



# COMMUNICATIONS

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## Failure Analysis

AsiaTAC presentation examines the failure of this steam process safety valve spring, see pg 4.

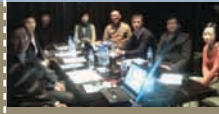
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## Calendar:

EuroTAC  
March 29 - 30, 2011  
Leverkusen, Germany

AmeriTAC 105  
June 6 - 9, 2011  
St. Louis, MO

AsiaTAC  
September 2011  
Shanghai, China

AmeriTAC 106  
October 10-13, 2011  
Nashville, Tennessee

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MTI Chair, Ed Naylor

# New Year, New Leadership at MTI

## Chair Reflects on Successes, Challenges, and Opportunities

When he gets down to business, new MTI Chair Ed Naylor can be a no-nonsense type of guy – a pragmatic materials engineer who isn't afraid to share his opinion, positive or negative. That is what makes his assessment of MTI, as the organization heads into 2011 and he into his first term at its helm, so encouraging.

"First of all, I'm thrilled with the health and vitality of the organization in its current form," says Naylor, crediting former Chair Dale Heffner, the Board, and MTI staff. "I'm excited about the direction that things are going.

"What strikes me is the ability of the organization to continue its activities, essentially without interruption of any kind, through the economic times that we've experienced here in the last couple of years. There were changes, but the organization kept doing what it was doing in terms of providing value to members. There was no big drop-off in membership." He adds this is confirmation that MTI is doing the kinds of things that its members appreciate.

"We have a challenge going forward because there are a lot of opportunities to continue the good momentum and the good activities that happened this year," continues Naylor. "We've made a

lot of changes. We're a different organization now than we were even three years ago. I think that we need to reflect on some of those changes and make sure that they work and that they are still providing the kinds of benefits and the direction that we thought they would when we implemented them.

"For example, we did away with resource advisory groups and resource groups, and we replaced them with Project Teams and Project Development Committees. We took the whole organization, and we aligned it with a couple of different versions of a Technology Roadmap for the Process Industries," an exercise he participated in during his stint as AmeriTAC Chair.

Now, the engineer in Naylor is ready to measure results. "Does that work?" he asks. "Does that still provide what is needed? Is there a better way now that we have the benefit of hindsight?"

Naylor takes these reflection, assessment, and adjustment exercises seriously because he's witnessed their effectiveness. "If you think you can solve a problem with the mentality that got you into the mess, then you're never going to get out of it," he predicts.

What kind of goals does the Chair have in mind as MTI begins its 35th year? "I think one of the things that I would very much



like to do is increase the activities within the EuroTAC," challenges Naylor. "They seem comfortable with being a training vehicle for younger engineers of the Europe-based companies. I would like them to be more than that. The old time corrosion experts in Europe have their own network, and they don't view MTI as that network. I'd like to change that. I'd like MTI to be that network like I feel it is in North America. I personally feel like my network is very much aligned with MTI."

Like his colleagues in Europe, he also recognizes the importance of embracing the younger member

representatives and tuning into the ways that they work. "The age of reference books and that kind of data collection is leaving us," believes Naylor. "Now our meetings and our member representatives display an incredible diversity in their approach gathering information and problem solving. Email is the new snail mail. Everything is immediate: immediate browsing, immediate texting, immediate information. I think our efforts at the web site redesign will go a long way towards addressing that, but there is more that we can do."

That said, Naylor doesn't

believe in change just for the sake of change. "I am thrilled to have the support of such talented and committed Directors, staff, member representatives and my Vice Chair Maria Østergård of Haldor Topsoe. Maria and I would very much like to keep a good thing going," he says. To accomplish that, the Chair plans to lean heavily on expertise within the organization. "I need to identify specialties amongst the MTI Board members, see if I can connect the specialist with the challenge and move the organization forward," he concludes. "The worst thing we can do is stand still in the world we live in today." ■



## Sumitomo Metals Joins MTI

Global supplier of advanced alloys shares expertise

The newest member of the Materials Technology

Institute is Sumitomo Metal Industries Ltd., a leading global steel company in Japan that has produced many grades of high-quality steel products since 1897. Sumitomo Metals is especially well-known as a major supplier of seamless tubes and pipes for the energy, petrochemical, and chemical industries. High-alloy oil country tubular goods (OCTG), stainless steel pipe for ultra-supercritical boilers, and steam generator tubulars for nuclear power plant boilers are examples of products in which Sumitomo Metals is a top supplier in the world.

