nuclear, Coatings, CP, Corrosion in Concrete, Oilfield

Chemicals and Water Treatment) meet at these annual CED days. However due to the unavailability of chair people, only two of the CED Working Groups (Nuclear and Coatings) held meetings. These were well attended and some very useful business was conducted. Regarding how some of the less active work groups could become more active and involve people from Aberdeen branch, a proposal has been made by Peter Allison to change the focus for working group activity in the oil and gas industry by forming one group which would focus on "Corrosion issues in the Oil and Gas industry". This would mean that two industry sectors, Nuclear and Oil and Gas had focused working groups rather than the previous functionally focused groups. This new group would include all of the current oilfield chemicals and oil and gas related monitoring activity. The consensus of the attendees present agreed this was the best way forward and discussions are taking place into how this could be implemented and opinions are

welcome. Going back to the meeting, as usual there was a pleasant buffet lunch and also there was a round up question and answer session at the end at which four of the five speakers were present. Companies exhibiting included Sherwin Williams, Corrocoat Ltd, Spencer Coatings Limited, North East Corrosion Engineers, Galvanisers Association, Proserve, and the Institute of Corrosion.

Nick Smart (AMEC) welcomed the delegates. The first lecture, entitled 'Role of corrosion engineering relating to offshore ageing & life extension, maximising recovery, and the EU directive on offshore safety' was given by Andy Duncan from Intertek.

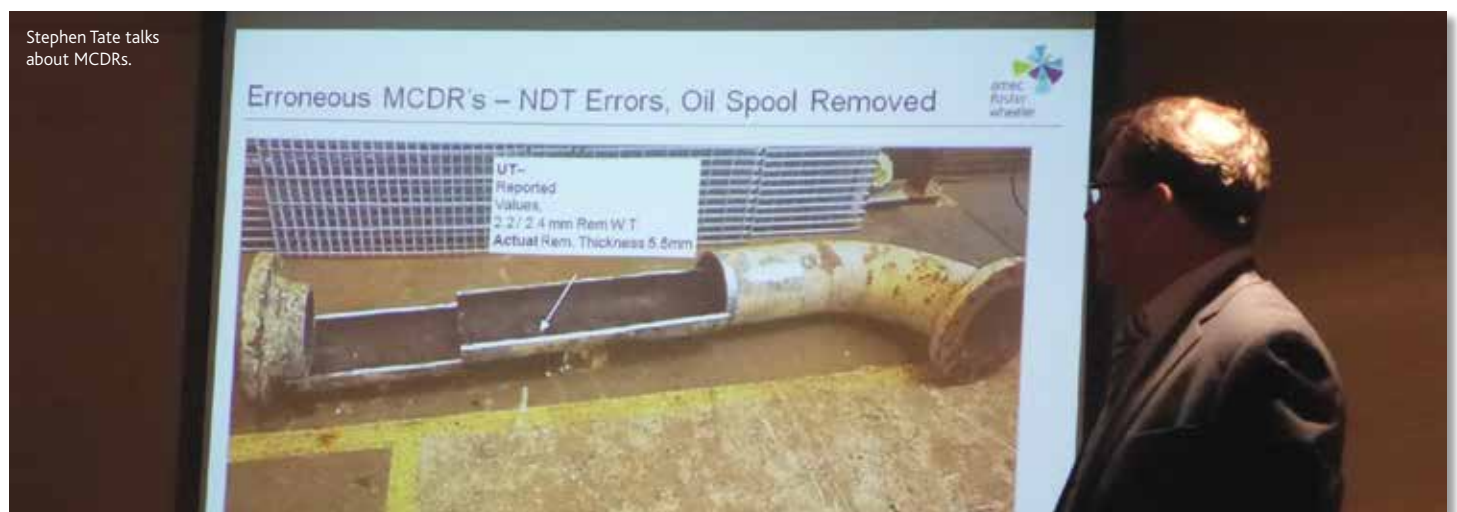
This was an entertaining talk. He started by giving the six laws of corrosion engineering which included including "anything that can go wrong will go wrong"; and "nature always sides with the hidden flaw". He also indicated the rather low esteem in which corrosion as a subject can be held in some quarters

with a quote: "Mr Duncan, we do not have a corrosion problem, we have a maintenance issue", (this despite the fact that nearly 80% of problems are corrosion related!). Andy stressed how important it is that integrity management and the role of the corrosion engineer are recognised by users, employers and by regulatory bodies. Next Martin Worth from Plant Integrity Management lectured on 'Assessment of remaining life of ageing equipment with limited information'. This was quite a clever statistically based approach which attempted to put more exact estimates onto lifetimes (and also the chance of failure after a certain time) by combining the variables statistically and including the range and type of statistical variable that it was eg Gaussian, Poisson etc. So if the original wall thickness could be between 8mm and 10mm (average 9mm), External corrosion rate could be 0.05mm/year to 0.2 mm a year (average 0.1mm) and internal similar, Time to coating failure 5 years to 20 years (average 10 years): all these added together led to a



much better statistical based probability of failure at any given time eg after say 20 years the chance of a failure was 50/50. Whereas after say 30 years it could be 99%. After a break for refreshments and look at

the exhibition, the next speaker was Kevin Christie from Amec Foster Wheeler who spoke on, 'Corrosion aspects of lifetime extension in the nuclear industry'. He pointed out that nuclear stations were originally designed





for a 25 year life. But now, with pressure to keep generation levels up, lifetimes are being pushed up to 40+ years. So what does this mean for metals? Plenty of problems! These include creep, irradiation creep, increased oxidation, flow assisted corrosion of steam lines, fatigue; as well as metals deterioration of non-metals like graphite, polymers and concrete. But he was confident that these risks can be assessed and managed. He took as a specific example O ring study for PWRs. This was followed by Carol Devine from North East Corrosion Engineers (NECE) who spoke on, 'Microbiological aspects of corrosion control associated with extended field lifetimes'. The aim of the oilfield microbiologist is to generate useful and appropriate data in order

to predict at which locations eg in pipework where there is a particular threat from MIC, to prioritise areas for treatment according to budget and time restraints and to apply and monitor appropriate strategies to mitigate against the effects of MIC in vessels. Examples were given to illustrate these areas. There was then a lunch followed by the afore mentioned working party meetings. The final lecture, 'Analysis of materials and corrosion damage reports (MCDRs) for ageing assets' was delivered by Stephen Tate from Amec Foster Wheeler. This commenced with a shocking 15 minute video showing a very horrendous number of corroded items in the North Sea situation. (This should be compulsory watching for all decision makers eg MPs

and Lords!). He then went on to describe MDCRs in detail: how they are ranked, how defects can be grouped, how some MDCRs are erroneous and some are missed, how some need to be monitored and how eventually a MDCR might be liquidated. He gave as an example of an erroneous MDCR an oil spool removal where the thickness was actually over twice what had been recorded by ultrasonics (2.2-2.4 mm when actual thickness was 5.5 mm (see picture)) The session finished at 4:30 pm with a Closing Panel Discussion, chaired by Nick Smart. In conclusion he thanked the Speakers, Aberdeen Branch for hosting the event and the delegates for attending.

By Douglas J Mills, Technical Secretary

NORTH EAST BRANCH NEWS

NORTH EAST BRANCH CONTINUES TO GROW

Two further meetings of the North East branch have taken place in May and July 2015 with attendance numbers continuing to increase. The branch had its highest number of attendees in July since it reopened earlier this year with over 35 people coming together.

North East Branch Secretary Gemma Malthouse commented "We're thrilled to have such a great response to the North East branch. We have had lots of interest from

local businesses and we're really grateful for the support we have received from the likes of Macaw Engineering and Newcastle University who have helped us by hosting the last two events".

"One thing that is key is the networking and opportunity to ask questions" added Neil Wilds, Branch Chair. "Having such a variety of people in attendance across different areas of the industry and with varied experiences

in the room we're seeing a lot of discussion following on from the presentations and new connections are made at every meeting".

The next meeting will be hosted at Macaw Engineering on Tuesday 8th September – to receive more information contact icorne@outlook.com

We hope to see you there!

NORTH EAST BRANCH MAY PRESENTATION

Doug Gilbert a corrosion consultant from Safinah gave a very well received presentation on Ballast Tank Corrosion and the IMO PSPC regulations. The presentation described in detail the corrosion issues found in ballast tanks and cargo tanks including;

1. Galvanic corrosion
2. Knife edging cracks
3. Reverse impact damage
4. Erection weld brake down
5. Holidays and missed areas
6. Corrosion of outfitting items
7. Weld & edge corrosion

This coupled with Doug's vast experience and numerous pictorial examples lead to lots of technical questions from the audience. A number of people in attendance were quite surprised by the level of information which is detailed in Coating Technical Files which are completed during construction of the ship and then follow the ship for the rest of its life. There was an interesting discussion on the merits of introduction of the IMO PSPC regulations especially the fact that increased costs that have been born by the owners, yards and coating suppliers whereas the beneficiaries of this investment have been the class societies, coating inspectors and coating test houses. The presentation ended with a summary that we still don't know what effect the IMO is having on the long term quality. This is because the same coatings that were being applied pre IMO are still in use having passed all of the prequalification tests. In the end it was recognised that that this has definitely been a good way to improve the standard of anticorrosion in ships but still there needs to be more done.'



NORTH EAST BRANCH JULY PRESENTATION

George Winning, Premier Oil, gave a very informative talk on the challenges for materials selection in Oil & Gas projects in remote locations. Some of the key challenges presented were;

- Safety
- Local environment
- Self Sufficiency
- Geopolitical Issues
- Enhanced Corrosion performance



Critically the key theme throughout the presentation was the need to have everything for the project at the project site and the need for long term reliability. This will include the necessity to build a laydown area and warehousing for all the equipment and supplies, and the logistics of housing personnel required for the project. Items such as subsea packages would need to be fully fabricated to be instantly installed rather than fabricated at project site. The

issues of having competent staff available are also a real challenge. Regarding any repairs if things go wrong and repairs are required they don't have the ability to draw from a 'Repair Club' like they have in the North Sea so there is need to keep repairs and failures to a minimum. The supply chain issues mean that if spares are needed they need to ship them from other areas which can take to 2-3 months in some cases unless local supplies are kept.

This all results in an upfront investment with increased CAPEX to reduce repairs and failures during operations. With increased CAPEX life cycle costs still need to be controlled so it is vital that operating costs must be kept to a minimum. This from a materials point of view drives the design decisions towards the use of corrosion resistant alloys (CRA's) which in the right circumstances give very long performance. However with CRAs other issues such as cracking pitting and crevice corrosion still need to be addressed to ensure the correct material is used for the environments to be encountered.

The night will also be remembered for the fact that the difference between seals and sea lions are that sea lions have ears and seals don't!

INSTITUTE OF CORROSION PROVIDES THE NEW PRESIDENT FOR CEOCOR

During the CEOCOR meeting in Stockholm in June 2015 our Past President, Brian Wyatt, was elected to be President of CEOCOR for a three year term until the middle of 2018.

CEOCOR is the European Committee for the Study of Corrosion and Protection of Pipes and Pipeline Systems. It addresses, in particular, corrosion and protection of buried drinking water, waste water, gas and oil pipelines. CEOCOR was founded in 1956 and became an International, non-profit, scientific association in 1981. It has membership from most European countries representing universities and research centres, water, waste water, oil and gas companies, producers of pipe, coatings and cathodic protection systems.

Its objectives are to foster international exchange of experience and expertise in an independent manner, to provide scientific and technical guidance publications and to contribute to European and International Standards. This work is divided into 2 Commissions; Commission 1 addresses Internal Corrosion of water and waste water pipelines and Commission 2 addresses External Corrosion and Cathodic Protection of water, gas and oil pipelines.

CEOCOR publishes its own documents and many excellent papers have been published at the annual Congress of CEOCOR and can be accessed by Members via the web site. The Institute of Corrosion has been a member of CEOCOR for many years; latterly David Harvey has been our representative.

Brian Wyatt is both an individual Member and ICorr's (and UK's) representative to CEOCOR and first attended the Congress and Technical Exhibition, in Florence in June 2013. Subsequently he and the then President of ICorr, Trevor Osborne, represented ICorr at the Congress and Technical Exhibition, in Weimar in June 2014. Brian has attended the 'Autumn Days' meetings in Brussels in 2013 and 2014; Chris Lynch also attended the latter on behalf of ICorr. Now that Brian is President of CEOCOR, ICorr will nominate a replacement for him as UK's representative to the CEOCOR Board.

Brian Wyatt, President of CEOCOR.



CEOCOR's main activity, in addition to its very high quality, high technical standard Congress papers, is in the Work Groups of the two Commissions. These function as open technical exchanges for field and laboratory experience, data and technical opinion; they are very significant meetings for joint learning and technology advance. One of their objectives is to prepare pre-standard documents within the field of competence of the Commissions. Past documents in the field of cathodic protection of buried pipelines have included the 2001 publication on ac corrosion, by far the best document on this subject at that time. More recently the 2013 document on the use of coupons and probes for CP monitoring purposes presents the technology and best practice in this field. Current work includes preparation of pre-standard documents on remote monitoring, instant off potential measurement techniques and reference electrodes. There is also a liaison group in respect of Certification. In Commission 1 the activities relate to internal corrosion, water quality, asset management and renovation techniques and microbial corrosion in sewer systems.

ICorr wish to encourage our Members to participate in both the Congress and the Work Groups of CEOCOR. Any Members wishing to receive more information can access the CEOCOR web site <http://ceocor.lu> or contact Brian Wyatt brianwyatt@controlcorrosion.co.uk. **Membership of CEOCOR is open to all. Attendance at the Congress (including the Work Groups) and participation in the 'Autumn Days' Work Group meetings is open to all.**

CEOCOR 2016 Congress is in Ljubljana, Slovenia from 17th to 20th May 2016; the 2015 'Autumn Days' Work Group meetings are in Brussels 24th to 25th November 2015.

The recent meeting in Stockholm was attended by participants from throughout Europe and also from Australia, Canada, South Africa, USA and Japan. A truly International meeting organised by a truly collaborative, International, non-profit making body. The most common comment from those who attend their first CEOCOR meeting is: 'This is the best technical meeting I have been to in years; I wish I had participated years ago.'

TO ADVERTISE IN CORROSION MANAGEMENT
 please contact Jonathan Phillips or Debbie Hardwick at:
 Square One +44 (0)114 273 0132 enquiries@squareone.co.uk

ICORR ABERDEEN JOINT MEETING WITH NACE

MONITORING OF ORGANIC COATINGS USING ELECTROCHEMICAL METHODS



A cross-section of the members.

