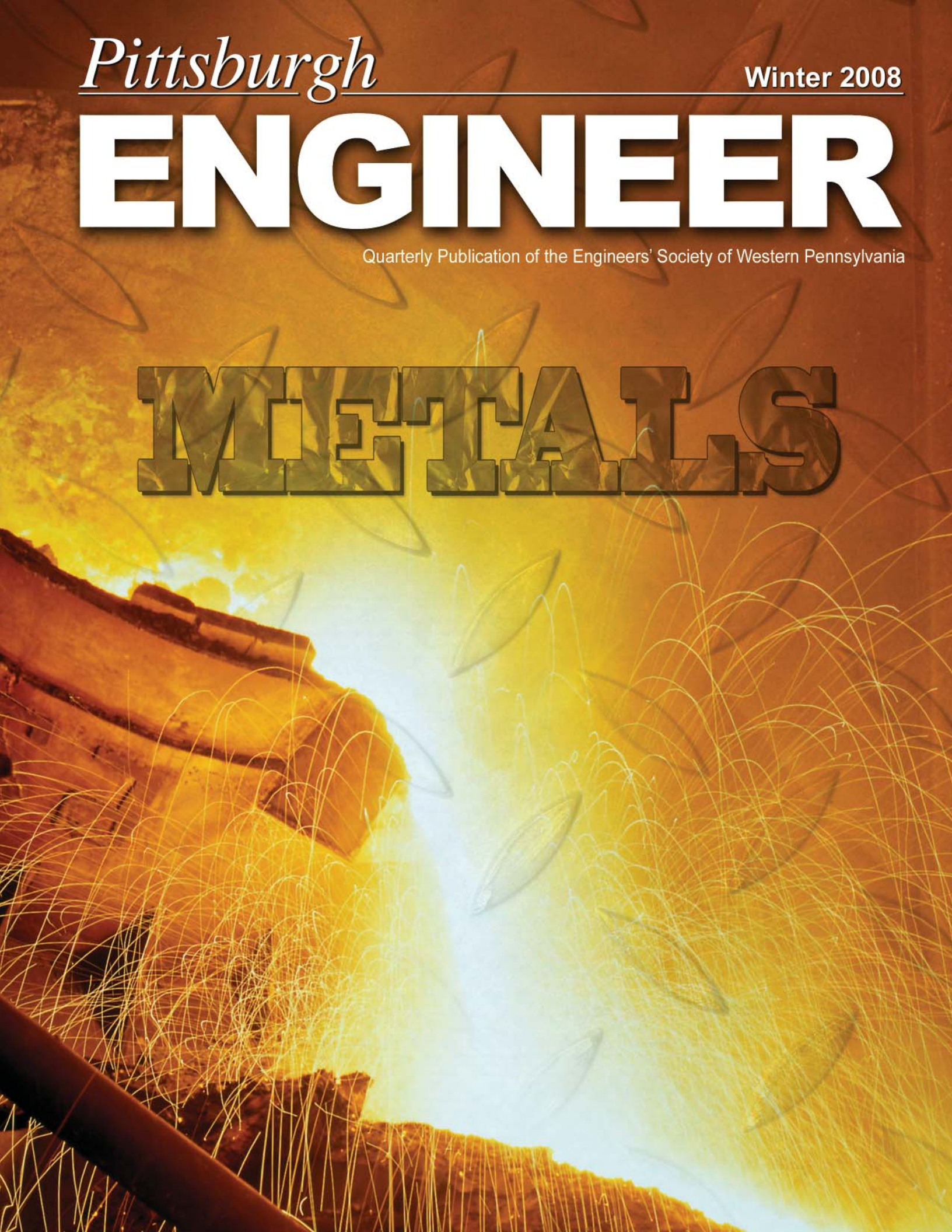
Pittsburgh
Winter 2008

ENGINEER

Quarterly Publication of the Engineers' Society of Western Pennsylvania

METALS



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Guest Editor

Bill Emling

Steel: Tough, Resilient, Optimistic

By Bill Emling
SMS DeMag

While the past several months have been extremely challenging for the international steel community, it is undeniable that the fundamentals of the North American steel industry are strong. That statement might remind one of the tragic declaration made recently by a certain Senator from Arizona, but please read on. This edition of Pittsburgh Engineer contains several articles to support that claim, and highlights the role that Pittsburgh will continue to play in the industry's exciting future.

Bucking the trends and moods of the day, the steel industry has invested billions of dollars in new plant and equipment and on developing new products—all to maintain or improve its competitive position in the global marketplace well into the future. Yes, some projects have been casualties of the economic downturn and have been postponed or shelved indefinitely. On the other hand, some major projects have either recently been announced, are in the process of being executed or have just been completed. These projects have implemented the latest technological advances from equipment suppliers and process engineers. Examples include:

- The expansion and upgrade of United States Steel's Clairton coke making operation described on pages 4-6.
- The investment announced by Allegheny Technologies at Brackenridge and Natrona described on page 18.
- The complex recently commissioned in Columbus, Mississippi, now known as Severstal Columbus, described on pages 7-9.
- The carbon and stainless steel facilities currently being constructed in Calvert, Alabama by ThyssenKrupp of Duisburg, Germany. The new operations will be the cornerstone of the company's NAFTA strategy and an integral part of its overall global marketing strategy.
- A plant currently being built in Amory, Mississippi, by Steel Development Company, named EcoSteel Recycling, LLC that will produce rebar for the construction industry.

If these examples aren't enough to convince the reader, be assured that several others are under development, setting the stage for the next upswing in expansion. Investment in the NAFTA region's steel industry is attractive for several reasons. Among these reasons are a highly skilled work force, a well developed energy grid with low cost electricity, established transportation systems (highways, waterways and rail) and relative political stability

New products dot the landscape, and will continue to be churned out by the industry's labs. Thomas Gibson, President and CEO of the AISI, points out in his article on page 16 that more than half of the steel in today's vehicles didn't exist only ten years ago, and vehicles still average 62 percent steel by weight. Other new steel grades are helping to rebuild bridges and other components of our infrastructure, and be the major structural supports in new homes and other buildings, and preserve our food.

Ron Ashburn, Executive Director of AIST, outlines what steps are being taken to advance the technical development of engineers in the steel industry, and in academia via the AIST's Foundation and the Material Advantage student program. Some very noteworthy items are presented on page 12.

The demand for engineers in heavy industry remains robust, as Mike Sylvestri of AllTek mentions in his article. Many positions remain unfilled—reminiscent

of the boom times of the late 1960's and 1970's. You can read the entire article on page 16.

Pittsburgh remains the hub for the talent and technology needed for the industry to be competitive and to continue its environmental stewardship, for which it is justly proud. The area's critical mass of steel manufacturers, equipment suppliers, consulting firms, universities, trade schools, and associations is unmatched anywhere, and is a major resource for the industry worldwide.

Recent years have seen significant global consolidation of the industry, with many marginal companies disappearing in favor of multi-national corporations with much healthier balance sheets. The consolidated industry has demonstrated improved profitability and the ability to better sustain itself during economic slow downs. While additional merger and acquisition activity is to be expected, in the near-term it will most likely be limited to niche opportunities for a select few companies with healthy balance sheets.

The economic stimulus package recently enacted in Washington promises to increase demand for the steel needed to rebuild our infrastructure. While some have advocated an even more aggressive program, the steel industry is very likely to benefit sometime during 2009.

Perhaps the over arching theme for the industry is efficiency, not just the efficiency of plants and equipment, but also the efficient and rapid development of new technologies and products that compete favorably with other materials vying for steel's traditional markets.

