

HUBER Report

International

News for Customers and Friends of HUBER TECHNOLOGY

September 2010

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IN BRIEF

Mechanical wastewater treatment

With the HUBER RoDisc® Rotary Mesh Screen we have risen to the challenge of increased requirements on future wastewater treatment. New technical developments combined with innovative manufacturing technology ensure the HUBER RoDisc® Rotary Mesh Screen is ahead of future requirements in wastewater treatment.

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Sludge treatment

When we speak about the future of sewage sludge disposal today, regional and supranational differences are evident. Everyone seems to talk about agricultural or thermal utilisation and phosphorus recovery but everyone also seems to interpret these topics most differently. What all these disposal ways in discussion have in common, however, is the need for efficient sewage sludge dewatering and drying.

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Filtration & ReUse

The demand for centralised sewage treatment plants has become nearly saturated in industrialised countries. A huge development potential still exists, however, in many other parts in the world, such as Africa, Asia, Russia, Middle East, South America, and even South and East Europe. Due to population growth especially in the conurbations of these regions adapted and sustainable local water management solutions are urgently required. "Water is life" in this context means the supply of drinking water as well as sanitation and irrigation solutions in these by nature arid regions.

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International trade fair for water – wastewater – refuse – recycling

HUBER exhibits at IFAT Entsorga 2010

IFAT (International Trade Fair for Water – Wastewater – Refuse – Recycling) is the biggest and most important international trade fair for innovations, novelties and services on the environmental sector. About 2,620 exhibitors from 44 countries will show their products and innovations for sustainable water management in industrial nations and adapted technologies for developing and emerging countries.

Conferences, symposia, workshops and forums will be organised to complete the program. Every two years Munich is the centre and pivotal point of international environmental technology. From 13 to 17 September 2010, everything in the city will be about environment again. HUBER has exhibited at IFAT for many years and always presented one of the biggest stands.

This year, HUBER will show its product portfolio on an area of 1,100 m². With its worldwide reputation, the trade fair is of great importance also for HUBER. HUBER is opening new markets in the fields of "Green Building" and "heat from wastewater".



HUBER stand at IFAT 2008

IFAT is the optimal platform to present further developments and novelties. For easy orientation on our

stand (in hall A2, stand no. 329) without spending too much time on finding exhibits or your contact partners, you will find a site plan on page 4 – 5.

HUBER ThermWin® and HUBER RoWin

Heat recovery from raw sewage

Environmental disasters, such as the oil disaster in the Gulf of Mexico, the global economic crisis and ever decreasing resources remind us that we urgently need a safe, eco-friendly and financially attractive energy source. Right below the ground, in sewers, is an unnoticed hidden source of energy that fulfils all these criteria: municipal wastewater. The HUBER Heat Exchanger RoWin has been developed especially for this application.

Heat pumps use environmental energy sources, normally groundwater or air. But both elements have the disadvantage that their energy level decreases in winter whereas in summer the air and groundwater temperature rises. This makes it difficult to use them as energy source or sink for the climatization of buildings, while wastewater possesses a huge heat potential even during cold months. The intake of shower and wash water ensures that the temperature level in the sewer rarely falls below 12 °C.

In summer, the soil serves as isolation against the warm sun and ensures that the maximum temperature does not exceed approx. 20 °C. This narrow range between minimum and



A HUBER Heat Exchanger RoWin installation on the Côte d'Azur

maximum values makes municipal wastewater the ideal medium for the operation of heat pumps. The reason why wastewater heat recovery has hardly been used by now is probably the fact that the coarse material and

contaminants contained within wastewater impair the function of heat pumps, and clarifying the wastewater would mean an unjustifiable expense.

For more information read page 3.

EDITORIAL



Dear Reader,

IFAT 2010, the major international trade fair, casts its shadow before. Exhibitors and visitors from all over the world are expected to come to Munich in September to see and discuss new products and solutions to be applied and implemented in the coming years. It may be debatable whether it makes sense to reduce the interval from three to two years. On the one hand, this means additional costs and enormous expenditure of extra work. On the other hand, innovation cycles of products and solutions, also of industrial goods, have become much shorter in recent decades. What has not changed is our ambition to offer our customers affordable innovative, high-quality products and solutions for their own benefit and the benefit of the environment. In this HUBER Report issue we give you a taste of what you can expect from us at IFAT and in the years to come. I look forward to seeing you at IFAT and will be pleased to receive your comments and suggestions for improvement.

We always hope to remain your reliable partner when it comes to solving problems.

Very sincerely yours,

Georg Huber

Reliable separation of solids from wastewater

L-shaped HUBER RakeMax® Multi-Rake Bar Screen completes the product range



● Berching

L-shaped multi-rake bar screen and like the RakeMax® screen belongs to the MAX family of HUBER screens. This screen has a flat and therefore hydraulically advantageous bottom section that transitions into a steep conveying section.

This combines the benefits of the well proven RakeMax®, reliable solids separation and high screenings discharge capacity, with a low head-loss due to a big effective screen rake surface. Material removal from the screen starts right at the bar rack mounted flat to the channel bottom so that any accumulation of disturbing material is eliminated. The cleaning elements, attached to the chain system, can easily be adjusted to different requirements. This is especially favourable for high solids loads.

Depending on the bar spacing, the bar rack design is either a flow-optimising bar or non-blocking wedge wire profile. Both ends of the cleaning elements are connected to drive chains. Each chain is driven by a sprocket on a common shaft and a flange mounted gear motor. At the end of the bar rack cleaning cycle the cleaning elements are positively cleaned by a pivoted comb which reliably discharges the removed screenings

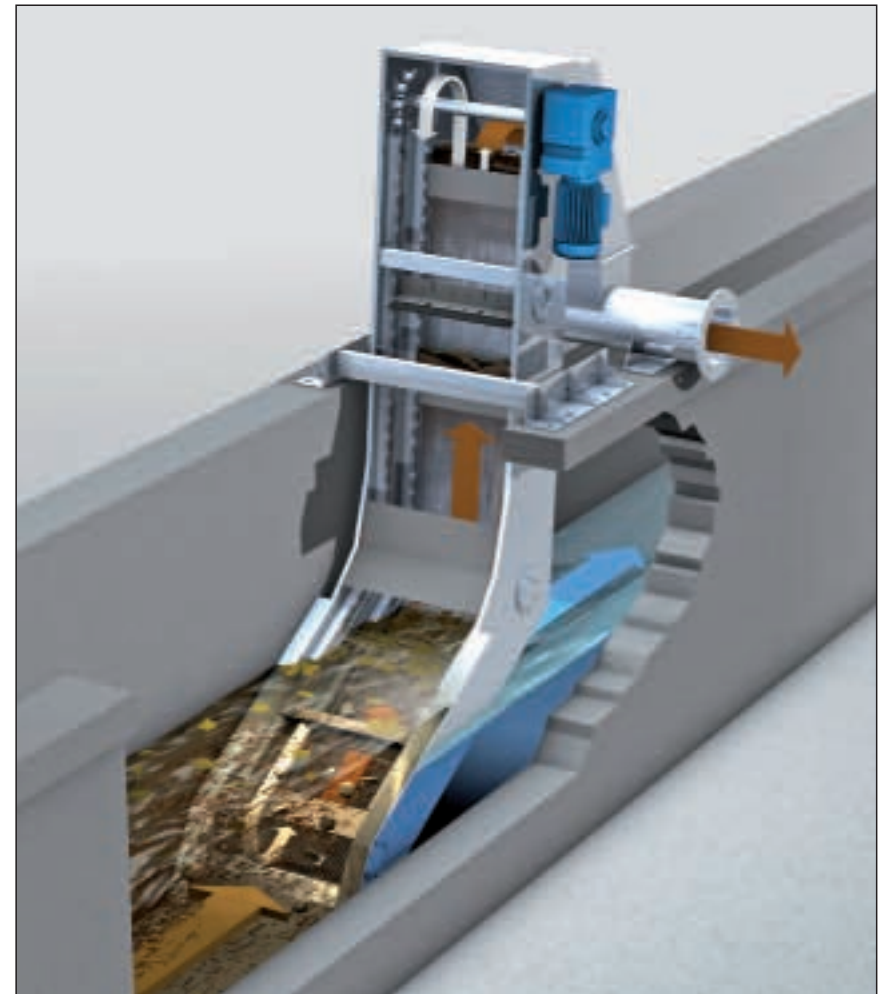
into a downstream transport or disposal unit. The easy to access and maintain drive unit is installed above the channel.

Due to the screen's compact design its height above floor is very low. Especially in existing screening plants minimum requirements on solids retention in the inlet are not reliably met so that the passage opening at the bar rack must be reduced, frequently with the result of growing hydraulic loads.

These conditions make it inevitably necessary to provide for a bigger hydraulic passage area, and this normally means that the size of the existing channel has to be extended or even a new building erected for the screen, with the result of high construction costs.

With the new L-shaped RakeMax-hf® screen HUBER offers another type of inlet screen in order to be able to better meet customer requirements in terms of specific constructional and hydraulic site conditions and reduce investment and operating costs.

BU Mechanical Treatment



The RakeMax®-hf screen consists of a flat and therefore hydraulically advantageous bottom section and a steep conveying section.

The HUBER RakeMax® Multi-Rake Bar Screen for preliminary mechanical wastewater treatment was developed by HUBER in 2003 and presented to the public for the first time at IFAT 2005. Due to its versatility the RakeMax® has since very well proven its efficiency and become firmly established in the global wastewater technology market.

On the basis of the successful RakeMax®, another new screen type for headworks has been developed in the course of continuous further development, the RakeMax®-hf. It is a

Longest HUBER Belt Screen EscaMax® units ever manufactured supplied to Copenhagen

WWTPs Lynetten and Damhusaen receive six HUBER EscaMax® screens each



● Copenhagen

ses the hygienic situation inside the screen room has significantly improved. Also downstream clarification processes profit because process-relevant materials, such as faeces, etc., are washed out and returned.

The screenings are transported to the Wash Presses by 32 m long launder channels, which very reliably work already with only a minor slope. The interaction of WAP/SL and launder channel leads to enormous savings in operating costs as screened wastewater is used as transport medium, very much to the delight of the Danish plant operators.

The customer is enthusiastic about the alternative launder channel technology which has eliminated operating problems previously caused by clogged or even worn screenings conveyors. Installation of the machines was not only a technical but also logistic challenge for HUBER because the six screens had to be mounted without interrupting the WWTP operation. All six screens were therefore

replaced one after the other over a period of three months. The first screen was put into operation in September 2009. Initially, the order conditions had included several guarantees but due to the high satisfaction of the operator with the HUBER equipment these were cancelled during the three-month installation phase.

