FISCHER

inside

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EDITORIAL

Thoughts on the economic upturn

Dear readers

After two timid, even recessive, years in the European mechanical engineering sector, commentators have increasingly been talking of a much-hoped-for upturn. This is music to our ears, as the machine tool industry, which is important to us, has been in sharp decline in our main markets.

But what is an «upturn»? The term indicates that the decline in the economy's productivity has been stopped, and is once again improving. When this change occurs, the recession is said to be «bottoming out».

Although these signs and expectations are positive, they seduce companies into behaving as riskily as an organisation is able to behave. Faith in the approaching upturn leads them, wrongly, to believe that it will go on up without any increased efforts from employees. These companies have got it wrong! Here, at FISCHER AG, we will be helping to create the upturn by remaining in control of our progress, constantly improving our in-house work ethic, and having the courage to seek out mistakes at all levels and take corrective action. This has worked well for us over the past two years, during which time we have been able to largely compensate for the downturn in our markets by winning new customers.

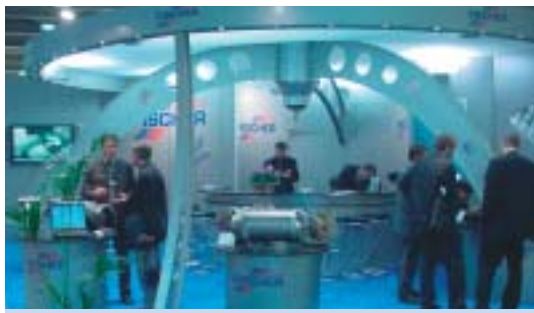
The upturn won't just happen on its own: it has to be created. By us, not by this collective economy. The economy, after all, is only the sum of our individual efforts.

Thank you for contributing to these efforts.

Christoph A. P. Rennhard
Dr. sc. techn. (ETH), CEO

Plenty of interest in FISCHER at the EMO

Like in 2001 in Hanover, the FISCHER Group had its own booth at the 2003 EMO, the world's major trade fair for the machine tool industry. The EMO is a biennial event and is considered by the trade to be the most important fair of its kind for metal-machining professionals.



FISCHER's generously proportioned, bright stand was where attendees were able to witness at first hand the true meaning of innovation in the field of spindles.

Milan sees record attendances

1989's record of 187,000 m^2 of rented space was, to everyone's astonishment, broken this year, with 2263 exhibitors from 39 countries taking 192,266 m^2 in 22 halls. 2003's rented space represents an increase of 17% over the 1997 Hanover EMO. Interestingly, the number of exhibitors barely rose (just under 1%) this year compared to the 1997 Hanover EMO's 2244 exhibitors, indicating, once more, that all the companies active on the international scene were present.

The upbeat appearance of the FISCHER stand once again attracted much attention from many attendees and other exhibitors. During the eight-day event large numbers of new contacts were established and relations with existing customers strengthened.

Fair highlight: FISCHER SmartVision

There were many innovations being shown by FISCHER, one of the focal points being the new SmartVision intelligent data evaluation system, representing a milestone in service life diagnosis – a form of «black box» for high-speed spindles. Likewise the top-of-the-range «aerospace» spindle, the FISCHER MFW 2310/24 VC HSKA63, with a maximum speed of 24,000 min^{-1} at 70 kW (S1 100%), knew how to wow the crowds!

With regard to grinding, the main crowd-puller was the new FISCHER MFM 10120 HJND-60 (120,000 min^{-1}) with integrated inner cooling, a development of the UniDrive line of spindles.

Once again, through its presence at the 2003 EMO, FISCHER showed that time has not been standing still in the world of spindle manufacturing.

FISCHER's SmartVision intelligent data evaluation system was one of the must-see highlights of Milan.

Highlights in light-duty machining

The high speeds of machine tool spindles mean enhanced machine efficiency. FISCHER AG in Herzogenbuchsee, Switzerland, has, with its FEZP product line of high-speed spindles, come up with a winner for light-duty machining. Combining the latest bearing technology with constant further development guarantees accuracy in manufacturing and economy in use.

