

Swemas innovates engineering

Welcome to Swemas AB. We are professional manufacturers of components for rock crushers. The company is located in Ludvika and was founded in 1983. The engineering company currently has 30 employees, and those employees have extensive experience of the industry and their expertise in the business is excellent. This is a discretion of the company on its website. The reason for the company's success is quite simply hard work and skilled people of vision managing the company's production and the ability to constantly think fresh.

Swemas AB was honoured with business of the year in Dalarna 2015.

It's nice getting the attention even if we are not comfortable with appearing on stage," say the brothers Johan and Fredrik Andersson, who run the company together. In recent years, they have invested more than SEK 30 million (Swedish krona) in the workshop in the Gonäs industrial area in order to streamline production. In 2014, they invested, inter alia, in a large and advanced 5-axis milling bed with multi-operation options such as boring and turning. Work pieces of up to 35 tons, and 10 metres in length, can be processed on the rotating circular table. The company specializes in the manufacture of wear and spare parts for the rock and gravel industry, often from their own designs. We are of course talking about heavy engineering. They own a foundry in China, where the wear parts of manganese steel are produced. Major investments have also been made here recently in order to increase capacity significantly. Almost all other products are manufactured in their own workshop. More than half of its sales are to companies in Sweden; the rest through retailers in Europe. "The market considers us a serious player, with really good products and now we plan to take more market share with our own distributors in more countries," said Fredrik.

Swemas was founded by the father of the brothers, Jan-Erik Andersson, in 1983. In the 1990s, the brothers began working in the company, and approx. ten years ago, a smooth generational change was undertaken. And, as mentioned, it is full speed ahead at the moment.

In focus - an extraordinary machinery investment

Travelling around Sweden and seeing how different companies tackle their future as component manufacturers is both interesting and instructive. It is inspiring and at the same time, you feel happy when you see what is happening in Swedish industry. Not everyone takes up the fight, but Swemas AB in Ludvika is a shining example of how it is easier and more fun to invest in new engineering for the future. But it is all about navigating correctly and now is the time to strike.

We meet production manager Richard Andersson of Swemas in Ludvika, who has now been provided with new options for developing the manufacturing processes through this investment and has entered into a very interesting phase that creates new opportunities for business development and a substantial increase in capacity in the workshop.

"We save time and considerably improve our quality, thanks to our new machine. We have a facility that creates a whole new manufacturing system for our company, and with the built-in 5-axis technology, which is very unusual for such a large machine, we now have a powerful milling/floor piece for the most demanding tasks," says Richard Andersson and Mattias Peterzon of Euromaskin clarifies that;

- SHW UniForce 6 is a robust and powerful tooling machine, which is primarily designed for large components. It is incredibly flexible and precise for long, large work pieces and is ideal for Swemas' manufacturing, which strives for high productivity in everything it produces.

We return to the time, around 2012, with an old boring machine working away in the workshop on tough assignments. It takes time to get the various components ready on the larger model, and you sometimes need 4 paces to get complete a product. You often have to move the component to another machine, which means new set-ups, set-up time and you have to spend a lot of time on measurements to ensure quality.

So when did your thoughts turn to investing in a new machine?

"It began with us needing to buy a large milling machine, but when we talked about it, we came to the conclusion that the cost was so great that we might as well invest in a machine that could handle more, such as boring and milling functions and the like. It was a long process that went on for over a year. We looked at several different brands on the market," said Richard Andersson.

Our first contact with the German machinery manufacturer, SHW, was at a trade fair, at which Euromaskin was exhibited along with SHW's proprietary orthogonal head.

"It looked very interesting and we got additional information on the manufacturer, and decided to visit EMO in Hanover in 2013 to meet with several of the manufacturers we had selected. We were down to three manufacturers, and after the show, when we thought SHW had the best technical solution, we visited the factory in Aalen, south of Stuttgart in Germany," says Richard Andersson and explains the decisive factor in choosing the machine (as you know, it was SHW which won the battle against two other established brands in the market, editor's remark).

What was the deciding factor in SHW's favour?