Customer satisfaction was also one of the main reasons that we received another order in January 2010 for the supply of two Sludge Acceptance Plants to WWTP Lynetten. Moreover, the order for the project Damhusaen was included in the Lynetten project. Lynettenfallelskabet I/S are the plant operators also in this case and site requirements were similar. We supplied again six HUBER EscaMax® screens and two WAP 6 SL Wash Presses. Only the WWTP capacity of 250,000 PE is smaller than that of the Lynetten plant so that screen size 6000 x 1752 mm with 8 mm perforated plate was sufficient. Each screen must be able to handle a flow rate of

1,305 l/sec. The great challenge for HUBER in this project were the extraordinarily high amounts of grit. But HUBER had the optimal solution also in this case. In collaboration with Dansk Stahlmontage A/S the customer showed himself impressed throughout the entire course of the project.

Owing to the innovative HUBER solution failure of screens under storm conditions, transport problems with conveyors and disposal problems due to insufficient screenings washing and compaction have definitely become a thing of the past. It was experienced in both projects that the amount of screenings separated by the 8 mm perforated plate screens had increased by up to ten times. A volume reduction of up to 70% is achieved through intensive screenings washing in the two Wash Press units that receive the screenings from two launder channels.

International Sales

The two WWTPs Lynetten and Damhusaen are situated directly at Copenhagen harbour. Lynetten is Scandinavia's showcase plant par excellence and counts a large number of numerous international visitor groups every week. The sewer system of the Danish capital is very old and flat with the result of enormous amounts of deposits being present in the sewers. In the event of heavy rainfalls, these deposits are carried along into the sewage treatment plant. The previously installed screen pumps with 10 mm bar spacing had great problems to cope with this situation.

The plant operators, Lynettenfallelskabet I/S, were therefore looking for an alternative solution. At IFAT 2008, the customer thoroughly examined various screening system and liked the HUBER solution with the perforated plate belt screen. He preferred the HUBER EscaMax® screen not least for its sturdy design, unique cleaning system and good experience made with it in applications of similar size. The positive experience the customer had made with the two HUBER Grit Washers RoSF 4 supplied in 2000 was another key to success.

We bided together with our long-time partners Dansk Stahlmontage A/S and won the tender. In April 2009, we received the order to supply six of the longest size of HUBER EscaMax®

screens (size 9000 x 2252) and two Wash Press units type WAP 6 SL. While HUBER manufactured and delivered the technical equipment required to meet the process requirements, our Dansk Stahlmontage A/S took over the installation of the machines. On WWTP Lynetten, a flow rate of 2080 l/sec is cleaned per screen, which is a plant capacity of 750,000 PE. Owing to the Wash Pres-



HUBER Belt Screen EscaMax® on WWTP Damhusaen



HUBER Belt Screen EscaMax® on WWTP Lynetten

Continued from page 1: A solution to heat and cool schools, hotels, etc.

Heat recovery from raw sewage

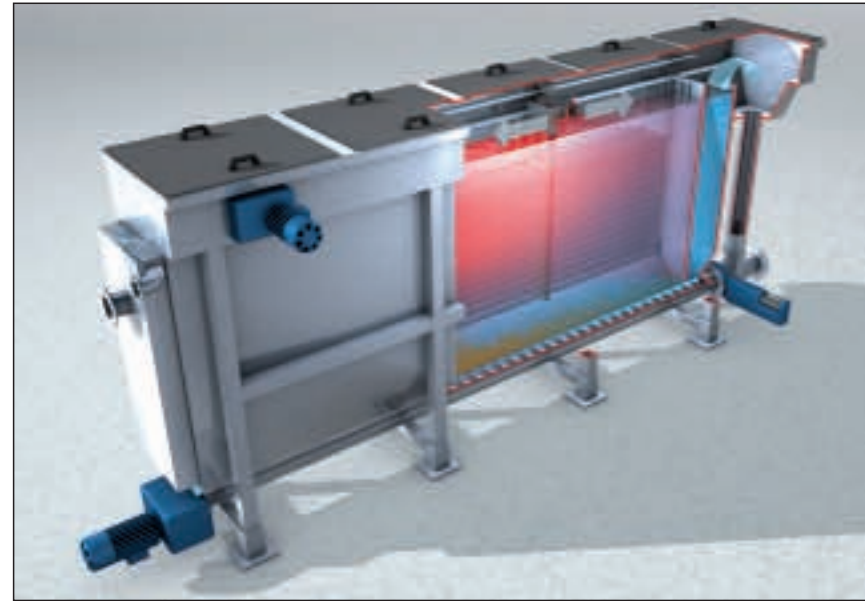


The HUBER Heat Exchanger RoWin has been developed by specialists with a completely different approach: transfer of the energy contained within the wastewater to a medium that is suitable to operate heat pumps. The patented HUBER ThermWin® system includes not only the wastewater heat exchanger HUBER RoWin but in addition optimised extraction of wastewater from the public sewer.

A tangential shaft installed near the wastewater collector both ensures that wastewater can flow by gravity into the shaft and serves as intermediate storage tank for the pump feeding the HUBER Heat Exchanger RoWin.

A HUBER ROTAMAT® Pumping Stations Screen RoK 4 ensures preliminary clarification of the wastewater and protects the HUBER RoWin® system against coarse material. The coarse material retained by the RoK4 screen

is returned downstream to the sewer along with the cooled down wastewater. To prevent negative influences of biofouling caused by microorganisms



Functional drawing of a HUBER Heat Exchanger RoWin

contained within the wastewater, the HUBER Heat Exchanger RoWin is equipped with a cleaning system which periodically cleans the surface of exchanger pipes and therefore prevents the growth of fouling. Such preventive cleaning guarantees a continuously high heat transfer.

The coarse material contained within the wastewater settles in the HUBER Heat Exchanger RoWin and can be discharged from the system by means of a screw conveyor. The core of the HUBER wastewater heat exchanger RoWin lies inside the sys-

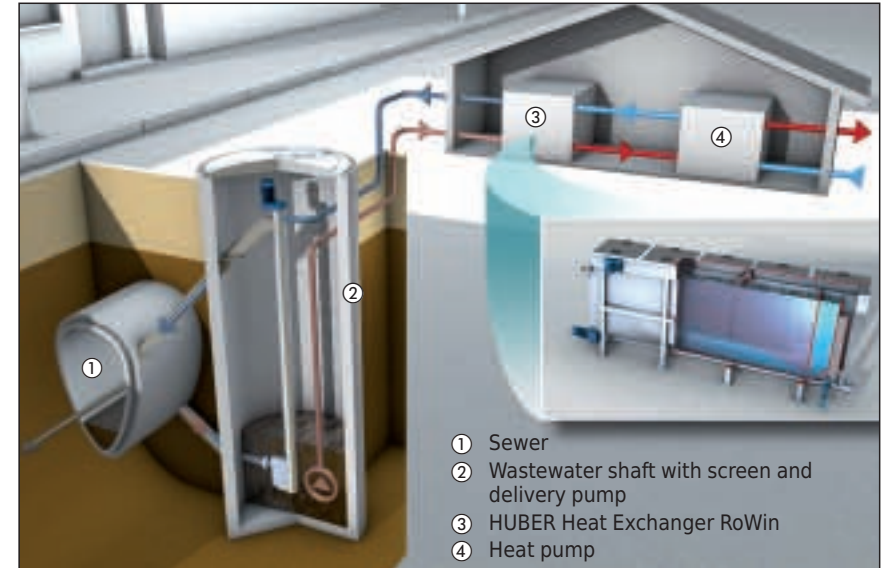
tem: Specially manufactured exchanger pipes guarantee the ideal heat transfer and the compact design ensure an optimal flow around the pipes. The basic HUBER Heat Exchanger RoWin version consists of a tank that integrates the pipe modules. It can be installed virtually everywhere. The resulting process engineering advantages are beneficial especially on industrial plants.

As an option, the modules can be installed directly in a channel or tank. In this case, no additional energy is necessary to pump the wastewater.

The energy-rich water flows directly around the pipes giving off its energy to the cooling medium. No additional floor space is required. Due to its modular design the HUBER Heat Exchanger RoWin can be adapted to meet specific site requirements.

The pipe modules can be installed in a tank; this keeps all options open. Wastewater is available in many places. Due to its energy level it is an ideal possibility to heat and cool schools, hotels, sports halls or industrial facilities.

BU Mechanical Treatment



HUBER ThermWin® System consisting of a HUBER Heat Exchanger RoWin and ROTAMAT® Pumping Stations Screen RoK 4

Large-scale screenings treatment projects

Major projects successfully executed in England and Russia



Four large projects could successfully be completed in the course of the past years: Dublin Bay (UK), Knostrop (UK), Mitchell Laithes (UK) and Saint Petersburg (Russia). The machines supplied were primarily big wash presses, screens, septic sludge and sewage sludge thickening machines, conveyors, and grit washers for flow rates from 20 to 30 m³/s.

Dublin Bay is a delta shaped inlet of the Irish Sea off the east coast of Ireland. The bay is approximately 10 km in width at its north-south base and 7

km in length to its apex at the centre of the city of Dublin, stretching from Howth Head in the north to Dalkey Point (at Dún Laoghaire) in the south. The metropolitan area of the city of Dublin almost completely surrounds three sides of the bay (the north, west, and south), while the Irish Sea lies to the east.

Dublin is the largest city and the capital of Ireland and counts approx. 5 million inhabitants on an area of 70,000 km². The wastewater treatment plant Dublin Bay is designed for

a population equivalent of 2 million, i.e. a maximum flow rate of 30 m³/s.

The following HUBER machines are installed on WWTP Dublin Bay:

- 7 HUBER RakeMax® Multi-Rake Bar Screen units, 2452 width
- 7 HUBER Wash Press WAP/SL units, size 12, with launder channel
- 4 ROTAMAT® Sludge Acceptance Plants
- 6 sludge thickeners

Another large project is Knostrop (UK) designed for 2 million PE and a flow rate of 20 m³/s. Three HUBER Wash Press WAP/SL units, size 12, for intermittent operation and another three Wash Press units of the same series are installed on this site.

The following HUBER machines were supplied to WWTP Kostrop (UK):

- 6 HUBER Wash Press WAP/SL units, size 12, with launder channel

Mitchell Laithes, Dewsbury is another project in the UK. Dewsbury is a minster town within the Metropolitan Borough of Kirkless, in West Yorkshire, England. It is to the west of Wakefield, to the East of Huddersfield and south of Leeds, and lies by the River Calder and the Calder and Hebble Navigation canal system.

The local wastewater treatment plant is designed for 250,000 PE and a screenings volume of 24 m³/h.

