Inside this Issue

2. Roundtable Preview
3. Value Award Applications
4. New MTI AmeriTAC Reps Share a Common Goal: Making a Difference
6. Project Team Creating New Guide for Welding 2205 Duplex Plate
9. Spring AsiaTAC Meeting Recap
10. Software Tool Helps Identify Volatile Chemical/Material Combinations
12. MTI Co-hosts Managing Aging Plants Conference with KCI
15. Scholarship Winners

http://www.mti-global.org
Western Canada Materials Roundtable Preview

The Western Canada Process Industries Materials Roundtable, hosted by MTI June 22, 2015 in Calgary, Canada, will focus on current and potential MTI project information. In addition, industry experts will share technical presentations on several important topics, including Abrasion and Corrosion Resistance of Polymeric Materials, Materials Selection Best Practices for Projects, and Brittle Fracture Risks with Non-Impact Tested Carbon Steel Piping, Fittings and Flanges.

Another hot industry topic is Stress Corrosion Cracking (SCC) in Pipelines, which will be presented by Dr. Richard Oviasuyi, a Research Engineer in Environment & Corrosion at MTI member company NOVA Chemicals. Pipelines are designed for a wide variety of applications and are used extensively in the oil and gas sector for the transportation of crude oil, natural gas, and other petrochemical commodities. Although this mode of product transmission and delivery is still regarded today as the safest, fastest and most economical when compared to all other alternatives, it’s not without its challenges.

The degradation of a pipeline’s structural integrity caused by corrosion has been a lingering problem in applications that require metals to be exposed to chemical environments. Depending on a metal’s in-service use, different forms of corrosion can occur, and the effects of some may be more deleterious than others.

One form of localized corrosion that continues to significantly affect material performance in the oil and gas pipeline industry is stress corrosion cracking. SCC is customarily defined as the delayed failure of alloys by cracking when exposed to certain environments in the presence of static tensile stress. It can be very perilous because the stress level at which failure occurs is typically below the stress required for mechanical failure in the absence of environmental effects.

“Most grades of high strength steels are susceptible to SCC and embrittlement,” says Dr. Oviasuyi. “Some other alloys like austenitic stainless steels, titanium alloys, aluminum alloys, mild steel, some copper alloys, plated wires etc. are also susceptible to delayed failures

> CONTINUED ON PAGE 14
Call for MTI Value Award Applications

MTI is seeking applications for its second annual Value Award. The Value Award recognizes members that have realized quantifiable value from successful application of knowledge gained through their MTI membership. Examples could include, but are not limited to:

- Incorporation of training or procedures developed and delivered by MTI
- Application of technical knowledge obtained from MTI Projects or Publications
- Savings and efficiencies realized from information gained at live TAC forums, structured forum presentations, or through MTI’s online technical forum
- Solutions obtained via MTI’s network of experts and member representatives
- Producer-supplier joint projects that have delivered value to the companies or the industry. (There is no limit to how many companies can be included on a single Value Award application that focuses on a collaborative effort benefitting more than one organization).

“The Value Award promotes cases of practical application of knowledge engineered within our collaborative community,” said John Aller, Executive Director. “We hope that the examples will also provide your fellow members with ideas on how they might be able to apply MTI resources to benefit their own companies. This is an opportunity to share the application of innovative solutions developed within our unique technical network, which could spawn new ideas and projects.”

In 2014, AkzoNobel (Coil Inspection Process), Dow Corning (RBI Methodology Training), DuPont (RBI for FRP Storage Tanks), Eastman Chemical (Furnace Tube Specification), and Huntsman (Evaluating Equipment for HTHA Susceptibility) all received awards for sharing how MTI helped support some of their companies’ successful projects. SABIC earned top honors, winning the Global Value Award for applying information from MTI’s Guidance for Plant Personnel in Gathering Data and Samples for Material Failure Analyses publication to its Reformer Repair Methodology project (see the Winter 2015 edition of MTI Communications).

The Value Award is open to all MTI members every year, but examples must be original. Also, member companies that won awards in the previous year are always eligible to submit new, unique applications in subsequent years.

“We would be excited to see either new or repeat winners in 2015,” noted Kirk Richardson, MTI Marketing Director. “The award just reinforces that there are many ways to achieve an ROI at MTI, and member companies are always finding creative new ways to apply this unique community’s technical information to their benefit. This year, members are also welcome to submit joint applications, where collaboration between supplier and producer companies has created value. It’s often MTI’s project team approach that fosters technical sharing and creates value for two or more members.”