The construction is interesting. When we started looking at the solutions in detail, we saw several interesting differences in how the machines are built, and we liked the way SHW build with few moving parts, which is less complicated. The design with the built-in C axis was a big plus, as you can run all 5 axes simultaneously without needing to buy anything extra. We can run all of the heads, e.g. the angle head, inside the confined spaces simultaneously. We can, for example, run 5 axes simultaneously while milling with the orthogonal head with both the rotary tables, which is probably the most common use when running simultaneously. For this, we chose Fibro and Ruckle rotary tables with

roller bearings and double motors with a Master Slave function; meaning backlash-free and the choice was for a roller unit instead of hydrostatic because there is a small lift on the table with hydrostatic, meaning the roller unit is a little faster (considering simultaneous milling). Some manufacturers delivered Turcite (sliding tables) and this was not considered as you can get a so-called slipstick effect (i.e. from standstill to motion so that it jerks and the feed becomes uneven).

"We have the accuracy that is very impressive thanks to the duo-drive which compensates the 1000 portion. (simply stated, two ball screws keep the height and straightness of the tool constant) which applies to all of the heads, which have different weights. Some manufacturers had other solutions for this, such as counterweights hanging on chains and internal tie rods that certainly do work, but we thought the duo drive was a better solution.

"One thing we discussed intensely internally was the choice between fixed quill and (moving quill, types of boring machines) as we often have deep holes. We reasoned that when the holes are smaller than the diameter of the fixed quills, we would switch to dampening tools which can be replaced as needed if they are damaged in the event of chip jamming, and dampening tools can be used for all possible angles and tight spaces, instead of only horizontally.

Besides, as the machine is equipped with a collision avoidance system (BRANKAMP manufacturer) that protects and stops the machine in the event of collisions or overloads.

Selected measurement systems are laser measuring tools, tool's touch probe for automatic measuring of turning tools, 3D touch probe for measuring the work piece.

The most important part of the machine is the head. This is also the basis for SHW's philosophy. The most important thing on a milling machine is thus the cutting head.

SHW has long experience of orthogonal heads. 50 years ago you had to patent an indexable head with a 1 degree pitch in the A and C axis. This head has been further developed since, and it claims that no other manufacturer has the experience SHW has for this type of milling head. The milling heads are manufactured by SHW itself with great accuracy.

"The universal head is always a standard part on SHW's machines, but most of the machines can be equipped with a main switch system, which we see here at Swemas in Ludvika. The machine then switches the milling head automatically without the operator needing to be present, unlike what many others can do. There is no need for cleaning or manual intervention," describes Joel Paldanius (see image, page 32).

What is the point of having a milling head changer in the machine concept?

"In principle, you can switch the head as you switch tools, i.e. we can choose the head depending on how we want to process a component, in principle in one set-up. If we need, for example, to make a long tapered hole, it takes an eternity to mill, and previously we moved the component to a lathe. We do not have to do that today with our new machine as we can programme a head change and turn what we want, mill and drill what we want, use the angular head for, e.g. internal key grooves, completely automatically," says Richard Andersson and continues "amazingly flexible and productive. If we look at the small rotary table we can, first and foremost, move it or simply remove it. We can set it up if we want a large drum or an axis tilting. We now also have our fixed 35-tonne table and we have movement in W of 2 metres as well, so we can run long and rotate.

We study the giant machine some more and find that it has been equipped with two different rotary tables and Rickard explains the thinking;

"As I said, the small rotary table has a maximum load of 8 tons and, just like the larger rotary table, which can handle up to 35 tons, both cannot be positioned correctly without the correct axes. The machine's frame has a C axis, so that all of the heads we have in our magazine can be run simultaneously with the two rotary tables. It thus becomes both a positioning 5 axis machine and simultaneously 5 axis, which is rare in a machine of this size.

We currently manufacture everything for stone crushers, which we sell as spare parts to all known brands around the world, such as Lokomo, Symons and others. We could build our own rock crusher from all of the components, but we do not sell complete crushers. A large part of our business is also repairing and refurbishing parts for crushers.

"I would like to take this opportunity to thank AME in Gothenburg which is responsible for the Mastercam. They have been very helpful with e.g. the post process," says Richard Andersson. We call Jan Bohman of AME and ask him to tell us a little about how they helped Swemas.

Right from the first visit, I realised that Mastercam was an excellent fit for Swemas. They wanted everything from simple 2D preparation of 5-axis, simultaneous milling, and most important of all, it had to work with their new advanced machine.

"The SHW machine solution is one of the most complicated post processors we helped develop. With all of the heads and tables and the selection of the axis combinations to be applied with different positions, this is actually 5 machines condensed into one. We are very happy with the end result. Using a simple choice for every operation, the user enters which axis combination to be used. In order to develop such a post processor, it is important that the end user understands their machine and can give us good program sample that explains what they want to do. Richard of Swemas really understood this and gave us the info we needed.

