



Baoji Titanium Industry Co., Ltd.:

Internal perfection equals international

2500t fast speed forging press

In 2004, Stainless Steel World paid its first visit to Baoji Titanium Industry Co., Ltd. (Baoti), arguably one of the top titanium products producers and key manufacturers of the China titanium industry National Standards (GB) and the Titanium Industrial Standards (YS). In the past six years, great developments in application, scale and product range have taken place in the titanium industry. So, how has Baoti made further strides towards its ambitious goal? Stainless Steel World revisited Baoti and interviewed Mr. Jia Shuanxiao, General Manager, and Professor Yang Xiaoming, Vice General Manager and Senior Engineer of Baoti to find out about the company's current situation and future vision.

By Juan Huang and Gillian Kersley

Innovation promotes the perfect industry chain

Walking around the Baoti plant, also known as 'China Titanium City', the first impression is of prosperity. Employees can be seen busily working in each and every station. The familiar name "Titanium City" can be traced back to the 1960's when the enterprise was originally set up, specifically to support the development of National state-of-the-art technologies such as aviation and aerospace. At the end of the last century, a reorganization took place and the 'Baoti' brand was established and

the company has risen to a leading position in titanium suppliers gaining broad recognition and appreciation. On entering the Baoti plant, Stainless Steel World could at once see the changes made since our last visit and how it has expanded so dramatically, whilst still managing to maintain the peaceful working environment enjoyed before. In comparison to 4000t/y in 2004, Baoti achieved a sharp rise in its output in 2009 to 17,000t/y. This figure simply proves that the strategic planning made six years ago by Baoti has been accomplished.

Mr. Jia explained: "The planned 'ten production lines' and 'three centers' are now becoming a reality, but that's far from our ultimate goal. Being an innovative enterprise, almost every one of the production lines is the subject of an ongoing renovation plan. For example, the melting system consists of wholly global imported advanced equipment such as: 7 sets of 10t vacuum consumable arc furnaces and an electron beam cold hearth melting furnace which results in a total melting production of 20,000tpy. We are



al reputation

now building an 8,000t oil press and associated blending and distributing system and electrode compact system.” Mr. Jia continued: “According to our plan, the melting production will reach 25,000 – 30,000tpy in two or three years. To the forging system we have added ancillary equipment such as an annealing furnace, machining equipment, surface treatment equipment, to support the existing 2500t a high speed forging press, and a 3150t hydraulic press. Both the production capacity and processing skills have been improved. Additionally, a German made, 10,000t forging press will be commissioned in the next year. This will further enrich Baoti’s forging product specification and variety and improve the product quality as well.”

Baoti invested 310 million Yuan to establish a new rod and wire production system which mainly produces high quality rod and wire products for the domestic and worldwide aviation industry and high class civilian markets. This system is now going

through pre-commissioning testing and the estimated titanium rod and wire production is 2,000tpy and steel products 300,000tpy. With regard to plate and sheet production, RMB 733 million has been invested to build up a professional titanium strip coil production line, which is expected to be commissioned by the end of this year with an annual output of 5000t for Phase 1. “Actually, this is the first of its kind in China which means the need for this production in China has been filled by Baoti,” emphasized by Mr. Jia proudly. Also, their newly built recycling system with an annual capacity of 5000t which helps the company to be more cost-effective and safe during the operation is “the only one in the country that can handle the work for every process of complete production”. In 2005, Baoti established a welded titanium tube plant – the very first one – with Valtimet S.A.S. and Timet Asia Inc. Production is currently running at 800 tons welded tubes per year. It is also worth mentioning that Baoti established a titanium sponge production line with an annual capacity of 10,000tons early in 2007, which made it one of the few enterprises worldwide operating a complete titanium industry chain. In addition to the previously mentioned, newly added production systems, main facilities and new production lines, Baoti is active in technical renovation and production capacity upgrading with regard to existing production systems. For example, major investments on the seamless tube production system, additional pipe rolling mills and an annealing furnace bringing the annual production to 2000t.