The May meeting was a joint session with the National Association of Corrosion Engineers (NACE) and was held on the 26th of May 2015 at the Palm Court hotel Aberdeen. The Annual General Meeting was held during this session and the last technical presentation of the 2014/2015 season was delivered by guest speaker Douglas Mills of the University of Northampton.

In the introduction, Douglas stated that the aim of on-site coating monitoring was to get a numerical indication of the coating's protection ability at a specific time, determine how much protection was left and estimate how fast it

is deteriorating. He explained the principles and application of various electrochemical techniques for monitoring coating systems in the laboratory. These techniques include DC Resistance, Electrochemical Impedance Spectroscopy (EIS), various scanning techniques, DC Current interrupter technique and Electrochemical Noise Method (ENM). He explained that the 'challenge' was transiting promising techniques with proven laboratory application to robust field application. For this to be possible, he observed that the technique would have to be portable, non-intrusive, fast, accurate, easy to interpret and leave no

long term change to the area examined. The presenter then focused on the Electrochemical Noise Method (ENM) giving a brief history of the technique and explaining in some detail the working principles of the method.

With illustrative photographs, the Dr Mills covered some case studies of how the technique had been applied with considerable success including being used for coating in an aircraft carrier, on a pier leg and other applications. In each case, he presented the results with interpretation comments. The presentation concluded by identifying improvement work for the future. This included development of a hand held unit with a paintometer which can be attached to structure, calibration techniques, automation of the system, improved delamination measurement and indication of the presence of active corrosion under the coating.

After the meeting, there was a Question and Answer (Q&A) session with discussion on various aspects of the presentation. 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>.



Chair makes a call for speakers during the meeting.



Guest speaker explains point.

PITTING AND CREVICE CORROSION RESISTANCE OF A NI-BASED ALLOY IN SYNTHETIC SEAWATER

Almabrouk Omar Aboulqasim: Corrosion Department, Sirte Oil Company Brega, Area 2, Libya.

ABSTRACT

Ni-Cr-Fe alloys are used in a wide variety of corrosive environments, and commonly in seawater, an aggressive and complex environment. The performance of these alloys is often characterized by investigating the pitting and crevice corrosion tendency.

This study presents the results of pitting and crevice corrosion resistance of Alloy-X750 based upon, accelerated electrochemical potentiodynamic polarization scans and immersion tests, respectively. Pitting tests were conducted in naturally aerated artificial seawater, at different temperature ranges from 4 to 50°C. At 20°C and above, the alloy suffered from pitting corrosion. It has been also found that as temperature increases, pitting potential decreases to more active values. However, in terms of dimensions and number of pits, it has been observed that as temperature increases, the number of pits decreases while their size increases.

At lower temperatures (10°C and less), the alloy exhibits transpassive dissolution rather than pitting corrosion. However, small pits were observed in the transpassive region, which has been also reported elsewhere¹. Critical Pitting Temperature (CPT) measurements revealed that CPT of the alloy lies between 11 and 20°C.

During potentiodynamic polarization measurements, ennoblement in corrosion potential with time was noted, and no steady state corrosion potential was attained, even when the test coupons were immersed in solution for more than 3 days prior to polarization.

Crevice corrosion tests were also carried out through long-term exposure in stagnant artificial seawater for 30 days at two different temperatures (25 and 40°C). The alloy did not suffer from crevice corrosion under the tested conditions. This may indicate that the alloy under crevice tests performs better, compared to accelerated electrochemical pitting tests.

INTRODUCTION

Corrosion resistant alloys (CRAs) are used extensively in the oil and gas industry and are a preferred choice when corrosion protection of carbon steel, in aggressive environments is considered unfeasible. Seawater is one of these environments and can cause severe general corrosion to carbon steel. Although CRAs do not generally suffer from general corrosion in seawater, they may deteriorate significantly due to more damaging localized, pitting and crevice corrosion (and stress corrosion cracking (SCC) in the presence of stress).

Alloy X-750 is a high corrosion resistant nickel base super-alloy, used extensively for high temperature services, as well under ambient temperature conditions in seawater environments. Recently, a number of failures of this alloy have been reported in seawater environments due to pitting and crevice corrosion damage. This current study was intended to provide an initial evaluation of the alloy's corrosion properties notably to investigate the pitting and crevice corrosion resistance of the alloy in seawater at different temperatures (from 4°C equating to seabed temperatures, to 50°C at risers piping systems).

Cyclic Potentiodynamic Polarization tests were conducted in synthetic seawater solution, to evaluate pitting resistance by characterizing the pitting and repassivation potentials. Critical Pitting Temperature (CPT) was also targeted in this work, another means of alloy's evaluation. CPT measurements were conducted electrochemically through both potentiodynamic and potentiostatic polarization tests.

An attempt to recognize probable pit nucleation sites that are thought to be responsible for failure due to pitting was implemented with the aid of optical and electron microscopy with (EDX) analysis. A semi-quantitative measurement of the degree of pitting attack on selected pitted sample was conducted by

interference microscopy to determine pit size, depth and volume.

Finally, crevice corrosion resistance was evaluated through long-term exposure tests in artificial seawater solution with two types of non-metallic crevice formers at 25 & 40°C, for 30 days.

EXPERIMENTAL PROCEDURE

The samples were extracted from solid round bar made up of alloy UNS N07750. The nominal chemical composition is given in table 1 below². Initially, the workpiece was cut into circular slices perpendicular (transverse) to the rolling direction. All samples were tested in the as-received (mill-annealed) condition.

Pitting Corrosion Tests

For pitting tests, several samples were cut into rectangular shapes of approx. 1cm², spot welded on the back face to an electric wire for electrical connection, and cleaned before embedding in epoxy resin with a plastic tube to isolate the wire from the electrolyte. The sample was then wet ground successively with 240,400 and 600 SiC grit paper, followed by degreasing with acetone and deionized water rinsing. To avoid the presence of fine crevices at the electrode-resin interface, the edges of the metal were masked with a quick-cure epoxy resin, leaving an exposed area of approx. 0.85 cm². Thus, after grinding to 600 SiC grit, all test samples were left in air for 2 to 16 hrs before introduction into the corrosion cell. Cyclic potentiodynamic polarization (CPP) was conducted in a 1L capacity, three-electrode polarization cell. A platinum counter electrode was used and the potential was measured against a saturated calomel electrode (SCE) connected to the cell through a salt bridge (Luggin probe) filled with the test electrolyte. Following immersion in solution, the open circuit potential (OCP)

Table 1: Chemical composition of alloy UNS N07750.

Test solution, used in all tests, was substitute ocean water, prepared in accordance with ASTM D1141.

Element	Ni + Co	Cr	Fe	Ti	Al	Nb + Ta	Mn	Si	S	Cu	C	Co
Wt%	73.0	15.5	7.0	2.5	0.7	1.0	1.00 max.	0.50 max.	0.01 max.	0.25	0.04	1.00 max.

was monitored for 1hr before polarization. A potential scan was started with a scan rate of 0.5mV/sec.; and current density recorded as a function of potential. The onset of localized corrosion was marked by a rapid increase of anodic current. The potential scan was reversed when a current density of 6mA/cm² was reached. The reverse scan continued until the hysteresis loop closed or the original start potential was reached. Pitting tests were performed at different temperatures, notably, 4, 10, 20, 30, 40 & 50°C. The corrosion cell was immersed in a thermostatted water bath for temperature control, and a thermometer inserted in the cell test solution to monitor the temperature during the test. As a minimum, duplicate samples were tested at each temperature. Following potentiodynamic tests, pit morphology was observed using an optical microscope and a scanning electron microscope (SEM) with energy dispersive x-ray spectroscopy for chemical analysis.

Crevice Corrosion Tests

Four samples, from the solid bar, were cut into 4mm thick slices, with a diameter of

56mm. Each sample was drilled with a 10mm diameter hole and marked for identification with an engraver. Samples were ground to 120 SiC grit, followed by cleaning with acetone and rinsing in deionized water. Before crevice assembly, all samples were weighed. Two types of non-metallic crevice formers were used: Continuous plateau PTFE multi-crevice assembly (figure1) and Serrated plateaus (with grooves) acrylic glass multi- crevice assembly (figure 2). Dimensions of such crevice formers are shown in figures 3 & 4 respectively.

Crevice samples were assembled with metal fasteners (nut-and-bolt type), made of 316 stainless steel, to ensure secure crevice assembly (figures 5 & 6). To avoid contact with electrolyte and electrically insulate the metallic fastener from the test specimen, the fastener and nut were coated with epoxy. To provide consistency in tightening, all crevice assemblies were tightened by a torque wrench applying a torque of 8.5 N-m.³

Two specimens were immersed in 1.8L of artificial seawater, and supported in the container by mounting with plastic string using the crevice former free ends (figure 7).

The interface between crevice former and nickel alloy was not pre-wetted with seawater or treated with any other substance prior to initiating crevice corrosion experiments. Crevice corrosion tests were performed at 25 and 40°C, with the two types of crevice formers placed in the same solution (figure 7). During exposure, the test was monitored at intervals for any indication of corrosion. After 30 days exposure in naturally aerated synthetic seawater solution, the four samples were extracted and analysed for signs of corrosion.

RESULTS

Cyclic Potentiodynamic Polarization (CPP) Measurements

Table 3 (on the next page) summarizes the measurements of pitting characteristics i.e. pitting potential and repassivation potential. The measurements were conducted at different temperatures.



Figure 1: Photograph of PTFE continuous plateau crevice former.

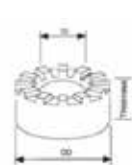


Figure 2: Photograph serrated acrylic glass crevice former.



Figure 3: Schematic of PTFE continuous plateau crevice former, Dim. in mm.

Dimensions of crevice geometry for both formers are given in table 2 below:



ID	OD	Thickness	Number of Slots	Groove Dimension	
				Depth	Width
Wt%	73.0	15.5	7.0	1mm	2.9mm

Figure 4: Geometry and dimensions of the serrated acrylic glass MCA.

Table 2: Dimensions of Crevice Formers

Type of crevice former	Crevice area (cm ²)	Wetted area (cm ²)	Area ratio	Crevice depth (cm)
Continuous	5.1	48.2	1: 9	0.47
Serrated	3.0	50.3	1:16	0.65



Figure 5: Photograph of crevice assembly; continuous plateau.



Figure 6: Photograph of assembly; serrated plateau.



Figure 7: Photograph of crevice samples immersed in solution.

Table 3:
Various characteristic putting parameters obtained from CPP as a function of temperature.

Test Temp. (°C)	Number of tests	E_{np} (mV) $SCE(25^{\circ}C)$	E_{pr} (mV) $SCE(25^{\circ}C)$
4	2	Transpassive dissolution	
10	2	Transpassive dissolution	
20	3	493 ± 03	191 ± 02
30	2	508 ± 78 (Standard Deviation)	161 ± 27 (Standard Deviation)
40	2	444 ± 02	122 ± 08
50	2	444 ± 44	085 ± 02

At higher temperatures, $\geq 20^{\circ}C$, alloy suffers from pitting, as shown in polarization curves figures 8A-D.

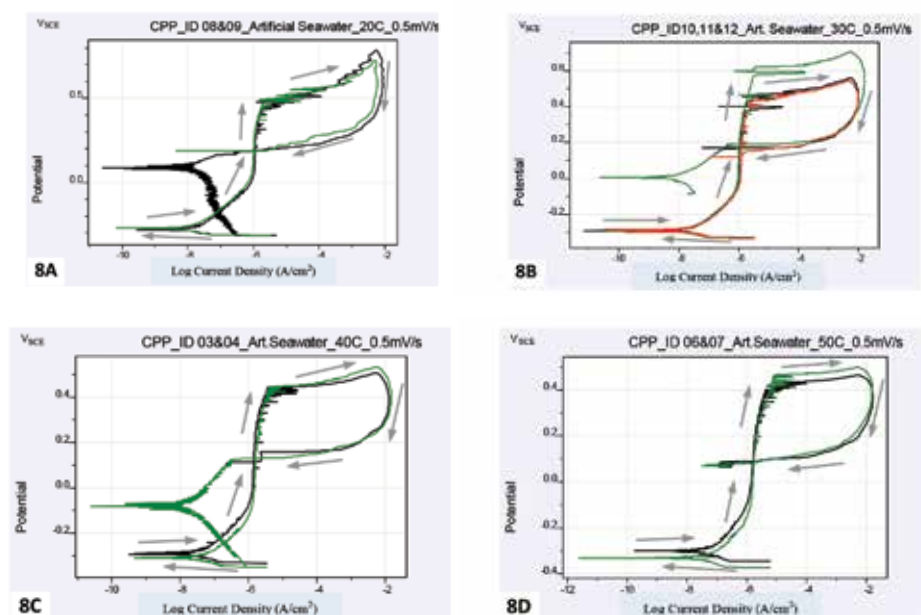


Figure 8: CPP curves of tests in normal aerated artificial seawater, scan rate 0.5mV/s, at: A) 20, B) 30, C) 40 and D) 50°C

At low temperatures (4 & 10°C), below the CPT, no pitting corrosion was observed. Rather, the alloy undergoes transpassive dissolution, where the whole passive film dissolves in solution at high overpotentials, resulting, overall, in general corrosion of the surface. This was confirmed visually by observation under the optical microscope (figure 9), where the surface was uniformly attacked to a large extent. However, there exist pits (several 10s of microns in size) at the surface (figure 10). This is supported by the metastable events observed from the polarization curve.

A further feature of transpassive dissolution is the preferential attack at the grain boundaries (figure 10), which results from higher reactivity of grain boundaries relative to grains.⁴ being a result of preferential segregation of various solute elements or the precipitation of metal compounds at the grain boundaries⁵.



Figure 9: Optical macrograph of transpassive dissolution, polarised at 10°C, 0.5mV/s.

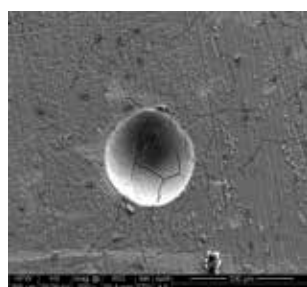


Figure 10: SEM micrograph of a pit at transpassive dissolution, polarised at 10°C, 0.5mV/s, before cleaning.

