

Berghof meets Berghof: A dialogue about solving mankind's problems

The Berghof Foundation has now been in existence for forty years, and the Berghof Group of Companies for forty-five years. It seems to be high time to raise the issue of what two enterprises have in common, which at first glance could hardly be more different. After all, they not only share the name of Berghof, they also share their founder, Prof. Georg Zundel, PhD, in whose life both were eminently important and meaningful. The lecture given by Professor Hans-Joachim Gießmann, PhD, Director of the Berghof Foundation research institute in Berlin, "40 years of project funding, conflict research, support for peace and peace education" offered everyone the opportunity to approach these important issues for the first time. As so often, first it is necessary to approach each other and become acquainted. In this respect the talk by Professor Gießmann and the informal gathering thereafter constituted a first important step towards starting a dialogue between the two Berghof enterprises.

In his talk Mr. Gießmann recounted the history of the foundation and described the broad spectrum of activities with regard to supporting projects and institutions. The Berghof Foundation was established in 1971 by Prof. Georg Zundel, PhD, as the Berghof Foundation for Conflict Research with the aim of making a contribution towards sustainable peace. Primarily its purpose is to academically reflect on the deep-seated causes for violent conflicts and thus indicate ways of resolving and overcoming conflicts peacefully. The benefactor

took his bearings from his own personal memories of the horrors of the Second World War and from the legacy left by his grandfather, Robert Bosch, for whom international understanding was always an issue close to his heart. Today, not only is the Berghof Foundation the largest private foundation for peace and conflict studies in the German-speaking region, it has also successfully established itself as an internationally recognised centre in its areas of activity.

But how does the Berghof Foundation fulfil the mission defined by its benefactor, and what distinguishes its work in qualitative terms? As a fundamental element of social cohabitation conflicts are indispensable. One of the most important basic principles of the foundation is to make use of the creative potential inherent to conflicts, at the same time avoiding the destructive consequences of violence for deciding a conflict. Pursuing this central idea, the foundation seeks to influence the relationships between the actors in violent conflicts by reinforcing skills, processes and methods of dealing non-violently with conflicts so that it is possible to resolve a conflict without resorting to violence. Learning processes are of central importance here. Practical experience with non-violent conflict resolution is reflected upon and systematically processed. In turn, the results of this process are prepared to meet the requirements of users and are then passed to actors and interested parties. The idea behind this approach is to make it possible to learn from positive and negative ex-

periences which have been collected and to avoid past errors. The special quality of the work of the Berghof Foundation comes from the fact that, due to the institutional interaction between practical work, research and education, it is able to represent the entire scope of this process. The practical and research areas are located at head office in Berlin, while the peace education sector is at the Tübingen branch, the Georg-Zundel House. The latter location is an expression of the special affinity of the Zundel family to the Tübingen region.

The matter of quality and the content of the foundation's work is inseparably linked to the question of its target groups. Although today in Europe we live in relatively peaceful circumstances, violence and war are ubiquitous at the centres of conflict in this world. However, there is still lots to do locally, for example at our schools. As is the case regarding its methods, the Berghof foundation pursues a broad approach and, as a matter of principle, collaborates only with people who are committed to non-violent solutions. The spectrum ranges from teachers to political parties and members of the government as well as members of non-government organisations, including resistance movements. The foundation regards pre-



From left to right: Nikolaus Rombach – Managing Director of the Berghof Group, Johannes Zundel – Managing Director of the Berghof Foundation, Prof. Hans J. Gießmann PhD, Director of Berghof Conflict Research/BCR.

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cisely this broad set-up at the interface between civil society and politics as one of its especially strong points. In its capacity as one of the few private, family-managed organisations, and in a field that is dominated by state institutions, it comes across as particularly credible. In the course of forty years this has enabled the foundation to build up a remarkable global network that represents one of the most important resources for its daily work. The Berghof Foundation definitely does not see the added value of its achievements in the propagation of prefabricated solutions, but in the creation of spaces in the broader sense that enable human encounters and make it easier to search for independent answers to questions pertaining to conflict.

Berghof meets Berghof: what is there to be said of this encounter? As so often, Mr. Gießmann's talk was followed by an equally important informal part. Over snacks and wine everyone sat together engaged in intensive discussions of the subjects and questions that had been touched on. There was great interest, and I was especially impressed by the candour of the employees present in the face of a topic which at first glance does not appear to be very closely related to their line of business. However, there was no lack of points of contact. After all, the conflicts at the world's centres of crisis are closer than ever today due to global networking. The assessment of political risks is therefore one of the core elements of international marketing, just as sustained peace-keeping is of growing importance for an increasingly export-oriented company like ours. Nobody was as aware of this as Robert Bosch, for whom the outbreak of the First World War signified a sharp decline in the international business. Besides common interests of this kind, there are more profound things in common linking the two Berghof enterprises closely with one another and which are ultimately attributable to the founder's conviction that – be it in the technical or social field – a solution for human problems is only possible by working together as partners and thinking systematically. Like the Berghof Group, the Berghof Foundation distinguishes itself by a high proportion of exceptionally well-qualified employees who work on solutions to problems that affect all of us in some way in a dialogue with customers and partners, including university institutions.

