AIST
MENASteelForum2020

Recap

The Middle East/North Africa (MENA) region is rich with steel production and is home to many active AIST members. AIST hosted a virtual Steel Forum specifically tailored to those in the MENA region on 10–12 November 2020. Steelmaking experts from around the world participated, offering their perspectives on steelmaking and highlighting successful projects and achievements both in the area and across the world.

Challenges for the MENA Steel Industry Post-COVID-19

The forum opened with a panel discussion held in Arabic, titled "Challenges for the MENA Steel Industry Post-COVID-19." Dr. Taha Mattar, director of Tabbin Institute for Metallurgical Studies, served as moderator of the session.

Adel Shawkat, international trading consultant – MENA, presented an overview of the global steel crisis during the COVID-19 pandemic and offered a comparison between COVID-19 and the 2009 global economic crisis. He also discussed the impact of lockdowns on the MENA region and offered recommendations of how the steel industry can survive.

Ashraf Hanna of RHI Magnesita discussed the impact of the COVID-19 pandemic on steel companies in North America. He noted the optimistic prediction of the fast recovery of the steel industry and lessons learned from the pandemic.

Amr Salah of Globe-Egypt introduced different ways to manage the COVID-19 pandemic in addition to the challenges and recommendations for the iron and steel industry sector.

The panelists answered questions from the audience related to the COVID-19 pandemic and the steel industry's "new normal" in the wake of the pandemic.

Modern Furnace Operations Panel Discussion

The forum continued with a panel discussion on modern furnace operations. Electric arc furnace (EAF) experts Osama Azab of Egyptian Steel Co.

Challenges for the MENA Steel Industry Post-COVID-19 Panel

Top row, left to right: Ashraf Hanna, RHI Magnesita; Amr Salah, Globe-Egypt; Dr. Taha Mattar, Tabbin Institute for Metallurgical Studies. Bottom row, left to right: Adel Shawkat, International Trading Consultant – MENA; Mohamed Saied, EZDK.

Top row, left to right: Jeremy Jones, CIX Inc.; Mohamed Outifa, Maghreb Steel; Andreas Volkert, Badische Stahlwerke GmbH. Bottom row, left to right: Karim Badr, RHI Magnesita; Osama Azab, Egyptian Steel Co. Al Ain Al Sokhna Plant; Mohamed Saied, EZDK.

Al Ain Al Sokhna Plant, Mohamed Outifa of Maghreb Steel, Andreas Volkert of Badische Stahlwerke GmbH, and Jeremy Jones of CIX Inc. provided the audience a unique opportunity to hear about the latest EAF designs and technologies available. This panel discussion was sponsored by RHI Magnesita.

Each of the panelists gave a "deep dive" into their specific areas of expertise and showcased their companies' capabilities. While most of the discussion focused on steel plants within the Middle East and North Africa, session moderator Karim Badr commented that it was "beneficial to hear about processes that are not common to the MENA region."

Osama Azab gave an overview of Egyptian Steel and its two steelmaking facilities. Egyptian Steel was the first plant in the MENA region to adopt Danieli's MI.DA technology. Mohamed Outifa of Maghreb Steel in Morocco spoke about the history of the company and provided technical specifications of its equipment and processes. Maghreb started out as Maghreb Tubes in 1975 and has become the first and only company to produce plate in Morocco.

Azab and Outifa both went into detail about their respective companies' scrap charging, refining and melting, and refractory maintenance practices. Azab noted that Egyptian Steel has a 100% continuous scrap charging process, which helps it to control the melting process.

The conversation then shifted to Germany, with Andreas Volkert's overview of Badische Stahlwerke GmbH (BSW), which is one of the country's largest producers of reinforcing steel. Volkert highlighted two benchmarks the company has recently achieved: its daily energy consumption record of 330 kWh/ton and its reduction in CO_2 emissions from 68 kg/ton to 52 kg/ton.

Rounding out the session, Jeremy Jones spoke about optimizing steel plants, based on his years of experience working in steel mills around the globe.

"Optimizing steel plants is a lot of fun," he quipped, acknowledging the breadth of opportunities and challenges that come with it.

Among the topics he discussed were scrap selection and feed mix optimization, a look at the future with regard to residual control, scrap challenges for EAF operations, operational challenges, and slag and melting profile management.

Energy and Operational Efficiencies

A session titled Energy and Operational Efficiencies was held on the second day of the forum, moderated by Karim Alshurafa of SMS group Inc. Amr Abdelghany of Cairo University opened the session with "Computational Fluid Dynamics for Energy Efficiency and Cost Savings." His discussion introduced computational fluid dynamics (CFD) and the origins of modeling, which can be traced back to a drawing by Leonardo da Vinci, and described how CFD is a useful tool in the iron and steel industry to save time, energy and money.

Karim Badr and Ashraf Hanna of RHI Magnesita presented "Review of EAF Technologies and Refractory Digitalization." Their discussion focused on the main challenges in the steel industry: energy costs, productivity, CO_2 emissions and, most importantly, safety measures. Hanna highlighted the benefits of scrap pre-heating, which can save up to 100 kWh/ton liquid steel in electrical energy, increase metallic yield, lower dust emissions and improve productivity.

The iron and steel industry accounts for 20% of global energy consumption and 7.2% of global greenhouse gas emissions, according to

Dr.-Ing. Jürgen Cappel. In "EAF Energy Efficiency," Cappel gave a detailed overview of potential energy-saving tactics and technologies, including oxygen trimming, automated slag doors, air mist cooling of electrodes, using high-carbon direct reduced iron, and heat recovery of EAF slag and offgases, to name a few.