The plate production system comprises one wide and heavy plate line plus one narrow sheet line and the titanium plate ranges from 0.5-100mm thickness with a width of up to 2.8m. An investment of 300 million Yuan resulted in upgrades here too, making the products suitable for the aerospace industry which requires the most advanced technology and professional skills. Based on their unique products, Baoti have obtained product certification from Boeing, Airbus, Goodrich and has become their long term supplier. Vice General Manager, Prof. Yang Xiaoming, went on to explain: “The casting system is another area of focus in Baoti’s product development plan. From the existing graphite and lost-wax casting lines, Baoti will expand their investment to develop precise castings and low cost castings. The largest titanium casting facility in China is expected to be established in the near future.”

Regarding the ten product lines, Prof. Yang added: “The titanium industry is a sunrise industry. Baoti has decided to take this opportunity through well planned and proactive preparation. On the commissioning of the new production lines, our product range will be upgraded by a wide margin and will match more applications in various industries.”

Why Baoti?

Baoti is the only titanium supplier in China that has obtained certification from more than ten world-class end-users such as Airbus, Boeing, BOMBARDIER, Goodrich, SNECMA, Rolls-Royce, Otto Fuchs KG, etc.



3.3m hot rolling mill



Gardens at Baoti facility



Bird's eye view of Baoti Industrial Zone

When asked why clients trust Baoti and prefer its products, Mr. Jia told us: "The reason is that we care about what our clients care about, although quality remains the key factor. Baoti follows three rules to ensure that only quality products are delivered. Rule one is the professional quality assurance system, specifically in force for titanium production. Besides ISO9001:2000, Baoti has obtained AS/EN9100 Space Quality Standard Certification from the French BVC, and has also obtained the EU PED Certificate and Norsok Certificate. In order to further expand the application range of Baoti Titanium products, we have obtained the ASME Pressure Vessels Certification as well as the Nadcap Heat Treatment and Non-destructive Testing Special Techniques Certification, etc. In accordance with the various standards and criteria from America, Europe, Japan and Russia, many brands and types of Baoti's precision-forged bars and seamless tubes enjoy a worldwide advanced position, especially Ti-6Al-4V sheets and billets. Secondly, the equipment and facilities also play an important role in quality assurance. Besides the new investments in the ten production lines, our Test Center and R&D Center provide solid support at the technical level. After continuous investments over the past years, the Test Center is equipped with more than 80 sets of the finest equipment in the world and has become the most complete and advanced test lab in north-west China. For all the physical, chemical and mechanical properties, every test requirement can be satisfied here."

"The third key factor for quality is the highly trained and dedicated personnel," added Mr. Jia. "This is Baoti's most valuable resource. 40% of Baoti's talent team are

specialists including 4 experts who enjoy the National Specific Allowance, 13 senior engineers with a professorship, 4 pacemakers within various fields, and so on."

"Besides the quality issue," continued Mr. Jia, "credit standing and cost are also important. Credit standing is deemed as the core value of Baoti. As a company, we are continually adding advanced equipment and improving product quality and delivery capability. It is well known among our clients that Baoti is a loyal and reliable partner. We are keen on brand building and have earned solid goodwill by providing world class products and satisfying service standards and delivery times. On the other hand, Baoti takes advantage of rich human resources and titanium reserves in China so the cost is comparatively restrained."

Most capable R&D center in China

"Baoti's Research and development Center is the most capable within the China titanium industry. That is also one reason

why Baoti identifies itself as 'innovative,' Mr. Jia told us. In order to integrate and maximize the use of resources of the existing R&D Center, the Baoti Institute was founded in 2009 and has been recognized as the national technique center and research center for titanium products. Based on the rich resources and dedicated efforts of senior experts, the return has also been valuable: more than 20 research projects about new titanium alloys for national key projects have been accomplished in the past few years with independent intellectual property rights. More than this, the institute has developed dozens of new materials and technologies for various industries such as: a low cost titanium alloy for golf club heads with BT341; BT311 plates for broad use in Japan, Europe and America; titanium alloy plates for marine use in deep diving submersibles; titanium alloys for aviation use as with the Shanghai based Commercial Aircraft Corporation of China Ltd., for which Baoti is the only titanium supplier.



