Special Metals Wiggin forges ahead with innovation and investment

Special Metals Corporation occupies a prestigious position in the world of high performance nickel alloys. Over 85% of all nickel alloys have been developed by this innovative company, which has launched 30 new products since 1995 alone. In 2005 the company was bought by PCC, and is now benefiting from substantial investments and refurbishments. Stainless Steel World visited Special Metals Wiggin in Hereford, UK to find out more about an innovative bar mill.

By David Sear & Joanne McIntyre

There's definitely an upbeat mood at Special Metals Wiggin in Hereford, UK. Following many months hard work, staff are putting the finishing touches to a brand new, USD 14 million custom-designed bar mill. "The original mill has been making bar material for the automotive valve industry since the 1960s," explained Mr Ian Hedley, Director Business Development. "However in July 2007 we secured our second long term agreement with a major automotive valve producer and that prompted us to invest in this state-of-the-art equipment. The mill was designed to our specifications and offers a unique method for producing bars for automotive and general engineering applications and is both highly flexible and offers very short lead times."

The new mill is capable of producing bars ranging in size from 12 to 32 mm. "While the automotive valve business is important to us, the mill can make bar products for a wide range of industries," explains Mr Hedley. "It's essentially a single reversing stand and four finishing stands. The bar product is passed through the reversing mill a number of times before it travels through the in-line finishing stands, goes through water quenching and is then removed from the mill to be cut, straightened, ground, and finally tested."

The time from start to finish is extremely fast with the bar being prepared within a day. "The new mill offers clear benefits to our customers in terms of cost, quality, consistency and capacity," says Dr Mike Simon, Strategic Business Unit Manager – Rod Mill. "The old mill

used a hand-rolling process which was labour intensive and produced a less consistent product. With an automatic mill all of the rolling is done in one pass line, resulting in a much more consistent shape, tighter tolerances and better control over the final structure."

While its automotive industry contracts provided the incentive for the purchase of the new bar mill, Special Metals Wiggin is keen to highlight that its potential utilization is much wider. Dr Simon: "The mill can roll practically any alloy including stainless steels and titanium. A variety of industries can therefore certainly expect to profit from the mill, which can make the starting products for pump shafts, general engineering requirements, the aerospace industry, etc. It is quite feasible that we will even roll bars for other supply companies as well."

High tech

As Stainless Steel World can testify, the lay-out of the new bar mill ensures a very efficient production flow. At the first cell the incoming bars are prepared. This includes "peeling" to guarantee the surface quality and dimensional consistency of the final product. In the next cell, the bars are heated and rolled. Steve Pearce, Circuit Manager pointed out that an ultra-modern induction heater is used. "This is much faster than the traditional gas heater," he commented. "As such we can significantly reduce cycle times and energy costs."

Immediately after rolling the bars pass through a laser gauge for dimensional control. This is just one of the features in a fully integrated system which has been designed to promote the quality of the final product. Finally, the bars are transferred to the finishing cell where, they can be ground and cut to length according to the client's specific requirements.

Forge upgrade

The new bar mill is the second step in a substantial investment program which Special Metals Wiggin is undertaking. "Since our parent company Special Metals Corp became part of PCC in 2005 they have been investing in our capabilities and product quality on this site to better serve our customers in the long term (see box). The company believes in investing in our future. We've already planned our next investment which will probably be even bigger," said Dr Simon.

The first step in the investment program is an on-going USD10 million upgrade of the 1,750 tonne open die forge press to improve its performance, consistency and productivity. The forge will benefit from a full mechanical hydraulic upgrade, including all new pumps, controls, manipulators, and feeders. The upgrade is being carried out in three phases and will be completed by the end of this year. Mr Hedley: "Some 80% of our products pass through the forge so the upgrade will be a huge benefit both to us and to our customers. It's literally at the heart of the company."

The bar mill and forge investments will also increase synergies with sister companies owned by Special Metals parent company PCC. For instance SPS Technologies makes fasteners and a lot of their products can now be served by the new mill, while Wyman Gordon which makes large forgings for the aerospace industry will benefit from the products made on the forge.

Alloy diversity

Special Metals has long been recognised as a leader in alloy and product diversity research, with activities spearheaded in Huntington, USA. The newest Special Metals innovation is INCOLOY® alloy 945 and its high strength derivative INCOLOY® alloy 945X. Specifically designed for the oil and gas industry, the alloys are currently going through the qualification process and have met or exceeded all expectations. Said Dr

(from left to right) Mr Steve Pearce, Mr Roger Price, Team Leader, and Mr Ian Hedley.

Tension control between stands.

Close-up of laser gauge.

