There was good news and bad news for the titanium industry when it met for the 19th Annual Conference and Exhibition in Monterey, California. The attendees did not need reminding that 2003 had been a tough year for the industry, with titanium demand having been hit hard by the recession in the commercial aerospace industry as a consequence of the effect of 9/11, SARS and the war against terror. The prospects for the future however look much better, the demand cycle for titanium is due to pick up during 2005 and exciting developments in technology offer the possibility of sharply reducing the cost of titanium paving the way for a rapid expansion of the overall market.

In his presentation to the meeting Tim Rupert, president and C.E.O. of U.S. titanium product manufacturer RTI International Metals Inc said that world demand for titanium products had fallen to levels not seen since the early 1990s. Total shipments of titanium had fallen from 85-90 million lbs in 2002 to 80-85 million lbs in 2003 as demand from the commercial aerospace industry dried up.

Echoing this sentiment Tom Williams, President of U.S. titanium alloy producer Allvac, said that the U.S. titanium industry had been particularly hard hit with shipments this year down to 35 million lbs, a level not seen since 1984. On a brighter note Rupert said that increased growth in air traffic over 2004 and 2005 along with the development of the Airbus continued on page 2
A380 and Boeing 7E7 would lead to a pick up in build rates for commercial aircraft in 2006. As a consequence the titanium industry should start to see improved demand from the beginning in 2005 as the commercial aerospace manufacturers return to the market.

In Europe and Japan the downturn had not been as severe as the U.S. Dr. Markus Holz Managing Director of Titania S.p.A./Deutsche Titan GmbH said that European titanium demand in the first half of the year had remained steady with demand from aerospace the same as last year and demand for industrial applications showing a slight increase. Masaaki Tachibana President of Sumitomo Corporation reported a similar picture on the Japanese market where demand from industrial applications had helped to support the market.

Recognising that titanium was a mature industry characterised by slow growth and a reliance on the cyclical aerospace industry, Williams said that the current downturn was forcing a change and that when it emerges from its current downturn it will be much stronger and more globally based. A key driver for this change was the prospect of new production processes bringing down the costs of both raw materials and processing. This was a theme taken up by J. Landis Martin, Chairman and CEO of U.S. titanium producer Timet, who told delegates that lower cost titanium production must continue to be a primary goal of the industry if the market is to grow in size. The existing Kroll process for producing titanium sponge had not changed significantly in the last fifty years. “Lower acquisition costs will be the catalyst for significant growth in the use of titanium in automobile, energy and consumer applications” he said.

Summarising titanium’s “holy grail” of lowering costs, Dr. Edwin H. Kraft President of EHK Technologies said that whilst titanium is the fourth most abundant structural metal its high cost has limited its use to less than 1% of the tonnage of aluminium and less than 0.1% of steel. The search was on for alternative routes to produce titanium products, which encompassed both lower costs for the production of raw materials and alternatives to conventional processing. He outlined fifteen prospective new production processes for titanium raw materials including the ITP Armstrong Conference Surveys

Your comments and opinions are needed. If you attended the TITANIUM 2003—19th Annual Conference and Exhibition, please be sure to return your conference survey via fax to (303) 404-9111. Your comments are helpful in incorporating and improving future conferences.

The TITANIUM 2003—19th Annual Titanium Conference proceedings held in Monterey, California on October 12-14, 2003 will be available January 1, 2004. Reserve your copy today by visiting the publications section of ITA web site located at www.titanium.org. Conference attendees will receive a complimentary copy of the cd-rom.

The cost for the proceedings is:
Members: $50.00 U.S.
Non Members: $75.00 U.S

Please Note: 2003 Proceedings only available in CD-ROM format.
### ITA Contest Winners

**Contest Winners:**

### Best Foursome
- Mark Kamon, Dynamet Inc
- Mitch Allenspach, Dynamet Inc
- Fred A. Janowski, RTI International Metals, Inc
- John Odle, RTI International Metals, Inc

### Most Honest Team
- Bill Bieber, VALTIMET
- Gus Gustin, TIMET
- Brett Paddock, Titanium Industries Inc
- Dennis Schumerth, VALTIMET

### Longest Drive:
- Dick Leopold, RTI International Metals, Inc.

### Closest to the Pin:
- Marty Procko, RTI International Metals Inc.

### Networking Luncheon Winners

Contest winners at the Networking luncheon received the following gift items. Listed below are the sponsors, prizes and winners. Prizes were found in the “Message in a Bottle” game.