The bottom line is simply that we in the industry and the Pittsburgh area have many reasons to be optimistic about the future. PE

Bill Emling is Vice-President for Steelmaking and Continuous Casting with SMS Demag, an ESWP Corporate Member firm. Bill can be reached at 412-237-8900

United States Steel Corporation is Ensuring the Future

By Ray Boronyak and Jack Withrow
United States Steel Corporation

In the physical world, resources are finite and new supplies take time to develop. In addition, experts disagree about whether the earth is running out of resources or we are running out of lead time to develop them – or both. Whatever the case, it is imperative that we plan ahead to ensure a reliable flow of energy and raw materials.

"Ensuring our company's raw material base is critical to our future," says United States Steel Corporation's Executive Vice President and Chief Operating Officer John Goodish. "And to maintain that base, we must make significant investments in our infrastructure to enhance production while improving our environmental performance. Investments in production and capacity mean little if they do not help sustain the well-being of our communities for future generations."

After carefully studying all of the issues surrounding raw material management, United States Steel has proposed capital expenditures to address these supply-stream issues, all of which strengthen our ability to improve both production and environmental performance.

Sustaining coke production and improving environmental performance are the two major drivers of the $1 billion multi-year investment program being planned for United States Steel's Clairton Plant. Clairton Plant, the nation's largest by-product coke making facility, has the capacity to produce 4.7 million net tons of blast furnace coke per year and is the primary source of coke for blast furnaces at several United States Steel facilities.

Metallurgical coke is one of the most important raw materials consumed in the steel industry. Coke is used to produce iron in the blast furnace process. In the blast furnace, coke acts as: (1) a fuel, (2) a reductant, and (3) a support for the burden of iron and fluxes. As a fuel, coke burns with hot air (1850 F) in the tuyere zone of the blast furnace producing a theoretical flame temperature of 3500 F. As a reductant, the carbon in the coke gets involved in the thermochemical reactions to reduce iron oxides into iron and the silicon oxide into silicon, an important element in the steel refining process. Lastly, the lumps of coke support the mass of ore and fluxes and provide voids through which the hot gases flow and thermochemically react with the burden.

Clairton Plant is one of the facilities comprising United States Steel's Mon Valley Works, the last remaining integrated steel facility in Pennsylvania. Mon Valley Works has four separate plants:

•Clairton Plant, located 15 miles south of Pittsburgh along 3.3 miles of the Monongahela River

•Edgar Thomson Plant, a steelmaking facility with two blast furnaces, a steel shop and continuous casting operations located in Braddock, PA

•Irvin Plant, a finishing operation with processing facilities from a hot strip mill through coating lines that is located in West Mifflin, PA

•Fairless Plant, a galvanizing line located in Fairless Hills, PA

The Clairton open hearth and steelmaking plant, built in 1901 by the St. Clair Steel Company, was acquired by United States Steel in 1904. The first by-product coke batteries (12 batteries of 64 ovens each) were built in 1918. Six batteries with 61 ovens each were added in 1924. Finally, four batteries of 87 ovens each were placed into operation in 1927. An additional battery of 85 ovens was completed in 1948, making Clairton Plant the largest coke production facility in the United States. The open hearth facilities closed long ago, but the coke production facilities continued to expand, providing high-quality blast furnace coke to United States Steel's iron making facilities.

By-product coke making at Clairton begins when coal arrives in river barges to be unloaded, pulverized and blended to create the right chemistry and physical properties. Coal moistures are monitored and the coal bulk density controlled utilizing special equipment developed by United States Steel. Coal is charged into airtight ovens and baked at temperatures nearing 2,000 F for 18 hours.

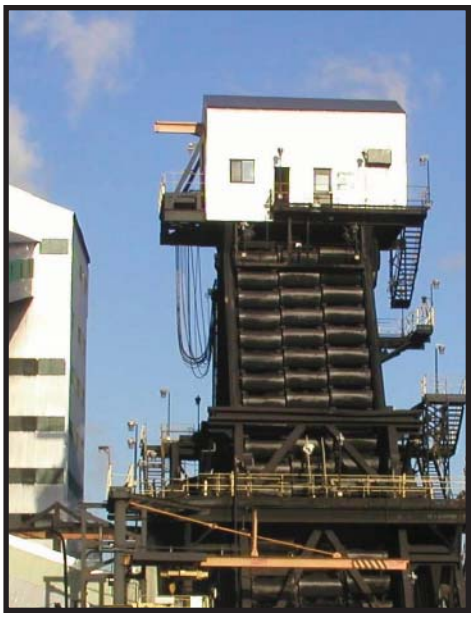
As coal is baked, volatile chemicals are removed as gases. These gases are collected and processed into a number of valuable by-products that are sold to other industries. Coke oven gas is used at United States Steel facilities to reduce the amount of natural gas purchased for steam and power generation.

Coal Barges in Clairton Harbor

The coke making process has inherent environmental challenges, including air emissions that occur through the oven doors and during the push-and-quench operations. Because the ovens operate under positive pressure to keep oxygen out and prevent combustion of the coke, the smallest leak in a door seal can create emissions that may violate air permits. Over the years, United States Steel has invested significant capital to improve the environmental performance of Clairton's coke batteries and reduce emissions. Some of these batteries are more than 50 years old and, in spite of best efforts, cannot be modified to meet today's stringent environmental standards. To achieve business and environmental performance goals, some of the batteries must be replaced.

In November 2007, United States Steel proposed a solution: replace aging batteries Nos. 1, 2 and 3 and Nos. 7, 8 and 9 with two new batteries – C and D – that would employ state-of-the-art coke making and emissions control technologies. The project would significantly improve the air quality in Clairton and ensure a sustainable coke supply for United States Steel.

On July 24, 2008, the Allegheny County Health Department issued an installation permit for the new C Battery at Clairton Plant. The C Battery permit allowed United States Steel to begin construction of the new C Battery, which when completed, will replace batteries No. 7, 8 and 9. Ground breaking ceremonies occurred on October 22, 2008. The project is directed by United States Steel Engineering, which has secured the services of several engineering providers and a coke oven technology supplier. The new battery, which will have 84 individual oven chambers each capable of producing approximately 25 tons of coke per oven cycle, will be constructed to compliment the existing plant infrastructure. Some new and modified coal and coke handling systems will be installed to accommodate the new battery. The C Battery coal supply will be transported to a new coal bunker utilizing a new "pipe conveyor," where the coal belt will completely encircle the pulverized coal on the belt, eliminating dust and coal spillage during transport (See Figure 1).



No. 1 Unit Barge Unloader

New utility pipelines to the existing by-product facilities will process the flushing liquor and raw oven gas and return cleaned coke oven gas to the new battery. The gas pressure control technology that is planned for use on the new C and D batteries is the PROven® system from Uhde GmbH of Germany. Instead of positive pressure within the gas collecting mains, the PROven® technology maintains constant negative pressure inside each main to reduce potential emissions through the battery doors and combustion stack. Both the U.S. Environmental Protection Agency and the Allegheny County Health Department have agreed that the PROven® system is the best available control technology for coke making (See Figures 2 and 3).

The new batteries will also have much larger ovens, allowing production levels to be maintained while decreasing the number of coke ovens in the plant by 216. his will reduce the number of openings for emissions to pass through by more than 25 percent plantwide when C and D batteries are completed and in operation.

The new batteries will incorporate several process systems to improve battery energy efficiency and reduce emissions:

•The battery combustion system will employ Uhde Corporation's double pair flue underjet heating system design with staged combustion to reduce NOx generation. C battery will be able to produce more coke than what is currently produced by batteries No. 7, 8 and 9 batteries while using significantly less energy. The excess gas from the battery will be utilized to reduce natural gas requirements at Pittsburgh-area Mon Valley Works plants.