Johannes Zundel

Berghof still growth-oriented



*Nikolaus Rombach,
Managing Director of the Berghof Group*

The year 2011 has almost come to an end, and it is time to look back on what has been achieved during this past year and a look forward at the prospects for 2012.

In 2011 almost all the business units show a very positive business trend enabling the Berghof Group to surpass its targets by around 10 % both in terms of turnover and earnings. Therefore, the Berghof Group can again look back on a successful year.

For example, by systematically developing new materials in the Fluoroplastic Technology business unit we were able to further expand the porous PTFE segment and develop improved membranes ready for the market in collaboration with our customers. These products will come onto the market in 2012.

Membrane technology experienced strong growth over the past year. Due to the introduction of the energy-efficient BioAirDS method to the market, in 2012 continued strong growth is also anticipated in the international markets. Berghof took account of this development by constructing another membrane-casting machine.

Targeted investments in further developing the Analytics business units in Tübingen and Chemnitz are also bearing fruit. Both locations succeeded in raising their turnover in excess of the budget and are anticipating further growth for 2012. By streamlining the services of the Analytics and Environmental Engineering business units under joint management further synergetic effects are anticipated.

Both the employees of the Process Engineering business unit and its management are looking forward to moving into the new company building in Mühlhausen in spring 2012. This building constitutes the basis for powerful growth and enlargement of the range of products and services, especially in the testing of components for electromobility.

The strategic priority set by the Laboratory Technology business unit for 2012 is the marketing of the new easyH₂O product line and further development of the international dealer network

for marketing the high-pressure reactors.

The goal of the Controls and Process Engineering business units in Eningen for 2012 is to discover new market and business segments for Blue Ocean and to continue to take optimal care of the existing customers. By merging the two business units the existing potentials are to be utilised better and added value generated for present and future customers.

These developments give cause to hope that, even if the economy takes a downturn, the Berghof Group will hold its own again in 2012 thanks to its heterogeneous structure.

We, the employees and management of the Berghof Group wish you, dear Readers, a Merry Christmas and a happy and successful New Year.

Nikolaus Rombach

Special honour for Berghof Group partners

There were radiant faces on November 8, 2011 when the Bundespreis für Handwerk in der Denkmalpflege (Federal Award for Crafts in the Preservation of Monuments and Historic Buildings) was presented in the Haus der Wirtschaft in Stuttgart.

Our partners received the special award for outstanding commitment to the preservation of protected buildings for their properties in Tübingen, Ob dem Himmelreich.

Minister-President Kretschmann handed the certificate to Mr. Schwille of the Zundel property management and the architect commissioned with the planning and execution, Mr. Bamberg.

Hans Schwille



From left to right: Thomas Bamberg, Minister-President Winfried Kretschmann, Hans Schwille

Controls

New Ethernet-based PLC controller in the format of an I/O terminal

In the form of the new EC1000 controller Berghof has brought the Ethernet “onto the terminal” with the full functions of a PLC. It saves space and programming and has many connection options, including visualisation.

How does one build a controller for machines, plants and other automation applications which is fit for the future? Ethernet technology alone no longer suffices at this point; instead it requires the greatest possible openness towards existing configurations and, above all towards future ones. Following the Ethernet terminals and Ethernet I/O systems, Berghof presented the CANtrol EC and the new Ethernet controller, EC1000 at the 2011 PLC/IPC/DRIVES trade fair.



The controller is accommodated in just one terminal (!)

Berghof has succeeded in installing the new EC1000 Ethernet controller in the housing of an I/O terminal, with full PLC functions and many connection options. The controller is harmoniously integrated in the terminal block and can only be identified visually as a PLC by its connections. The I/O can be connected up directly here, but what about the Ethernet? It's already inside it!

All options on 25 mm

To save space, as many application options are accommodated on a module which is only 25 mm wide as are normally found in a portfolio consisting of many controllers:

- Fast connection: Ethernet, EtherCAT, CANopen and serial
- Flexible networking: PROFINET and BACnet as a software option
- Simple visualisation: CoDeSys Visu with Ethernet terminals (e.g. ET1000)
- Optimal programming:
- Optionally CoDeSys 2.3 or 3.4
- Save data conveniently: with USB and SD-slot
- Large processors and reserve capacity
- Extensive I/O assortment
- Proven system, extended to include Ethernet

The “highlight” of the project is not just Ethernet and the small dimensions; above all it is the high degree of flexibility. Reliable interfaces are extended by state-of-the-art technologies such as EtherCAT. The visualisation is already installed

by way of CoDeSys and, if necessary, an Ethernet terminal is simply plugged on. Important automation protocols are available and the user can choose between the CoDeSys versions 2.3 or 3.4. It is therefore possible to utilise time-tested elements or to benefit from the advantages of state-of-the-art software technology.

Greater flexibility for automation experts

All users in Automation – especially those who wish to simplify their data monitoring – can profit from this variable and open architecture, irrespective of whether they are in mechanical and plant engineering, building or industrial automation or even industrial services. All users benefit from the modular automation architecture and the integration of PLC, Ethernet visualisation, data logging and CoDeSys in a compact, multifunctional, extendable mini control unit which takes up very little space. This makes it possible to put partial units, such as individual machines

or modules, into service both in an autonomously automated state and clearly programmed. And the trend towards simple wiring in a linear topology has also been taken into account. The simple wiring of EtherCAT, connection to central control systems and integration into the machine and factory network are all taken into account. All in all this is a cost-cutting system topology which reaches as far as the I/O modules. Here such functions as the recording of encoder signals and their direct connection to analog outputs are combined.

