

EFC Website
and Social Media presence p.10

Young EFC Report p.25

EUROCORR 2021

BUDAPEST, HUNGARY,

19-23 SEPTEMBER 2021

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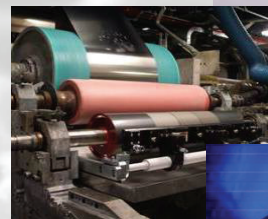
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A few words from the EFC President



Arjan Mol
12th EFC President
(2019-2020)

To all the members of the European Federation of Corrosion

Dear colleagues, dear friends,

Welcome to a once-more voluminous, exciting and diverse EFC Newsletter! Amidst these challenging times, the EFC is striving to remain committed to its mission of providing an active international network platform for corrosion scientists and engineers, junior and senior, from industry, academia, research institutes or other stakeholders.

Please note that after launching a brand-new website, the EFC is now also present on social media, including LinkedIn - the platform most used by professionals. You are the EFC's main asset and we will be pleased to present your EFC-related activities on our LinkedIn page. Also, I would encourage you to promote and advertise the new EFC LinkedIn profile amongst your colleagues. This is a great way to improve the visibility of both your organisation and of the EFC on social media.

Furthermore, with the unfortunate cancellation of the physical EUROCORR 2020, the EFC has worked hard at keeping the community together this year and providing a virtual platform for the exciting progress made in corrosion science and technology across universities, research institutes and industry. The EFC hopes that the virtual EUROCORR will enable everyone to remain up-to-date on recent progress across the globe and to take part in interactive meetings during or after the virtual event. Having said that, with this I wish to extend my sincere thanks and wholehearted sympathy to the Brussels local EUROCORR 2020 organizing team for their tremendous hard work in the preparations of the originally planned physical EUROCORR 2020 and look very much forward to a near future Belgian EUROCORR edition!

As always during recent years, it is a great pleasure to see the expanding activities of Young EFC (YEFC). The YEFC is an initiative created in 2016 by the EFC aimed at attracting and supporting young researchers and engineers in the field of corrosion. The main objective of YEFC is to provide young corrosionists with a platform to build their own networks and to strengthen their scientific careers across national borders. This year they have also been extremely active with the World Corrosion Organisation (WCO) in co-organizing several exciting activities surrounding Corrosion Awareness Day 2020 on April 24. Even under pressing COVID-19 restrictions and measures, this year's Corrosion Awareness Day has resulted in various interactive and original events across the globe as detailed herein: I hope it also provides inspiration for future activities to be organized in your country!

Several Member Societies, such as CEFRAFOR (France) and SOCIEMAT (Spain), have taken the opportunity to describe their mission and general activities herein: if you would like to do so also for your Member Society in future editions of the EFC Newsletter, please feel free to contact the Editors.

News from the Science and Technology Advisory Committee (STAC), the beating technological and scientific heart of the EFC, is also presented herein, while the Task Force on Atmospheric Corrosion and the Working Party on Nuclear Corrosion reach out to you for information and show their willingness for active networking and collaboration across our community.

While it still seems far away, we remind you that EUROCORR 2021 is planned to take place in beautiful Budapest, Hungary: please see the kind invitation of the local organisers herein.

All in all, this edition of the EFC Newsletter reveals our community to be alive and kicking! Let's stick together in these difficult times, remain patient and make the best of it in the meantime: the only time you run out of chances is when you stop taking them. And if you do so and stumble, make it part of the dance! Take care, stay well dear colleagues and friends: I look forward to seeing you all soon again in real life in the near future; by any means, it will happen somewhere, sometime!

Arjan Mol, EFC President



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EFC Newsletter
N°28 - September 2020



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HUNKOR, the Hungarian professional corrosion engineering society, together with Diamond Congress Ltd., have been awarded the privilege of organizing the annual Congress and Exhibition of the European Federation of Corrosion (EFC) in Budapest in 2021. Thus, on 19th – 23rd September 2021, Budapest in Hungary will be hosting this event. For this article, we asked Dr. Bálint Medgyes, member of the local organizing committee, Associate Professor at Budapest University of Technology and Economics Department of Electronics Technology/BoA and STAC member in the EFC about the conference and plans.

EUROCORR 2021 Budapest, Hungary

WHY IT IS IMPORTANT FOR YOU TO HOST EUROCORR IN BUDAPEST?

Since its foundation in 1992, HUNKOR has pursued its mission and endeavoured to serve the needs of all branches facing corrosion-related materials degradation problems. EUROCORR is the largest and most important corrosion-related event in Europe and it will be an honour to host it in Budapest.



EUROCORR 2021 should provide a great opportunity for all companies involved in primary metal production, the processing of materials and metals, surface finishing, and the manufacture and assembly of metal parts to attend and participate. The motto of EUROCORR 2021 is:

Materials science and advanced technologies for better corrosion protection.

To achieve this aim, EUROCORR 2021 will provide high-level scientific presentations in numerous parallel sessions during four days. The agenda includes plenary and keynote lectures by internationally recognised experts, several workshops, discussion fora, and an exhibition to allow industrial stakeholders to introduce themselves in an effective way.

I am sure some of us can still recall memorable moments from EUROCORR 2003, which also took place in Budapest. Please tell me a few words about Budapest and also about the venue of the event!

The city is the capital of Hungary and is an economic, financial and cultural centre with two million inhabitants. Beautifully situated on both sides of the Danube river, it has a history encompassing over 2000 years. It boasts numerous museums, theatres, concert halls, plentiful restaurants and other amenities. Several baths and thermal waters of various medicinal springs are also at the disposal of visitors. In recent years, the UNESCO placed several parts of the city on the World Heritage list. In 2019 Budapest won the title of "Europe's best destination" based on the results of half a million people's votes. The "pearl of the Danube" is not just a perfect destination, it is also one of the most beautiful and safest cities in Europe.



And there is something else that keeps bringing visitors back to our capital – the legendary Hungarian hospitality. We hope our delegates will experience this for themselves at the Budapest Congress Centre where EUROCORR 2021 will take place. This convention centre is the largest, most modern congress and meeting facility in Hungary, with 17 multi-functional rooms, high quality catering services, state-of-the-art on-site audio-visual support and a maximum of 4000 m² of exhibition space to welcome up to 2000 people.

Do you have some special plans for the congress in terms of social activities?

During the Welcome Reception at the Budapest Congress centre, our venue will have the privilege to introduce our delegates to its gastronomic excellence. The Gala Dinner is expected to take place on the Európa Boat, which is the biggest and the most equipped river event boat in Central Europe providing breath-taking views of the Danube river and the embankment.

Budapest offers several great excursion possibilities for the companions of our participants. Accompanying persons will have to opportunity to take part in a half-day guided sightseeing tour of Budapest by bus.

What are the topics of EUROCORR 2021? Is there a specific field that is being more strongly emphasised this time?

The topics of EUROCORR 2021 are as follows:

- Corrosion and Scale Inhibition
- Corrosion by hot gases and combustion products
- Nuclear corrosion
- Environment sensitive fracture
- Surface science and mechanism of corrosion and protection
- Corrosion education
- Physico-chemical methods of corrosion testing
- Marine corrosion
- Microbial corrosion
- Corrosion of steel in concrete
- Corrosion in oil and gas production
- Coatings
- Corrosion in the refinery and petrochemistry
- Cathodic protection
- Automotive corrosion
- Tribo-corrosion
- Corrosion of polymer materials
- Corrosion and corrosion protection of drinking water systems
- Corrosion of archaeological and historical artefacts
- Corrosion control in aerospace
- Corrosion reliability of electronics
- CO₂-corrosion in carbon capture and storage (CCS) applications
- Atmospheric corrosion.

Alongside these topics, domestic and international corrosion experts will provide corrosion-related workshops, and special training courses.

***We are looking forward
to EUROCORR 2021
and wish you all the best
for the upcoming months!***

Website

[HTTPS://EUROCORR2021.ORG/](https://EUROCORR2021.ORG/)

DEADLINES

Submission of Abstracts	19 th January 2021
Notification of Authors	30 th April 2021
Early Participant Registration	31 st May 2021
Submission of Full Papers	30 th June 2021
Authors Registration (presenter)	30 th June 2021

EFC AWARDS 2020



EUROPEAN CORROSION MEDALLIST PROFESSOR STUART LYON

Professor Stuart Lyon has been announced as this year's laureate of the European Corrosion Medal. He is being acknowledged for his contribution and significant research in the fields of atmospheric corrosion, and corrosion protection by organic coatings as well as corrosion inhibition using emerging and novel analytical techniques for advancing the fundamental understanding of corrosion mechanisms for over 35 years. He is

widely recognised as a corrosion scientist with an international scientific reputation at the academic level who at the same time has made a strong impact on industrial applications in corrosion and corrosion protection. This is also reflected in his large publication record in many high-ranked journals. In addition, his strong impact on higher education and industry, and clear willingness to share knowledge among the corrosion community, nationally, within Europe and on a global scale has been underlined by the Award jury. Moreover, the Jury recognises his committed, long-lasting and ongoing service for the EFC in many aspects and positions, such as being a regular attendee of and presenter at EUROCORR Congresses, organizer of EFC events, especially EUROCORR 2008, and active participant in EFC Working Parties - notably: WP4 (Nuclear Corrosion); WP6 (Surface Science & Mechanisms of Corrosion Protection); WP7 (Corrosion Education); WP8 (Physico-chemical Methods of Corrosion Testing); and WP14 (Coatings).

Stuart Lyon currently holds the position of AkzoNobel Chair in Corrosion Control, School of Materials, University of Manchester, United Kingdom (since 2012), and Director of Research from 2013 to 2017. He obtained his BA in metallurgy and materials science (1979), MA and PhD in solid-state electrochemical sensors (1983) from the University of Cambridge, United Kingdom, and his DSc for research excellence in atmospheric corrosion from the former University of Manchester Institute of Science and Technology (UMIST) (2002). Starting his scientific career at UMIST in 1983, he was appointed Professor in Corrosion Control at the School of Materials, University of Manchester in 2007.

Throughout his career, he has been actively engaged with professional institutes including the Institute of Corrosion (ICorr), of which he was the President from 2005 to 2007, member of the Corrosion Committee of the Institute of Materials Minerals and Mining (IOM3), and also Editor-in-Chief of Corrosion Science Engineering and Technology, a publication of IOM3, since 2006. He has been awarded the 2000 I.T. Watkins Award of the Institute of Metal Finishing-IMF (2000), the 2012 Grande Medallion Cefracor - French Corrosion Society (2012) and the Guy Bengough Award of IOM3 (2014).

In consideration of his global reputation and the quality of research and teaching, he is a very worthy recipient of the **European Corrosion Medal**.

Professor Stuart Lyon is invited to give a Plenary at the virtual EUROCORR on Monday, 7 September 2020. The award ceremony and presentation of the Medal will take place at EUROCORR 2021 in Budapest.

CAVALLARO MEDAL LAUREATE PROFESSOR FABRIZIO ZUCCHI



The 2020 Cavallaro Medal has been awarded to **Professor Fabrizio Zucchi**, Italy.

