Edition 1/08

world of tools

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HORN'S CUSTOMER MAGAZINE

This months subject:

WIND POWER ON THE UPSWING

- Generator shafts for power station systems
- High efficiency due to thread milling by circular interpolation
- DIHAWAG – with Swiss determination at the front
- Training and advanced training at HORN

Dear Readers,

Machining of very small components – an activity where the magnifying glass is an indispensable aid – was a central theme of our last customer magazine. In this issue, we deal with the other extreme, that of machining large parts. Using the example of a gear box casing for wind turbines, we describe an application which could not be achieved efficiently until our tooling was adopted.

For both small and large part machining, standard products were the starting point for the customer solution. However it was the expertise of our employees that provided the task-oriented solution and finally achieved the required results.

As we will be more and more involved in tasks of this kind in the future – as well as "standard requirements" – we have set our course in the direction of increased capacity. Our new building – it provides an additional production area of 5,500 m^2 – should also ensure speedy delivery of high quality products.
But even the best equipped and organised production facility is less effective without skilled and motivated employees. Therefore, we pay particular attention to training and advanced training. You can find more information about this in the "About us" section.

I hope this information helps to further reinforce your confidence in the capabilities of our company.

Lothar Horn
Managing Director,
Hartmetall-Werkzeugfabrik Paul Horn GmbH,
Tübingen

world of tools HORN'S CUSTOMER MAGAZINE

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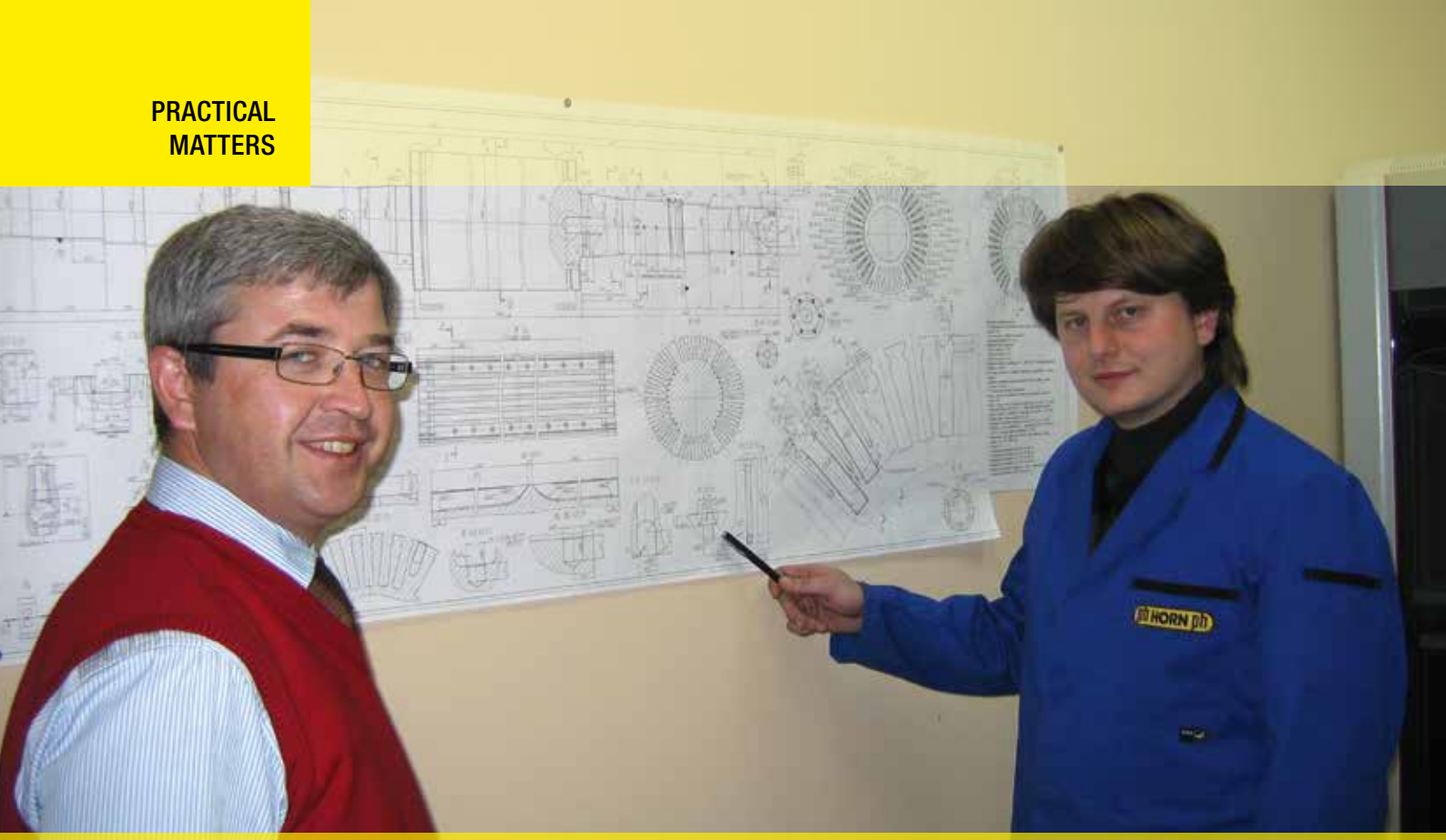


ENERGY FROM THE URALS

Andrey Mikhin, Managing Director, and Alexey Sataev, Technical Director (from the left) of our Russian sales partner Intercos Tooling developed the strategy for milling the slots in generator shafts.

Side milling cutter Type 383 mills generator shafts

The Russian company, Privod, has modernised the machining of generator shafts for power stations. Horn side milling cutters are playing a decisive role in this.

"Privod" means "drive" in the English language. The product range of this company, which has 2,000 employees, can be aptly described with this term indicating movement. It embraces generators for power stations with outputs up to 160 Megawatts, electric motors for locomotives and pumps for natural gas transport through pipelines – a manufacturing segment where Privod has achieved a world wide market share of 96 per cent.

One of the two Type 383 side milling cutters used at the Privod company.

Like many companies of the former USSR which manufactured products directly or indirectly for the armaments industry, Privod was strategically established during the postwar period in the middle of the Urals in Lyswa. The city with just under 70,000 inhabitants is in the Perm region on the Lyswa river, part of the Volga river system, approximately 1,800 km East of Moscow.