Visualisation inside: simply connect the terminals

Terminals in the sense of an “Ultra-thin Client” can be connected easily via Ethernet. All user programs are already integrated into the CoDeSys PLC controller. This principle of the “server-based PLC visualisation” is conducive to the trend towards leaner terminals. The Ethernet terminals merely serve as an extension for inputs and outputs. This terminal-server concept via Ethernet offers effective ways of keeping software available centrally. All the visualisation masks are part of the PLC program. The Ethernet terminals access only the visualisation and therefore manage without a second tool, or indeed lists of variables.



Ideal for data monitoring

Standard functions from the PC world, such as the recording, saving, evaluation and representation of data, are available at all times and can be saved as a file for evaluation. For MS Office programs this takes place in the CSV format by way of the IP network and FTP (file transfer protocol), by means of a web interface, or simply via the integrated USB port or an SD card.

CoDeSys in a new version

CoDeSys V3 – an industrial standard continues to develop: Berghof has already integrated the new generation. The hardware platform was equipped with the proven version 2.3 and with the future-oriented version 3.

Communication protocols via Software library

One advantage of Ethernet cabling is the continuous access to industrial and building automation by means of communication protocol. The two most important representatives are available in the Berghof Ethernet PLC: There is a Profinet device implementation for the industrial environment and BACnet assumes the access to building automation. The two protocols are based on pro-

ven IT standards. In view of the fact that the controller supports TCP/IP unrestrictedly, access to company-wide data transfer across all levels is guaranteed.

Summary

In the form of the EC 1000 PLC, Berghof has developed a strong "family head" at the centre of the new CANtrol EC control system. It is only 25 mm wide; with EtherCAT and Ethernet interfaces it is designed for state-of-the-art communication.

The CANtrol EC control system is completed by the ET1000 Ethernet terminals for visualisation and the EtherCAT I/O with its digital, analog and MotionControl modules.

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The 2011 Master Award winner works for Berghof Automation Engineering

Bosch has conferred the award for the "Best Master Thesis" on our new employee, Mr Tobias Gall, for outstanding achievements in his master thesis.

Mr Gall completed his studies this year as the best in his semester of the Mechatronics course of studies at Reutlingen University with a master thesis on "The implementation of a multifunctional Input/Output plug-in card as an EtherCAT Slave". Mr Gall wrote his master thesis at Berghof Automation Engineering in Enningen.

We congratulate Mr Gall, who has been working in our hardware development department since September 2011, on his outstanding final degree and are delighted to be able to welcome him in his new position.

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From left to right.: Tobias Gall, Franz Ott



The Berghof team at the SPS/IPC/DRIVES in Nuremberg - from left to right: Holger Liedermann, Nicki Schlozer, Robin Turner, Eva-Maria Oeden, Alfred Rechtenbacher, Franz Ott

SPS/IPC/DRIVES 2011, a trade-fair summary

New products introduced by Berghof greatly in demand

The SPS/IPC/DRIVES fair in Nuremberg is the top trade fair in the automation industry. This year again, it attracted a record number of exhibitors and visitors. We at the Berghof stand in Hall 6 also welcomed and advised more visitors than before. The trade fair stand was marked by numerous product presentations.

Compact, multifunctional and communicative is how best to describe the updated product portfolio for 2012. The star of the trade-fair stand is only 25 mm wide, but it nevertheless heads the new CANtrol EC family of controllers. It is the EC 1000 CoDeSys PLC. Its compact dimensions and high performance make the EC1000 PLC very good for controlling machinery. The EC1000 is equally good for capturing, storing and analysing machine data. At the same time that the EC1000 is introduced to the market, the most recent version of the PLC programming tool, CoDeSys V3 will also become available. Berghof therefore offers its customers such advantages as object-oriented programming and optically improved visualisation in a single tool.

One of the users' requirements is seamless integration of the new and time-tested Berghof PLC into a technological environment. Application-specific communication protocols are required for this. Therefore Berghof provides PROFINET for an industrial environment and BACnet for building automation.

However, our customers from the energy industry are active not just in buildings but also on the high seas. We are therefore currently preparing to apply for nautical approval of our DC1000 display controller. A controller suitable for use on ships must be robust and efficient.

Operating terminals are increasingly being installed inside the machine, while the data-capture sensors and actors continue to be accommodated in the switching cabinet. By installing these functions in different places valuable installation space can be optimised and the operating function ergonomically optimised. Berghof is keeping abreast of this trend with two product lines: On the one hand with the time-tested Ethernet terminals, and on the other with the new Mini DC, the DC1103.

This new product portfolio enables Berghof to offer optimal technological functions which contribute towards reducing costs in particular.

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Environmental Engineering

PCB cleanup at the Bundesakademie (Federal Academy) in Trossingen

The Bundesakademie für musikalische Jugendbildung (Federal Academy for the musical education of juveniles) in Trossingen is the advanced training institute of the German federal associa-



tions for extra-curricular musical education and the cultivation of music. The central area with the foyer and several side wings was built in 1970/71 and was extended by multiple additions up until 1998.