He has been selected for this EFC distinction for his important contributions to the development and dissemination of knowledge in corrosion protection by inhibitors applied to fight general corrosion, pitting corrosion, hydrogen permeation and stress corrosion cracking on different engineering alloys. His research includes the improvement of knowledge of corrosion protection by silanes; understanding the mechanisms of stress corrosion cracking on stainless steels, nickel, brasses and aluminium alloys, duplex and superduplex, and achieving information about the correlation between stress corrosion cracking and hydrogen permeation on carbon and duplex steels; as well as understanding the corrosion behaviour of dental materials - in particular of dental materials in artificial saliva, mercury amalgams and vetro ionomeric cements for conservative dentistry and gold alloys of different nobility for prosthetic dentistry.

In 1968, Fabrizio Zucchi started his University career as a Lecturer in Corrosion and Corrosion Protection of Metals at the University of Ferrara, Italy. From 1980 to 1984 he held the position of full Professor in Chemistry at the Polytechnic of Turin. From 1984 to 2008 he continued in the position of Full Professor, first in Dental Materials within the degree course of Dentistry and from 1991, in Chemistry for Engineering within the degree course of Materials Engineering and then Mechanical Engineering of the University of Ferrara.

Prof. Zucchi has belonged to the 'A. Daccò' Corrosion Study Centre (now 'A. Daccò' Corrosion and Metallurgy Study Centre) of the University of Ferrara since 1960. From 2000 to 2011 he was the Director of the Centre. After his retirement in 2008, he continued to operate dynamically as contract professor with teaching activity at the University of Ferrara, collaborations with the industry and with his scientific activity within the 'A. Daccò' Centre until 2016. From 1998 to 2001, Fabrizio Zucchi was the Chairman of the EFC Working Party "Corrosion and Scale Inhibitors" Working Party (WP1) and Co-Chairman of this WP until 2014.

He was actively involved as co-organiser of the 5-day courses in theory and practice of "Corrosion Inhibitors", sponsored by the Working Party, which was held in 1986, 1988, 1993, 1996 and 2001 at DECHEMA, Frankfurt am Main. He has co-organized nine editions of the conference "European Symposia on Corrosion Inhibitors" (SEIC), held at the University of Ferrara from 1960 to 2000 and was the Chair of the 10th SEIC in 2005. These Symposia were among the most important events in the world, for the dissemination and discussion of scientific topics in the field of corrosion inhibition.

He collaborated in the organization of the "International School of Corrosion", an international school addressed at graduates from developing countries which was held in Ferrara from 1984 to 1988.

He is co-author of more than 200 publications in national / international journals and in books and over 100 publications in conference proceedings. Altogether, he is a very worthy recipient of the Cavallaro Medal.

Professor Fabrizio Zucchi is invited to give a Plenary at the virtual EUROCORR on Wednesday, 9 September 2020. The award ceremony and presentation of the Medal will take place at EUROCORR 2021 in Budapest.



HONORARY FELLOW OF THE EFC PROFESSOR PHILIPPE DILLMANN

This year, Honorary Fellowship of the EFC has been awarded to **Dr. Philippe Dillmann**, France. Philippe Dillmann obtained his Engineering degree in 1994 and his PhD in 1998 from the Technical University of Compiègne, France. In 1999 he joined CNRS and more specifically Pierre Süe Laboratory (LPS), a joint unit CEA/CNRS, where he quickly created a group called "Archaeomaterials and Prediction of Alteration" which he led and which in 2005 became the Archaeomaterial Laboratory and Alteration Prediction (LAPA), a laboratory within NIMBE (Nanosciences and Innovation for Materials, Biomedicine and Energy). He currently holds the position of Vice-Director of the IRAMAT (Institut de Recherche sur les ArchéoMATériaux) a CEA/CNRS. During these years, he continued and extended his original approach linking corrosion and heritage conservation.

His obvious desire for openness to the outside world is expressed by the numerous national and international collaborations. He not only greatly developed knowledge about the corrosion phenomena of ancient, historical and archaeological metal objects, but also created a real European school specific to the behaviour and alteration of these historical or archaeological metal objects, of which the laboratory he directs is a major player. Its positioning at the interfaces between corrosion, metallurgy, archaeology and history is the other originality of his research.

The Jury recognises his outstanding accomplishment at the interface between corrosion science and archaeological sciences or heritage conservation by studying corrosion mechanisms of ancient, historical or archaeological artefacts as well as by developing suitable preservation methods for these artefacts.

Philippe has demonstrated outstanding commitment to EFC in this area of corrosion science through the foundation of the Working Party No. 21 "Corrosion of metals of cultural heritage", currently named "Corrosion of Archaeological and Historical Artefacts", for which he was the first Chairman for six years (2007-2013). Moreover, he is one of the editors of the first EFC "Green Book" on heritage artefacts called "Corrosion of Heritage Metallic Artefacts (EFC No 48) and of the EFC publication No 65 "Corrosion and Conservation of Cultural Heritage Metallic Artefacts".

He has delivered significant benefit and impact to the EFC in these roles and is a very worthy recipient of an Honorary Fellowship.

Philippe Dillmann will be awarded Honorary Fellowship by the EFC President at EUROCORR 2021 in Budapest.

EUROCORR 2020

YOUNG SCIENTIST GRANT WINNERS

THE EUROCORR YOUNG SCIENTIST GRANT WILL BE AWARDED FOR THE FIFTH TIME AT EUROCORR 2020.

The objective of this grant, introduced by the EFC in 2016, is to stimulate interaction and collaboration within the international corrosion community by providing financial support to junior corrosionists to enable them to visit and interact with other corrosionists at their home institute abroad.

Each year a maximum of three EUROCORR Young Scientist Grants, up to a maximum of € 1,500 each, are awarded. In addition, in the frame of the partnership between EFC and the Chinese Society for Corrosion and Protection (CSCP), a donation from the CSCP allows an additional grant of €1,500 to be awarded. Further, the CSCP will grant the direct support of €3,000 to winners whose collaboration includes travelling between China and Europe.

This year the grant will enable :

- ▶ **Mrs Safiya Al Abri**, University of Manchester (UK), who will visit Dr. Joao Tedim, University of Aveiro (Portugal): to work on "Organic-ceramic hybrid coatings for corrosion protection of aluminium."
- ▶ **Mr Edoardo Basilico**, IFP Energies nouvelles/INSA-Lyon (France), who will visit Prof. Anne Neville, University of Leeds (UK): to work on "Identification of cementite enhanced cathodic activity and its impact on localized corrosion of carbon steel."



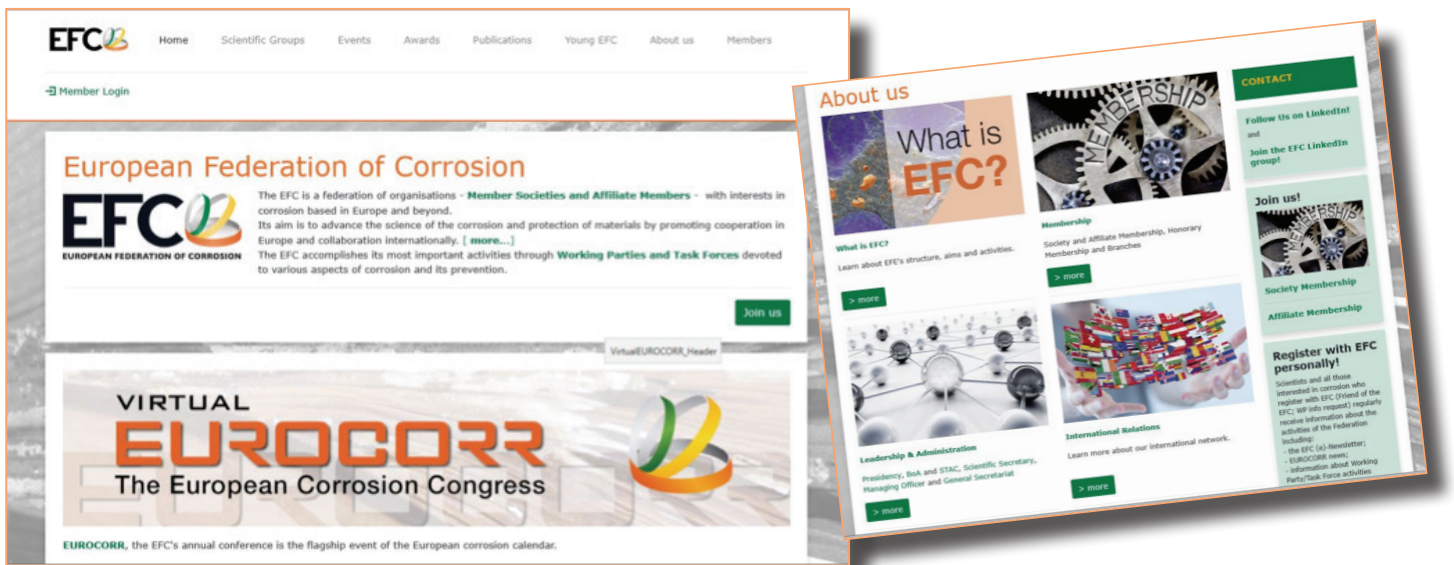
Further information on the EUROCORR Young Scientist Grant can be found on the EFC website under the pages "EFC Awards", including the Rules of the grant (flash QR code for direct access or follow the link.

<http://efcweb.org/YSG>

EFC WEBSITE AND SOCIAL MEDIA PRESENCE

VISIT THE NEW EFC WEBSITE AND REGISTER WITH US!

The new EFC website efcweb.org was launched in May 2020



EFC IS LAUNCHED ON LINKEDIN JOIN US!

The EFC has been launched on LinkedIn, the social medium most widely used by professionals. We aim to keep the corrosion community updated, and to provide it with a tool for exchange and networking.

The following two pages have been created: the **EFC official company page**, where events and news are regularly published, and the **group of EFC discussion page**, where members of the corrosion community can exchange information particularly on scientific and technical subjects.

Those of you who have already joined us on LinkedIn will have enjoyed the posts published by the very active Young EFC, useful updates on the organization of this year's virtual EUROCORR as well as presentations from our members.

So, stay in touch and we look forward to seeing you on the LinkedIn EFC pages!



Link to the EFC official profile on LinkedIn



Link to the Group of EFC discussion page on LinkedIn

NEW MEMBER SOCIETY AND AFFILIATE MEMBERS

WE WELCOME A NEW MEMBER SOCIETY JOINING IN DECEMBER 2019:



▶ **The Industrial Surface Treatment Association (Association ION)** is the Dutch trade association for companies and institutes involved in surface treatment. We collaborate with industrial stakeholders in influencing serious issues for the manufacturing industry. We mediate between policy-makers and SMEs to ensure

that all parties are well informed and communicating correctly. We protect the interests of the industry by ensuring a safe and secure trade environment in which the authorities make good long-term decisions. We participate in the Board of the European Committee for Surface Treatment (CETS), an international federation of national associations engaged in the supply of technology, chemicals, and paint products to the surface treatment industry, with the aim of providing a scientific and engineering voice at the European Union on proposals for environmental, health and safety legislation. We are involved in the intersectoral working group "Corrosion under insulation" that conducts research to better map this failure mechanism and develop technologies and strategies for extending the service life of installations. The Innovat.ION Foundation represents us in the implementation of innovative industry-related projects based on an open structure funded by the participating companies and knowledge institutions with possible support from subvention(s). Prof. Dr. J. M. C. Arjan Mol (Delft University of Technology) is a board member of this Foundation.