Open markets influence production processes

Currently there are some technical production changes being made at Privod. A recent project involving HORN concerns manufacture of generator shafts made of 36CrNiMo4. Until recently, these large parts were machined with carbide-tipped milling cutters, mainly for regrinding reasons. This approach was dictated by historical problems associated with obtaining replacement parts which forced many companies in the

former Eastern Bloc to operate as self-sufficiently as possible. Today, these consequences of the planned economy have largely been eliminated and companies like Privod can use modern technologies and products available in the global market, for example milling tools with indexable inserts.

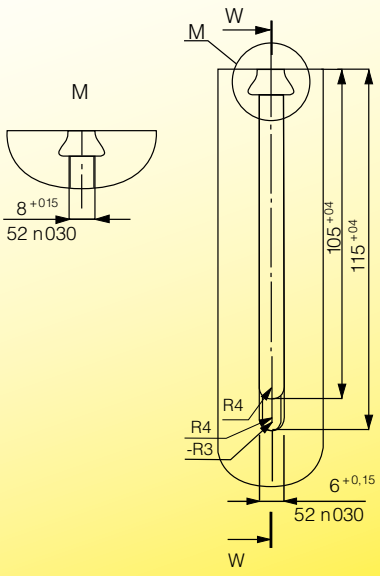
Thus, we received an enquiry via our Russian sales partner, Intercos Tooling in St. Petersburg, regarding machining of straight slots on the circumference of a generator shaft. A Köllmann horizontal milling machine is used for this process. There are 52 longitudinal slots, each 1500 mm long and 115 mm deep, to be milled in a shaft with an outer diameter of 820 mm. The process begins with milling of an 8 mm wide slot to a depth of 105 mm. This is followed by milling a 6 mm wide slot of 10 mm additional depth to achieve final depth. The 6 mm slot is produced with a full radius cutter. Dimensional tolerance on the milled slots is +0.15 mm to enable press fitting of copper wires as part of the subsequent assembly process. A Köllmann horizontal milling machine is used for this process.

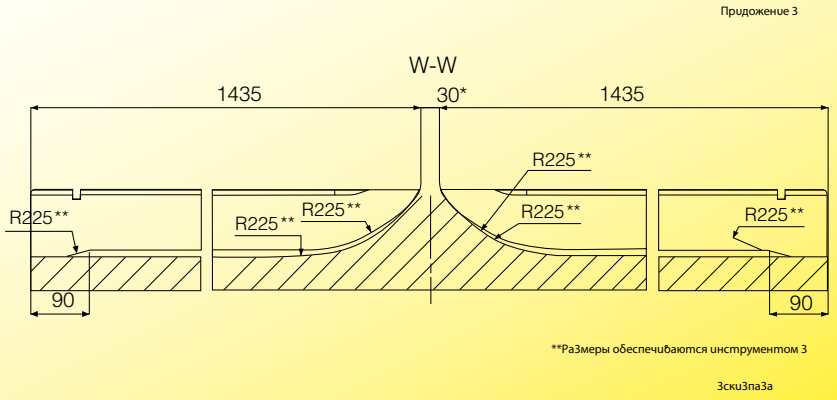
Special tools for generator shafts

We recommended our side milling cutters, Types 383.0450.0148 and 383.0450.0149 for this task. Cutting edge diameter is 450 mm and there are 44 teeth. These tools have axial run-out and concentricity tolerance of 0.05 mm. The tooling needed to be able to cope with difficult machining conditions. These included a problem with adequate supply of cooling lubricants. As this problem could not be resolved satisfactorily, cutting inserts with the heat-resistant coating AS65 were selected and thus the cooling lubricant was dispensed with. A further problem was that the conventional milling method initially selected led to thermal problems due to a high proportion of chippings remaining in the horizontal slots after machining. Using the climb milling technique provided a remedy whilst the technical chip forming drawbacks accompanying this change were outweighed by improved chip evacuation. As the milling cutter "shovelled" the chips out of the slot, no chip residues were left behind so heat dissipation was clearly improved. With a cutting speed of 90 m/min and a feed rate of 120 mm/rev, the milling cutters achieve total cutting distance of 80 metres – sufficient for complete machining of one shaft. As well as the surprisingly high travel distances, the plant manager, Toporov, was mainly impressed by the reliable process working method and the quiet cutting process based on the positive cutting geometry. Apart from the simple and easy replacement of the indexable inserts and the reliable service of our Intercos sales partner in the after-sales area which resulted in further plus points, the satisfaction of the Privod company with our products and services means we can anticipate further, successful collaboration.

Thanks to the high service life of the milling cutters, a generator shaft with 52 slots can be finish machined.

Pictures below:
The slot is milled in two steps with two tools using up-cut milling.





WIND POWER ON THE UPSWING

Our thread milling cutters make working without reclamping possible for making threads in different sized shafts.

Thread milling of gear box components for offshore systems

In Europe, harnessing the wind as the energy source for windmills was already established in the 12th century. In modern times, wind power is experiencing a renaissance as politicians force the use of environmentally friendly methods for electricity generation.

Market leader for offshore wind turbines

Wind power generation today is mainly onshore, i.e. on the mainland. In the long term, the offshore market will certainly develop more strongly. In this business, Winergy AG is today the world's leading supplier of gear units, generators and couplings for the drive systems of wind turbines. Flender AG machines the casings for the large gear units of Winergy AG in its works in Friedrichsfeld and Voerde. The Flender Group which belongs to Siemens has approx. 7,000 employees and has its headquarters in Bocholt.

The tools mounted in an hydraulic expansion chuck mill threads from M34 mm with pitches up to 6 mm and lengths up to 150 mm.

Different gear unit parts, different chipping tasks

Gear wheels with tip diameters of 1,200 mm are not unusual sizes for the various gear units. The associated shafts are machined on a Type M 100 WFL lathe. Its drive power is sufficient to machine features including the face side fixing holes and the centre hole for a M42 x 4.5 mm thread. Making the eccentric flange holes, however, proved problematic. As the power of the pivoted tools was marginally sufficient in continuous operation for threads from M36 upwards, the drilling and thread cutting operations were very time consuming and thus cost-intensive. Michael Garcia from the Tool Technology department therefore looked for a more efficient solution.

Shorter overall time or complete machining without reclamping?

Thomas Berger, of Horn's technical support and sales department, identified a suitable solution for what is a rather untypical application of our tools due to the dimensions involved. He recommended the 6-cutter inserts Type 628 with the shank SM 328. Both he and Michael Garcia were aware that no time would be saved by changing over from cutting with a tap/drill to thread milling. The key benefits were that the thread could now be made on one machine without reclamping and without needing to invest in a new and more powerful machine.