•Screw-feed coal charge cars will be utilized to significantly shorten oven charging times, reducing the potential time for emissions during the charge. The charge cars will have "under hung" operator cabs to allow for better visibility of the battery top and charging operations.

•The PROven® system enables ovens to be charged without the use of steam or high-pressure flushing liquor aspiration, reducing energy usage and waste water generation during the oven charging operation.

•A computer-controlled coke transport car will receive the coke pushed from the ovens and transport it to a 164-foot-tall quench tower that will utilize a self-cleaning quench water settling sump. The tower is equipped with two sets of baffles and a unique arrangement of sprays to significantly reduce particulate emissions during the quenching operation.

•C battery will share a coke wharf with the existing B Battery, an adjacent 75-oven Carl Still designed battery which began operation in 1982. Both batteries will have computer-controlled quench cars transporting coke from their respective quench towers to the common coke wharf.

•A new coke screening station with improved particulate emissions controls will be constructed to screen the smaller diameter mixed breeze by-product from the blast furnace coke.

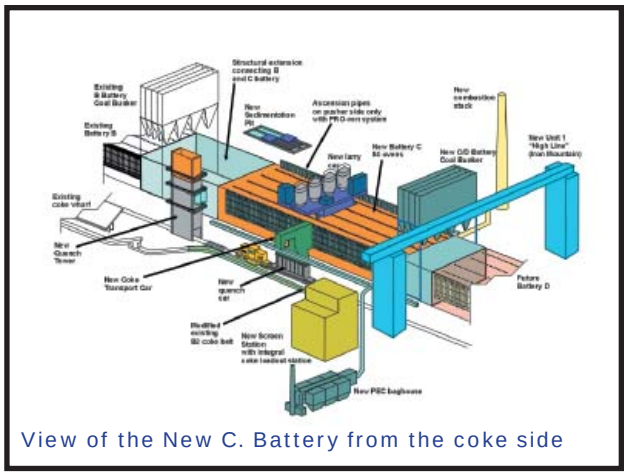

View of the New C. Battery from the coke side

Figure 1

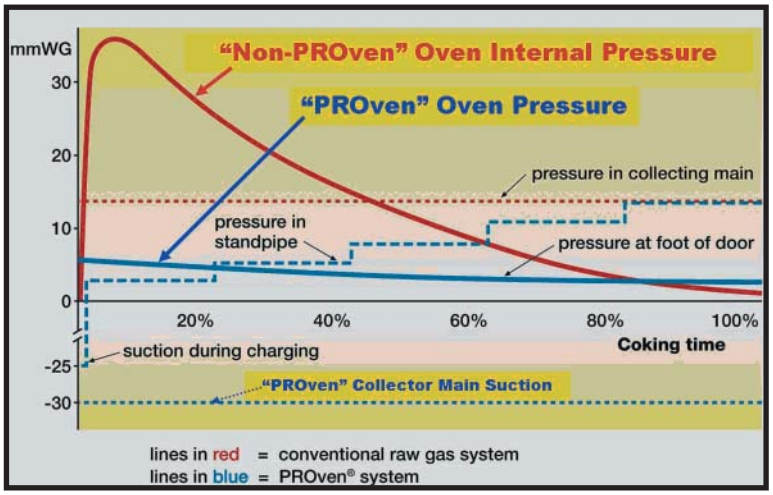


Figure 2

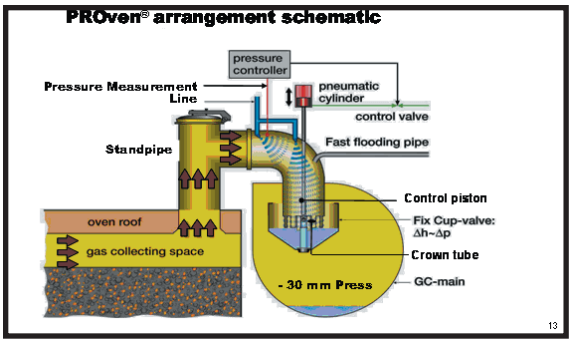


Figure 3

Construction of C Battery is scheduled to be completed by December 2011. United States Steel has also applied for an installation permit to construct the D battery, which will use the same technology as the C Battery, to replace production from existing coke batteries No. 1, 2 and 3. D battery will be located to the south of C Battery, on the other side of the new coal bunker, and utilize companion machinery with C Battery.

In addition to the new batteries, environmentally focused maintenance and rehabilitation work is planned for several of Clairton's remaining batteries. These projects are good examples of how United States Steel is continuing to create safe, environmentally responsible programs that address supply-stream issues by strengthening the company's raw material position and maintaining our standing as a good corporate citizen. By investing in our operations today, we are positioning our company for a sustainable future. PE

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Jack Withrow is the Area Manager - Battery Refurbishment for United States Steel Corporation Clairton Works, and can be reached at JWithrow@uss.com

Severstal Columbus: a New Plant Complex for High-Quality Surface Sheets

By Christoph Klein
SMS-Demag

Severstal Columbus is America's newest steel complex. It is located in the South of the USA, the country's new industrial centre, location of a number of automobile manufacturers and their supplying industry. Severstal Columbus started production between December 2006 and November 2007 and includes all process stages from steelmaking to hot dip galvanizing. The current capacity of the plant is 1.35 m tpa, but will be doubled to 2.7 m tpa by 2010.

All key equipment was supplied by SMS Demag including the major part of the electrical equipment and automation system. The plant technology was tailored to produce high-quality products for the automotive, home appliance and construction industry.

As the facility was built on a "greenfield" site, an optimal layout for the production could be chosen. The overall layout is based on a "U" shape in which the steelmaking plant, CSP® plant and cold-rolling complex are arranged at an angle of 90 degrees relative to each other. This basic layout allows short distances between the facilities as well as simple coil handling. After each stage of production Severstal Columbus can withdraw intermediate products, in order to flexibly meet market demands.

Production Overview

The steelmaking plant consists of a direct-current electric arc furnace with a tapping weight of 150 tons, a twin-type ladle furnace and a twin-type vacuum degasser. The CSP® plant is the heart of the Severstal Columbus works complex. The CSP® caster produces thin slabs that are up to 1,880mm wide and rolled to finish gauges between 1.4 and 12.7mm in the six-stand CSP® rolling mill. The downstream facilities consist of a combined pickling line/tandem cold mill, a batch annealing line with offline skin pass mill and a hot-dip galvanizing line.

The production facilities have been optimized to achieve the targeted steel quality and surface finishes and geometrical tolerances.

Steelmaking

For steelmaking, the metallic charge materials of the electric arc furnace are selected according to the steel grade to be produced. Available here are scrap as well as low tramp-element substitutes such as sponge iron (DRI/HBI) and pig iron, but also specially selected scrap grades with a very high degree of cleanliness. The actual quality of the steel is achieved through the secondary metallurgical treatment of the crude steel.

The ladle furnace is used to exactly set the chemical composition and transfer temperature and a very good degree of cleanliness and low oxygen ("Clean Steel Technology"). The molten metal is finally treated in the twin-tank vacuum degasser.

CSP plant®

The CSP® caster is a vertical solid bending machine consisting of four segments and has a metallurgical length of 8,065mm. It produces thin slabs that are 60 and 65mm thick.