Website: <https://vereniging-ion.nl/>

WE WELCOME FIVE NEW AFFILIATE MEMBERS WHO HAVE JOINED THE FEDERATION SINCE SEPTEMBER 2019:



▶ **Duvine Ltd., United Kingdom**

We are a specialist designer and manufacturer of switch-mode DC power systems for Impressed Current Cathodic Protection (ICCP) applications. Our CP power modules are ideally suited for use in both single output and multi-zone systems. We custom-build integrated systems to meet customers' exact specifications. These can be provided in a wide range of enclosures to meet particular site requirements.

Duvine has over 35 years' experience with switch-mode rectification technology, which is ideally suited for the ICCP industry. Our equipment has significant advantages over traditional T/R systems such as inbuilt interrupters, digital display interfaces, versatility, control, ripple, size and weight. We also offer a range of additional modules for GPS synchronisation, GPRS, 3G remote communications and SMS alerts.

We offer 3 standard modules, which form the basis of every system we produce:

◆ CP500: Either 50V 10A or 25V 20A ◆ CP150: 18V 6A ◆ CP30: 12V 2A

Website: <http://www.duvine.co.uk/>



♦ Integrated Global Services, Czech Republic

We are specialized in on-site corrosion protection in the power and energy sectors. We execute 100-150 projects each year,

protecting internal surfaces of pressurized vessels and boilers with High Velocity Thermal Spray coatings. Some of our solutions have been adopted and included in corporate standards by O&G and Power sector majors as a long-term corrosion prevention measure. We look for knowledge exchange with key corrosion experts, that could lead to the development of more effective corrosion protection materials, techniques and standards.

Website: <https://integratedglobal.com/>

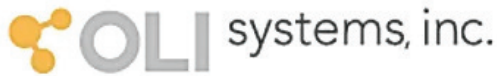


♦ LBBC Baskerville, United Kingdom

LBBC Baskerville specialise in High Pressure and High Temperature Autoclave design, manufacture and testing which have been specifically developed for corrosion testing. Such systems have been developed to improve corrosion testing methods and standards whilst simulating extreme environments in a

number of applications including Oilfield corrosion (upstream and downstream), Geothermal, Carbon Capture and Storage, Nuclear, and many more applications/industries. The company LBBC Baskerville is part of the larger LBBC Group and started as a spin-out company from Baskerville Reactors and Autoclaves and a PhD in Corrosion at the University of Leeds. LBBC Baskerville employed Dr Danny Burkle upon completion of his PhD in Oilfield Corrosion at the University of Leeds which was funded and sponsored by BP (specifically working on corrosion prevention and management in downstream applications). The company still works in partnership with Prof. Anne Neville at the University of Leeds, and have recently sponsored a PhD student on corrosion-related activities. Danny is a professional member of the Institute of Corrosion (MICorr) and is on the committee of the Young ICORR Division after winning the ICORR Young Engineer Programme in 2018. Ensuring our link with both academia and industry will help us to continue to succeed in developing equipment for improved results when corrosion testing.

Website: <https://lbbcbaskerville.com/>



♦ OLI Systems, Inc., USA

OLI Systems, Inc. delivers insights for industrial process design and analysis through rigorous electrolyte chemistry-based process modelling solutions. This is a result of 48 years of research and development in

electrolyte science, that has produced state-of-the-science electrolyte thermodynamic models with supporting underlying data validation.

Below are few resourceful links that demonstrate our work in Corrosion:

- <https://www.olisystems.com/oli-studio-corrosion-analyzer>
- <https://www.olisystems.com/technical-briefs>
- https://wiki.olisystems.com/wiki/Corrosion_rate_calculation_FAQ%27s
- https://wiki.olisystems.com/wiki/Calculating_Pitting_Corrosion

Illustrative videos showing how our software technology and capabilities within the corrosion world:

- <https://www.olisystems.com/case-studies>
- <https://www.olisystems.com/spotvideo021>

Reasons for us to be a member in the EFC:

- OLI Systems is looking to share knowledge, technology and its capabilities with industry leaders for value addition in the corrosion world.
- Building brand awareness and visibility in the EU region of who we are and how we can impact various industries with OLI Simulation software specially on corrosion.
- Partner/collaborate with interested corporations and universities within the Corrosion field (and more).



♦ Trenton Europe, France

Trenton Corporation is a privately owned American company. Since 1949 the Trenton Corporation has pioneered the development of wax-based anticorrosion products. Thousands of miles of pipelines

are now protected by Trenton systems throughout the world. Our products include wax-tapes, primers, outer wraps, hot-applied coatings, and casing filling. Our reasons for joining are to be part of the European community of the EFC and benefit from participating in related exhibitions in Europe.

Website: <https://trentoncorp.com/>

A full listing of our Member Societies and Affiliate Members can be found on the EFC website at:

<https://efcweb.org/About+us/Membership.html>

MEMBER SOCIETY ACTIVITIES AND PROFILES



CEFRACOR - The French Corrosion Society (www.cefracor.org)

CEFRACOR (CEntre FRançais de l'AntiCORrosion; The French Corrosion Society) is a non-profit scientific society. First created in 1960, CEFRACOR merged in 1989 with the AIAC (Association of Anti-Corrosion Engineers). The members of CEFRACOR have a common interest in corrosion and anticorrosion. As of today, CEFRACOR has 150 corporate members and a total of 750 individual members, of which 2/3 are industrials. The current CEFRACOR President is Prof. Philippe MARCUS.

Scientific and Technical Committee

The CEFRACOR Scientific and Technical Council is currently chaired by Christine BLANC and brings together the chairs of the 14 Topical Committees which are open to the CEFRACOR members and provide an ideal forum for the exchange of scientific and technical information. The committees write technical documents, draft standards, and prepare technical and scientific events. For many years, they have been very active in the following directions:

- ▶ Providing support for young researchers, including the organization of symposia, the awarding of prizes, and the publication of Special Issues of scientific journals and/or specific books summarizing the contributions of young researchers to the symposia;
- ▶ Providing support for industrial partners, e.g. in the definition of new test standards, and global contribution to the writing of new ISO standards;
- ▶ Organizing thematic Workshops and schools and the writing of books which are often published in both French and English versions;
- ▶ Providing support for the organization of national and international conferences, e.g. EUROCORR;
- ▶ Providing training measures for corrosion science;
- ▶ Writing and editing of guidelines.

Certification

CEFRACOR operates various certification schemes coordinated by its Certification division, which is headed by Marcel Roche and is independent from the Education and Training Division. Areas of certification apply to the competence of persons in some specific areas of corrosion control, e.g. cathodic protection and field-applied coatings for buried or submerged pipelines, as well as certification of continued professional education courses in corrosion and corrosion prevention proposed by training organizations.

Education and Training

Headed by Claude DURET-THUAL, the Education and Training division is currently planning its next training sessions on "Inhibitors and Water Treatment" and "Tribocorrosion". The schedule for 2021 will be posted on the CEFRACOR website on September 2020.

Upcoming Events

- ▶ The 10th edition of High Temperature Corrosion and Material Protection (HTCPM) will be held from March 28 to April 2, 2021 at Les Embiez (France).
- ▶ The 7th days of Cathodic Protection and Associated Coatings will be held from June 8 to 10, 2021 at the Congress Center of Antibes Juan-les-Pins (France).

The Hungarian Corrosion Society (HUNKOR) was established on the 6th of January 1992 to consolidate corrosion specialists who had been operating independently in various Hungarian organizations into one body.

The main goal of the alliance is to bring together professionals working in different fields of corrosion protection, to inform them about the events of corrosion life and to support their work.

The members of HUNKOR are mainly active in industrial corrosion protection. Their experience is mainly in the field of painting, electroplating and other coating technologies, as well as corrosion protection in the chemical, pharmaceutical, oil and construction industries.

The main objectives of HUNKOR can be summarized as follows:

- ◆ Elaboration of objective expert opinions for the national governing organizations (State Secretariats, Hungarian Academy of Sciences); preparation of studies upon request
- ◆ Giving an opinion on the necessary accreditation of testing sites in order to facilitate their establishment by developing competitive quality
- ◆ Facilitating the flow of information
- ◆ Protection of professional interests
- ◆ Organization of regular professional lectures, training, and exhibitions
- ◆ Preservation of professional cultural heritages
- ◆ Enforcement of consumer protection
- ◆ Protection of monuments against corrosion

HUNKOR has also placed a lot of emphasis on representation in international corrosion organizations, and has a long history of Cooperation with the EFC (for example, the annual EUROCORR congress was organized in Hungary in 2003).

In connection with EUROCORR 2021 in Budapest, the preparatory work has been ongoing since 2017. HUNKOR is preparing for the EUROCORR 2021 event with great enthusiasm and effort.



The Institute of Corrosion (ICorr) is going from strength-to-strength, despite the challenges of the Covid-19 pandemic. A complete refresh of the Institute brand has been applied to the website, social media platforms, magazine, stationery and marketing material. (see new logo above) At the same time, the range of social media interactions has been greatly expanded, including the posting of weekly blogs, making it easier for members to keep track of what is going on across the wide range of Institute activities.

One positive aspect of the lockdown has been the success of the Institute's online activities. The Corrosion Engineering Division (CED) working day on April 29 was attended by more than 50 people from as far afield as India and New Zealand. At this event the Paul McIntyre Award (presented to a senior corrosion engineer who has also advanced European collaboration and international standards development) was made to Dr Carmen Andrade of the Spanish National Research Council, for her work in the field of concrete durability and reinforcement corrosion. There was also a successful series of five webinars organised at the end of April by the Aberdeen Branch in conjunction with the Marine Corrosion Forum which attracted over 100 participants to each event. Meanwhile, ICorr President Gareth Hinds gave a presentation at the World Corrosion Organisation (WCO) webinar (see separate report) marking World Corrosion Awareness Day on April 24, which was attended by over 250 people.

The Institute's Young Engineer Programme has also gone online. This year's programme was heavily oversubscribed, with more than 60 applicants of which 32 were selected to participate, highlighting the success and growing popularity of the programme. The delegates receive online training and mentoring in a range of corrosion-related disciplines and work together in groups on an industry case study. Each group will present its solution to a panel of ICorr judges in November and the winning team will be rewarded with a free trip to the NACE conference in Salt Lake City in 2021.

In order to liven up their lockdown, "Corrosion@Manchester" young ICorr researchers organised a photography competition that was sponsored by AkzoNobel as part of their strategic research partnership on corrosion protective coatings with the University of Manchester. The competition focused on "corrosion in the home" (because, of course, no-one could travel anywhere). A total of 30 entries were submitted by 18 participants covering a range of damaged objects, and the variety and quality of the photographs were impressive. The gallery can be viewed online at <https://manchestercorrosionlab.co.uk/entries-from-corrosion-at-home/> with the winning entries are shown below. Congratulations to the winners who will receive vouchers for on-line shopping.



1st prize: "When 4 coats fail"



2nd prize: "Years of service"



3rd prize: "87 years in the bathroom"



**POLSKIE
STOWARZYSZENIE
KOROZYJNE**

PSK
Polish Corrosion Society
(activities 10.2019-06.2020)

After its 13th Conference (presented in EFC April Newsletter), on 24-25 October 2019 the Polish Corrosion Society organised a PSK Seminar "Design of Coating Anti-corrosion and Fire Protection Systems on Steel Structures". The participants received four interesting lectures:

The consequences of incorrect and incomplete corrosion protection design solutions - mgr inż. Łukasz Augustyński
 ▶ Typical specification of corrosion protection - what it must contain and what should be paid special attention to - dr inż. Agnieszka Królikowska

- ◆ Problems of selecting reactive fire protection systems for steel structures - mgr inż. Iwona Gajecka
 - ◆ Color and gloss - color patterns and assessment methods - mgr inż. Michał Jaczewski
- The model form for corrosion protection specifications using organic paints was distributed.