SHW is growing in Sweden

Finally, Mattias Peterzon says that there are now several SHW machines in Swedish industry, and that it is now expanding in Sweden with more and more inquiries and orders.

"This is about the customer needing that little extra for increased function and flexibility, preferably 5 axes. And all of the companies that visit the factory in Germany along with Euromaskin and meet our experts and designers are very impressed. In fact, anyone who visited the factory in the real-life situations has invested in an SHW machine.

More production time

Richard Andersson gets the final word;

"The new machine from SHW has been a boost for us, as we previously manufactured many of our components in a "bad way", i.e. less efficient, with many different set ups, which takes up a lot of time. Today we have halved our processing time for many of our parts and also increased the quality. One thing that impresses is the machine's accuracy; it is very good. ■

CAPTIONS

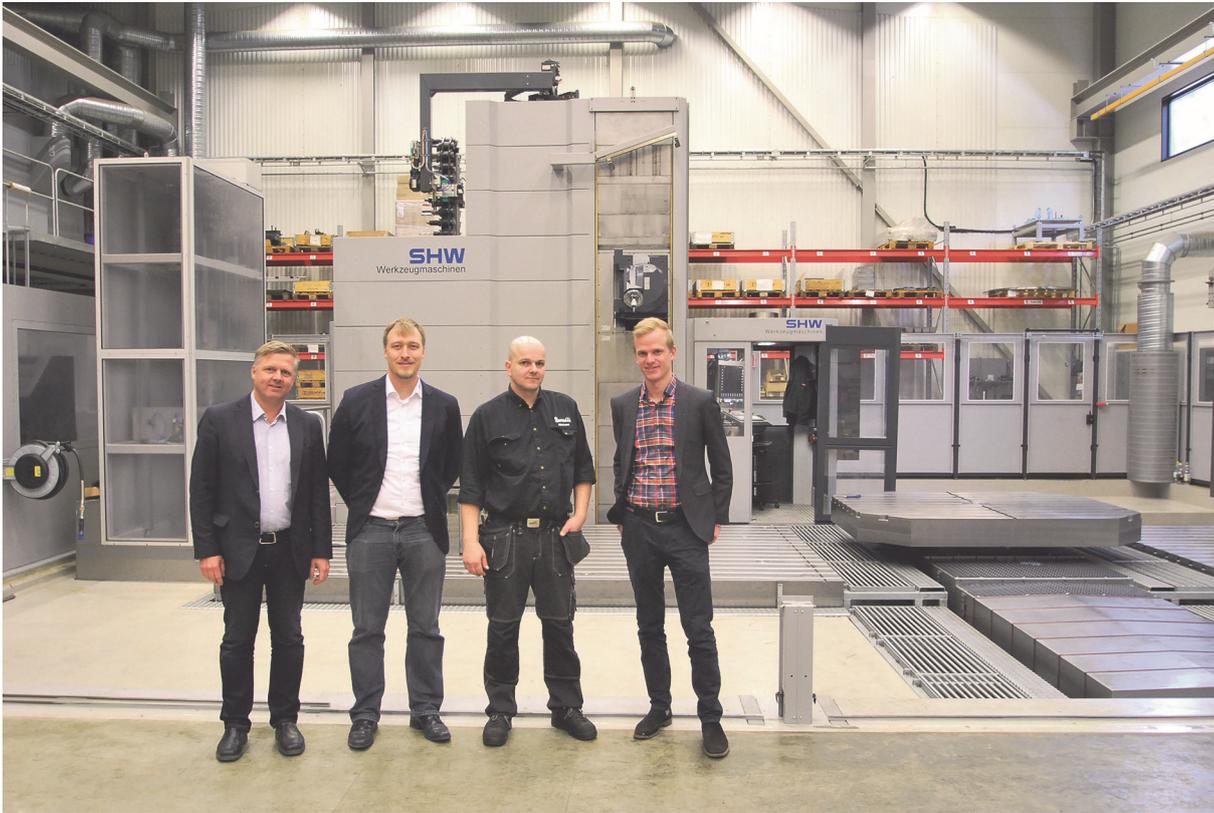
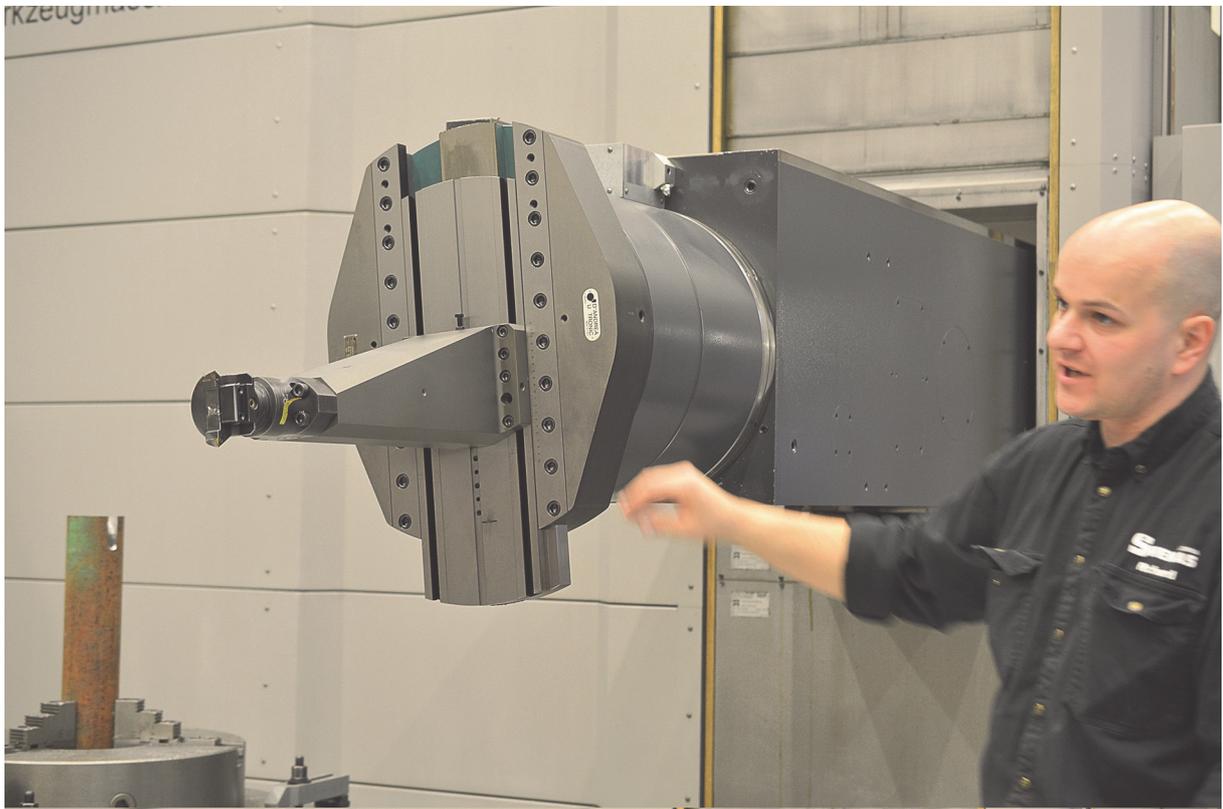