The system of CSP® funnel-shaped mould and submerged entry nozzle is the process core in terms of productivity and product quality. An electro-mechanical stopper rod mechanism which is actuated

CSP Caster

CSP Hot Strip Mill

via a servo drive with linear ball guidance results in a system without clearance/ backlash. The system ensures a very accurate mould level control. For a high-quality surface finish the formation of inclusions must be avoided in the caster. In addition to the selection of the right casting powder, the use mainly of the hydraulic mould oscillator and electromagnetic brake are important factors here. On the exit side of the continuous caster, a special slab cleaning facility is arranged between the withdrawal and straightening units and the pendulum shear to remove primary scale from the top and bottom of the slab by low-pressure water.

In the 6-stand CSP® mill the thin slabs are rolled down to strips with final thicknesses form 1.4 to 12.7 mm. To remove all scale before the deformation, the high-pressure descaler has four vertically adjustable rows of spraying headers which supply a maximum water pressure of 380 bar.

In the CSP® mill a number of actions was taken to suppress the renewed formation of scale. To influence the strip surface temperatures in the finishing mill, adequate strip cooling units were arranged in front of F1 and between F1, F2 and F3. In addition, roll-gap lubrication (F2-F4) and anti-peeling devices (F1-F4) were installed. Roll-gap lubrication reduces the level of roll forces and in case of high thickness reduction suppresses the tendency for vibrations to occur. The anti-peeling device contributes to achieving a long service life of the work rolls and hence to the avoidance of surface defects. For close geometrical strip tolerances and improved operation, the mill is equipped with:

- highly accurate automatic gap control
- dynamic massflow control via hydraulic loopers
- automatic leveling control using SMS Demag's differential tension looper in F5
- the technology package CVC® plus for profile and flatness control including advanced profile, contour and flatness control (PCFC)
- our physical based process model for pass schedule calculation (PSC).

Pickling Line/Tandem Cold Mill

The pickling line uses SMS Demag's turbulence pickling technology. It is characterized by shallow and horizontal pickling channels, patented immersion covers which seal the pickling channel and acid injection by spray headers on the entry and exit side of each pickling tank. With a channel height of only about 150 mm it ensures a high acid flow velocity and hence large turbulences as well as a fast adjustment of the acid temperature and reduced energy consumption. Due to the good controllability of the process, no pickling inhibitors are necessary.

The five-stand tandem cold mill is capable of rolling steel strip from 1.4 to 5.0mm to final gauges from 1.4 to 0.28mm. All of the 4-high stands are equipped with CVC® plus technology featuring positive and negative work-roll bending. Together with the multi-zone cooling system and actuators, the flatness measuring roll installed in the exit ensures optimal flatness. Downstream of the last millstand the dry strip (DS-) system is installed to yield an excellent, dry strip surface without residues of rolling emulsion.

The endless strip is cut by drum shear and coiled by a double reel unit. For the inspection of the strips right at the line, the in-line inspection "Rotary Inspect" is installed, thereby allowing suitable corrective actions to be taken at an early stage, i.e., just one coil away.

Continuous Galvanizing

Prior to galvanizing, the material is welded to form an endless strip, degreased, cleaned and recrystallization annealed in the annealing furnace. The material then passes through the zinc pot. The thickness of the zinc coat may be precisely set by the air knife. For GA grades the zinc pot is followed by a galvannealing furnace.

After cooling, the galvanized strip may be skin-pass rolled in an inline four-high skinpass mill. This is followed by a tension leveller and processing lines for chromate-free products and products containing phosphorous.

IPQS®

Apart from the numerous individual measures and technologies that serve to ensure a high product quality, Severstal

Cold Rolling Mill

Columbus use IPQS® (Integrated Product Quality System) developed by SMS Demag. The focus of this powerful quality control tool is on the integrated observation and processing over all process stages of the plant and process data and their correlation with the product qualities. The system allows Severstal Columbus to correlate quality results with the parameters of the overall process. It forms the basis for the development of quality-oriented product strategies.

Plug & Work

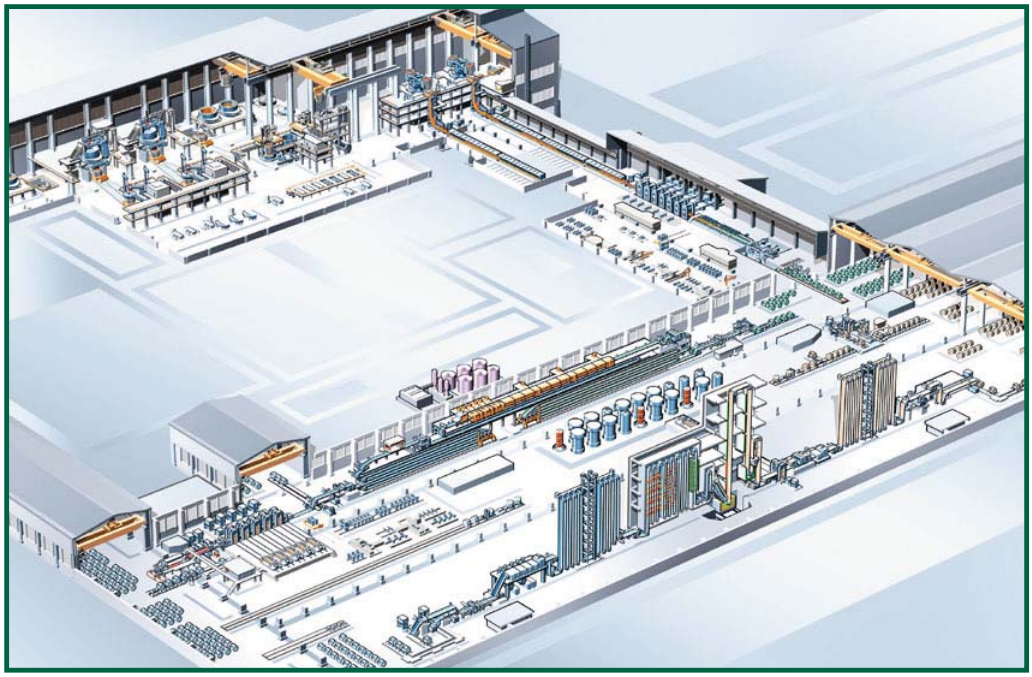
The automation system was tested before delivery using SMS Demag's Plug & Work concept. Plug & Work tests use the software and hardware of the original supply scope and perform a real-time simulation of the complete production process. For this purpose the customer-specific designs are used and the relevant geometrical data, the kinematic and dynamic behavior of the corresponding plant unit as well as the function of the field instruments arranged on the unit are translated in automated draft process and simulated against the automation system. Reality can thus be imaged as precisely as possible and the automation system can be optimized already before its commissioning.

Operating Results

The different facilities started production step-by-step in 2006/2007. The heart of the new works complex, the steelmaking plant and CSP® plant, started operation in August 2007. Already after five months, the production reached more than 90% of the contractual guaranteed capacity. In comparison to other CSP® plants, the ramp-up of Severstal Columbus was one of the steepest together with the Chinese plant of Jisco. This clearly proves the benefits of having the mechanical and electrical equipment plus automation system supplied from a single source as well as of advanced commissioning by means of the Plug & Work concept. Various operational results show also the high quality of the different plants.

Conclusion

Soon after the start-up of the plant complex, Severstal Columbus started with the expansion of the works. Steelmaking capacity will be doubled in 2009. Accordingly, the hot strip production will be doubled by installing the second CSP® casting strand and the second coiler. The pickling capacity will rise to 2.3 million tpy by the installation of a fourth pickling tank and by setting up a push-pull pickling line. The galvanizing capacity will be doubled by installation of a second continuous galvanizing line. PE


Severstal Columbus Plant Overview

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AIST: ENCOURAGING TECHNOLOGY AND ITS DISSEMINATION GLOBALLY

By Ronald E. Ashburn
Association for Iron and Steel Technology

A recent study by the University of Pittsburgh's Center for Industry Studies found that Pittsburgh-based suppliers to the steel industry have not only survived the changing times, they have demonstrated their resilience and grown.