**Allegheny Technologies Incorporated**
- Joseph Steed, International Titanium Powder, LLC
- Maggie Richardson, Perryman Company
- John Burger, Platt’s Metals Week
- Kurt Faller, TIMET Automotive
- Javier B. Sepulveda, International Metal Trading
- Kathleen Monsees, Hi-Tech Welding Services, Inc
- Scott Shoppell, Ft Wayne Metals Inc
- Jeff Slater, Fort Wayne Metals Inc

**Dynamet Inc.**
- Dereck Roberts, VSMPO Tirus, U.S.

**Grandis Titanium**
- Rich Forman, TST Ti
- Pierre Gonthier, Martin CNIM

**ITA**
- Ed Kraft, EHK Technologies
- Mike Stitzlen, Tricor Metals
- Masa Rao, University of California, Santa Barbara
- Tony Caizza, Plymouth Extruded Shapes
- Gareth McCabe, Mako PT

Gary Johnson, TICO Titanium Incorporated
- Mr. Tanaka,
- Cliff Bugle, Dynamet Incorporated

**JTS**
- Scott Gaugler, Stratcor Performance Materials, Inc.

**Plymouth Extruded Shapes**
- Mr. Ronald Granader, Corrosion Materials

**Reading Alloys Incorporated**
- Mr. Ron Donn, United Alloys & Metals, Inc.
- Howard Freese, Allvac

**Rome Metals Incorporated**
- Ryota Ozawa, Tokyo Titanium Co., Ltd.
- Mr. Brian Drummond, Allvac

**RTI International Metals, Inc.**
- Terry Ogura, Sumikin Bussan International Corporation
- Rich Slate, NF&M

**Solar Atmospheres Incorporated**
- Todd Clements, Valbruna Corporation

**Trans World Alloys**
- Pat Laney

**Wire Works Studio**
- Tim Rupert, RTI International Metals, Inc

Zak Inc.
- Igor Krjenitski, Grandis Titanium

### General Session Raffle Winners

**Rome Metals Inc.**
- Guess The Beads Contest
- Tom Rasmusin, Defense National Stockpile

**ITA**
- Aquarium Tickets
- Eiichi Nakanishi, Mitsui & Co., Ltd.

**ITA Teddy Bear**
- Daniel Harris, US Vanadium Corporation

**Chopsticks**
- Richard Berthier, CNIM
What’s New In Titanium?

**Titanium Welding Purge Monitor**

A Purge Monitor designed specifically for the welding of Titanium has been developed by Huntingdon Fusion Techniques Limited.

This attractive, 110/220 50/60Hz unit is computer intelligent and uses an advanced solid state, five year life zirconia sensor to guarantee accurate oxygen readings in the 10 ppm range.

Designated "Argweld®" Titanium Weld Purge Monitor, it measures from 1000-10 ppm and has an alarm which allows setting of high/low levels.

As the Monitor is activated, a display provides operating instructions. It has a PC serial port allowing use of an RS232 lead for connecting a PC and a printer and there is an input port on the rear to monitor weld start/stop for the optional data logging.

The fast stabilizing (15 sec) sensor is fitted into a connector which allows the gas to flow past its face. As the sensor works on positive flow from the purging system, the instrument does not need a pump.

Adding to this, the sensor does not need a heating system like other sensors, so there is much less to go wrong with the Argweld® monitor thus minimizing repair and maintenance costs.

The connector is designed to be easily attached to any welding chamber, enclosure or other Titanium Weld Purge System.

For further information contact: Huntingdon Fusion Techniques Limited, Stukeley Meadow, Burry Port, Carms, SA16 0BU, UK or call +44 (0) 1554 836836, Fax No: +44 (0) 554 836837. Email: hft@huntingdonfusion.com or visit their website at: http://www.huntingdonfusion.com.

