

Background

Contact: Kevin Lane at (412) 848-8345 or at KLane85579@aol.com

Specialty Metals in the Pittsburgh Region

Subject matter experts available for comment on this topic include:

L. Patrick Hassey
Chairman, President and CEO
Allegheny Technologies, Inc.

Frank Perryman
Partner
Perryman Company

Dennis M. Oates
President and CEO
Universal Stainless & Alloy Products

Ron Ashburn
Executive Director
Association for Iron and Steel Technology

Hans J. sack
President
Latrobe Specialty Steel

John P. Surma
President and CEO
United States Steel Corporation

The domestic specialty metals industry is a capital intensive, highly competitive industry that is modern and efficient and a recognized global leader in the development and implementation of new and innovative product and process technology. As such, it competes successfully on a global basis, exporting significant quantities of product, particularly product in the more highly valued end of its overall product distribution. Despite its preeminent position in this global market, it must contend with unfair trading practices from its global competitors, industry consolidation, high energy and regulatory costs, periodic swings in raw materials costs, high capital costs and high legacy costs.

Regardless of these challenges, growth in demand for specialty steel products exceeds five percent per year due to product improvements and increased global lifestyle expectations.

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There are about three dozen specialty metal or specialty steel companies operating within the Pittsburgh metropolitan statistical area (MSA.) IN 2006, the latest year for which data was available, these companies employed nearly 4,100 workers and posted sales in excess of \$4.3 billion. Beyond the MSA and within 100 miles of Pittsburgh are hundreds of other specialty steel manufacturers, processors, fabricators and related companies that comprise a supply chain and industry cluster.

Major industry players, such as Allegheny Technologies, Universal Stainless, AK Steel, Latrobe Specialty Steel, Perryman Company Electralloy, make the region a world center of excellence in the specialty steel industry. In general, local industry leaders are positive about the near-term future of the industry, while expressing concern about the long-term future, in the face of foreign competition.

Specialty steels stimulate other sectors of the economy. Many of these metals are so versatile that they add higher quality characteristics to manufactured goods, for example, corrosion resistance or high strength with lower weight.

Defining Specialty Steel

Due to the broad range of manufacturing activities encompassed by the industry, definitions of the term “specialty steel” tend to be elusive. Specialty steel enterprises run the gamut, including fully integrated mini or “boutique” mills that produce both commodity stainless steel products for resale; the stock they use to forge and finish high performance parts; fabrication plants that make parts, tools and utensils and treatment and finishing mills that add value to commodity stainless steel products by enhancing surface durability and aesthetics. In terms of application and use, specialty steels range from the stainless steel sink for the typical kitchen to the high-performance, nickel-based super alloys that keep jet engines flying while under extreme thermal and mechanical stress.

Specialty steels differ in several ways from the conventional steel that is used in construction girders, car bodies and “tin” cans. First, and perhaps most important, specialty steels are chemically and metallurgically designed and manufactured to meet highly specific performance standards. Second, unlike conventional carbon steel, which uses iron as its main feed material, specialty steels are manufactured mainly from re-melted scrap steel.

Finally, specialty steels are manufactured in significantly smaller quantities and command significantly higher prices than carbon steel.

Scales and Costs

For comparison of production scales and pricing, Latrobe Specialty Steel illustrates differences between three types of steel producers. Whereas a large producer of both conventional carbon steel and stainless steel might produce 20 million tons of product per year, Timken’s Canton, Ohio alloy steel facility might make 1.5 million tons of automotive bearing and special bar quality steel each

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year, using a 150-ton furnace at a price of 30 to 50 cents per pound. Latrobe Specialty Steel's plant, on the other hand, would typically produce 50,000 tons, in a 35-ton furnace at prices ranging from \$1.50 to \$50.00 per pound.

Latrobe Specialty Steel's sales typically have benefited from the strong aerospace and specialty steel markets, which comprise a considerable portion of the company's overall sales.

In October of 2006, AK Steel's board of directors approved a \$55 million expansion, upgrading and modification project at its Butler, Pennsylvania and Zanesville, Ohio facilities which is expected to increase production capacity for high quality, grain-oriented electrical sheet steels by about 12 percent. A \$14 million capital investment to increase electrical steel production capacity at its Butler works was announced in April of that year. The two investments combined have served to boost AK Steel's production capacity for electrical steel products to about 335,000 tons per year.