Effect of Temperature on Pitting Characteristics

The dependence of the pitting potential on the electrolyte temperature is summarized graphically in Figure 11 where a negative shift 70mV shift in E_{np} in the active direction was observed as the temperature increased from 20 to 50°C. The decrease in pitting potential with temperature suggests an increased instability of the protective film at higher temperatures due to accumulation and stronger chemisorption of chloride ions on the metal surface, causing easier breakdown of the passive film.^{6,7} It was also observed from analysis of the polarisation curves, that the temperature has an effect on the passive current density of alloy in the naturally aerated artificial seawater. The passive current density tends to increase with increase in temperature. Rosenfield postulated that this effect is possibly related to the fact that hydrolysis of anodic dissolution products takes place very readily at higher temperatures.⁸

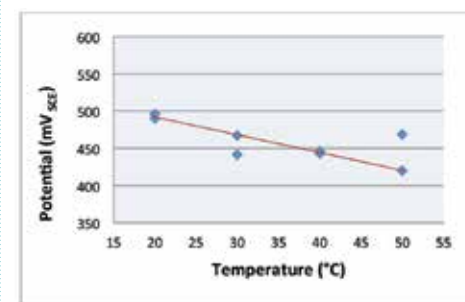


Figure 11: Dependence of E_{np} on temperature; normal aerated artificial seawater, scan rate 0.5mV/s.

Critical Pitting Temperature (CPT)

It was derived from cyclic potentiodynamic polarization experiments that the CPT lies between 10 and 20°C. Further investigations of CPT using potentiodynamic polarization at 12, 14, & 16°C revealed that: $10^{\circ}C < CPT \leq 12^{\circ}C$. Interestingly, however, potentiostatic determination of CPT at 700 mV and 500mV suggests that the CPT is 5 and 6°C, respectively, see figure 12.

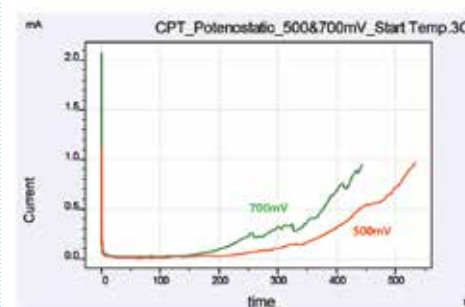


Figure 12: Potentiostatic CPT determination using 500 & 700mV_{SCE}. Starting temperature 3°C, Temp. ramp 1°C/min, CPT determined at 200µA/cm².

This difference in the value of CPT between Potentiodynamic (12°C) and potentiostatic (6°C) methods is more likely to be due to a crevice effect at the metal-epoxy interface causing premature corrosion activity below the actual CPT in the case of potentiostatic methods as it has been revealed, under optical microscopy, that corrosion was observed at the interface between the metal and epoxy-resin. Based on this, and without further investigation being conducted, potentiostatic results were discarded. Thus, it was considered that the CPT lies between 10 and 20°C.

Pit morphology studies

Above Critical Pitting Temperature

Hemispherical pits were observed (after potentiodynamic polarization above E_{np} , up to current densities of 6mA/cm², with a sort of lace-like cover at the edge, i.e., a thin metal membrane with a relatively large hole (due to high applied potential) at its centre and numerous randomly distributed small holes, as shown in figure 13. This may indicate that the pit started at a precipitate/inclusion and then it has grown radially under the metal surface away from the precipitate/inclusion; further surface penetration comes from underneath, producing the lace-like structure that extends from the precipitate/inclusion.⁹ Formation of this membrane may indicate that the passive film on UNS N07750 is selectively attacked and corrosion continues below the surface of the film¹⁰.

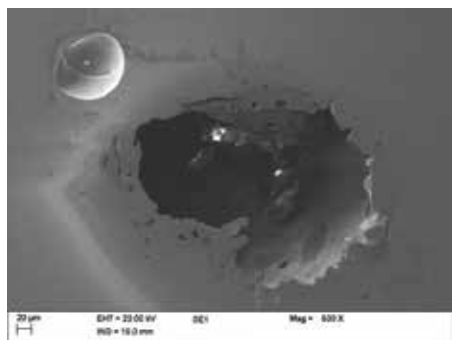


Figure 13: SEM micrograph of a pit showing thin metal membrane; polarized at 30°C, 0.5mV/s, before cleaning.

Below Critical Pitting Temperature

Open hemispherical pits were found (figure 14) in the alloy after being polarized to high potentials (approx. 1V_{(SCE)(25°C)}). This may indicate that the thin membrane, that was observed at higher temperatures > CPT (figure 13), has been attacked by the aggressive anions under high potentials. It was also noticed that internal sides of pits formed, at low temperatures (below CPT) in the transpassive dissolution, are honeycombed to some degree with many facets, i.e., the inside walls of pits are crystallographic (bounded by crystallographic planes).

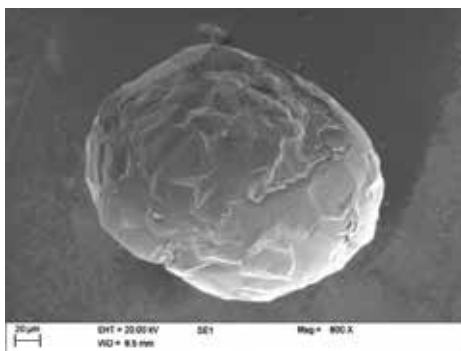


Figure 14: SEM micrograph of a pit showing open pit morphology without lacy cover, at 10°C, 0.5mV/s, Transpassive Dissolution.

H. Pickering & R. Frankenthal observed a similar case with Fe in HClO₄; and postulated that the faceted structure is an expected feature of active dissolution from a film-free surface under conditions for which the rate is controlled by the removal of atoms from the surface i.e. activation controlled.⁹ The formation of these facets inside the pit indicates anisotropic dissolution of the alloy. Z. Szklarska-Smialowska suggested that the pit is formed on different grains having different orientations.¹

Pits depth and size

Two arbitrary selected pits were analyzed using interference microscopy to determine their approximate depth and size. Dimensions of samples obtained by the white light interferometry are given in table 4 (below). Pits were formed on the sample tested at 50°C, where the reverse potential scan commenced at 6mA/cm².

Microstructural Characterization and Pit initiation Site

In an attempt to understand the pit nucleation sites of alloy UNS N07750, optical and electron microscopy and EDX analysis was conducted on an etched sample prior to, and after, polarization in solution. The microstructure of the as-received sample consists of equiaxed grains of FCC-matrix (gamma matrix, with annealing twins), containing large μ m size blocky or cuboidal inclusions. Smaller precipitates were seen at the grain boundaries

and in the grain interior¹¹ (see Figures 15 A and B). Note microstructures were revealed by electro-etching in 5% Nital at 8V for 10s. EDX analysis of one precipitate identified the precipitate as a mixed Ti carbide, Ti,Nb(C,N) (figures 16 A-K).

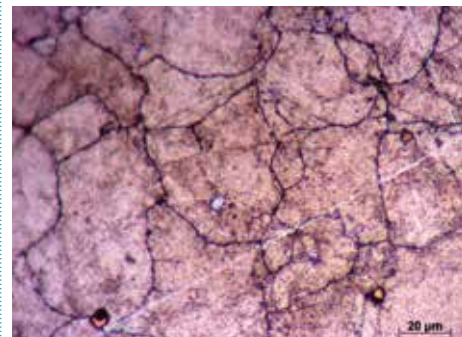


Figure 15A: Optical micrograph of showing precipitates at grain boundaries and in the grain interior.

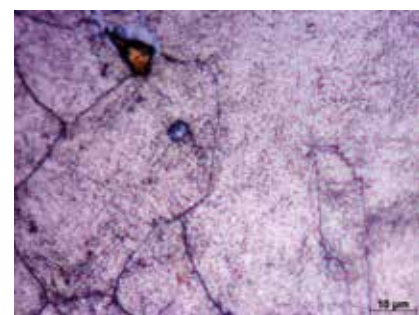


Figure 15B: Optical micrograph showing annealing twins and precipitates at grain boundaries and within the grain interior.

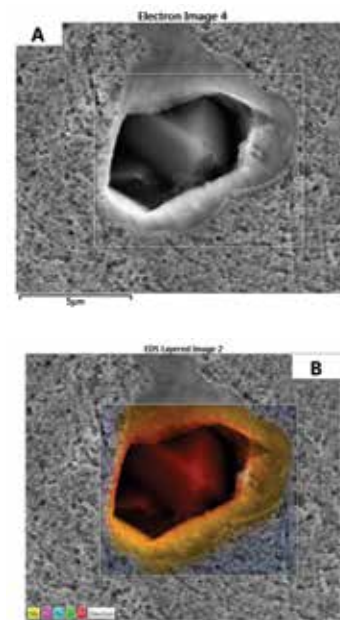
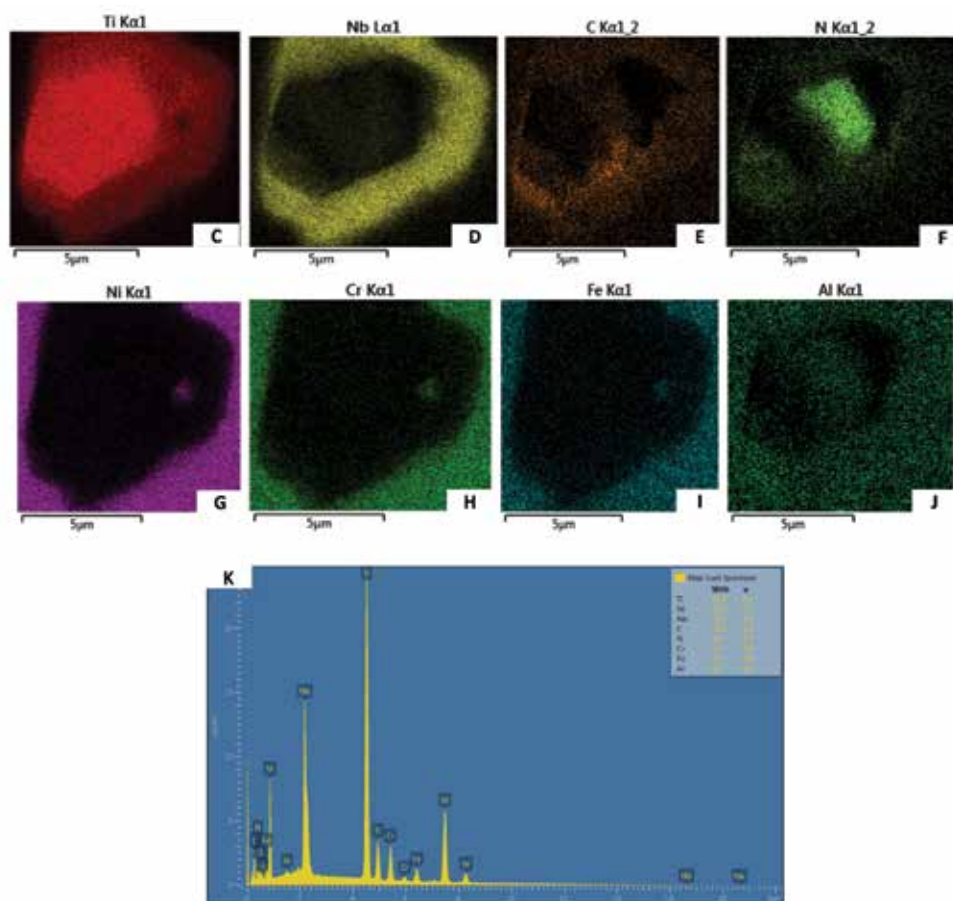


Table 4:
Dimensions of two selected pits.

No.	Temp. °C	Pit depth (μm)	Pit diameter (μm)	Pit volume (mm ³)	Weight loss(1) (μg)
Pit_01	50	137	518	0.014	116
Pit_02	50	199	186	0.010	83

(1)Density = 8.28g/cm³



Figures 16A-K EDX mapping analysis showing the elemental composition of a precipitate found in the matrix; After polarization in artificial seawater.

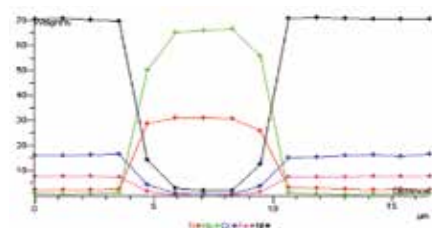
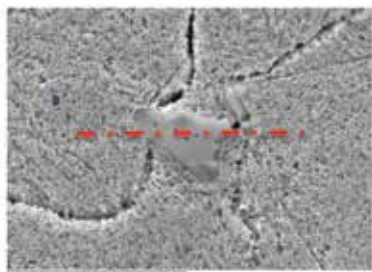


Figure 17: SEM image (left) showing analysis location and EDX point analysis (right) indicating the precipitate to be rich in Ti-Nb-. Note line colour; Black=Ti, Green=Nb, Red=Fe, Pink=Cr.

Figure 17 shows an example of another precipitate within the matrix, which on analysis was found to be rich in Ti-and-Nb.

Crevice Corrosion Immersion Tests

Following immersion of 4 crevice samples, in naturally aerated artificial seawater at 25 and 40°C, for 30 days, no apparent corrosion on the surface was observed from optical

microscopy and it was concluded that alloy UNS N07750 did not suffer from crevice corrosion under these conditions. These results seem to be inconsistent with electrochemical pitting measurements, which show that alloy UNS N07750 is not highly resistant to pitting corrosion with pitting potential E_{np} less than 500mV_{SCE(25°C)} and relatively low CPT (10 to 20°C). This may be due to the nature of the test methodology and development and improvement of the protective properties of the passive film. In the case of accelerated electrochemical testing, there is a continual, increasing driving force (potential) for oxide film breakdown, where this is not the case for the long-term crevice test that is conducted at 'constant' open circuit potential. Degerbeck¹² compared field tests with potentiodynamic pitting potentials and chemical pitting in various solutions and concluded that the effect of minor deviations in alloy content in stainless steels, on the resistance to localized corrosion in calm natural seawater, cannot be evaluated with any degree of certainty by means of the accelerated electrochemical or chemical tests that were performed. Oldfield¹³ has also pointed out that poor correlation between most of accelerated tests makes it difficult to predict seawater corrosion resistance on the basis of just one accelerated test or to relate different tests to each other. Furthermore it

should not be discounted that 30 days may be insufficient time for electrolyte to ingress into the crevice gap and repeating the tests wherein the crevice sample is configured whilst being immersed within the solution, hence trapping solution within the crevice, rather than being configured in air and then immersed.

CONCLUSIONS

The following conclusions can be drawn from this work:

1. At low temperatures (4 & 10°C), alloy UNS N07750 is resistant to pitting corrosion in artificial seawater.
2. At 20, 30, 40, and 50°C, the alloy suffers from pitting corrosion with pitting potentials of 493, 508, 444 & 444 mV_{SCE(25°C)}, respectively.
3. Potentiodynamic polarization measurements of CPT have showed that CPT of alloy UNS N07750 is in the range of 11-20°C.
4. In the transpassive dissolution of alloy UNS N07750 at low temperatures; small pits were found in the transpassive state with preferential attack at the grain boundaries.
5. At higher temperatures (above CPT), pits were covered with a thin metal membrane (lace-like cover) having a relatively large hole at its centre and numerous randomly distributed small holes. Inside the pit, a polished structure was observed, which is a characteristic of dissolution in the presence of rate-limiting film.
6. Arbitrarily selected pits analysed under interference microscope for dimensional measurement, were 137 and 199µm deep and 518 and 186µm in diameter, reflecting high pit growth rate in seawater.
7. Alloy UNS N07750 was not found to suffer from crevice corrosion when immersed in substitute (non-stirred) naturally aerated seawater at 25 and 40°C, for 30 days. This suggests that the alloy has good resistance to crevice corrosion in seawater under the conditions tested in this study.

