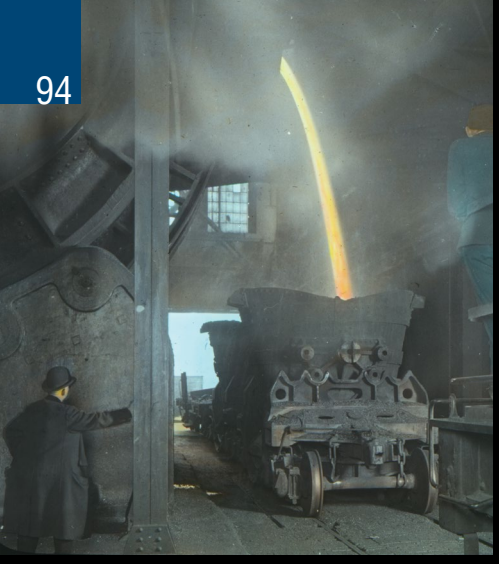
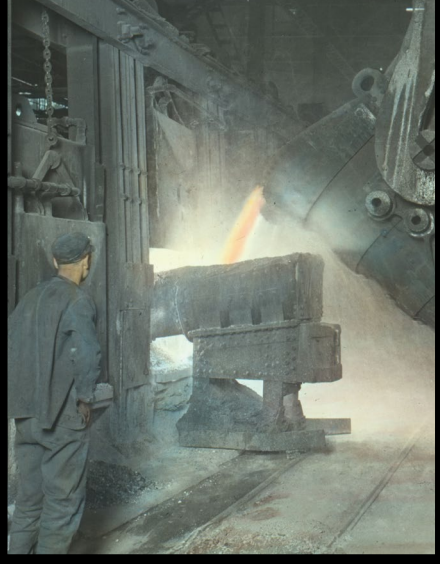




The High-Tech Side of the Steel City

THE NEW FACE OF STEEL IN PITTSBURGH

For more than a century, Pittsburgh has embraced its identity as the "Steel City." As far back as the American Civil War, Pittsburgh was a major supplier of iron and steel used in ships and weaponry. The utilization of the Bessemer process at Andrew Carnegie's Edgar Thomson Plant in 1875, along with the nation's growing railway system, allowed the American steel industry to advance by leaps and bounds along the Monongahela, Allegheny and Ohio rivers.

Through the early 20th century, Pittsburgh was producing half of the steel in the United States. When the nation's efforts in World War II called for steel, around 95 million tons of it came from Pittsburgh.

Then in the 1970s, the city underwent a dramatic transformation, as a confluence of factors such as foreign competition, recessions and the oil crisis put local steel production in jeopardy. Steel mills began to shut down, unemployment rates rose and many people left the city and the industry, which led to a generational gap that is still felt today.

Currently there are no steel mills within the city limits. But that's not to say the region as a whole is devoid of steel production.

The Edgar Thomson Plant, now part of U. S. Steel's Mon Valley Works, still stands tall in Braddock, just outside the city. And the company's Research and Technology Center is located across the river in Munhall.

A short drive from the city will show that steel production still thrives in Western Pennsylvania. Universal Stainless produces specialty steels in its facility in Bridgeville to the south; Allegheny Technologies Inc.'s US$1.2 billion hot rolling and processing facility sits on the Allegheny River in Brackenridge, northeast of the city; and TMK-IPSCO's facility in Koppel and AK Steel's Butler Works are located north of the city.

While the landscape of Pittsburgh's steel industry has changed, the city is known today as a center for technology and innovation. In fact, compared to other cities known for manufacturing, such as Cleveland, Detroit and Chicago, Pittsburgh boasts a higher concentration of suppliers to the industry. Many major OEMs to the global steel industry have their U.S. headquarters in Pittsburgh, including ANDRITZ, Danieli, Primetals Technologies, SMS group, Tenova and numerous others.