The following HUBER machines are installed at Mitchell Laithes:

- 3 HUBER Wash Press WAP/SL units, size 12
- 2 HUBER Wash Press WAP/SL units, size 6

Saint Petersburg, located on the Neva River at the head of the Gulf of Finland on the Baltic Sea, has more than four million inhabitants and is Russia's second biggest city and one of

the biggest cities in Europe. The Saint Petersburg wastewater treatment plant is dimensioned for 3.5 million PE and flow rates of up to 22 m³/s.

The following machines are installed at Saint Petersburg:

- 4 HUBER Wash Press WAP units, size 6
- 4 comminuters

➤ 2 belt conveyors

➤ 8 COANDA Grit Washer RoSF 4 units

These installation examples prove that HUBER has the expertise to design and supply the optimal solution for any customer's wastewater treatment plant, whether small or large-scale plants.

BU Mechanical Treatment



HUBER Wash Press WAP 12 SL, Mitchell Laithes (UK)



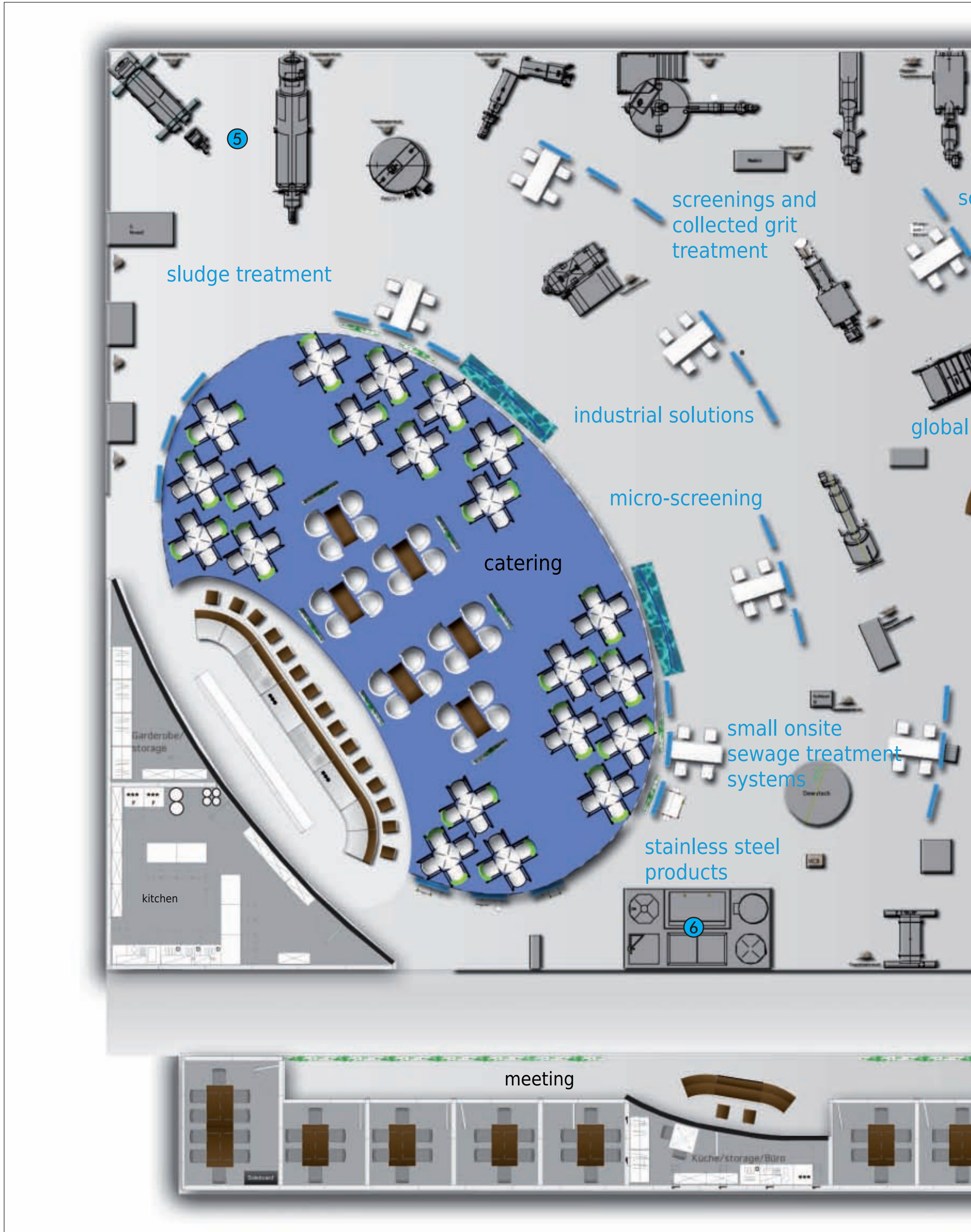
HUBER Wash Press WAP 12 SL, Knostrop (UK)



HUBER Wash Press WAP SL, Dublin Bay (UK)

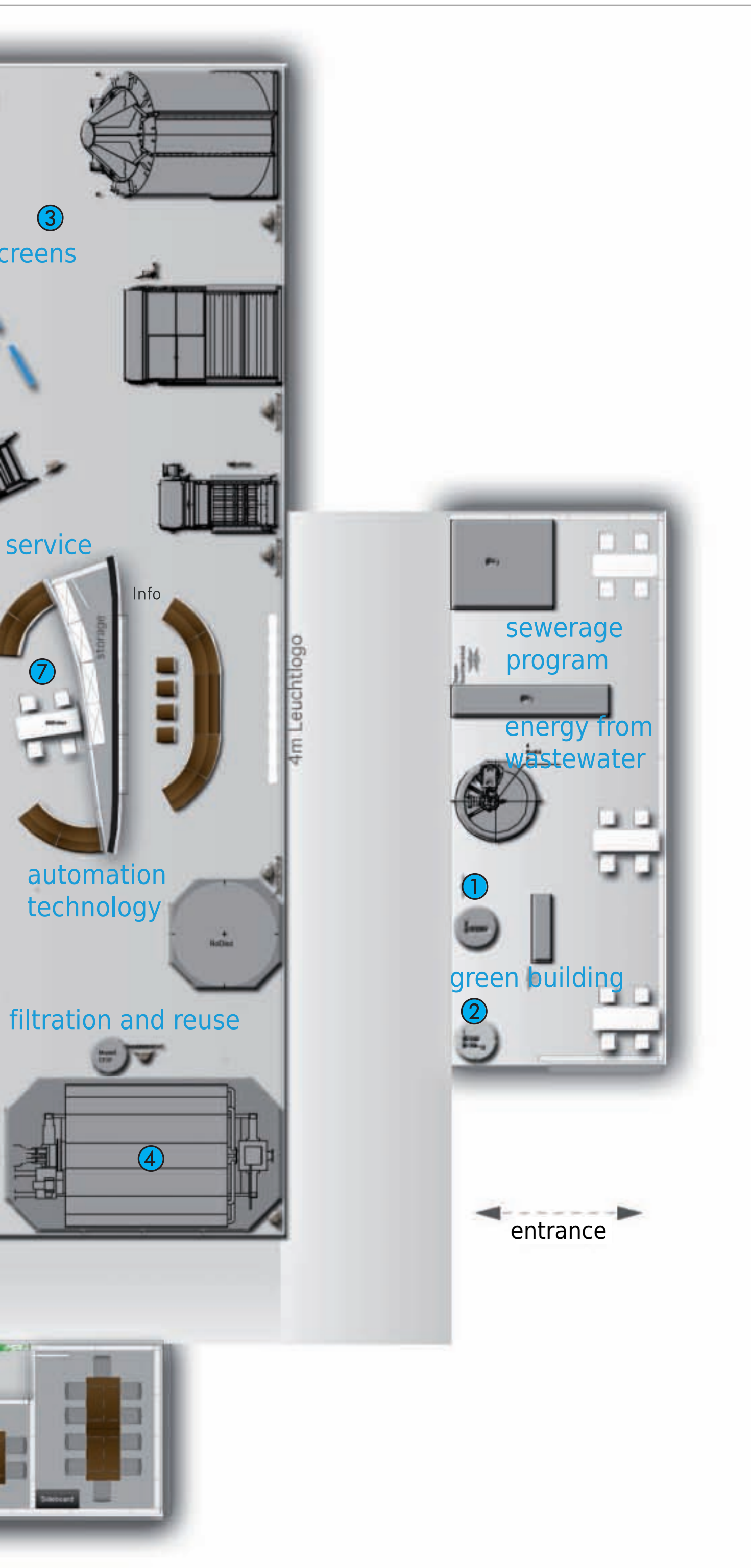
[HUBER exhibits at IFAT 2010 from 13 to 17 September in hall A2, stand no. 329.](#)

Our motto this year: HUBER looks beyond the obvious



Novelties and innovative products on the HUBER stand

Innovative solutions to increase water and energy efficiency



Water shortage and the lack of wastewater disposal systems in many countries in the world combined with increasing raw material and disposal costs call for future-proof innovations and intelligent solutions. In times of climate change the development of such solutions needs to take into account the aspect of energy efficiency. HUBER has risen to this challenge by developing innovative products and presents its product range, including future-oriented solutions to increase water and energy efficiency, to the visitors of IFAT Entsorga 2010 fair where HUBER exhibits on 1,100 m² in hall A2, stand no. 329, from 13 to 17 September.

① 1. Heat recovery from wastewater

HUBER has broken new ground in the field of heat recovery from wastewater and opened new application possibilities. "We are experiencing live the birth of the market of heat recovery from wastewater", says business unit manager Christian Frommann pointing to the huge potential lying there. Solutions of this kind are a low-cost and sustainable alternative to gas and oil. HUBER early recognised this and is now able to present at IFAT its innovative heat exchanger RoWin as the core of the ThermWin® system for energy recovery from wastewater.

② 1. Green Buildings for the City of Tomorrow

Wastewater heat utilisation will increasingly be applied also in the field of building technology. For large building developments, such as high-rise buildings or shopping centres, HUBER offers the possibility to use their wastewater as a regenerative heat source. Since HUBER has developed also groundbreaking solutions for wastewater treatment and reuse of treated wastewater, HUBER is in the position to implement trendsetting concepts for buildings that will be important building blocks for the "City of Tomorrow".

③ Optimisation and extension of the product range for mechanical treatment

The HUBER RakeMax® Multi-Rake Bar Screen, well-proven and highly valued in the market, has been completed with another space-saving model, the RakeMax® high flow series. This innovation allows to install the bar rack of the screen at an extremely flat angle even with minimum hydraulic losses while screenings are discharged at a very advantageous steep angle. For small sewage treatment plants with small grit amounts HUBER has developed a grit washer for connection to the well-proven ROTAMAT® Complete Plant Ro5. This combines all functions in one single plant – screening, screenings treatment, grit removal and grit washing – and ensures cost-efficient operation. The HUBER RoDisc® Rotary Mesh Screen presents itself with an impressively improved performance. Up to 30 individual filter discs increase the throughput by approx. 50% compared to the previous model but with still the same low pressure losses and therefore maximum energy efficiency. This micro screen is offered for advanced wastewater treatment with mesh sizes from as small as 10 µm. The new RoK 2 Storm Screen combines two major functions: throughput measurement with an integrated measuring weir and screening in one single step. The technology used permits the most accurate measurement even with low flow rates. The measuring weir itself is sturdy, reliable and inexpensive.