Milling with new strategy

Another successful application is thread milling by circular interpolation of a M42 x 4.5 mm thread on a Pittler PV1000 machining centre. The component is a spur gear made of 18CrNiMo. The milling cutter plunges into the core hole at high speed and then mills the 90 mm long thread by down-cutting at a speed n = 1,800 rpm and a feed rate of f = 0.65 mm/rev. The 110 second cycle plays a subordinate role for the performance assessment, as no thread could be milled on the old machines. The Horn tool saves the reclamping and thus makes complete machining on one machine possible.

Thread depths of 100 mm and more are not uncommon on the different shafts. Consequently the projection length of milling cutter and shaft quickly exceeds 150 mm with an increasing tendency for vibration. Hans-Jörg Unland, a colleague of Michael Garcia, also experienced this with the initial milling attempts with a Weldon shank. Conversion to a hydraulic expansion chuck provided a remedy. It guarantees the required stability and significantly quieter work operation.

Handling benefits prevail

After the positive results confirmed with other thread dimensions, Michael Garcia saw HORN as the preferred partner for machining these large parts. He summarised the project as "The results to date can be built on" and this was followed by additional projects. As well as improved productivity, conversion to thread milling means that cutting grease can be replaced by a 4 % grease emulsion, improving the local environment. Accurate, repeatable blind thread milling provides further simplifications and it has become possible to remove l by blowing out. And as the milling cutters are based on standard inserts, rapid replacement is possible and costs are reasonable. Use of the 628 milling cutter for both M42 and M48 threads also contributes to this positive costs structure. The smaller milling cutter Type 613 is used for the M36 thread. Space saved in the tool storage of the machine due to the wide application ranges of both tools can be occupied by other tools, an important requirement for single set-up machining of complex parts.

Michael Garcia (Flender), Thomas Berger (HORN) and Hans-Jörg Unland (Flender) (from left to right) are jointly looking for ways to rationalise the thread manufacture for the large parts. M42 x 4.5 mm threads must be milled in the flange side of the shaft blanks.

**Picture left:
Parts for a wind turbine gear unit.**

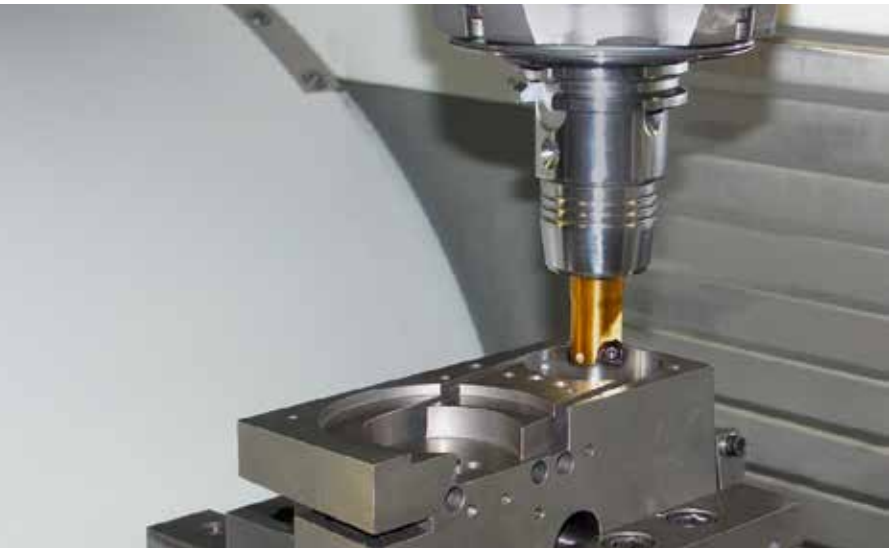
ONE FOR ALL

The coated round shanks and industry standard threaded connection of the DA system are available with cutting edge diameters of 16 to 32 mm.

Performance boost due to 3-cutter milling system DA

Milling is the dominant method in mould making. In order to keep machining times and costs down, tools are needed which are designed for multiple machining tasks. Examples of this universality are our DM and DS solid carbide systems for diameters up to 16 mm. However, large material removal rates for roughing and finishing require milling cutters with larger diameters – dimensions like those which the DA system now provides with cutting edge diameters of 16 to 32 mm.

DA system during milling of a bearing case.



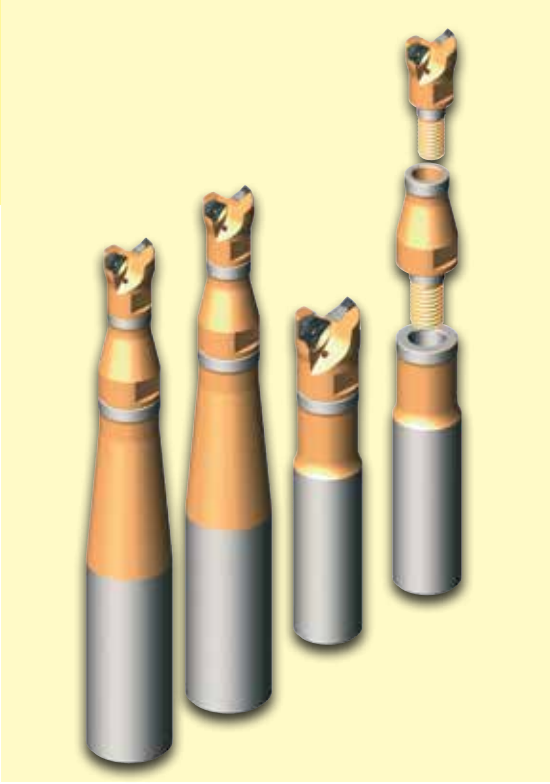
High efficiency due to 3-cutter insert

A striking feature of the DA system is the indexable insert with three cutting edges. The axial and radial cutting of the insert, which is available in two sizes, produces an exact 90°-shoulder. Five corner radii of 0 to 1.0 mm for the large insert and three corner radii of 0 to 0.4 mm for the small insert provide sufficient adjustment options for production tasks such as face, corner, slot, pocket and plunge milling and pre-drilling in steels, non-ferrous metals and plastics.

Depending on the material and cutting depth, feed rates up to 0.4 mm can be selected for steel. Depending on the insert size, contact widths up to 3 mm or 4.5 mm are possible for plunge milling. Vertical plunging up to 1 mm is also possible depending on the diameter.