The Seminar materials are available to PSK Members from the PSK website.

In September 2019 PSK President, Agnieszka Królikowska was elected as a member of the EFC Board of Administration (BoA). The three-year term of office started on 1 January 2020.

PSK took patronage over training events in the field of corrosion, conducted by the Road and Bridge Research Institute which took place in January and February 2020 and in June 2020, the latter being the first one in on-line format. The PSK patronage was also granted to the European Congress Technical Coatings Congress (ETCC) to receive discounts for PSK members' participation.

PSK website is still being developed and providing information about events, especially about free EFC seminars during the pandemic time. The new EFC website was also announced as well as the launching of EFC presence on LinkedIn. PSK still keeps in touch with its members, also sending newsletters concerning new pandemic problems. PSK annual Conference which was planned in May 2020 was postponed to October 2020. We hope to meet soon!



RISE **Research Institutes of Sweden AB**

Creation of a New Member Research Consortium on Application of Stainless Steels in Biorefinery Processes

The Research Institutes of Sweden AB in Göteborg (RISE) and the French Corrosion Institute are conducting twelve membership programmes encompassing over 150 companies, large and small, from various sectors to find efficient solutions to joint challenges. Many research projects are initiated through collaborative membership programs. To adapt to new sustainable developments and respond to new interest from our member companies, we are now initiating a new Member Research Consortium on the Application of Stainless Materials in Biorefinery Processes.

The future of refineries is green. Since biomass is now widely used as a raw material in the manufacture of everything from paints and toothpaste to electricity and biofuel, RISE is developing concepts for the refineries of the future. The raw material in a biorefinery comes solely from renewable sources e.g. forests or waste products from agriculture and abattoirs. In future, if we are to meet climate challenges and environmental goals, we will need to manufacture both more and new bio-based products, such as cellulose for textiles, ethanol, biogas, bio resin and aviation fuel, as well as protein for use in feed for agriculture and lignin for the cement industry. This implies new processes and new environments leading to new and increased material and corrosion challenges. With this in mind an extensive literature survey examined the application of stainless materials in biorefinery production, giving a basis for the development of testing procedures and research activities relating to corrosion of stainless materials in biorefinery processes.

Due to the variety of raw materials, biofuels are produced via a range of conversion processes including mechanical, chemical, biochemical and thermomechanical. The first two are mainly used as pre-treatments. The main biochemical processes are fermentation and anaerobic digestion, which take place at relatively low temperatures of up to 200 °C, but involve chemicals, catalysts and enzymes. Torrefaction, pyrolysis and gasification are the most common processes for thermomechanical conversions and can be operated at above 700 °C. Biorefinery plants are likely to experience corrosion due to exposure to these corrosive environments. However, few cases of corrosion have yet been reported for bioenergy production facilities, possibly due to the young age of the structures and components. The literature also indicated that research activity focusing on the corrosion of materials in the biorefinery is still fairly limited, and very few published articles are focusing on corrosion of materials used in biorefinery production. Alloys used for biorefinery application include internally coated carbon steel, stainless steel, nickel-based alloys and lean duplex stainless steel. Experimental results regarding corrosion testing were reported in the case of the first three, while only an example of commercial scale was given for the last one. These results are very specific to processes and local feedstocks.



Most scientific research was focused on improving the properties of feedstocks and process parameters. The corrosion behaviour of alloys used in the process has been scarcely reported.

In order to bridge this gap, we aim to create a Member Research Consortium (MRC) focused on the use of stainless steels in biorefinery processes, where collaboration among researchers, scientists, material manufacturers and biorefinery plant operators can be initiated. Activities are tentatively (i) a survey of component failure cases in biorefinery processes, (ii) testing various materials in the most relevant environments according to the survey and possible forthcoming recommendations from biorefinery process experts, (iii) continuous research activities on the

corrosion of different materials in the presence of new and advanced feedstocks. Expertise among members can be exchanged to facilitate the development of testing and research activities concerning the corrosion of stainless materials in biorefinery processes. In case of interest, please contact Namurata Palsson (namurata.palsson@ri.se)



SOCIEMAT - Spanish Materials Society: Corrosion Research Activities



The worldwide crisis caused by the COVID-19 pandemic has not prevented the Spanish Materials Society (SOCIEMAT) from maintaining its spirit of work and support of research activities in the field of corrosion in Spain.

The great success of EUROCORR2019 in Seville, which brought together more than 1000 participants, including some of the most outstanding corrosion material researchers, from all over the world has inspired SOCIEMAT to continue with other initiatives. In particular, for the Corrosion Awareness Day (24th April) a Corrosion special issue of the MATERIAL-ES Journal was organized with Dr. Marta Mohedano as guest editor. The main aim of the issue is to improve the visibility of the corrosion research lines and industry in Spain and to create a solid national network.

SOCIEMAT is proud to have representatives of the main corrosion research groups in Spain among its members These include:

- ▶ Characterization of Corrosion and Degradation of Materials (Complutense University of Madrid), with an interest in alloy engineering and the tailoring of surface protective and functional properties, and specializing in advanced surface treatments;
- ▶ Corrosion and Protection of Metallic Materials (COPROMAT) of the National Centre for Metallurgical Researches State Agency for Higher Council for Scientific Research (CENIM-CSIC), optimising metallic materials behaviour in numerous environments and imprinting new functionalities or enhanced properties onto metallic surfaces;
- ▶ Surface Technologies (Mondragon University), studying the correlation between surface topography, protective film degradation, and stainless-steel corrosion; corrosion analysis in various environments and conditions; the tribological behaviour of grey cast iron sheaves; and Nickel-based alloy forging strategies for minimum cost and intergranular corrosion;
- ▶ The Materials and Manufacturing Division of Centro Tecnológico (CEIT), focused on developing the highest standards for stainless steel and nickel alloying elements for extreme environments, compositional design and thermo-mechanical processing of API grades and surface technology, and coating systems;
- ▶ Degradation and Corrosion of Materials (GRUDECORR; University of Cantabria), studying the relationship between microstructure and corrosion of ferrous and nonferrous metallic systems and its effects on mechanical properties, cost corrosion analysis, on-site failure analysis, and materials selection and corrosion protection in hostile environments;
- ▶ The Tekniker Corrosion Group, studying corrosion and protection measurements and the characterization of a wide range of materials and coatings in extreme conditions, reproducing the hostile working conditions for a wide range of applications, and evaluating the synergistic effect of tribocorrosion of metals and coatings.

A full listing of our European and International EFC Member Societies can be found on the EFC website at: <https://efcweb.org/About+us/Membership.html>

CASE STUDIES

Affiliate Members of the Federation have been invited to present their research and technical developments in the field of corrosion through the publication of case studies. Two case studies are presented below:



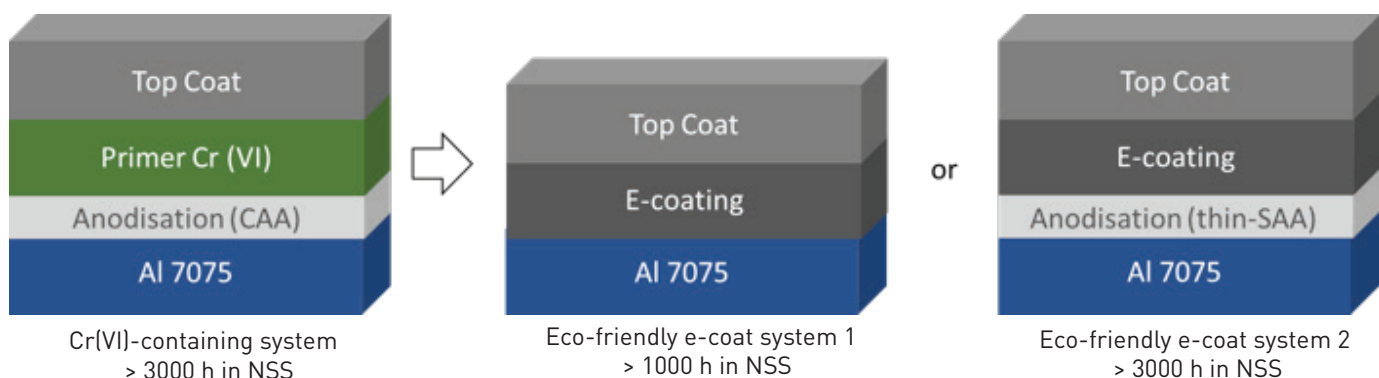
CORROSION PROTECTION OF AERONAUTIC COMPONENTS BY AN ECO-FRIENDLY ANAPHORETIC E-COATING



In the aeronautic industry, most parts made of aluminium alloys are protected against corrosion by treatments based on the application of anodization processes and multilayer painting. This commonly implies the use of Cr(VI) compounds which are substances affected by REACH regulation. To date, there is no simple and reliable Cr(VI)-free treatment in use that meets the requirements of all the aerospace original equipment manufacturers (OEMs) In this context, an alternative treatment to chromic acid anodising plus primer, based on an anaphoretic electrocoating, has been analysed in the recently finished ECOLAND project funded by Clean Sky 2.

Electrocoating is a process by which electrically charged particles are deposited out of a water suspension in order to coat a conductive part. The electrocoat process is regulated by the voltage applied to a water-based formulation that also contains polymeric resin or binders, pigments, and solvents. Electrocoating products are referred to as anodic or cathodic, indicative of where the coating deposition takes place. Anodic (anaphoretic) electrocoating involves the use of negatively charged paint particles that are deposited onto positively charged metal substrates. Moreover, anaphoretic coatings are able to deposit an intrinsic anodic layer during the growth mechanism (e-coat anodic barrier) that increases corrosion protection. It has been shown that oxide filaments grow within the initial seconds of the process due to a rapid dissolution of aluminium and subsequently form a dense sub-layer at a lower rate throughout the entire deposition process.

The work performed on the ECOLAND project has shown that an alternative Cr(VI)-free treatment for Al 7075 based on a colloidal and polyurethane anaphoretic e-coating is feasible. The coating has good adherence, scratch and erosion resistance, chemical resistance, good paintability and similar behaviour to that of Cr(VI)-based coatings against corrosion. A comparison of anaphoretic electrocoating against the Cr(VI)-containing process has shown reductions of 40 % in emissions, 13 % in energy consumption and 30 % in lead time, along with a cost saving of 21 %. All these benefits are mainly due to the elimination of the Cr(VI)-containing spray primer. Moreover, the application of thin sulphuric acid anodizing combined with an e-coating offers a promising approach to providing environmentally friendly coatings with high corrosion resistance.



Schematic illustration of eco-friendly coating systems and current Cr(VI)-containing coating system

The ECOLAND project, in which Liebherr-Aerospace acts as Topic Manager, has been led by CIDETEC Surface Engineering (Spain), which is a research centre with a strong scientific background and expertise in surface treatments, industrial scale-up of different coatings, surface modification techniques and the development of various coatings (surface solutions) for protection against corrosion. This project also relied on the participation of a strongly consolidated company in the field of anaphoretic coatings, namely LVH Coatings (UK) along with CTME (Spain), a company qualified by the National Aerospace and Defence Contractors Accreditation Program (NADCAP) for aeronautical testing and validation with wide experience in chemical and physical testing of protective coatings for Aluminium and experience in performing LCA studies in various sectors, including aerospace. This project has been funded by the Clean Sky 2 Joint Undertaking under the European Union's Horizon 2020 research and innovation programme (grant agreement No 785412). For more information: <https://www.cidetec.es/en/projects/surface-engineering-6/ecoland-4>



Images of the e-coating line and e-coat tank at the CIDETEC Surface Engineering facilities

This project has received funding from the Clean Sky 2 Joint Undertaking (JU) under grant agreement No 864521. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Clean Sky 2 JU members other than the Union. This publication reflects only the author's view and the JU is not responsible for any use that may be made of the information it contains.