However, it was one alloy in particular that led the company to join MTI. "Bill Watkins of MTI suggested that we join MTI after he learned about our new anti metal-dusting alloy 696," says Satoshi Matsumoto, Manager of Technical Services at Sumitomo Metal USA. "Because of its high performance characteristics, he thought it should be considered

by those participating in MTI's Metal Dusting Project. We subsequently attended AmeriTAC 100 as a guest and realized that we could contribute to this project and also benefit from the expertise of the other project members."

In a larger sense, Sumitomo Metals aims to raise corporate value with distinctive product offerings based on superior technologies, and membership in MTI should help accomplish this. "As material necessity is the mother of new product inventions," says Mr. Matsumoto, "we hope to discuss our material challenges with MTI members and solve problems to our mutual benefit." He also appreciates the opportunity to communicate with overseas customers and colleagues, not only at the meetings, but also via various forums, including e-mail discussions.

*"We hope to discuss our material challenges with MTI members and solve problems to our mutual benefit." - Satoshi Matsumoto*



Internal finned tube

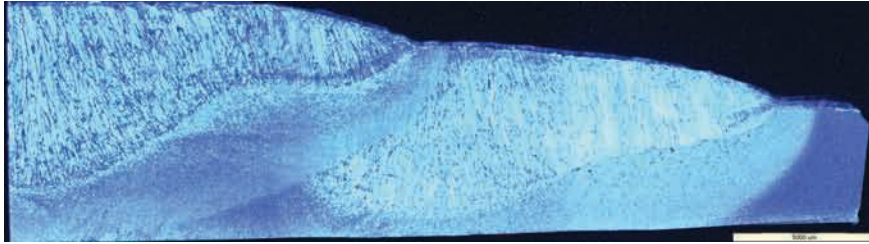
### Alloys for energy & chemical plants

The major challenge for all suppliers of advanced alloys is the continually growing need for high-quality, high-grade steel tubes and piping systems that can withstand the severe environments of advanced energy-production and chemical-process plants.

For example, the greatest challenge for thermal power generation is to increase efficiency and reduce carbon dioxide emissions. The deciding factor for enhancing efficiency is to expand the capacity of boilers and increase the temperature and pressure of steam. When such steam conditions exceed their critical point, this is called supercritical (SC) power generation, and one level above this is called ultra-supercritical (USC). To build an ultra-supercritical power plant, it is essential to have

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# AsiaTAC Update



Ryan Yang (Air Products) presented this photomicrograph showing HIC of multipass welding, which caused leakage in a process gas cooler.

While many people around the world were preparing for New Year's Eve, MTI was squeezing in one last meeting in 2010. According to AsiaTAC Chair Henry Ye, a group of 15 people recently participated in an f2f (face-to-face) meeting at the Parkyard Hotel in Shanghai, China on December 30. Member companies attending included Air Products, AkzoNobel, Albemarle, BASF, Bayer, Dow Corning, DuPont, Jiuli High-Tech Metals, and Sandvik.

Agenda items included introductions and announcements, information on MTI's worldwide activities, three project updates (Chinese Materials Comparison,

Fitness for Service, and Bolting), a technical presentation, project proposals and champion nominations, new member development activities, a question and answer session, and a group lunch. That is a lot to bite off in a day's work.

The session started with introductions and Ye announcing Albrecht Girgensohn as AsiaTAC's new Vice Chair. Girgensohn, Head of Mechanical Integrity at Bayer Technology and Engineering (Shanghai) Co., Ltd., talked about his insights and ideas for the future of AsiaTAC (see related article).

Project Champion Henry Ye led a discussion on MTI's Bolting in China Project. All members

showed strong interest in offering a fastener training session presented by an industry expert from ASM. It was suggested that the training could be scheduled in connection with the September annual conference.

Ryan Yang of Air Products talked about two failure analysis case studies. "His presentation lasted about 30 minutes, and generated a lot of discussion," reports Ye. Yang's first case history covered steam boiler (process gas cooler) leakage due to hydrogen induced cracking of multipass welding. His second study reviewed the failure of a steam process safety valve spring (carbon steel) due to general corrosion (see cover photo).