Easy-to-use downloadable smart applications are available at mti-global.org in the Member Resources section: http://www.mti-global.org/mti-value-award. Submit your entry to Kirk Richardson at krichardson@mti-global.org by September 10th to be eligible for recognition in 2015.

MTI will announce the winners of its second annual Value Awards at the AmeriTAC, AsiaTAC and EuroTAC meetings in the fall of 2015. The Global Value Award Winner will be announced during the Annual Members Meeting at AmeriTAC 118 in Houston, Texas this October. We look forward to seeing your entries! •
New MTI AmeriTAC Reps Share a Common Goal: Making a Difference

One of the great benefits of being a member of MTI is serving as a representative on one of its Technical Advisory Councils. AmeriTAC, AsiaTAC and EuroTAC are great opportunities to interact with other materials science and engineering experts, providing MTI with a method of optimizing information and products, while shaping the overall direction of MTI’s projects.

MTI welcomes several new representatives to its TACs (see full list, inset). Among those, Cody Kell, Senior Materials Engineer at 3M’s Engineering Systems and Technology Group; Gregory O’Brien, Product Manager – Chemical Process Industry at SIMONA America; Jacob Rodriguez, Technical Sales Engineer/Metallurgy at Corrosion Materials; and Bernard Schulze, Staff Consultant at Stress Engineering Services, Inc. bring unique working experience. All are seeking to gain knowledge and better the industry.

Kell, who graduated from the University of Washington (Seattle) with a Bachelor of Science in Materials Science and Engineering, has been working in the materials processing industry since 2008. Prior to joining 3M, he worked as a metallurgist at Gerdau Steel Mill in St. Paul, Minnesota, and as a metallurgical process engineer at Raytheon Precision Manufacturing in Dallas, Texas. His experience has been in metal fabrication, including welding, brazing, heat treating, non-destructive testing and metal alloy selection.

John Warinsky, who served on the TAC for 3M for several years, introduced Kell to MTI and encouraged him to become the company’s AmeriTAC representative. “John offered me the opportunity with the support of my manager, and I gladly accepted,” he says. “I see this as a great way to take full advantage of the benefits that MTI membership provides and to extend those benefits to other groups within 3M.”

In sharing what he hopes to get out of his experience with MTI, Kell explains, “I hope to gain knowledge and perspective through networking with other materials experts. 3M’s interest was sparked by the Managing Aging Plants initiative. After attending the TAC meeting in February, I can see projects, such as Corrosion Testing of Extruder Alloys and Design of Field Corrosion Testing, having direct benefit to our manufacturing processes at 3M.”

Rodriguez, the Technical Sales Engineer/Metallurgy for Corrosion Materials, wanted to get involved with MTI immediately. “I wanted to get involved as quickly as I could and being a TAC representative seemed like the way to do that,” he says. Rodriguez has been in the materials processing business for two years, after graduating from the University of Texas El Paso in 2012 with a Bachelor of Science in Metallurgical and Materials Engineering. While still new to the industry, he specializes in high nickel and other corrosion resistant alloys.

“I am interested in any projects involving corrosion resistant alloys,” notes Rodriguez. “I am the technical liaison between sales and our suppliers and customers. If a technical question comes from a customer, I want to do my best to help them find a solution and provide direction with regard to application and alloy selection.”

Rodriguez also provides training to Corrosion Materials sales personnel to make them better equipped to provide service to their customers. As part of his decision to volunteer as his company’s TAC representative, he says, “I am hoping to build good relationships with other industry professionals and learn as much as I can from them.”

Schulze, a Staff Consultant for Stress Engineering, brings a wealth of experience, 25 years in the materials processing industry. He has only been involved with MTI for a little over a year, but his metals background makes him a valuable addition to the technical community: “I am a metallurgical engineering consultant, providing technical experience and project management to a variety of clients.”

As is often the case with supplier-side solutions providers, it didn’t take Schulze long to see the value in taking on the AmeriTAC Representative role and becoming even more active in MTI. “It is an excellent opportunity to interact with technical representatives of other member companies to identify and discuss common problems that are faced in the process industries,” he emphasizes. “The TAC forums are an excellent source for identification and open discussion of technical items of interest.”