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Mattias Peterzon, Sales Director Euromaskin, Sebastian Abele, representing the machinery builder SHW, Richard Andersson Production Manager Swemas and Joel Paldanius, machine salesperson Euromaskin.







Images – 336, 337, 339, 340, 341

*Richard Andersson demonstrates the benefits of the exchangeable milling head and emphasises the importance of using long booms in processing for optimum access without vibration. He praises Sandvik Coromant's dampening adapters which are well suited to Swemas' tasks. Silent Tools® is the trademark for a range of tool holders for turning, milling, boring and drilling. The tool holders are designed to minimise vibrations with a damper inside the tool body. The majority of Silent Tools' customers use these tools for long overhangs. Which affords great productivity gains and improved surface finish. **Source** Sandvik Coromant.*



Image - 130

Switching the head at once.



Image - 149

Here we see a so-called tool pick-up for long and heavy tools, such as boring tools and the large adapters that are used. Tools that do not fit in the machine tool magazine; smart solution.

"This system is indispensable for us, as we need the most automated process available. We cannot be involved with manually switched tools, everything must be automatic and the operator can press start and go on to another job," said Richard Andersson and adds, "Our philosophy is based on new machine technology".



Images - 334 and 155

Swemac renovates and manufactures spare parts for jaw and cone crushers, screens, etc.



Image - 141

The switching system for the machine heads which automatically selects which one to use. Heads are switched quickly.



Image - 153

Approx. 160 kg on the table, which takes 35 tons. In the background is the head switching system with milling heads for different applications.





Images – 132, 133, 134
No captions