"During the last f2f meeting, we had a technical presentation about Painting Defects and Inspection provided by Sky Yan of AkzoNobel," says Ye. "I think this is a good practice. We will keep having a technical seminar for each f2f meeting in the future."

AsiaTAC's next f2f meeting will be in the first quarter of 2011. ■



## Girgensohn Embraces Role as

MTI recently strengthened its leadership team with the addition of Albrecht Girgensohn as AsiaTAC's new Vice Chair. Girgensohn is the Head of Mechanical Integrity at Bayer Technology and Engineering (Shanghai) Co., Ltd.

"Albrecht has a lot of experience in both engineering technology and people leadership," according to AsiaTAC Chair Henry Ye. "He is surely a great asset to AsiaTAC.

He has already actively taken the lead to update the AsiaTAC

Representative list since he became the Vice Chair. I have a strong confidence that we will be able to work together to make AsiaTAC stronger and better."

Girgensohn's extensive background working with materials in a variety of professional roles will certainly help. After receiving a Master's Degree in Mechanical Engineering from Technical University Braunschweig, Germany (1993), Girgensohn joined the Max-Planck-Institute for Iron Research in Duesseldorf. "After four years, I received a doctor's degree in Material Engineering and left to join a company named SMS Siemag in Duesseldorf," he recalls.

"This is a big plant engineering and construction company, engaged in design, installation and start-up of key equipment for the iron and steel industry, up to turn-key installation of complete steel plants of components of steel plants. I worked there as a development engineer, mainly involved for process and equipment design for steel casting equipment."

In 2006, Girgensohn left SMS and joined Bayer in Leverkusen. "I worked in the Materials Technology Department of Michael Renner as a Material and Corrosion Engineer, providing consultancy services for several chemical plants as well as power plants inside and outside



# Solvents book helps dissolve materials selection challenges

## MTI Announces New Volume in the MS (Materials Selector) Series

It typically takes four years to finish an undergraduate degree in Chemical Engineering. Sheldon Dean and his colleagues at MTI spent about the same period of time (with a few unavoidable delays) painstakingly researching and pulling together a new 500-plus page book on solvents, a reference that will be published sometime in the first half of 2011. "It's been an evolutionary process," quips Dean.

The result will be a resource that provides valuable information to engineers in a variety of industries. "This book is a reference that is aimed at people who are trying to develop projects that use organic solvents in the process, and it's designed to help them select materials of construction," he explains. "I considered two possibilities: new construction and the reuse of existing equipment. These projects usually include tanks, pipes, and pumps and a variety of other equipment. Specifications need to be

developed for these items before they are purchased."

MTI's new resource may help improve that arduous process. "This book covers 60 different solvents," reports Dean. "They're arranged in 16 different families (i.e., groups of solvents with the same reactive radicals or structures). For example, if we're talking about alcohols, that covers everything from ethanol to the amyl alcohols. They're all a little different, but they all have a lot of similarities."

Each of the family chapters covers a variety of topics. Nomenclature is one issue that is discussed for each family. "Some of these solvents have 10 or 15 different names," according to Dean. "Two people may be talking about the same solvent, but because they have different names, they might not even realize they were talking about the same solvent. So the nomenclature discussion gives the reader a way to understand the issue."



Swollen rubber elastomeric coupons tested in a Methyl Pyrrolidone solvent (photo courtesy of Eastman Chemical Company)

Dean reports the book also covers important topics like transportation. "If you are going to move solvents from point to point, you need to know what kind of tanks and vessels to put them in and how to transport them," he believes. "I've covered that area from the standpoint of materials of construction."

Handling solvents after they have cycled through a system is yet another issue. "In a chemical process, you may end up with solvents that come out at the end of a process after they have been used," explains Dean. "They're spent, and they may have impurities in them. At that point, it is important to know what to do with them

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## AsiaTAC Vice Chair

of Bayer," he reports. "In 2009 I was transferred to Shanghai and became in 2010 head of the Mechanical Integrity Department of BTES (Bayer Technology and Engineering Shanghai), following Knuth Schweier, who was also my predecessor in the role of MTI AsiaTAC Vice Chair."

But Girgensohn knew of MTI before he came to China and had already started to use the knowledge and expertise of its professional network. "One of my first things I was asked to do in China was attending the MTI AsiaTAC Meeting 2009," he remembers. "There I realized how important it is, especially for professionals in the fast-developing Asian countries, to strengthen

networks, but also to be able to provide local engineers opportunities to learn and develop their expertise and skills. MTI can provide these kinds of opportunities at a very high level, and this I want to support."