Many of MTI’s projects dovetail with Schulze’s experience. He provides expertise in process equipment integrity, fitness-for-service, inspection planning, non-destructive testing, fire damage assessment, and weld and corrosion assessments. “My involvement in TAC provides direct and routine exposure to industry related challenges,” said Schulze, who graduated from the Illinois Institute of Technology in 1984 with a Bachelor of Science degree in Metallurgical Engineering. “These interactions allow me
to either provide assistance based on my existing expertise or develop new insights.” He adds that he hopes to establish and grow new relationships with technical leaders.

Schulze’s current areas of focus have been on high temperature hydrogen attack (HTHA), auto-refrigeration/brittle fracture and high temperature creep studies. Stress Engineering specializes in assisting clients with equipment condition assessments usually referred to as fitness-for-service type programs. He points out, “Stress Engineering is very interested in identifying and developing better methodologies and technologies to improve data inputs and outcomes of these types of assessments for our clients.”

O’Brien is looking forward to working with some of the best minds in the chemical processing industry. As Business Development Manager-Chemical Processing Industry for SIMONA America, he is responsible for bringing technologically sound products into the market in a professional corporate manner. His responsibilities include: product development, market penetration, product growth, product commercialization, capital budgeting, product training and other areas of expertise.

Despite a busy schedule, O’Brien is getting involved with MTI because of the tremendous challenges that face the dual laminate and lining industry. “MTI projects specifically address the needs of the marketplace by identifying weaknesses and problematic areas of concern within our industry,” he reports. “I would like to apply my expertise to help problem solve and eliminate deficiencies within the corrosion industry.” He adds that he will be looking for any MTI
Duplex Stainless Steel (DSS) 2205 is a common construction material for use in chloride-containing environments. This is due to the alloy’s outstanding corrosion performance and high mechanical strength together with its lower cost compared to other material solutions.

In oil refineries, one significant application for DSS 2205 is in the reactor effluent air coolers (REACs), where thick plates are used for the header box and tube sheet. The sulfur-bearing conditions of these REAC environments present a different challenge.

Reported failures of several REAC header boxes fabricated from thick 2205 duplex plate has led to significant concern about possible limitations on acceptable materials of construction and process conditions for REAC applications. In order to avoid similar problems, MTI members initiated a project to review failures and develop a best practices guide for the design, welding, repair, and inspection of 2205 duplex stainless steel (DSS) equipment made from thick plate (>1 inch).

The potential for a problem is significant enough that there are still 41 members listed on the Project Team. “At least three major industry failures have occurred that have led to fires and explosions,” reports David Moore, Discipline Leader – Materials & Corrosion at BP. “One of these occurred earlier this year after this project was initiated. Other incidents have caused financial and reliability concerns, but not fires or explosions.”

The MTI Project Team presented a draft of Part 1 of the guide, “Causes of REAC Failures” at AmeriTAC 116 in February. Part 2, “Welding Guidelines,” was made available to project members.
in April 2015 and discussed on a project conference call in April. “It should be completed by AmeriTAC 117,” estimates Moore. Part 3, “Guidelines for In-service Inspection,” will be presented at AmeriTAC 117 in June. “I expect that all 3 parts will be completed by AmeriTAC 118,” he concludes.

Several team members have learned enough through their involvement in the project to make significant changes to their operating practices even though the project is months from actual completion — another example of value for active MTI participation. “Some companies have decided to proactively upgrade existing DSS REACs and not specify DSS for new REACs, at least until the past failures are better understood,” reports Moore. “That’s where this project fits in. Other companies are inspecting and assessing existing REACs to get assurance that they are not susceptible to cracking in-service.”

The review of failures quickly revealed the need for better communication between mills, fabricators and refinery project teams. “Anyone considering purchasing a new DSS REAC should start communications early with potential fabricators to assure this cracking issue is addressed in the specifications and shop controls,” suggests Moore. “It can be hard to cover all relevant details in a guideline document such as this. While I think the principles are well covered, the implementation requires good interaction between the material supplier, fabricator and purchaser.”