**Ronald W. Schutz Recipient of the Russ Ogden Award for Outstanding Contributions in Reactive and Refractory Metals and Alloys**

The awards subcommittee of ASTM B10 committee has selected Ronald W. Schutz, Corporate Specialist-Industrial, RMI Titanium Co. as the recipient of 2003 Russ Ogden Award for Outstanding Contributions in Reactive and Refractory Metals and Alloys. This award is named after the first chairman of ASTM Committee B10. The award was presented at the B10 Committee Meeting in Tampa, Florida on Wednesday, November 19, 2003.

**Sodium process for the production of titanium powder and the ITT Continuous Plasma Quench for the production of ultra fine titanium powder.** The process that has been grabbing the headlines is the FFC Cambridge process, currently being evaluated by a team lead by Timet and supported by a US$ 12 million grant from the U.S. government. Laboratory tests have demonstrated that the FFC process can produce titanium at much lower costs than the existing Kroll process (some estimates put this as much as 50%). The challenge for the Timet team is to reproduce the lab results on a full-scale pilot plant, work on the project is expected to last four years.

Alternatives to conventional processing include the electron beam single melt process, plasma arc and electroslag melting. These processes allow for the usage of a high proportion of scrap, reducing raw material costs and producing titanium slabs in a single process rather than the dual process currently used. They have already been successfully used to manufacture products used in the primary structure of military aircraft and are likely to be adopted in other aircraft parts shortly.

Other new processing techniques presented to the meeting included the superplastic forming of titanium sheet into complex shapes. William Swale, Technical Executive of UK based Aeromet International described his company’s progress in this field, which with coupled with the development of fine grained Ti6Al4V alloy offered the prospect of reduced manufacturing costs.

Gary Ezell, Aerospace Product Manager of Plymouth
Extruded Shapes described how improvements in extrusion technology were bringing the cost of production down by producing near net shape dimensional profiles. Near net shape fabrication using rapid profiling was also an area that MER Corporation has been working on, Dr. James C. Withers, CEO of the company said that a combination of this technology and one of the new low cost titanium metal production techniques could offer the prospect of ultra low cost titanium components.

A key beneficiary of lower titanium costs will be the U.S. Army where it is being incorporated in the design of vehicles to meet weight, transportability and manoeuvrability requirements. Brijmohan J. Roopchand, Stephen Luckowski and Frank Petrosillo from the U.S. Army’s Armament Research Development Engineering told the meeting that modern warfare requiring a fighting force that can be moved rapidly, often by air, into the theatre of war and as a consequence the army’s use of titanium has been rising steadily. It is not just in sophisticated weapon systems where titanium is finding use anything that can reduce the weight carried by the soldier on the ground is being considered. Petrosillo described a project that he had been working on to replace the army’s aging fleet of trailer vehicles, with new titanium trailers weighing 500-1200 lbs less than its predecessors.

The U.S. Navy is also looking to increase its use of titanium where its non-corrosive properties and weight saving give it significant advantages over other materials. Currently it is used in a variety of applications including heat exchangers, pumps, exhaust uptakes and aircraft carrier catapult systems. The Navy would like to expand the use to many other areas including piping, valves, propulsion and electrical systems the key constraints being both the high cost of titanium parts and the difficulty of welding titanium which requires specialised gas shielding. The navy is also working on getting the welding costs down, Kim N. Tran a mechanical engineer at the U.S. Naval Surface Warfare Center told the meeting that they had found that they could drop the inert gas shielding dew point requirement for titanium pipe welding from −60°F to −40°F without any detrimental effects. Daido Steel would like to see the introduction of effective technologies, new equipment and processes along with constant adaptability and the vision to predict their customer’s future requirements were all helping to meet the key challenge for a distributor of saving time. Brett Paddock, Vice President of distributor Titanium Industries Inc. highlighted the changing role of the distributor as the titanium market matures with more and more distributors being asked to provide technical information to engineers and entrepreneurs for the development of new titanium applications.

Further efficiencies were being sort by the distribution industry, George Esseff, Jr, President and C.E.O. of U.S. titanium distributor Supra alloys Inc. described how the introduction of effective technologies, new equipment and processes along with constant adaptability and the vision to predict their customer’s future requirements were all helping to meet the key challenge for a distributor of saving time. Brett Paddock, Vice President of distributor Titanium Industries Inc. highlighted the changing role of the distributor as the titanium market matures with more and more distributors being asked to provide technical information to engineers and entrepreneurs for the development of new titanium applications.

