Inspections in tunnels

Comparison of ageing tests
I AM VERY GLAD to welcome you to this new issue of Corrosion News. This issue covers very interesting topics. In particular, I invite you to read about the new projects initiated at Swerea KIMAB: Sustainable indoor urban recreation environments – Indoor pools; and New test method for thermomechanical fatigue in corrosive environments. As you will also notice, several seminars were recently organised by Swerea KIMAB. One on thermal oxides and post-weld cleaning techniques (JOINOX 2016), and another on Surface Protection (Ytskydd 2016). One should also mention the 1st International Seminar on Paintings for Corrosion Protection in Marine & Infrastructure held in November 2015. One of the papers presented at the last seminar has been added in this issue: Comparison of accelerated ageing tests as per ISO 20340 Annex A and NACE SP0108 standards. Still in the field of Paint, a FROSIO certification course for inspectors of paint systems and surface treatment was recently held at Swerea KIMAB.

AS USUAL, we will hold our Members Days in 2016. The first one which concerns members of ARCOR association will be held at Institut de la Corrosion on May 11-12th 2016 in Brest (France). The other one under the Swedish Association will be held at Swerea KIMAB on November 16th 2016 in Stockholm (Sweden). This will be a good opportunity for the members to follow up all the R&D programmes at Institut de la Corrosion and Swerea KIMAB within the field of Corrosion. I would like to draw your attention to several events in the coming months: Firstly, the 6th International Seminar in the Field of Automotive Corrosion that is planned for May 18–19th 2016 in Stockholm (Sweden) and secondly, Brass Alloy 2016 that will held on May 25-27th 2016 in Stockholm (Sweden).

FINALLY, PLEASE also note that one of the major European corrosion events, namely Eurocorr 2016 will take place in Montpellier (France) during September 11-15th 2016 where we will have the pleasure to welcome you at our booth. I hope you will find this issue of Corrosion News interesting and I am looking forward to meeting you at one of our member days and at Eurocorr 2016!

Nathalie LeBozec
Responsible R&D
Transport Industry
Institut de la Corrosion, France
Swerea KIMAB has developed a unique new method for testing thermomechanical fatigue in corrosive environments. Tests show that new, more corrosive fuels, could halve the life expectancy of certain materials.

During the last ten years Swerea has worked with the automotive industry in analysing environmentally friendlier alternatives to today’s pre-treatment processes.

In a recently finished project coordinated by Swerea KIMAB, the focus was on the need for an industry-wide approach of the assessment of damages and requests for improved non-destructive testing techniques.

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There are definite advantages if the materials in aircraft engines stand up to wear and tear, and new power stations operate reliably, without causing unnecessary disruptions. Swerea KIMAB has developed a unique new method for testing thermomechanical fatigue, TMF, in corrosive environments. Tests conducted at Swerea KIMAB show that new, more corrosive fuels, could halve the life expectancy of certain materials.

In the future it is expected that gas turbines will operate frequently in more corrosive environments than previously. This is mainly due to the increased use of conventional fuels with higher sulphur content. A similar trend is foreseen within the power sector as a result of increased use of biofuels.

**Shorter life expectancy of materials**

As the use of biofuels has become more common in power plants, new demands are placed on components. For example the effects of chloride, which is strongly corrosive, are clearly evident. Also for the gas turbine industry there is a legitimate concern that the life of the materials can be reduced significantly with the new fuels.
in corrosive environments

– We have therefore seen a need for new, more comprehensive test methods for verifying this, says Rikard Norling, Research Leader at Swerea KIMAB. To date, there has been a lack of data concerning the simultaneous effect of a corrosive gas environment and thermomechanical load.

Normally, thermomechanical testing is always conducted in air, but this does not take into account the effects of the environment inside the gas turbine. What is studied, above all, is how well the materials withstand repeated starting and stopping.

The underlying hypothesis for also factoring in the effects of fuel and gasses is that these can influence how the material is affected by high-temperature corrosion to a much greater extent than if testing is only done in air.

Adapted test rig

For the experiment, a test rig for thermomechanical testing has been adapted for testing in the presence of the corrosive and toxic gasses. Among other things, the test rig has been equipped with double-hermetically sealed test chambers. A gas delivery system has been added, so that the flow rate of corrosive gas can be controlled during testing.

