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The new dimension has given ARBURG the best possible start to 2000. Our technology days held in Lossburg in March were an unbelievable success for our company. Around 2,100 visitors came over the three days to inspect the new additions to our range and our new building, ARBURG II.

This investment at the Lossburg site, the growth and evolution of which you have been able to follow in recent issues of our magazine, offers our customers the assurance that they will be able to rely on ARBURG and its quality in the areas of technology, know-how and service for many years to come. In complete contrast to trends within the industry on the world market, customers were able to see for themselves there and then that ARBURG is going to continue being ARBURG in future too – and there's no question about that!

Of course, you will be able to get the up-to-date picture on how things are progressing with the ARBURG II project in this issue of ARBURG today. Given the speed of the transformation to date, it goes without saying that a whole host of changes have taken place up to the publication of this issue.

At the same time, however, we want to provide you with a greater overview of our international activities. Whether it is breaking the ground for our Swiss branch office or training our international service engineers, ARBURG thinks globally and acts locally – as the company slogan goes – as is self-evident for our globally active company.

You will see from our article on the millennium locomotive from Märklin that we are world leaders in the field of powder injection moulding. And, as ever, you will also find a good helping of technology in our familiar Techtalk article.

We hope you enjoy this issue.

Karl Hehl

Eugen Hehl



“When are you finally coming?”

This is the question American customers, in particular, will be asking Fritz Heubach, former ITS group manager, because by 2003 he will have his permanent base in the US branch office.

ITS stands for “International Technical Support” and is to branch offices abroad and ARBURG agents what AWT and service are to German customers.

In the early '80's, practical necessities were decisive in the growth of this department. The machinery became increasingly complex with the introduction of microprocessor technology, producing a greater need for technical support. This meant that an on-site transfer of know-how from ARBURG straight to the customer became imperative.

The development of the group and its potential led to a number of ITS employees being “loaned out” to various ARBURG branch offices for quite long periods. A second member of the ITS team of

eight is currently permanently stationed abroad: Werner Laukemann works in Singapore covering the territory of south-east Asia. The most important objective in both cases is the development and expansion of activities on site.

Eduard “Eddi” Stückle, deputy ITS group manager, has the job of stepping into Fritz Heubach's shoes temporarily during his absence. The group as a whole is part of the foreign sales division.

Wide variety of tasks

Apart from joint customer visits with agents and branch offices, training in the country concerned or in Lossburg, telephone and fax support and project management, participation in international exhibitions is a further sphere of activity for ITS staff. So there's no shortage of stress. The job has very little to do with trips and fun in far-off lands!

Capacity and operational planning for exhibitions takes place annually and activities abroad are organised in three-month plans.

Activities are based primarily on market importance, in conjunction with and at the request of trading partners and branch offices. But there are also regular “fire-brigade campaigns”, which require particular commitment from ITS employees. “It goes without saying that we always try to solve problems as quickly as possible,” explains Eduard Stückle “but we can only work within our existing organisational possibilities”.

Flexibility is the key

In the first instance, ITS tries to fill internal vacancies purely on the basis of the necessary know-how (technology, languages). In addition to technical service, customer service and application functions, there are of course also representative duties, which must not be underestimated.

And while we are on the subject of requirements, flexibility is the personal quality of greatest importance within ITS. Although each employee has “his countries” to look after in principle, he can actually be employed anywhere in the world. “But without support from home, we are as good as helpless, because we are away on average 10 to 20 weeks of the year”, admits Stückle.

Worldwide know-how transfer

Mutual support and working hand-in-hand are of prime importance in ITS. “We want to increase the transfer of know-how worldwide”, is how Eduard Stückle describes the objective. But at this stage there are no plans for a reduction in travel, at least not as long as the question “When are you coming over” remains synonymous with competent, international service from Lossburg.

ARBURG technology days: A new dimension

ARBURG's motto for this year "The New Dimension" can in many respects be transferred to its technology days. The three-day in-house exhibition held in Lossburg at the end of March established a new visitor record.

As many as 2,100 visitors from 19 countries attended the huge show. The Friday smashed all one-day records in the history of ARBURG with around 900 visitors. The lion's share of guests visiting over the three days naturally came from Germany, although 35 % had travelled in from abroad.

But it was not only the number of visitors that threatened to break records – with 43 exhibitors, ARBURG presented the most extensive exhibition range to date in the hi-tech area of plastics injection moulding. Whether in the technical centre or the exhibition spaces specially set up for the technology days, whether in the ARBURG Allround Center or the new ARBURG II building – feverish activity prevailed throughout over the three days. Wherever you looked, technical discussions were taking place on every aspect of technology, contracts were being concluded and visitors looking in amazement at the impressive new buildings.

A new dimension in the range

In recent months, ARBURG has significantly extended its range of machines and will continue this expansion in future too, up to machines with a clamp force of 4,000 kN. Yet the new dimension open to view on the technology days also included a modular handling system – the MULTILIFT – as well as the production and application technology know-how for which ARBURG is traditionally outstanding.

