

Make, rather than buy

■ Helmut Damm

Currently, the Aerzener Maschinenfabrik is producing fans and compressors at somewhere near the limit of its capacity. Business is booming, thanks to the fact that the latest machining technology has succeeded in striking a balance between flexibility, quality and economy.

The current order book at Aerzener Maschinenfabrik has a particularly healthy look. The fans, compressors and gas meters it makes for industrial applications are in great demand throughout the world. As a result, sales forecasts often become so much waste paper before the ink has had time to dry. The company is usually associated with the production of fans or compressors, but it also builds complete systems including silencers, supporting structures and acoustic enclosures.

In view of the fact that exports account for around 80 per cent of the company's sales, the uncertain course of the German economy is not a matter of any great concern to the people in Aerzen. The music is

playing throughout the world and the Aerzener Maschinenfabrik is one of the first violins.

Keeping calm and doing the homework

Only five years ago, however, the signs were entirely different. The market, packed with manufacturers, threatened to run out of steam. The family-owned Aerzener Maschinenfabrik, whose history goes back to 1864, introduced restructuring programmes which laid the foundations for the company's subsequent success. In addition to reducing overheads, the product range then on offer was analysed. Was it wise to go on offering everything when good sense

took second place to the customer? From small fans to large fans, even the largest fan in the world? Only standard products, only special products, or both?

The company standardised its product range and worked on the productivity of its methods. Andreas Gattermann (Fig. 2) has been with the firm for eight years and, as Factory Manager, is responsible for »everything to do with production, from incoming goods to the finished machine.« In his opinion, persisting with a wide product range has turned out to be absolutely right, »In view of the company's policy of achieving in-depth added value, the mix of low-cost standard machines and one-off systems, developed and made for specific customers, provides the right business ratio between the use of production capacity and the average profit margin per end-product. Even in the case of the large machines, we enjoy a unique position in terms of manufacture and service. I would, however, describe our considerable improvement in productivity in the last few years as being the basis for the future viability of the company. In order to achieve

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Fig. 1. Chucking on the left, machining on the right – handling two parts at the same time: the two-station Matec 30 L machine with two traversing columns allows the Aerzener Maschinenfabrik to perform the economical machining of castings in short runs with minimal non-productive times.



Fig. 2. The investment in a Matec two-column machining centre represents the first contribution to securing the future of the production site in Aerzen. Associates in the project were, from left, Matec's Area Representative Stephan von Domarus, and Factory Manager Andreas Gattermann and Production Planner Christoph Schmieder, both from Aerzener Maschinenfabrik.

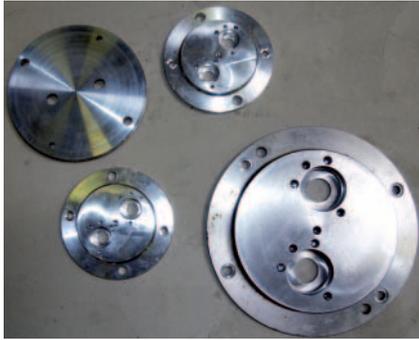


Fig. 3. Steel and aluminium side panels for gas meters – the bearing drill-holes and dowel pins comply with exacting quality standards in the hundredths of a millimetre range.

this, no end of brainstorming went into reviewing our processes and technologies.«

Internal processes must stand up to benchmark comparisons

The systematic relocation of production operations is not a subject for discussion in Aerzen, particularly in the case of core components such as rotors and pistons. When it comes to constant make-or-buy decisions, it is true that in individual cases external jobbing contractors get the nod, but this seldom applies to production companies in low wage countries. The reasons underlying these decisions can be well made out, »If you consider quality, price and on-time deliveries as the essential criteria, our own in-house processing facilities offer a number of unique, important benefits. From the standpoint of quality alone, our experience in dealing with components and materials naturally gives us a considerable advantage. Outsourcing is also subject to fundamental limitations in that, whenever we ourselves have only limited needs, little is going on elsewhere, and vice-versa. In the very nature of things, we are more likely to receive low-cost quotations when demand is low. In times of a healthy economy, prices also rise in the free market. As regards outsourcing from low wage countries, there are probably only a small number of companies doing this consistently and these are really acting against their own interests when it comes to actual savings. In my opinion, the administration costs are considerable. In our case, moreover, the proportion of variable costs is relatively low. The wage rate advantage of low wage countries only pays off from about 40 per cent and upwards.«

Assuring the future with high-productivity machines

The virtual lack of any pressure to make use of outsourcing, however, results in a well thought out system for in-house machining. In order to keep pace with the competition in the long term, a »future assurance programme« was recently agreed, which envisages investments amounting to EUR 50 million up to the year 2010. The principal project is the construction of a

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Adolph Meyer founded the Aerzener Maschinenfabrik in 1864. Since 1868, the product range has consisted of three-piston fans, augmented in 1930 by three-piston gas meters and, since 1946, by screw-type compressors. In 1978, the company built the largest three-piston fan in the world (with a volumetric capacity of 84,000 m³ per hour) and in the 1984 the largest screw-type compressor (with a volumetric capacity of 65,000 m³ per hour).

Operating on a global scale, the family-owned company now develops, manufactures and sells tailor-made products for specific customers, backed up by comprehensive services, to designs based on the concept of twin-shaft, three-piston machines.

The company is represented with sales branches in seventeen countries. Local content takes the form of the final assembly of the machines and their maintenance. In Aerzen, the company employs a staff of around 850, of which 44 are trainees. Three hundred further employees work in its 22 subsidiary companies. The principal customers for its machines and systems are the steel industry, sewage treatment plants, cement works and the agricultural and chemical industries.