It’s been a learning experience for everyone, including Moore. “Going into this project I thought I had some understanding of the problem and its causes based on one case history from my own company that I had worked on a few years ago,” he recalls. “Now, after digging into this project and reviewing multiple failures, I feel that I have a better and more in-depth understanding. I now have a better appreciation that the technical information already existed. Work was done in the 1980s and 1990s on understanding the resistance of DSS to Sulfide Stress Cracking in oilfield production environments. “Working through this project helped me to see that this was relevant to the REAC issue, even though the environments are different. I believe the microstructural effects from welding and the effect of ferrite content in welds is valid for both environments. Therefore, I am confident that if properly implemented, the guidelines in this work will prevent cracking incidents. I thought we had to come up with something new, and learned that there was already a significant amount of existing knowledge and information that could be used.”

In retrospect, Moore thinks that the catalyst to making progress was writing a working paper. “Taking this step forced me, as champion, to gather and organize the data from the case histories and forced me to think about what that information was telling me,” he explains. “The working paper then gave team members something to review and feedback on about clarity of the information and correctness of the analysis. It allowed us to build consensus that we understood the issue. Similarly, the guidelines in Part 2 followed the same approach: get something on paper that project members could review and

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comment on so that we can move toward consensus. The meetings at AmeriTAC were for communicating approaches and information and then phone conferences were used for getting feedback and making decisions." He says that the process has worked well.

In fact, this is Moore’s first time as an MTI Project Champion, and it has been a positive experience. “This has greatly increased my awareness of MTI and demonstrated to me the value of taking these leadership roles,” he emphasizes. “I am much more knowledgeable about DSS REACs than I was two years ago. I would encourage others to actively participate—that’s where the value comes from.” Others will benefit as well.

Ultimately, Moore believes that the project will help member companies understand the potential consequences of failures of DSS REACs and raise the awareness that new units need careful fabrication controls. “Existing units may need inspection and assessment to assure they are safe to continue operation,” he adds.

But the discussion on this important issue doesn’t have to stop when the new guide is published this fall. “Future sharing of inspection findings might be useful to improve the guidelines proposed,” suggests Moore. There may also be an opportunity to work with others in the processing industries. For example, “There is sufficient interest in this issue to have a group of API members explore starting a Joint Industry Project (JIP) to better understand the SSC mechanism in the REAC environment,” he says. “So one thing members could do is to get involved in the JIP. Contact me if you are interested.”

For further details about MTI’s Welding of Duplex Alloys Project (214-11), visit the Funded Projects section at mti-global.org.

Top: Spray from a cracked 2205 welded header box during high pressure water test. Bottom: The heat affected zone in this cracked weld micrograph shows that the ferrite was high at 72% compared to the 60% desired maximum.
projects that increase the technical understanding of corrosion and its relationships to thermoplastics, an area of particular interest to SIMONA America.

O’Brien brings plenty of experience to our technical community, having started in the materials processing industry in 1980. He is a graduate of Wittenberg University with a Bachelor of Arts in Chemistry and is also an attorney in Ohio, graduating from Marshall School of Law in 1989. O’Brien is a corrosion specialist in thermoplastics in corrosive environments. His areas of specialty include dispersion of solids into thermoplastics and liquids.

“MTI offers a very efficient structure,” observes O’Brien. “The TAC representatives organize and prioritize those needs. Once organized, they (TAC reps) set out to identify scientific methods to answer the unanswered questions or improve upon the identified weakness and problematic areas.”

No “rookie” when it comes to volunteering, O’Brien serves as a RTP-1 subcommittee member Dual Laminates for American Society of Mechanical Engineers (ASME) and serves on the subcommittee for Dual Laminates for Power Industry American Welding Society (AWS). He and his new colleagues won’t find a shortage of opportunities at MTI.

MTI welcomes Kell, Rodriguez, Schulze and O’Brien to the AmeriTAC team. As the TAC representatives, they will be participating and guiding MTI’s current and future research. Each of them brings different areas of expertise and experience, but all of them have the desire to listen and learn from other experts serving on the TAC teams and share their expertise to make a positive contribution to the materials processing industry.

For more information about MTI’s projects, seminars, interactive online forums, and other activities contact your TAC Representative.
Everyone knows that oil and water don’t mix, but companies in the Chemical Processing Industries (CPI) have thousands of much more hazardous combinations to consider on a daily basis. For example, mix chlorine (dry) or bromine with normally corrosion resistant titanium alloys and you have a potentially volatile or even explosive situation. While that same titanium alloy might actually become more corrosion resistant with the introduction of oxidizing metal ions such as ferric or cupric (iron or copper) into a process stream, under similar circumstances and conditions, otherwise highly durable zirconium alloys may suddenly become vulnerable to corrosion.