Stainless

The most widely produced type of specialty steel is stainless steel, which is defined by the Specialty Steel Industry of North America, (SSINA) as steel containing more than 10.5 percent chromium. The SSINA lists more than 100 stainless steel alloys, categorized within five crystalline microstructure systems. Each crystalline system, or phase, carries a different set of materials characteristics. Principal among those characteristics are hardness, strength, formability, ductility, weldability, conductivity, magnetism and corrosion resistance. Depending on the balance of crystalline phases of the subject steel, these characteristics are tunable by a variety of methods, including rolling or working the metal in either a hot or cold state, heating after manufacture (annealing), surface treatment (pickling), machining and aging.

The International Stainless Steel Forum (ISSF) has announced that global stainless steel production in 2008 was nearly 25 million metric tons.

How Alloys Become Specialty Metals

In addition to chromium, a wide range of alloying metals may be added to improve performance. Those metals include nickel, silicon, carbon, manganese, molybdenum, sulfur, selenium, tantalum, titanium, copper, vanadium, tungsten, niobium cobalt, hafnium and zirconium. These elements are added for purposes of variously increasing corrosion, scaling or heat resistance, welding performance, tensile strength, or to enhance machining, cold working or surface finishing. As an industry convention, once an alloy component exceeds 30 percent of the total composition of the product, it is no longer considered an alloy, but is referred to as the alloy's metallic base. Hence, the metal in high performance components is called a nickel-based alloy, rather than nickel-steel. The technology of specialty steels has advanced so far and so rapidly, that many metals previously called specialty steels are now considered specialty metals. Many manufacturers of specialty steels are also in the specialty metals business.

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Titanium

After iron and aluminium, titanium is the third most common metal to be found in the earth's crust. Titanium is chemically stable, lightweight, strong, corrosion-resistant and heatproof, but in the past, the high cost of extracting it from other minerals has made it too expensive for industrial use. However, titanium is finding its niche in a variety of industries, including aerospace, military, automotive, sporting goods and medical.

As recipients of an appropriation of \$1 million in the 2007 Department of Defense Appropriations Act, Robinson-based Crucible Research is exploring ways of converting titanium ore into a more durable, lightweight metal. The DoD funds will allow the company to build a full-scale manufacturing plant adjacent to its current facility. To date, the company has invested upwards of \$10 million of its own money in powdered titanium research and development.

Ten years ago, the U.S. titanium industry consisted of ten companies capable of producing high-quality titanium suitable for building airplanes. Today, only three are left standing, and two have locations in Pittsburgh: RTI International Metals (one of *Fortune* magazine's top 100 fastest growing companies for 2008) and Allegheny Technologies. Dallas-based Timet is third and a Russian company, the world's largest producer of titanium, is the fourth.

Titanium producers are stepping up and expanding their capabilities to take advantage of the fact that the growing demand for the specialty metal in the aerospace and defense industries has catapulted prices approximately 80 percent in recent years. Industry experts believe that prices will continue their ascent. Consequently, Allegheny Technologies had approved a \$60 million expansion plan for its Washington, PA plant for completion in 2008.

The Washington County-based Perryman Company recently completed a \$30 million expansion, and has plans for a decade-long growth at a rate of 10 to 20 percent.

In May 2006, the world's largest aircraft maker, Airbus SAS of France, entered into a 10-year agreement with RTI International Metals. The company will supply titanium to support the new Airbus 380 program. Over the contract's term, RTI expects to generate revenue in excess of \$800 million.

Product Classification

Specialty steel commodities are classified by two basic shapes: flat and long products. Flat products include stainless steel plate, coils and sheets, while long products are ingot, bar, wire, rod and seamless pipe.

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Higher value forged and finished products are made of high purity steel that is frequently re-melted and solidified two or more times. Increasingly, the term “specialty steels” is being replaced by “specialty metals” to more accurately reflect the range of products made by various manufacturers in the industry. Specialty metals include nickel-based alloys, titanium and precision-engineered metals, such as silicon electrical steel.

Industries Served

The specialty steel industry serves virtually every major industrial sector, including aerospace, construction and mining, chemical processing, oil and gas drilling, food equipment, appliances, automotive, machine and cutting tools, electrical energy, medical, defense, electronics and transportation services.

Manufacturing Process

To make specialty steel, electricity is used to melt scrap steel, either in an electric arc furnace or a vacuum induction-melting furnace. In addition, other raw materials, such as ferrochrome or nickel may be added to adjust the metal’s chemistry. Depending on the specific process, heat is generated, either by an electrical arc struck between an electrode and the scrap inside the furnace, or by induction, which uses the metal itself as an electrode to generate thermal energy by means of electrical resistance. The vacuum facilitates the removal of reactive gases, such as nitrogen and oxygen and contaminants, such as phosphorus, which negatively affect the steel’s performance characteristics.