ARBURG displayed machines in the 150 to 2,500 kN clamp force range with a multitude of possible applications. One that attracted particular interest was an ALLROUNDER 520 C 2000-350/150/150 in the shape of a three component machine with the injection units at a 45° angle. Customers were also spellbound by the MULTILIFT H handling system, completely contained beneath the protective hood of an ALLROUNDER 630 S. And customers were keen on obtaining information, whether on "normal" plastics processing in varied form or the combination of several components, whether on thermoset or silicon processing, or on PET (drinks bottles), ceramic and metal powders or CD production – crowds of visitors hungry for information congregated everywhere, going at the shop-talk hammer and tongs!

New dimension in production

Customers were naturally also eager to see the new ARBURG II building. The company opened the gates of this section to the public for the first time and allowed customers and journalists to take a look behind the scenes of the three-figure million investment at the Lossburg site. Although production had not yet begun in ARBURG II when the technology days were held, preparations for it were well underway. This meant that visitors on the best frequented works tours were able to survey the future production areas.

This offer was enthusiastically taken up by customers. A total of 216 works tours were conducted over the three days. According to one visitor, "ARBURG has shown here that the company is going to be around well into the future too". The customers appreciated being allowed to inspect ARBURG II even before the removal work had been completed, thereby gaining a genuine impression of the new dimension.





A particularly impressive feature of the works tours was the new assembly hall of ARBURG II, standing bathed in light and still empty. Apart from injection moulding machinery and products, visitors were also able to inspect the production plant. Detailed questions were answered by ARBURG specialists right there at the machine or control system.

Technology days – a magnet for the public

The increasing influx of visitors each year is indicative of the fact that ARBURG is absolutely right to hold its technology days early on in the year. Visitors were even welcomed from as far afield as Brazil and Israel. This means that ARBURG has been able to register a new visitor record each year to date.

The attraction here is quite obvious. There is no other exhibition where the customer can see more ARBURG machines and technology than at these technology days. And, in addition to this, they can of course also inspect the hi-tech production plant used for injection moulding. Because ARBURG sets the highest standards in relation to product quality, the production plant must also satisfy the most rigorous requirements.

An ambitious programme of presentations

The technology days further lived up to their name with an ambitious programme of presentations by external and internal speakers. While ARBURG specialists dealt with the subjects of handling equipment and the integration of peripherals in the SELOGICA machine control, two teams of outside specialists were brought in to speak on biodegradable plastics. Helmut Nägele and Jürgen Pfitzer of the Fraunhofer Institute for Chemical Technology in Pfinztal spoke on the subject of "Arboform – a thermoplastic material based on secondary expansion raw materials", while Dr Norbert Mundigler and Harald Zold of the Austrian Inter-University Research Institute for Agrarian Biotechnology spoke on "Fasal – a wooden material suitable for injection moulding".





Gira: Bright colours, cool forms

At Gira in Radevormwald, they're keen on design. From the architecture, through the communications line to the products themselves – everything simply goes together. That's because at Gira the concept of design doesn't mean a wild outfit or cluttered layout. Here, design means clear lines, distinct contours, simple functionality, robust longevity – attributes that draw together.

For those who love the aesthetic touch, they will find it everywhere at Gira, both as a partner and a customer, but nowhere more so than

in the simple, yet ambitiously high-grade design of all electrical installation systems that the company sells through the electrical trade. Such essentially simple details of room design as switches and sockets are for Gira highly important components of an optimal living and working environment. This is why product design is given equal importance alongside innovation and technical product quality. Gira's advertising manager, Hartmut Keen, defines the aim of the company that has been distinguished with the most notable of design prizes in this way, "We aim to translate quality into technology and design".

Apart from light and automatic switches, Gira's current product range also includes clock detectors, data technology and telecommunications connections and alarm and blind control systems. The family firm, which was founded in 1905, now employs 750 staff, all of them at its head office. With the exception of Austria and China,

where Gira has its own marketing companies, and the Netherlands (with wholesale businesses), the international market is served solely by self-employed commercial agents.

One of the highlights of the Gira range is the Instabus system for the programming and control of any sort of building management technology. Weak current circuits enable such things as blinds, lighting, heating and a building's entire sensory system to be operated centrally using a PC or special control equipment or automatically program-controlled. The system has such an open design that it can be

In love with aesthetics – both the Gira headquarters in Radevormwald and the company's products satisfy the most rigorous demands in relation to design. Photography: Gira



used just as easily in a family house as in a complete industrial installation.

Cooperation based on several pillars

In this case, the collaboration between Gira and ARBURG is, exceptionally, based not simply on the quality and reliability of the ALLROUNDER, but also not least on the spatial proximity of the two companies in Radevormwald. Gira is just 100 metres from the ARBURG Technology Center as the crow flies.

However, according to Heinz Kleinschmidt, mould-making, con-





struction and plastics technology manager, there are other reasons why Gira has in this and in recent years purchased a total of 12 S range ALLROUNDER injection moulding machines, integrated into overall systems for parts production.