Reactivity is the tendency of substances or materials to undergo chemical change, which can be good or bad. When the reaction is bad, it can result in explosions, fires, chemical spills, and other potentially catastrophic events.

To provide guidance and disseminate reactivity data, The National Oceanographic and Atmospheric Administration (NOAA), in conjunction with partnering companies and technical associations, developed the Chemical Reactivity Worksheet (CRW). The free software (http://response.restoration.noaa.gov/reactivityworksheet) allows CPI professionals to review the reactivity hazards of thousands of individual chemicals as well as predict the consequence of mixing chemical substances. Since its release in March 2013, the CRW Version 3 (CRW3) has been downloaded approximately 180,000 times.

According to Dave Gorman, a reactive chemicals subject matter expert with the Dow Chemical Co. and team leader of the CRW3 and CRW4 projects, past efforts to produce a single, reliable chemical-compatibility tool have had very limited success. “The development of a single, reliable chemical-compatibility tool that could be used for generating all chemical compatibility charts was considered an elusive ‘holy grail’ within our company, and various attempts to produce such a tool over the years met with very limited success,” he reports. However, Gorman explains, “When we analyzed all the tools available within and outside of Dow versus a list of over 30 criteria for an ideal chemical-compatibility tool, we realized that the CRW and a particular tool within our company had complementary strengths.” The resulting hybrid tool was CRW3 and its customizable database of more than 5,000 chemicals.

Reactive groups are categories of chemicals, such as “carbonate salts” or “ketones”, that react in similar ways because they have similar chemical structures. To predict the potential reactivity of a mixture of chemicals, the CRW first identifies the reactive groups to which the chemicals belong, then predicts the kind of pair-wise reactions likely to occur when members of these groups are mixed together. The reactive hazards of any two groups are expressed by a series of statements, such as “Reaction products may be explosive or sensitive to shock or friction”.

However, current versions of the CRW can only predict reaction outcomes between two chemicals at a time. For mixtures of more than two chemicals, the software is limited to predicting the reactivity between all possible pairs of those chemicals. The model doesn’t predict catalytic interactions.

The software’s chemical datasheets list intrinsic hazards, such as flammability, explosive, or tendency to polymerize, for each chemical, and describes whether a chemical reacts vigorously with air, water, or other materials. Users can virtually mix chemicals to identify potential dangers, as well as add their own proprietary chemicals to the customizable tool. The development group continues to refine the resource, adding new features, including components that identify volatile mixtures of chemicals and adsorbents used for leaks and spills.
In addition, the team plans to include materials of construction and chemicals that are incompatible in an upcoming new release. MTI is working with an NOAA team, which includes members Dow and DuPont, to develop the CRW4, with a planned release for early fall of 2015. AIChe’s Center for Chemical Process Safety (CCPS) is helping with this update, and plans are in motion for CCPS to take over responsibility of the tool in the future. In the meantime, MTI has helped supply NOAA with a solid foundation of information on incompatible material-chemical combinations from its databases and books like “Materials Selection for the Chemical Process Industries.”

James Farr, Senior Chemist, NOAA, who launched the CRW project in 1998, explains, “The lion’s share of our user groups are in the Chemical Industry. This program helps them identify what the incompatibilities might be with the materials that are already at their facility. It’s a way that they can make decisions about storing chemicals.” That requires knowing the strengths and weaknesses of a variety of metals, polymers, and ceramics. MTI has spent nearly 40 years studying how those materials perform in processing environments. The suitability of materials of construction is a major issue for chemical plants that transfer chemicals through pipelines, valves, and reactors. “Sometimes those chemicals are corrosive,” points out Farr. “There are solvents that may melt elastomers and valving systems. All of these sorts of things create hazardous situations in the plant. It’s a chemical reactivity-related question, so we thought it would be a good idea to include materials of construction suitability information in our tool.” He, Gorman and the team have been working with MTI Associate Director Emory Ford to gather the data.

CRW4 will enable engineers to quickly access critical safety-related information that could help them avoid costly failures. “We’ve had several people mention that when they do some kind of process change and they have new chemicals coming into a plant, they have to find storage space for those chemicals, and having something like this, they will know what materials may be incompatible right off the bat,” shares Farr. “They have tanks and pipelines waiting for those chemicals that may be unsuitable. They will have that documented, and it helps them make decisions about how they are going to handle that material. We want to help people by getting information out to them to try to answer some of these questions, so that the number of accidents is minimized in a plant.”