HIGH VELOCITY THERMAL SPRAY (HVTS) CLADDING STOPS ALLOY 625 WELD OVERLAY CORROSION IN WASTE TO ENERGY (WTE) BOILER



Renergia Perlen

Following two years of construction, the Renergia Waste to Energy plant went into operation in 2015. This is a joint effort of all waste disposal associations from Central Switzerland and Perlen Papier AG. Renergia Zentralschweiz AG is responsible for more than just recycling waste from Central Switzerland. It supplies Perlen Papier AG with process steam, the district heating networks Rontal and Emmen with hot water, and provides electricity for approximately 44,000 households

WTE Boiler Fireside Corrosion

The Hitachi Zosen Inova (HZI) furnace installed at Renergia is an inclined moving grate four-pass waste to energy boiler with an external economizer. The boiler's thermal capacity is 47MW with the steam flow of 58 t/h and steam pressure of 41 Bar at 410°C. An alloy 625 weld overlay was shop-applied on the fireside water wall panels to protect the WtE boiler tubes from fireside corrosion. After months of operation, an inspection revealed accelerated degradation of the alloy 625 just above the grate. Several solutions were considered including replacement, field-applied weld overlay and thermal spray.

Evaluation of Alternatives

The replacement of affected water wall sections with new sections and like-for-like weld overlay repair were dismissed as intensive and time-consuming solutions. "Thermal spray" technology had mixed results in boiler applications so the plant invited four thermal spray vendors to perform test applications on different sections within the boiler. Out of the four claddings applied, only 2 delivered satisfactory results, with the IGS HVTS solution being the best in terms of performance and capacity. Multiple IGS HVTS guns can be operated inside the boiler at the same time with no capacity limitations. Supported by comprehensive laboratory testing and extensive field experience, IGS HVTS alloy cladding has no issues with permeability or disbondment and can offer lasting protection, where other technologies fall short. The test application results and additional references convinced the head of maintenance to choose IGS HVTS as the solution to their problem.

HVTS Application

The IGS HVTS application took place in 2017 on a 20m² area located on the left membrane wall at the very low furnace of the moving grate WtE boiler above the refractory. The plant also had a thermal spray (TS) coating applied by a different vendor on the right-hand side of the membrane. These areas were then inspected in 2018 to determine the treatments' effectiveness at stopping the weld overlay (WMO) degradation. Whereas the area clad with IGS HVTS was no longer affected by corrosion, the unprotected alloy 625 WMO and the other vendor's TS, both continued to degrade. It was therefore decided to extend the scope and apply HVTS alloy cladding onto an additional ~20m² area in 2019. Inspection later that year confirmed that the areas protected with high-velocity thermal spray (HVTS) alloy cladding were not exhibiting any pitting corrosion or wastage, while adjacent unprotected alloy 625 weld overlay sections were showing signs of wear and degradation.

For more information: <https://integratedglobal.com/services/on-site-thermal-spray-coatings/>

NEWS FROM EFC WORKING PARTIES AND TASK FORCES

NEWS FROM THE WORKING PARTY 4 ON NUCLEAR CORROSION



Henri Coriou Award 2020



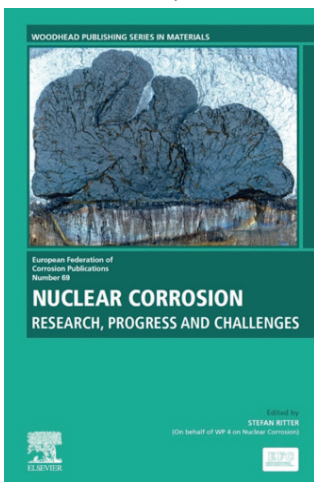
This year, for the fifth time, the Coriou Medal for outstanding contributions to corrosion science and engineering in the nuclear field has been awarded. From a group of outstanding candidates nominated by the members and friends of the WP 4, the five-person jury has selected Ulla Ehrnstén (VTT Technical Research Centre of Finland Ltd., Finland) as this year's recipient.

Ulla Ehrnstén is working at VTT as a principal scientist in the field of nuclear materials and root cause analyses. Her research experience of over 30 years covers the performance of nuclear materials in various nuclear environments including BWRs, PWRs, VVERs, and GenIV systems. Root cause analysis for both national and international customers has been key in her work since the early days at VTT. She teaches nuclear materials behaviour at the Aalto University and Åbo Academy University, as well as giving courses for newcomers in the nuclear field at the STUK (the Finnish

nuclear safety authority). She is the project manager and key scientist in several Finnish research projects in the area of nuclear materials and was leader of VTT's nuclear materials team. She is currently the project manager of the largest SAFIR2022 project 'BRUTE', which deals with the characterisation of reactor pressure vessel weld metal trepanns removed from the Barsebäck 2 pressure vessel. She has authored more than 150 scientific articles, several hundred customer reports and three book chapters. She also participated in several EU-projects and is a working group leader in the International Cooperative Group on Environmentally-Assisted Cracking, a scientific board member of the Environmental Degradation and Fontevraud conferences and has been a steering committee member in several European energy/nuclear safety research alliances or councils.

A new EFC 'Green Book' has been released

In 2017 the WP 4 marked its 50th anniversary with a workshop during EUROCORR comprising invited talks from renowned experts covering almost the entire range of nuclear corrosion topics. As a result of these workshop contributions, **Nuclear Corrosion: Research, Progress and Challenges**, is being published as part of the "Green Book" series of the EFC. This book builds upon the foundations of the very first book published in this series in 1989 ("Number 1 – A Working Party Report on Corrosion in the Nuclear Industry"). Since that publication, this WP has guided and supported the research and application of results in the broad field of nuclear corrosion.



This newest volume (No. 69) starts with a recap of the history and (recent) activities of the WP 4 and provides an overview on the state-of-the-art of research in some of the most important areas of nuclear corrosion. The chapters covered include ageing phenomena in light water reactors, reprocessing plants, nuclear waste disposal, supercritical water and liquid metal systems. This book will be a vital resource for researchers and engineers working within the nuclear field in both academic and industrial environments. More information is available via the EFC website (or here: <https://www.elsevier.com/books/nuclear-corrosion/ritter/978-0-12-823719-9>).



Report on the WS on Long-Term Prediction of Corrosion Damage in Nuclear Waste Systems (LTC 2019)

The 7th edition of the series of international workshops on the long-term prediction of corrosion damage in nuclear waste systems (or LTC 2019, EFC event no. 443) was held from November 19 to 21 in Nancy (France). CEFRACOR (French corrosion association) has organized the event with the support of ANDRA (French national nuclear waste organisation) and CEA (French Alternative Energies and Atomic Energy Commission). The main objective of these workshops is to get together scientists and engineers from various countries that are developing high-level nuclear waste disposal technologies, with the goal of promoting scientific and technical exchanges concerning the long-term behaviour of metallic containment materials and engineered barrier systems. The event succeeded in gathering 70 participants from 15 countries (see the group photograph) with 38 oral presentations and 24 posters. In particular, the workshop compared the approaches that are being developed worldwide for predicting long-term corrosion phenomena, including corrosion strategies for interim storage and geological disposal. The 2019 edition has been divided into five oral and one poster session, which addressed the following items: overview on national programmes with emphasis on similarities, common challenges and different approaches, legal issues, retrievability, etc.; experimentation with candidate materials, including laboratory tests, full-scale demonstration, in-situ testing and methodology; modelling, monitoring and design.



Also a best poster prize was awarded to two young professionals. The winners of these prizes are Typhaine Guillemot (PSI, Switzerland) for her poster entitled *"Understanding the carbon speciation during iron corrosion in the alkaline anoxic conditions for safety assessment of radioactive waste repositories"* and Joakim Halldin Stenlid (Stockholm University, Sweden) for his poster entitled *"On the cathode reaction for sulfide-induced copper corrosion"* (see the picture showing the recipients in the centre together with the prize jury).

The workshop's networking activities included extended coffee breaks, a technical tour and a gala dinner in the prestigious city hall of Nancy, where wine and food were greatly enjoyed together with friendly exchanges and a warm atmosphere. The one-day technical tour was organized by ANDRA to the underground laboratory of Bure. The visit was not only very instructive and well organized, but also greatly appreciated by the participants. Finally it may be reported that LTC's international scientific committee elected Bruno Kursten (SCK CEN) as its new Chairman and decided to propose to the EFC WP4 to hold the next LTC workshop in Switzerland (organized by Nitikas Diomidis, Nagra) in 2022.

A more detailed report can be found on WP 4's website.

Working Party website:
www.efcweb.org/WP4.html



NEWS FROM THE WORKING PARTY 1 ON CORROSION AND SCALE INHIBITION

The Working Party on Corrosion and Scale Inhibition (WP1) organized a 2-day **Intensive Course on Corrosion and Scale Inhibition - Theory, Testing, Application** (EFC-Event-No. 456) on 18 – 20 February 2020 in the Institute for Maintenance and

Corrosion Protection Technologies (IFINKOR) in Iserlohn, Germany, in cooperation with GfKORR (Gesellschaft für Korrosionsschutz e.V.) and the WCO (World Corrosion Organization).

Fourteen participants from six European Countries (Germany 5, Belgium 3, France 2, Great Britain 2, Greece 1, The Netherlands 1) were brought up to date regarding knowledge in theory, testing and application of corrosion and scale inhibitors with emphasis on application and environmental aspects. Half a day was devoted to “Green Inhibition” and the registration of corrosion and scale inhibitors considering REACH (Registration, Evaluation, Authorization of Chemicals) managed by ECHA (European Chemicals Agency). The course programme provided ample information to enable course participants to tackle inhibitor problems efficiently. The international group of lecturers consisted of Prof. Dr. Günter Schmitt (IFINKOR, Germany; Chair WP1), Dr. Wolfgang Hater (Kurita Europe GmbH, Germany; Co-chair WP1), Prof. Dr. Helena Otmačić-Ćurković (Department of Electrochemistry, University of Zagreb, Croatia), Prof. Dr. Fatima Montemor (Department of Chemical Engineering, University of Lisbon, Portugal; EFC-Past-President), Dr. Robert Lindsay (Corrosion & Protection Center, University of Manchester, United Kingdom), Prof. Dr. Kostas Demadis (Department of Chemistry, University of Crete, Greece) and Dr. Tim Gommlich (IFINKOR, Germany). A second edition of the course is planned for 2021.

TASK FORCE ON ATMOSPHERIC CORROSION CATALOGUE OF EUROPEAN ATMOSPHERIC EXPOSURE SITES

The goal of the Task Force Atmospheric corrosion is to foster collaboration between researchers from universities, institutes and industry in order to assist in the development of solutions for reducing the negative impact of corrosion in structures and objects exposed to the atmosphere. For the testing of new or improved corrosion protection measures, various laboratory tools and techniques are available, including modelling, accelerated corrosion tests and field exposures. The last one comes into the picture usually in the final stages of product development, where the former techniques have obvious limitations with respect to the appropriate simulation of real atmospheric environments.