ACKNOWLEDGEMENTS

The author would like to acknowledge Sirte Oil Company – Brega/Libya for the financial support and The University of Manchester for access to laboratories and facilities.

REFERENCES

1. Z. Szklarska-Smialowska, *Pitting Corrosion of Metals*, NACE Publication, pp341-342.
2. *ASM Metals Handbook Vol.2, Properties and Selection: Nonferrous Alloys*, pp. 1363-1396.
3. *ASTM Standard G78: Standard Guide for*

Crevice Corrosion Testing of Iron-Base and Nickel-Base Stainless Alloys in Seawater and Other Chloride-Containing Aqueous Environments, 2001.

4. Z. Szklarska-Smialowska, Pitting Corrosion of Metals, NACE Publication, pp92.

5. A. John Sedriks, Corrosion of Stainless Steels, 2nd Edition, p. 231.

6. D. Choi and G.S. Was, Corrosion, Vol. 47, p. 262, 1992.

7. A. John Sedriks, Corrosion of Stainless Steels, 2nd Edition, p. 105.

8. ASM Metals Handbook Vol.13A, Corrosion: Fundamentals, Testing & Protection, pp.236

9. H.W.Pickering on Mechanism of Pit and Crevice Propagation on Iron & Stainless Steels, "Localized Corrosion, NACE-3, R. Staehle, B. Brown, J. Kruger, A. Agrawal, NACE Houston, pp.261-269, 1974.

10. Z. Szklarska-Smialowska, Pitting Corrosion

of Metals, NACE Publication, pp.127-140.

11. O.T. Woo et al., Microsc. Microanal. 17 (Suppl 2), 2011.

12. J. Degerbeck, J. Electrochem. Soc., 1973, 120, 175

13. J. W. Oldfield on Test techniques for pitting, crevice corrosion resistance of stainless steels & nickel-base alloys in chloride-containing environments, International Materials Reviews 1987 Vol. 32 No. 3

FOR ALL THE LATEST CORROSION INDUSTRY JOBS VISIT THE ICORR JOB BOARD

For job seekers

- Over 60 jobs currently being advertised
- Set up job alerts for immediate notifications
- Upload your CV so employers can find you
- Free to use

For employers

- Place your job in front of our highly qualified members
- Over 10,000 visitors every month
- Fill your jobs quickly with great talent

All sustaining members receive a 15% discount.

For more information contact Jonathan Phillips on 0114 273 0132 or email jonathan@squareone.co.uk

INSTITUTE OF CORROSION

Home » Job Board

Job Board

Featured Jobs

- Corrosion Engineer**
Houston, Texas
Stress Engineering Services Inc.
- Corrosion/Materials Engineer**
Cambridge, Other / Non-US
TWI
- Pipeline Integrity Specialist/Technician**
Nederland, Texas
Sunoco Logistics
- Sr. Specialist/Advisor - Corrosion & Materials**
Baton Rouge, Louisiana
Albemarle
- Corrosion Supervisor**
Honey Brook, Pennsylvania
Sunoco Logistics
- Corrosion/Materials Engineer**
Cambridge, East of England
TWI
- Research Associate**
London, London
Imperial College London

[View All Jobs](#)
Institute of Corrosion site map

Job Seekers **Employers**

- Post a Job
- View CV
- Products and Pricing
- Access Your Recruiter Account

POST YOUR JOBS

ALL THE LATEST JOBS IN YOUR INBOX

Questions/Feedback
If you need assistance or have feedback about this service contact customer service

© The Newton Building, St. George's Avenue, Northampton NN2 6JB Tel: 01604 838833 Fax: 01604 838879 Email: info@icorr.org

Website designed and hosted by Square One Advertising and Design

About ICOR	Membership	Professional Development	Training & Qualification	Books	Conferences & Events	Business Directory	Forum	Corrosion Management Magazine	Job Board	Contact Us
Structure of ICOR ICOR Achievements Regional Branches Young ICOR Technical Committees ICOR Awards Contact ICOR Comms	Membership Information Fees Becoming a Member Benefits Ordinary Membership Student Membership Student Membership	Chartered Engineer Chartered Engineer	Introduction CP Certification Scheme In-service Certification Chartered Engineer Chartered Scientist Young ICOR Corrosion Engineering Student Scheme Editorial Council	Latest News Resistant News New Arrivals Conferences & Events				About Corrosion Magazine Advertising Information Books on Order Articles		



WHO WE SERVICE

Offshore/Marine/Renewable Energies/Petro Chemical

OFFICES

Jarrow | Great Yarmouth | Northern Ireland



The Industrial Coatings division offer experienced, qualified and more importantly quality workforce, who have provided solutions for key industry players including Shell, Total & Wood Group.

Services provided include Industrial Blasting & Spraying, Project Management, Fabric Maintenance, Inspection & Supervision, Rope Access, Blade Inspection & Insulation Solutions.



The training division courses are based around the commercial service offerings & more. Including ICATS, Train the Painter, Rope Access & are available at all of our training centres.

Off-site Training

Mobile trainers are available providing training worldwide for companies who require training at their own facilities on location & do not want any 'down time' on their projects.

Custom Built Courses

Tailor made solutions and custom made packaging are available to suit individual company requirements.

Trade Testing

Health & Safety and employee competencies are some of the biggest concerns & risks for all employers & trade tests are highly recommended.

Wescott 'ALPHA' a simulated static oil rig and facilities are used for training & trade tests where our qualified HSEQ & Compliance Officer will audit and verify assessments are carried out correctly.



CONTACT US FOR FURTHER INFORMATION

T: +44 (0) 191 497 5550 E: info@wescottcoatings.com W: www.wescottcoatings.com

Wescott Group | Unit 9 B/C & 10 | Tyne Point Industrial Estate | Jarrow | Tyne & Wear | NE32 3UP

DENSO SEASHIELD 80 PROTECTS MANX OUTFALL PIPE

Manx Utilities in the Isle of Man have installed a new sea outfall pipe at Kirk Michael for the discharge of foul effluent from its treated waste water plant. Hyder Consulting, consulting engineers for the new pipe installation, approached Winn & Coales (Denso) Ltd for advice on a suitable system to protect the joints on the outfall pipe.

Due to the extreme tidal conditions at the exposed location it was decided that Denso SeaShield 80 System would be used, but with an additional application of Denso Glass Outerwrap to combat the severe conditions. The contractor chosen to apply the system was JCK Ltd from Ballasalla, Isle of Man.

Winn & Coales also provided assistance and guidance to JCK Ltd in the application of the system. The successful work was overseen by Homes Grace Consulting Engineers, Hyder Consulting and Manx Utilities.

Denso SeaShield 80 System consists of Denso S105 Paste, Densyl Mastic, Denso Marine Piling



Applying Denso Glass Outerwrap to Manx Utilities new sea outfall pipe.

Tape and Densoclad 70. On this particular application Denso Glass Outerwrap, which is a flexible fibreglass cloth impregnated with a water activated resin, was used as additional protection over other SeaShield 80 systems.

Denso Glass Outerwrap provides a protective coating which offers exceptional mechanical and impact strength for underwater, underground and above ground pipes, flanges and other irregular surfaces.



For further information contact: Winn & Coales (Denso) Ltd, Chapel Road, London SE27 0TR
Tel: 020 8670 7511 Fax: 020 8761 2456 E-mail: mail@denso.net Website: www.denso.net

BAGNALLS WINS FAMILY BUSINESS APPRENTICE 2015

In 2015, Family Business United launched a new campaign to find the 'Family Business Apprentice of the Year 2015'. A nationwide search was undertaken and family businesses from all different industries were encouraged to nominate potential candidates.

Bagnalls, a family owned and managed business, celebrating 140 years in the painting, decorating and coatings industry, nominated three of their promising apprentices for the award. Despite being early on in their careers, each apprentice has demonstrated that they have the skills and commitment to become excellent tradesmen in the future.

Six finalists were shortlisted in total to attend the awards, held on Monday 8th June at the premises of Close Brothers Asset Management, who sponsored the event.

Paul Andrews, of Family Business United explains "All of the finalists were a credit to themselves and the family businesses they represent. Their employers should be congratulated for the time and commitment invested in their apprenticeship schemes. The



Troy Sanderson of Bagnalls (centre) pictured with Paul Andrews of Family Business United and Penny Lovell, Head of Private Clients at Close Brothers Asset Management.

finalists demonstrated great commitment, desire to achieve and willingness to go the extra mile."

"We were pleased to announce Troy Sanderson of Bagnalls as the worthy winner. He impressed us right from the start. He demonstrated his capabilities as a painter, his commitment to being an excellent employee and his desire to deliver great customer service, regularly going above and beyond the role expected of an apprentice."

Troy works as a Painting and Decorating Apprentice at Bagnalls. Established in 1875,

Bagnalls continues to be one of the country's leading painting, decorating and specialist coatings contractors. He attended the event with two of his painting apprentice peers who had also been shortlisted as finalists, Joel Mortlock and Connor Smith.

On winning the award Troy added, "I am absolutely delighted to have won the first Family Business United Apprentice of the Year Award. I would like to thank my employer Bagnalls for giving me an opportunity to pursue a career in painting & decorating and for encouraging me to enter the competition."

Stephen Bagnall, Managing Director of Bagnalls added "It was great to see so many apprentices at today's awards and I am personally very proud that three of our apprentices reached the final judging. All three of our apprentices have demonstrated their commitment to our long standing apprenticeship programme since they joined Bagnalls. It was a wonderful surprise when Troy Sanderson, was named as the overall Family Business Apprentice winner, 2015."



For further information contact: Alfred Bagnall & Sons Limited, 6 Manor Lane, Shipley, West Yorkshire, BD18 3RD
Tel: 01274 714800 Fax: 01274 530171 www.bagnalls.co.uk

BAGNALLS' SITE MANAGER HAS THE WOW FACTOR!

Experienced Site Manager, John Kelleher, has been awarded a WOW award by the Derby Hotels Group for his impressive performance during the external refurbishment of the Caesar Hotel near Kensington Gardens, London.



The WOW Awards are an international staff recognition programme designed to reward nominated staff for doing an exceptional job. The Caesar Hotel General Manager, Lee Melville, was pleased to see that John had been recognised for his professionalism and attitude.

The anonymous nomination, highlighted John's helpfulness, quick response and proactivity, stating that "when things are not quite going to plan, he deals with them, without fuss or complaint."



Left to Right John Kelleher (Bagnalls) Lee Melville Caesar Hotel General Manager.

Bagnalls are undertaking the project as subcontractor to The Lady Builder Ltd, property and construction experts. This award is particularly special as John works for Bagnalls and is not a hotel employee. Steve Mandry, Bagnalls' Branch Manager added "This award is a real testament to how his positive approach stood out and we are really pleased that his hard work and dedication to customer care has been recognised."



For further information contact:

Alfred Bagnall & Sons Limited, 6 Manor Lane, Shipley, West Yorkshire, BD18 3RD

Tel: 01274 714800

Fax: 01274 530171

www.bagnalls.co.uk

BAGNALLS BLAST THEIR WAY TO VICTORY AT THE 2015 PDA AWARDS

At the 27th Annual Premier Trophy Awards of Painting and Decorating Association, Bagnalls were proud overall winners of the Industrial Category Award as well as receiving awards in the Commercial, Decorative and Highly Decorative categories for other painting contracts undertaken during 2014.

Bagnalls' Contracts Manager Bernie Smith and Site Supervisor Kevin Travers collected the Industrial Category Award alongside Taylor Woodrow's Senior Project Manager John Hartley. The award was presented for the outstanding painting and decorating works undertaken to Nottingham Hub Railway Station last year, as part of a £60 million redevelopment project by Vinci Construction / Taylor Woodrow. Bagnalls undertook a wide range of industrial and decorative painting works across the station, however most notably was the ultra high pressure washing/blasting and re-painting of the 111 year old steel roof trusses in the historic Porte-cochère at the station entrance.

Following the win John Hartley commented "I was delighted to witness Bagnalls being awarded the top prize in the 'Industrial' category at the 2015 PDA Premier Trophy Awards for their work at Nottingham Station. This reflected a fantastic job done, I really



Left to Right: Kevin Travers, Bernie Smith, John Hartley, Paul Roughan from Akzo Nobel - holding the cert; John Milne, PDA National President

enjoyed working with the Bagnalls team and for me, this achievement reflects their excellent safe working practice and positive attitude shown throughout the project. The highest quality of workmanship is there for all to see and this has contributed significantly to the transformation of the 111 year-old station into a modern transport Hub, fit for the 21st Century. Well done!"

The awards which took place at the prestigious Plaisterers Hall in London saw Bagnalls scoop several other certificates, these were;

Commercial Category

- Highly Commended Certificate for the major redecoration to the new build Bristol Southmead Hospital.

Decorative Category

- Commended Certificate for the external redecoration to a Grade II listed building at Port Sunlight on the Wirral.

Highly Decorative Category

- Very Highly Commended Certificate for redecoration of Wolverhampton Grand Theatre.
- Highly Commended Certificated for redecoration of Morley Town Hall, a Grade I listed building.
- Commended Certificate for the redecoration of Leeds Civic Hall.

Bagnalls Group Managing Director, Stephen Bagnall said "Being recognised by our Trade Association for the projects we deliver is very important to us as a specialist painting contractor. We are very proud to have won the Industrial category for works delivered at Nottingham Hub as this was a true test of our capability not only in painting but also managing works safely in a very busy station environment and meeting the tight deadlines required by the customer. The finished project is testament to the skills and expertise of our site and management teams."