The new AsiaTAC Vice Chair explains that his first goal is to support Ye in performing his tasks for MTI. "I hope, together, we can achieve the target to bring MTI in Asia forward and make it attractive for companies and professionals to join the events and activities and benefit for their daily work," says Girgensohn. "Thus, the biggest challenge will be to make people in Asia aware of MTI and make it easy for them to get in contact with this organization.

According to my experience here in Asia, it is at least unusual for industry professionals to share their knowledge and experience with others as free and open, as it is usual and necessary for MTI. Only by providing opportunities to participate in projects, which have a close connection to the daily work of the involved persons, this mind set can be changed. AsiaTAC has already performed and finalized some good projects in this vein, and this I would like to support further. At the end, joining and participating AsiaTAC should be beneficial for the local professionals. In my opinion, only this can be the basis for the further development and growth of AsiaTAC." ■



> CONTINUED FROM PAGE 5

because you can have major problems. If you put them in the wrong tankage and the tank fails, you may have a disaster.”

The book also includes some of the basics about solvents: “things like their physical properties, boiling points, melting points, specific gravities, solubility in water, flammability, and electrical conductivity,” says Dean. “Where appropriate, I put in some information on the basic chemistry: how the solvents are made and what types of chemical reactions they will participate in – especially those that are related to corrosion because some solvents are reactive. If you don’t understand the chemistry of them, you are going to make mistakes.”

Working with polymers, which are increasingly used in processing applications, is of particular concern, according to Dean. “The biggest issue is not the metals, but the way solvents attack and react with polymers because plastics and elastomers have become so important in chemical plants,” he points out. “This was a

major issue because solvents, by their very nature, go after plastic materials. You need to know what polymers will survive and which ones are going to fail in the presence of the solvent. They can fail in different ways. The thing that happens to most of them is swelling, but they also can dissolve, and they also can crack, so these are issues that I’m trying to address.”

Dean says he was only able to cover safety and environmental issues in a general way because these issues are very complex and go far beyond materials of construction. “I’ve tried to make it clear that those issues do exist, and you need to be really careful about them, especially toxicity and flammability,” he states. “Where I’ve known of failures or where I’ve known of things that have happened, I’ve tried to put that information in the book so whoever reads it will be informed because the worst thing to do is to have a failure that is predictable.”

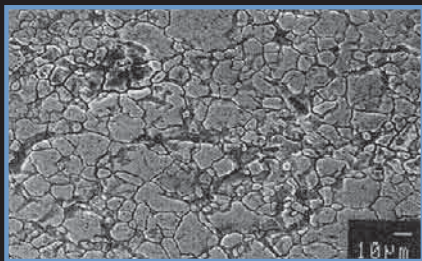
This is not a book that you are going to want to sit down and read

cover to cover, according to Dean. “This is reference that you are going to want to put on the shelf and have it available to you when the time comes that you need to deal with a solvent,” he suggests. “That said, the first three chapters would be valuable to read, in general, because they have a lot of gems on how to think about solvents and how to deal with them. When you need the other detailed information, you can find it in the latter chapters.”

The author and MTI Fellow can finally see the finish line and the gratification of a finished product. “I hope that MTI will make it available to the people who need it,” he says.

Dean credits John Grubb (ATI Allegheny Ludlum), Rick Clark (Lloyd’s Register Energy Americas), Srinu Kesavan (FMC), Karol Argasinski (Solvay Solexis), and Tony Scribner (MTI) for helping with the project. He adds that the new book is dedicated to the memory of MTI pioneer and Fellow Bert Krisher. ■

## CRAs Seminar Stimulates Discussion in Baltimore



Intergranular corrosion of stainless steel  
(photo courtesy of TMR Stainless)

MTI hosted a seminar on “Manufacture of Today’s Corrosion Resistant Alloys” at its Fall 2010 Meeting in Baltimore, Maryland. Presentations covered how recent changes in manufacturing processes for austenitic stainless steels affect their properties, microstructures, and surface qualities. Gary Coates of the Nickel Institute, who moderated the session, also gave a presentation on “Annealing

Practices and Non-specificity of ASTM Specifications for Austenitic SS Plate, Bar, Forgings, and Fittings.”