There are numerous atmospheric exposure sites in Europe in locations with different corrosivity and prevailing corrosive factors. To ensure that the most reliable data are obtained from long-term field testing, it is necessary to select a site or sites with corresponding characteristics. As not all sites are generally known, an initiative was launched within the TF to prepare a catalogue of European field exposure sites. This will include climatic and corrosivity data from well-established and managed sites along with the contact details of their managers. The catalogue will help industry and researchers to find the right place for their outdoor corrosion programmes.

As we are now collecting information about sites to be included in the catalogue, please forward any available information to: tomas.prosek@vscht.cz. Updates on the process will be published at www.efcweb.org activate the link in the TF Atmospheric Corrosion section.

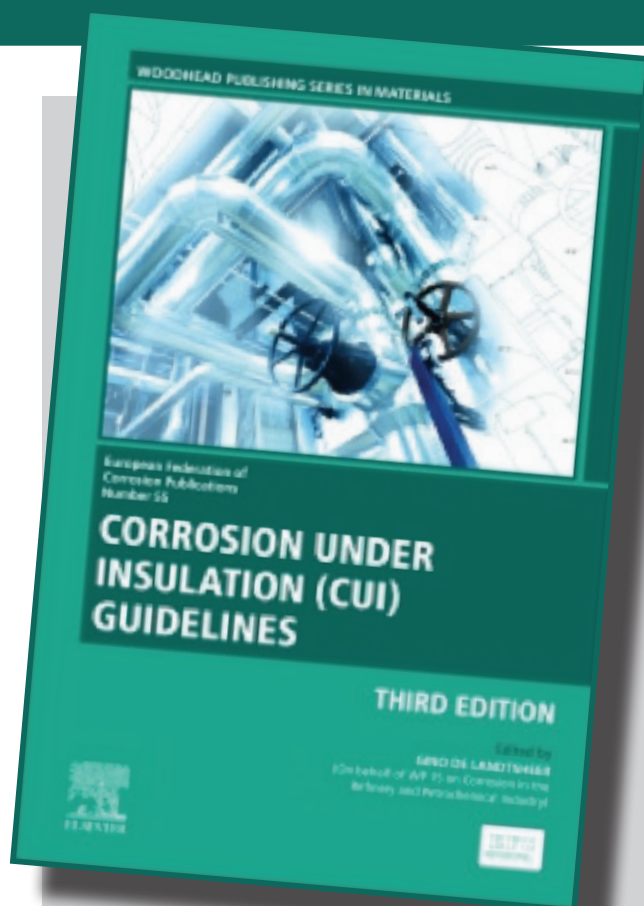
New EFC Publications

CORROSION UNDER INSULATION (CUI) GUIDELINES: TECHNICAL GUIDE FOR MANAGING CUI (EFC NO 55- 3RD EDITION)

Description

Corrosion Under Insulation (CUI) Guidelines: Technical Guide for Managing CUI, Third Edition, Volume 55 builds upon the success of the first two editions to provide a fully up-to-date, practical source of information on how to monitor and manage insulated systems. In the first edition of this book published in 2008, the EFC Working Parties WP13 and WP15 engaged together to provide guidelines on managing CUI with contributions from a number of European refining, petrochemical, and offshore companies. The guidelines were intended for use on all plants and installations that contain insulated vessels, piping, and equipment, and cover a risk-based inspection methodology for CUI, inspection techniques, and recommended best practices for mitigating CUI.

The guidelines include design of plant and equipment, coatings and the use of thermal spray techniques, types of insulation, cladding/jacketing materials, and protection guards. Corrosion-under-insulation (CUI) refers to the external corrosion of piping and vessels that occurs underneath externally clad/jacketed insulation as a result of the penetration of water. By its very nature CUI tends to remain undetected until the insulation and cladding/jacketing is removed to allow inspection, or when leaks occur. CUI is a common problem shared by the refining, petrochemical, power, industrial, onshore and offshore industries.



Editor: Gino De Landtsheer

Woodhead Publishing; Published Date: 3rd August 2020; 220 pages; Hardcover ISBN: 9780128233320

Nuclear Corrosion - Research, Progress and Challenges (EFC No. 69)

For details see News from the Working Party 4

For online ordering of the EFC Publications, go to:
<https://www.elsevier.com/catalog/all/all/all/european-federation-of-corrosion-efc-series>

EFC Web-Seminar Series

INAUGURAL EFC WEB-SEMINAR ON "CORROSION PROTECTION BY ORGANIC COATINGS"

Keeping the community together is an important issue for the EFC in these present times. As physical meetings are more-or-less impossible this year, the EFC has decided to enter the virtual world by establishing a series of web-seminars. The first one in this series took place on 20th May focusing on "Corrosion Protection by Organic Coatings". After the opening by Wolfram Fürbeth as Chairman of the EFC Working Party "Coatings", the following four presentations on current research in the field were given:

- ▶ Steel corrosion protection using post-consumer polyethylene terephthalate coatings (Michele Fedel, University of Trento)
- ▶ Parallel EIS and IR measurements to study the formation and destruction of interfacial bonds between polymers and metal oxides (Herman Terryn, Vrije Universiteit Brussels)
- ▶ Mapping the Transport Channels in an Epoxy Coating with AFM-IR (Simon Gibbon, Akzo Nobel)
- ▶ Effect of surface chemistry on the bonding mechanisms, strength and durability of steel-epoxy adhesive bonds (Jost van Dam, TU Delft)

More than 600 participants followed the presentations online during the 90-minute Web-Seminar. Lively discussions followed each presentation making the first EFC webinar a great success.

The presentations are available at: <https://efcweb.org/WebSeminars>

SECOND EFC WEB-SEMINAR FROM WORKING PARTY "NUCLEAR CORROSION"

Following the success of the inaugural EFC Web-Seminar on "Corrosion Protection by Organic Coatings" organised by Wolfram Fürbeth, Stefan Ritter, Chairman of the EFC Working Party "Nuclear Corrosion", continued the series by inviting speakers from EUROCORR in Seville in 2019 to give their presentations to an online audience.

The second EFC Web-Seminar took place on 30th June 2020, and after a brief opening by Stefan Ritter, the following four presentations on state of the art research in the broad field of nuclear corrosion were given:

- ▶ SiCf/SiC cladding for LWR: Assessment of flow accelerated corrosion (M. Le Flem)
- ▶ Stress corrosion testing of copper in near neutral sulfide solutions (C. Taxén)
- ▶ A study of stress corrosion cracking by high-speed atomic force microscopy (S. Moore)
- ▶ Corrosion mechanisms of T91 (Fe-9Cr) steel in Pb-Bi eutectic alloy aided by thermodynamic calculations: Effect of oxygen (S. Gossé)

110 people attended the virtual event and a lively discussion with many questions followed each presentation. In these current difficult times concerning COVID-19, it may be that the virus is forcing us to use the internet as it was always meant to be used - to connect with one another, share information and resources, and come up with collective solutions to urgent problems. Of course, such online events cannot fully replace face-to-face seminars, but they could well complement such events in a COVID-19-free future.

Young EFC Report



The Young EFC (YEFC) is an initiative created in 2016 by the European Federation of Corrosion (EFC) with the aim of attracting and supporting young researchers and engineers in the field of corrosion. The main objective of YEFC is to provide young corrosionists with a platform to help them build their own networks and to strengthen their scientific careers across national borders.

Ongoing actions promoted by the Young Federation include:

- ◆ Dissemination of courses and workshops;
- ◆ Young EFC Mentoring Program;
- ◆ EFC awards for young scientists (EFC Poster Prize, EUROCORR Young Scientist Grant).
- ◆ The Young EFC also played a prominent role this year in the events that took place on or near Corrosion Awareness Day (see below). Due to the international situation with respect to the COVID-19 virus, participants were encouraged to innovate and modify their initiatives to an online and safe format. Below are reports on some of the activities that were organised.

How to join the YEFC?

If you think that networking, communication, innovation and learning are key factors for a successful career in the corrosion field, do not hesitate to join the Young EFC.

Visit our website for more information: <https://efcweb.org/YoungEFC.html>

YEFC contact: YoungEFC@efcweb.org

ACTIVITIES PROMOTED BY THE YEFC

In total, twelve activities were independently organized by the Young EFC over the period from the beginning of March to the end of May, with two of them actually occurring on Corrosion Awareness day and the others inspired by that day. Descriptions of seven of the activities based on the summaries provided by the organizers are given in the following paragraphs.

A webinar on “**How does corrosion influence the health of concrete?**” was organized by **the Reinforcement Corrosion and Structural Safety Group of the Eduardo Torroja Institute of the Spanish National Research Council** and was conducted by Javier Sánchez Montero, Nuria Rebolledo Ramos and Julio Torres Martín. This event was attended by twenty seven people. The webinar reviewed the various processes of degradation that affect concrete, including the various types of corrosion in reinforcing steel and the main agents that cause this corrosion. The various tests for understanding how CO₂ and chlorides enter into the concrete were explained including the electrochemical measurements employed to evaluate the degree of structural corrosion, and the necessary regulations for its assessment.

“**Predicting corrosion protection: First sight at Electrochemical Impedance Spectroscopy**” was a one day course run prior to lockdown on March 3rd for high school students by Luciane Sopchenski Santos and Leonardo Bertolucci Coelho from **the Materials Unit of University of Mons (Belgium)**. The participants attended an introductory talk about the basic concepts of corrosion and corrosion measurement techniques. They learned about open circuit potential, potentiodynamic polarization and electrochemical impedance spectroscopy. Following the presentation, they were introduced to the laboratory and its different instruments. The students could observe the different electrochemical behaviour of stainless steel and aluminium alloys after various periods of exposure to corrosive media. After collecting the data, they learned how to interpret and fit an equivalent electrical circuit model for electrochemical impedance spectroscopy. At the end of the event they could understand the protective nature of coatings and learned how to predict their failure.

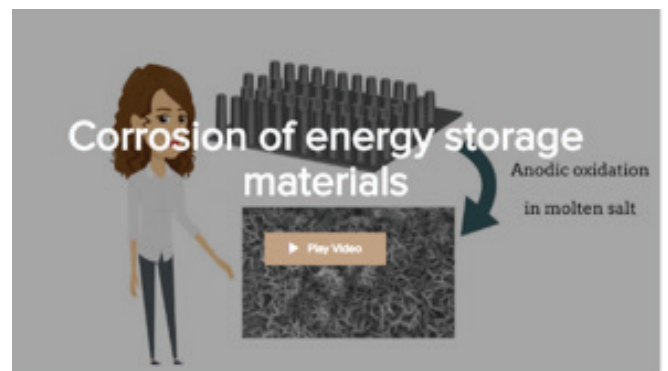
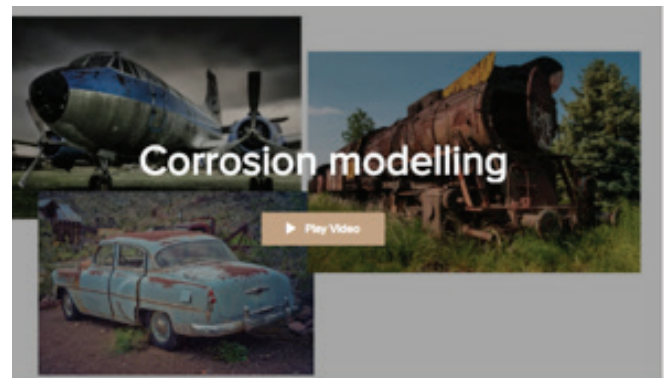
The **Hungarian Corrosion Awareness Day** was organised by Dorina Kovács (**HUNKOR, Hungarian Corrosion Society**) and Balázs Varbai (**Department of Materials Science and Engineering (Budapest University of Technology,)**) and presented online on the HUNKOR Facebook page, where short videos and articles from various Hungarian industries can still be viewed. The corrosion resistance of guitar strings, design of a clamp for corrosion testing, and Corten steels were among the items shown. There was also a highly successful photo competition for which twenty three photos were uploaded from all over the continent (Hungary, Spain, Germany etc). Thanks to the indispensable support of the Young EFC, over 1900 people viewed these pictures Zsombor Krójer was the winner of the “like” contest (Fig. 1).