Cappel cited strategies that would work well for the MENA region, since its steel production is predominantly EAF based. He also noted that the MENA region "is an attractive and developing market for all kinds of industrial and steel products."

Closing out the session, Hans-Jürgen Odenthal of SMS group GmbH presented "Efficiencies Achieved Through the Use of CFD Modeling." His discussion covered CFD modeling in four cases: a fume extraction system, an EAF, a ladle and a metal powder production plant. He noted that "worldwide emissions standards are getting tighter and tighter, so special attention must be paid to the entire dusting system."

New Projects/New Technology

The New Projects/New Technology session, sponsored by SMS group, was moderated by Mohamed Saied of EZDK.

Mohamed Abo Mossaed of EZDK opened the session with "Modernization of CSP Plant at EZDK, Alexandria, Egypt, Performance Improvement, Enlargement of Product Portfolio." Mossaed gave a complete overview of the modernization of EZDK's 1-million-metric-ton CSP plant, which took place in 2015–2017 in partnership with SMS group. The project also included an overhaul of the plant's

automation system, which allowed for an additional benefit of automatic roll changes.

Mohamed Shahtout of Emirates Steel Co. then discussed Emirates Steel's sustainability initiatives. Emirates Steel is the only integrated steel producer in the United Arab Emirates, and it recently announced that its products comply with the Leadership Energy and Environmental Design (LEED) Green Building rating system. Among the case studies Shahtout highlighted were its dust agglomeration initiative, which is currently in hot commissioning and is expected to save US$7 million/year, and its carbon capture project, which uses a CO_2 absorber system that captures CO_2, which is then used by the oil and gas industry to extract oil from the ground.

In a perspective from the U.S., Barry Schneider of Steel Dynamics Inc. (SDI) gave a presentation about the company's Sinton, Texas, plant. The Sinton plant will be a "next-generation EAF-based steel mill" that introduces products that go beyond what SDI currently makes. Once the 3-million-metric-tons-per-year mill is completed, SDI will see a 25% increase in its annual steel production capacity. Throughout his discussion, Schneider focused on sustainability and highlighted that SDI is the largest ferrous and non-ferrous recycler in U.S. He also noted the renewable energy sources that will power the Sinton plant.

The final presentation of the session was given by Mohammed Al-Zayer of Hadeed — A SABIC Affiliate. Al-Zayer's "Optimization of Primary Coating for Iron Ore Pellet" focused on a method to reduce clustering of iron ore pellets in the direct reduction shaft furnace. He described experimental work of applying a solution to the pellets under varying conditions.

Energy and Operational Efficiencies Session

Top row, left to right: Karim Badr, RHI Magnesita; Dr.-Ing. Jürgen Cappel, Cappel Stahl Consulting; Ashraf Hanna, RHI Magnesita. Bottom row, left to right: Dr. Hans-Jürgen Odenthal, SMS group GmbH; Mohamed Saied, EZDK; Karim Alshurafa, SMS group Inc.

Top row, left to right: Mohammed Al-Zayer, Hadeed – A SABIC Affiliate; Mohamed Saied, EZDK. Bottom row: Barry Schneider, Steel Dynamics Inc.

Case Studies in Digital Transformation

The third day of the forum featured a series of presentations that highlighted case studies in digital transformation. Mike Dudzic of ArcelorMittal Dofasco served as moderator.

The session opened with "Digital Transformation Case Studies From EZDK Flat Steel Division," by Mohamed Saied of EZDK. Saied discussed the "enormous opportunities for the steel industry through digital transformation," as he put it. "Digital transformation gives the steel industry a sustainable advantage which paves the path for greater success," he said.

Saied provided tips for companies investing in digital transformation technologies, which include: embracing adaptive design, adopting agile execution, focusing on a clear set of objectives, adopting new technologies early, evolving analytics platforms, investing in talent and collaborating with other departments.

Alexander Thekale of Primetals Technologies followed in a discussion on advanced profile control empowered by digital transformation. His presentation focused on strip control, challenges and applications. One point Thekale highlighted is the need for both IT personnel and engineers to be involved in process modeling. Engineering know-how and training are equally as important as the knowledge of modeling. "They're thinking about the same issue from totally different worlds," he explained.

Eric Almquist, Star Tool & Die Inc., closed out the final session with his presentation titled "Implementation of Augmented Reality for Frontline Steel Workers." He gave an assessment of what the workforce will look like in the years to come and how emerging technologies can help to bridge the skills gap. He stated that there will be a skilled labor crisis in 2020–2030, and that every country except India will have a deficit about 85.2 million workers (which is equal to the population of Germany) with an unrealized revenue of US$8.4 trillion.

AIST's First Event in the MENA Region

The three-day forum had 167 attendees and was the first formal programming AIST has conducted in the MENA region.

AIST wishes to thank its media partner, The Steel Network; the presenters; and all of those who joined the audience. Special thanks are extended to the organizers of the event, as well as to the event sponsors, SMS group and RHI Magnesita. This forum represented almost two years of planning and organization during some challenging times.

AIST's membership comprises individuals from more than 70 countries across the world, working in myriad capacities within the global steel industry. To support the education and training of our members, AIST's Member Chapters offer regional programming in a variety of platforms — from technical presentations at monthly meetings, to steelmaking symposia and larger-scale Steel Forums.

AIST members in the MENA region are currently working to formally establish an AIST Middle East North Africa (MENA) Member Chapter to facilitate future technical programming for this developing region. Visit AIST.org/local-member-chapters/find-a-chapter/mena to learn more. ✦

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