

Improving reliability in a recycling plant using a high strength modern steel

Recycling plants are different from many other activities since they are not so dependant on the general economical situation. They have a business that is depending on specific factors like long term political decisions and short term scrap prices. Crucial for all recycling plants is to be able to run the equipment as much as possible and avoid any maintenance stops as far as possible.

Especially, unplanned interruptions due to equipment failures are very costly. So, when Hermanos Lopez a Spanish company specialised in recycling of large metal scrap needed to replace one of the wear pieces they searched for the highest quality material available. The wear piece should be used in the largest crusher handling 350 tons of scrap/day. The 18-24 hammers inside the crusher rotates at 2000 rpm. Since each hammer weighs around 80 hammers very high forces are involved and highest performance spare parts needed.

To find a suitable replacement part, Hermanos Lopez contacted the Madrid company Forjas Vecina. Forjas Vecina is manufacturing wear pieces since 30 years and knows very well the recycling market. They decided to manufacture the wear piece from a 150 mm SM140 steel plate made by the Swedish steel producer SSAB. The SM140 steel was chosen since it has the wear resistance needed but also since its properties are optimised for an economical usage in the workshop. Important in the application is also that the SM140 steel is 100 % quality controlled including mechanical and ultrasonic testing on each plate produced. SM140 also has a guarantee on a minimum crack resistance value. Brittle steel is never sold increasing the possibilities of a problem free usage at the recycling plant.

The SM140 steel was obtained from the official Toolox dealer , Sermetal Valencia who had the relatively uncommon thickness of 150 mm in stock.


To machine the piece, Forjas Vecina used a Correa milling machine. A two insert Sandvik Corodril 390 tool was selected with 1030 insert quality. Due to the thickness of the piece a relatively long tool was needed which complicated the machining. During machining of high hardness steels it is very important to avoid vibrations so if possible the tool should be as short as possible. To avoid vibrations the plate was fixed very strongly to the machine table.

The best machining result was obtained with a feed of 345 mm/minutes and a speed of 1000 rpm. It was not necessary to modify the machining parameters during the manufacture of the piece. No lubricant was used.

Francisco Ruiz Mesas, Machining expert at Forjas Vecina says that manufacture went very smooth. Since the piece did not move during milling all machining could be made from one side in one set-up making it possible to finish the piece in 1 day. Time was an important factor since Hermanos Lopez wanted the piece installed as soon as possible

Mr Mesas also noticed that the steel was very homogenous and the consumption of inserts limited despite the high hardness material. He also noticed the very characteristic strong blue color of the machined chips. A sign that the heat from the machining stays in the steel chips and don't destroy the carbide in the inserts. A reason why the life time of the inserts can be high even if the hardness of the steel is very considerable

Hermanos Lopez got their finished SM140 piece ready to be used after around one week from them contacting Forjas Vecina. A very short time compared to buying the original spare part or if heat treatment would have been needed

Fig.: 1 



Recycling plant Hermamos Lopez, Madrid Spain

Fig.: 2 



Used cars waiting to be crushed

Fig 3



Crusher during maintenance. The part in the centre of the picture rotates at 2000 rpm during usage

Fig.: 4



Francisco Ruiz Mesas, Forjas Vecina Madrid Spain 🇪🇸

Fig.: 5



Toolox (SM140) piece during manufacture.

Fig.: 6



Toolox (SM140) piece during manufacture