Fig. 1. Winning photograph of HUNKOR organized photographic competition



Fig. 2. Examples of videos produced by Swedish group

The **mCBEEs Innovative Training Network (ITN)** PhD students (Live Mølmen (**Department of Electrification and Reliability, Research Institutes of Sweden**), Salil Sainis (**Department of Materials and Manufacturing, Jönköping University**) and Sabrina Patricia Rosoiu (**Center for Surface Science and Nanotechnology, University Politehnica of Bucharest**)) produced a total of fourteen videos (2-5 minutes each) describing the corrosion problems they are working on, and how they are helping solve these problems (Fig. 5). These were posted on YouTube as well as on the mCBEEs website, Facebook, Twitter and LinkedIn pages, the students own personal accounts, and the common accounts for all Marie Skłodowska-Curie Actions. On the mCBEEs website, the videos are sorted according to application areas: modelling, energy conversion, electronics and biocompatible materials. As well as helping to spread awareness of the corrosion awareness day, the videos are a great tool for our students to disseminate their personal projects. For more information on the mCBEEs initiative, please visit their website (www.mcbees.eu).



“**Keeping in touch with corrosion**” was the subject of six dissemination articles related to corrosion science published via a LinkedIn account by Dr. Eva García-Lecina, Dr. Gemma Vara and Dr. Jesús Manuel Vega **from CIDETEC Surface Engineering in late April**. Topics included: the impact of corrosion upon society in terms of economic costs and social risks; the importance of high temperature corrosion and strategies for dealing with it; the widespread prevalence of electrochemical corrosion and the various approaches/tools for evaluating it at industrial and research institutions; the crucial nature of localized corrosion when it affects functionality and the importance of evaluating and addressing it for gaining a better understanding of the corrosion phenomena; the need to minimize corrosion damage using protective coatings, and the harmful synergic effect of corrosion when it occurs in combination with processes such as wear; the role of corrosion monitoring

Fig. 3. Examples of posts published on Cidetec's LinkedIn page



Fig. 4. Example of slide from COMSOL webinar

Demo Sacrificial Anode Protection

- Cathodic protection of a steel structure using sacrificial AlZnIn anodes
- Decreased protection over time due to anode consumption and build-up of resistive films



Protection of the surface of the surface of a steel in an offshore platform (for any of the platforms is prevented by all sacrificial anodes)

Fig. 5. Example from Oli Systems webinar: modeling and interpretation of data

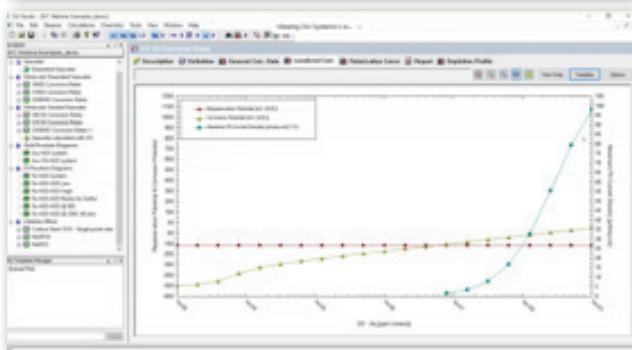
Corrosion simulation

OLI^s studio

- Thermodynamics of corrosion
 - ✓ Real solution Pourbaix diagrams
 - ✓ Corrosive, passivating and inert areas
 - ✓ For a given pH and ORP
- Corrosion of chemical attack
 - ✓ Bulk solution in contact with a metal surface
 - ✓ General and localized corrosion
 - ✓ Researching: stress corrosion and cracking
- Remaining asset life calculation
 - ✓ Extreme value statistics
 - ✓ Statistical model (pit depth versus time)

OLI^e engine

OLI^t tools



in corrosion control, for example by the anticipation of catastrophic failures. The various posts published throughout the week can be found on the CIDETEC LinkedIn page (<https://www.linkedin.com/company/fundaci-n-cidetec/>) and are illustrated in Fig. 3.

A free online **COMSOL Multiphysics course** was hosted on May 12th by Yara Soares and Frank de Pont (**COMSOL**). The webinar provided an introduction about how to use the COMSOL Multiphysics® software to simulate corrosion and corrosion protection (Fig. 4). The Corrosion Module, an add-on to COMSOL Multiphysics, incorporates the requisite tools and features to model all types of electrochemical corrosion phenomena from the microscopic scale of localized corrosion on grain boundaries, through the complex chemical and electrochemical corrosion reactions in pits, gaps, and crevices, up to the full scale modeling of anodic sacrificial and cathodic protection systems of oil rigs and transport infrastructure, and chemical plants. A total of twenty five people took part in a two-hour online session introducing the basic theory of electrochemical-based corrosion. In a series of demo models, the various interfaces and features in the Corrosion Module were used to model the cathodic protection of a steel structure using sacrificial AlZnIn anodes.

On Tuesday, 26 May 2020 a 90 minutes webinar on “**Corrosion Modeling Basics**” was presented by **OLI Systems**. This free course organized by PhD Diana Miller, Mike Kochevar and Dira Silvera was oriented for young researchers and engineers challenged by the need for ingenious technical expertise combined with a strong scientific understanding of fundamental materials and corrosion problems. Members of the Young EFC had priority seating. The OLI Studio Corrosion Analyzer is an aqueous corrosion simulation software package used for the accurate prediction of general corrosion rates and the propensity of localized corrosion, thus enabling the mitigation of corrosion, increasing useful asset life and improving operational efficiency and reliability. This presentation course was designed to train attendees on how to use the OLI software platform V10 and its underlying chemistry principles to model electrolyte solutions and study their impact on metallic corrosion. Participants left with basic concepts of how to calculate and interpret: general corrosion rates, localized corrosion susceptibility, polarization curves, and Pourbaix diagrams. The 31 people who participated in this online session learned how to formulate and build their own electrolyte and corrosion applications and interpret the data presented in reports and plots (Fig. 8)

Links for more information

♦ World Corrosion Organization: <http://corrosion.org/>

♦ Young EFC flyer for the Corrosion Awareness Day 2020:

https://efcweb.org/efcweb2019_media/Documents/YoungEFC/corrosion+awareness+day+24+April+2020.pdf

♦ Selection of images from the Corrosion Awareness Day 2019:

http://corrosion.org/Welcomes-to+WCO/_/Han_2019%20Corrosion%20Awareness%20Day%20Activities.pdf

WORLD CORROSION AWARENESS DAY



THE CORROSION AWARENESS DAY ON 24TH APRIL 2020

In 2010, the World Corrosion Organization (WCO) assisted by the European Federation of Corrosion (EFC), the Chinese Society for Corrosion and Protection (CCPS), NACE (USA) and the Australasian Corrosion Association (ACA), established the Corrosion Awareness Day on the 24th April. In the frame of this day, various events are organized around the globe in order to raise awareness of the extensive problems caused by corrosion. The 2019 edition encompassed a hive of activities, including conferences, poster presentations, live corrosion experiments, and web-seminars in a wide range of countries such as China, France, Spain, Israel, South Africa, Pakistan, Portugal and the USA.

The 2020 edition was strongly supported by the YEFC, who invited young researchers to actively take part in online action(s) related to Corrosion Science and Engineering on or around 24th. These are reported in the Young EFC section. There was also a successful Web-Seminar on Low Carbon Technologies which is reported below.

WCO-EFC LOW CARBON STEEL TECHNOLOGIES WEB-SEMINAR

This year, on Corrosion Awareness Day (24th April), the World Corrosion Organization (WCO) organised a Web-Seminar dealing with "Corrosion and Low Carbon Energies" This topic is presently of paramount interest due to the shift from fossil fuel-based energy production to low carbon energies.

The WCO organised a panel of internationally renowned speakers on this topic, which was chaired by Damien Féron (CEA, France). Presentations included: "Environmental Degradation of Light Water Reactor Fuel Rods in the Entire Fuel Cycle" by Raul R. Rebak (GE, USA); "Corrosion issues in Fusion Reactors" by Digby D. Macdonald (University of California at Berkeley, USA); "Cost reduction of water electrolysers via insights into anode current collector corrosion" by Gareth Hinds (NPL, UK); "Corrosive CO₂-stream components, challenging for materials to be used in CC(U)s applications" by Ralph Bässler (BAM, Germany); and "Corrosion & solar panels" by Polina Volovitch (ENSCP, France).

Five hundred participants from around the world logged on to attend the presentations during the two-hour web-seminar and numerous questions were posed to the authors after their presentations.

The presentations can be found online via the WCO website at: www.corrosion.org.

PREVIEW: EUROCORR 2022 & 2023

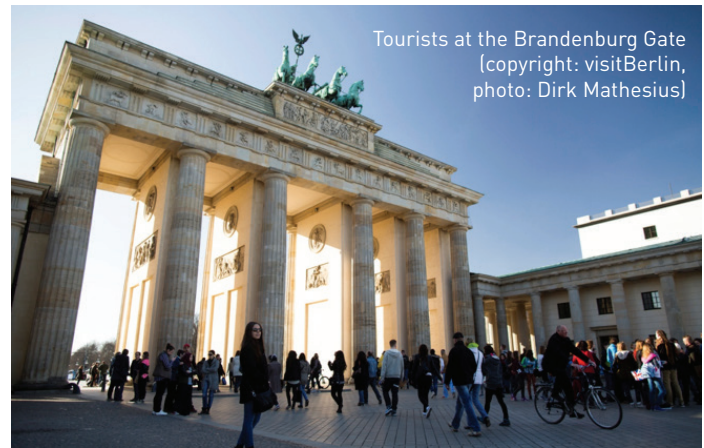


EUROCORR 2022 28TH AUGUST TO 1ST SEPTEMBER 2022, BERLIN, GERMANY

EUROCORR 2022 is being organised by GfKORR (Society for Corrosion Protection) and DECHEMA (Society for Chemical Engineering and Biotechnology) under the motto "Corrosion in a changing world - Energy, Mobility, Digitalisation". The flagship event of the European

Federation for Corrosion will take place in the heart of Berlin at the Maritim Hotel, Berlin. Each year EUROCORR attracts over one thousand corrosion experts from all over the world. The high level of scientific expertise of the participants has made EUROCORR a permanent fixture on the agenda of experts from universities and industry. For young colleagues the Young EFC provides a platform to exchange ideas with expert colleagues and to become part of a unique network.