In 2009 structural investigations carried out by Berghof Environmental Engineering on behalf of the town council of Trossingen revealed jointing compounds containing PCB in the older parts of the buildings. Measurements showed the PCB content to be up to 36,550 mg/kg. According to the PCB directive, PCB contents in excess of 10,000 mg/kg from so-called primary sources are assumed, which significantly affect pollution of the indoor air. Indoor air measurements showed 922 ng/m³ in the entrance hall, proving the existence of higher PCB contamination than the precautionary limit of 300 ng/m³. In the federal academy buildings the joints containing PCB measure a total of 1,300 m.

As part of the general refurbishment of the academy, which began in 2010, the entire interior is to be renewed and a new music hall is to be built. In the course of the general refurbishment the intention is to replace all windows and doors and at the same time to have the building joints containing PCB removed expertly by a specialist company. The objective of the PCB cleanup is the complete removal of all jointing compounds containing PCB and of the sides of the concrete joints in the immediate vicinity.

In order for the federal academy to maintain operation, general remediation will take place in 14 stages. Each stage covers one area of the building which will be completely remediated within a defined period.

Trossingen town council has commissioned Berghof Environmental Engineering in Tübingen to plan the PCB remediation, to issue the invitation to tender and provide expert site management and measure the results.

The PCB remediation fits in with the trades which are carrying out the individual stages of the general remediation, and will take several years. In the schedules for each stage only a small time window lasting only a few days is to be devoted to removing the joints containing PCB. The work must be done continuously and effectively within this time so that the subsequent work is not impeded. This means that the remediation firm depends on the preparatory work – especially gutting and cleaning the rooms to be remediated – being carried out expertly and on time. If the work of any of the trades is delayed at all it will have a negative impact on the work thereafter. For the expert site management this amounts to a special logistical challenge and particularly requires continuous coordination with the site management of the overall measure, the PCB cleanup company and the other firms carrying out the work on the building.

Berghof Environmental Engineering will verify the successful removal of the joints containing PCB by means of measurements for the purpose of monitoring performance.

PCB remediation has been in progress since May 2011. 7 of the 9 stages involving jointing compounds containing PCB have meanwhile been carried out successfully. The stage involving the most highly contaminated joints in the foyer area is to follow in 2012.

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Expert meeting on the “Amendment to the Federal Soil Protection Act and Ground Water Protection Ordinance”

Effects on the practice for processing historical burdens

At this year’s General Meeting of the altlastenforum (historical burdens forum) Baden-Württemberg e.V. (registered society) on 20.10.2011 this expert event was chaired by Reiner Söhlmann from Berghof Analytics + Environmental Engineering.

Speakers were recruited from the Federal Ministry for the Environment, Nature and Reactor Safety (BMU), the Federal Environmental Agency (UBA), the Federal Institute for Materials Research



Host Reiner Söhlmann

and Testing (BAM), the State Office for Mining, Energy and Geology (LBEG) and from a laboratory. Mr Söhlmann was able to welcome some 90 participants in his introductory speech.

The motivation behind the event was to convey the background to the amendment. Since the speakers are directly involved in the amendment, this objective was achieved excellently.

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Land recycling in the inner-city area

New institute and library building at Furtwangen University



The Schwenningen location is part of the Hochschule Furtwangen University (HFU) which has a total of around 4,800 students. Between October 2010 and October 2011 a new institute and library building was erected on the university campus in Schwenningen as part of the federal and state future investment programme. Costs: Approximately 5.3 million euros.

The new building provides capacity for study courses in the field of “International Economics” or, as the local newspaper put it: “...for tomorrow’s managers”.

The building forms the southern access from the railway station to the campus and has 900

square metres of seminar rooms and office space and another 480 square metres to accommodate the university library.

For the construction of the new building Berghof Environmental Engineering in Tübingen was commissioned to free the land for building by Vermögen und Bau Baden-Württemberg, Constance Office, Rottweil Branch Office. The main focus of this was the selective deconstruction of 5 old town houses which were built between 1889 and 1910.

One of the buildings was in a state of disrepair owing to damage from hail and could no longer be entered. The extreme amount of mould demanded special health and safety measures such as the use of filter cabins for the excavator and personal protective equipment.

Before the actual demolition, contaminated parts of the building were dismantled, for example some 1,500 m² of slag filling under wood floors.

When the pits left behind after the building had

been demolished were refilled, the planned new building imposed demands on the building land which also had to be taken into account.

The intensive and trusting cooperation between Vermögen und Bau Baden-Württemberg and Berghof Environmental Engineering enabled this sensitive land recycling project in the inner-city area to be realised to the utmost satisfaction of all those involved in it.

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Fluoroplastic Technology

New-generation pressure equalisation membranes made from high performance PTFE for the protection of electronic modules in the automotive sector



For over 40 years the Fluoroplastic Technology business unit of the Berghof Group has been developing ventilation solutions made from the high performance plastic, polytetrafluoroethylene (Teflon®, Dyneon™ PTFE). These are used in all instances where it is necessary to equalise temperature differences and differences in pressure due to high altitudes, and at the same time guarantee reliable protection against water inrush and contamination. It is the unique properties of the high performance plastic, PTFE, which predestine it to be used in porous form based on permeable membranes as the ideal material to meet these requirements.