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Fig. 4. Housing cover made from a mass produced casting – machining to a finish takes place in a single chucking through the casting scale from above; relief-turning the recess poses no problems.

10,000 m² production centre capable of making 20,000 standard fans and compressors a year. Preferential treatment was given to an initial replacement investment in this project at the end of 2005, when the necessity arose to urgently replace a venerable Norte two-spindle machining centre, due to its limitations in respect of capacity and precision. It had been used to machine sophisticated housing components but, given rising quantities, rapidly became the eye of a needle. As the Operations Planner with Aerzener Maschinenfabrik, with the responsibility for production planning, Christoph Schmieder (Fig. 2) was entrusted with the new procurement. »In order to underbid the prices of external suppliers with our in-house processing, our need was for a high level of machine productivity. The proven concept of a long-bed machine with two traversing columns and the feasibility of shuttle working (and, in turn, resetting in parallel with productive time), also seemed to us to be the only economical option. In addition, it was intended that two components should be machined in parallel in a single chucking action (or two, at most), so the quality of the machine was no less important. After sounding out the market, the choice very quickly fell on a Matec (Köngen) 30 L double-spindle traversing column machine (Fig. 1). The reason for this lay not so much in the fact that hardly any German manufacturers of machines of this type still exist, as that we were persuaded by the willingness of the company to transform our ideas in the best possible way (resulting in a machine affording the requisite versatility) combined with a short delivery time and a fair price for the technology offered. We have now been working with it for >>



Fig 5. Electronically linked twin spindles - the Aerzener Maschinenfabrik benefits in several ways from the machine designed by the manufacturers, Matec, in the form of flexibility, quality and economy.

four months and it is fulfilling all our expectations, something which also goes for Matec's customer services.«

The task for Matec and its Sales Manager, Stefan von Domarus (Fig. 2) lay in producing a production system in keeping with the times, which would occupy a specific floor area of the same size as its predecessor, and in adapting certain items of equipment made by designated manufacturers and specified by the client for use with the machine, such as a chip extraction system, cooling lubricant tank and treatment station, and air filters. It was also necessary for the 30 L to be modified in such a way as to accommodate all the existing fixtures, for which a machine table with a non-standard groove interval was used. Finally, it also had to be possible for the existing NC programs (apart from adapting the cutting parameters) and the SK40 tools to be used.

The objective – a safe investment

As is usual with the people at Aerzen, the production experts were meticulous in ensuring that their requirements were realised and pronounced themselves satisfied only after visiting a satisfied customer and agreeing final acceptance of the machine operating under production conditions on the manufacturer's site. In this way, Gattermann ensures that each far-reaching investment decision is taken on the basis of the most comprehensive information possible, »First, we compare all the relevant aspects of the potentially successful quotations down to the last detail, including customer services. Our experience of the final acceptance of a machine at the manu-

facturer's works has been entirely satisfactory. Any problems of any importance, which can always ultimately occur, are met with a greater degree of self-interest on the part of the manufacturer if the machine is standing around and getting in the way on his factory floor. The last thing I want when production is running flat out is monuments in the form of machines which the manufacturer cannot get to work.«

The Matec 30 L possesses other performance features which reinforce the soundness of the investment. Thus, the two traversing columns are only linked electronically by way of the control system; physically, they are independent of each other. If, for instance, one spindle fails, the shuttle operation with the other functional spindle can be maintained until the fault is rectified. Equally useful from the standpoint of production accuracy is the fact that both spindles or tools can be individually adjusted for height and diameter. This option is ruled out in the case of machines with only a single traversing column supporting two spindles or two physically connected columns. As regards the tolerances laid down for distances between centres and plane-parallelism, which amount to only one hundredth of a millimetre in the case of the bearing drill-holes and dowel pins in the side plates for gas meters (Fig. 3), the individual adjustment facility contributes considerably to the quality assurance processes which accompany production.

The Matec designers have even succeeded in producing a two-station machine offering a larger working range of 800 x 4000 mm yet occupying only the same floor area – an advantage in adaptability when it

comes to the variety of parts processed which, in addition to side plates and housing covers (Fig. 4), also embraces large wheel housings. The ability to react means a full order book. Ease of resetting and accessibility are two characteristics which the Matec 30 L also inherited. With these, the high productivity processes of the two-station double spindle design (Fig. 5) make it a complete production unit which meets the demands of the Aerzener Maschinenfabrik, not least by accommodating the short reaction and processing times following the receipt of an order which the company has set itself.

In this connection, too, the company aims to set standards, as Gattermann emphasises, »We have achieved our objective of shipping out complete systems within three working days of receiving the order. The market calls for this ability to react so, as a result, we not only receive a higher quota of orders but are also able to accommodate our customers' wishes to place orders at the shortest possible notice. If you offer flexibility, it will be expected of you. It gives us a unique position in the market, at least for a limited time.«

»Happy engineering« calls for up to date flexibility

Being flexible is a basic capability which the Factory Manager demands universally, from his highly qualified employees (of whom over 90 per cent are certified as skilled workers), from the machine tools, which must get by without foundations so that, if necessary, they can be rearranged in accordance with the flow of materials, and, needless to say, from the methods employed. Ultimately, it boils down to »happy engineering«, Gattermann's own term for the willingness to make changes which makes its mark on the Company's sophisticated products, even after the order has been placed.

Missing a deadline because a supplier has defaulted on a delivery »does real harm«. It is for this reason that, within his area of responsibility, Gattermann prefers modern production technology and the economies afforded by in-house manufacture to outsourcing. <<

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