Just as the region has adapted to a shrinking steel industry with new and exciting opportunities, so has the Association for Iron & Steel Technology (AIST).

As an international, member-based, technical association representing iron and steel producers, their allied suppliers and related academia, AIST is dedicated to advancing the technical development, production, processing and application of iron and steel.

Established on January 1, 2004, AIST was formed by the merger of two longstanding societies, the Association of Iron and Steel Engineers (AISE), founded in 1907, and the Iron & Steel Society (ISS), founded in 1974. The best practices of both predecessor organizations were incorporated into AIST to create a strong international, member-based technical organization that has sustained itself in an environment of continual change.

A Large, Diverse, and Active Membership

More than fifteen thousand professionals and students in 65 countries are members of AIST; the Association and its membership have earned the industry's respect for their knowledge and understanding of the business. The current membership distribution: 43% industry suppliers, 30% producers, 25% students and 2% academia. (See Figure 1)

Members actively participate within the association primarily through nine Technology Divisions comprising 28 Technology Committees that address specific process, engineering, equipment or reliability technologies associated with the iron and steel industry. Members who serve on Technology Committees become an integral part of a vital network with a goal to solve problems and advance the industry's technology. Committee activities include plant tours, conference program development, industry surveys, round table discussions, technical presentations, and the development and maintenance of technical reports and benchmarking metrics.

AIST's 22 Member Chapters represent regional concentrations of individual members in the iron and steel community from around the world. They are an integral component in facilitating the exchange of ideas and strengthening AIST's global network, offering industry professionals the opportunity to participate in AIST on a grassroots level.

Conferences, Publications, and other Contributions to the Industry

In 2008, AIST's major international conference, AISTech, was held in Pittsburgh and hosted more than 8,000 professionals from the entire spectrum of steel producers, suppliers, consumers and academia. The exposition was sold out, with 466 companies showcasing their products and services. AISTech is an annual event held in various cities, bringing together technologies from around the world to promote a global network to help steel producers and suppliers compete in today's global marketplace.

AIST members also benefit from the monthly journal, Iron & Steel Technology, which publishes technical articles for metallurgical, engineering, operating and maintenance personnel and provides readers with the latest information on production

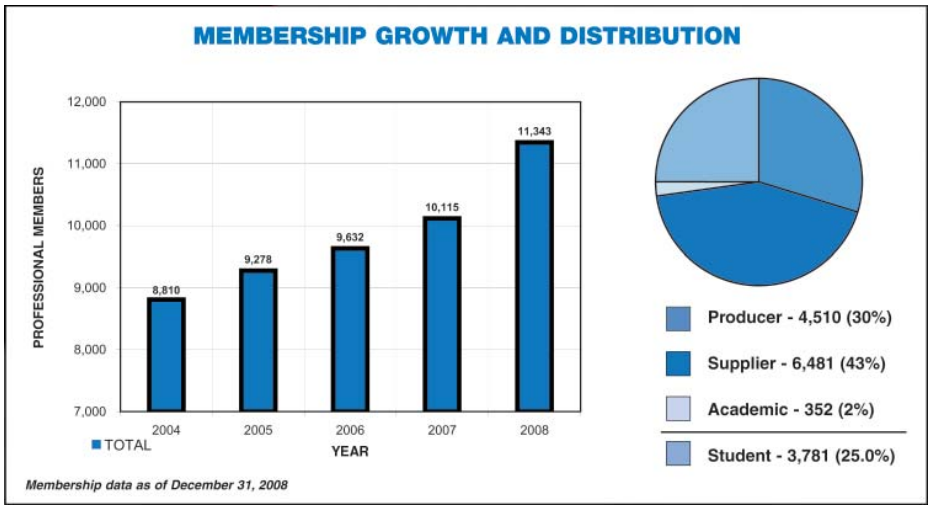


Figure 1

statistics, technological breakthroughs and trends in equipment, processes and operating practices.

AIST also offers member discounts on publications, including books and technical reports that are considered standards in the industry. Thousands of published papers and books are available to the general public on the AIST Steel Library (www.SteelLibrary.com).

Students: the New Technologists

Almost 4,000 student members actively participate in the association via 75 student chapters as part of the Material Advantage program, designed to provide a single, affordable membership to the materials science and engineering professional organizations of ACerS, AIST, ASM International and TMS. AIST's involvement in the Material Advantage program provides a significant opportunity to reach a large student audience through communication between the students and AIST Member Chapters and Technology Committees.

With a strong belief that innovative ideas ultimately come from the new generation of students, the AIST Foundation was organized for charitable, education and scientific purposes, with a goal to attract technology-oriented professionals to the steel industry. The AIST Foundation awards college scholarships and program grants to provide these students a helping hand. It is anticipated that approximately $450,000 will be awarded in 2009 through scholarship and cooperative programs.

Global Activities for a Global Business

Our global association conducts more than 200 meetings per year (representing well over 10,000 attendees) all over the world, and AIST is proud to bring new technologies to members. With the intent to broaden global activities, AIST sponsored its first International Crane Symposium in Kosice, Slovakia in September 2008. Through the strong support of the United States Steel Corporation, the sold-out training course of 94 attendees heard presentations regarding fundamental, safe maintenance practices which will improve the reliability of Electric Overhead Traveling (EOT) cranes. The attendees represented fourteen different countries, some traveling from as far away as Brazil, India and the United States. AIST Committee attendees represented plant maintenance staff; applications, electrical, mechanical, safety, service and design engineers; operations personnel and management; and individuals who supply parts, equipment and services to the EOT crane industry.

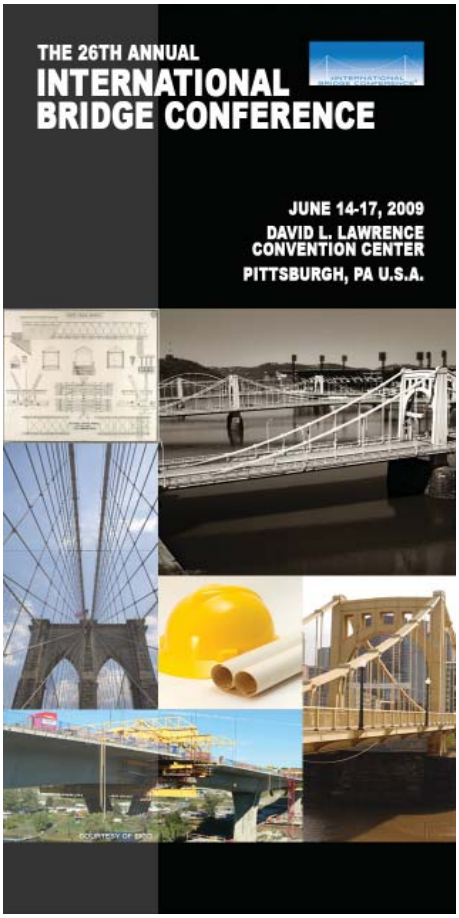
Pittsburgh is Still the Hub of a Changing Industry

The transformation of today's American steel industry is taking place right in our own backyard. Pittsburgh is home to 25 percent of America's steel mill suppliers. More than 300 companies employ those who cut steel and make bricks, tools, lances, sensors and other specialty equipment. The growth of this region and its economy in the days of Andrew Carnegie evolved from extensive trade of steel, so it should be no surprise that today, there are still more people working in the steel industry in the Pittsburgh area than in any other metropolitan region.