For further information contact: Alfred Bagnall & Sons Limited, 6 Manor Lane, Shipley, West Yorkshire, BD18 3RD
Tel: 01274 714800 Fax: 01274 530171 www.bagnalls.co.uk

CATHODIC PROTECTION CONSULTANCY SERVICES

BEASY

Ashurst Lodge, Ashurst,
Southampton, Hants, SO40 7AA
Tel: 02380 293223 Fax: 02380 292853
Email: t.froome@beasy.com www.beasy.com

CORROSION CONTROL

3 Ivy Court, Acton Trussell, Staffordshire ST17 0SN
Tel: 01785 711560 Fax: 01785 711561
Email: brianwyatt@controlcorrosion.co.uk
www.controlcorrosion.co.uk

Consultant & Technology

Juldiss Street 12, Atyrau, Kazakhstan, 06001
Tel: +7 701 7571831
Email: consultanttechnology@mail.ru

CORROSION ENGINEERING SOLUTIONS LTD

25 Longman Close, Watford, WD18 8WP
Tel: 01923 490302
Email: info@corrosionengineering.co.uk
www.corrosionengineering.co.uk

CUMBERLAND CATHODIC PROTECTION LTD

GO2 & GO3 The Bridgewater Complex, Canal Street,
Bootle L20 8AH
Tel: 0151 5500015 Fax: 0151 5500016

PRO-TECH CP LTD

Chase End, The Oxhey, Tewkesbury, Gloucestershire GL20 6HR
Tel: 01684 298679 Mobile: 07717 487632
Email: pmsmith@protechcp.com
www.protechcp.com

CATHODIC PROTECTION AND MONITORING

BAC

CORROSION CONTROL

RCSL

CORROSION MONITORING

CATHODIC PROTECTION, INTERNAL
CORROSION MONITORING AND PIN BRAZING
PRODUCTS AND SERVICES

Stafford park 11, Telford, Shropshire, TF3 3AY, UK
sales@bacgroup.com www.bacgroup.com
Tel: +44 (0) 1952 290321
Fax: +44 (0) 1952 290325

CATHODIC PROTECTION CO LIMITED

TRUSt™ Transformer Rectifiers
REFINE™ Reference Electrodes
Cathodic Protection Systems
ELGARD™ MMO Mesh Anodes
CUPRION™ Marine Anti Fouling
RUSTROL Systems

Venture Way, Grantham, Lincolnshire NG31 7XS
Tel: +44 (0) 1476 590666 Fax: +44 (0) 1476 570605
Email: cpc@cathodic.co.uk www.cathodic.co.uk

CATHELCO

Marine House, Dunston Road,
Chesterfield S41 8NY
Tel: +44 (0) 1246 457900 Fax: +44 (0) 1246 457901
Email: sales@cathelco.com www.cathelco.com

CORROCELL LIMITED

17 South Meade, Maghull, Liverpool L31 8EG
Tel: 0151 249 8461 Fax: 087087 92585
Email: dp@corrocell.co.uk

CORROSION CONTROL INCORPORATED

494 Fairplay Street, Rutledge,
Georgia 30663, USA
Tel: +706 557 9624
Email: engineering@corrosioncontrolinc.com



Corrosion Control Services Ltd.

SPECIALISTS IN CATHODIC PROTECTION
Innovation House, Euston Way,
Town Centre, Telford TF3 4LT

Tel: 01952 230900 Fax: 01952 230906
www.corrosioncontrolservices.co.uk



INTERPROVINCIAL CORROSION CONTROL CO. LTD.
Leaders in the Cathodic Protection Industry... Since 1957

SOLID-STATE CATHODIC ISOLATOR®

Mitigation Of AC Induced Voltages • Lightning • AC Fault Current



TEL: 905-634-7751

RUSTROL
SYSTEMS

FAX: 905-333-4313

www.Rustrol.com



Corrosion Control Company AB

Box 72, 268 03 Billeberga,
Sweden

*Your specialist when it comes to Cathodic Protection
Systems for Power Plants, Tank Farms, Pipelines,
Concrete Structures, Harbours, Jetties and Refineries.*

Tel: +46 418 411 900 Fax: +46 418 411 935
Email: info@3ccc.se Website: www.3ccc.se

CORROSION TECHNOLOGY SERVICES EUROPE LTD

TRANSFORMERS, RECTIFIERS,
MATERIALS, C.P. SYSTEMS

11 & 12 Merlin Park, Mildenhall, Suffolk IP28 7RD
Tel: 01638 711955 Fax: 01638 711953
Email: enquirieseu@ctsonline.com
www.ctsonline.com

CATHODIC PROTECTION AND MONITORING

CORRPRO COMPANIES EUROPE LTD

Corrosion Engineering, Cathodic Protection,
Corrosion Monitoring

Adam Street, Bowesfield Lane, Cleveland,
Stockton-on-Tees TS18 3HQ

Tel: +44(0) 1642 614 106 Fax: +44(0) 1642 614 100

e-mail: ccel@corrpro.co.uk

www.corrpro.co.uk

Solid-State DC Decoupling Devices

- Mitigate Induced AC
- Decouple CP Systems
- Protect Insulated Joints
- Isolate Electric Equipment
- Maintenance-Free
- Solid-State
- AC Fault, Lightning Rated
- Third Party Certification



Zone 1 and Zone 2 products certified to
ATEX and IECEx requirements



DAIRYLAND
ELECTRICAL INDUSTRIES

www.dairyland.com

Contact our UK based agent:
DC Materials Supply +44 (0) 1799 860075

DEEPWATER

Offshore corrosion control

Deepwater EU Ltd.

Oak House, Tanshire Park, Shackleford Road,
Elstead, Surrey, GU8 6LB

Tel: +44 (0) 1483 600482

www.stoprust.com

DUVINE LTD

DC POWER SOLUTIONS

Sturmer Road, Haverhill, Suffolk, UK, CB9 7UU

Tel: +44 (0)1440 706777 Fax: +44 (0)1440 762810

e: sales@duvine.co.uk www.duvine.co.uk

IMPALLOY LTD

Bloxwich, Walsall, West Midlands, WS3 2XN

Tel: 01922 714400 Fax: 01922 714411

Email: sales@impalloy.com www.impalloy.com

Matcor

101 Liberty Lane, Chalfont, PA 18914

Tel: 800 523 6692 Fax: 215 348 2699

Email: matcorsales@matcor.com

Website: www.matcor.com

MCPS LIMITED

102/2a Throckley Way, Middlefields Industrial Estate,
South Shields, Tyne & Wear NE34 0NU

Tel: +44 (0) 0191 456 0466 Fax: +44 (0) 0191 454 1066

Email: sales@mcpsltd.co.uk www.mcpsltd.co.uk

MGDUFF

...trust the name

ZINGA

Liquid anode technology

Zinc, Aluminium and Magnesium Anodes

- Specialists in cathodic protection scheme design and consultancy
- Propeller shaft earthing and monitoring systems



Tel: +44 (0)1243 533336 Fax: +44 (0)1243 533422

sales@mgduff.co.uk www.mgduff.co.uk

MME GROUP

Materiaal Metingen Europe B.V, Rietdekkerstraat 16,
PO Box 4222, 2980 GE Ridderkerk, The Netherlands

Tel: +31 (0) 180 482 828 Fax: +31 (0) 180 462 240

e: info@mme-group.com www.mme-group.com

North East Corrosion Engineers Ltd

West Pitmillan Business Centre Foveran,
Ellon, Aberdeenshire

Tel: +44 (0) 1358 788116 Fax: +44 (0) 1358 789828

e: sales@neceltd.com www.neceltd.com



CORROSION ENGINEERING AND CATHODIC PROTECTION FIELD SERVICES

Contact: David Eyre 0208 334 2700

email d.eyre@penspen.com

or Lee Jones 01639 713010 email l.jones@penspen.com



R & R Corrosion Ltd.

5 Broomiesburn Road,

Broomiesburn Industrial Estate, Ellon, Aberdeenshire AB41 9RD

Tel: 01358 729644 Fax: 01358 729655

Email: info@rrcorrosion.com

www.rrcorrosion.com

SILVION LIMITED

The Brambles, Grantham Road, Old Somerby,
Grantham, Lincs, NG33 4AB, UK

Tel: 01476 590932 Mob: 07872 857310

Email: sales@silvion.co.uk; rbritton@silvion.co.uk Web: www.silvion.co.uk

VolkerLaser Ltd

223 London Road, Worcester WR5 2JG

Tel: 0844 800 4560 Fax: 01905 352060

Email: enquiries@volkerlaser.co.uk Website: www.volkerlaser.co.uk

TO ADVERTISE CONTACT

SQUARE ONE

Tel: +44 (0)114 273 0132

Email: jonathan@squareone.co.uk

COATING APPLICATORS

ALFRED BAGNALL & SONS LTD

6 Manor Lane, Shipley, W.Yorks BD18 3RD

Tel: 01274 714800 Fax: 01274 530171

Email: info@bagnalls.co.uk www.bagnalls.co.uk

APB CONSTRUCTION (UK) LTD

First Floor Offices, Grange Business Centre

River Works, Grange Lane, Sheffield, S5 0DP

Tel: 01709 541000 Fax: 01709 541411

Email: gary.bentham@apbcon.co.uk

APB GROUP LIMITED

Ryandra House, Ryandra Business Park,
Brookhouse Way, Cheadle, Stoke on Trent ST10 1SR

Tel: 01538 755377 Fax: 01538 755010

BALISTA LIMITED

4 Westacre Gardens, Ormesby, Great Yarmouth, Norfolk

Telephone 01493 262262 (option 1)

Mobile 0044 7867518858

Email: duncan@balista.info

BLUHULL GROUP

Orange Grove, Birbal Street, Balzan
BZN 9013, Malta

Tel: +356 21445807

Email: jborg@bluhullmarine.com

CORROSERVE

- Specialists in anti-corrosion engineering and corrosion protection
- Fast, efficient and economical solutions to corrosion-related problems
- Combining engineering skills and coating excellence for long term solutions
- Repair and refurbishment for components from pumps, pipes and valves through to tanks and vessels
- On-site teams and workshop-based facilities

Tel: 0113 276 0760 Fax: 0113 276 0700

Email: info@corrocoat.com

www.corrocoat.com

Reader Enquiry: CM015

Denholm Industrial Services

200 Carmichael Street, Glasgow, G51 2QU

Tel: +44 (0)141 445 3939

Email: Damian.O'Brien@denholm-industrial.com

DRH Coatings Ltd

Suite 5, 3 Shawcross Industrial Estate,
Hilsea, Portsmouth, PO3 5JP

Tel: 0239 2666165

Email: garydeeks@drhcoatings.co.uk

DYER & BUTLER LTD

Mead House, Station Road, Nursling, Southampton, Hampshire SO16 0AH

Tel: 02380 742222 Fax: 02380 742200

Email: enquiries@dyerandbutler.co.uk

Website: www.dyerandbutler.co.uk

F A CLOVER & SON LTD

INDUSTRIAL PAINTING CONTRACTORS SINCE 1917

Tel: 020 89486321 Fax: 020 89487307

Email: ian@cloverpainting.com

FOUNTAINS (part of the OCS Group)

Blenheim Court, George Street, Banbury, OX16 5BH

Tel: 07876556197

Email: Donovan.gosher@fountainsgroup.co.uk

GABRE (UK) LTD

12 Church Street, Omagh, Co Tyrone BT78 3BX

Tel: 028 82240391

Email: info@gabrielhughes.com

GPL SPECIAL PROJECTS LTD

PO Box 516, Salford, M5 0BJ

Tel: 0161 745 7888

Email: ben.dobson@gplgroup.co.uk

Hankinson

PAINTING GROUP

Blasting & Protective
Coatings Division

- Blasting
- Scaffolding and encapsulation
- ISO9001 and NHSS19A accredited
- ISO14001 accredited
- Award winning safety and training standards
- National coverage

0870 789 2020 www.hankinson.co.uk
 Cotton Place, 2 Ivy Street, B/head, Wirral CH41 5EF

HERRINGTON INDUSTRIAL SERVICES LTD

GRITBLASTING, METAL SPRAYING & APPLICATIONS OF SPECIALISED COATINGS

Crown Works, Crown Road, Low Southwick,
Sunderland, Tyne & Wear, SR5 2BS

t: 0191 516 0634 f: 0191 548 1553

e: herringtonltd@gmail.com Website: www.herringtonltd.co.uk

COATING APPLICATORS



ICS
Industrial Coating Services

Are expanding rapidly...

We have an excellent well trained, motivated and highly accredited workforce. Delivering high quality projects. Completed within time frames and on budget.

Training
Confined space
PTS/COSS
ICATS
ICORR Paint Inspector
SC01/02
First Aid - 4 day
SMSTS
SSSTS
PASMA
IPAF
NEBOSH

Accreditations
LIVD8
NHSS 19A
Constructionline
ISO 9001
Link up
OHSAS 18001

Services:-
Surface preparation
Protective Coating Application
Scaffold and Encapsulation
Graffiti removal / anti graffiti coating
High pressure water jetting

T: 0845 474007
E: info@industrialcoatingservices.co.uk
W: www.industrialcoatingservices.co.uk

JACK TIGHE LTD

Redbourne Mere, Kirton Lindsey, Gainsborough,
Lincolnshire, DN21 4NW
Tel: 01652 640003
Email: sales@jacktighe.com

JPV LTD

Over 30 years experience of Preparation & Coating

Abrasive Blasting, Specialist Coating Applications,
High Pressure Water Jetting

t: 01277 201515 f: 01277 201616 e: paul.jpv@btopenworld.com

KAEFER OPUS LIMITED

Ethan House, Royce Avenue,
Cowpen Lane Industrial Estate, Billingham TS23 4BX
Tel: 01642 371850 Fax: 01642 562971
Website: www.opus-services.com

KUE Group Limited

Birksland Street, Bradford BD3 9SU
Tel: +44 (0)1274 721188 Fax: +44 (0)1274 720088
Website: www.kuegroup.com

MABEY BRIDGE LIMITED

Station Road, Chepstow, Monmouthshire NP16 5YL
Tel: +44 (0)1291 623801 Fax: +44 (0)1291 625453
Email: mail@mabeybridge.co.uk

MCL COATINGS GROUP LTD

Pickerings Road, Halebank Industrial Estate
Widnes, Cheshire WA8 8XW
Tel: 0151 423 6166 Fax: 0151 495 1437
Email: info@mcl.eu.com
Website: www.mcl.eu.com

MPM NORTH WEST LTD

Marine Road, Maryport, Cumbria CA15 8AY
Tel: 01900 810299
Email: mikej@mpmnw.co.uk
Website: www.mpmmarine.co.uk

NORTHERN PROTECTIVE COATINGS LTD

16 High Reach, Fairfield Industrial Estate, Bill Quay,
Gateshead, Tyne & Wear NE10 0UR
Tel: 0191 438 5555 Fax: 0191 438 3082
Email: jack.welsh@npcoatings.co.uk

NUSTEEL STRUCTURES

Lymane, Hythe, Kent CT21 4LR
Email: simon.slinn@nusteelstructures.com
Website: www.nusteelstructures.com

ORRMAC COATINGS LTD

Newton Chambers Road, Thorncliffe Park Estate, Chapeltown
Sheffield S35 2PH
Tel: 0114 2461237 Fax: 0114 2570151
Email: orrmac@aol.com Website: www.ormmac.co.uk