Although there is no record of how many problems the software has already helped its users avoid, the thousands of downloads every month testify that the industry finds it helpful. “We still have several features that could be added to make the CRW a better tool, but even in its current form, we view it as the gold standard among tools available for determining chemical compatibility,” concludes Gorman.

When a chemical reaction is bad, it can result in explosions, fires, chemical spills, and other potentially catastrophic events.
MTI Co-hosts Managing Aging Plants Conference with KCI

MTI and KCI Publishing co-hosted the world’s first Managing Aging Plants (MAPs) Conference & Expo at the Messe Congress Center in Düsseldorf, Germany, March 3-4, 2015. MTI Member Company Schmidt + Clemens was a major sponsor of the unique event.

MAPs attracted 186 delegates from processing industry-focused companies located around the world. The conference & expo brought together technical staff and managers in producing, consulting, and engineering companies, suppliers and manufacturers, inspection service companies, regulatory bodies, and executive decision-makers within these organizations, with the goal of sharing knowledge on how to extend the lifetime of aging industrial plants in a safe and reliable way.

In addition to Schmidt + Clemens, several other MTI member companies participated in the MAPs Conference, including AkzoNobel, Asahi Kasei, BASE, Bayer, Becht, Dow Chemicals, DuPont, NobleClad, and Sabic.

“All plants are becoming older,” observes Lars Rose, a Materials Engineer with DuPont de Nemours (Deutschland) GmbH who attended the conference. “So, in order to prevent degradation and to perform at the highest levels of safety, profitability, and quality, all global companies need to invest smartly into their installations. MAP is an excellent platform to share that knowledge across the industry and to catch up with new developments in the inspection sector.”

According to Ed Naylor, a Materials Engineer with AkzoNobel, the timing was right (maybe even overdue) for a Managing Aging Plants Conference. “Much of the chemical processing industry today, at least in North America and Western Europe, operates facilities that were built decades ago, but those plants are now being operated under tighter regulatory guidelines and (thankfully) with much greater attention to safety, reliability and mechanical integrity,” he explains. “My company is no different. Equipment is at or beyond its original design life, yet it remains quite serviceable provided it is operated and maintained with care.”

After opening welcome speeches from Thijs Elshof, CEO at KCI Publishing and Kirk Richardson, Marketing Director at MTI, Neil Henry, Principal Materials Consultant at ABB Limited, UK presented Managing Aging Plants – Ten Years After. “Neil Henry (as if speaking to the site manager for an aging facility) said, ‘You’re not responsible for getting the plant to its current condition, but you are responsible for safely operating it into the future,’” reports Naylor.

Henry’s lecture was followed by a presentation on Managing Aging Plants from the Perspective of a Multinational Operator by Paul de Bruijn, who is Technical Integrity Advisor, HSE Division, TOTAL Refining & Chemicals. “Paul de Bruijn pointed out that the whole idea of managing aging plants is the transitional path from the 20–30-year operational design window to the actual operating life cycle which we see is 40, 50, 60 years or even more!” emphasizes Naylor, who rated the plenary lectures excellent. “I took useful nuggets from each one,” he adds.

MAPs also included concurrent workshops, including Risks-based Inspection; Material Selection for Replacement & Interface; The Role of Safety Culture and Safety Leadership in Managing Aging Plants; and Steam Reformer Furnaces.

Naylor found two of the interactive sessions particularly valuable. “I attended the Materials Selection workshop in which we had lively discussions about the effect of material manufacturing technology advancements and the importance of truly understanding the reasons for equipment replacement,” he shares. “The Safety Culture workshop was a unique and entertaining learning experience, and the shared experiences of the various paper presentations were also very interesting,” observes Naylor.

Dispersed between these workshops were a variety of papers ranging from the Management of Aged Equipment Lacking Documentation (by MTI member company representative Eileen Chant of Becht Engineering) to The Use of Fitness for Service Assessments in Aging Plants.