④ HUBER membrane systems make wastewater a resource

Innovative HUBER membrane bioreactor systems provide valuable water generated from wastewater. They are already applied to ensure water supply in arid regions. But HUBER offers perfect solutions also for applications with space constraints and/or special wastewater treatment requirements. The new HUBER BioMem® system has been developed to complete the HUBER product range. This innovative system operates according to the SMBR principle. The scouring air is used for both membrane cleaning and biological oxygen supply. For smaller applications, the system is available as a compact containerised unit.

⑤ Sludge disposal – a problem of the future solved today

"The sludge disposal issue and energetic utilisation of sewage sludge are gaining in importance worldwide", says Klaus Martin, HUBER business unit manager for the sludge treatment sector. HUBER has used this as motivation to expand its product range for mechanical sludge treatment and sludge drying. The HUBER sludge thickening program has been completed by a newly developed drum thickener, which is advantageous due to its high thickening degree and especially economic efficiency. The HUBER Solar Active Dryer SRT and the HUBER belt drying system that utilises exhaust heat show impressively that even sewage sludge drying and energy efficiency do not have to be contradictory.

⑥ Stainless steel equipment

HUBER stainless steel products are the best for use in water supply or municipal and industrial wastewater treatment. For their production, HUBER SE has modern technologies of production. This standard of production is yielded by well-trained and highly motivated employees in combination with the most modern machinery. To ensure continuously high quality for our customers, our company pursues the philosophy of a high vertical integration in production. According to our philosophy to excel in stainless steel, we process this material solely. As potable water is our most important resource and should sufficiently be available for all people, Huber considers it especially important to offer innovative treatment techniques particularly for this field.

⑦ Global lifecycle service

Qualified HUBER staff offers expertise in service for every customer, any HUBER product, on any site in the world. This is ensured by our international local service centres and experienced service engineers on site. We are always at the side of our customers and their machines and plants, worldwide and a product life long.

Use your chance to experience live "HUBER solutions for today and tomorrow" with their products. Visit us in hall 2 at IFAT 2010.

We look forward to having you as our guests.

One-hundredth millimetre screens filter 8.43 cubic metres of wastewater per second

28 RoDisc® Rotary Mesh Screens clarify Asian Games' wastewater



The 16th Asian Games will take place at Guangzhou (Guangdong province), China, from 12 to 27 November. They are the biggest sport event in Asia and held every four years. All Asians, in a fever of excitement, are waiting for the Games to begin. For such a major sporting event as the Asian Games the local infrastructure needs to be modernized and expanded. This includes also wastewater disposal and treatment plants, the capacity of which needs to be extended and their technical standard improved to state-of-the-art.

HUBER received the order for the supply of 28 RoDisc® Rotary Mesh Screens for the largest WWTP in the city Lie De. The screens will treat the daily produced wastewater of in total more than 2.15 million inhabitants from a connected area of 150 square kilometres. The peak load will be 8,43 cubic metre per second (!). The wastewater filtered by the 10 micron screens is virtually solids-free and discharged into the Pearl River.

The RoDisc® Rotary Mesh Screen is a micro filter and in this project used to pretreat the wastewater prior to its treatment in a UV disinfection plant. Reliable retention of the activated sludge flocs and fine suspended matter not retained by the secondary clarifier is the precondition for a trouble-free and efficient operation of the UV disinfection plant. The virtually solids-free effluent from the disc filter reduces current consumption and increases the efficiency and life of the UV disinfection plant. The screens

consist of 24 horizontally arranged rotating filter discs installed on a central shaft and are submerged by up to 60 % while in operation. The filter discs remain in rest position during the filtration process, which results in low operating costs. The solids settle by gravity on the filter surfaces themselves, which leads to gradual blinding of the mesh with retained solids as the filtration process progresses, resulting in an increasing pressure differential. When the predefined maximum pressure differential has been reached, the solids are removed from the filter surfaces by the slow rotation of the filter discs combined with a spray nozzle bar. The spray nozzles are pump fed utilising some of the filtered wastewater. The removed solids are washed into a trough

situated below the segment openings prior to being discharged to the WWTP inlet and the filtration process runs on continuously whilst the filter discs are being cleaned. One filter disc consists of 12 individual filter segments made of high-quality polypropylene. The filter mesh is in this project a stainless steel mesh. Innovative thermal embedding has been applied to fix the mesh on the filter plates.

The advantages of this sort of mesh are in particular its defined separation size, long life and stability. Thermal embedding achieves the form-locked connection of the mesh with the filter plate so that the mesh is durably protected and safely fixed. HUBER has equipped other large projects in China with RoDisc® Rotary Mesh Screens. Disc filters have been supplied also to the WWTPs Shi Jing (6 RoDisc® 30), Jiang Ning I (2 RoDisc® 20), Jiang Ning II (4 RoDisc® 26) and Wuxi (2 RoDisc® 20). Due to its low pressure loss and space requirement, the disc filter could be integrated without the need to change the WWTP concept but with the result of a significantly improved and reliable effluent quality that contributes to the protection of waters in China.

BU Mechanical Treatment



8 RoDisc® 24 screens in the factory just before delivery with the clearly visible discs consisting of individual plastic segments

HUBER RoDisc® Rotary Mesh Screen

The solution for upgrading a wastewater treatment plant to cope with increasing loads



Due to the increasing hydraulic loads and changing settling behaviour of the activated sludge, secondary clarifiers are frequently unable to reliably ensure the solids retention required. The increased COD, BOD and phosphorus load of the effluent will finally lead to higher wastewater fees and the loading of the receiving watercourse with oxygen-consuming substances. An efficient, economical and fast to implement solution that achieves a virtually solids-free effluent is presented and described below.

The situation on WWTP Winsen

The German municipality Winsen (Aller) is situated in the county Celle in Lower Saxony and counts a total of about 13,000 residents in six districts. Originally built in 1986/87, WWTP Winsen was expanded in 2000/2001 including nitrification and denitrification to be able to handle 22,000 PE. The wastewater is deliver-

ed to the wastewater treatment plants via pump stations. The treatment plant consists of a compact unit with screen and grit trap and an anaerobic settling tank for biological phosphorus elimination. The aeration stage consists of two tanks aerated intermittently and two secondary clarification tanks. Simultaneous precipitation is possible if required to remove residual phosphorus. The clarified water is discharged into the river Aller, a water of quality class II. The excess sludge simultaneously stabilised in the aeration stage is thickened mechanically and stored prior to being used in agriculture. The existing aerobic-thermophilic sludge stabilisation plant is not operated. After the shutdown of a sewage treatment plant in one of the neighbour municipalities also these wastewaters are planned to be treated on WWTP Winsen. The new equivalent connection value is therefore 25,000 PE. A recalculation after this expansion showed

that the existing secondary clarifier would not be able to reliably meet the required effluent quality in case of peak flows of nearly 520 m³/h. Several possibilities were then taken into consideration, such as adding another secondary clarification tank, intermediate storage tank at the inlet or a downstream filter plant. The municipality finally decided in favour of the filter plant because it reliably clarifies even peak flows and, moreover, is able to take over the function of a "police" filter in the event of disturbances and therefore, all in all, is the most versatile solution.

Technical description of the HUBER RoDisc® Rotary Mesh Screen

The HUBER RoDisc® Rotary Mesh Screen works on the basis of the well-proven drum filter principle. The screen consists of horizontally arranged rotating filter discs installed on a central shaft and are submerged by up to 60 %. The disc segments are covered with a woven polyester mesh (alternatively stainless steel mesh). The wastewater to be treated flows through the segments from inside to outside and the filtrate is discharged over a weir at the inlet end of the screen. The advantages of using such a mesh are in particular

Continued from page 1: New application possibilities

HUBER RoDisc® Rotary Mesh Screen ready for the future



Maximum corrosion protection is an indispensable prerequisite in wastewater treatment. HUBER has used a pickling bath for many years already to achieve the optimum passivation of stainless steel surfaces. Increasing requirements (chemicals in filter inlet) and increased use of the Disc Filter for filtration in coastal areas (salt water) made it necessary to go new ways. HUBER has therefore developed a new type of discs with a high-quality polypropylene base frame.

In addition to increased corrosion resistance, this new type of discs has other positive effects that open up new market chances: Due to their significantly reduced weight the maximum possible number of discs for one machine can be increased from 20 to 30. The resulting 50% increase in throughput per machine makes the micro screen affordable also for the operators of big treatment plants who want to upgrade their plants. The new design also permits easy replacement of the filter mesh (stainless steel or optionally polyester). The filter mesh is attached to the flat frame and can be replaced without the need to dismount the discs.

The method of how the mesh is fixed to the flat frame should be pointed out especially. In contrast to other common micro screening technologies on the market, the mesh of the RoDisc® screen is not glued onto the frame but attached and embedded by means of a special patented thermal process. At the point of attach-

ment the mesh is completely sheathed by the plastic flat frame material so that a form-locked connection and thus 100% protection of the attachment point against external influences is achieved. Reliable and permanent mesh fixture is guaranteed independent of the use of chemicals for the reduction of phosphate or endocrine substances. The innovative manufacturing technology applied with the HUBER RoDisc® screen sets a milestone in disc filter technology.

BU Mechanical Treatment



Plastic segments of a HUBER RoDisc® screen

its defined separation size, two-dimensional structure, long life and stability. The filter discs remain in rest position during the filtration process, which results in low operating costs. The solids retained at the screening surface lead to water back-up and cause thus the water level to rise within the discs and central pipe. When the predefined maximum water level has been reached, the solids are removed from the filter surfaces by the slow rotation of the filter discs combined with a spray nozzle bar. The spray nozzles are pump fed utilising some of the filtered wastewater (internal

wash water circulation), this eliminates the need for external water supply. The removed solids are washed into a trough situated below the segment openings prior to being discharged and the filtration process runs on continuously whilst the filter discs are being cleaned. The resulting level difference between the water level inside the central shaft and inside the concrete tank is the driving force within the filtration process and renders unnecessary wastewater lifting or sucking off.

BU Mechanical Treatment



HUBER RoDisc® Rotary Mesh screen installed in a concrete tank

Continued from page 1: General overview

Sewage sludge treatment, quo vadis?