– I would venture to say that the method we have developed is unique, since we subject the materials to temperature variations, corrosive influence and mechanical load, says Rikard Norling. Testing with the new method, which has been developed by Swerea KIMAB, indicates that the concerns regarding materials and service life appear to have been confirmed; i.e., the use of new more corrosive fuels could reduce the life expectancy of certain materials by nearly half. Our hope is that the method can aid the development of materials with longer service life, reduced material losses and, ultimately, lower carbon dioxide emissions.

The testing project has now reached the concluding phase
– We are now summarizing the results in a research report and I hope that we will soon be able to publish a scientific article on the subject, says Rikard Norling.

Development of the test method has been made possible thanks to support from the Swedish Energy Agency and the Swedish Energy Research Center, Energiforsk. Siemens Industrial Turbomachinery has also participated as an interest-group company.

– Swerea KIMAB has helped to fund the research project and the intention is to make the test method available to companies that need to test materials for use with corrosive fuels, explains Rikard Norling.

Contact

Rikard Norling, rikard.norling@swerea.se
A one day seminar organized by Swerea KIMAB and TWI took place at TWI Granta Park (Cambridge) on the 27th of January. The results from the 3–5 year European Project RFCS JOINOX, coordinated by Swerea KIMAB, were presented.

The seminar dealt with thermal oxides on stainless steel welded joints, with focus on the relationship between the oxides, corrosion resistance and suggested post-weld cleaning strategies.

More than 50 participants attended the conference including stainless steel manufacturers, shielding gas companies, consultancy companies and end-users from chemical and offshore sectors. A similar seminar will be arranged at Swerea KIMAB (Stockholm) in the following months. For more information on the subject visit the project website www.joinox.com

Contact
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ARCOR General Assembly and MRC meetings
Brest, May, 11–12, 2016

For further information, contact Nathalie LeBozec, nathalie.lebozec@institut-corrosion.fr
Hello there...

…Christophe Mendibide, researcher at Institute de la Corrosion, in Brest, France.

You are, amongst others, engaged in research regarding sulfide stress cracking resistance of carbon steel. What is that all about?
– In fact I joined the French Corrosion Institute (FCI) 1.5 years ago as deputy manager of the Saint-Etienne site. I am also in charge of other technical activities not only related to carbon steel or sulfide stress cracking as you indicated. I also work as leader of specific projects and with failure analysis in the framework of corrosion science and particularly for the oil and gas industry. Of course I am also part of the management, recruitment and training of the employees.

In your opinion, what would you say are the main challenges within your work?
– Today we are facing a severe crisis of the oil and gas industry, which is our main market at Saint-Etienne. The oil price has fallen by 75% in only 2 years, rendering many wells currently operated as unprofitable, delaying many development projects and thus decreasing the volume of work subcontracted to companies like FCI. Considering the current political situation, I have the feeling that this crisis could be long. You may already know for example that the NATO sanctions against Iran have been partially lifted and the country will therefore be allowed to become an oil exporting country again. Therefore oil prices will probably not significantly increase without a decision from OPEC to limit production. One of our short-term challenges is to adapt our activity and find new work opportunities.

Who or which industries would mostly benefit from the results of your research? In what way?
– Mostly the oil and gas industry, either through our qualification test services or through the subcontraction of research and development projects.

Why did you take an interest in this research field from the beginning?
– It is difficult to answer that, it’s like trying to explain why you prefer coffee rather than tea… I was attracted by corrosion science during my studies and already then considered this specialty as a career. It is interesting because it is a science at the border between material science and chemistry, and it is highly applied. When working in corrosion science you can see the impact of your work and results of your research within a short timeframe.

Tell us something about your background!
– I graduated as an engineer in year 2000 from the French school for electrochemistry and electrometallurgy (Grenoble, France) – Specialty: material Science and Electrochemistry. 2003 I presented my PhD thesis at Insa de Lyon – Study of the resistance of nanostructured coating to hot/wet corrosion and wear with correlation to the microstructure. I have also been working as research and development engineer with different projects.
Damage Atlas and Handbook on inspection of FRP
TODAY, THERE ARE no common guidelines for damage assessment of plastic materials and composites, which increases the risk of incorrect assessments and expensive failures. Glass fiber reinforced polyester (GRP or FRP) is a well-proven material in many corrosive environments, such as acids in chemical industries, bleaching chemicals in a pulp mill, or flue gases of a combustion plant. Inspection of process equipment made of FRP is essential for procurement, quality control, maintenance and revision. FRP can show changes in visual appearance which do not necessarily influence service reliability and lifetime. On the other hand, underestimating damages may have serious consequences with respect to safety, environment and economy.