In this climate of growth and change, AIST continues to promote the development of new technologies and diversified products, reaching out to established and new customers throughout the world.

The steel industry in the Western Pennsylvania region is an active part of the present economy, as well as a key player in making a huge impact for a brighter future for the global industry. PE

Ronald E. Ashburn is the Executive Director of the Association for Iron and Steel Technology, located in Warrendale PA. He can be reached at rashburn@aist.org.



America's Steel Industry: Keeping Its Eye on the Future

By Thomas J. Gibson
President and CEO, The American Iron and Steel Institute

The steel industry, like others, is being impacted by global economic conditions. Most manufacturers have been taken aback by the suddenness with which conditions deteriorated. No one knows when recovery will begin, but some economists are predicting improvements could by the second half of 2009. In the interim, the steel industry is keeping its eye on the future in terms of both economic recovery and future market opportunities.

Restructuring has Strengthened the Industry

America's steel industry today is positioned better than ever to deal with a decline in demand. During the crisis of 1998-2003, the industry strengthened itself from within through extensive consolidation, restructuring, and capital investment. As a result, the industry is leaner, more efficient, more resilient, better able to respond rapidly to changing business and other conditions, and more competitive in the global marketplace.

The consolidations that took place, in some cases, also ushered in management teams that eliminated multiple layers of management. Some companies went from seven layers of management – from the factory floor to CEO – to just two. Efficiencies resulted through the elimination of duplicate capital spending, lengthening production runs through coordinated marketing among facilities, optimizing product movement between facilities, and leveraging existing sales and research. Re-negotiated labor agreements during this time period reduced costs and raised productivity.

New Investments in Environmental Stewardship

The steel industry continues its long-term commitment to invest in reducing energy use and emissions. Not only does that make good business sense, but it honors our industry's commitment to be responsible environmental stewards. We have done just that – and we continue to do so – through our support for breakthrough technologies, which will provide the ultimate answer to the climate issue.

Working under the leadership of the American Iron and Steel Institute (AISI), the industry has partnered with leading universities as part of the CO2 Breakthrough Program. The Program is aimed at developing new ways of making steel while emitting little or no carbon dioxide, and is being coordinated worldwide by the World Steel Association. Such new developments in steelmaking are required, since today's processes are mature and their energy use has already been minimized; producers in the United States have reduced the energy required to produce one ton of steel by 33 percent since 1990.

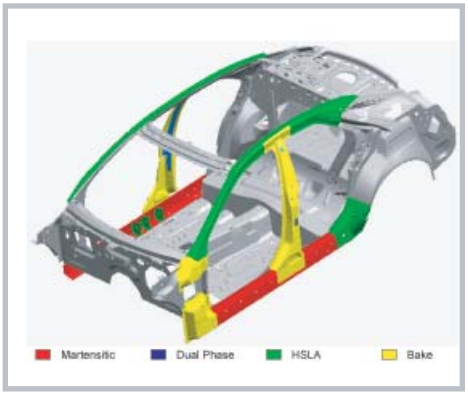
The North American cluster of the CO2 Breakthrough Program began with Phase I, a joint program under the Technology Roadmap Program for research and development between members of the AISI and the U.S. Department of Energy. The four universities participating in Phase I are the Massachusetts Institute of Technology (MIT), the University of Utah, Columbia University, the Missouri University of Science and Technology (MUST), formerly the University of Missouri-Rolla. The processes being tested are: molten oxide electrolysis (MOE) at MIT; ironmaking by hydrogen flash smelting at the University of Utah; and carbon capture and sequestration methods at Columbia University and MUST.

Phase I's laboratory-scale experiments demonstrated that MOE and hydrogen flash smelting are technically viable, which was very encouraging. In response to these results, steelmakers have moved forward in partnering with these two universities and embarked on Phase II, which involved building pilot-scale facilities of the two processes to develop scale-up parameters and assess their economic viability.

The pilot work is scheduled to take three years. If successful – for one or both of the technologies – a demonstration-scale project (Phase III) lasting four to five years would follow. The projects at Columbia University and MUST are nearing the end of Phase I.

Tangible Evidence of Commitment to the Future

These and other investments show the steel industry's commitment to a sustainable future, and today's steels are providing the solutions necessary for tomorrow's challenges. For example, Advanced High-Strength Steels (AHSS) are the most sophisticated steels available today for automotive applications.• They reduce weight, raise fuel efficiency, and



CTS Exploded View

lower emissions. They exhibit a superior combination of high strength and crash energy management to increase safety, they are formed more easily to lower production costs, and they resist denting.

The most recent research from Ducker Worldwide projects the proportion of AHSS in body and closure components will rapidly grow to 35 percent by 2015, up from 9 percent today, helping to reduce overall vehicle weight by 50 pounds. These and other benefits are maintaining steel's role as the preeminent material of choice in today's vehicles, where the proportion of steel to the total weight of the vehicle stands at 62 percent.

Steel in Residential Construction

Today's steels are also protecting Americans at home in the event of natural or man-made disasters, and consumers are taking notice. According to a recent poll conducted by Harris Interactive, 87 percent of homeowners building a home in an at-risk area for wildfires would consider installing a steel or metal roof. Steel roofing is fire-retardant, providing an important line of protection in the event of wildfires. Today's steel roofs also provide excellent protection against wind, water, snow, and ice, and they are even hail-resistant. Steel roofs can last for more than 50 years, twice as long as a traditional asphalt roof, and today's steel roofs can be made to look like traditional roofs. Unlike other roofing materials, steel is also 100 percent recyclable.

Steel framing also offers important protection for American families. Steel framing is durable, it won't warp or twist, and the strength-to-weight ratio of steel is the highest of any residential building material. In the event of a natural disaster such as a hurricane, steel framing will help keep one's home standing. Steel framing is also not vulnerable to fungi, mold, or termites.

Bridges, Cans, and More

A decade ago, in cooperation with the Federal Highway Administration and the U.S. Navy, AISI's member companies developed High Performance Steel (HPS), a new bridge steel plate technology that reduces costs up to 18 percent and weight up to 28 percent below traditional materials. More than 200 HPS bridges are in service in 43 states.

Moreover, the North American steel industry is working to protect the consumer food supply by promoting the nutritional and safety benefits provided by canned foods. The Canned Food Alliance (CFA), a partnership of AISI member steel producers, can manufacturers, and food processors, is working to inform consumers about the nutritional and convenience benefits of buying canned food. Research has found that by the time food is consumed, canned food is as nutritious as its fresh and frozen counterparts. In addition, cans are the most tamper-resistant packaging, and the food will keep for two years without any significant loss of nutrients.

A Sustainable Future

Overall, sustainability and a commitment to the environment have become integral parts of the North American steel industry's vision and mission for the future. Through investments in new and innovative technologies, a renewal of our long-standing commitment to recycling, refinement of industry performance metrics, and collaboration, across the industry and with other sectors, today's steel industry has become an environmental leader. In fact, the industry is recognized as having the steepest decline of total air emissions among nine manufacturing sectors studied in the U.S. Environmental Protection Agency's (EPA) 2008 Sector Performance Report.

The investments mentioned above, and others in research and development, both in the plant and in meeting customers' needs, make clear steel's commitment to a sustainable future. The results thus far are promising. America's steel industry remains focused on innovative approaches and advanced technologies that will make it part of the solution to the nation's economic and environmental challenges. PE

Thomas J. Gibson is President and Chief Executive Officer of the American Iron and Steel Institute (AISI), a non-profit association of North American companies engaged in the iron and steel industry. He can be reached at 202-452-7100.