Audience debate on some of the world’s most urgent processing industry topics continued on the second day after presentations from speakers at the TWI in the UK, EMEA, in Zurich Switzerland, the Fraunhofer Institut for Material Flow and Logistics in Germany, Cristal in the USA, the HSE in the UK, and TUEV, Austria. Lectures included: Plant Aging and the Link to Asset Integrity Management, An Insurer’s Perspective on Managing Aging Plants, Industry 4.0: Hype or Opportunity?, Risks-based Asset Integrity at Cristal, Managing Aging Plants as Carried out by the Great Britain COMAH Competent Authority, and Managing Aging Plants from an Inspection Body’s Perspective.
A subsequent series of fifteen lectures, running in three parallel sessions, gave detailed technical insights into many of the different challenges facing those working in maintaining aging plants, as well as providing information on several new tools that are available to support decision-making within these plants. The information-packed MAPs Conference finished strong with three more workshops on Fitness for Service, Corrosion under Insulation, and Plastics in Corrosive Environments.

“I found great value in sharing experiences and learning how other companies and engineers apply trending concepts, such as ‘inherently safer design’ and ‘as low as reasonably possible’, as well as gaining reinforcement and agreement for initiatives I am trying to implement within my company,” concludes Naylor. “The conference provided many learnings for me to incorporate into our efforts at managing aging plants.”

Rose adds that he enjoyed some of the technological presentations. “For example, we have been using simple ASME flange connections for as long as ASME has existed, but these have a tendency to leak,” he reports. “There was one presentation by Freudenberg on leak-free flanges that they claimed had never had a single leak in service. Assuming that is true, it would have been beneficial for all industries if that type of technology had been adopted by ASME when they started writing their standards on flanged connections. Or, if it could be adapted into global engineering standards (beyond NORSOK, which already has it) in the future.

“It is exactly discoveries such as this one (and there were many more) that makes MAP such an interesting conference. Of course, I also immensely enjoyed my own session on Issues with Aging Plants, as this gives a platform to discuss issues with everybody at the conference. I am looking forward to joining MAP again in the future,” added Rose.

Speaking of which, MTI is working with KCI Publishing to plan more MAPs Conferences, seminars, and events around the world. Watch mti-global.org for announcements and visit managingagingplants.com for blog posts by MTI and KCI staff and other valuable information.
resulting from embrittlement. Any industry that uses these products for their operations, especially when exposed to certain environments, should have in place an integrity management program that caters for failure prevention from SCC and embrittlement.” He believes that an important step in that direction is understanding some of the details revealed by research.

“SCC propagation, while commonly observed along grain boundaries of polycrystalline alloys, can also be transgranular,” explains Oviasuyi. “Grain boundaries are amorphous interfaces between crystalline grains and are well known to act as hosts for secondary phases, inclusions and alloy impurities that may all affect, usually in a harmful way, the corrosion resistance of industrial alloys.”

Pipelines are particularly susceptible to potential problems. Metals with high residual stresses sometimes need very little or no applied stress to result in failure by SCC when exposed to a sensitive chemical environment, according to Oviasuyi. “Metal components with severe SCC can sometimes appear shiny and free of corrosion while containing large colonies of microscopic cracks,” he adds. “This is the reason why SCC can propagate undetected until failure occurs.”

There are potential solutions, according to Oviasuyi, including metallurgical tailoring of alloying elements. “This is considered when optimizing an alloy’s corrosion resistance, for example: alloying with chromium to enhance oxide film’s passivity and using various casting techniques to limit formation of secondary phases/inclusions,” he notes. “In addition to alloying elements, grain texture and grain boundary geometry have also been known to influence localized corrosion.”

The current investigation, led by the pipeline integrity research group at NOVA Chemicals Centre for Applied Research in collaboration with TransCanada Pipelines Limited & Western University, is designed to simulate the effects of the combination of mechanical stress/strain, hydrogen and chemical environments anticipated on energy pipelines to ultimately determine if the propagation and preferred direction of strain induced cracks are influenced by microstructural texture of the material.

In the meantime, Oviasuyi is looking forward to discussing alternative solutions at the roundtable, including the effectiveness and performance of vapor corrosion inhibitors (VCIs), especially for protecting aboveground storage tanks. “Most people who apply VCI technology often have a second and/or third method for protecting their assets,” he notes. “It is therefore difficult to evaluate the contribution of VCIs alone in prolonging the life cycle of the equipment it is protecting. Are there industries/people who have used VCIs as a stand-alone method for corrosion mitigation and how will they rate their performance?” Oviasuyi hopes to find out at MTI’s Western Canada Materials Roundtable in Calgary.

