

Central Florida AIChE hosts 40th International Phosphate Fertilizer & Sulfuric Acid Technology Conference

Now in its 40th year, the International Phosphate Fertilizer and Sulfuric Acid Technology Conference is always one of the year's highlights. This event, hosted by the Central Florida Chapter of the American Institute of Chemical Engineers, brings colleagues from around the world to Florida's Gulf Coast to share their ideas concerning chemical process technology, specifically the production of phosphoric acid, phosphate fertilizers, and sulfuric acid. The conference, held last June 10-11 at the Sheraton Sand Key Resort in Clearwater, Fla., included the following presentations:

—"Digitalization—What does it look like in H₂SO₄?" by Hannes Storch of Outotec.

—"MECS OTS Dynamic Process Simulator for Operator Training," by Brian Lamb of DuPont MECS.

—"Sulfuric Acid SO₃ Dewpoint Measurement," by Chetan Chothani of Breen Energy Solutions.

—"Advanced Concentration Measurement of Sulfuric Acid," by Sebastian Vreemann of SensoTech GmbH.

—"Benefits of PIOX S in HR Systems," by Brian Reynolds of FLEXIM Americas Corp.

—"Product Strategies of Sensors," by Chris Davis of ION247 Managed Services.

An integral part of the conference is the Sulfuric Acid Workshop. This year's 19th annual Sulfuric Acid Workshop, moderated by



James Byrd of Jacobs Engineering Group, left, receives the 2015-2016 Central Florida Chapter of the AIChE Engineer of the Year award from Bob Andrew during the chapter's meeting in Clearwater, Fla.

Rick Davis of Davis & Associates, focused on current advances in process instrumentation as it applies to the sulfuric acid process and production. The session included presentations that were geared toward practicing engineers with various degrees of exposure to the sulfuric acid process, plant operation, and plant maintenance. The workshop aimed to assist engineers in evaluating the operation and the maintenance of their plants. Best practices and case studies were shared, allowing industry leaders to learn from each other on topics ranging from tank lining and converter startup to EPA regulations.

Sulfuric Acid Workshop presenta-

tions included:

—"Best Practices Utilizing FRP and Elastomeric Liners for Steel and Concrete Tanks," by Michael P. Yee and Richard Taraborelli, PE, RT-Consults PLLC.

—"Recent Advances in Sodium Based Sulfuric Acid Tail Gas Emission Control," by Leonard J. Friedman & Samantha J. Friedman, PhD, of Acid Engineering & Consulting.

—"Upgrading a Sulphuric Acid Plant: Project Execution Strategy and Performance Evaluation," by Andrés Mahecha-Botero, Brad Morrison, Brian Ferris, Hongtao Lu, J.P. Sandhu, C. Guy Cooper, and Nestor Chan of NORAM Engineering and Constructors Ltd.

—"Understanding Dynamics and Emissions During Sulfuric Acid Converter Startup," by Per A. Sørensen and Kurt A. Christensen of Haldor Topsøe.

—"Keys to Successful Internal Gas-Gas Heat Exchanger Replacement, A Case Study," by Jesse Huebsch, P. Eng.; Grant Harding, P. Eng.; and Jean-Philippe Hudon, EIT, of Chemetics and Bill Jones of Lucite.

—"Stack Acid Mist—How Low Can You Go?" by Douglas Azwell, Steven Ziebold, and Evan Uchaker, PhD, of MECS.

—"Control Systems Migrations in Phosphate Plants: A Road Map for Success," by John O'Toole and Richard Brooks of Hatch.



This year's sulfuric acid workshop delved into the topic of the advances in process control. Rick Davis, left, of Davis & Associates moderated the question and answer discussions for the panel of the presenters. Pictured are, from left, Brian Reynolds of FLEXIM Americas Corp., Sebastian Vreemann of SensoTech GmbH, Chetan Chothani of Breen Energy Solutions, Hannes Storch of Outotec, Brian Lamb of DuPont MECS, and Chris Davis of ION247 Managed Services.

—"Cost and Performance Benefits of Dual Laminate Pipe over Lined Steel," by Kira Townsend of RPS Composites, Inc.

The Clearwater conference is always about more than presentations and panel discussions, though. James Byrd of Jacobs Engineering was presented with the Engineer of the Year award for his contributions to the field. And all attendees enjoyed family-friendly hospitality suites each night, which afforded the chance to network, reconnect with old friends, and enjoy some great Florida cuisine.

Dates for the 2017 conference have been set for June 9-10, 2017. For more information, visit the event's website at www.aiche-cf.org. □

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LESSONS LEARNED: Case histories from the sulfuric acid industry

By: Rick Davis, president of Davis & Associates Consulting Inc.

Packing size is important

A plant planned to repack an inter-pass absorption tower that was fouled with sulfate deposits. The repacking would reduce the pressure drop and return the tower to a clean plant condition. The original packing consisted of 3-inch ceramic saddles topped off with a 2-foot layer of 2-inch saddles.

The plant ordered the required packing and a sub-contractor removed and installed the new packing. There was not enough packing purchased and an additional approximately eight inches of 2-inch saddles were required to bring the packing level to the proper level below the acid distributor troughs. Additional 2-inch saddles were not available in inventory, but 1-inch saddles were. The plant decided to use 1-inch saddles to get the plant on-line versus waiting an extra day for the delivery of new material.

Shortly after the plant came back on-line, the performance of the tower was worse than before repacking the tower. When the tower was opened it was found that the 1-inch saddles were all broken and laying on components above the acid

distributor and in the distributor troughs.

A quick review found that the 1-inch saddles had fluidized. There is a significant difference in the pressure drop across 2-inch packing versus 1-inch. The published packing factor of 2-inch saddles is 40 versus 98 for 1-inch saddles (145 percent higher). The 1-inch saddles were operating in the flooding zone and beyond to cause fluidization.

The plant had to shut down again and repack the tower to remove the broken saddles. Saving one day cost another eight days' additional downtime.

Lesson learned: Do not change the original design without an engineering examination of the proposed changes.

Rick Davis is a chemical engineer with over forty years of experience in the sulfuric acid industry and he provides a wide range of engineering services to the sulfuric acid industry with expertise in plant design, plant operations and legal advisement.

For more information, please contact Rick Davis of Davis & Associates Consulting Inc., at (863) 646-7930 or rick@consultdac.com. □