DEMAND FOR TALENTED ENGINEERS REMAINS STRONG

By Mike Sylvester
AllTek Staffing

Perhaps many readers will find it surprising that very few engineers, designers, and drafters in the civil/structural, mechanical, and electrical fields are available to fill openings in the heavy industry/construction sector. The main reason: the recent increase in demand from the energy sector.

The encouraging bottom line is that the overall demand for talented engineers remains strong, even now when many industries and firms are facing new uncertainties. We in Western Pennsylvania are particularly well equipped to meet that demand.

A Region of Survivors, Workers, and Learners

This region by its very nature is made up of survivors. In the 24 years that I have been placing engineers, designers, drafters, and project managers, I've sensed that good engineering talent survives on its own merits. Despite the fact that employers of engineers are bought and sold, open and close, and move in and out of town, talented, hard-working engineers remain employed, and they stay here whenever they can.

Our engineering schools help assure the future of the profession and our industries by developing the technical ingenuity for which we are justly known. The next generation of engineers being incubated here is expected to spawn incredible advancements in the fields of factory automation, laser applications, green energy, and other technologies, some of which we can only imagine.

Although many of the steel mills are gone, 25% of the steel services industry still resides in Southwestern PA.

This one statistic is perhaps validated best by the memberships of AISI and AIST, which are heavily weighted toward engineers and project management professionals from our region. In addition, ASME lists Pennsylvania as the third largest state in terms of membership.

AllTek Staffing, which focuses on the engineering market in this area, was ranked by Staffing Industry Report as the 9th fastest growing staffing firm in the US, and by Inc. Magazine as one of the top 100 fastest-growing companies in the Service Provider category in its annual Inc. 5000 issue. The awards are further evidence of a vibrant area with a healthy demand for engineers.

New Opportunities for Employment

The devaluation of the American dollar has attracted a huge wave of foreign investment in local engineering and manufacturing firms; the smart money still bets on this market. In turn, many local firms have extended a global reach, bringing a vast library of technical talent to a world racing to build infrastructure and manufacturing capacity. As a result, the area has transformed itself from one of the manufacturing hubs that built America to a "city-state", able to bring efficient and effective engineering to a far vaster market.

Westinghouse nuclear is a prime example of global reach. It is hiring and building here at a rapid pace in response to new energy initiatives worldwide.

New industries are opening here as well. For example, Solar Power Incorporated (SPI), in Belle Vernon, plans to produce more solar capacity in 2009 than existed in all the US in 2007. Flabeg Inc., a German automotive glass producer, is building a facility in Clinton Township that will produce solar mirrors that will reflect concentrated solar rays into an engineered glass tube and then into oil vats. Heat in the oil boils water, producing steam, which then is used to generate electricity.

Interestingly, Flaberg considered only Pittsburgh and Albuquerque as a site for the plant. I asked David Littau, from Flabeg, who was in charge of choosing a home for this new facility that will employ 200, why he had chosen Pittsburgh. I pointed out that Albuquerque enjoys more sunny days per year, and is closer to the market for panels. I thought that the odds were stacked against us. The tipping point in our favor was our abundance of technical talent and our strong work ethic.

Biofuels could be another new industry on the cusp of growth; significant public and private funds are being invested in it and other forms of alternative energy. Laser applications (both defense and consumer) have spawned a wave of firms competing

for a share of this vast and developing market.

Geography and Market Proximity: Other Advantages

Local geography works to our advantage as well as to our disadvantage. Having managed multiple engineering recruiting offices and spending a lot of time in Detroit and Chicago, I learned that Pittsburgh and its surrounding areas are very commuter-friendly versus the other huge engineering markets mentioned above. Professionals in this market are far more willing to commute to opposite ends of the Metropolitan area. On the other hand, recruiting in the northern suburbs of a metro area such as Chicago and expecting employees to commute to anywhere south of the city is virtually impossible, which makes these huge markets more like multiple smaller markets. If a company builds or manufactures here, it will be able to design it here.

Optimism in an Age of Uncertainty

There is indeed much to be optimistic about in this market. Large engineering/construction firms such as Fluor Corp and CH2MHill have made Pittsburgh the hub of its metals service sector. Siemens, Danieli, and SMS Demag, the three main original equipment manufacturers for steel making that are headquartered in Germany, have established their North American bases here and employ nearly 1000 professionals. Companies this size are investing in this area to some extent because they are able to attract the talent necessary to sustain their businesses.

When I consider the makeup of our people and other advantages we offer, I harbor no doubts that the world looks to us now, and will look to us in the future, for a pool of engineering talent within the strategically critical steel, construction, and mining industries. PE

Mike Sylvester is a veteran recruiter of technologists in all disciplines, and is now vice president, operations, of AllTek Staffing. He can be reached at mike@alltekstaffing.com.

Allegheny Technologies Inc. Announces Strategic Investment in Their Flat-rolled Products Segment

Contact: Dan S. Greenfield

Allegheny Technologies Incorporated (ATI) announced that its Board of Directors has approved subject to satisfactory resolution of certain open issues, a strategic investment in their flat-rolled products segment. The project is estimated to cost $1.16 billion and take four years to complete. The return on investment should be more than 20% by 2014, including estimated annual cost reductions of $120 million. The project is expected to be self-funded. As a result of this strategic investment, ATI's annual capital expenditures are likely to remain in the range of $500 to $600 million for 2009 through 2012.

The strategic investment includes:

1. A new advanced specialty metals and hot rolling and processing facility: This investment, which should be completed in 2012, is designed to produce exceptional quality, thinner, and wider hot-rolled coils at reduced costs with shorter lead times, and lower working capital requirements. ATI has tentatively chosen to locate the advanced specialty metals, hot rolling and processing facility at its Brackenridge, PA site pending resolution of certain open issues, including state and local approvals.

2. The consolidation of the Natrona, PA grain-oriented electric steel melt shop into ATI's Brackenridge, PA melt shop: This consolidation is expected to improve the overall productivity of ATI's flat-rolled grain-oriented electrical steel and other stainless and specialty alloys, and reduce the cost of producing slabs and ingots. The investment should also result in significant reduction of particulate emissions. This consolidation is expected to be completed in 2010.

"This investment is a critical step in our ongoing transformation of ATI's Flat-Rolled Products segment into a globally-focused business capable of generating high levels of profitability and cash returns across the business cycles," said L. Patrick Hassey, Chairman, President and Chief Executive Officer. "Our Flat-Rolled Products has been repositioned over the last several years with an improved cost structure and product mix and a diversified global market focus. This segment has been transformed into a profitable specialty metals business and is no longer a typical stainless steel business.

"The initiative is expected to further enhance ATI's Flat-Rolled Products segment's competitive position in the global chemical process industry, oil and gas, electrical energy, and aerospace and defense markets as well as other durable goods and consumer markets.

"When completed, we believe ATIs new advanced specialty metals hot rolling and processing facility will provide unsurpassed manufacturing capability and versatility in the production of a wide range of flat-rolled specialty metals. We expect improved productivity, lower costs, and higher quality for our diversified product mix of flat-rolled specialty metals, including nickel-based and specialty alloys, titanium and titanium-alloys, zirconium alloys. Precision Rolled Strip® products, and stainless sheet and coiled plate markets.

"We view this investment as a game changer for our Flat-Rolled Products segment. It provides a quantum leap in manufacturing technology. Our new advanced hot-rolling and processing facility is designed to be the most powerful mill in the world for production of specialty metals. It is designed to roll and process exceptional quality hot bands of up to 78.62 inches, or 2 meters, wide. We believe this investment will further improve the overall cost structure of our diversified flat-rolled products, provide our customers with a full complement of products at much shorter lead times, and reduce our working capital requirements.