The first five plants, which included a 320 S, a 370 S, two 420 S's and a 470 S with handling equipment, represented replacement investment in which a market analysis had been conducted among the four strongest machine suppliers and reinforced by employee participation through questionnaires. Here, as in the next seven production cells, quick delivery

above all was the decisive factor that enabled ARBURG to win through against the competition. However, the quality assurances given, the overall business process, service, functionality and operation of the plants, the process control and high standards of safety impressed Gira managers and staff alike.

While the five production units purchased in the previous year produce standard parts, the seven new production cells with ALLROUNDERS 320, 370 and 420 S will be used for the manufacture of up-to-date components. Here, the advantage that Gira was one of the first companies in the world able to rely on the combination of machinery and handling technology from one source has come to bear once again. The company uses the ALLROUNDER in conjunction with the MULTILIFT H universal extraction handling system.

Pluses for the ALLROUNDER

The advantages are crystal clear – less time expended and lower costs through joint programming of the overall configuration using the SELOGICA machine control system, useful cycle time reductions, definable free set-down possibilities and flexible interfaces for retrofitted peripherals, several moveable axes that can be used simultaneously. According to Heinz Kleinschmidt, this means that the ALLROUNDER/MULTILIFT H combination guarantees the universal application potential necessarily required for the investments already planned in the direction of a fully automated production and manufacturing system for different individual parts and components. The “make or buy” decision was clearly influenced by the costings achievable with ARBURG’s combined technology in favour of the “make” option – own production, in other words.

The future talked about at Gira is actually already here. Another new building in Radevormwald – a site that Gira has committed itself to in the same way as ARBURG has to Lossburg – involving an investment of over 20 million deutschmarks is already in the implementation phase. There is no doubt about what this is to be used for. The highly automated production of plastic

parts and components in an ergonomic working environment. Hopefully once again with the involvement of ARBURG’s top-quality injection moulding technology



Production at Gira: the company is one of the first worldwide to use ARBURG’s combined technology with the ALLROUNDER injection moulding technology and the MULTILIFT H handling system.



“Design and functionality. At Gira, both attributes are combined to create a harmonious whole.”
Photography: Gira

Using only the very best



When it comes to celebrating the millennium, it has to be the very best. This was a thought shared by Märklin, the world's best-known manufacturer of model railways, which led to the mini-issue of a so-called "millennium locomotive". ARBURG was actively involved in this project through its powder injection moulding (PIM) know-how.

Here are a few specifications for this exquisite model. The chassis and the breast pieces of the Swiss cult locomotive "Crocodile", with a gauge of H0, are made from high-purity platinum Pt 950 and the greatest importance was placed on authenticity during production. The roof running boards, for instance, are made from real wood, the AWS magnets are fully operational, the roof ladders, handlebars and strip conductors of the electronic flat bars are gold-plated, the windows of the engine and the centre section are made from ground, etched glass, the shunting light above the electrical peak signal is a ruby. Each locomotive costs 63,500 DM incl. VAT and as for sales – they've already sold out!

A model with a history – the "Crocodile"

The "Crocodile" electric locomotive, technically "series Be 6/8 or Ce 6/8", was put on the tracks by Swiss engineers to move large loads. The first Märklin model came onto the market back in 1933 and was followed by new designs with ever-increasing visual refinements.

A traditional link

The link between Märklin and ARBURG is one with a long tradition. However, this longterm collaboration had previously only existed in the field of plastics injection moulding. But it was precisely this collaboration that triggered the

enquiry from Märklin's development department in September 1999 as to whether ARBURG could manufacture metal wheels for a special locomotive using the PIM process. Further discussions then led to the materialisation of the "technology locomotive" project. For Märklin, the main aim was to use similar materials in the model as in real life. Although discussions initially revolved around the locomotive's wheels, the focus later shifted to the injection moulding of the ceramic insulators.

For simplicity's sake, Märklin carried out its initial sample injections on a mould for plastic parts using zirconium dioxide, a white

ceramic. Märklin managers were immediately convinced by the standard of the parts. In some cases the values of relevance to quality were even significantly higher than those of plastic parts.

Once the first hurdle had been crossed, the problem of colouring was solved fairly quickly. The desired colour effect could be achieved by adding oxide paints, in other words, additional metal oxides.

The successful start made with the insulator production also influenced the originally conceived metal wheel project. The metal powder was mixed at ARBURG; the base material was heat-treatable, high-grade steel. Here, too, the wheels were first injection moulded using a mould that had actually been designed for diecasting. And this first batch brought smiles to faces at Märklin too.