Pipeline Induction Heat Ltd

The Pipeline Centre
Farrington Road, Rossendale Road Industrial Estate
Burnley, Lancs BB11 5SW
Tel: 01282 415323 Fax: 01282 415326
Email: Sales@pih.co.uk www.pih.co.uk

PIPERCREST LTD

T/A Halls Specialised Services
Brooklyn Farm, North Hill, Norden on the Hill, Essex SS17 8QA
Tel: 01375 361408 Fax: 01375 361448
Email: halls@btconnect.com

PORT PAINTERS LTD

Unit 3, Ringside Business Park, Heol-Y-Rhosog, Cardiff CF3 2EW
Tel: 029 2077 7070 Fax: 029 2036 3023
Email: port.painters@talk21.com

PPC LTD

10 Valiant Gardens, Hilsea, Portsmouth PO2 9NZ
Tel: 0239 2612405
Email: enquiries@ppc-ltd.info

RHINOCEROS LIMITED

Huntingdon Works, Huntingdon Road, East Finchley,
London, N2 9DX
Tel: 0208 444 6165 Fax: 0208 365 2865
Email: contracts@rhino247.co.uk www.rhino247.co.uk

STORY CONTRACTING LIMITED

Burgh Road Industrial Estate,
Carlisle, Cumbria CA2 7NA
Tel: 01228 590444

SHUTDOWN MAINTENANCE SERVICES LIMITED

Tel: 01634 256969 Fax: 01634 256616

Email: smsltd@btconnect.com

Website: www.shutdownmaintenanceservices.co.uk

SPECIALIST BLASTING SERVICE LTD

Smith Quay, Hazel Road,
Southampton, Hampshire SO19 7GB

Tel: 023 8044 4455

SPECIALIST PAINTING GROUP LTD

Padholme Road East, Fengate, Peterborough PE1 5XL

Tel: 01733 309500 Email: info@spg.uk.net

Website: www.specialistpaintinggroup.co.uk

STANDISH METAL TREATMENT LTD

Potter Place, West Pimbo, Skelmersdale
Lancs, WN8 9PW

Tel: 01695 455977 Fax: 01695 728835

Email: stuart.croft@standishmetal.co.uk

SURFACE TECHNIK (OLD HILL) LIMITED

Sovereign Works, Deepdale Lane, Lower Gornal,
Dudley DY3 2AF

Tel: 01384 457610 Fax: 01384 238563

Email: peter.morris@surfaceteknik.co.uk

Website: www.surfaceteknik.co.uk



TICOATINGS
PROTECTIVE COATINGS

Our services include:

- On Site Grit Blasting
- Specialist Coating
- Testing and Inspection Services
- Rope Access
- Confined Spaces
- PTS Operatives

Approved By:

- Constructionline
- Link Up - Proof
- UVDB - Verify
- Investor In People
- CHAS
- Local Authorities
- British Waterways
- Transco

Tel: 01204 468080
Fax: 01204 695188
Email: admin@ticoatings.co.uk
www.ticoatings.co.uk

Reader Enquiry: CM013

TEES VALLEY COATINGS LIMITED

Unit 26, Dawson Wharf, Riverside Park Road, Middlesbrough TS2 1UT

Tel: 01642 228141

Email: sales@teesvalleycoatings.com

Website: www.teesvalleycoatings.com

WALKER CONSTRUCTION (UK) LIMITED

Park Farm Road, Folkestone, Kent CT19 5DY

Tel: 01303 851111 Fax: 01303 259439

Email: admin@walker-construction.co.uk



TORISHIMA Surface Coatings Division

We operate a modern, state of the art coatings facility in Glasgow

Applicators of

- Ceramic Systems
- Primer Systems
- Rust Converters
- Tank and Pipe Linings
- Structural Coatings
- Fluoropolymers
- Dry Film Lubricants
- Phosphate conversion coatings
- High Build Application
- CUI Rehabilitation
- Composite Pipeline Repairs to ISO/TS 24817 & ASME PCC-2



Industries we serve

- Wastewater
- Oil and Gas
- Food and Beverage
- Manufacturing
- General Industry



Call us today on 01236 442390 or email info@torishima.co.uk

2 Colliery Gate, Clyde Gateway East, Glasgow, G32 8RH

WEDGE GROUP GALVANIZING LTD

Stafford Street, Willenhall, West Midlands WV13 1RZ

Tel: 0845 271 6082

Email: info@wedge-galv.co.uk

Website: www.wedge-galv.co.uk



WESCOTT COATINGS
INDUSTRIAL COATINGS & BLASTING SERVICES

SERVICES

- Industrial Coatings & Blasting Services Worldwide
- Full Fabric Maintenance & Project Management
- Offshore & Marine
- Renewable Energies & Petro Chemical
- Industry related training courses
- (courses include ICATS, Train the Painter, I.B.C.T, I.B.A.C.)

LOCATIONS

- Jarrow - Great Yarmouth - Northern Ireland

CONTACT

Wescott House, Unit 9 B/C & 10 Tyne Point Industrial Estate,
Jarrow, Tyne & Wear, NE32 3UP

W G BEAUMONT & SON LTD

Beaumont House, 8 Bernard Road, Romford, RM7 0HX

Tel: 01708 749202 Fax: 020 85909885

Email: tom.costello@wgbeaumont.co.uk

WILLIAM HARE LTD

Brandlesholme House, Brandlesholme Road, Bury BL8 1JJ

Tel: 0161 609 0000 Fax: 0161 609 0468

Email: jeff.grundy@hare.co.uk www.williamhare.co.uk

CONSULTANTS TESTING AND INSPECTION

AW CORROSION SOLUTIONS LTD

5 Brookfield, Four Elms, Edenbridge, Kent TN8 6NJ

Tel: 01732 700924

Email: info@awcorrosionsolutions.co.uk

CAN

Hareness Road, Altens, Aberdeen, AB12 3LE

Tel: 01224 870100 Fax: 01224 870101

Email: info@cangroup.net

Website: www.cangroup.net

CORROSION MANAGEMENT LTD

Engineering Consultants

21 Sedlescombe Park, Rugby, CV22 6HL United Kingdom

Tel: 01788 816231

Email: cox@corr-man.demon.co.uk

DNV-GL

Cromarty House, 67-72 Regent Quay, Aberdeen AB11 5AR

Tel: 01224 335000 Fax: 01224 593311

Email: david.baxter@dnvgl.com Website: www.dnvgl.com

EXOVA

Rosewell house, 2A(1F) Harvest Drive, Newbridge,
Midlothian EH28 8QJ

Tel: 03302220321

Email: europe@exova.com www.exova.com

HALCROW GROUP LTD

Asset Management and Engineering

Lyndon House, 62 Hagley Road, Edgbaston, Birmingham B16 8PE

Tel: 0121 456 0644 Fax: 0121 456 1569

Email: segersp@halcrow.com www.halcrow.co.uk

INDEPENDENT PROTECTIVE COATINGS SERVICES LTD

Unit 14, Hedgend Industrial Estate, Stuart Lane,
St Nicholas-At-Wade, Kent CT7 0NB

Tel: 01843 845472 Fax: 01843 847722

INTECSEA

LANSBURY ESTATE, 102 LOWER GUILDFORD ROAD,
KNAPHILL WOKING GU21 2EP

Tel: 01483 795300

Email: andy.taylor@intecsea.com

INTERTEK PRODUCTION & INTEGRITY ASSURANCE

Bainbridge House, 86-90 London Road, Manchester, M1 2PW

Tel: +44 161 933 4000

Fax: +44 161 933 4001

Email: production.assurance@intertek.com

Website: www.intertek.com/corrosion

MOTT MACDONALD

Materials & Corrosion Engineering
Spring Bank House, 33 Stamford Street
Altrincham, Cheshire WA14 1ES

Tel: 0161 926 4000 Fax: 0161 926 4103

Email: paul.lambert@mottmac.com www.mottmac.com

Paint Inspection Limited

Milton House, 7 High Street, Fareham PO16 7AN

Tel: 0845 4638680

Email: ian@paint-inspection.co.uk

www.paint-inspection.co.uk

Plant Integrity Management Ltd

1st Floor Office, Woodburn House,
Woodburn Road, Blackburn AB21 0RX

Tel: 01224 798870 www.pim-ltd.com

Email: maraneda@pim-ltd.com

SAFINAH LTD

21a Bridge Street, Morpeth,
Northumberland NE61 1NT

Tel: 01670 519900

Email: enquiries@safinah.co.uk

SCALED SOLUTIONS LTD

INDEPENDENT LABORATORY SERVICES

Tel: 01506 439994

Email: enquiries@scaledsolutions.co.uk

www.scaledsolutions.co.uk

SONOMATIC LTD

Dornoch House, The Links, Kelvin Close,
Birchwood, Warrington WA3 7PB

Tel: 01925 414000

Email: info@vsonomatic.com

Website: www.sonomatic.com

STEEL PROTECTION CONSULTANCY LTD

PO Box 6386, Leighton Buzzard, Beds. LU7 6BX

Tel: 01525 852500 Fax: 01525 852502

Email: david.deacon@steel-protection.co.uk

Website: www.steel-protection.co.uk

TOPLINE LIMITED

40 Birabi Street, GRA Phase 1,
Port Harcourt, Rivers State, Nigeria

Tel: 084 46238

Email: info@toplinelimited.net Website: www.toplinelimited.net

SPECIFIERS

SSE Ltd

Grampian House, 200 Dunkeld Road, Perth PH1 3GH
Tel: 01738 456000 Fax: 01738 456647

SUPPLIERS COATINGS

BREWERS PROTECTIVE COATINGS

Reform Rd, Maidenhead, Berkshire SL6 8DA
Tel : 01628 784964 Fax : 01628 672578
E-mail : info@brewersprotectivecoatings.co.uk
www.brewersprotectivecoatings.co.uk



The Protective Coatings Professionals™

UK Office & Warehouse
Unit 26, Craftsmans Way, East Goscote Industrial Estate, East Goscote,
Leicestershire LE7 3XJ Tel: +44 (0) 116 269 7777
Aberdeen Office
23 Rubislaw Den North, Aberdeen AB15 4AL Tel: +44 (0) 1224 329 098
www.carboline.com

CHEMCO INTERNATIONAL LTD.

INNOVATIVE RUST & WET-TOLERANT, SOLVENT-FREE COATINGS
East Shawhead Industrial Estate, Coatbridge, Scotland, UK
Tel: 01236 606060 Fax: 01236 606070
Email: sales@chemcoint.com www.chemcoint.com

CORROCOAT

CORROCOAT

- Extensive range of high technology coating systems and composites
- Specific range of coating systems
- Focus on R&D and technical support
- Low VOC levels with little or no solvent content for reduced atmospheric pollution
- Effective single coat solutions available
- Increasingly specified as the industry standard

Tel: 0113 276 0760 Fax: 0113 276 0700
Email: info@corrocoat.com
www.corrocoat.com

COUNTER CORROSION LTD

Formulators and Applicators of Customised Protective Coating and Lining Systems for Steel and Concrete
Tel: 01924 468559/380002 Fax: 01924 458019

FM 01548 | EMS 583748

Leaders in Corrosion Prevention & Sealing Technology

Since 1883

130

Over 130 Years Service to Industry

Winn & Coales (Denso) Ltd

Denso House, Chapel Road, London SE27 0TR Tel: 0208 670 7511
Fax: 0208 761 2456 Email: mail@denso.net Web: www.denso.net
A Member of Winn & Coales International

Long-term Solutions for Corrosion Control

HEMPEL PAINTS UK LTD

Llantarnam Industrial Park
CWMBRAN
Gwent NP44 3XF
Tel: 01633 874024 Fax: 01633 489012
Email: sales@hempel.co.uk www.hempel.com

INDEPENDENT PROTECTIVE COATINGS SERVICES LTD

Unit 14, Hedgend Industrial Estate, Stuart Lane,
St Nicholas-At-Wade, Kent CT7 0NB
Tel: 01843 845472 Fax: 01843 847722

INDESTRUCTIBLE PAINT LTD

25 Pentos Drive, Sparkhill, Birmingham, B11 3TA
Tel: 0121 7022485 Email: sales@indestructible.co.uk
Website: www.indestructible.co.uk

INTERNATIONAL PAINT LIMITED

Stoneygate Lane, Felling, Gateshead,
Tyne & Wear NE10 0JY
Tel: 0191 469 6111 Fax: 0191 496 0676
Email: pc.marcomms@ak20nobel.com
Website: www.international-pc.com

For all the latest news, events and debates join us on



JOTUN PAINTS (EUROPE) LTD.