In light-duty machining, high speeds contribute considerably to the economic efficiency of manufacturing individual components. The higher the spindle's speed, the higher the volume of chips produced, and the shorter the processing time.

Because high speeds also reduce the stress resultants, the tool's service life is improved. As a specialist in the field of high-speed spindles, FISCHER AG has a wide range of such spindles for a whole variety of flawless, light-duty machining of wood, plastics, glass, light metals and composite materials.

Spindles for lighter duties

The FEZP product line comprises a group of high-speed spindles with a variety of power profiles. Despite their high speeds, these spindles display excellent heat dispersion characteristics. This can be seen from the temperature values achieved during a performance test of an FEZP 170 high-speed spindle with an HSK-F63 tool interface, protective airflow sealing, 55 mm diameter bearing, with an output power of 22 kW (S1 100%), a torque of 19 Nm (S1 100%) and maximum speed of 27,000 min^{-1}. Temperatures in the various spindle bearings rise relatively rapidly, but settle down to a lower level after a short while. Even after soak testing at maximum speed for eight hours, bearing temperatures range between just 28.2°C to a maximum of 38.5°C.

Sealed bearings, lubricated for life

The use of lubricated-for-life bearings plays a significant role in the reaching of such low temperatures as these. Only now does the implementation of new materials and lubricants in these bearings make such low temperatures possible. It means that, given the same operational demands, the service life expectancy of these bearings is one to three times longer than conventional bearings. Additionally, the use of lubricated-for-life, sealed bearings simplifies exchanging the spindle's bearings, resulting in shorter maintenance times, and hence shorter machine downtimes. In a best-case scenario – where the bearing remains in use three times longer – maintenance costs can be lowered by almost two-thirds. Even if the sealed bearings last only twice as long as conventional ones, maintenance costs are still reduced by a quarter, which, in both scenarios, compensates for the higher purchase costs of these bearings, compared to conventional ones.

With precision spindles that are perfectly suited to light-duty machining FISCHER, here, too, remains the best choice.

As with all FISCHER AG product lines, FEZP spindles are constantly being enhanced.

SmartVision

for onscreen spindle data

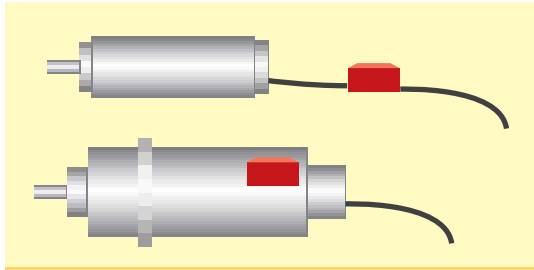
The «holy grail» of every machine operator and technician has now been neatly made a reality by FISCHER: SmartVision allows direct access to the inner workings of the high-performance spindle, instantly delivering precise data evaluation via a laptop.

As is generally known, the main spindle is the most stressed component of a modern machine tool. At the cutting edge, where the tool and cutting fluid come into direct contact with the material, the status of the spindle must not go unmonitored. SmartVision constantly monitors the spindle's core criteria, such as the:

- **speed range of the process**
- **output power**
- **number of tool changes**
- **bearing temperatures**