Sewage sludge is continuously generated on municipal and industrial wastewater treatment plants during the process of organic pollutant degradation. In the past years, the

annual volume of municipal sewage exceeded 10 million tons dry substance in Europe alone, and the trend continues upward. Due to the very different rates of connection in the

individual countries, with e.g. a rate of virtually 100 % in the EU member states, and therefore regionally very different sewage sludge volumes it is only understandable that there are controversial approaches as regards sludge disposal ways.

In some countries, due to new legislation and eco-political consideration, some disposal methods have been prohibited or at least restricted, such as landfilling of sewage sludge. For many states the recovery of materials contained within sewage sludge still plays an important role. This applies to both landscaping and sludge spreading on agricultural land. The fertilization effect of sewage sludge and especially its phosphorus content is normally sufficient to cover the nutrients demand of typical agricultural land.

On the other hand, there are a lot of countries where the agricultural

application of sewage sludge is met with much scepticism due to its potential heavy metal pollution and content of organic pollutants, such as PFT. In these countries there has been a clear trend towards concepts for thermal sewage sludge treatment for some years already, partly combined with the approach to recover the phosphorus contained within sewage sludge.

Against this political and economic background it is understandable that the sewage sludge disposal issue can be discussed quite controversially. Even if there is no generally accepted concept for future sewage sludge disposal existing presently, adequate sludge pre-treatment is required with all concepts described above.

A major pre-treatment step is to reduce the water content of the sludge. Sewage sludge generated on wastewater treatment plants typically

shows a DS between 1 and 5% depending on where exactly it is generated. The average DS content of digested sludge is 4%. This means that one cubic metre of digested sewage sludge contains 960 l, which would permanently have to be transported without prior dewatering.

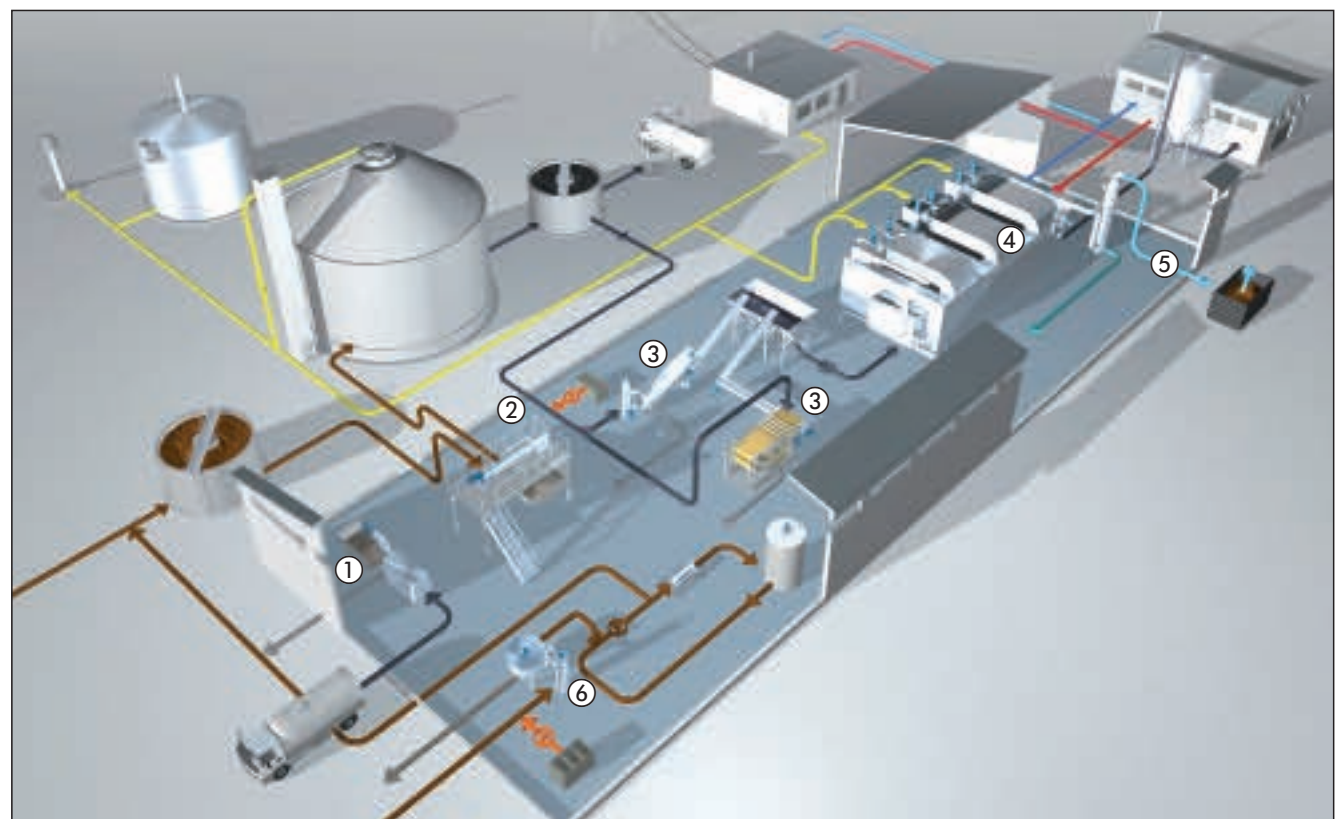
The major benefits of dewatering and drying are weight and volume reduction and the increased thermal value. Consequently, the process chain that allows for later thermal utilisation of dried sewage sludge comprises the steps of prior screening, thickening and drying.

Screening – thickening – dewatering – drying – utilisation – all from one source

BU Sludge Treatment



Typical sewage sludges: liquid – pasty – solid



① Sludge Acceptance Plant ② sludge screening ③ dewatering ④ drying ⑤ exhaust air treatment ⑥ thickening

Sludge drying plant supplied to Shenzhen, South China

Start-up of the biggest sewage sludge drying plant in the world



Start-up work of the drying plant in Shenzhen, South China is in full swing. After the planning phase and delivery & installation, start-up of the in total four drying lines type BT+ 5-4 is presently carried out. In cooperation with the customer, even difficult project phases could be managed so that two lines can already be operated.

The contract for the large-scale project Shenzhen was signed more than two years ago. After the relatively

short but intensive planning phase, the manufacture of the dryers in the HUBER factory started still in 2008 and also the purchase parts were ordered at that time. In January 2009, the first part delivery comprising the equipment for two of the treatment lines was sent to Shenzhen. A total of 137 seawater-resistant boxes were necessary to ship the equipment. Delivery of the equipment for line 3 and 4 took place three months later.

Installation was carried out by a local crew supported by HUBER service

staff. Two lines were ready to be operated after only six months installation time (including buildings). When the first test runs of line 1 and 2 started, line 3 and 4 were ready to be installed. At the end of 2009, the first two lines were started up with sludge. They dry 200 tons per day with a DS content of 18 – 22% to 70% DS.

During the start-up phase of the other two lines the plant operation is continuously optimised to most perfectly meet the specific requirements of the Chinese sewage sludge, which is significantly different from European sludge. Sludge testing beforehand was impossible as the complete wastewater treatment plant of the 13 million city Shenzhen was expanded and upgraded while the drying plant was installed.

In the course of project planning diverse assumptions had to be made and corrected during the start-up phase. Owing to the many years of experience of the start-up team and HUBER process engineers, optimisation of the drying plant on site will presumably be completed by October 2010.

We will try to completely finish this project and give it over to the customer by the end of the year. About 400 tons of sludge per day will then be dried by this HUBER belt drying plant.

BU Sludge Treatment



Line 3 during installation



Condensation stage of line 1

HUBER ROTAMAT® Screw Press demonstrates its efficiency

HUBER Technology, Inc (HUBER USA) is accomplishing capture of an increasing market share of the municipal solids dewatering market



The North American subsidiary, HUBER Technology, Inc (HUBER USA) is accomplishing capture of an increasing market share of the municipal solids dewatering market. Initially, the RoS 3.2 Inclined Screw Press demonstrated that simplicity, reliability, and unattended operation of a dewatering press were possible. The dominant technologies in the USA for dewatering have historically been

long quiescent period, through careful specific sales and marketing efforts, FK Ltd through its subsidiary in the USA made major in-roads towards the acceptance of screw press technology as being a viable choice in the municipal solids dewatering market. While the design was greatly improved from the Somat days, the performance of the FK technology was only able to produce



Willis T. Emmons, manager of WWTP Kennebunk (left) and Greg Claffey of HUBER Technology Inc. (right)

the Belt Filter Press (BFP) and the Centrifuge. It has been the introduction of the RoS 3Q Inclined Screw Press that has created a driving force to move HUBER to the forefront in municipal solids dewatering.

North America's initial impression of the Screw Press was tainted by a poorly designed and inadequately supported vertical screw press introduced in the early eighties known as the Somat (<http://www.somatcompany.com>). It never performed well with municipal biological sludges. After a

comparable results to Belt Filter Presses and not able to achieve results that could match Centrifuge technology. However, it was the simplicity and automatic unattended operation that secured the market for Screw Press technologies.

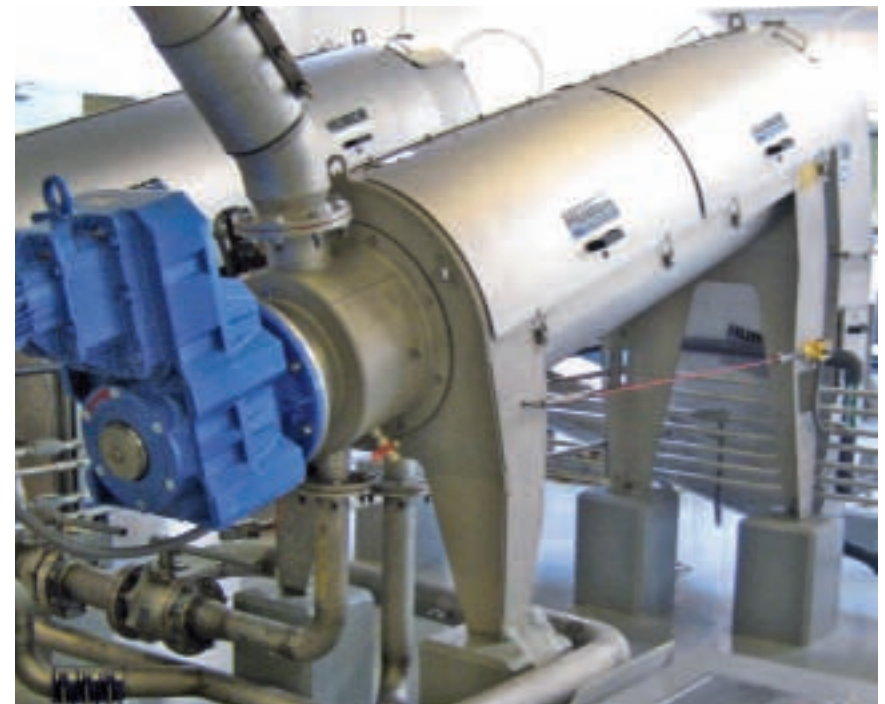
Even though HUBER USA can trace initial installations of the RoS 3.2 Inclined Screw Press as far back as 1996 with sales of RoS 3.2 units to Hydroxyl in Canada, it wasn't until the breakthrough installation at Old Town WWTP in Maine in 2003 that a

solid foothold into the Municipal market was realized. Starting small, HUBER USA picked up single orders annually the following couple of years until 2005. Through solid sales and marketing effort backed by HUBER competence, quality and service, HUBER has seen a steady increase in the volume of orders for the RoS 3 technology.