Stather Road, Flixborough, Scunthorpe, North
Lincolnshire DN15 8RR

Tel: 01724 400 125 Fax: 01724 400 100

Email: decpaints@jotun.co.uk
www.jotun.co.uk

SHERWIN-WILLIAMS
Protective & Marine Coatings

(formerly Leighs Paints)

Your Asset Protection Partners

T: +44 (0)1204 521771

W: sherwin-williams.com/protectiveEMEA

PPG PROTECTIVE & MARINE COATINGS

Unit 3 Maises Way, The Village, Carter Lane,
South Normanton, Derbyshire DE55 2DS

Tel: +44 (0) 1773 814520 Fax: +44 (0) 1773 814521

Web: www.ppgpmc.com

SPENCER COATINGS LTD

6 York Street, Aberdeen, AB11 5DD

Tel: 01224 288780

Fax: 01224 211070

Website: www.spencercoatings.co.uk

SPECIALTY POLYMER COATINGS INC

64 Tudor Avenue

Worcester Park

Surrey KT4 8TX

Tel: 020 8337 4953 Fax: 020 8337 4953

Website: www.spc-net.com

STORK TECHNICAL SERVICES (RGB) LIMITED

Norfolk House, Pitmedden Road,
Aberdeen AB21 0DP

Tel: 01224 722888 Fax: 01224 723406

Email: robert.grainger@stork.com

Website: www.storktechnicalservices.com

TINSLEY SPECIAL COATINGS

Enterprise House, Durham Lane,
Eaglescliffe TS16 0PS

Tel: 01642 784279 Fax: 01642 782891

Email: enquiries@tinsleyspecialproducts.com

SUPPLIERS GENERAL**AIRBLAST EUROSPRAY**

25 King Street Industrial Estate, Langtoft, Peterborough PE6 9NF

Tel: 01778 560650 Fax: 01778 560724

Email: j.cook@airblast.co.uk

Website: www.airblast.co.uk

APPLIED GRAPHENE MATERIALS

The Wilton Centre, Redcar, TS10 4RF

Tel: 01642 438214

Email: info@appliedgraphenematerials.com

DOORNBOS EQUIPMENT

Tel: 01642 673391 Fax: 01642 673210

Email: sales@doornbosequipment.co.uk

Website: www.doornbosequipment.co.uk

FERNOX**MAKES WATER WORK**

Forsyth Rd, Woking, Surrey GU21 5RZ

Tel: 01483 793200 Fax: 01483 793201 www.fernox.com

Fischer Instrumentation (GB) Ltd

Gordleton Industrial Park, Pennington,

Lymington, Hampshire SO41 8JD

Tel: 01590 684100 Email: mail@fischergb.co.uk

FM CONWAY LTD

Conway House, Rochester Way,

Dartford, Kent DA1 3QY

Tel: 0208 6368822 Fax: 0208 6368827

Email: sharon.howlett@fmconway.co.uk

LLEWELLYN RYLAND LTD

Haden Street, Birmingham B12 9DB

Tel: 0121 4402284

Email: research@llewellyn-ryland.co.uk

NEONICKEL (BLACKBURN) LTD

Walker Industrial Park,

Blackburn BB1 2QE

Tel: 01254 503505

OCEANEERING INTERNATIONAL SERVICES LTD

Oceaneering House,

Pitmedden Road, Dyce,

Aberdeen AB21 0DP

Tel: 01224 758500

Rud Chains Ltd

Units 10-14 John Wilson Business Park,
Whitstable, Kent CT5 3QY
Tel: 01227 276611 Email: Katie.crane@rud.co.uk

SIKA Ltd

Watchmead, Welwyn Garden City,
Hertford AL7 1BQ
Tel: 01707 394444
Email: enquiries@uk.sika.com

SCANGRIT

Eastfield Road, South Killingholme, Immingholme,
Immingham, North Lincs DN40 3NF
Tel: 01469 574715 Fax: 01469 571644
Email: sales@scangrit.co.uk Website: www.scangrit.co.uk

RECIPROCAL ORGANISATIONS

ELSEVIER SCIENCE LTD

The Boulevard, Langford Lane, Kidlington,
Oxford OX5 1GD
Tel: 01865 843000 Fax: 01865 843010

INSTITUTE OF METAL FINISHING

Exeter House, 48 Holloway Head, Birmingham B1 1NQ
Tel: 0121 6227387 Fax: 0121 6666316
Email: exeterhouse@instituteofmetalfinishing.org
www.uk-finishing.org.uk

MPI GROUP

Peel House, Upper South View,
Farnham, Surrey GU9 7JN
Tel: 01252 732220 Fax: 01252 732221
www.protectivecoatingseurope.com

QUALITY CONTROL

elcometer
Inspection Equipment

Measure • Monitor • Improve

+44 (0)161 371 6000
sales@elcometer.com
www.elcometer.com

TRAINING AND COATING INSPECTORS

ARGYLL-RUANE LTD.

Meadowbank Rd, Rotherham, South Yorkshire S61 2NF UK
Tel: +44 (0)1709 560459 Fax: +44 (0)1709 557705
E-mail: enquiries@ruanetpo.com
Website: www.argyllruane.com

**TO ADVERTISE
IN CORROSION
MANAGEMENT**
please contact
**Jonathan Phillips or
Debbie Hardwick**
Tel: +44 (0)114
273 0132
Email: enquiries@squareone.co.uk

Visit the
ICATS website
www.icats-training.org

ICATS REGISTERED COMPANIES

ICATS is a comprehensive structured training scheme for the registration, training and certification of industrial surface preparation and coating operatives. Companies wishing to have a workforce certificated under ICATS must first register with Correx.

Workplace training is carried out by ICATS certificated trainers who are qualified to train and assess operatives. Training is carried out in-house and may be undertaken by a certificated trainer employed by an ICATS registered training organisation. However it is more usual for registered companies to nominate experienced employees to ICATS for prior approval as company trainers. Subject to meeting the acceptance criteria, nominees attend a 2 day ICATS Company Trainer course held at various locations in the UK.

Successful completion of the ICATS course by operatives leads to certification by Correx. Trainers and operatives will require re-certification after 3 years and renewal after 9 years.

ICATS REGISTERED COMPANIES

A & R Painting Services Ltd

Marwood House, Riverside Park, Bromborough,
Wirral, CH62 3QX
Tel: 0151 445 3589

Abbey Gritblasting Services

Unit 13, Clopton Commercial Park, Clopton,
Woodbridge, Suffolk, IP12 3TP
T: 0191 262 0510

Alfred Bagnall & Sons

6 Manor Lane, Shipley,
West Yorkshire, BD18 3RD
T: 01302 853259

AlpAccess s.r.l.

I.L. Caragiale, 21 Ploiesti, 100015,
P.H. Romania
T: +44 (0) 722140858

A McKie Building & Engineering Ltd

19 Kyle Road, Irvine, Ayrshire, KA12 8JX
T: 01294 279586

APB Construction (UK)

First Floor Offices, Grange Business Centre,
River Works, Grange Lane, Sheffield, S5 0DP
T: 01709 541000

APB Group Limited

Ryandra House, Ryandra Business Park,
Brookhouse Way, Cheadle, Staffs, ST10 1SR
T: 01538 755377

Applus UK Ltd

Block 2, Units C & D West Mains Industrial Estate,
Grangemouth, Stirlingshire FK3 8YE
T: 01324 489785

Armourcote Surface Technology Plc

15/17 Colvilles Place, Kelvin Industrial Estate, East
Kilbride, Scotland, G75 0PZ
T: 01355 248223

Austin Hayes Ltd

Carlton Works, Cemetery Road, Yeadon, Leeds,
LS19 7BD, UK
T: 0113 250 2255

Aveon Offshore Ltd

Aveon Offshore Facility, Rumuolmeni, Port Harcourt,
River State, Nigeria
E: dpetillion@aveonoffshore.com

B&A Contracts Ltd

Dale Road, Hubberston, Milford Haven, Pembrokeshire
SA73 3PR
T: 01646 693489

BAE Systems Surface Ships Support Ltd

Room 213, Naval Base Headquarters, Building 1/100,
PP127, Portsmouth,
PO1 3LS
T: 023 92857279

BAM Nuttall Ltd

St James House, Knoll Road,
Camberley GU15 3XW
T: 0782 5798440

Beever Limited

Little Coldharbour farm, Tong Lane, Lamberhurst,
Kent, TN3 8AD, UK
T: 01892 890045

Bilfinger Salamis UK Ltd

4 Greenhole Place, Bridge on Don,
Aberdeen, AB23 8EU
T: 01224 246499

Bluhull Marine Ltd

Orange Grove Birbal Street
Bazlan, BZN 9013 MALTA
T: +356 21445807

Border Coatings (Scotland) Ltd

Unit 7, Station Road Industrial estate, Earlston,
Berwickshire TD4 6BZ
T: 01896 848919

Brightstar Shotblasting & Coatings Ltd

Newhall Works, Newhall Road, Sheffield, S9 2QL
T: 0114 2618532

Briton Fabricators Ltd

Watnall Road, Hucknall,
Notts, NG15 6EP
T: 0115 963 2901

BSM Consulting

11 Kingsmead, Nailsea BS48 2XH
T: 01275 854708

Cape Industrial Services

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

C E Pittaway & Son Ltd

106 – 114 Flinton Street
Hull HU3 4NA
Tel: 01482 329007

Celtic Specialist Treatments Ltd

Enterprise House, Herbert Road,
Newport, South Wales, NP19 7BH
T: 01633 267007 (office)
01633 215900 (workshop)

Centregreat Engineering Ltd

11/12 Wyndham Close, Brackla, Brackla Industrial
Estate, Bridgend, CF31 2AD
T: 01656 650481

Chemcem Scotland Ltd

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

Cleveland Bridge UK Ltd

Cleveland House, Yarm Road,
Darlington, DL1 4DE
T: 01325 502345

Coastground Ltd

Morton Peto Road, Capton Hall Industrial,
Great Yarmouth, Norfolk, NR31 0LT
T: 01493 650455

Coating Services Ltd

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

Collis Engineering Railway Contracts

Salcombe Road, Meadow Lane Industrial Estate,
Alfreton, Derbyshire, DE55 7RG
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: 01132760760

Corroless Eastern Ltd

Greens Road, Greens Industrial Estate, Dereham,
Norfolk NR20 3TG
T: 01362 691484

County Building Services Ltd

Unit D3, Spectrum Business Estate,
Anthony's Way, Medway City Estate,
Rochester, Kent, ME2 4NP
T: 01604 711507

Darcy Spillcare Manufacture

Brook House, Larkfield Trading Estate, New Hythe
Lane, Larkfield, Kent ME20 6GN
T: 01622 715100

D&D Rail Ltd

Time House, Time Square, Basildon
Essex SS14 1DJ
T: 01268 520000

Denholm Industrial Services

200 200 Carmichael Street,
Glasgow, G51 2QU
T: 0141 445 3939

D F Coatings Ltd

Unit 17, Willments Ind. Estate, Hazel Road,
Woolston, Southampton SO19 7HS
T: 0238 044 5634

Donyal Engineering Ltd

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

DRH Coatings Ltd

Suite 5, 3 Shawcross Industrial Estate, Ackworth
Road, Portsmouth PO3 5JP
T: 023 9266 6165

Dyer & Butler Ltd (Rail)

Mead House, Station Road, Nursling, Southampton,
SO16 0AH, UK
T: 02380 667549

E G Lewis & Company Ltd

Suite 5, 3 Shawcross Industrial Estate,
Ackworth Road, Portsmouth PO3 5JP
T: 01792 323288

ENC (Yorkshire) Ltd

Unit 3B Rotherham Road, Dinnington,
Sheffield, S25 3RF
T: 01909 567860

ESB Surface Engineering

203 Westgate Street, Gloucester,
GL1 2RN
T: 01452 306272

F A Clover & Son

Bardolph Road, Richmond
Surrey, TW9 2LH
T: 0208 948 6321

Farbuild Ltd

Trelawn Lodge, Vicarage Road, Wingfield, Diss,
Norfolk IP21 5RB
T: 01379 640670

Ferrous Protection Ltd

Units 27-29 Saddleworth Business Centre,
Huddersfield Road, Delph, OL3 5DF
T: 01457 873419

FMC Technologies NIGERIA

No. 22 Gerrard Road
Ikoyi, NIGERIA
T: +234 (0) 8039740023

Focus Scaffolding Ltd

Meadow Road Compound, Meadow Road,
Whitehaven, Cumbria, CA28 9HY
T: 01946 592338

Forth Estuary Transport Authority

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

Forward Protective

Vernon Street, Shirebrook, Mansfield
Notts, NG20 8SS
T: 01623 748323

Fountains part of OCS

Group of Companies UK Ltd
Blenheim Court, George Street
Banbury, OX16 5BH
T: 01295 750000

GABRE (UK) LTD

12 Church Street, Omagh,
Co Tyrone, BT78 3BX
T: 028 8240391

Gemini Corrosion Services

Brent Avenue, Forties Road, Montrose,
Angus, DD10 9PB
T: 01674 672 678

Global Energy Group (Access Coatings) Ltd

Unit 5, Service Base, Shore Road,
Invergordon, IV18 0EX
T: 013648 855123

GPL Civil Engineering Ltd (Special Projects Division)

Kennedy House, Cheltenham Street,
Salford, M6 6WY
T: 0161 745 7888

H&H Contracting Ltd

8 Barnfield Hill, Exeter,
EX1 1SR
T: 07960 090725

Hayes Engineering Services Ltd

Brindley Road, Off Hadfield Road,
Cardiff CF11 8TL
T: 029 2022 6088

Harsco Infrastructure UK Ltd

Unit 3 Manby Road, South Killingholme,
Immingham, North Lincolnshire, DN40 3DX
T: 01469 553800

Harrisons Engineering Lancashire Ltd

Judge Wilmsley Mill, Longworth Road
Billington, Clitheroe, Lancashire, BB7 9TP
T: 01254 823993

HBS Protective Coatings Ltd

40 Manse Road, Belfast BT8 6SA
T: 028 90708280

Hempel UK Ltd

Llantarnam Park, Cwmbran,
Gwent, NP44 3XF
T: 01633 874024

Herrington Industrial Services Ltd

Crown Works, Crown Road, Low Southwick,
Sunderland SR5 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

International Energy Services Ltd

94 Awolowo, Ikoyi, Lagos State, Nigeria
T: 014615636

Interserve Industrial

Unit 2, Olympic Park, Poole Hall Road
Ellesmere Port, Cheshire, CH66 1ST
T: 0151 3737660

Visit the ICATS website
www.icats-training.org

Jack Tighe Coatings

Sandall Lane, Kirk Sandall,
Doncaster, DN3 1QR
T: 01302 880360

Jack Tighe Ltd

Redbourne Mere, Kirtton Lindsey, Gainsborough,
Lincs, DN21 4NW, UK
T: 01652 640003

J Murphy & Sons Ltd

Hiview House, Highgate Road,
London NW5 1TN
T: 020 7267 4366

JWM Industrial Services Ltd

47 Barton Road, Stretford,
Manchester, M32 9FA
T: 0161 2825329

JTL Fire Ltd

24 Cove Road, Farnborough,
Hants, GU14 0EN
T: 01252 545741

J W Coatings Ltd

9 Prospect Road, Ossett
West Yorks, WF5 8AE
T: 01924 267022

Kaefer C&D Ltd

Riverside House, Rolling Mill Road, Viking Industrial
Estate, Jarrow, Tyne & Wear NE32 3DP
T: 0191 428700

K & N Finishers (Southern) Ltd

Castle Trading Estate, Porchester,
Fareham, PO16 9SF
T: 02380 869700

Kilnbridge Construction Services Ltd

McDermott House, South Crescent,
Cody Road Business Park, London E16 4TL
T: 0207 511 1888

K P Coatings Ltd

Unit 4, James Park, Mahon Road,
Portadown, Co Armagh, BT62 3EH
T: 02838 338151

Lanarkshire Welding Co.