Custom-made indexable inserts

Our philosophy of the optimum combination of geometry, carbide and coating has been implemented for development of the DA indexable inserts. The simple looking indexable insert incorporates a number of technical refinements. The eccentric curved cut



Picture left:
Due to the combination of shank shaft, reducer and milling head, appropriate tools for the task can be compiled economically.

adapted to the radial side is common for all inserts. It guarantees maximum possible cutting stability for every diameter. Simultaneously, the axial side wiper geometry ensures a best possible surface. Due to the different chipping angles for the radial and axial machining, the insert is well adapted for the respective machining.

The size 1 is designed for cutting depths up to 3 mm. Due to the small insert size, the 32 mm diameter cutter body can be equipped with up to five inserts. Thanks to the higher number of indexable inserts, the reduced process parameters due to the lower stability as compared with the insert size 2 can be compensated for. This enables cutting depths up to 4.8 mm. Its higher stability makes the size 2 suitable not only for difficult to machine materials but also for higher cutting parameters as compared with the smaller insert.

Both insert sizes are available in two carbide grades. Grade TA45 is recommended for general metalworking. The very sharp insert is ideal for free cutting materials and for machining non-ferrous metals. The SA4B grade is particularly suitable for medium and difficult chipping tasks and achieves clearly higher machining lengths for the same cutting parameters.

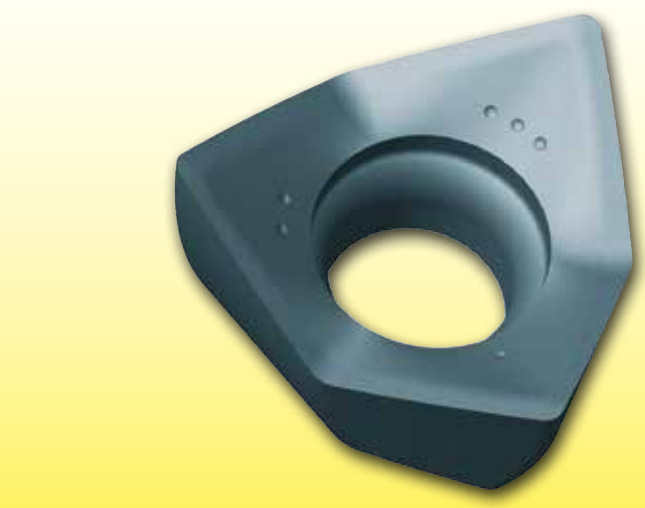
Coated base carriers provide benefits

All holders and supports of the DA Type series are coated with hard material. The coating strategy developed in many series of tests protects against corrosion and wear. The hard layer also reduces the wear in the insert seat and thus increases the tool life of the product. There are seven basic holders with Weldon shank and seven screw-in milling cutters available, depending on insert size and cutting edge diameter. Numerous holders and reducers are available for the screw-in milling cutters so that a solution can be achieved for every machining task. There are also various main bodies with shortened head and cylindrical shank with diameters 16 and 20 mm for mounting driven tools in the turret of CNC mill-turning centres. These holders are exclusively designed for the insert size 1 due to the low chipping forces to be maintained. With low feeds, high stock removal rates can still be achieved due to the higher number of inserts.

Proven in practice

As well as tool and mould making, application areas of the DA system include general mechanical engineering, medical technology and the aviation and aerospace industry. The efficiency of the system resulted from the three usable cutters and the highly positive geometries in combination with the wiper and curved cut on the free areas. The system has been patented on account of these outstanding features. With the DA tool system, together with the DM and DS systems, we can now provide tools for diameters from 0.2 to 32 mm. Due to the many possible applications of the DA milling cutters, the claim of being able to complete numerous machining operations with one milling cutter can be justified. – Even “One for all!”

Three cutting edges, highly positive indexable insert for the DA system.



SELF-SUFFICIENT EVEN FOR CARBIDES

Our quality guarantee: Carbides from our own production

Manufacture of a tool only achieves optimum results if we can control the complete process chain, We develop and manufacture our own carbides at HORN Hartstoffe GmbH for this reason.

Our company founder, Paul Horn, practised this philosophy when he planned a carbide production facility with process technology matched to HORN's requirements. He realised his idea in 1992 with the founding of HORN Hartstoffe GmbH. The wholly-owned subsidiary of Hartmetall-Werkzeugfabrik Paul Horn GmbH is approximately 10 minutes walk from the main factory, has 42 employees and produces exclusively for the requirements of our tool factory.

The structure of the carbide blanks is assessed using a microscope during the final inspection. Jürgen Mauz, Quality Assurance Manager and Heinrich Kleine, Plant Manager (from left) are involved.

Plant manager Heinrich Kleine is responsible for the production of the carbides from the preparation of the metal powder to the shaping and the sintering to the final inspection. The toolmaker master craftsman employed at HORN for 18 years was selected by Paul Horn to intensively involve himself with the process technology for the manufacture of carbides in order to be able to take over responsibility in the planned company.

It's all in the mix

Carbide manufacturing begins with the preparation of the powder form carbide alloys into mixtures which can be pressed. The starting material in powder form with grain sizes of 0.6 to 3.5 µm is mixed in batches with a batch weight of approx. 1,200 kg. This batch size guarantees high uniformity in the powder composition – an essential requirement for high quality carbides. There is already a lot of expertise in this phase of the

carbide production. Maximum precision is required during the weighing and dosing of important pressing aids and additives for the later shaping as differences can severely change the final product.

Shaping using extruders

The mixture can now be pressed into pre-forms whose shapes correspond to the later tools in piston extruders. The cutting tools of the Supermini range are produced in this way. The pre-forms or pressings are very porous and brittle and cannot be machined; therefore they are pre-sintered in pre-sintering furnaces. During heating, the pressing aids are “sweated out” of the carbide pre-forms so that mechanical machining on CNC machines is possible afterwards. After this, our specialists bring the carbide semi-finished products into the shape which the customer needs using diamond and PCD (polycrystalline diamond) tools. The more precisely this is done the less effort is needed for the finish grinding and coating. Often, only a few tenths of a millimetre have to be ground off to achieve the required tolerance or surface quality.

Shaping by injection moulding

Our two cutting edges tools are formed by injection moulding. As a high number of degrees of freedom can be realised with this technology, complex geometries with undercuts and reliefs can be made relatively easily. High precision injection moulding tools are of course required which are made by our six mould making specialists. We were the first tool manufacturer in the world to reliably produce our indexable inserts using injection moulding processes.

Up to 30,000 carbide blanks per batch are pre-sintered in the pre-sintering furnace.