As HUBER USA was getting more involved earlier in the design and selection it became increasingly apparent that the RoS 3.2 technology could match performance of the competing FK technology but not show any great improvement over the competitor in terms of performance of cake solids produced. Other factors such as, smaller size, quality construction, superior capture rates gave the RoS 3.2 an edge on the screw press competition. However, the real key to establishing increased market share was going after the Centrifuge in matching performance and exceeding it with chemical and electrical efficiencies.

The breakthrough came with introduction of the RoS 3Q Inclined Screw Press technology. Initially data provided with the RoS 3Q technology did not really show any appreciable difference in the capabilities as compared to the RoS3.2 and the FK designs. Much of the data available at that time for the RoS 3Q did not have adequate enough understanding on how the system would behave on Waste Activated (WAS), Aerobically Digested Secondary, and Membrane Bio Reactor (MBR) sludges. This type of sludge makes up a majority of the plants in the United States.

HUBER USA understood the importance and the timeliness of the introduction of the RoS 3Q to the North American market. It was decided to proactively invest in a pilot program to gather and accumulate an extensive database representative of the biological thin sludges representative of a majority the USA treatment plants. Through a series of planning meetings with the Sales and Technical departments it was determined that a pilot tour of weekly demonstrations to be developed and manned by properly trained HUBER technicians. This has been, at first glance a costly undertaking, which has proven over time to be highly effective. HUBER USA has been able to collect the targeted database while simultaneously demonstrating HUBER competence, quality, and service. With a head start for FK well underway, this was a key strategy for HUBER to provide hands-on direct experience for the customer. To date this work is resulting in direct procurement orders and preferential positioning for contract



Two RoS 3Q 440 units installed on WWTP Kennebunk

tenders. A recent order and installation of two RoS 3Q 440 units for Kennebunk, Maine was the direct result of this strategy. This project involved the replacement of an existing 2 meter Belt Filter Press. The two RoS 3Q 440's fit in smaller footprint than existing 2M BFP. Much to the delight of the operators at Kennebunk, it was shown that once the unit was commissioned and put into service the units were able to have higher throughput than originally designed for.

Of even more significance was the discovery that the RoS 3Q was demonstrating results on thin biological sludges (0.5% DS – 2% DS) that met or surpassed Centrifuge technologies. We observed a marked impro-

vement of the performance of the RoS 3Q technology could match the performance of a Centrifuge on thin biological sludge. Immediately following the Orange County testing the pilot was brought to a test at Lake Arrowhead, California. The same Centrifuge manufacturer followed immediately after the RoS 3Q west tested in California.

Similar results to what was observed at Orange County, FL were observed at the facility in California. What was significant about this testing at Lake Arrowhead was that; it was overseen by a major engineering firm which was convinced that a screw press could not handle "fines" (capture rate) well and could not produce the same cake solids as a centrifuge. This was primarily due to their exposure



Dewatered sludge

vement of the performance of the RoS 3Q over the RoS 3.2 design. Not only did this mean that we surpass our primary screw press competitor (FKC) in performance of cake solids and capture rate; it also opened the door to direct competition to the Centrifuge. Similar to the Kennebunk decision, a decision by PACE Engineering was made to purchase a RoS 3Q 800 unit for their new Santa Paula WWTP in California as a direct result of a pilot at another one of their facilities. They had previously standardized on centrifuges for their plants. However, the pilot showed them they could achieve similar results with a significant savings in chemical costs as well as maintenance and energy costs.

Two important tests recently underscored this breakthrough. Up until recently we had not been directly compared to Centrifuge testing. Indirectly our testing had shown comparable results. However, recently completed testing side-by-side with a major Centrifuge manufacturer for three weeks at Orange County, Florida facilities demonstrated that the

to a large well publicized FKC installation at Monterey Bay, California. After observing the results of the Lake Arrowhead trials the engineer had a complete change of attitude and began to cooperate with HUBER on the design details for the client.

Some of the lessons learned along this journey are; it is important to be involved in the supply of entire "system". There are many variables that affect the performance that produce these reported results. The entire process needs to be known. Special attention needs to be considered for polymer mixing and proper operation.

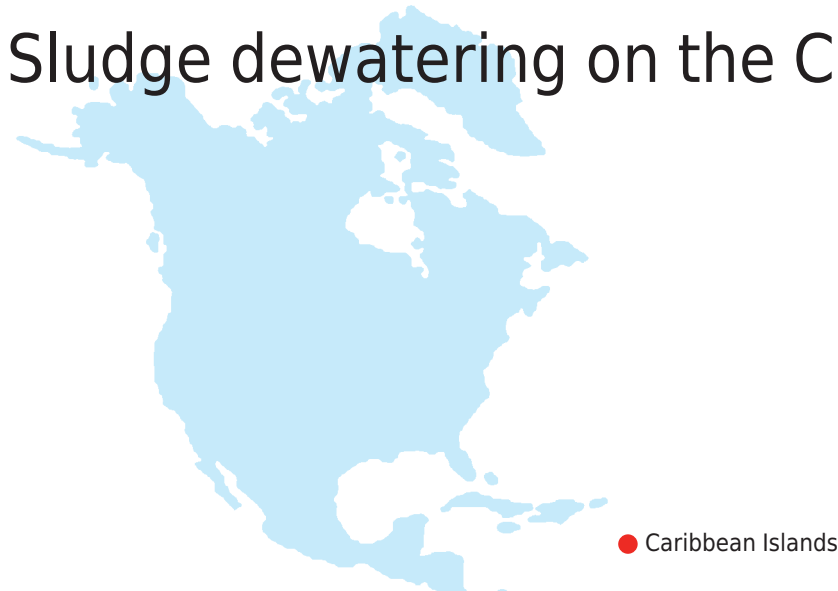
The other lesson learned is that we observed a much higher performance capability for thin sludge (WAS, MBR) than initially reported. If we had not conducted this extensive pilot strategy HUBER USA would most likely not have any appreciable installation base due to lack of experience and a machine sized too large to be competitive.



Distribution screw for dewatered sludge, Kennebunk

Reliably operating ROTAMAT® Screw Press RoS 3Q

Sludge dewatering on the Caribbean Islands



● Caribbean Islands

"I would say we chose it because it's clean, efficient and best value for money", says Sam Neilands, project manager in reference to the purchase of Huber's highly successful screw press RoS 3Q. Three units were purchased for the dewatering of MBR sludge on the islands of Barbados and St.Vincent. Stringent effluent regulations make MBR technology the preferred technology to treat wastewater in this region.

To date most sludge generated by these MBR units is picked up by lorries and then transported to the local landfills. However increasing transport and disposal costs and space

restrictions on these relatively small islands are making wastewater treatment plant owners in the Caribbean region understand the necessity of having to treat and dewater their sludge. The initial investment costs are guaranteed to be compensated within a very short period of time. Sludge dewatering with our sludge screw press completes the package Huber can provide for one of the most advanced wastewater treatment systems, pretreatment – MBR units – sludge dewatering.

HUBER's RoS 3Q is a simple yet very efficient system which consists of a screw rotating at slow velocity, en-

sed in a cylindrical sieve. The equipment transports and dewateres the sludge as it reaches a pressure cone at the end of the screw where the dewatered sludge is then discharged. The excess water is collected in the bottom of a housing which surrounds the screw and sieve unit. This housing also keeps odours in and any dangerous objects out.

As testing of the RoS 3Q was very successful at the plant of Monheim in Germany we recommended using the same model for our applications in the Caribbean. To date three RoS 3Q have been sold in the Caribbean region. All projects were acquired by Newwater Inc, HUBER Latin America's local representative for the Caribbean region. Coverley Plantation, a national housing development on the island of Barbados was our first screw press sold.

The treatment plant with membrane units is planned to handle an average of 1016 m³/d of wastewater in its second phase. We expect it to generate 33 m³/d of sludge which will be dewatered by one of our RoS Q440's. St. Vincent is where our second RoS Q440 unit will be installed. This luxury estate project called Buccament Bay will produce a wastewater flow of



ROTAMAT® Screw Press RoS 3Q installation on the Caribbean Islands

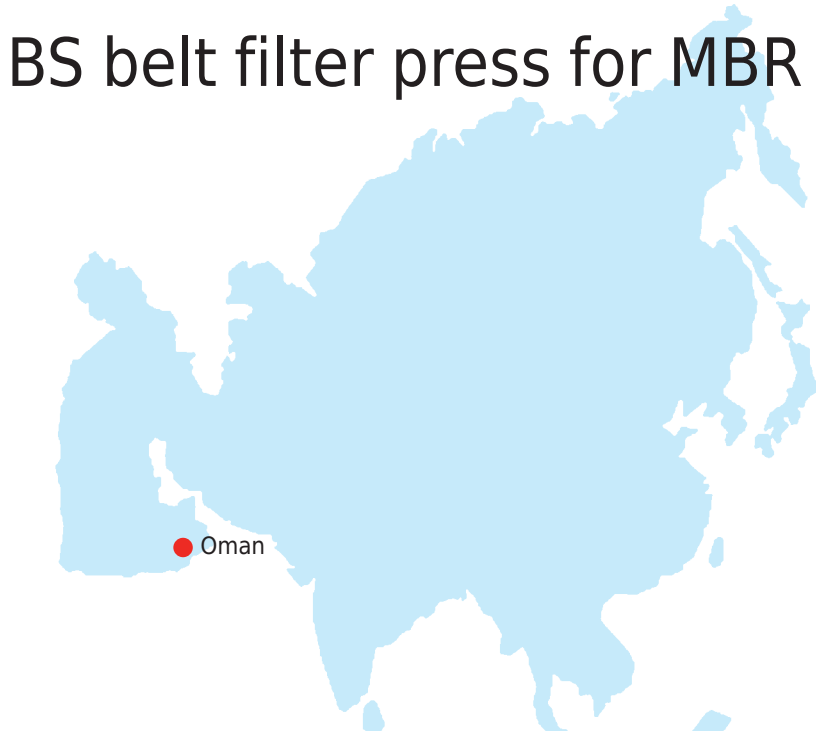
1706 m³/d. The third RoS 3Q will come completely pre-installed on a trailer including the polymer unit and all additional equipment necessary for sludge dewatering. This screw

press is a mobile "plug and play" unit which will be let to dewater many of wastewater treatment plants on the island of Barbados.