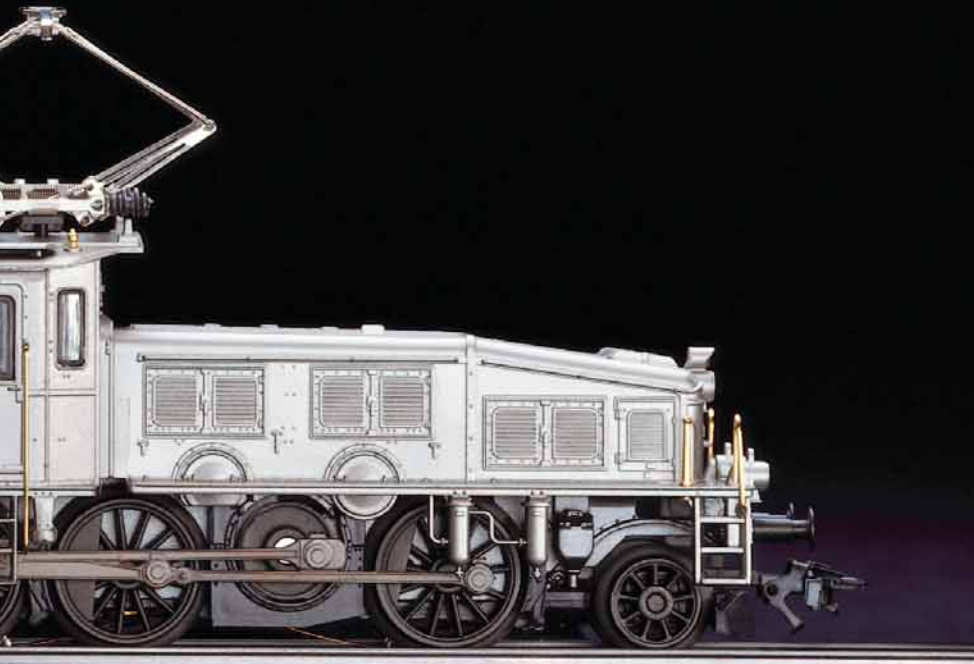
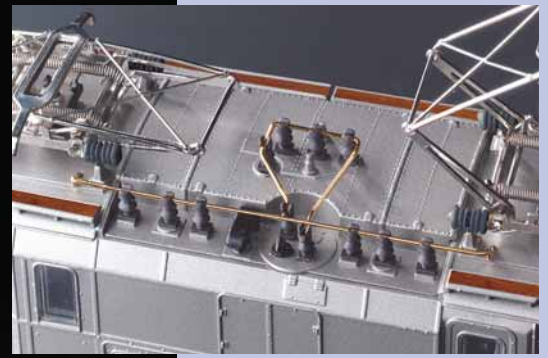
What are the advantages of MIM wheels?

The wheels produced by metal injection moulding (MIM) are made from high-grade stainless steel 17/4 PH. Something of particular benefit here was the definable material hardness. The precise mixing and optimisation of the material



The original "Crocodile" and the millennium replica. The green cult locomotive from Switzerland (shown top) actually in use and the details that ARBURG contributed to the exclusive Märklin model. Authentic ceramic insulators (shown centre), wheels made from high-grade steel and con-rods from titanium (shown bottom).

Photography: Märklin



enabled an ideal compromise to be reached between wheel hardness and track abrasion.

Insulators, wheels, con-rods

But back to the insulators. The next step in the co-operation between ARBURG and Märklin involved the creation of the ceramic mould, which was completed externally within only six weeks. A rare achievement—production could begin immediately and with good results, in the absence of problems or readjustments.

The starting shot for construction of the wheel mould came at virtually the same time and discussions, deliberations and planning between the two companies continued. These specifically revolved around the production of an additional part for the millennium locomotive – the so-called coupling rod made from titanium. ARBURG acted as the go-between for Märklin and another customer involved in processing titanium.

All parts created as part of the collaboration between Märklin and ARBURG are microparts, which are visible as details of the locomotive and must therefore have good visual properties. The insulators

were produced on an ALLROUNDER 270 S 250-60 using a special 15 mm diameter screw with positional control. Due to the material's abrasive properties, the nozzle and screw were made from hard metal.

The small issue of the injection moulded part meant that only a single-cavity mould was required, despite its small dimensions. The gate weighed about 1.16196 g and the injection moulded part 0.0591 g. For optimum material processing, a cylinder temperature of between 150° C and 165° C and a mould temperature of 58° C is necessary. With regard to mould technology, the mould has fluid temperature regulation and is exposed to micro-rays in the mould cavity, which completely removes the erosion structure and smoothes and compresses the surface, so that optimum parts ejection can be achieved with no adhesion. Two ejector stamps ensure an even force distribution during parts ejection. Centring cones were necessary as a precautionary measure, in order to ensure that the mould sides fitted as well as possible upon closing.

Subsequent parts treatment

The next step following the manufacture of the parts is removal of the binder. This process involves the plastic in other words, being expelled from the parts. In the case of the insulators, the binder removal process was combined, first for 14 hours with water as the solvent at a temperature of 67° C, then by thermal means for 32 hours. The final production stage is sintering at 1,380° C in an oxide environment. After this 31-hour procedure, the parts displayed a 19 % shrinkage and were ready to be incorporated in the millennium locomotive.