In addition, John Grubb (“Specified and Unspecified Elements and ASTM Specifications”) and Cheryl Botti of ATI (“Modern Rolling Mill Practices”); Jim Fritz of Outokumpu/TMR Stainless (“Carbon, Nitrogen, and Silicon in Commodity Stainless Steels” and “Ferrite and Martensite in Wrought Commodity Austenitic Stainless Steels”); and Dave O’Donnell of RathGibson (“Tube and Pipe Annealing and Performance Implications”) gave presentations during the day-long special event.

“It was different than any other presentations ever made at MTI in that it gave insight to the changes that, in general, manufacturers do not talk about publicly, at least if

not specifically asked,” explains Coates. “It also pointed out some weaknesses in specifications and gave some indications of possibilities and difficulties to change them.”

If survey results were any kind of barometer, the session was on target for the audience. “If you look at some of the comments people made, it kind of touches right on it,” says Bill Watkins, MTI Associate Director. “For example, ‘There was such a clear and great focus on the technical content. It was refreshing to leave commercial considerations behind and just learn and review.’ That was one of the quotes.” Another stated, “21+ years as a corrosion specialist, and I learned something!”

Visit [mti-global.org](http://mti-global.org) for a complete summary of this seminar and check back frequently for announcements about future events. ■

# Opportunities Materializing for Scholarship Winners

The winner of MTI's fourth annual Bert Krisher Memorial Scholarship will be announced at NACE's annual Corrosion Conference in Houston, Texas (March 13 - 17). Meanwhile, the three previous winners of the \$10,000 materials engineering award have been busy making the most of a unique opportunity.

Samantha Lawrence, the most recent scholarship winner, graduated from Colorado School of Mines in December 2010 and just began her doctoral work in Materials Science at Washington State University in January 2011. "My thesis work will involve nanomechanical testing to investigate materials reliability and corrosion susceptibility," she reports. "I am very excited for this new adventure, even though I haven't had much of a break from the completion of my last one."

Lawrence's MTI experience broadened her perspective of the CPI. She was impressed with the interaction and networking between the companies and the way the award was presented to her at NACE. MTI members called her, met her at NACE for lunch, and really gave her great support and exposure.

"I feel very privileged to have received the MTI scholarship last year," says Lawrence. "Receiving the MTI scholarship was great in terms of finances, certainly, as my parents did not have to pay any tuition difference for my final semester at CSM, but more importantly, I appreciate the contacts I made at both the NACE conference and also at the MTI meeting in June. I met so many wonderful people who want to help me succeed, both now, as a student, and in the future when I begin looking for a job as an engineer."

In the meantime, the ambitious student has parlayed the scholarship experience into other opportunities. "Because I was awarded the MTI scholarship and two others and was

therefore able to attend NACE Corrosion 2010, I started thinking about presenting at a future conference," explains Lawrence. "It turns out I will actually be presenting some of my research on developing in-situ radiation detectors, using SiC, for generation IV nuclear reactors in the research in progress symposium at NACE (Corrosion 2011) and at ATI's Corrosion Solutions Conference in September 2011. I am looking forward to it!"

David Cole, who won the scholarship in 2009, will graduate from University of Cincinnati this spring with a Bachelor's Degree in Materials Engineering. "I am extremely thankful for the Materials Technology Institute supporting me in my academic studies," he says. "I am currently applying to graduate schools to continue further my studies. Having seen how much of a problem it is within the chemical process industry, I hope to obtain my thesis pertaining to the problem of corrosion."

Cole has leveraged his experience with MTI in another way. He is currently working part-time in undergraduate admissions and recruiting and teaches incoming students about scholarship opportunities. "Being a student recruiter for the College of Engineering and Applied Science allows me to mention to perspective materials engineering students the number of scholarship opportunities they have available," he says. "The size of the Bert Krisher Memorial Scholarship often gets the attention of perspective students."

From his perspective as a student advisor, Cole suggests pairing the MTI scholarship with an internship might provide greater value to students and industry as a whole. For example, he suggests giving \$5000, a 10-week internship job with an MTI member company, then another \$5000 upon

completion of the internship. Cole believes that might draw a smaller applicant pool, but would result in higher retention within the CPI.

Coming to the MTI meeting gave him new ideas of "what a materials engineer could look like," and he learned about different ways that materials engineers can work in the Chemical Processing Industries. Cole plans to participate in CPI-related projects, such as researching hydrogen sulfide embrittlement in steels, once he moves on to graduate school. After that, his goal is to work in academia.