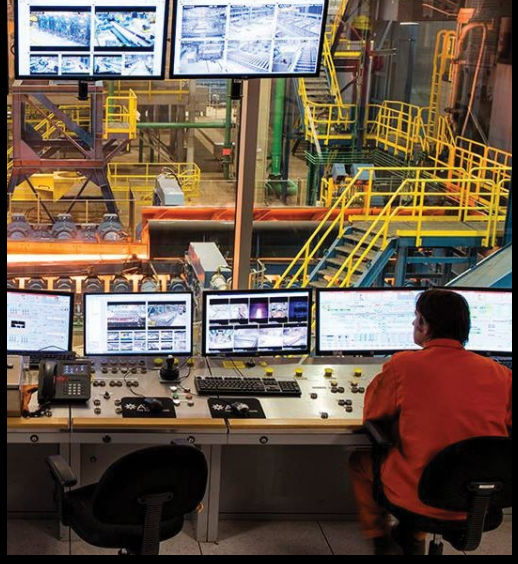
The evolution of the steel industry carries on in Pittsburgh through the digital transformation movement. Companies such as Management Science Associates (MSA) and Thermo Fisher Scientific offer solutions for cloud-based management of real-time process data. From receiving an email alert that it's time to conduct preventive maintenance to being able to monitor thickness gauges in real time, the ability to collect and digitize data is revolutionizing the steel industry.

"Steelmaking has evolved into a process that can be optimized, and data can be collected at every point along the way," said Christopher Burnett of Thermo Fisher Scientific. The company's logistics and I.T. divisions are located in the Pittsburgh area.

"Some of the digital science we're working on is to make things convenient for a maintenance manager or line manager so they can monitor the data."

MSA's roots in Pittsburgh date back to the 1950s. According to the company's vice president, Patrick Gallagher, MSA has been providing cloud computing and data center services since "before the terms were coined." Gallagher stressed that

Photos on this page courtesy of Ken Kobus and the University of Pittsburgh Library System's Guide to the Steel Process Lantern Slide Collection.



BY AMANDA L. BLYTH

security of this data is of utmost importance. And companies like MSA are up to the task of embedding the proper security to ensure confidentiality and protect assets.

Robotics also has staked a claim in Pittsburgh, with the National Robotics Engineering Center (NREC) at Carnegie Mellon University (CMU). The NREC is the largest robotics research organization in the U.S. It operates in a 90,000-square-foot facility that was built more than 120 years ago for the steel industry. In the mid-1990s, the facility was converted to house world-class robotics research and development.

Attendees of AISTech 2019 will have the opportunity to tour the NREC on Thursday, 9 May, to see recent robotics development and technology firsthand.

Among the projects the NREC is engaged in are autonomous material transport; vehicle stability; and hybrid safety systems that enable humans and robotics to work together safely.

Pittsburgh is also home to cutting-edge steel research at the university level.

Dating back to its Carnegie Tech days, Carnegie Mellon University has always played, and continues to play, a large role in bringing new technology and breakthrough research to the steel industry.

Richard Fruehan, founder of CMU's Center for Iron and Steelmaking Research (CISR), spent 36 years at the university, sharing his steel expertise with students and colleagues. Fruehan serves as director emeritus of the center, which is led by director Chris Pistorius and faculty member Bryan Webler.

"CISR was formed in the 1980s, as Pittsburgh was starting the long and often painful shift from steel production center to technology center," Webler said.

"The center has two objectives: conduct basic research and educate students. Basic research is necessary to help develop new grades of steel and to ensure those steels can be produced with the lowest environmental impact. CISR research focuses on the latter part. Obviously the education of the next generation of engineers is critical because they will be the ones who take steelmaking technologies into the future."

World-class steel research also thrives next door at the University of Pittsburgh in the Department of Mechanical Engineering and Materials Science. Led by more than 30 full-time, tenured or tenure-track faculty, the department's research efforts focus on advanced manufacturing and design, materials for extreme conditions, modeling and simulation, and quantitative and in-situ materials characterization.

It's research like this that keeps steel at the heart of Pittsburgh.

The tech side of the steel industry is advancing exponentially in the digital age, and there's good reason to believe that Pittsburgh will continue to play a significant role in the future of steel. ✦

Photos on this page courtesy of (left to right): United States Steel Corporation, Allegheny Technologies Inc. and Steel Dynamics Inc. – The Techs Division