New ideas through practical necessities

Even today, it is often still the practical necessities that move injection moulded parts manufacturers to consider leaving the well-trodden paths of parts production and replacing traditional manufacturing methods with injection moulding alternatives. And this is exactly how things developed at Märklin. Based on existing requirements, new methods were tested and finally introduced, which offer enormous advantages over the old manufacturing methods, but have neverthe-

less tended to flourish in obscurity up to now. Through the expansion of the customer base, on the one hand, and the development of areas of application as a result of this, on the other, the market for such applications will, however, grow noticeably in the future. This has helped with the breakthrough of an area of technology in which ARBURG holds a leading position, both in terms of know-how and also in consultation and equipment.

The final



The finishing touches were already being put to the final exterior form of the works extension with building phases 21 and 22, referred to internally as "ARBURG II", at the start of the new millennium, when the glass façade was added to the new production hall. But although the building gave an outward impression of completeness, it still had to be entirely structured internally.

The heart of the building for the purposes of infrastructure and logistics is the avenue running through building phase 21, which, with a width of 16 metres and a corresponding height, is suitable for the loading and unloading of lorries up to 40 tonnes. Linked to this is the line to the central supply point in phase 20, which connects ARBURG I and II.

Above the avenue runs the technical level as a supply line for the halls, providing all the necessary supply and removal lines for all media.

Raw material recycling

In the interests of conserving external resources, the recycling of raw materials is given high priority. Consequently, waste heat produced at test benches, for instance, is conducted to the glass-fronted façade system and used to heat the hall.

In addition, a total of 600 cubic metres of rainwater can be amassed in separate collection tanks and used to irrigate the surrounding gardens, to cover the demand for grey water (e.g. for toilet flushing) or to feed the sprinkler tank. This increases the overall storage capacity of ARBURG I and II in this area to almost 1,000 cubic metres or 1,000,000 litres.

Production flow in a "logistical circuit"

The production flow in the new hall is not arranged in lines, as in previous production halls, but in a logistical circuit as far as the packing point. At the end of the hall, the bought-in parts are unloaded from lorries and used to assemble ALLROUNDER's with the components produced in-house. These are then inspected before being packed at the start of the hall and transported away by lorry again.



countdown



Working at windy heights – lifting platforms were used everywhere to position the cranes' cross beams where they would actually be used later.



The finishing touch – tradesmen know exactly where it's needed. And everyone does their bit to ensure that the work is completed quickly



A bundle of cables – it takes an expert eye to know which cable loom performs which function. The life blood of ARBURG II flows through the middle of the technical level.

Start of the final completion phase

At the start of the year it was still hard to imagine these processes, because phase 21 was still completely empty, apart from a few lifting platforms, marked production points and conveyor systems. Yet with the introduction of the floating, two-centimetre thick magnesite composite plaster floor, the hall's final completion phase was soon launched. Only three other development stages came before the flooring, in order to protect the plaster from damage – the crane and steel construction, the laying of the ventilation ducts and pre-installation of the pipelines. These were followed by the final installation of the electrical systems, sprinklers, smoke alarms and other supply mechanisms. For reasons of time and efficiency, work was conducted simultaneously. While the plaster flooring had already been laid, smoothed and sealed at the front of the ground floor, crane fitters were still busy at the back of the hall.

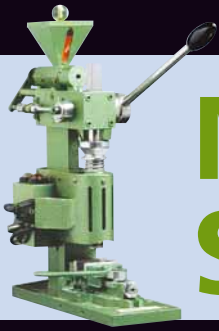
The master offices, social areas and toilet facilities, as well as technical areas, lie outside the production hall as satellite buildings and are linked to the production area by staircases. The technical supply to the hall area (duct system) is at a level of 7 metres; the basement at 5.05 metres (exhibition store, buffer area for machine stands, etc.) The subassembly fabrication point for the different machine types is also located here.

All hands on deck for the ARBURGers

During the busiest periods, internal ARBURG staff were joined in the building by a further 200 outside employees.

The basic and final installation work in the electrical and communications area, as well as the assembly of the pneumatic post and some of the sanitary installation, was carried out by ARBURGers using up to 25 lifting trucks.

Wolfgang Mast and Gottfried Schrempp coordinated this deployment, which continued on an even greater scale at weekends. When there is so much motivation among staff to complete such a mammoth project even before production actually begins, there can be no doubting the quality and speed of the actual production itself – particularly when you are offered a view at your workplace coupled with the very latest technology such as that found in ARBURG II.



MILE-STONES

So-called "milestones" in a company's development usually come from relatively modest beginnings. Carl Benz or Graham Bell would certainly never have dared to dream about the dynamics and progress their inventions would one day initiate. The ARBURG story was similar, beginning with a small, initially hand-operated injection moulding machine that had actually only been conceived of and built to solve the firm's own problems.

The story surrounding the "small injection moulding machine" begins, as is so often the case, with a problem. As Germany's "economic miracle" was beginning to unfold at the start of the 1950's, ARBURG switched its production from everyday commodities to flashlight equipment. Things went very well in the early years but the problems began when the flashes were exported overseas. Leakage currents in the electrical connections caused the batteries to discharge, leading to largescale complaints. The resulting situation threatened to destroy the business and had to be rectified as quickly and reliably as possible.