New injection moulding machines with automated workpiece handling are being used at HORN Hartstoffe GmbH. The automation equipment specially designed for this application was developed by ourselves. The experience gained during the design and use were in turn beneficial for the operating equipment construction for the automation of various types of machines in the main factory.

Sintering ensures the final strength

The complete moulded pre-form is now almost complete but it still has to achieve its final strength. This is done using sintering, a time and temperature controlled heat treatment. The sintering temperature dependent on the carbide quality of the pressed or injection moulded parts for the final sintering is between 1,300 °C and 1,500 °C. Final sintering, the actual compression sintering. is performed in a vacuum in the sintering HIP (hot isostatic pressing) furnace. Resultantly the volume of the greenstock part reduces by approx. 20 to 25 percent and a carbide with high strength and toughness is produced from the porous greenstock part. All the process data influencing the sintering process are determined from the characteristics of the greenstock parts and are defined under the batch number. They are displayed digitally on the furnace for continuous monitoring. Data and parameters crucial for quality are recorded and archived for the later final inspection. As high pressures and temperatures and flammable gases are used for sintering, our four sinter HIP furnaces have very high technical safety requirements.

Picture left:
The picture shows a tool of the Type 229 with two cutting edges after the shaping using injection moulding (bottom) and in the sintered condition (top). The volume reduction by approx. 20 to 25 percent during sintering can be clearly seen. The experience and expertise of our employees are crucial for matching the process chain with this shrinkage.

The carbide mixture is injected in a mould during injection moulding. After opening the mould, a gripper removes the blank and deposits it on a graphite plate.

Automatically operating measurement machines check each carbide insert for dimensional accuracy.

Permanent checks and in-process controls

Despite the modern process technology and the reliable methodology – as prerequisite for a high quality final product – each manufacturing step is monitored, checked and controlled. Material analyses, material tests and sintering process optimisation establish whether the chemical and physical properties of the different carbide grades are assured. Other parameters are the batch-dependent determination of physical measured values of the samples and microscopic porosity and structure examinations.

We check the dimension for the sintered carbide blanks in a 100 percent control to guarantee the product quality. The actual values determined for every individual carbide plate by measuring machines with fully automated measurement processes are then evaluated in the form of dimensions and test reports on a PC and archived. In addition, our employees are tasked to perform visual inspection; it is their responsibility to recognise damage, deformations and defect cracks and to reject them before further processing or despatch to the customer.

The manufacture of a sintered tool takes about seven days from placing the order to the finished product. As all orders come from Paul Horn GmbH, the material requirements planner there indirectly creates the production planning for Hartstoffe GmbH.

1 Entrance

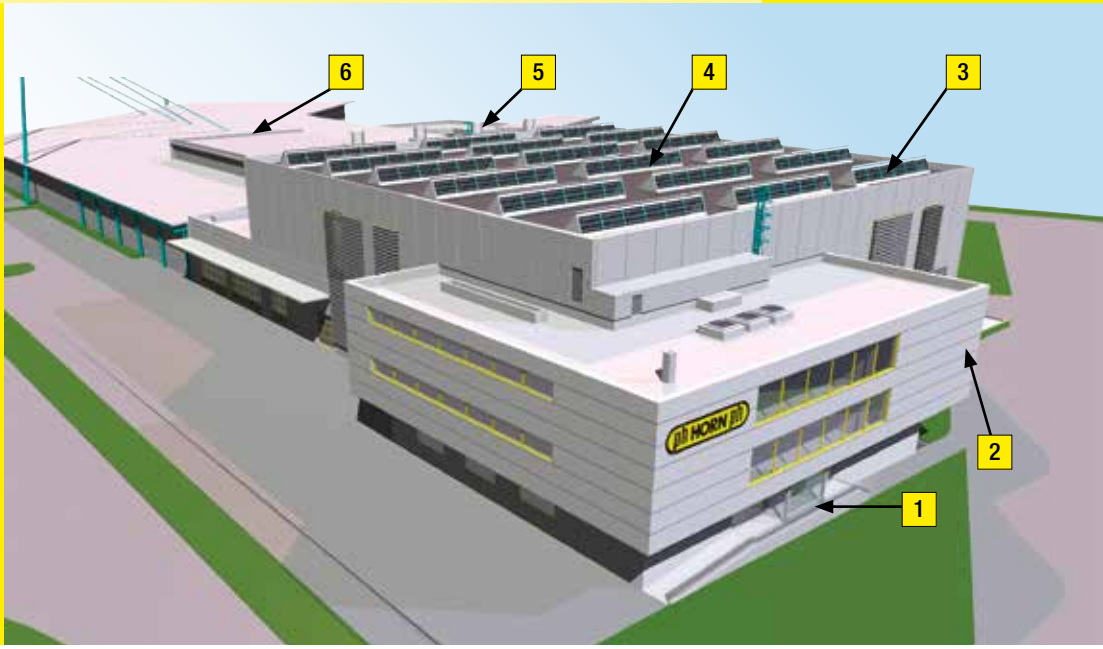
2 Offices and social rooms

3 Solar system for environmentally friendly energy generation

4 Production

5 Entrance „Unter dem Holz“

6 existing building



Model of our new building

New building shortly before completion

Step by step commissioning from April

The new production building at Tübingen is almost complete one year after the ground breaking ceremony. Two storeys with 5,500 m² of production area and 800 m² of social rooms and an underground car park with an area of 3,000 m² will soon be operational.

No interruption of the production process

Installation of new machines and relocation of existing production equipment in the new and/or old building must be done without interrupting the production process. Walter Wiedenhöfer and his team have developed a moving plan for the various departments to meet this requirement. The responsible “carrier” for the work – mainly planned for weekends – is our Maintenance Department which will be supported where needed – for example for the change from the old to the new building – by external companies. Two large gates on each storey will indeed make the machine transport easier; nevertheless some heavy and large volume units must move “over road and yard”.