Access to data has many benefits

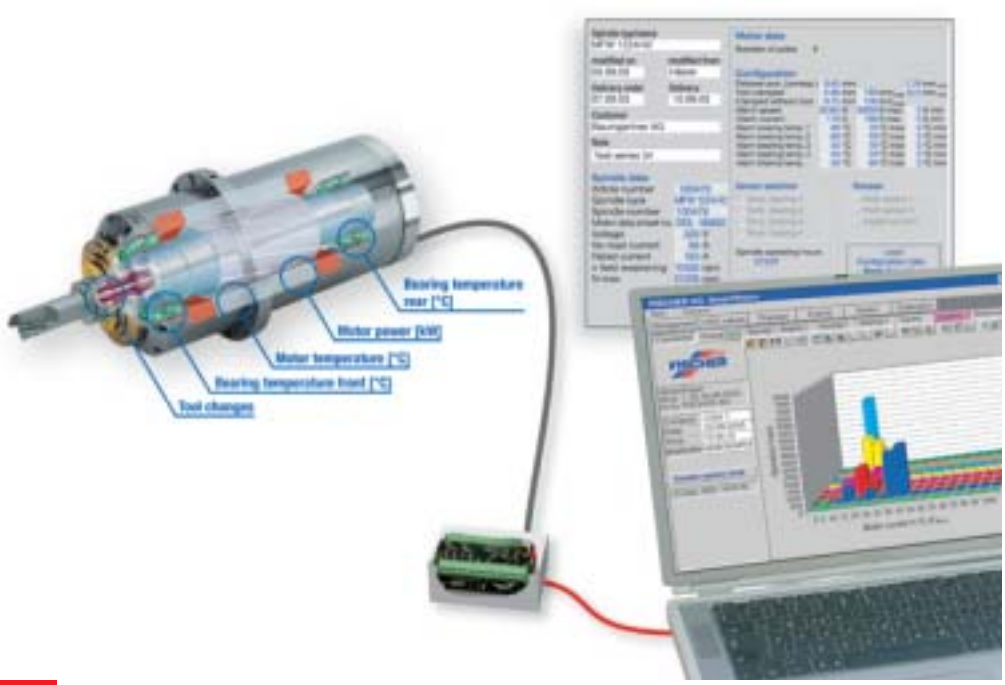
Modern machine tool workshops are plainly performance and benefit-oriented. With its access to areas that previously lay hidden, SmartVision provides unprecedented added value. The newly acquired data not only allows best use to be made of spindles' performance parameters, but also enables their service life to be accurately diagnosed, thus avoiding unexpected failures. SmartVision also takes on the role of a «black box» by recording and archiving the most relevant data during the manufacturing process. Care has been taken to display only the most useful functions, allowing, say, precise alarm threshold values to be entered for all the motor data. This is a feature that is guaranteed to protect the machine and its owner from unwelcome surprises!



Configuration of the SmartVision electronics.

Easy to use

SmartVision's software program can be installed on any PC computer running Windows 98 or later. The program comes in three languages (German, French and English) and is logically laid out. Use of an RS 232 interface for the laptop and an RS 485 interface at the machine allows any laptop to be connected for direct access to, and evaluation of, the spindle data. The system is very easy to use and requires no extra training.



Huge interest in this genuine innovation

The industry's need for this genuine innovation was clear for all to see at the Milan EMO. We are therefore planning to equip most off-the-shelf FISCHER precision spindles with SmartVision in the near future. Existing spindles can be partly converted to SmartVision during a spindle overhaul.

Contact us now for the latest documentation.

Combitec AG Biel – internal circular grinding machines and more

Combitec AG, based in Biel/Bienne, Switzerland, has been manufacturing internal circular grinding and other top-quality machines and components for over twenty years. The firm attributes its continuing growth to its highly developed innovation capabilities, and the targeted development of its product range. This strategy has permitted Combitec to consolidate its market position over the past number of years.

The CT-250 comes fitted with up to three FISCHER MFZ 860 internal grinding spindles as standard.

Since launching its CT-400 and CT-700 internal circular grinding machines over ten years ago, Combitec has continued a step-by-step development of the internal circular grinding sector. The current top of the range is the CT-960 CNC internal circular grinding machine, available with a Computer Numeric Controlled B-axis and 4-way high-precision revolver for radial and conical grinding. For company also makes the CT-250 for the manufacture of small components.