Father, Arthur Hehl, and his two sons, Karl and Eugen, immediately set about locating and removing the fault causing the discharges. The solution to the riddle was that the connectors on the connection cable between the battery and the flash unit needed to be insulated. The material required for this was plastic, but they had no machine to produce it in the correct shape. Injection moulding machines for large parts already existed, but not for smaller parts and also not for injecting around small parts. True to the Swabian "meddling" mentality, Karl Hehl himself set to work

and built ARBURG's first injection moulding machine for injecting around small parts, including metal connectors, from the fragments of an iron railway bridge that had been blown up. An interesting technical detail: In order to inject around the inserts, the hand-operated plunger-type injection unit was positioned vertically and worked in the mould's parting line, so that the connectors could be easily inserted and injected around horizontally with the supply line already fitted.

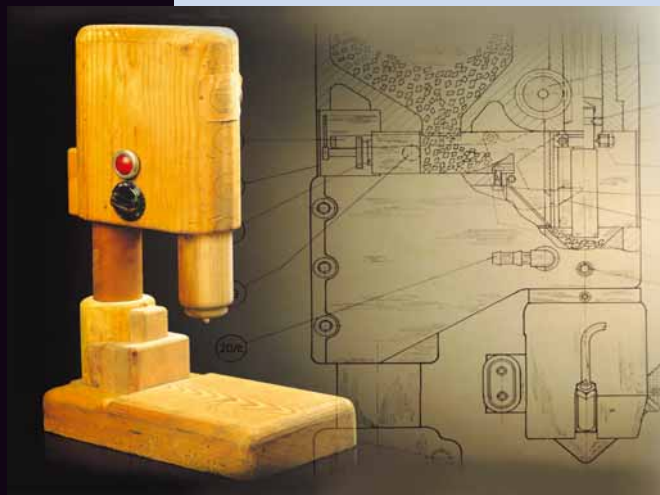
How did things develop from there?

Anyone who has taken a closer look at ARBURG's history will know this story very well. What is far less well-known, though, is how things developed from there.

In 1954 only a few examples of ARBURG's internal design were produced to meet the company's own requirements. Then in 1955 the supplier of pivoted connector parts asked ARBURG why it was no longer placing any orders with them. The problem was discussed and resulted in the supplier/customer relationship being reversed. From 1956 ARBURG produced injection moulding machines for the former supplier and began series-production in 1957.

But even with the start of the first production run intended for sale, the machine underwent basic modifications from both a functional and design point of view. Father and brothers Hehl set particular store by the machine's appearance. A wooden model provided the basis for the

optimum "face" of the machine, which was based on the same functional principle. The advertising at this time ran accordingly – "An injection moulding machine, not a drill!".



The criteria may change, but the quality remains the same. A huge breakthrough came in the '60's, for instance, when the machine was sound-damped.



tion at the start of 1959. This was the first time that a fully automatic ARBURG machine with pneumatically operated clamping and injection unit capable of manufacturing parts in several working positions

had gone onto the market. With this new drawing card in its range, ARBURG was able to celebrate its first engineering anniversary at the end of the year: 1,000 ARBURG machines had been sold by then.

The C-machine concept turned out to be truly trend-setting in years to come. Delivery of the C4b was not discontinued until 1970, after continuous im-

provements to the model. Its successor, the C4S, continued to be built and sold until 1983. And many of these machines are actually still in use throughout the world today, reliably producing injection moulded parts – just as befits a "milestone" in the history of machine engineering.

In 1956, two years after Karl Hehl's great inspiration, ARBURG was already employing 10 members of staff in its engineering firm. Then in 1957 the first series machine was produced in the shape of a hand-operated, non-swivel, plunger-type design for a 10 g shot weight and supplied as the C1. This year also saw the first sale of C4 machines, as well as the granting of trademark rights on the indexing clamping unit and also parting plane injection.

In 1958 the C2a was added to the ARBURG product range. Although this machine was still completely hand-operated, it had an indexing clamping unit, the basis for the ALLROUNDER system that was subsequently patented. The C4a, which came onto the market at the end of the year, combined for the first time a pneumatically operated injection side with a swivelling, manual clamping side.

The C4b, one of ARBURG's bestsellers, went into series produc-



ARBURG handling technology: Fully integrated in SELOGICA

Whether it's the Integral Picker, MULTILIFT H or 3-axis NC handling unit – ARBURG's handling technology is based on the principle that the injection moulding machine peripherals should, wherever possible, be incorporated in the immediate machine environment. This applies firstly to the attachment, supply and protective mechanisms of the handling equipment and, secondly, also to operation using the SELOGICA machine control system.

The advancing trend towards the rationalisation of production processes not only requires innovative machine and mould technology, but also flexible handling technology. "Intelligent parts management" – which is how the requirement goes – can range from simple gate removal, through parts removal to complex production cells. ARBURG can supply the appropriate handling technology for all these areas, providing a rational and practical link between injection moulding and parts handling.

At ARBURG, handling technology is essentially an integral part of the machine. What this means, in particular, is that the user receives a complete solution tailored to his requirements, in which the machine, mould and handling processes are centrally controlled by the SELOGICA system.