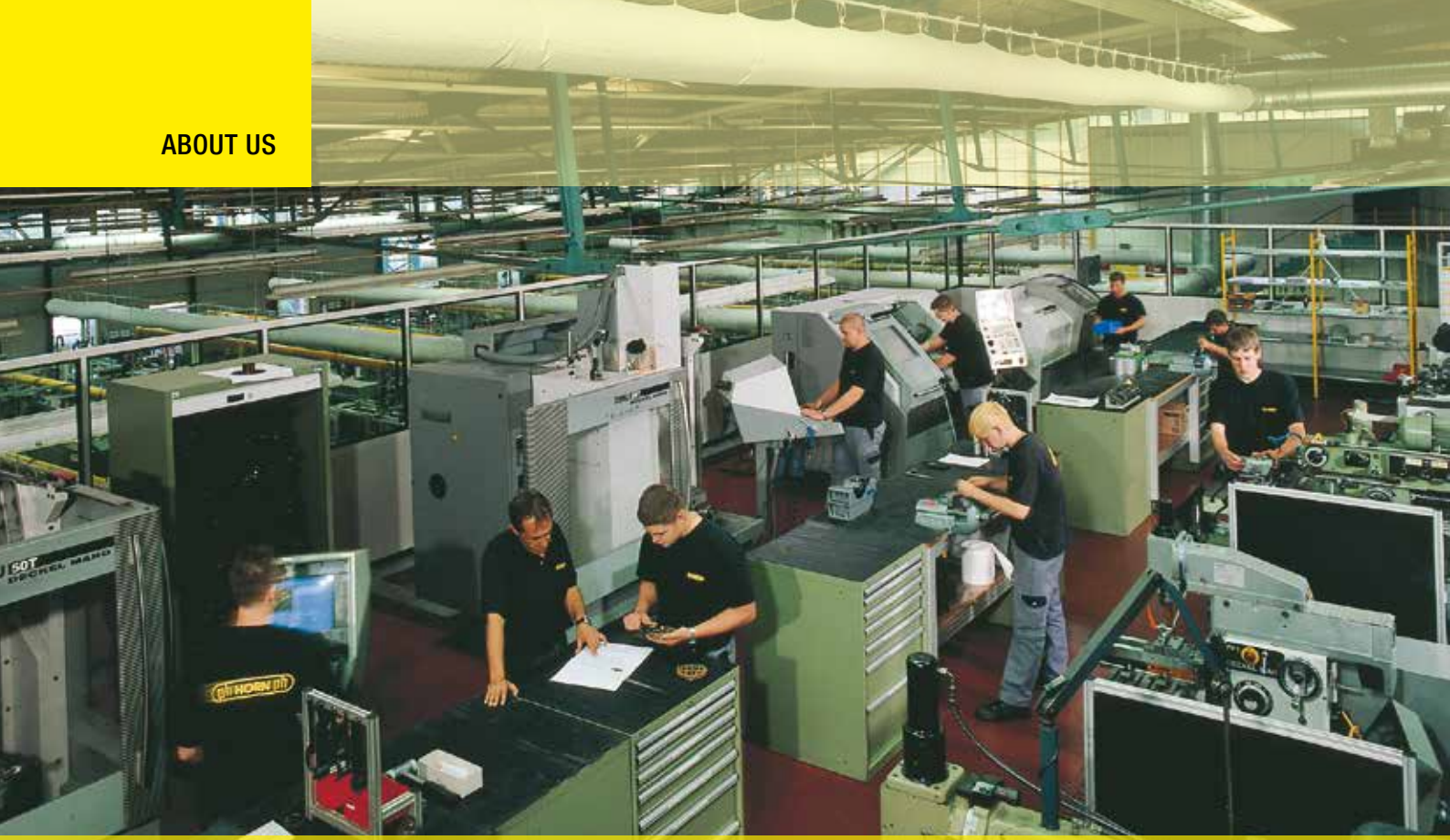
The different moving directions and priorities with or without building and floor change are carefully matched to each other with respect to dates and capacities. Thereby, departments will be completely or partially, permanently or temporarily moved to new locations in order to also create space for renovation work.

Optimised production flow, guaranteeing future capacities

Thanks to the area expansion, the production flow can be optimised without major interventions in the established processes. Benefits are mainly produced by improvements in the detail. For example, production materials, raw materials and equipment can now be stored in several space saving lift systems. “Space eating” storage areas are now a thing of the past.

The capacities of all departments are significantly increased by the new building. Examples include coating. The tool refining which is becoming more and more important for our in-house production will occupy almost double the area in the future. The grinding shop is also receiving different, completely new production lines. Total machine investments are 26 million Euros and the total cost of the new building is 14 million Euros. In exchange: doubling of the production area to date and 250 new jobs in the medium term.

On the way to completion: the new building in February 2008.



TRAINING AT HORN

The trainees have the opportunity to put what they have learned into practice on ultra modern machines.

Training and advanced training for beginners and professionals

Paul Horn GmbH is currently training 22 young persons as industrial mechanics, exclusively for its own requirements. When our new building is opened this will increase to 60 in four levels. In the general production area, approx. 100 employees per year receive technical training.

The word has got around in the Tübingen region and beyond that HORN provides outstanding training. Therefore, the number of applicants regularly exceeds our capacities. One reason for this esteem is the work of our Training Department Manager, Patrick Wachendorfer. He has been employed by us for more than 20 years and has been responsible for training for eight years. His technical knowledge and experience are also very much in demand outside our company, for example in the testing committee of the IHK and other bodies. Among other things, he participates in the development of future training content.

Training Manager Patrick Wachendorfer (right) with a trainee.

On the way to skilled employee

One training focus is imparting basic knowledge about work processes including the applicable CNC technology. Specific CNC training is particularly important for later work in our company as more than 90 % of the machines inventory is composed of CNC machines. Therefore, the machine equipment in the training workshop is hardly any different from that in the production.

In order for the young people to be able to acquire general experience, they work in different departments of the company in one year to learn the complete business process. Foreign experience is also in the training plan. During a 4-week stay at Horn Cutting Tools Ltd, our subsidiary in England, they have the opportunity to experience the typical working day on site as well as the country and the people.

The 22 young professionals have well-founded knowledge after their training period.

Only the very best machines

Visitors to our training workshop often surprised by the up-to-date design of machines installed there. These are fully-fledged production machines which could also be used in production at any time. After completion of the new building, there will be more machines with a value of 1.8 million Euros. Thus, the training area has an inventory of 30 ultra modern machines.

Machines can be purchased but not specialists! Walter Wiedenhöfer, Production Manager, and Patrick Wachendorfer are planning the investments in "training" with a view to the benefit to be derived from this. One focus is carbide grinding as the knowledge gained here is very important for our grinding shop. Therefore, supplementing the official training plan, the young people receive a well-founded training from manual grinding to using CNC tool grinding machines.

All young people are taken on as permanent employees after the training. The learning time is shortened for many due to their performance so that they can enter the professional life after three years or can embark on individual paths for advanced training and education.

Skilled employees in the classroom

The technical knowledge must also be constantly refreshed and adapted to the state of the art for "seasoned" employees. This is done with internal training managed by Hans-Jürgen Füger. The production technician has been employed by us for more than 20 years and has been responsible for four years for theoretical and practical training for the subjects of operational safety, cooling lubricant materials, measurement, quality assurance, grinding and others. The training is carried out at the machine in different sized groups or individually.