HUBER Latin America

HUBER supplied sewage treatment equipment to a site in Oman

BS belt filter press for MBR sludge dewatering in Oman



● Oman

Not for the first time, HUBER SE equipped a sewage treatment plant in Oman with sludge dewatering machines. The belt filter press BS Combi delivered to Al Ansab New STP proves its extraordinary efficiency in membrane sludge dewatering.

The first HUBER belt filter presses type BS supplied to Oman were installed on STP Darsait in 2003. STP Darsait is one of several wastewater treatment plants in the Omani capital

Muscat. In 2005, HUBER submitted offers for the tender for another STP in Muscat, Al Ansab New STP, and in 2006 received the order for three belt filter presses, type BS Combi. The specific feature of Al Ansab STP is that it is not connected to a sewer system, i.e. the wastewater, approx. 52,000 m³ per day, is delivered to site exclusively by tanker vehicles.

After mechanical pretreatment the wastewater is further treated in a MBR plant. This treatment process

generates a daily rate of approx. 680 m³ sewage sludge with 16 g/l DS solids content. This sludge is thickened in one single process step by the BS Combi belt filter press that discharges a spadeable press cake. The BS Combi system consists of a belt thickener directly installed on a belt filter press. The belt thickener separates approx. 80% of the inflow before the belt filter press further reduces the prethickened sludge volume by another 70%.

The advantages of combined thickening and dewatering:

- Minimal space requirements
- Individual adjustability of thickening and dewatering
- No additional conveying units or buffer tank required between thickening and dewatering system
- No additional flocculant dosing system required prior to dewatering
- Wash water demand completely covered by filtrate water from the thickening process

A total of three treatment lines have been installed at Al Ansab to treat the sewage sludge. Always two of the

lines are operated at a time for about 10 h/d and 7 d/w. Each line consists of a belt thickener with 2 m filter belt width and a belt filter press with 1.8 m belt width. When the sludge dewatering plant was put into operation in February 2010, all guaranteed values could be achieved or even exceeded right from the beginning.

The total separation degree of 96% corresponds to a solids load within the filtrate of only 70 mg/l with an inlet DS of 16 g/l. In view of the fact that the membrane sludge with 90%

loss on ignition shows an extraordinarily high organics content, the achieved DR content of 24.0 in the press cake is exceptional.

In addition to the belt filter presses with polymer conditioning and control technology, also three RPPS screens for mechanical pretreatment and two COANDA Grit Washers including control systems have meanwhile been delivered to Al Ansab New STP and put into operation.

BU Sludge Treatment

	Guarantee value	Start-up result
Throughput [kgDR/h*line]	650	660
Press cake DR [%]	22.0	24.0
Total separation degree [%]	95.0	96.0
Polymer consumption [kg_{WS}/t_{DR}]	8	7.5



Convoy of tanker vehicles delivering wastewater to Al Ansab New STP



Two lines of the BS Combi belt filter presses with belt thickeners mounted on top before start-up

A large university under construction

HUBER supplies a MBR sewage treatment plant to Najran University



HUBER Technology Middle East recently received a six million order to supply the equipment for a membrane wastewater treatment plant to the University of Najran in the Kingdom of Saudi Arabia. The HUBER scope of supply includes the technical equipment for the individual biological treatment stages, 16 VRM® 30/480 units and four ROTAMAT® Complete Plants Ro 5, size 120 l/s. The start-up of the equipment is planned to be completed in May 2011. Najran (Aarabic نجران) is a city in southwestern Saudi Arabia near the frontier with Yemen. It is the capital of Najran Province and one of the fastest growing cities in Saudi Arabia with a population growth from 47,000 in 1974 and 90,983 in 1992 to nearly 250,000 in 2004. Najran can

look back on thousand years of history. It once was an oasis in the settling area of the Muh'amir at the beginning of the Incense Route and therefore of great strategic importance. First militant conflicts took place as early as 685 B.C. and continued through the following centuries. Under the Abyssinian influence, a huge Christian community developed that formed an alliance with Aksum at the beginning of the 6th century. King Yusuf Asar Yathar, a follower of Judaism, conquered Najran in 517 and caused a massacre among Christians who henceforth have been known as the martyrs of Najran. In the following years Najran became less important and in 1934 the former Yemeni city was annexed by Saudi Arabia. Bedouins in search of water

were the first to settle in the Najran region. Due to the continental climate prevailing there the average annual precipitation did not exceed 88 mm. Nevertheless, agriculture was developing over the centuries, while the industrial development in this region is still ongoing. This fact was one of the reasons why the Ministry of Education of Saudi Arabia preferred this region when it came to invest into a 0.5 billion Euro project.

Najran University is located east of the city in the middle of the desert. Covering an area of more than 18 million square metres it will in the future be one of the biggest university complexes in the Kingdom of Saudi Arabia, uniting 15 academic institutes under one roof. The complex designed for a total of 45,000 students will be divided into two campuses, one for men and one for women.

The university complex will further house a medical city, research and development centre, sports and entertainment facilities and dormitories for teaching staff, clerks and students. The erection of a hotel and commercial centre began already some years ago. The development of the areal included a sewage treatment plant for the treatment of the wastewater generated there. The tender specification was for approx. 36,288 m³/d divided into seven treatment lines for approx. 5,184 m³/d or 120 l/s throughput for 2 hrs each. In



Najran University with the two central campuses, one for men and one for women

view of the low precipitation amounts in this region a MBR sewage treatment plant was put out to tender to provide for the possibility to reuse the treated water. HUBER Technology Middle East submitted an offer and was successful. They recently received the order to supply the equipment for four treatment lines at a total volume in excess of five million Euro. They furthermore have the chance that the order will be extended in the course of the coming year and they will be commissioned to supply also for the other three treatment lines. All treatment lines are operated independently and consist

of an approx. 1,100 m³ balancing tank, an approx. 500 m³ denitrification tank and a 1,000 m³ bio-tank. The complete technical equipment for these tanks is included in the HUBER scope of supply. The main components to be supplied are four VRM® 30/480 units and a ROTAMAT® Complete Plant Ro 5 (size 120 l/s) with a RPPS 780/3 screen per treatment line. According to the supply contract the first start-up phase is scheduled to be completed within the first quarter of 2011 – certainly an ambitious schedule but we look forward to rising to this challenge.

BU Filtration & ReUse

CONTIFLOW® Sandfilter CFSF

The solution for tertiary filtration, wastewater reuse and process water



Increasing requirements on effluent qualities to protect our waters are more and more gaining in importance in industrialised nations while in less developed countries, mostly with arid or semi-arid climatic conditions, the availability of water for irrigation still has priority. Natural resources primarily have to be used for human consumption so that only a small part of the available water resources can be used to generate food through agriculture. In this respect, especially the reuse of wastewater is increasingly becoming important, after its treatment adapted to the purpose.

One option is wastewater treatment in MBR plants, but even conventional treatment systems are able to meet at least the minimum requirements for irrigation. Conventional treatment in municipal sewage plants provides for this purpose subsequent sandfiltration followed by UV disinfection, chlorination or ozonisation. Well proven HUBER CONTIFLOW® Sandfilters are used for deep bed filtration with simultaneous backwashing and washing of the contaminated sand. Despite filter velocities of up to 15 m/h the frequently stringent effluent requirements concerning turbidities are reliably met. Regeneration and standstill times, as typical for other filtration processes, can completely be omitted due to discontinuous or continuous sand washing

cycles. In combination with the HUBER Sandfilter, also process variants are possible, such as phosphate removal or post-denitrification. In the course of the past year, several CONTIFLOW® Sandfilter projects could be implemented in the very dry Spanish regions Alicante and Murcia and on the Canary Islands. Characteristic for all these projects are their special effluent requirements and the conditions on site. High quality stainless steel, a combination of plastic and

stainless steel materials or combination with phosphate removal make each project an individual solution. The plants have meanwhile all put into operation and shown excellent effluent values to the full satisfaction of the customer. Three of the projects are presented here in more detail as examples.

Rincon de Leon

Rincon de Leon is situated near the bathing resort Alicante on the Mediterranean coast of the Iberian Peninsula. The filtration plant is designed for an hourly wastewater throughput of 2,100 m³ and consists of five filtration lines with 10 CONTIFLOW® Sandfilters as concrete design each. The relatively high rate of industrial wastewater in combination with the coastal location make it necessary to use duplex stainless steel for built-in components, and PVC and PE for pipelines and other built-in parts. Beside turbidity removal, the focus is on the precipitation and removal of phosphorus to protect the downstream hollow fibre membrane plant, which was installed at the beginning of this

year and since recently has been in the start-up and run-in phase.

Alcantarilla

Alcantarilla is situated near the large Spanish city Murcia. Due to the necessity of service water recovery through tertiary treatment the city's wastewater treatment plant was retrofitted with HUBER Sandfilters. The 14 filters are designed for a throughput of 160 l/s and installed as two lines. Start-up took place at the beginning of this year. The two-line concept allows the operator to use one or two lines, as necessary, for varying inflows. This extremely energy-efficient method of operation convinced the customer already in the offer phase and the efficiency has also been proven by the plant operation so far.

Barranco Seco

The WWTP Barranco Seco, designed for approx. 20,000 PE, is situated on the sunny Canary Island Tenerife. In order to protect the picturesque scenery and coast line it had become necessary to retrofit the WWTP with a

third treatment stage. Three stainless steel CONTIFLOW® Sandfilters, size 72, were installed and put into operation in the middle of the past year. Due to local law concerning the safeguarding of jobs at least a part of the equipment to be supplied had to be manufactured by local companies. The tanks were therefore provided by a local steelwork company.

The built-in components for the tanks and the complete control systems, however, were manufactured in Germany. To sum up, it can be said that the cooperation, implementation and start-up of the plant went off very well. In the future, this example of processing a project is to be applied more frequently on the Canary Islands. The total order volume of all projects described before is approximately 2.2 million Euros. We wish to take this opportunity to thank our Spanish subsidiary HUBER Espana S.L. and the final customer for their good cooperation and speedy processing and implementation of the projects.