The advantages of this integration in the machine control system are evident. There is a standard operating philosophy for both machinery and handling equipment. Handling operations are programmed in the process editor with their own symbols and the same

operating system. Consequently, the handling equipment cycle sequence is created in the same way as the familiar graphics sequence programming of the ALLROUNDER in a separate flow chart and through synchronisation points integrated in the actual machine cycle.

The efficiency of the integrated control system is particularly demonstrated in complex processes. Whether these involve the multi-layer set-down of finished parts, the receipt of inserts from magazines or the removal of random samples and substandard parts and their storage in separate containers, SELOGICA enables even the most complicated processes to be freely programmed through graphical sequence programming.

All processes necessary for overall production can therefore be locally programmed by the machine operator straight onto the machine. The entire process remains constantly transparent and comprehensible, without there being any need for a reorientation into special programs. All handling data sets belong to the mould data sets in this case and can be stored accordingly on disk. Shorter tooling times, flexible production planning and ease of operation are the immediate advantages of this central programming.

Training with vision

What was still a vision in 1999 is on the verge of becoming reality in 2000 – the worldwide harmonisation of service engineer training. This is ARBURG's way of demonstrating its commitment to partners and customers in the field of service too.

For service engineers, training should be the foundation stone for what is, wherever possible, a longterm commitment to the company.

Here, as in the spares service, the important thing is to guarantee and impart a standard level of know-how as the basis for worldwide customer support. The model for international training is the instruction received by service engineers in Germany, which lasts about twelve months. The service engineers working at branch offices and for trading partners are completely integrated into the training programme, as has already happened with colleagues from Italy, France and Asia.

Basic training is given at Lossburg on the basis of a fixed curriculum and timetable. This means that 20 service engineers are prepared for deployment each training year. According to Roland Paukstat, technical service manager, "Participants start with 11 weeks' theoretical and practical training in-house, after which they spend nine weeks with customers, followed by a further six weeks in-house training and 11 further weeks of service practice in the branch office concerned. The course ends with a further four weeks of instruction, giving a total of 20 weeks of theoretical and 22 weeks of practical training.

Three training modules

The first learning block deals with the so-called basic technologies. In the second training block, special technologies are taught, such as positional control or hydro-accumulator operation. The more complex technology stages of the ALLROUNDER are also included in

the programme. The third stage deals not only with the "new dimension" machines, 320 K and 630 S, but also with options and peripherals. The key words here are MULTILIFT, two-component injection moulding, electrical dosage, etc. Following this basic technical



Eyes and ears wide open, is the message in the practical element of the service technician's training, when the machines and the workings of the individual components are explained in detail.

training, additional regional training modules can be followed, as required.

Character is crucial too

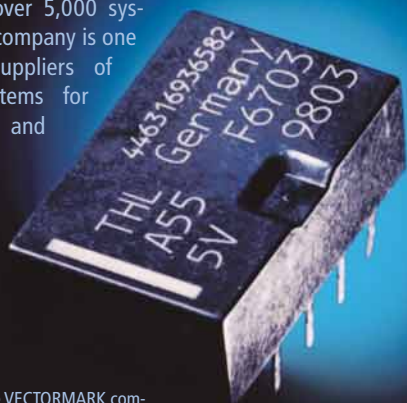
Apart from the general requirements made of staff, they must also have spent at least one month at the branch office concerned before they start training, so that their personal qualities and technical aptitudes can be assessed. Roland Paukstat gets straight to the point, "There's no use if someone is willing to learn, but the rest of his training or his character mean he is not a team player. This must be clearly determined before training begins."

Writing with light



When it comes to inscribing smart cards, which are series-produced on plastic injection moulding machines, the most important elements are speed, reliability and optimum precision. In addition, because the entire card production process is very quick, the subsequent processing must also run swiftly and reliably.

ARBURG is running a pilot project in this field in conjunction with Haas-Laser GmbH & Co KG in Schramberg, which places the VECTORMARK compact laser inscribing station between the card production point and card buffer in special collection containers. Haas-Laser has been working in the field of laser technology since 1972 and has been part of the Trumpf group since 1992. With over 5,000 systems installed, the company is one of the leading suppliers of Nd:YAG laser systems for marking, welding and cutting.



With the VECTORMARK compact, even small parts can be inscribed reliably, accurately and with a high degree of contrast (right).

For the booming smart card market, ARBURG's range of machines includes the SMARTLINER 800, a production cell for the manufacture of card bodies. This incorporates an ALLROUNDER with SELOGICA control system and peak process control, a corresponding injection mould, an ARBURG Integral Picker S and the fully automatic card magazine assembly with alternating system.

800 smart cards/hr

The plant is highly efficient, producing at least 800 ABS card blanks an hour for a single cavity mould. Very short removal times can be guaranteed by means of parallel movement sequences. A conveyor belt acting both as a cooling section and supply to the stacking magazine, takes up the

Thanks to its compact design and light weight, the VECTORMARK compact inscribing laser from Haas-Laser (left) can easily be integrated into a production line with the ARBURG SMARTLINER 800 (bottom right). One element of this production cell is the ARBURG Integral Picker S, which removes the smart card from the mould (centre right).



smart cards in order. The stacking device attached to the end of the belt can be fitted with six standard magazines, each taking 500 cards.

