Production increase thanks to sinter-forged MMC bits

The Danish company FMT A/S processes i.a. wood waste from the building sector and the recycling sector. By using a sinter-forged MMC bit in its mobile waste reducer, the company has managed to produce a greater amount of compost than earlier, while enjoying the bonus of improved finances.

Today, the market offers new, inexpensive and wear-resistant steel-based MMC materials. They are characterised by having embedded hard particles in a steel matrix, improving the wear resistance compared to conventional materials. The uniform distribution of the embedded particles ensures uniform wear resistance properties throughout the material. Apart from the wear-resistant properties, the MMC materials excel in their good ductility properties - two properties that are normally difficult to combine. MMC materials are therefore very suitable for application in functions requiring high wear resistance and involving considerable exposure to impact.

FMT A/S currently uses 1.9 kg sinter-forged MMC bits in their reducer, which crushes the waste against a plate at high speeds.

Longer service life with MMC bits

When reducing garden waste, there is a risk of taking in rocks and other unwanted elements, which will be sorted out after passing the drum with the bits. Naturally, this entails exposure to heavy impact and wear on the bits.

Other examples of items manufactured using the sinter-forging technique include a small cutting disc used to remove bark from trees in the forestry sector. With a weight of only 120 g, the cutting disc represents the other end of the scale in relation to the above-mentioned bits. The cutting disc is incorporated in Iggesund Tools’ bark cutting tools, which are mainly used in the USA, Canada, and Europe.

Microstructure of respectively unetched and etched MMC. Black areas are matrix-reinforcing particles with improved wear resistance.

Abrasive blasting wear test

![Graph showing Abrasive blasting wear test results]

- Sinter-forged MMC material
- Hardox 400
- Carbon steel-heat treated (index 100)
The sinter-forging process is a powder-technological process, in which you consolidate the powder material to full density. A pre-form is produced using conventional powder techniques and subsequently forged to its final shape in hot condition. Components manufactured by means of sinter-forging achieve 100% relative density, improving their properties as regards ultimate strength, fatigue strength, elongation as well as impact strength. Sinter-forging allows the manufacture of net-shape components, eliminating the need for expensive further machining. Sinter-forged MMC materials are difficult to machine using cutting tools; hence the advantage in manufacturing components without further processing.

System 3R has already received a number of their constructional details for suspension tools from FJ Sintermetal. Consequently, it was only natural for the Swedish company to solve an urgent task in close co-operation with the factory in Denmark.

System 3R offers products that help customers increase their productivity. Thanks to e.g. robots, they improve the overall production level and the exploitation of the machinery. The task that System 3R presented to FJ Sintermetal was not a simple one. The company needed two suspension fixtures for their spark erosion machine; they also wanted to achieve cost savings. The suspension fixtures are used to hold blanks for electrodes while machining and for subsequent suspension in spark erosion machine. Consequently, the company required very high item accuracy and uniformity. In addition to stringent dimension and tolerance requirements, System 3R emphasised on sufficient material strength and the possibility of fixing the electrode material by means of gluing as well as soldering. This meant that the items could not have open pores allowing dirt and oil to gather and impair the gluing or soldering. Last but not least, the task had to be solved at a realistic price level. As the article is a consumable, System 3R’s customers cannot accept a solution that is too expensive.

Savings achieved

The solution to the System 3R assignment was a further development of a patented sintered material, with full density achieved by pressing and conventional sintering - without any form of sealing of the micropores normally found in sintered materials.

This process ensured the accuracy and uniformity required. The task was thus solved in full, and the desired cost savings were achieved. It is System 3R’s future aim to have FJ Sintermetal take over the entire product responsibility for this task and supply the items packaged in System 3R’s cartons directly to the Swedish company’s warehouses.