At the heart of the machines: FISCHER spindles

Users have long been waiting for a machine that can provide accurate and cost-effective grinding of small components, and Combitec is entitled to the success it is enjoying with the CT-250. As is the case with the CT-450, the CT-250 comes fitted with FISCHER spindles as standard. The CT-250 uses the MFZ 860 and the CT-450 uses the entire MFM 12 line of products. On the subject of the CT-450 with MFM 12 spindles, Combitec's customers value the fact that they are able to cover a broad range of spindle speeds and power levels with a small number of spindle types. These days Combitec's product range provides a broad choice of proven and trend-setting internal circular grinding machines at all power ratings.

Based in Biel, the company employs some thirty staff, and provides all manner of solutions under one roof.

Wide-ranging, one-stop expertise

With its thirty staff, the company provides all-round customer service, from the development to the realisation of a project. All the services provided by Combitec, such as CAD construction, mechanical manufacturing islands, electronics, software, training and field service, are integrated in-house.

Combitec's wide-ranging expertise is also reflected in its comprehensive range of products, which includes the familiar linear components from the «Combiline», clamps, cross tables and lots more besides, as well as the internal circular grinding machines and CNC circular finishing machines.

For more information on Combitec AG visit **www.combitec.ch**

The CT-450 comes fitted with two FISCHER MFM 1242/60 and MFM 1290/90 internal grinding spindles as standard.

Barbeque party at FISCHER AG

The date for the barbeque party 2003 was set for 29th August. For the whole of that week we followed the weather forecasts with some trepidation.

Unfortunately for us, the forecast for Friday was not looking too good; that said, we were ready for whatever the weather was going to throw at us, so we weren't too fussed. The proceedings kicked off at 5 pm, with the first members of staff arriving for an after-work beer, wine or other form of refreshment at the little café-style tables that had been arranged in the car park.

Lively international participation

A good number of colleagues from our subsidiaries in France and Germany also came to the party, something that we were extremely pleased about. Even the board of directors wasn't about to miss out on this well-attended event. CEO Chris Rennhard greeted all those present, gave a short talk on how the business was going and thanked the organising committee.

After his address, it was time to eat. The catering was provided by Fankhauser, butchers from Wangen an der Aare, who had prepared an elaborate buffet of salads and various meat specialities. This year's kebab stand was once again a huge success. The sun had blessed us with its presence during the first part of the proceedings, but dark rain clouds gradually blocked it out and we felt a few drops of rain. This did not have much of an effect on the supper as we were sitting under cover.

The DJs were in the house!

The evening was loosened up, musically speaking, by our DJs Markus Baumgartner and Alejandro Cantero. A variety of games had been laid on, which contributed to the enjoyment of the evening and the convivial atmosphere. Staff young and old met at the table-tennis table or for a game of table football.

People chatted about work, and this and that.

In between, we were spoiled with a vast sweet buffet, for which we wish to thank the busy cooks: it was extraordinarily difficult to choose between the many different treats. But after a few games of table-tennis we were able to go back and try some more!

The unforgettable barbeque party ended at midnight, and is sure to remain a pleasant memory for a long time to come.

A big thanks to everyone who had a hand in organising and running the party!

The sales team enjoying a spot of wit and repartee.

The FISCHER Fortuna team were at the party, and immediately felt at home amongst us.

HSC spindles

put through their paces

All spindles developed by FISCHER AG in Herzogenbuchsee are continually subjected to thorough testing while they are being built. The procedures that are required to do this are conducted on a dynamic test bench that was developed in-house by FISCHER. Every spindle prototype is tested during its development stage for as long as it takes for it to fully come up to the specifications that have been determined for that type of spindle. Only then does a spindle go into production.

The testing of prototypes for the constructive optimisation of spindles that have just been designed forms as much part of a spindle's performance guarantee as the careful testing of a spindle after it has been manufactured and before it leaves the factory. FISCHER AG's dynamic test bench for checking spindle performance is the only one of its kind in the world, and took an immense amount of effort, man-hours and investment to set up.