The production cell and peripherals are centrally programmed via the SMARTLINER's SELOGICA user surface. The multitude of integrated functions makes the entire plant operation problem-free and reliable. Compared with the customary production process to date, basic bodies can be produced in a single working step. The material requirement is also minimal, because there is no waste. Further advantages are the fully automatic and therefore low-labour card production, as well as the automated further processing – for example, with the diode-pumped inscribing lasers in the VECTORMARK compact series from Haas-Laser.

Optimally designed for card inscription

The SMARTLINER 800 configuration with the VECTORMARK compact inscribing laser has already been on show at a number of exhibitions. The advantages of this inscribing unit lie firstly in its compact design and light weight, which mean it can very easily be integrated into a production line. The high degree of efficiency and low operating costs resulting from this and the short working times are further advantages of the Haas Laser. The double-frequency version of the VECTORMARK compact also facilitates greater contrast and enables the cards to be inscribed without the surface being damaged. The Haas-Laser/ARBURG collaboration has brought a system onto the market, in the form of this production cell, which can produce complete chip card series quickly and, at the same time, exceedingly flexibly.

The new sales consultants in Germany

ARBURG's field sales team has grown. Due to the increasing product range, more staff have been taken on and the size of the sales territories reduced accordingly.

sales, in-house and field service made up the commercial end. The consultants also spent time in different departments, to gain an additional insight into ARBURG's overall business operation.

Because ARBURG is known for its outstanding training, it was time for the new sales consultants to go back to school. From January to May 2000 they received thorough training in both the technical and commercial aspects of their new job at the company's head office in Lossburg. Plastics, the injection moulding process and the entire ARBURG range of machines were the focal topics of the technical training side, while information on

Yet alongside the theoretical training there were practical aspects to the timetable too. As a result, the budding sales consultants were able to have a sneak preview of their future sphere of duty and look over the shoulder of the professionals during customer visits.

Thomas Knop, aged 31, worked in the chemical industry as a senior clerk in technical export sales and gained experience abroad in Europe and the USA.

Reinhold Baar-Bartelt, aged 41, previously production manager in the packing industry involved in development and applications technology, as well as technical sales.

Thomas Dirnberger, aged 31, worked as an applications engineer and in technical sales.

Dietmar Hagnberger, aged 32, gained several years' experience for field work as a senior clerk in domestic sales at ARBURG.

Thomas Kypke, aged 41, spent several years in ARBURG's customer training and also in the on-site technical consultancy of foreign customers.



Thomas Knop



Reinhold Baar-Bartelt



Thomas Dirnberger



Dietmar Hagnberger



Thomas Kypke

GERMANY

FRANCE

ARBURG

Münsingen

Zurich


LIECHTENSTEIN

AUSTRIA

SWITZERLAND

ITALY

Breaking the ground in Münsingen

 **With a ceremonial breaking of the ground, the German machine engineering company ARBURG recently officially began its new building project in Münsingen. The worldwide producer of plastics injection moulding machines is to construct a building for its Swiss branch to the south of Bern.**

ARBURG AG had previously been based in a rented building close to the construction site in Belp.

Branch manager, Peter Moser, was able to welcome Eugen Hehl, chairman of the parent company, ARBURG GmbH + Co, to this ceremonial event. In his address, Eugen Hehl clearly highlighted the importance of the Swiss market to the machine engineering company, which is represented on all the major plastics markets worldwide with 16 branches and three agency offices. "Our globally active family business only sets up branch offices on ARBURG's own land, in ARBURG's own building where it is really worth it from a strategic standpoint", said Eugen Hehl.

Recognition for the Swiss branch

However, Eugen Hehl did not want this new building activity to be seen simply as symbolising the strength of the Swiss market, but also as praise for and recognition of the outstanding work carried out by the team under the leadership of branch manager, Peter Moser.

Special structural features

The new branch office will be built on a plot measuring 18 by 32 metres and should, upon completion, resemble the parent office.

Geological conditions will enable ARBURG AG to use the ground water located beneath the surface for air conditioning and heating in the new building. By means of modern thermal pump technology and so-called refrigeration ceilings, the premises will be either cooled or heated. ARBURG will be using this technology for the first time anywhere in the world in its Swiss office. If everything goes to plan, the offices will be ready for occupation at the end of this year.



Digging with great gusto – Eugen Hehl (2nd from right), branch manager, Peter Moser, (right), ARBURG's senior project manager, Manfred Wolfer (2nd from left) and the architect in charge, Jörg Jost (left) boldly took hold of their shovels on the building site in the Swiss town of Münsingen.



In his address, Eugen Hehl (left) stressed the importance of the Swiss market for the machine engineer's worldwide operation. Also shown here are branch manager, Peter Moser, (2nd from left), architect, Jörg Jost, (2nd from right) and chairman of the local council, Daniel Weissmüller.