In a recently finished project coordinated by Swerea KIMAB, the focus was on the need for an industry-wide approach of the assessment of damages and requests for improved non-destructive testing techniques (NDT). The outcome of the project, the damage atlas will provide a common tool for the assessment of defects.

The damage atlas is aimed at inspectors of plastics and composites in the industry or at inspection companies. In the atlas, you will find the proper term for the damage, one or more pictures of typical examples and a brief explanation of the cause of the damage and the appearance. In the accompanying table there is guidance for the assessment of how serious the damage is and recommendations for when and how the damage should be repaired.

The purpose of the atlas is to be a help on site of the inspection of various types of process equipment of glass fiber reinforced plastic (GRP).

The atlas has been developed together with an accompanying handbook. The handbook describes FRP, damages and NDT methods in more detail. The handbook will be available soon (Energy Research Institute report no 2015: 180).

Contact
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ABOUT THE PROJECT:
The project, which was funded by Energiforsk (the Energy Research Institute, formerly Värme forsk) and the Swedish Energy Agency, was conducted by Swerea KIMAB and Inspecta in cooperation with Termap and Bodens Energi. Within the project, a total of 32 people representing 19 companies and organisations took part in the development of the damage atlas and handbook by attending workshops, inspections and NDT-method testing arranged by the project.
CLAES TAXÉN is an exceptionally competent researcher who has extensive knowledge of fundamental corrosion, electrochemistry and modelling. Thanks to his solid understanding of the theory of chemical processes, Claes has an ability to create directly applicable corrosion models.

For many years, Claes has worked on national and international joint research concerning corrosion in copper-based materials. For example, Claes has developed a model for predicting copper levels in drinking water. Claes has also worked with renowned electrochemistry specialist Prof. John Scully, co-publishing papers on models that explain pitting propagation in copper-based materials.

Claes is an innovative researcher and a good ambassador for Swerea KIMAB. He is frequently consulted, both internally and externally, as a specialist in his field, and he is held in high esteem by colleagues, always taking the time to discuss new problems and share his knowledge generously.

Contact
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Claes Taxén has been awarded the 2015 Einar Mattsson Award

The book "Urban Pollution and Changes to Materials and Building Surfaces" (Ed. P Brimblecombe), discusses the ways in which materials are likely to be damaged by contemporary urban pollutants, with an emphasis on the effects of air pollution. A chapter "Air Pollution Damage to Metals" by J. Tidblad, Swerea KIMAB, is included as well as chapters describing damage to stone, glass and many other building materials. The volume should be of interest to scientists and policy-makers dealing with the effects of urban pollution, as well as undergraduate and graduate students working in this area. The book can be purchased on the website: www.worldscientific.com/worldscibooks/10.1142/p1062 The retail price is £76.00.

Contact
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Lead is a common alloy substance in brass, but due to the associated health hazards, it is becoming increasingly important to produce lead-free brass. A new alloy, free from lead, has been developed and is already on the market.

Together with Swerea KIMAB, Nordic Brass Gusum has developed a new lead-free brass alloy, AquaNordic®, within the framework of a Vinnova project.

Successfully tested
The new alloy combines both good corrosion properties and machining properties with significantly better environmental performance, and at a lower price than corresponding alternatives. The alloy also complies with all current health and environmental requirements, and has been successfully tested by Nordic Brass Gusum’s customers.

According to a life cycle analysis, made by Swerea IVF, the environmental impact for the new alloy is at least 30 percent lower than with other lead-free brass materials, and compared to other materials such as plastic, the difference is even greater.

The alloy is already commercially available from Nordic Brass Gusum.

“We’ve developed a superior alternative to leaded alloys. The new brass is easy to recycle, easy to machine and also less expensive than the competing product. AquaNordic® is an innovation,” says Håkan Amnäs, CEO for Nordic Brass Gusum.