Depending on performance and purity requirements, secondary and tertiary melting and refining are done by means of argon/oxygen carbon reduction (decarburization) or a vacuum oxygen decarburization process, (respectively called AOD and VOD in the industry). Both processes alter the operating atmosphere and its pressure to permit the removal of impurities, while protecting the molten steel from recombining with either contaminant gases or residual solids. At its facility in Monessen, Koppers annually produces approximately 360,000 net tons of furnace coke, a key ingredient in producing steel, and sells it all to the world's largest steel company, Mittal Steel USA.

Defining the Niche

In many specialty steel operations, the same array of equipment is used to manufacture many different specialty steel products, which makes effective capacity utilization one of the keys to success. As a practical matter, specialty steel manufacturers typically rely on niche markets in order to optimize capacity utilization and to compete effectively in the area of higher value-added products. For some producers, no single specialty market is large enough to completely fill surplus

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capacity. Furthermore, offshore production, as a result of downstream customers' demands for lower prices, results in a trend toward domestic concentration on high value production. Consequently, support services and research become less economically viable, as a consequence of lower overall output.

Industry Voices

Through SSINA, the specialty steel industry expends considerable effort in Washington, D.C., taking advantage of U.S. trade laws, which are compliant with World Trade Organization regulations and designed to mitigate unfair trading practices by foreign competitors. In addition, SSINA has led an initiative in Washington focusing on the overall improvement of U.S. manufacturing competitiveness, especially in the specialty steel industry.

Testimony from the SSINA in 2005 alerted the U.S. China Commission to the importance of the health of the specialty metals industry to national defense. Shilling's testimony explained that technology development travels with the manufacturing process. Facilities and plants in the specialty metals industry are laboratories. It is therefore naïve to think that manufacturing of these materials could be transferred to China, while technology development is kept here in the U.S.

Continued off-shoring may result in a cascade of events detrimental to national defense, to the specialty steel industry and to the American industry at large. Without domestic commodity production, the SSINA testimony claimed that the U.S. will not have jobs for engineers and scientists, which naturally will result in a dearth of science and engineering university graduates, which in turn over time, will result in fewer new technologies and products, thereby undercutting our ability to compete in the future.

Predicting the Future

The Specialty Steel Committee of the Pittsburgh-based Association for Iron and Steel Technology (AIST) reported that for the near term, the United States specialty steel industry is well positioned to compete in a global marketplace, but cautions that production capacity may be purchased and installed by anyone with the financial resources to do so. Although the capital cost of entering the specialty steel industry is high, the profits associated with the production of high-performance products may serve as an incentive for emerging countries to buy their way into the industry. Although world production capacity is currently more or less in line with demand, low capital cost investments by emerging nations could conceivably lead to excess world capacity. Such eventualities would result, not only in inventory gluts, but de facto unfair trading practices, as a result of the low cost of capital in emerging nations.

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Titanium manufacturers' interest in military contracts is protected by the specialty metals clause, a provision to the 1941 Berry Amendment, which mandates that certain materials used for U.S. defense be manufactured in the U.S. However, the Aerospace Industries Association (AIA) has lobbied the Department of Defense to relax its interpretation of the law and allow the Russian-made titanium to enter the U.S. market.

Comparing Costs

A study conducted by Latrobe Specialty Steel analyzed the effects of emerging markets on the specialty steel industry, with a focus on the competitive realities of low labor cost countries (LLCC) versus high labor cost countries. The analysis compared the relative cost fractions of labor, capital and freight from Asia to the United States across carbon steel, special bar quality steel and specialty steel products. The limited study revealed an increasingly favorable bias toward foreign manufacture and export of small, light, high value products, traits that define specialty steel products. The study concluded from this that domestic migrations to high value products alone cannot protect against foreign substitutions of those same products.

In addition, the Latrobe Specialty Steel study considered the possibility of non-economic behaviors by foreign governments, including market-distorting government subsidies, excess capacity and global raw materials shortages. Other potential illegitimate competitive advantages posed by LLCCs include zero-cost capital, disregard for environmental problems, currency manipulation and trade protection. In light of this set of potential threats, service, flexibility and customer responsiveness are a key to the successful cultivation and preservation of the U.S. specialty steel industry's customer base.

In response to these conditions, Latrobe has modernized and expanded production capacity for re-melted and double re-melted products for the aerospace and cutting tools industries. In addition, they have entered the tool steel distribution business for commodity products manufactured offshore. Today, Latrobe Specialty Steel's distribution business contributes about one-third to the company's revenues.

Going Where the Business Is

Bridgeville, PA-based Universal Stainless and Alloy Products serves the aerospace, power generation, petrochemical and manufacturing industries.