ITA conference proceedings are now available. To order your copy, visit the publications section of the ITA website at www.titanium.org or contact ITA at info@titanium.org. Nigel Tunna may be reached at Metal Pages at Nigel@metal-pages.com, Tel: +44 208 255 8325, website: www.metal-pages.com

Upcoming Conferences & Exhibitions:

January 2004
1-5  MD&M West Show, Anaheim, CA USA
12-14 2004 The Super Show, Orlando, FL USA
27-28 ShipTech 2004, Biloxi, MS USA
29-30 Water for a Sustainable & Secure Future, Washington DC USA
Committee News

ITA Safety Committee
The meeting objectives for ITA Safety Committee 2004 include completing a rough draft of the Safety Manual outlining some of the hazards associated with manufacturing titanium. At this time the committee is organizing an outline of existing and proposed topics, reviewing existing information and looking for volunteers to write drafts of selected topics. The outline contains the following items: crucible section, NAK welding, crucible repair, partial containments, storage/turnings, past incidents categorized by types, control system types and procedures, training procedure ideas for new members to avoid complacency, basic “what if” questions and answers.

The committee would also like to start a Safety Notice email list. In the event that a serious safety related incident unique to the titanium industry occurs, it was recommended that a preliminary summary of the incident be faxed to the ITA. The ITA will forward the incident via an email list to member organizations for distribution as a safety awareness bulletin.

The group also decided that the 2004 Safety Meeting will tentatively take place in conjunction with the TITANIUM 2004 – 20th Annual ITA Conference & Exhibition during October 3-5, 2004. Safety committee participants do not have to attend the Conference in order to attend the meeting. Interested members wishing to participate should contact Stacey Blicker at telephone (303) 404-9400 or via email to sblicker@titanium.org. Thank you for your support!

ITA Specifications Committee
It’s that time… ITA is calling all members to participate in updating the ITA Specification Booklet. This Specification Booklet includes member changes (as applicable) to current specifications, international titanium specification information, as well as inclusion of current applications as relates to alloys. Interested members wishing to participate should contact Stacey Blicker at telephone (303) 404-9400 or via email to sblicker@titanium.org. Thank you for your support!

ITA Applications Committee
Tradeshows were among the topics discussed at the past ITA Applications Committee. In 2004 the International Titanium Association is proud to participate as an exhibitor at the NACE Corrosion 2004 Exhibition on March 28 – April 1, 2004 in New Orleans, Louisiana as well as the Medical Design & Manufacturing East Show on June 15-17, 2004.

Attending these shows allow the ITA the opportunity to represent the industry as a whole and continue to promote titanium usage. During the show, the ITA booth will distribute titanium literature as well as the current Buyer’s Guide thus further promoting our member companies. As a member of the Association this unique Member Benefit provides your organization the opportunity to promote your industry to potential customers. To volunteer for an hour or more or if you would like to volunteer for the entire day at this Exclusive Member Benefit please contact Stacey Blicker directly at (303) 404-9400 or via email to sblicker@titanium.org.

2004 Fundamentals of Titanium Workshop Locations
The Fundamentals of Titanium will be taught in 5 locations during the 2004 year. The This comprehensive workshop will prepare you to present and work effectively with job-related functions involving titanium. Receive a complete overview of titanium and a thorough grounding in its metallurgy, characteristics, properties and uses. Currently the course is scheduled for the following dates and locations but is subject to change.

North Carolina, March 2004
Bresca, Italy, April 21-24, 2004
New York City, New York, June 15-18, 2004
New Orleans, Louisiana, October 6, 2004
Los Angeles, California, November 4, 2004

For more information visit the seminars section of the ITA website at www.titanium.org or email info@titanium.org for more information.

Technical Discussion Forum
The Technical Discussion Forum is an excellent opportunity to educate the general public on titanium. This Forum allows individuals to post questions or seek advice on applications involved with titanium. ITA relies on membership to actively participate in assisting with technical questions.