Lead has been replaced
Brass is typically used in water taps, and small amounts of lead are normally added to the alloy to make it easier to machine. But lead is a toxin, dangerous to health, and is being phased out. In the new brass alloy, lead has been replaced with ceramic particles for retained good machining properties.

Brass Alloys 2016
An international arena for presentations and information exchange, aiming to boost and facilitate on-going and future research work in the field of brass materials and processing.

Program and registration form on the web site: www.brassalloys2016.com

Contact
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In a project for the Stockholm bypass (Förbifart Stockholm), Swerea KIMAB has assisted Trafikverket, the Swedish Transport Administration, with the elaboration of corrosion related requirements on materials and coatings for use in road tunnels.

The photos are from inspections in tunnels with XRF-measurements for identification of materials, and visual inspections identifying corrosion risks and corrosive effects on materials used.

Contact
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THE ANTICORROSION PROTECTIVE ability of coatings applied to steel is an important requirement for materials used in offshore constructions which are exposed to severe marine environments C5M or more. The selection of suitable protective paint systems including new coating technologies and surface preparation aspects implies the need for preliminary corrosion testing. The most reliable way of testing is obviously to perform field exposures in harsh environments representative of operating conditions which is time consuming, costly and sometimes not possible for practical considerations. Thus, the selection of paint systems for marine offshore application is often based on results from accelerated laboratory tests such as the conventional neutral salt spray test (ISO 9227, ASTM B-117) or more advanced cyclic corrosion tests such as ISO 20340 annex A or NACE SP0108 among others. The last standard refers to test methods NACE TM0304 and TM0404 for maintenance and new construction coatings respectively. Most of these accelerated corrosion tests are considered to be relatively quick ranging from 1440 to 4200 hours for neutral salt spray and ISO 20340 Annex A, respectively. However, it is also well-known that these tests do not fully represent environmental conditions. ISO 20340 and NACE SP0108 standards are both recommended for the assessment of paint systems for offshore applications. Nevertheless, they differ largely regarding the test duration (3 months for NACE versus 6 months in ISO), the salt solution (Synthetic seawater in NACE versus NaCl in ISO 20340), the cycles as well as the sample preparation (scribe). More details are given in Figure 1.

Comparable material ranking
The behavior of 12 different coating systems applied on abrasive blasted steel panels was studied in the two different accelerated corrosion tests. No damage such as blistering, rusting or cracking were observed on the overall surface in either test. The defects were concentrated at the periphery of the scribe. The rust creepage value was plotted when ranking the paint systems from the best to the poorest after the ISO 20340 test cycle, as shown in Figure 1. In addition, the acceptance criteria given by the different standards for zinc and non-zinc primers were highlighted as horizontal lines which allowed direct selection of paint systems. Comparable material ranking may be obtained after both testing conditions, with approximately twice as much corrosion degradation from the scribe after the ISO 20340 test than the NACE rust creepage test, except for one epoxy paint system (S9) which was more affected after the NACE test. A rather satisfying correlation of NACE and ISO 20340 data was also observed when plotting linear regression plots as given in Figure 2.
This figure also shows that 3 months of the ISO 20340 test method is already indicative of the 6 months situation. The aspect of underpaint corrosion from the scribe line should also be considered when comparing testing conditions or field exposures, as it reflects the mechanisms of corrosion propagation. Indeed, upon testing conditions, previous authors have shown that the corrosion of steel under thick paint layers may be governed by cathodic delamination or anodic undermining. As an example, continuous salt spray usually favours cathodic delamination on epoxy based paint and results in important rust production in the scribe line while a delaminated surface free of rust may be observed under the coating around the scribe. On the contrary, cyclic corrosion tests which alternate pollution phase (salt spray) with wet and dry cycles are in general governed by anodic undermining. In that situation, steel corrosion propagates under the paint from the scribe forming blisters and/or filaments full of rust. Such corrosion pattern was observed in both ISO 20340 annex A and NACE tests as shown on photographs in Figure 3. Comparable pattern and extent of blistering was noted when considering both tests at similar exposure durations which supports our previous comment on the exposure duration influence.