Training about the subject of grinding and the associated surroundings is also the focus of the professional training here. This production area which is the most important for us should reflect the latest state of technology not only by the machine equipment but mainly by the expertise of our employees and thus assure our technology head start.

The need for training is constantly increasing due to the rapid development of the technology and our high requirements. A reaction to this is the increase in the training areas for the training of young people which are also best suited for Hans-Jürgen Füger and his objectives due to their equipment and presentation technologies. As trained specialists for our requirements do not exist, we must react. On the one hand we can only ensure the succession and on the other hand the expertise of our skilled employees by using our own initiative and investments in the training of young people and further training of adults.

Hans-Jürgen Füger is responsible for the theoretical and practical training.

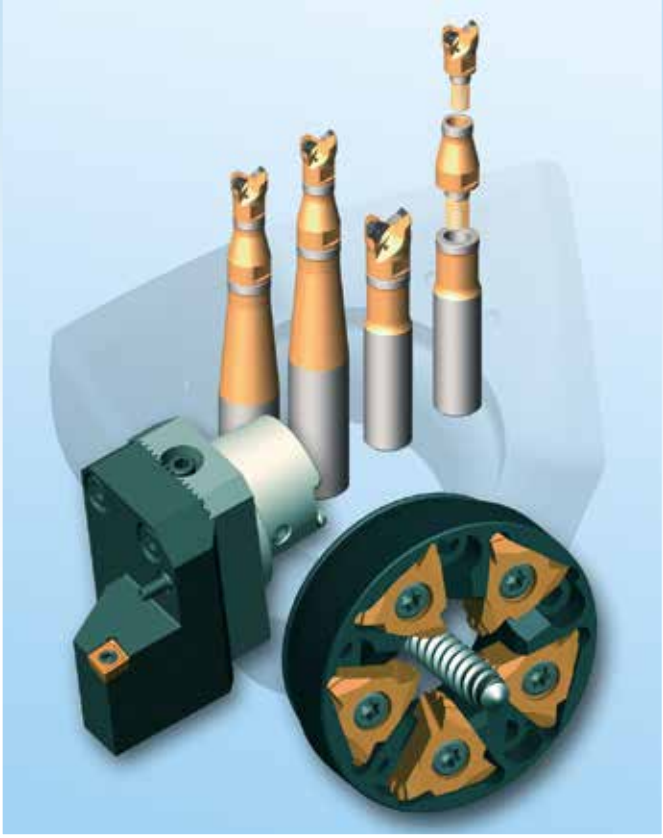
Review

EMO 2007, 17-22 September 2007: Top grades for exhibitors and visitors

More exhibitors, more visitors, more international interest – and all this for an exhibition duration shortened by two days! This is how the general organiser of the EMO assessed the world metalworking exhibition.

Lothar Horn confirms this positive view in his summary: “We have had very interesting conversations and made numerous new, very promising contacts. Our stand was very active even on the first day. Live machining on the three demonstration machines attracted the technically interested public and the parts produced there were very much in demand”.

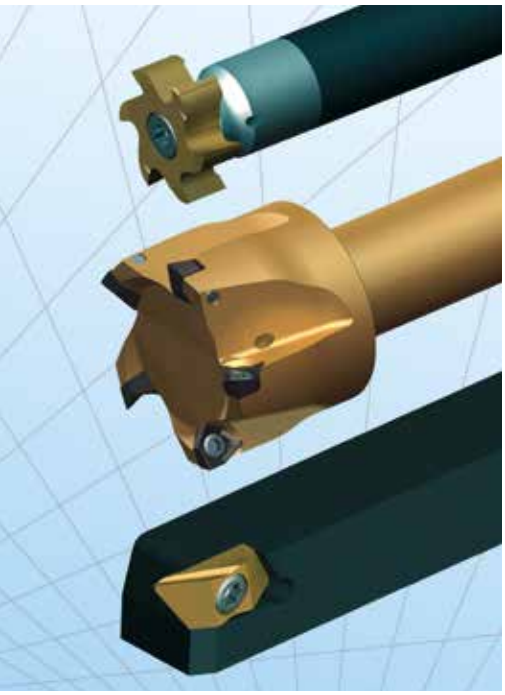
Our innovations and further developments such as milling cutters from the DA and DS series, the EWS Slot broaching attachment, the M139 slotting cutter, the Kennametal KM16 Micro system, the A135 indexable inserts with toolholder 357, the full radius insert



S229 geometry K and the thread spinning machine M302 provided ample material for discussion. Our employees could not complain about lack of interest by visitors and could also present HORN as one of the technology leaders at Hannover.

Review

METAV, 31 March to 04 April 2008, Düsseldorf



We exhibited the following innovations and new developments.

Slot milling cutter M139 for aluminium. Fitted with 10 carbide inserts with special geometry for aluminium machining. Cutting edge diameter 100 mm, milling depth up to 25 mm. Inserts with the extremely narrow cutting widths of 1.4/1.5 and 1.6 mm can be clamped in the same main body.

The new high-performance grades AS62 and AS66 for steel and cast iron machining. They provide a further increased efficiency and can also be used for dry machining.

Grooving and parting on Swiss type machines. Up to 6 mm groove depth in one cut with toolholder H274 and insert S274. Shank versions: square, 10 x 10 to 16 x 16 mm, Kennametal KM 16 Micro system, Graf system.

45° chamfer with DA milling system. Modified main body and shanks enable the milling of 45° chamfers when using standard DA inserts.

Milling tools for driven tools on lathes. Short, compact design, throat depth up to 40 mm, shank diameters 12/16/20 mm. Geometries for steel and non-ferrous materials:
Thread and T-slot milling with system M311/ M313/ M328 up to cutting edge diameter 27.7 mm. 6 cutting edges indexable insert with PL geometry.
Five milling shanks DA system with three indexable inserts for cutting edge diameters 20/25/32 mm.

Sporting commitment for the region

Sponsoring makes planning school and popular sports possible

“As a company, we feel that it is our social responsibility to contribute to the positive development of our town”. Lothar Horn underlines this corporate responsibility with a donation to the town of Tübingen and thus continues the social commitment of his father.