The skills in the processing and application of porous PTFE, gathered and established over decades, are the result of constant new challenges posed by our customers and the close collaboration with them.

These experiences led to the development of a

new generation of permeable pressure-equalisation membranes with a defined, symmetrical pore structure. Under the brand name of permeaflo[®] these are now among other things the centrepiece of pressure equalisation elements (PEE) of all kinds.

The main focus when developing the permeaflo[®] pressure equalisation membranes was on executing the physical-technical specifications such as air flow rate and water entry pressure in finely tuned stages, at the same time significantly increasing the performance characteristics to enable us to respond to the diverse new and sophisticated requirements of our customers with tailored solutions.

A further benefit for the customer is the completely symmetrical pore structure of permeaflo[®] pressure-equalisation membranes.

It ensures that the membranes are water and dirt-resistant in both directions, but permeable for gases. Therefore it is not necessary to predefine an installation direction.

Depending on the requirement, our membranes are available in the form of foils, turned and punched components and also as prefabricated structural components such as screw-in or clip-in built-in elements. This guarantees easy integration into existing components and ultimately contributes towards optimising the production process of our customers.

permeaflo[®]

Characteristics

- Typical air flow rate at $\Delta p = 70$ mbars (1.0 psi): 16 NI/h.cm²
- Typical water entry pressure: 0.6 bars
- Thermal stability: - 40 to 125 °C
- Water-resistant
- Oil-repellent (optional)
- Universal resistance to chemicals
- Protection class IP68 is met
- Conforms to the EC Directive 2000/53/EC (End-of-life vehicle directive)

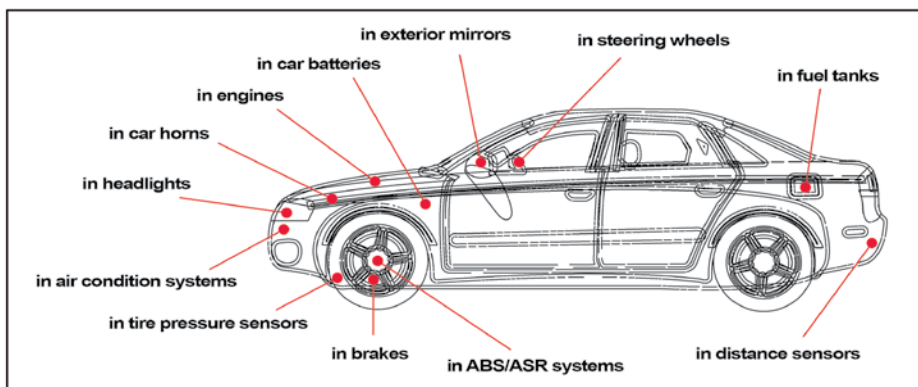
Ventilation solutions in the automotive sector

As the illustration shows, permeable membranes are used in the automotive sector in a large number of electronic vehicle components such as instrumentation and control systems, as well as in headlights and batteries. There they are subject to extremely high quality requirements and must always function reliably under very difficult conditions.

Berghof developed the permeaflo[®] M60 membrane specifically to meet the requirements in the automotive sector; it both has the requisite typical characteristics required in vehicle construction and it meets the high quality standards of the industry.

In the sophisticated vehicle environment permeaflo[®] M60 provides protection of the electronic modules against condensation, water inrush and differences in pressure; it also prevents dust, dirt, salt and oils from entering. It is the unique properties of the high performance plastic, PTFE, which guarantees top resistance and a long service life for our pressure equalisation membranes.

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Membrane Technology

Altenberge Central Dump — a seepage treatment success story



The Altenberge plant in North-Rhine Westphalia, and the majority of the Berghof modules and membranes installed there, have been in operation since 1996. They can therefore testify to a service life in excess of 15 years.

In this plant the seepage water is treated in the following process steps: nitrification - denitrification - ultrafiltration plant – adsorption stage. The most important plant parameters in brief:

Hydraulic capacity: 350 m³ per day
 Seepage water volume per year: Approx. 100,000 m³
 Power consumption of whole plant: Approx. 200 kW
 Start of operation: 20.08.1996

The ultrafiltration plant equipped with Berghof modules possesses the following characteristics and quality parameters:

Module type: MO P37
 Membrane type: 37.03 (polypropylene)
 Membrane material: PES
 Cut-off: 100 kD
 Permeate flux: 102 to 162 l/hm² depending on membrane status and type
 Cleaning: Cleaning intervals
 Approx. 8 weeks
 Combination cleaning acid/alkaline

Quality parameters		Inlet	Drain
TSS	g/l	27	
BSB5	mg/l	280	20
CSB	mg/l	2,000	234
NH4-N	mg/l	900	5
AOX	mg/l	1.1	0.5

Based on this membrane which was installed successfully 15 years ago in Germany, Berghof has further developed the product and its integration into new modular technologies.

Thanks to this ongoing product development, today Berghof can provide a PVDF membrane with new, crucial advantages:

- Improved chemical resistance
- A longer life expectancy
- Membrane with smooth service, hence less tendency to foul

Prospects

The largest MBR seepage-water treatment plant in the world with Berghof membranes with a capacity of 3,500 m³/day is to be built in China in 2012. At present over 150 Berghof MBR seepage-water plants are in operation. Berghof is market leader for this application in China.

