# An example on how modern steels can increase component quality without increasing price

Many workshops have noticed how the quality of the steels they are using are continuously being lowered. Before, the performance in machining could be expected to be homogenous within a piece and between deliveries of a certain steel grade. This is no longer the case. Instead, steels have started to in many cases limit the development of modern high speed machining. The ideal of running machines 24 hours without operator control at increasing speeds is difficult to achieve if there is a risk to find impurities or hot spots inside the steel. At the same time as the quality has decreased, the steel price has as all machine workshops know increased significantly. The reason for this situation is as so much else in our new globalised world the competition from developing markets such as China. On one hand they are consuming raw materials pushing the cost of those upwards which in turn increases steel price. On the other hand they are exporting steels more and more to Europe. 10 years ago most of the alloyed steel used in Europe was made at a few European steel factories. Today, a big part of the steel is imported from countries like China or Russia. This trend will only increase in the future

In a situation like this, a machine workshop who can find a way to make their components from high quality steels without increasing their production cost would get a competitive advantage, since he can deliver a guarantee on the components performance to his customers.

When the Spanish company Herso got an order for the machined components for repairing a car tyre recycling machine, they decided to see if they could somehow make them in a more modern way. Herso has since a long time during their 60 years been specializing in making machines for the rubber and plastic industry so they know the demands on the steels in such equipment.

At the same time they are sufficiently flexible to use new technology when they find it. In Fig 1 and Fig 2 the main components for the machine can be seen. The traditional way of making the piece in Fig. 1 would be to buy alloyed steel type 42CRMo4 in a round bar, not an optimal solution both for the questionable quality of 42CrMo4 steels and the large amount of machining needed starting from a round bar. The ring in Fig. 2 would typically be made in the same way or from softer steel like C45 flame cut to the ring shape.

After consulting with their steel supplier, Sermetal Valencia, Herso decided to use the steel grade Toolox 33 for both components. Toolox have a higher strength and crack resistance than both 42CrMo4 and C45 grades. It also represents a much higher guarantee on the properties since Toolox is only manufactured by Swedish steel producer SSAB. Since Toolox is ultrasonically and mechanically tested plate per plate there is a full guarantee that low quality is never sold.

To lower component cost it was decided that Sermetal Valencia should flame cut the pieces from Toolox plate. Something possible with Toolox thanks to its much lower carbon content compared to other high strength steels. Since the components could be flame cut close to their final shape, Herso could save a lot of time, minimize wear on the tool inserts as well as buying less material.

For the machining Herso used only Iscar tooling, with a speed of 60 m/minute and a feed of 1-2 tenths of millimetres per pass. The only complication they found was to handle the gap between the ring parts seen in the setup used for the machining. The gear ring had to made in segments since it was necessary for easy maintenance of the recycling machine.

Herso SL is very satisfied with his solution since they knows their customer will notice a improved machine performance at the same time Herso has not needed to increase his production cost due to upgrading to more advanced steels. Herso knows that by continuing finding these kind of solutions they will be a preferred supplier of the end customers also in the future

**Fig.: 1**

Parts of gear ring for rubber recycling machine

**Fig: 2**

Rings for rubber recycling machine

**Fig 3**

Oxycutting of gear ring parts

**Fig 4**

Setup for maching gear ring parts