Lack of facilities for young people is an important area that attracts a lot of discussion. However, when it comes to actually doing something, the level of active involvement is small. One of these is HORN with its donation for the modernisation of the urban SV 03 stadium. As well as sportsmen, more than 3,000 school students who receive their sporting lessons there find outstanding conditions in the future Paul-Horn-Bahn. The venue is classed as a type B stadium, suitable for regional championships and international contests. The Paul Horn-Arena is another beneficial contribution to the promotion of popular sports. In the future, the company will cover the operating costs of this sports arena for school sport and for other sporting events.

The Olympic champion, Dieter Baumann, raised a proud sum for promoting upcoming runners and the upgrading of the stadium during his first marathon run.

Students and associations are getting involved

Contributions from students and associations towards modernisation of the SV 03 stadium are striking. In one event five Eurocents was payable for each completed lap of the stadium during a student sponsored run. The result was that 815 km were completed and more than EUR 3,000 was raised.

The LAV ASICS athletes broke a world record. 24 relay runners, including Dieter Baumann, Olympics champion in 1992 for 5,000 metres, covered exactly 402.719 km in 24 hours and thus exceeded the previous best record of 400 km.

Dieter Baumann also took part in a marathon run in Frankfurt for the good cause. Sponsors paid EUR 1,000 for every minute that his time was less than three hours. The Olympic champion raised EUR 30,000. Half of this is for the benefit of the stadium and the rest is going to support upcoming runners in Hessen and Baden-Württemberg.

These initiatives from students and sportsmen show the great value attached to sport. They reassure us and confirm our commitment to popular sports.

Picture left:
students from all education levels participated in the sponsored run for the stadium renovation.

WITH SWISS DETERMINATION AT THE FRONT

DIHAWAG, our sales partner in Switzerland

HORN has had a very long sales relationship with DIHAWAG in Biel. Technically experienced and distinguished by the famous Swiss efficiency, the company laid the foundation more than 30 years ago for the long term success of our products in Switzerland.

Market opportunities recognised and used

The first contact to HORN was in 1976 by Mr. Winfried Haberzeth and Mr. Walter Mühlemann. As managers of the cutting tools division at the company Courvoisier in Biel, they were quick to recognise the opportunities for our niche products on the Swiss market. As well as cutting tools, Courvoisier at this time was still concentrating on the steel trade and the construction equipment business.

The management of DIHAWAG: Christian Haberzeth (left) and Walter Mühlemann (right)

After four years of sales experience with our tools, Winfried Haberzeth and Walter Mühlemann decided to become independent and founded the company DIHAWAG on 1st May 1980. In parallel with our products, the sales portfolio was successively enhanced with other tools for material removal, clamping equipment and measuring machines. As well as high quality products, DIHAWAG very quickly impressed its customers with experience in technical sales and an outstanding customer service.

Continuous growth

With continuous expansion of its activities on the Swiss cutting tools market the need for office and storage space also increased. DIHAWAG had to exchange its “birthplace” in the Salzstrasse in Biel for larger premises. These premises were also soon too small and the company management decided to invest in its own building. The company moved to the Zürichstrasse in Biel in 1994 and thus an important step into the future was taken.

Picture left:
Warehouse for chipping tools, clamping equipment and measuring machines.

Picture right:
View into the offices.

Unfortunately, Winfried Haberzeth could not enjoy the successful development of his company for very long. His death at the age of 55 in October 1996 was a complete surprise. Despite this deeply sad event, the development continued and his son, Christian Haberzeth, took his place in the management of DIHAWAG.

Customer proximity pays off

Notwithstanding the particular situation of the Swiss Confederation, the market in Switzerland is strongly influenced by economic developments in Germany. Nevertheless, the DIHAWAG management had an excellent understanding of how to reduce the effects of economic crises elsewhere. New ideas, technical understanding of the production problems and costs of the customers and an exemplary service were central to this. Customer support based only on the pages in the catalogue is something foreign for the sales engineers of DIHAWAG. They rely on their technical abilities and competence to provide individual solutions at the highest level. Everything according to the maxim of providing not the cheapest, but the most cost-effective from the product range. As this outlook is at one with the principles of our company, joint activities on the market and with the customers are considerably easier.

Optimistic for the future

Last year, Switzerland imported cutting tools from Germany with a value of approx. 58 million Euros. The Swiss Confederation is thus the fourth largest export country for Germany. This importance is further underlined by the import of machine tools and accessories with a value approaching 400 million Euros. With this share, Switzerland is positioned among the top ten countries world wide, even above Great Britain, India and the Czech Republic.

DIHAWAG today with 25 employees and a turnover of more than 18 million Swiss Francs is one of the largest and leading sales companies for cutting tools, clamping equipment and measuring machines in Switzerland.

Looking at our Swiss sales partner it can justifiably be maintained that the Swiss core principle of “calm, purposefulness, reliability and persistence” in combination with a consistent pursuit of quality is a reason for the successful development to a top position in material removal. We owe the DIHAWAG team our thanks for this company philosophy and the market position thereby achieved.

Company headquarters of DIHAWAG in the Zürichstrasse in Biel.

GROOVING • PARTING OFF • GROOVE MILLING • BROACHING • PROFILE MILLING

HORN is at home in more than 70 countries in the world

• Subsidiaries or representatives

Hartmetall-Werkzeugfabrik
Paul Horn GmbH
Postfach 17 20
72007 Tübingen
Tel.: 07071 7004-0
Fax: 07071 72893
E-Mail: info@phorn.de
www.phorn.de

HORN France S.A.
665, Av. Blaise Pascal
Bat Anagonda III
F-77127 Lieusaint
Tel.: +33 -1-64 88 59 58
Fax: +33 -1-64 88 60 49
E-Mail: infos@horn.fr
www.horn.fr

HORN CUTTING TOOLS LTD.
32 New Street
Ringwood, Hampshire
GB-BH24 3AD, England
Tel.: +44-1425-48 18 00
Fax: +44-1425-48 18 90
E-Mail: info@phorn.co.uk
www.phorn.co.uk

HORN USA Inc.
Suite 205
320, Premier Court
USA-Franklin, TN 37067
Tel.: +1-615-771-41 00
Fax: +1-615-771-41 01
E-Mail: sales@hornusa.com
www.hornusa.com

HORN Magyarország Kft.
Szent István út 10/A
HU-9021 Györ
Tel.: +36-96-55 05 31
Fax: +36-96-55 05 32
E-Mail: technik@phorn.hu
www.phorn.hu

FEBAMETAL S.p.a.
Via Grandi, 15
I-10095 Grugliasco
Tel.: +39-011-770 14 12
Fax: +39-011-770 15 24
E-Mail: febametal@febametal.com
www.febametal.com