MTI members can register for this special event at mti-global.org. Guest invitations are available for producer companies only (contact the MTI office). Further details are available at mti-global.org.

Spring AsiaTAC Meeting Recap
> CONTINUED FROM PAGE 9

- Examination for Application of Lean Duplex Stainless Steels to Chemical Plants
- Applications of Nickel Alloys in Chemical Production Sites in China and Their Common Failure Mechanisms
- Statistical Analysis of Inspection Data and its Application in Chemical Plants

CUI emerged as a project of high value and worth pursuing, according to Liu. One opportunity is to participate in a potential project, “Predicting CUI”, which was started at AmeriTAC, but has drawn significant interest in Europe and Asia.

“International interest in this subject is real, and I think MTI is in a good position to lead this potential global project,” observes Chen. “Dr. Nakahara’s data gathering approach will provide a basis for building a comprehensive model, and we hope other MTI global members could contribute to the data collection and model building.

We might also utilize additional model building tools, such as the one proposed by Dr. Narasi Sridhar of DNV during our AsiaTAC Meeting.” Those who are interested in the project, can obtain more information under Potential Projects at mti-global.org.

For the full meeting report and access to available CUI and other technical presentations, look for AsiaTAC Spring 2015 – Tokyo, Japan under TACs/AsiaTAC on the MTI web site.
Introducing the 2015 MTI Scholarship Winners

The winners of the 2015 MTI Bert Krisher Memorial Scholarship have been announced: Nate Sutton, a junior at the University of Akron, and Stephanie Sultan, a senior at the University of Florida, are this year’s recipients.

This scholarship will not only provide financial support to Sutton and Sultan as they finish their undergraduate studies, but both Sutton and Sultan appreciate its value as a bridge to further hands-on experience in the field and to other minds in the industry.

Sutton, a Corrosion Engineering major who also minors in mathematics and business, plans on investing the prize money in his education. “I think that corrosion engineers need to be technical subject matter experts as well as a savvy businessperson in order to thrive in the industrial setting,” he says, but adds that the scholarship is more than just funding for school: “It’s also an invitation to become more involved in a large-and-growing industry that works with an astoundingly large range of problems in the world.”

Sultan, a Materials Science and Engineering major, concurs: “MTI realizes the importance of providing financial support and connecting with undergraduate students whose career aspirations are in line with MTI’s mission and strategy. Others should consider applying for this scholarship for the extensive network of expertise and resources that become available when one is involved with MTI.”

Both students plan on capitalizing on their respective professional opportunities by attending future MTI meetings, and both look forward to meeting leaders in the industry and exchanging ideas. Sultan believes that “involvement with MTI during undergrad may lead to career-long relationships, where students who enter companies in the processing industries can not only benefit from but also contribute to the development of new technology and sharing of technical knowledge.”

Future career paths for both Sultan and Sutton are likely within the Oil and Gas Industry. “I hope to be in a production facility for a good portion of my early career,” Sutton says. “I’m a visual learner, and I think that I’d learn the most working directly with equipment and being able to put my hands on the problems—with proper PPE, of course.”

Sultan envisions a graduate degree before entering the professional ranks, though she also notes, “I have recently had the opportunity to conduct research at the University of Florida as well as internationally at McGill University. These unexpected opportunities have allowed me to closely investigate current materials challenges and gain an in-depth understanding of several classes of materials, which has opened my eyes to the importance of research and continuing education for a materials engineer.”

Sutton also has a passion for lifelong learning and its practical application. He observes that “the people I’ve worked with so far never have just one reason for starting their careers. Rather, they have a sincere fascination—which I share—for understanding how materials behave and why they behave the way they do.”

“Trying to understand how something microscopic affects macro-scale phenomena and how both relate to industry from a business perspective could challenge and excite someone like myself for a whole career,” he adds.

For more information about the MTI Bert Krisher Memorial Scholarship and for information on applying for the 2016 awards, visit mti-global.org.
Mark Your Calendar Today and Plan to Attend One of MTI’s Fall TAC Meetings

AmeriTAC 118
October 26 – 29, 2015 • Houston, Texas

EuroTAC Fall Meeting
November 4 – 6, 2015 • Ludwigshafen, Germany

AsiaTAC Fall Meeting
December 2 – 4, 2015 • Shanghai, China