**Similar material ranking**

Despite significant differences in the two testing methods such as duration, salt solution, sequence of cycles or scribe orientation, similar material ranking was observed apart from one epoxy coating. With twice the duration, the ISO 20340 annex A test also generated about twice as much corrosion creepage compared to the NACE test, which indicates more an effect of duration rather test parameters. If the acceptance criteria of the corresponding standard was applied comparable protective paint selection was established except for one epoxy paint which was rejected by one standard only.

**Contact**

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Reference:

A greener pre-treatment alternative for automotive industry

DURING THE LAST TEN years Swerea has worked with the automotive industry and suppliers of materials and chemicals in analysing environmentally friendlier alternatives to today’s pre-treatment processes. The analyses enable companies to make the decision on whether to switch methods based on balanced facts.

Phosphating is a surface treatment method that provides excellent corrosion protection by ensuring good adhesion of coatings and paints. The disadvantages are that the method requires considerable energy, produces sludge and is not compatible with multi-metal systems (a metal mix). For companies looking to eliminate phosphating, there are environmentally friendlier alternatives.

One example is zirconium-based, thin-film coatings. The method is nickel-free, has fewer environmentally hazardous chemicals, produces lower by-product volumes and consumes less water and energy. It is also more compatible with multi-metal systems.

The problem is that it is not as robust and the corrosion protection for painted metal is often lower than with traditional phosphating. Switching processes is not an easy decision.

Developed methods
Swerea has developed methods for studying and evaluating thin film coatings to assist companies with this decision. Swerea systematically studied the effects of material types and process parameters – such as temperature, time and pH – on corrosion protection with the alternative greener method.

“Thanks to collaboration between automotive suppliers and Swerea, a shift in processes can be simulated,” says Lina Orbéus at Scania.

The thin-film method has been refined over the years, and in many cases, now fulfils the demands for good corrosion protection.

Contact
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6th International Seminar in the Field of Automotive Corrosion
Stockholm, May 18–19, 2016

The topic the first day:
“Corrosion testing of Automotive Materials”

The topic the second day:
“Surface Treatment and Corrosion Aspects of Materials used in the Automotive Industry”.

Program and registration form on the web site:
New project on indoor swimming pools.

**PEOPLE GO** to the indoor pool to learn to swim, exercise, train, play or just relax and enjoy each other’s company for a while in congenial surroundings. At least, that is our expectation of a modern indoor pool facility. But the reality is often all too different, with poor environment, deficient safety, deterioration, leakage and substandard energy efficiency. Of course, this is neither sustainable nor attractive.

The project “Sustainable indoor urban recreation environments – Indoor pools” will focus on the great needs which exist in terms of service life, lower energy consumption and better environment for indoor pools. A kick-off for the three-year Vinnova project was held with about 30 participants in mid-January at Swerea KIMAB.

The project brings together pool users, buyers, industry and researchers to collaborate on finding optimal total solutions of the future. The challenge is to build indoor pool facilities sustainably while also taking safety and health into consideration. The project will focus on total solutions that employ innovative new technology. Seven work packages which together, in one way or another, seek to identify and develop new solutions are included.

– We will produce guidelines for materials selection, above all for the parts of indoor pool facilities which today have a short service life. As well, guidelines for methods of renovating older facilities will also be developed, explains Bror Sederholm, Swerea KIMAB, who is managing the Sustainable Materials Selection component of the project.

Many of our indoor pool facilities, which were built in the 1970s and 1980s, are now in very poor condition and must be renovated, or even demolished. During the 1970s materials for these facilities were selected on the basis of then-current standards. Today, indoor pool temperatures are often considerably higher than they were in the 1970s, and these facilities are in many cases used as water parks which feature wave pools and flume rides, creating the need for water tanks which have an impact on various structures near the pool. To meet demands arising as a result of new activities such as those associated with water park features, more sustainable materials are needed.

**The aims of the project:**

- More sustainable, attractive and safer indoor pool facilities with satisfied visitors, satisfied personnel and satisfied owners.
- Contractors with a holistic approach and new, smart and innovative solutions with respect to materials, purification technology and procurement processes.
- A sustainable knowledge platform that will become self-financing, with knowledge and expertise that endures and develops.

We are doing needs analysis via questionnaire surveys, interviews and literature studies.

- What works?
- What doesn’t work, and why?
- What is lacking?
- What can we do in the short and long term?
- How can the challenge be met most effectively?