Simon: "Technically INCOLOY® alloy 945 is a very advantageous alloy, designed in consultation with some oil producers and equipment manufacturers. They needed an alloy that was cheaper, stronger and more corrosion resistant than available materials to tap into very deep sub sea wells producing very sour oil and gas. At great depths the industry needs a stronger alloy to get the crude to the surface. Even a small increase in strength leads to a huge advantage in terms of the size of pipe required. The need to access wells which are even deeper and hotter has led industry insiders to predict something even more robust will be needed within 15 years. Whether these wells are viable does depend somewhat on the oil price but easily accessible sources of oil will inevitably run dry sooner or later."

"This is an example of how Special Metals works very closely with customers to anticipate their needs up to five years in advance," continued Dr Simon. "The early development work for INCOLOY® alloy 945 was carried out with major oil companies and their 1st tier suppliers. While we are developing high performance nickel alloys for our immediate customers - material suppliers – who are further up the chain, we also communicate with the people at the other end to anticipate their future needs too. That's why we keep in touch with larger players in other industries, such as the major aircraft engine manufacturers.

The finishing cell (front) and the rolling mill (background).

Forward looking strategy

Managing Director Mr David Waring, who recently joined Special Metals Wiggin after a ten year stint with PCC, was keen to outline the company's investment strategy.

"PCC is making significant investments at Special Metals Wiggin because we aim to become more sophisticated in our market approach. We looked at what aspects of the company we wanted to address, where we believe we can grow, and how our customers are served by the rest of Special Metals Corp. We then came to the decision that the automotive valve bar sector was an area in which we wanted to compete."

PCC's strategy is to consider both top and bottom line growth, continued Mr Waring. "We're looking to improve our market share across a range of sectors. There is great potential for growth and generally we seek to do that by identifying high tech, low cost methods of manufacture. The investments here at Special Metals Wiggin provide a state-of-the-art means of producing our product range. These offer benefits in terms of quality and labour costs while also enabling us to be more flexible and better serve the market."

Historically Wiggins has a strong reputation for good quality products and technological innovations. It now aims build on that by expanding its customer service and flexibility. Mr Waring: "These investments will enable us to

Detangler on finishing cell

(from left to right) Dr. Mike Simon, Mr Robert McGowan, Engineering Director, and Mr Keiran Holdstock, Production Supervisor.

provide that little bit extra for customers in terms of delivery performance, reliability, and product quality. We want to offer the whole package. Competing and growing in the international marketplace means we have to be better than anyone else and these investments give us the edge."
Ongoing market research helps Special Metals Wiggin to target growth areas. "The nuclear power generation industry will certainly be an interesting sector for us," noted Mr Waring. "A lot of reactors will be built in the next 20 years and we want to be part of that, and future investments will ensure we are. PCC is a forward looking company that will continue to invest in Special Metals Wiggin and its other companies, and is already looking at the next steps in the coming five to ten years."
Mr Waring remains very positive about the future outlook despite the slowdown experienced by some industrial sectors. "Although we've noticed some pressure on the market the economic downturn has actually prompted us to take actions which will make us stronger in the long run. Situations like this force a company to be very critical of its own activities and to identify routes for improvement. Everyone within PCC takes a long-term view and is not panicked by short-term bumps," continued Mr Waring. "Our investment plans will therefore continue unabated in order to further enhance our customer service. And, of course, once the global economy does pick up again we will be in a stronger position than ever to compete."

Under the PCC umbrella

Precision Castparts Corporation (PCC) employs over 21,000 people worldwide in 16 countries. The company is a worldwide manufacturer of complex metal components and products, providing high-quality investment castings, forgings and fasteners/fastener systems for critical aerospace, industrial gas turbine, general industrial, medical, armament and automotive applications. Annual sales in 2008 topped USD 6.8 billion. PCC is made up of three divisions Investment Cast Products, Fastener Products and Forged Products. Special Metals Corporation (SMC) is part of the Forged Products Division.

Facts & Figures

Name:	Special Metals Corporation
Products:	Nickel, cobalt and high-performance iron-based alloys
Production facilities:	11 in Europe and the USA
Offices:	Netherlands, Dusseldorf, Beijing, China, Hong Kong, Singapore, Bangalore
Processing capabilities:	Vacuum induction melting, air induction melting, electro-slag re-melting, vacuum arc re-melting, electric furnace/AOD, press forging, hot rolling, cold drawing, extrusion, cold rolling of sheet/strip
Trademarks:	Monel®, Incoloy®, Inconel®, Nimonic®, Nilo®, Udimet®, Incoclad®, Permanickel®, Inco-Weld®, Incoflux®, Ni-rod®, Incotest®, Wiggin®, Ferry®, Duranickel®.
Key markets:	Aerospace, oil & gas, automotive, power turbines, pollution control, chemical processing
Employees:	2,800 worldwide
Turnover:	USD 1,500 million (2008)