Founded in 1994, Universal has little to offer in commodity products. The company focuses its resources on the development of close relationships with customers who buy significant amounts of the products that Universal has positioned itself to produce and market efficiently. Universal's strategy targets markets that will be less affected by exports, due to its close relationships with high-value customers.

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Recent History

Between 2001 and 2003, in the aftermath of 9/11, the market for stainless steel plate and sheet products collapsed, largely as a consequence of downturns in the airline industry. The year 2004 and the first part of 2005 saw a recovery largely due to developments in the aerospace industry, such as Boeing's new, high efficiency 787 airliner.

Although recent upturns in the aerospace sector appear to be buoying the domestic market, steady increases in foreign imports of specialty steel commodity products combined with decreases in domestic consumption continue to give some industry leaders cause for concern for the future. Production data from the ISSF indicates that the stainless steel market was oversupplied for an extended period. Import consumption and market penetration data from SSINA shows recent increases in total specialty steel imports and total foreign penetration of specialty steel into the U.S. market has risen significantly.

In October of 2006, United States Steel Corporation opened its world-class 120,000 square-foot research and technology center in Munhall near Pittsburgh. The center employs 110 research and technical personnel who provide a broad range of support to the company through advances in product and process technology. The high-level research efforts conducted at the center will help ensure that U.S. Steel remains at the forefront of technological advances, and our region will continue to play a role in this increasingly competitive global industry.

In November 2006, U.S. Congressman Mike Doyle (D-Swissvale) announced that the National Park Service designated the old Carrie Furnaces, which formerly produced iron for the U.S. Steel Homestead Works, a national historical landmark. The designation provides historical protection for the mill and could help fund preservation and restoration, which may cost up to \$100 million.

Leveling the Playing Field

Far and away, the gravest concern among industry leaders is that of competing against foreign governments. They unanimously proclaim the urgency of maintaining a level playing field through the vigorous enforcement of existing trade laws. In 1998, in response to foreign "dumping" of steel products into the United States, the U.S. International Trade Commission (ITC) imposed anti-dumping and countervailing duty orders variously on stainless steel plate, coil and strip products made in Belgium, Canada, Italy, Korea, South Africa, France, Germany, Mexico, Taiwan and the United Kingdom. In March of 2005, the ITC conducted a five-year sunset review on the tariffs. After deciding to revoke duties on the United Kingdom and France, regulators reinstated duties on all other originally named countries. U.S. steel industry tariff revenues are distributed to steel companies who prove that they have been injured by unfair competition or dumping.

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Winning the Game

All in all, the state of the specialty steel industry in the Pittsburgh region is bright, if not perfect. Despite concerns about near term challenges, such as rising energy costs and longer-term issues, such as foreign imports and leveling the playing field, most specialty steel leaders express optimism for the future. The SSINA states that the industry is well-positioned to take advantage of near-term opportunities, particularly in aerospace.

In addition, the AIST is positive about the United States' ability to compete in the global marketplace.

Latrobe Specialty Steel expresses cautious optimism, noting that as a result of current excellent market conditions, which are partially created by the growth of emerging markets, like China, competition from those nations is less of a factor than just two years ago. However, capacity growth in those countries already has begun to swing the pendulum the other way again.

Universal continues to expect favorable conditions in the long term, due to the reemergence of the aerospace industry and developments responsive to the world energy crisis, which is predicted to result in a global expansion of heavy industry.

Also among the bright spots is Allegheny Technologies. Since mid-decade, the company has been setting sales and profit records. Fueled by strong growth in shipments of titanium products, the company reported sales of \$5.31 billion in 2008, the second best year in its history. Net income for the full year was \$566 million. The company employs about 9,300, including about 3,000 in western Pennsylvania.

A turning point came when Allegheny Technologies acquired J&L Specialty Steel for \$67 million in June 2004. J&L Specialty, formerly based in Moon, operated a melting, casting and finishing plant in Midland in Beaver County. The company also operated a finishing plant in Louisville, Ohio. The resulting efficiencies, flat overhead costs and a backlog of orders (including an eight-year contract with Boeing, valued at about \$2.5 billion, to supply titanium for various commercial and aerospace applications, including Boeing's new Dreamliner 787 airplane) bodes well for the company's future profitability.

Chief Executive Officer Pat Hassey recently explained that what once was a stainless steel company with some specialty metals, has turned into a specialty metals company with some stainless steel. Allegheny Technologies will be a major factor in titanium mill products.

Sentiment among industry leaders is widespread that as long as the playing field is level, U.S. specialty steel producers, especially those in the Pittsburgh region, are well positioned to exploit anticipated opportunities in the global marketplace and to reap the rewards thereof.

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