82 John Street, Wishaw,
Lanarkshire, ML2 7TQ
T: 01698 264271

Ledwood Protective Coatings Ltd

Waterloo Industrial Estate
Pembroke Dock, Pembrokeshire, SA72 4RR
T: 01646 623600

Livingstone Surface Treatments Ltd

Unit 4, The Energy Coast Business Park, Haile,
Egremont, Cumbria, CA22 2NH
T: 01946 841191

Mabey Bridge Ltd

Station Road, Chepstow,
Monmouthshire NP16 5YL
T: 01291 623801

Maclean & Speirs Blasting Ltd

Unit D, East Fulton Farm, Darluith Road, Linwood,
Paisley PA3 3TP
T: 01505 324777

Maclean & Speirs Blasting Ltd

Unit D, East Fulton Farm, Darluith Road, Linwood,
Paisley PA3 3TP
T: 01505 324777

Maldon Painting Company Ltd

2 Spital Road, Maldon,
Essex CM9 6EB
T: 07956597392

Mark Smith Inspection Services Ltd

14 Seaham Close, South Shields,
Tyne & Wear, NE34 7ER
T: 0191 456 9925

MCL Coatings Group Ltd

Pickerings Road, Halebank Industrial Estate, Widnes,
Cheshire, WA8 8XW
T: 0151 423 6166

Miller Fabrications Ltd

Baronhall Works, Overtown Road
Wishaw, Lanarkshire, ML2 8EW
T: 01698 373770

MIS North East Ltd

Units 2, 5/5a Mill Hill, North West Ind Estate,
Peterlee, SR8 2HR
T: 0191 514 2804

Moore Steel Developments Ltd

Station Road, Thorney,
Peterborough PE6 0QE
T: 01733 270729

Murvic Contracts Ltd

Askern House, High Street
Askern, Doncaster, DN6 0AA
T: 01302 701122

New Image Contracts Ltd

Askern House, High Street, Askern
Doncaster, DN6 0AA
T: 01302 708070

N L Williams Group Ltd

Westside Industrial Estate, Jackson Street, St.
Helens, Merseyside WA9 3AT
T: 01744 26526

Northern Protective

16 High Reach, Fairfield Industrial Estate, Bill Quay,
Gateshead, Tyne & Wear, NE10 0UR
T: 0191 438 5555

NSG UK Ltd

Fourth Avenue, Deeside Industrial Park, Deeside,
Flintshire CH5 2NR
T: 01244 833138

Nusteel Structures

Lympne Industrial Estate, Lympne, Hythe,
Kent, CT21 4LR
T: 01303 268112

Offshore Marine Services Ltd

Brumby House, Jalan Bahasa, PO Box 80148, 87011
Lubuan F.T. Malaysia
T: +35621424410

Orrmac Coatings Ltd

Newton Chambers Road, Thornccliffe Park Estate,
Chapelton, Sheffield, S35 2PH
T: 0114 246 1237

Over Rail Services Ltd

Unit 10 Millhead Way, Purdys Industrial Estate,
Rochford, Essex, SS4 1ND
T: 07976372866

Paintel Ltd

Trianon, Westover, Ivybridge,
Devon, PL21 9JH
T: 01752 719 701

Painting & Labour Services Ltd

Unit 1, Queens Road,
Immingham DN40 1QR
T: 01469 578105

PCM Nigeria Plc

99 Rivoc Road Trans Amadi, Port Harcourt,
Rivers State, Nigeria
T: +2348055297828

P H Shotblasting & Spraying Services

43a Drumrainey Road, Castlecaulfield, Dungannon,
Co Tyrone, BT70 3NY
T: 028 8776 7722

Pipeline Induction Heating

The Pipeline Centre, Farrington Road, Rosendale Rd
Industrial Estate, Burnley BB11 5SW
T: 01282 415323

Port Painters Limited

Unit 3, Ringside Business, Hoel-Y-Rhosog
Cardiff, CF3 2EWx
T: 02920 777070

Possilpark Shotblasting Co Ltd

Dalmarnock Works, 73 Dunn Street,
Glasgow, G40 3PE
T: 0141 556 6221

Prestec UK Ltd

168 Birmingham Road, Shenstone Wood End
Staffs WS14 0NX
T: 0121 308 8001

Pro Steel Engineering Ltd

48a Severnbridge Industrial Estate, Symondscliffe Way, Caldicot, Monmouthshire, NP26 5PW
T: 01291 424949

Radleigh Metal Coatings Ltd

Unit 30, Central Trading Estate, Cable Street, Wolverhampton, WV2 2HX
T: 01902 870606

R H Painting Limited

Alexander House, Monks Ferry, Birkenhead Wirral, CH41 5LH
T: 0870 7892020

R.L.P. Painting Contractors Ltd

Unit 1 Grange Lane, Balby, Doncaster DN4 9BB
T: 01302 853077

RMF Construction Services Ltd

Unit 2, Oughton Road Birmingham, B12 0DF
T: 0121 440 7970

SCA Group Ltd

Woolsbridge Ind. Park, Three Legged Cross, Dorset, BH21 6FA
T: 01202 820820

Severn River Crossing Plc

Bridge Access Road, Aust, South Gloucestershire, BS35 4BD
T: 01454 633351

Sherwin-Williams Protective & Marine Coatings

Tower Works, Kestor Street, Bolton, Lancs. BL2 2AL
T: +44 (0)1204 521771

Shirley Industrial Painters & Decorators Ltd

Grand Union House, Bridge Walk, Acock's Green, Birmingham, B27 6SN
T: 0121 706 4000

Shutdown Maintenance Services Ltd

Kingsnorth Industrial, Hoo, Rochester, Kent, ME3 9ND
T: 01634 256969

Sitecote Ltd

33 Kielder Close, Ashton in Makerfield, Wigan, WN4 0JE
T: 07714678719

Solent Protective Coatings Ltd

Tredegar Wharf, Marine Parade Southampton, Hants, SO14 5JF
T: 02380 221480

South Staffs Protective Coatings Ltd

Bloomfield Road, Tipton, West Midlands, DY4 9EE
T: 0121 522 2373

Southern Coating Contractors Ltd

Malmesbury House, 227 Shirley Road, Shirley, Southampton, SO15 3HT
T: 0238 0702276

Specialist Blasting Services Ltd

Smiths Quay, Hazel Road, Woolston, SO19 7GB
T: 023 80438901

Specialist Painting Group Ltd

Unit 3 Propser House, Astore Park, Padholme Road East, Fengate, Peterborough, PE1 5XL
T: 01773 309500

Stainless Restoration Ltd

Unit M1, Adamson Industrial Estate, Croft Street Hyde, Cheshire, SK14 1EE
T: 0161 3686191

Stamford Construction Limited

Barham Court Business Centre, Teston, Maidstone, Kent MW18 5BZ
T: 07912037033

Standish Metal Treatment Ltd

Potter Place, West Pimbo, Skelmersdale, Lancs, WN8 9PW, UK
T: 01695 455977

Stobbarts Ltd

Tarn Howe, Lakes Road, Derwent Howe Industrial Estate, Workington, Cumbria CA14 3YP
T: 01900 870780

Story Contracting Ltd

Burgh Road Industrial Estate, Carlisle, Cumbria CA2 7NA
T: 07730 764414

Stream Marine Training Ltd

Kintyre House, St Andrews Crescent, West Campus, Glasgow International Airport, Paisley, PA3 2TQ
T: 0141 212 8777

Tees Valley Coatings

Riverside Park Road, Middlesbrough, Cleveland TS2 1UT
T: 01642 228141

Surface Technik (Oldhill) Ltd

Rovereign Works, Deepdale Lane, Lower Gornal, Dudley, DY3 2AF
T: 01384 457610

TEMA Engineering Ltd

5-6 Curran Road, Cardiff, CF10 5DF, UK
T: 020920 344556

Tinsley Special Products

Enterprise House, Durham Lane, Eaglescliffe, Stockton-on-Tees TS16 0PS
T: 01642 784279

T I Protective Coatings

Unit 6, Lodge Bank, Crown Lane, Horwich, Bolton, Lancs, BL6 5HU
T: 01204 468080

Torishima Service Solutions Europe Ltd

Sunnyside Works Gartsherrie Road Coatbridge ML5 2DJ
T: 0123642390

Transvac Systems Ltd

Monsal House, 1 Bramble way Alfreton, Derbyshire, DE55 4RH
T: 01773 831100

Underhill Engineering Ltd

Plymbridge Road, Estover, Plymouth, PL6 7LX
T: 01752 752480

Vale Protective Coatings Ltd

Building 152 - Langar North Industrial Estate, Harby Road, Langar, NG13 9HY
T: 01949 869784

Walker Construction (UK) Ltd

Park Farm Road, Folkestone, Kent, CT19 5DY
T: 01303 851111

Wardle Painters Ltd

Unit 5, Wimborne Building, Atlantic Way, Barry Docks, Glamorgan, CF63 3RA, UK
T: 01446 748620

Wescott Coatings & Training Services Ltd

9b/9c Tyne Point, Shaftsbury Avenue, Simonside Industrial Estate, Jarrow, Tyne & Wear, NE32 3UP
T: 0191 497 5550

W G Beaumont & Son

Beaumont House, 8 Bernard Road, Romford RM7 0HX
T: 01708 749202

William Hare Ltd

Brandlesholme House, Brandlesholme Road, Burys, Lancs, BL8 1JJ, UK
T: 0161 609 0000

Wood Group Industrial Services Limited

Kirkstone House, St Omers Road, Western Riverside Route, Gateshead, Wear, NE11 9EZ
T: 0191 4932600

Xervon Palmers Ltd

331 Charles Street, Royston, Glasgow G21 2QA
T: 0141 5534040

Visit the ICATS website
www.icats-training.org

INSTITUTE EVENTS

July/August 2015 No. 126

DIARY DATES 2015

Thursday 8th October 2015

London Branch Event:
People, Process, Plant and Performance the 4 p's of Corrosion Management

To be held at Imperial College, London, SW7 2AZ.
Speaker: Bill Hedges, BP.

Monday 12th - Thursday 15th October 2015

Corrosion Control in Industry, Structures and Plants

Suitable for Corrosion Engineers, Architects, Structural Engineers, Maintenance Engineers, Inspectors, Insurance Assessors and Corrosion Engineers.

Venue: Amsterdam
Details from Colin Britton, FICorr, MRSC, Corrosion Engineering Consultancy and Training Courses The Butts, Station Road, Kimbolton, Cambridgeshire, England.
Tel: +44 (0)1480 860943 Mob: 0774 8270801 Email: cbrit79727@aol.com

Monday 12th - Friday 16th October 2015

Advanced Cathodic Protection

<http://mobilityoilandgas.com/corrosion-control-in-the-oil-and-gas-industry/>

Location: London: 12-16 October, 2015
For details of courses, please see information below:
Mobility Oil & Gas Petroleum Engineering Consultancy & Technical Training Services Upcoming Course.
Contact: +442030867082 or training@mobilityoilandgas.com
Mobility Oil and Gas is accredited by the British Accreditation Council

for Independent Further and Higher Education as a Short Course Provider.

Tuesday 20th - Friday 23rd October 2015

Corrosion Control in the Oil and Gas Industry

<http://mobilityoilandgas.com/corrosion-control-in-the-oil-and-gas-industry/>

For details of courses, please see information below:
Mobility Oil & Gas Petroleum Engineering Consultancy & Technical Training Services Upcoming Course.
Contact: +442030867082 or training@mobilityoilandgas.com
Mobility Oil and Gas is accredited by the British Accreditation Council for Independent Further and Higher Education as a Short Course Provider.

Thursday 12th November 2015

London Branch Event:
Young Engineers Program, Presentations

Evening to be held at ROSL, SW1A 1LR, London.

Thursday 10th December 2015

London Branch Event:
London Branch Christmas Lunch

To be held at ROSL, SW1A 1LR, London ROSL.
After Dinner Speaker: David Gunson, Former Air Traffic Controller.

Thursday 14th January 2016

London Branch Event:
Petra Ernst, Intertek P&IA

To be held at Imperial College, London, SW7 2AZ.

Thursday 11th February 2016

London Branch Event:
Jozef Soltis, Macaw Engineering

To be held at Imperial College, London, SW7 2AZ.

Thursday 3rd March 2016

London Branch Event:
Jim Glynn, Beanny

London Branch Chair Talk
To be held at Imperial College, London, SW7 2AZ.

Thursday 14th April 2016

London Branch Event:
Elizabeth Hillier, DNV

To be held at Imperial College, London, SW7 2AZ.

Tuesday 17th - Friday 20th May 2016

CEOCOR 2016 Congress

The CEOCOR 2016 Congress takes place in Ljubljana, Slovenia.
Contact Brian Wyatt for more information:
brianwyatt@controlcorrosion.co.uk or visit <http://ceocor.lu> and the Marine Corrosion Forum at www.marinecorrosionforum.org

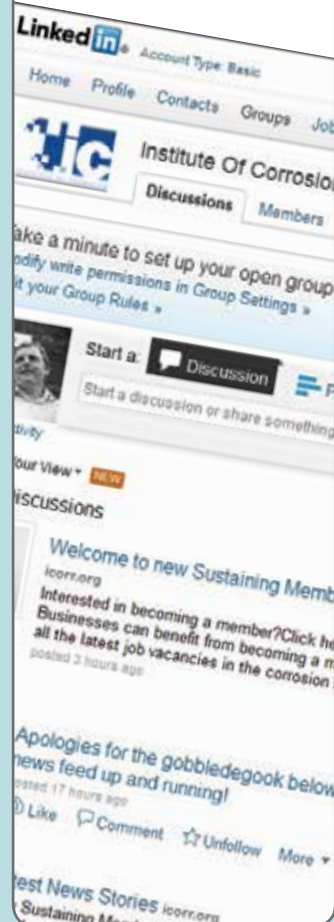
**TO ADVERTISE
CONTACT
SQUARE ONE**

**Tel: +44 (0)114
255 7911**

Email: enquiries@squareone.co.uk

For all the latest news, events and debates join us on

LinkedIn



London Branch publish a monthly Newsletter; to be included on the circulation list please contact Sarah Vasey sarah.vasey@akzonobel.com

BRANCH CONTACT DIRECTORY

ABERDEEN:

Frances Blackburn (Secretary)
Tel: 01224 243360
Email: ICorrABZ@gmail.com

DUBLIN:

Martha Hidalgo (Secretary)
Tel: +353 01 4027945
Terry Hinds (Chairman)
Tel: 0145 066 71 Fax: 0145 662 13
Email: info@galcosteel.ie

LONDON:

Jim Glynn (Chairman)
Tel: 01843 601712
Mobile: 07748 993326
Email: jglynn@beanny.co.uk

Paul Brooks (Secretary)
Tel: 01638 711955
Mobile: 07880 791087
Email: pbrooks@ctscp.com

George Winning (Speaker Secretary)

Tel: 0207 730 1111
Mobile: 07710 305777
Email: gwinning@PREMIER-OIL.com

MIDLANDS BRANCH:

Ali Sharifi (Chairman)
Tel: 01212125061
Email: ali.sharifi@amey.co.uk

NORTH EAST:

Neil Wilds (Chair)
Diane Smith (Vice Chair)
Gemma Malthouse (Secretary)
Email: icorme@outlook.com

NORTH WEST:

Brenda Peters, Analysis Scientific
Tel: 01706 871700
Email: brenda.peters@analysis-scientific.co.uk

YORKSHIRE:

Nigel Peterson-White
Tel: 07793 710559
Email: n.peterson-white@imeche.org

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