**Contact**

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**FACTS**

The project is run by CBI Betonginstitutet in collaboration with Swerea KIMAB, SP Sveriges Tekniska Forskningsinstitut, Badmästarförbundet and SFK (Sveriges Fritids- och Kulturchefsförening).

Other participants include: Byggeramikrådet, GAFS, GPA, GT Plastmontage, NCC, Nordic Galvanizers, Outokumpu, Rebet, Sika, SBB, Sveriges Byggindustrier, Svensk Byggtjänst, Teknikmarknad and We Group. In addition, representatives from several swimming and bathing facilities are also taking part in the project.

Funding amounting to SEK 9 160 000 has been granted by Vinnova for the three-year project, which is part of the Challenge-driven Innovation programme Sustainable attractive cities.
swimming pools
The annual conference Ytskydd (surface protection) was held in Gothenburg in February. Swerea KIMAB is a co-organizer of this event, which has focus on corrosion protection of metals and surface protection of concrete. With about 250 participants and 40 exhibiting companies, Ytskydd is the biggest Nordic conference in this area.

The message is to spread information about new, but also proven products, cleaning and application techniques, standards and regulations in order to increase sustainability and capital care and to minimize the effect on health and environment.

Society as a whole, as well as individual companies and organisations can save a lot of money if well adapted products and application techniques are chosen for new equipment, buildings, bridges, structures etc, as well as for renovation.

The two-day conference had in total more than 70 presentations. In the afternoons there were 8 parallel sessions each day, among others, Water and Sewage, Power and Heat, Concrete, Buildings, Process industry, Rubber linings, Sealant materials, Cleaning and Preparation, Corrosion protection and Inspection.

In one of the presentations a customer to Swerea, HWQ Group, presented a development project regarding relining of district heating pipes. In this project both Swerea KIMAB and SICOMP have been involved to give material advice, test and evaluate potential reinforced epoxy linings that can cope with at least 120 °C and the specified load cases. Through this renovation technique with high quality liner material, a lot of money can be saved, instead of excavating damaged pipes and then installing new ones.

Swerea KIMAB had an exhibition stand with information about how we can support our customers when it comes to corrosion protection; for instance field and accelerated testing, analysis techniques for inspection of coatings and substrates and also some examples of solutions for different corrosion protective measures etc. Furthermore, the updated version of the Swedish Handbook of Protective Coatings (Handbok i rostskyddsmålning) was presented and sold.

During the conference dinner the annual prize “The Surface Protection Company of the Year” was awarded. There were two winners this year. The first one, Södra Cell, has taken a powerful initiative for better corrosion protection in connection with an expansion project at the plant in Värö. The Swedish Armed Forces was awarded for saving a lot of money with thermally sprayed coatings on components used in tanks.

Contact
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**Industridagarna 2016**

**The Forest Industry Days**

**THIS YEAR, SWEREA KIMAB** participated in Skogsindustridagarna (the Forest Industry Days) in Sundsvall March 17–18, as exhibitors, speakers and as a host for the new session on Plastic Materials in Industry.

The new session was hosted by Swerea KIMAB and Inspecta in cooperation, as an outcome of the fruitful collaboration of the two companies during recent years. The use of plastic materials in industries like pulp and paper is a very important topic which sometimes gets neglected. The target group for the new session was people who are working with and use plastic in various ways. Hosts were Caroline Ankerfors, Swerea KIMAB, and Pernilla Utterström, Inspecta.

The program for the session included a presentation held by Petter Bergsjö at Steuler-KCH Nordic, on possibilities with plastic materials in various industrial environments. Jörgen Kristiansson and Pernilla Utterström, both from Inspecta, gave a presentation in cooperation with Termap on how to work in order to make joints and welds in plastic materials according to the demands in the standards.

Thereafter, the Handbook and Damage Atlas on inspection and status assessment of fibre-reinforced plastics (FRP) using NDT methods (see page 8) was presented by Caroline Ankerfors and Pernilla Utterström.

The plastics session concluded with a panel discussion. The panel included Hans Norin, Termap, Hans Järnberg, Billerud Korsnäs Gävle, and Johan Rytberg, Inspecta. All three have a lot of experience working with plastic materials as producers, end users or inspection engineers. Chairman for the discussions was Swerea KIMAB’s Caroline Ankerfors. The discussions covered topics such as material choice, procurement, inspection and status assessment.