Cutting: Reaming
I would like to get opinions on reaming Ti. The hole size is roughed to .370 dia and it's going to finish at .3755. The hole is approx. 2.0 deep and through. The Ti is commercially pure and we are using soluble oil for coolant. Type of reamer and speeds and feeds would be appreciated.
Classified Ads

The Classified’s section of the ITA Web Site is located at www.titanium.org. When you submit a classified ad, ITA will proof your advertisement, process your payment, and post it to the website within 3 business days.

Classified Ads

Free Guide to Weld Purging
Name of Your Company: Huntingdon Fusion Techniques Ltd
Contact Email: www.huntingdonfusion.com
Description: The Company has specialized in Weld Purging Technology since 1975 and has developed a number of weld purging accessories which are used internationally in Industries fabricating with Titanium. All Companies welding titanium materials will benefit from having a copy of the guide available. This 20 page A5 booklet is presented as a glossary of weld purge terms and information from A to Z. Apply by email for an electronic copy; for hard copies to be mailed, state the number of copies and the current postal address.

Materials Wanted:
Looking to buy Titanium Usables.
Name of Your Company: North American Alloys
Contact Name: Steve Meredith, steve@northamericanalloys.com
Description: North American Alloys is looking to buy excess inventories of usable titanium materials in all alloys and forms. Please contact Steve at 1-866-577-4161 or e-mail at steve@northamericanalloys.com

Titanium CP And 6-4 Secondary Usable Material
Name of Your Company: Affinity International, LLC
Contact Name: John Li
Contact Email: john1098@adelphia.net
Description: We are looking for titanium CP and 6-4 secondary usable material or scrap material in big quantity.

Products For Sale:
Seamless, Precise, Cylindrical Titanium & Nickel Alloy Components
Contact Name: Gary Ezell, gezell@plymouth.com
Description: Plymouth Extruded Shapes is a member of the Plymouth Tube Company, manufactures titanium & steel extruded shapes for numerous industries, including aerospace, transportation, heavy equipment and machinery, food and dairy, pulp and paper, textile, architectural and medical industries. Call to find out how we can save you cost, labor and scrap or visit: www.extrusions@plymouth.com

Metallurgical - Manufacturing Engineer
Contact Name: Miles A. Abkowitz
Contact Email: maabkowitz@dynametotechnology.com
Description: Challenging position for a metallurgist, materials engineer or mechanical engineer with experience in powder metallurgy and/or titanium materials, processes and applications. Candidate must be technically versatile, combining hands on mechanical capability with strong writing ability and excellent customer contact skills. To be responsive, candidate must provide a cover letter stating qualifications for this position, a resume and salary requirements. A complete description can be located on the classified section of the ITA website at www.titanium.org.

Business Opportunity:
Experienced Sales Engineer
Contact Email: jobopenings@vulcanium.com
Description: Vulcanium, leading titanium equipment manufacturer, seeks experienced sales engineer. BA in chemistry, engineering, other tech field or equal experience; 5 years related sales; mechanical aptitude. Light travel. Metal finishing industry experience a plus. We offer team environment, competitive salary, bonus, medical, 401K. Fax resumes to 847-498-3392 or jobopenings@vulcanium.com.

UK agent seeking additional lines.
Contact Name: David R Green, david.green2@virgin.net
Description: UK agent with B.Eng degree, 30 years metal sales experience and well established contacts in aerospace, power generation and offshore markets. Looking for additional products such as castings, forgings or other titanium products.

Materials For Sale:
Titanium and Steel Extruded Shapes
Name of Your Company: Plymouth Extruded Shapes
Contact Name: Gary Ezell, gezell@plymouth.com
Description: Plymouth Extruded Shapes is a member of the Plymouth Tube Company, manufactures titanium & steel extruded shapes for numerous industries, including aerospace, transportation, heavy equipment and machinery, food and dairy, pulp and paper, textile, architectural and medical industries. Call to find out how we can save you cost, labor and scrap or visit: www.extrusions@plymouth.com
Current Membership Includes the Following Companies

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<tr>
<th>Company Name</th>
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<td>Allegheny Technologies Incorporated</td>
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<td>President Titanium Incorporated</td>
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Founded in 1984 the International Titanium Association is a nonprofit networking trade association for the titanium industry. The primary focus of the Association is to promote the continued growth of the industry as well as educate the public on benefits and implementation of using titanium. Current membership includes 100+ organizations.