

## Nine Brokk machines at work for the world's largest producer of stainless steel

Taiyuan Iron & Steel (Group) Co. Ltd. (TISCO) is China's largest producer of stainless steel with a production of over 3 million tons of stainless steel per year. All production is carried out at a one single complex in the Shanxi Province in northern China. The complex is known to have some of the most advanced equipment and technology.



In the beginning of 2004, TISCO wanted to make the cleaning of the Argon Oxygen Decarburization (AOD) converter more efficient. There are three converters in a row and they accumulate a lot of slag around the mouth during production. The converters are accessible with a platform with a maximum capacity of 10 tons so the size of machine used for converter mouth cleaning was limited. TISCO was using a hook mounted to an overhead lift for ripping off the slag around the converter opening, a method that was both time consuming and dangerous.

Meanwhile, the ladle debricking was carried out by manual jackhammers or sometimes by borrowing a large debricking machine from another department. Given the size of the large debricking machine, it

was difficult to transport the machine from one area to the other and the method also resulted in damage to the safety lining in of the ladle.

To solve these problems, Brokk delivered two Brokk radio controlled debricking machines model 330 to TISCO – one for the AOD converters and one for ladle debricking. The converter mouth cleaning proved very efficient and the machine is now used three times per shift for cleaning. Each cleaning only takes 6-8 minutes and is very safe for the operator due to the remote operation. When the machine is not in use, it is parked in a corner so it does not disturb the other work for ongoing steel production.



Cleaning of converter mouth with Brokk 330 in hot condition

The ladle debricking proved very efficient compared to other methods used before. By using Brokk's precision, TISCO can demolish only the working lining and save the safety lining. Each debricking of the 75 ton capacity ladles takes only 2.5 hours. Before Brokk, it took three people and a full shift to clean out the same ladle. Given the successful use of the first machine, Brokk delivered two more B330 machines for ladle debricking in January 2005.



Safe and efficient ladle debricking

‘We were quite surprised about the power of such small and versatile machine. We are very happy with the decision to purchase Brokk’, says Mr. Lee, Product Manager of Taiyuan Steel.

Given the successful use of Brokk, TISCO also involved Brokk for efficient and safe debricking of the newly commissioned electric arc furnace (EAF). In April 2005, Brokk delivered another two B330, one for EAF debricking and one for tundish debricking, bringing the total number of Brokk machines at TISCO up to six. In August 2005, TISCO ordered their seventh machine, also to be used for ladle debricking.



Brokk 330 used from a platform for cleaning of torpedoladle opening

In July 2006, the new iron plant was commissioned on the same complex. The facility is ultramodern with a 4,350 m<sup>3</sup> blast furnace. Two more machines were delivered for this plant. One B330 is used for cleaning the torpedo openings in a specially designed cleaning station. The other is for cleaning the runners from the blast furnace where it has proven very efficient for cleaning out slag while at the same time easy to manoeuvre. With these two machines, TISCO has a total of nine Brokk machines model 330.



Commissioning and training by Brokk engineer in blast furnace area