Jeremy Staats, the first MTI materials engineering scholarship recipient, learned about the scholarship through a professor at Missouri University of Science and



MTI's Ed Naylor (left) and Gene Liening (right) present Samantha Lawrence with the 2010 Bert Krisher MTI Scholarship in San Antonio, TX.

Technology. Nearly three years later, he is working for Equity Engineering, where he interned before finishing school.

According to MTI Associate Director Heather Stine who caught up with Staats, the contacts that he made during the award presentation at Corrosion 2008 were helpful to him.

Stine reports that the inaugural award winner has an open-ended invitation to attend a future MTI Meeting and experience the organization's value firsthand. For more information about the Bert Krisher Memorial Scholarship, visit [mti-global.org](http://mti-global.org). ■

## EuroTAC Sets Agenda

The next EuroTAC meeting will be held March 29 – 30 at the Lindner Hotel BayArena in Leverkusen, Germany. "This year, we have gone for a slightly different format," according to Michael Turner, EuroTAC Chair. "The 1½ day meeting will concentrate solely on metals. The meeting will basically be divided into 3 sessions, the first concentrating on duplex stainless steels and covering various aspects of their use in the CPI. The second session will be dedicated to MTI activities, including an update on the current Metal Dusting project, which is being carried out in conjunction with Dechema. The final session will revolve around reactive metals (e.g. Ti) and will deal with subjects ranging from where and why these metals and alloys are used up to fabrication and welding aspects. All in all, it should be a very interesting and informative meeting!" Visit [www.mti-global.org](http://www.mti-global.org) for the draft agenda. ■

## Sumitomo Metals Joins MTI

» Continued From Page 3.

boiler tubes with the strength to withstand high temperatures and high pressures. They must also provide strong resistance to both steam oxidation of internal surfaces and hot corrosion of external surfaces. After much R&D effort, Sumitomo Metals developed alloys called SUPER304H and HR3C for tubes that can handle boiler temperatures of 600°C, and today they are the global standard for USC boilers.

The chemical industry is also making efforts to improve efficiency. To address this challenge, Sumitomo Metals and Toyo Engineering Corp. jointly developed a new duplex stainless steel alloy called DP28WTM for applications in urea plants. This

alloy provides excellent resistance to urea carbamate, an intermediate corrosive material for urea production. In addition, it actually improves urea production yields by reducing the amount of oxygen that must be injected to inhibit vessel corrosion.

"Our strength is a broad and deep knowledge of steel and other metals and alloys based on over 100 years of R&D activity," says Mr. Matsumoto. "We believe that Sumitomo's extensive line-up of stainless steels and highly alloyed steel grades will themselves contribute solutions to some MTI projects." For more information about Sumitomo Metals, visit <http://www.sumitomometals.co.jp/e>. ■

## MTI-global.org by the Numbers: Granta

As the numbers below demonstrate, Granta's online library of MTI publications is widely accessed. In fact, members from the USA, UK, Argentina, Singapore, Denmark, Germany, Sweden and Saudi Arabia have recently tapped into the valuable resource. According to Dan Williams (Product Manager, General Manufacturing & Materials, Granta Design), the most popular documents included "Cleaning of Process Equipment and Piping" and "Guidelines for Preventing Stress Corrosion Cracking in the Chemical Process Industries."

MTI Associate Director Emory

Ford reported that 16 new handbooks are being added to the library, which brings the total number of MTI documents to 39. (For a complete list of publications, visit [mti-global.org](http://www.mti-global.org).)

Anand Samant, Senior R&D Manager at Praxair, has worked with Ford and others to manage MTI's participation in the library. Samant thinks that there is still room for improvement. "From my perspective, this functionality will become even more popular with users once access to the documents is easier and more user friendly," he says. "The addition of the new link on the MTI website to allow direct access to publications

online will enable this and we will see a growth in usage."

Until MTI launches its new web site, the Granta Program link, instructions, password, and other information can be found in the Hot Topics and Downloads sections at [mti-global.org](http://www.mti-global.org) in the Members area. Here is a look at Granta by the numbers. ■

• New MTI publications added	16
• Access from different countries	20
• Total MTI publications online	39
• Members visits Granta	920
• Pages viewed	22,423