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Prozesstechnik

Berghof AMS — Audit-Measurement-System

Today car seat manufacturers are faced with extremely high quality requirements which are constantly becoming more stringent. It is therefore eminently important to satisfy both the customers' and our own quality demands in the production area.

To meet these requirements certain product characteristics are checked in the course of production. Monitoring takes the form of regular pro-

duct audit measurements on the car sets. A car set consists of the front seats, the second and – depending on the type of vehicle – a third bench seat. The evaluation of the results is used to continually optimise the process sequences.

For the product audit measurements at different points on the car seat, such as rotary axles, slide axles and tilt functions etc. the compression and traction force curves are measured and analysed in compliance with test regulations.

Berghof has developed the Audit Measurement System (AMS) to perform these product audit measurements on car seats.

The Berghof AMS is constructed from a measuring table to accommodate



Characteristics

- Reliable, reproducible results
- Automatic measured value capture and evaluation
- Display of the measured data on the operator interface
- Automatic archiving of the measured data
- Standardised hardware and software technologies used
- Dependable mechanics for variable adjustment of all measurement points
- Multilingualism

and fix the seats and a measuring portal with six manually adjustable, rotational and translatory adjustment axes. Thanks to this setup the force-displacement measuring unit can be aligned and positioned on the car seat in any position with a random orientation. It is no problem to integrate an existing measuring table provided by the customer into the measuring portal.

The force-displacement measuring unit consists of a motor-driven linear axis with a built-in force sensor and incremental displacement sensor, and it is connected to the instrument cabinet. The instrument cabinet essentially contains an in-

dustrial PC, the controller for the linear axis and the measuring amplifier for the force sensor. The individual measurements are parameterised and stored in setting mode via the user interface. In the measuring mode the operator selects the desired measurement. Measurement is started on the variable operator panel. During the measurement the linear axis is displaced along the preconfigured measurement range, whereby the force-displacement curve is measured.

The measured curve is displayed graphically to the operator in a system of coordinates. The curve trace is automatically analysed in accordance

with specific criteria. The measured curves with evaluation data can be archived in a database if requested. Reporting and analysis of the archived measured data from the regular product audit measurements are carried out by means of a data management tool, such as "DIAdem" from National Instruments.

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Promotion of young talents at Berghof



Children participating in the Engstingen holiday programme are busy building a robot which they will program thereafter.

More or less as expected, only boys were attracted to this interesting and promising item in the Engstingen holiday program. They were all interested in technology. Therefore it was no problem for the seven boys aged 12 to 15 to build a programmable robot from the LEGO MINDSTORMS NXT kit.

Although this is a technical toy, it can nevertheless be used well as a teaching aid. It is a good example of an embedded system in which a micro controller works together with electromechanical parts and sensors. For example, the robot can react to touch, noises, light and colours and determine distances by means of an ultrasonic sensor. Readings are shown on a display, sound files are played-back with a built-in loudspeaker and defined motion sequences are controlled by the servo motors.

Control sequences which can be executed on the micro controller can be created very fast with the intuitive drag & drop programming software.

Programming the robot was really exciting for the children. A variety of problems were dealt with under instruction, and in passing the children playfully learned the basic principles of programming. Concepts for solutions were developed on the basis of the respective problem and were implemented programmatically. The programs were tested, corrected and optimised and, if desired, also adapted and further developed. The sky is the limit when it comes to ideas.

The objective of the event was to arouse the interest and enthusiasm of young people for technology and hence also for technical vocations. In

neering partner, National Instruments, Berghof in Eningen provided the entire equipment for the workshop. By doing so, Berghof has made a small but important contribution towards the promotion of young people.

At all events, the children found it extremely exciting to find out about technology, build the robot and put it to a purposeful use. And they certainly had plenty of fun; some were very disappointed when the day came to an end.

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view of the current lack of qualified experts, which is increasingly becoming a hindrance to growth and innovation in Germany, all areas of education are challenged to counteract this and to awaken the interest of young people in studying technical subjects.

In cooperation with its measurement engi-

Leading international trade fair for electric mobility - eCarTec Munich 2011



After more than 100 years of combustion engine development history, electric mobility is now ushering in a new traffic era worldwide. The development of electrified drives is one important element of future mobility. Our Process Engineering business unit in Mühlhausen presented itself at the eCarTec for the first time this year with this in view.

At the eCarTec trade fair the focus was on such topics as: Electric vehicles, drive and engine technology, engineering and supplies, energy and infrastructure and storage technologies.



High Voltage Battery Pack BMW X6 (ActiveHybrid X6).

Berghof Process Engineering presented new products such as test systems for power electronics, PETS (Power Electronics Test Systems), as well as test and conditioning systems for energy storage in vehicles. The High Voltage Battery Pack for the BMW X6 (ActiveHybrid X6) proved to be a special eye catcher on site. In this setting Berghof cooperated with BMW AG to demonstrate the use of the BMS Battery Management System.

The trade fair showed that the fundamental principles of the technologies for electric drives, energy storage and grid infrastructure have already



Berghof stand at the eCarTec 2011 in Munich

been developed. However, at numerous points in the value creation chain more research, optimisation and, above all networking is required. Berghof sees a special challenge in this if it is to play a

crucial role in determining this market sector in future. The new products presented by Berghof at the fair and the numerous contacts made at the fair constituted a positive start which must now continue to be developed.