Electron beam cold hearth melting furnace (EB furnace)



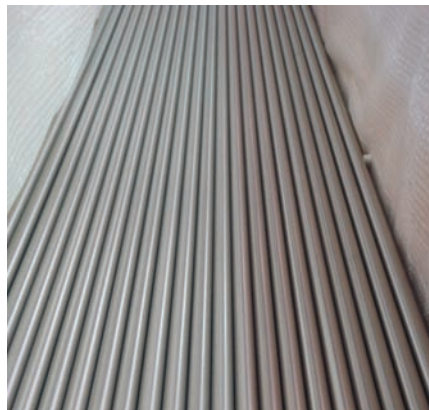
Baoti's management team

At the same time as developing titanium production capability, Baoti is also active in new product development and is keen on promoting balanced development. Baoti will use the newly erected production lines to produce titanium products for the aerospace industry, titanium alloys, titanium alloy pipes for the marine industry and plates, forgings and castings, also seeking to develop architectural and decorative titanium strips, thick wall tubes for the Oil & Gas and seawater desalination industries. In addition, Baoti will further develop zirconium, nickel and their alloys and steels in civil use such as the chemical industry.

Ready for more international partners

"The strategic goal of Baoti is to become involved in more overseas business and thereby play a more important role in the global titanium industry," explained Mr. Jia. In 2009, Baoti achieved titanium production of 17,000t and 8,982t within the first half of 2010, giving the company a 60% share in the domestic market and 90% in the domestic space market. As a certified titanium products supplier, long term business relations are already established with Boeing, Airbus and Goodrich as well as their subcontractors. Baoti's products have also been supplied to Japan, Germany, UK, Norway, Sweden, India, Singapore, etc. with over 360 types of products able to be manufactured up to ASTM, AMS, JIS, ASME or GOST standards.

"We are willing and ready to cooperate with more international partners," Mr. Jia told us. "In fact, Baoti has a lot of successful experience in multi-cultural cooperation. The welded tubes joint venture, Xi'an



Titanium tubes

Baotimet Valinox Tubes, Co., Ltd. established in 2005 with Valtime S.A.S (France) and Timet Asia Inc. (USA) is a good example of this. Of course, when it comes to cooperation we are both broad and flexible, as in our consignment sales with stockists and exclusive agents. Baoti has long term business relationships with world famous stockists and, accordingly, will be setting up liaison offices in America

and Europe to provide an even better service to clients and get closer to the market. Naturally, brokers with sales contracts are also more than welcome," smiled Mr. Jia.

"As well as the business pattern," continued Prof. Yang, "it is also very important that Baoti offers a much extended product range and upgraded product profile through significant investment and research works. In this way we can work with clients from even more industries, such as sports equipment, medical, chemical, oil exploitation and refineries, etc. Recent examples may help to give a clearer idea about our specialities: an Indian chemical project, 30t seamless titanium tubes, a Middle East seawater desalination project, 50t Ti-Mo-Ni seamless tubes; the Huayang Power Plant (Meng Jing Power plant), 84.5t Gr2 Titanium plate; Bohai Petroleum Equipment Zhongcheng Machinery Manufacturing Co., Ltd., 65t titanium tubes for oil drilling; Baoji Dongli Special Metal Co., Ltd, 200t titanium tubes for oil drilling; Shihlien Chemical Industrial Jiangsu Co., Ltd, 600t tubes for a 1.2 million ton soda facility and a 1.2 million ton for a vacuum salt making facility."

Mr. Jia concluded: "Baoti is well prepared for this ambitious plan because, as you can see, we have diversified our production structure towards a higher level. More updated and high level quality products fall into our product category. Win-Win Cooperation and Mutual Development is always Baoti's most important concept. We expect to share our knowledge and resources with more and more clients and partners globally."



10t workshop in the melting plant