"The new facility and enhanced capabilities are expected to create a new production model for our standard grade stainless sheet products. By producing hot-rolled coils wider, thinner, flatter, and faster, we intend to cut our flow times in half by finishing more of our standard grade stainless sheet products through our continuous automated finishing line in Midland, PA. This results in exceptional quality products to reduce their working capital requirements. We also expect to be able to nearly double our own inventory turns on these products.

Key facts on the Advanced Specialty Metals Hot Rolling and Processing Facility

- Unique Alloy versatility – Common facility to produce hot bands for titanium and titanium alloys, nickel-based corrosion and high temperature alloys, zirconium alloys, super and

duplex stainless alloys, grain-oriented electrical steel, and austenitic, ferritic and martensitic stainless alloys.

- Facility Design – 881/2 inches, or 2250 millimeters, hot rolling system with continuous variable crown system and a 7-stand, 4-high finishing mill
- Power – Separating force over 3 times current capability
- Power Capability – Hot bands capable to produce up to 78.62, or 2 meters, wide finished product
- Product Processing and Handling – Advanced walking beam furnace, laminar cooling, and slab and plate handling
- Automation – Fully automated facility providing safe working environment with best available controls technology and increased productivity
- Environment-Friendly – Green systems include advanced environmental controls such as a fume collection system, low NOX furnace burners, fume suppression sprays, and closed loop water treatment plant.

"The consolidation of our grain-oriented electrical steel melt shop into our highly efficient and flexible Brackenridge, PA melt shop is expected to improve our cost structure by eliminating a plant footprint, improve our melt capacity utilization rates, increase overall productivity, and significantly reduce our particulate emissions footprint," Hassey added. PE

This news release may contain certain "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Certain statements in this news release relate to future events and expectations and, as such constitute forward looking statements. For more information, visit http://www.alleghenytechnologies.com/pages/contact/disclaimer.html

YOUR WORD$ CAN MAKE YOU RICH (Or Poor)

By Pete Geissler

"Engineers can't communicate." I've heard these self-defeating words—perhaps from you—far too often during my forty-year career as a professional communicator and teacher. They're usually followed by excuses, cloaked as valid reasons, such as these: Engineers weren't taught to communicate in college, they're too right (or left) brained, they're more interested in numbers than words, they should have learned to communicate in high school, communicating is a natural skill that you are either born with or not, and so on. All of these excuses are bogus.

Nevertheless, employees, managers, and owners of engineering and other firms know intuitively that murky, wordy, imprecise communications have cost them promotions and big bucks. One owner told me that he fears bad communications could cost him his entire business.

So, being a curious sort, a few years ago I decided to convert intuition to hard numbers and surveyed some twenty employees and owners of consulting and manufacturing firms, I arrived at these startling and consistent conclusions:

Unclear, imprecise, wordy communications (hereafter called 'bad') cost the firms from one to ten percent of revenue. A VP of a large engineering/construction company said this: "The cost of bad communications can cost us as much as one to two percent of revenue, a very significant sum in this business where the highest profits we can expect are from four to five percent. So if we could eliminate bad messages, we could raise profits by 20 to 50 percent." One respondent said that bad communications surely cost more than his firm's net profits. He continued his thought by noting that his firm's profits would double if he could somehow convert bad to good, a.k.a. clear, precise, and concise. The estimates of total costs were supported by anecdotes. For example, a former area president at Westinghouse told me that his unclear communications concerning a proposal for a large substation cost the company hundreds of thousands of dollars, and came close to costing him his job.

Bad communications have cost several respondents their jobs or have prevented their promotions. On the other hand, several respondents cited good communications as the reason for landing contracts, raises, research grants, and scholarships. Again, such generalities were supported by anecdotes. A former marketing manager at Westinghouse attributes a well-written letter to landing a major contract for turbine-generators. An attendee of my seminars, an employee at a high-tech firm, e-mailed me to say the he has been able to keep his job and advance his career because of his improved abilities to communicate. Another respondent, an EVP of a large consulting firm, replied that he hires new engineers first on their abilities to communicate, then on their abilities to engineer. He reasons that he can teach most engineers how to be better technologists, but he would find it difficult to teach those same engineers how to be better communicators. By the way, this same EVP attributes to a great extent his success in the field to his abilities to communicate.

Productivity, Quality, Profitability, and Promotability—Start with your Communications

Consultants have only two products: proposals and reports. Both can include drawings and words, of course; and both are sales documents. Perhaps most importantly, proposals and reports are your most public reflections of your intelligence, i.e. your understanding of clients' needs. If your understanding is communicated clearly and accurately, you create sales opportunities, increase your hit rate and productivity, and lower your costs. The reverse is equally valid. Example: A management consultant from New York complained to me that his hit rate was a woeful twenty percent and it was destroying his productivity and profitability. I listened to his presentation and read his proposals, and, to be polite, they were twice as long as they needed to be, and murky beyond comprehension. We worked together for a month, and his hit rate more than doubled.

Axiom 1

All else being equal, well-reasoned and clearly communicated proposals and reports beat out the badly reasoned and muddily communicated.

Getting to your final products requires all sorts of internal communications, and they also are reflections of your intelligence. If they fit our definition of 'bad', productivity and promotability plummet, and costs soar, simply because they initiate tag games needed for clarification, whether those games are via e-mail, phone, fax, or memo.

We've all set up such games, and they're irritating as well as costly. Here's a typical, if a bit petty, example. I recently needed to meet with my boss (I think of my clients as my bosses and I like them to think of me as part of their staff, so this really is an example of internal communications). Anyway, in this case my boss is the president of a small consulting firm and I suggested, via e-mail, three days during which I was available at any time. He e-mailed me, 'Tuesday is good'. I e-mailed him, 'What time, or how about lunch?' He e-mailed me, 'My morning is open.' I e-mailed him, 'What time?' He e-mailed me, '930 or 1030.' I e-mailed him, 'I'll be there at 930' Seven e-mails instead of the two that were really needed.

Axiom 2

Good internal communications are key to good proposals and reports, and can raise or lower PQPP in familiar, dramatic ways.

Good communicators create their presentations and documents quickly because they have internalized the fundamentals and put them to use as a matter of course, while bad communicators tend to struggle with grammar, syntax, structure, and other basics.

Axiom 3

Skilled engineers complete quality drawings and specs more quickly than the inept; the same is true for skilled communicators.

The Choice is Yours

If you've read this far, and if I've been persuasive enough, then you're searching for ways to be more productive, profitable, and promotable. Here are three suggestions:

First, realize that engineers aren't beyond redemption; they can learn to be better communicators if they are willing to internalize a few fundamentals. My experience as a professor and teacher at consulting and other companies is that abut twelve hours of class time and a few simple exercises are all that's needed to get the ball rolling.

Second, retain a writer or editor who understands your business to work with those employees who are responsible for proposals and reports to create lasting improvements.

Third, offer a series of short seminars—my clients prefer two-hour meetings either over lunch or an after-work pizza—that focus on applying fundamentals to their letters, memos, proposals and reports, thereby bringing theory to the practicalities of their tasks.

Please e-mail me at geissler@earthlink.net for more on the results of my survey, or for a syllabus of my seminars. Thanks. PE

Pete Geissler is a professional communicator of scientific, technical, and management information. He has taught writing at Duquesne University's Graduate School of Environmental Science and Management, and at the technical and professional writing program at Carnegie Mellon University. For more: www.peteswords.com

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