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Laboratory Technology

Water detection without chemicals by means of the easyH₂O®

The water content of substances plays a major role in many different industries. However, laboratories depend on a fast and reliable method for detecting the water content to establish local control of raw materials and products. Delays in the production process owing to insufficient quality control entail high costs for the manufacturer. The Berghof easyH₂O® delivers fast, reliable and reproducible results and therefore contributes to a more efficient production process. No toxic or special

chemicals like, for example, the Karl Fischer titration are required to operate it. The operator profits from the very low operating and disposal costs.

Selective high-temperature coulometric detection of water

The Berghof easyH₂O combines thermal evaporation of water with a selective, electrochemical water sensor made from hygroscopic phosphorus pentoxide (P₂O₅). In this process

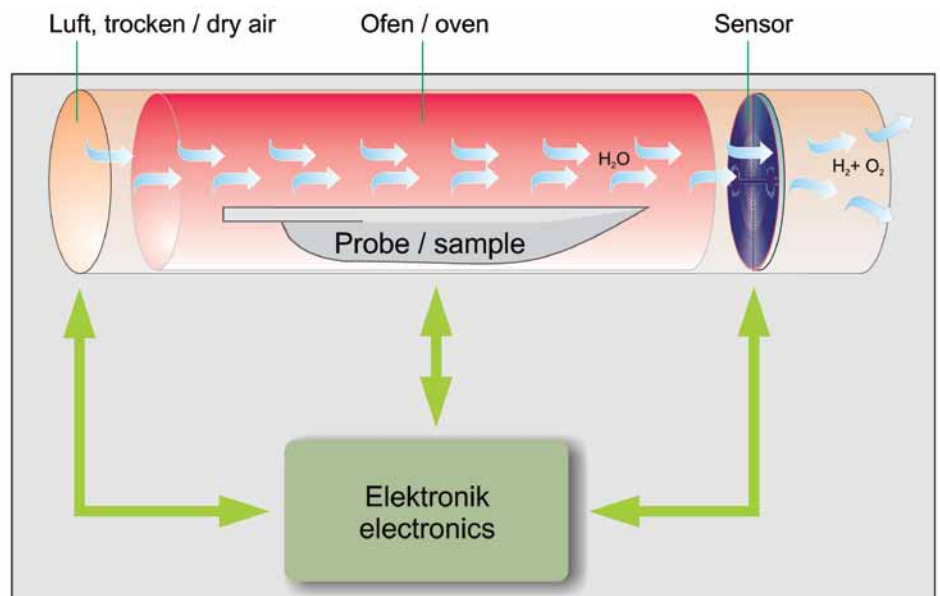
ambient air is sucked-in and dried to obtain the carrier gas. This makes it possible to do without special chemicals. Furthermore the easyH₂O® is characterised by a high degree of verifiability. Samples containing between 1µg and 5 mg of water can be determined. The highly sensitive P₂O₅ sensor therefore facilitates the detection of water in material using samples weighing only a few milligrams. Besides development laboratories which can only use small sample quantities

Infobox easyH₂O

EasyH₂O® combines 3 standard measurement techniques in a simple and reliable method:

- Samples are heated by convection heat, similar to the cabinet drying method.
- Water is absorbed by means of hygroscopic phosphorus pentoxide, similar to the method for measuring humidity in gas:
- Coulometric evidence of the bonded water by means of Faraday's Law, similar to the Karl-Fischer titration:

This combination results in an exact, reliable tool which contributes significantly in R&D and quality assurance.



owing to the synthetic conversion, laboratories that examine the expensive raw materials at incoming goods control also benefit.

Example applications

The Berghof easyH₂O[®] is suitable for a large number of very different samples which can be analysed in sequence (refer to table). There is no need to exchange the sensor for this. During measurement the sample remains in the oven chamber and does not come into contact with the P₂O₅ sensor. This makes it possible to exclude cross-contaminations which can distort the result.

The easyH₂O[®] broadens the product range of Berghof Laboratory Technology to include an environmentally friendly and reliable apparatus for water detection which delivers fast, inexpensive results.

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Industry	Sampling	Water content EasyH ₂ O [®] (%)	Water content Karl Fischer (%)
Pharma	Lactose	5,2	5,2
	Dextrose	8,0	8,2
	Vitamin C tablets	2,3	2,9
Food	Starch	10,6	10,7
	Coffee	3,7	4,1
	Coffee whitener	3,1	3,9
Cosmetics	Cosmetic raw material	12,4	12,8
	Soap	2,1	2,1
	Soap raw material	1,7	1,8
Materials	Polyester	0,2	0,2
	Polyethylene	< 0,01	< 0,01
	Quartz powder	0,1	0,1
	Gypsum	17,4	17,51



Berghof sells Environmental Express HotBlock™ digestion systems

From now on Berghof, itself the manufacturer of the innovative speedwave microwave digestion devices and the digestec pressure digestion systems, will be selling the HotBlock™ digestion systems manufactured by Environmental Express, Charleston (South Carolina), USA. Environmental Express has revolutionised acid digestion of easy-to-digest samples such as waste, soil, sludge, wastewater etc. by introducing the principle of disposability.