Berlin is multi-faceted. Berlin is diverse. Berlin sets trends. It is not without reason that the German capital city is one of the most visited cities in Europe. First-class museums, international trade fairs and all kinds of sights attract visitors in droves. Whether at Potsdamer Platz, Alexander Platz, Kurfürstendamm or Prenzlauer Berg, the city is full of various surprises. Berlin stands for freedom, tolerance and diversity of life-styles. Go on a journey through time and discover the scenes of world history in Berlin. You should therefore note the date and plan a trip to Berlin in autumn 2022.



Tourists at the Brandenburg Gate
(copyright: visitBerlin,
photo: Dirk Mathesius)

EUROCORR 2023 27TH - 31ST AUGUST 2023, BRUSSELS, BELGIUM

EFC's annual conference EUROCORR 2023 will take place in Brussels (Belgium). The organisers, VOM asbl in collaboration with University of Mons, Vrije Universiteit Brussel, Materia Nova and DECHEMA are pleased to invite you to participate in EUROCORR 2023.

Place: Brussels, SQUARE Brussels Meeting Center

Information: University of Mons, Prof. Marjorie Olivier, marjorie.olivier@umons.ac.be
VOM, Ir Veerle Fincken, v.fincken@vom.be
Vrije Universiteit Brussel, Prof. Herman Terryn, herman.terrinn@vub.be
Materia Nova, Dr Mireille Poelman, mireille.poelman@materianova.be



Reichstag building (Copyright: visitBerlin, Foto: Pierre Adenis)

EFC WORKING PARTY INDEX

The EFC currently has twenty-two active Working Parties (WPs) and one Task Force, listed below, each concerned with a different aspect of the corrosion of metals, alloys and polymer materials. Activities of the EFC Working Parties/Task Forces include: collaborative research and testing programmes; organisation of workshops, seminars and conferences; preparation of state-of-the-art reports, guidelines and proceedings for publication as volumes in the EFC Series and the organisation of sessions at EUROCORR.

Membership to the EFC Working Parties is available as a right to all EFC members belonging to both European and International EFC Member Societies or to EFC Affiliate Members, including companies or universities/research centres. Anyone wishing to join one of the Working Parties listed below should apply to the appropriate Working Party Chairs. Please refer to the EFC website at <https://efcweb.org/Scientific+Groups> for full details on Working Party activities or contact EFC Scientific Secretary, Roman Bender (e-mail: roman.bender@dechema.de).

EFC WORKING PARTY 1: CORROSION AND SCALE INHIBITION

► **Chair:** Prof. Günter SCHMITT, IFINKOR (Institute for Maintenance and Corrosion Protection Technologies nfpLtd.), Iserlohn, Germany; E-mail: guenter.schmitt@ifinkor.de

EFC WORKING PARTY 3: CORROSION BY HOT GASES AND COMBUSTION PRODUCTS

► **Chair:** PD Dr. Mathias GALETZ, DECHEMA-Forschungsinstitut, Frankfurt am Main, Germany; E-mail: mathias.galetz@dechema.de

EFC WORKING PARTY 4: NUCLEAR CORROSION

► **Chair:** Dr. Stefan RITTER, Paul Scherrer Institut, Nuclear Energy and Safety Research Department, Villigen PSI, Switzerland; E-mail: stefan.ritter@psi.ch

EFC WORKING PARTY 5: ENVIRONMENT SENSITIVE FRACTURE

► **Chair:** Dr. Krzysztof WOLSKI, Centre SMS - UMR CNRS 5146, École des Mines de Saint-Etienne, Saint-Etienne, France; E-mail: wolski@emse.fr

EFC WORKING PARTY 6: SURFACE SCIENCE AND MECHANISMS OF CORROSION AND PROTECTION

► **Chair:** Prof. Philippe MARCUS, École Nationale Supérieure de Chimie de Paris, Paris, France; E-mail: philippe-marcus@chimie-paristech.fr

EFC WORKING PARTY 7: CORROSION EDUCATION

► **Chair:** Prof. Daniela ZANDER, Gießerei-Institut, RWTH Aachen, Aachen, Germany; E-mail: D.Zander@gi.rwth-aachen.de

EFC WORKING PARTY 8: PHYSICAL-CHEMICAL METHODS OF CORROSION TESTING

► **Chair:** Prof. J.M.C. Arjan MOL, Delft University of Technology, Department of Materials Science and Engineering, Delft, The Netherlands; E-mail: j.m.c.mol@tudelft.nl

EFC WORKING PARTY 9: MARINE CORROSION

► **Chair:** Prof. Philippe REFAIT, Laboratory of Engineering Sciences for Environment (LaSIE), University of La Rochelle, La Rochelle, France; E-mail: prefait@univ-lr.fr

EFC WORKING PARTY 10: MICROBIAL CORROSION

► **Chair:** Dr. Pierangela CRISTIANI, RSE - Ricerca sul Sistema Energetico S.p.A., Milano, Italy; E-mail: pierangela.cristiani@rse-web.it

EFC WORKING PARTY 11: CORROSION OF STEEL IN CONCRETE

► **Chair:** Prof. Michael RAUPACH, RWTH Aachen, Institute for Building Materials Research, Aachen, Germany; E-mail: raupach@ibac.rwth-aachen.de

EFC WORKING PARTY 13: CORROSION IN OIL AND GAS PRODUCTION

► **Chair:** Mr. Marc WILMS, Shell Projects & Technology, Mechanical, Material & Integrity (MMI), Amsterdam, Netherlands; E-mail: marc.wilms@shell.com

EFC WORKING PARTY 14: COATINGS

► **Chair:** PD Dr.-Ing. Wolfram FÜRBEETH, DECHEMA-Forschungsinstitut, Frankfurt am Main, Germany; E-mail: wolfram.fuerbeth@dechema.de

EFC WORKING PARTY 15: CORROSION IN THE REFINERY AND PETROCHEMISTRY INDUSTRY

► **Chair:** Dr. François ROPITAL, IFP Energies nouvelles, Direction Chimie et Physico Chimie Appliquées, Département Electrochimie et Matériaux, Solaize, France; E-mail: francois.ropital@ifpen.fr

EFC WORKING PARTY 16: CATHODIC PROTECTION

► **Chair:** Mr. Jérôme CROUZILLAC, BAC Corrosion Control, Voisins-le-Bretonneux, France; E-mail: j.crouzillac@bacfrance.com

EFC WORKING PARTY 17: AUTOMOTIVE CORROSION

► **Chair:** Ms. Elizabeth SZALA, R & D - Innovation Centre Duffel, ALERIS ALUMiNUM DUFFEL BVBA, Duffel, Belgium; E-mail: elizabeth.szala@aleris.com

EFC WORKING PARTY 18: TRIBOCORROSION

► **Chair:** Dr. Stefano MISCHLER, École Polytechnique Fédérale de Lausanne (EPFL), Tribology and Interface Chemistry Group, Lausanne, Switzerland; E-mail: stefano.mischler@epfl.ch

EFC WORKING PARTY 19: CORROSION OF POLYMER MATERIALS

► **Chair:** Dr.-Ing. Jürgen HEINEMANN, DIN CERTCO Gesellschaft für Konformitätsbewertung mbH, 12103 Berlin, Germany; E-mail: juergen.heinemann@dincertco.de

EFC WORKING PARTY 20: CORROSION AND CORROSION PROTECTION OF DRINKING WATER SYSTEMS

► **Chair:** Dr. Johann Wilhelm ERNING, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany; E-mail: wilhelm.erning@bam.de

EFC WORKING PARTY 21: CORROSION OF ARCHAEOLOGICAL AND HISTORICAL ARTEFACTS

► **Chair:** Dr. Delphine NEFF, Archaeomaterials and Alteration Prediction Laboratory, SIS2M/LAPA CEA/CNRS, CEA Saclay, Gif-sur-Yvette, France; E-mail: delphine.neff@cea.fr

EFC WORKING PARTY 22: CORROSION CONTROL IN AEROSPACE

► **Chair:** Mr. Theo HACK, EADS Innovation Works, Munich, Germany; E-mail: theo.hack@eads.net

EFC WORKING PARTY 23: CORROSION RELIABILITY OF ELECTRONICS

► **Chair:** Prof. Rajan AMBAT, Technical University of Denmark (DTU), Materials and Surface Engineering, Lyngby, Denmark; E-mail: ram@mek.dtu.dk

EFC WORKING PARTY 24: CO₂-CORROSION IN CCS-APPLICATIONS

► **Chair:** Dr. Ralph BÄSSLER, Bundesanstalt für Materialforschung und -prüfung, Berlin, Germany; E-mail: ralph.baessler@bam.de

In addition:

EFC TASK FORCE ON ATMOSPHERIC CORROSION

► **Chair:** Dr. Tomáš PROSEK, University of Chemistry and Technology Prague, Department of Metallic Construction Materials, Kralupy nad Vltavou, Czech Republic; E-mail: tomas.prosek@vscht.cz

Forthcoming EFC Events 2020/2021

Please check the respective event websites for postponements!

2020

7-11 September 2020

virtual EUROCORR 2020

www.eurocorr.org / www.eurocorr2020.org

EFC Event No. 461

Lviv, Ukraine,

6-8 October 2020 (NEW DATE)

XIII International Conference "Corrosion-2020"

<http://www.ipm.lviv.ua/corrosion2020/en/index.html>

EFC Event No. 464

Stare Jabłonki, Poland,

14-16 October 2020 (NEW DATE)

PSK Conference "State-of-the-art-anticorrosion technologies"

<https://psk.org.pl/konferencje-sympozja-targi/konferencja-psk-w-starych-jablonkach>

EFC Event No. 465

Ustroń Jaszowiec, Poland

2-4 December 2020 (NEW DATE)

28th National Conference on Scientific and Technology "Anticorrosion. Systems - Materials - Coatings"

<http://gliwice.sitpchem.org.pl/28-antykorozyja-2020/>

2021

EFC Event No. 466

Frankfurt, Germany

14-18 June 2021

ACHEMA2021

<https://www.achema.de/en/>

EFC Event No. 460

Malaga, Spain

22-25 June 2021 (to be confirmed)

Symposium on Corrosion and Surface Protection Methods - CNMAT 2020

EFC Event No. 455

Antibes Juan-les-Pins, France

8-10 June 2021 (NEW DATE)

7^{èmes} Journées Protection Cathodique et Revêtements Associés

(7th Cathodic Protection and Associated Coatings meeting)

<https://www.cefracor.org>

EFC Event No. 451

Cambridge, United Kingdom

5-9 September 2021 (NEW DATE!)

Advances in Corrosion Protection by Organic Coatings - ACPOC

<https://acpocconference.org/> or contact ruthbinghamfreelance@gmail.com

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“CEA - CORROSION Service”

FRENCH ALTERNATIVE ENERGIES AND ATOMIC ENERGY COMMISSION (CEA)

ENERGY DIVISION (DES)

APPLIED SCIENCES AND SIMULATION INSTITUTE FOR LOW CARBON ENERGY (ISAS)

DÉPARTEMENT DE PHYSICO-CHIMIE (DPC)

*SERVICE DE LA CORROSION ET DU COMPORTEMENT
DES MATÉRIAUX DANS LEUR ENVIRONNEMENT (SCCME)*

FROM RESEARCH TO INDUSTRY

cea



CORROSION IN THE NUCLEAR CYCLE AND IN LOW-CARBON ENERGIES

Research and development, testing and modelling, thermodynamics and kinetics, advices and consultancies, courses and training (with INSTN), ...

CEA-SCCME

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