Besides this, Swerea KIMAB’s Bertil Sandberg gave a presentation about what lessons can be learnt from the corrosion problems encountered with the new Sundsvall Bridge and in Swerea KIMAB’s exhibition booth you could also meet and discuss corrosion with Magnus Nordling, responsible for the Swerea KIMAB member research program on corrosion within pulp and paper industry.

**Contact**
Magnus Nordling, magnus.nordling@swerea.se

**Skogsindustridagarna (Forest Industry Days)** is a two-day annual meeting for the pulp, paper and energy producing industries, as well as for entrepreneurs within the industry. The meeting, which is arranged by Inspecta, includes traditional presentations but also a well-attended exhibition. This year's theme was sustainability. The seminar included three parallel sessions; fiber processes and the recovery cycle, plastic materials in the industry, and safety in large projects. Failures, accidents and counter measures are always included in the program. Over 200 people attended the conference this year.
**Plastic welding trainers**

**Swerea KIMAB** has received a formal approval as plastic welding trainers (CEPW) by the Swedish Welding Commission (Svetskommissionen).

We will have several courses in autumn 2016 and spring 2017. The courses take place in Kista. Register at our website (http://www.swerea.se/epw).

**Contact**
Daniel Ejdeholm, daniel.ejdeholm@swerea.se

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**Scholarships**

Marie Allvar has received a scholarship of 56 000 SEK from Axel Hultgrens fund to work for General Motors in Detroit for three months starting April 4th, 2016.

Ragna Elger has received a scholarship of 60 000 SEK from Prytz British Fund No. 2 to complete the doctoral thesis "High temperature corrosion in biomass-fired energy applications – alloying effects and test environment comparisons". The opponent is Gordon Tatlock. The thesis will be presented June 3 at KTH (F3, Lindstedtsvägen 26) at 10.00. Everyone is very welcome!

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**Members’ day 2016**

**Swerea KIMAB, Stockholm, November 16**

Member Research Consortia (MRC) and project meetings. Joint session with guest speaker, highlights from current work, laboratory tour and dinner.

**SAVE THE DAY**
Program and personal invitation will be sent out in June.

**Contact**
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During March, Teknologisk Institutt (TI) in Oslo held a course for certification of inspectors for paint systems and surface treatment at Swerea KIMAB. The idea to have this FROSIO certification course in Stockholm was to attract more inspectors from Sweden, and the result was very positive, 16 of the 21 participants were Swedish.

The plan now is to repeat this successful arrangement between TI and Swerea KIMAB in the near future.

The goal of the course is to give the participants sufficient theoretical knowledge and practical exercises in order to qualify them to perform independent inspections on items where paint systems have been used as corrosion protection. Also included in the course is an understanding of how different environments can affect objects and typical measures used to protect against corrosion.

During the course, led by Lars Laugen and Andreas Vestre from TI, Swerea KIMAB was presented by Svante Nordänger, and after the presentation was a social mingle for all course participants was held which included snacks and refreshments.

On the last day of the course an examination was held by two examiners from FROSIO in Norway. The contents of the course and the requirements for approval are regulated by Norwegian Standard NS 476.

Contact
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Calendar

April 19, 2016
Sustainable Business Day
Location: Stockholm, Sweden
More information at www.swereakimab.se

May 11–12, 2016
Members’ Day in Brest
Location: Brest, France
More information at www.institut.corrosion.fr

May 18–19, 2016
6th International Seminar in the Field of Automotive Corrosion
Location: Stockholm, Sweden
More information at www.swereakimab.se

May 25–27, 2016
Brass Alloys 2016
Location: Stockholm, Sweden
More information at www.brassalloys2016.com

September 11–15, 2016
Eurocorr 2016
Location: Montpellier, France
More information at www.eurocorr.org

November 16, 2016
Members’ Day 2016
Location: Swerea KIMAB, Stockholm, Sweden
More information at www.swereakimab.se

Courses

FRANCE
Visit the website for current courses:
www.institut-corrosion.fr

PLastic welding certification courses
November 8–10, 2016
December 6–8, 2016
February 7–9, 2017
Mars 21–23, 2017
More courses will soon be published at our website

SWEDEN
More information at
www.institut-corrosion.fr
More information at
www.swereakimab.se