Up to 96 samples are digested simultaneously in disposable vessels in the PTFE-coated graphite heating blocks, the "HotBlocks". The same vessel is worked with from weighing-in through to spectroscopic analysis. At no time is it necessary to transfer the sample solution. Therefore contamination is prevented effectively. The acid-resistant digestion vessels are always supplied with a purity and capacity certificate. They provide ±0,5% (Class A) volume accuracy by means of appropriate graduati-

HotBlock™

on. Reproducible, reliable results are guaranteed.

Full automation of the digestion process is feasible with the unique AutoBlock™ systems. This addition to the product range now enables Berghof to offer digestion solutions for easy-to-digest environmental or food samples, even including the most difficult ceramic samples.

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The Berghof Group of Companies

Controls

Control technology system solutions from Berghof save time and cut costs. The solutions comprise our own hardware and software components supplemented by customer-specific developments and services. This is the way we prove our competence and win our customers' trust. Our system solutions are the basis for our growth.

Eningen

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Prozess engineering

Berghof supplies innovative test technology to guarantee that growing quality demands and increasingly sophisticated product innovations in production and development are met. We support our customers in fulfilling their ever more complex assignments. We constantly face these challenges, improving ourselves and our skills, while retaining the self-responsibility of each employee.

Eningen

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Analytics

Berghof performs chemical and physico-chemical analyses for companies in the pharmaceuticals and food industries as well as for environmental engineering and the waste management industry. We support our customers with the planning and interpretation. Beyond analytics and sampling, our objective is to identify customers' needs, be accessible for customers and implement optimal solutions in cooperation with them. The key to it is that we act as partners providing consultancy

in matters concerning analytics and the relevant regulations.

Tübingen

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Chemnitz

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Environmental engineering

As independent experts Berghof is responsible for expertises and consultancy. We are your partner for engineering services in the environmental sector. We take responsibility for the entire project control, starting with the planning, obtaining the necessary permits and through to documentation, support and supervision of the measures taken. The interdisciplinary employee structure enables us to find professional solutions even for very complex assignments.

State-of-the-art database-related evaluation systems and innovative measuring systems help to save time and cut costs. Our customers benefit from our decades of experience.

Tübingen

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Ravensburg

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Membrane technology

Berghof is a competent partner for membrane filtration. Our high quality organic tubular membranes and modules are used successfully in many interesting markets, such as external MBR technology. We supply our OEM partners with a broad range of products including engineering, service and innovative process concepts to enable them

to act with even greater economic efficiency and success in the market.

Leeuwarden, Niederlande

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Laboratory technology

The Berghof laboratory apparatus are based on high quality fluoropolymers. Pressure vessels produced from this are used worldwide in chemical laboratories in industry and research. We develop and market innovative concepts for apparatus for heating and reaction control for preparing samples and in trace analytics, as well as for syntheses under high pressure.

Eningen

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Fluoroplastic Technology

Berghof develops new applications based on the most modern fluoropolymers and their special material properties. These include, for example, customer-specific pressure equalisation elements or optical reflectors made from porous PTFE. The processing technique we use is the isostatic compression-moulding method, which we continued to develop and have perfected.

Over 40 years' experience is the guarantee for unsurpassed quality and competent consultancy.

Eningen

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Employees with jubilees in 2011

We thank all those who are celebrating jubilees for all the work they have done and for their loyalty to Berghof:

For 50 years

- Erich Holder

For 40 years

- Roland Witmann
- Josef Waidmann

For 10 years

- Gundula Koch
- Sofiane Saidi
- Katrin Lorenz
- Daniel Werz
- Wladimir Korn
- Alexander Wiedemann
- Uwe Schlotterbeck

Retirement in 2011

With our best wishes for his future, we bid farewell to:

- Erich Holder

Analytics

Berghof Analytics — Monitoring and accreditation upgrade

In November this year in the Analytics sector routine monitoring was carried out and at the same time the accreditation of the Chemnitz and Tübingen locations was upgraded in compliance with ISO 17025.

The upgrade was performed because of newly introduced measuring systems: Inductively coupled plasma - mass spectrometry (ICP-MS) at the Tübingen location and inductively coupled plasma – optical emission spectrometry (ICP – OES) at the Chemnitz location. We already reported on this in the 2011-1 Berghof news.

Furthermore, there was an upgrade to include the Soil and Historical Burdens specialist module. This has prepared us very well for the new requirements arising from the introduction of the (German) regulation concerning experts and examination centres for soil protection and historical burdens (BodSchASUV0) in Baden-Württemberg. These measures give our customers the certainty that they are obtaining results by means of state-of-the-art processes and accredited methods.

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From left to right: Production Manager Kurt Knoll, Roland Witmann, Managing Director Nikolaus Rombach, Josef Waidmann, Area Manager Franz Ott

Current Developments and changes in the Berghof Group

In future the Controls (C) and Test Engineering Eningen (TE) business units will be cooperating closely.

To this end the two units are to merge into a single business unit managed by Franz Ott. The objective is to create added value for existing and new customers by amalgamating the two areas of competence, and thus together they will become a more effective unit in the automation market.

Since August this year the Analytics and Environmental Engineering business units have been operating under the management of Mr. Kapp.

In this case the measure aims at networking the Analytics and Environmental Engineering locations more closely and at generating optimal services for our customers.

Nikolaus Rombach

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