Essential for testing spindle types

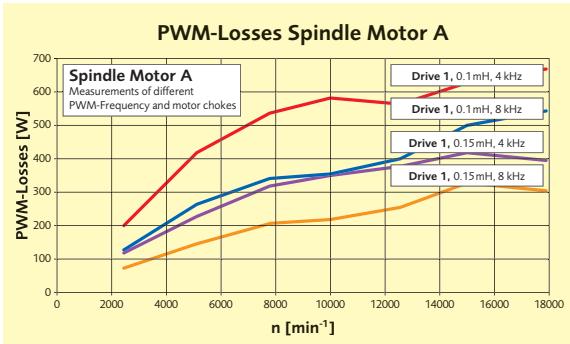
The test bench provides an invaluable service, especially in the reengineering that's involved in testing types of spindles in accordance with the ISO 230-7 norm that comes into force this year. This involves an evaluation of thermal and geometric factors, oscillations, vibrations and, of course, the functions themselves. The functions comprise the flow rates, consumption, noise levels, as well as specific characteristics that depend on criteria determined by the use to which the spindle is put: these are the changes of tool, power output, thermal stability and accuracy. These parameters are variously assessed according to the sphere of application (automotive and aerospace industries, tool and mould construction, medical technology), though they all remain equally important to FISCHER AG. Testing procedures are developed according to the job in hand. A spindle goes into construction only when its prototype – evaluated on the test bench – fully meets the specifications that have been determined for that type of spindle, i.e. when its construction has been optimised as far as is possible.

Revealing: the dynamic test bench performance

Shaft power is an important criterion when choosing a spindle. The power at the shaft of a milling spindle depends, however, on a number of factors. It is hugely affected by the individual components of the machine being used, namely, the spindle motor, the motor's cooling system, the frequency converter, converter parameterisation and, in every case, the chokes in use. When the test bench was being developed, care was taken to ensure that all these factors could be simulated, in order to be able to determine a spindle's actual performance.

The test bench is able to test at low and high speeds. Speeds up to 75,000 min^{-1}, power levels up to 150 kW (S1 100%), and torques up to 500 Nm (S1 100%) can be evaluated directly at the shaft. A brake, front-coupled directly to the shaft, is used for testing the actual spindle power. The test bench is also suited to test High Speed Cutting (HSC) spindles.

A battery of computers and measuring devices processes the data obtained on the dynamic test bench.



The graph shows how additional losses relate to speed in a series of tests at different PWM frequencies and chokes.

The test bench is also used to check all the components, from the spindle motor to the cooling system. FISCHER's renowned quality proves that this investment really pays off.

An experienced team of experts conducts the tests, following a precisely defined set of procedures.

FISCHER's hallmark: the «golden spindle nose»

Viewed as a whole, a FISCHER precision spindle – an ingenious masterpiece – can be an object of particular fascination. One's attention is immediately drawn to the trademark golden end ring.

For efficient inner grinding the compact MFM 10120 HJNDK-60 spindle from the UniDrive product line instantly accelerates to 120,000 min^{-1}, and the immensely strong MFW 2612/18 VC HSK-A100 rated at 100 kW (S1 100%) delivers effortless power over long periods. All this occurs, almost invisibly, in the heart of renowned machine tools. The only outward sign of the spindle's presence in the machine is this core component's golden «nose».

Functional design of the spindle nose

All of FISCHER's spindles have been equipped with a specially coated end ring for many years. Not only does it look elegant, but it also fulfils an important function. During abrasive machining processes, chips from all kinds of materials are thrown up against the spindle nose. They hit the FISCHER-designed end ring, which efficiently and durably protects the end of the spindle.

Others readily copy anyone with a nose for clever solutions. It happens all the time – but it is generally recognised that such copies are poor imitations of the original. FISCHER's many years of expertise are reflected in the entire spectrum of its spindle manufacture; from the product, all the way to a complete international service network. That's why every FISCHER spindle has a right to the FISCHER logo and the «golden nose»!

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Measuring a spindle casing on a precision measuring apparatus

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