BU Filtration & ReUse



Size comparison: Sandfilter with 20 filters (bottom left) – total WWTP for approx. 150,000 PE



Built-in components of CFSF 50 C – interaction of different materials with corrosive waters

Not cheap but sustainable and profitable

An example of wastewater reuse with MBR in Indonesia



Water is the basis of life, of agricultural utilisation and industrial development. The access to water, however, is not the same for all people. Published figures are self-explanatory: 1.1 billion people are without satisfactory access to potable water and 2.6 billion have to live without adequate sanitation. Especially rural, decentralised areas and rapidly growing megacities are a challenge in terms of adequate water supply and sanitation. In 25 years, according to UN prognosis, two third of the people on

pace with the explosive growth. Many of the new development areas are not connected to drinking water and wastewater systems. The population growth leads to massive overexploitation of groundwater resources and as a result to sinking groundwater levels and very salty water because the groundwater level today lies 30 m below sea level. At such a depth, access to water via wells is virtually impossible. Existing sewer systems are hopelessly overloaded. The wastewater runs off untreated and conta-



Clean drinking water supply – a global challenge

our planet will be living in cities and more and more megacities will be developing. While, in 1950, there were only two megacities with more than eight million residents, we will have 36 of them in 2015.

Cities are growing due to increasing migration from the land by people searching for work in cities because of their bad living conditions in rural areas. All the people living in megacities not only need food but also drinking water and adequate wastewater disposal systems. This will involve high future requirements on the efficiency of water line and sewer networks. The insular state of Indonesia is commonly not associated with water shortage. Situated in the damp tropical areas with an annual precipitation of approx. 2,000 mm, Indonesia is rather faced with floodings during the monsoon. But the exact opposite is true.

Due to far progressed karstification, natural storage of precipitation is impossible and especially clean water shortage is prevailing in large cities. Jakarta, capital of Indonesia with about 18 million residents, is one of the megacities of our days and has to cope with all the challenges of an explosive population growth. One problem is the excessive overexploitation of water resources. Jakarta has water supply and dewatering systems designed for about 500,000 persons. Its infrastructure could not keep

sal systems, the government more and more favours decentralised solutions for local wastewater treatment water reuse. Against this background, membrane plants for waste-

Although the wastewater there is discharge through a sewer system, it is even profitable due to high water prices to treat only a part of the wastewater flow. About 250 m³/d waste-



HUBER VacuumRotationMembrane VRM® Bioreactor

water treatment with the option of water reuse represent a key technology for solving the problems described above. In the course of the past years several HUBER MBR plants of different size and for different applications have been installed in Indonesia and aroused the public interest. Three big HUBER MembraneClear-Box® plants are working for three fire stations in the middle of a conurbation.

The previous wastewater treatment system consisted of wastewater discharge into simple cesspools and repeatedly untreated wastewater got mixed with groundwater. With the new MBR plants the clarified and disinfected wastewater (approx. 25 m³ per day and plant) serves for cleaning of the fire trucks and filling the tanker vehicles. They represent an efficient solution for wastewater treatment, water reuse and groundwater protection. A HUBER Vacuum Rotation Membrane (VRM®) treats the wastewater from the government buildings in a big Indonesian province, which is a volume of about 250 m³/day.

The specific advantages of membrane technology, small volumes and omission of a secondary clarifier, rendered it possible to upgrade the old overloaded non-expandable sewage treatment plant installed below the park of the government buildings. Also in this case the treated wastewater is reused, particularly for the air conditioning system and irrigation of the parks. A renowned hotel group operates several hotels on Sumatra, one of them in the northern part of the Sumatra Utara province.

water is treated by a HUBER MBR plant installed in the cellar of the hotel while the rest of the wastewater flows into the sewer system. Since 2008, they have irrigated their green areas with permeate and saved the high costs for fresh water. Another



Jakarta – a megacity with approx. 18 million residents

plant is installed in an industrial company, a manufacturer of tobacco products in Indonesia and a member of Philip Morris Group. In view of increasing effluent standards and the necessity to generate service water for internal purposes, they decided in 2007 to invest into a new MBR plant.

The complete equipment was supplied in mid 2007 and consisted of a preliminary screen, dissolved air flotation plant and MBR plant.

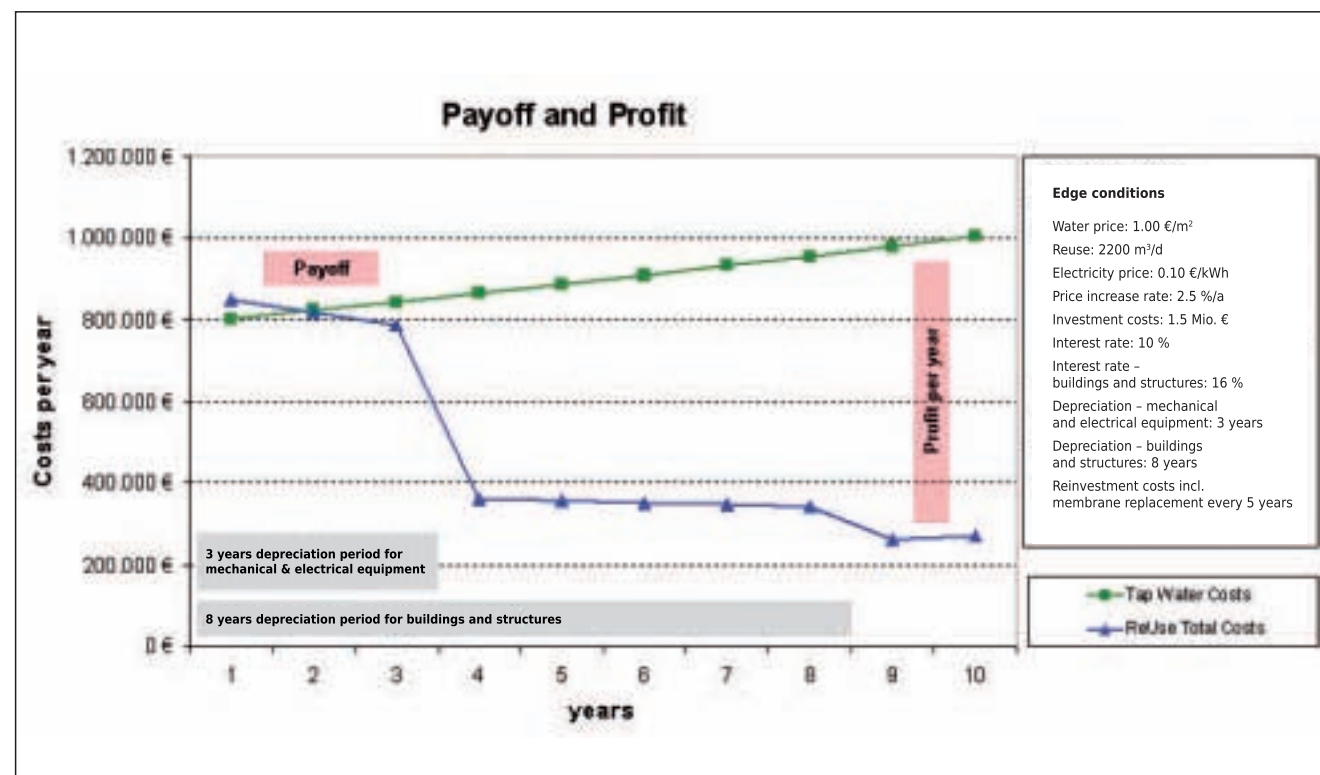
The plant was put into operation a year later by our Indonesian partners Grahadikia and since is delivering approx. 180 m³/d high-quality service water, which is used for irrigation and cleaning purposes. The following example of a VRM® installation in Jakarta proves that these applications in Indonesia represent reasonable solutions not only in the ecological but as well in the economical sense. The membrane plant installed on the third basement floor of a tower with shopping centre and offices offers a capacity of 2,200 m³/d, which due to the high effluent quality can be fed into the air conditioning and cooling system.

A comparison of the investments into the complete clarification technology with the water fees otherwise payable for the operation of the air conditioning plant, shows that the MBR system pays off after only about 1.5 years! The basic data for this economic efficiency comparison are listed in the right margin of the below table. With a water price of 1.00 €/m³ a conservative basis was used; the actual price in Indonesia is traded at about 2-3 \$/m³. An electricity price of 0.10 m³/kWh was assumed, although the

costs for industry customers lie at about 50% of this price. A 2.5 %/a price inflation was taken into account for mechanical and electrical equipment and construction technique, further interest rates and a depreciation of 10% and 3 years, or 16% and 8 years respectively, as well as the complete re-investment costs for spares and wear parts for 10 years.

With a less conservative but from today's point of view realistic approach related to water price and electricity costs the MBR plant would be more efficient even within less than a year than a plant without water reuse. This example shows that the operator profits within a very short time from his investment into adequate clarification technology with the option of water reuse, in this case 1.5 million Euro.

To sum up, it can be said that all these applications have one thing in common: They substantially contribute to the sustainable protection of the scarce resource drinking water and ensure independence and security of supply, combined with the economic benefit for the plant operator who can save the high costs for fresh water when reusing treated wastewater.



Economic efficiency of a MBR plant with reuse of wastewater for the air conditioning system

Continued from page 1: The innovation in global water management

HUBER BioMem® MBR / SMBR



Economic growth in conurbations depends on a functioning water management on all levels. Also the development of tourist centres in new holiday regions depends on individual, low-cost and (flexible) decentralised solutions for wastewater and irrigation systems. This refers also to small remote towns, villages, factories and production facilities in rural areas. Decentralised water management solutions furthermore result in cost savings, plant safety and independence of public systems. Individual local solutions are the solutions of the future.

Under these aspects, the HUBER BioMem® SMBR system has been developed for decentralised applications worldwide:

- hotels with seasonal load peaks
- suburban settlements in arid regions
- remote villages with high wastewater quality requirements
- small factories and production facilities
- permeate reuse for irrigation

Particular attention has been paid to operational safety by using a two-line

wastewater treatment plant with a limited number of components.

Plant set-up

The HUBER BioMem® SMBR system is a modular system consisting of individual filtration units that are combined as required due to specific wastewater and combined water volumes. Standardised sizes make the system

available for plant sizes of 200 – 2500 PE (25 – 600m³/d). The HUBER BioMem® SMBR system is available as a conventional concrete design or as a mobile containerised unit wired ready for connection.

On the basis of the concept “a complete sewage treatment plant from one source” associated components are available as optional modules, such as machines for mechanical pretreatment, phosphate precipitation, excess sludge disposal, or even equipment for remote control and data protection. Interfaces are clearly defined and the customer has one single contact for advice and support.

The HUBER BioMem® system consists of mechanical pretreatment, buffer tank for flow equalisation and MBR plant. The MBR plant consists of an aeration tank with a two-line filtration plant. The two-line design increases operating reliability. And if the two-line design is realised in two chambers, the plant can be adjusted to varying wastewater flows, such as

seasonal fluctuations. One of the chambers can be connected or disconnected as needed without affecting operating safety.

The principle of the HUBER BioMem® SMBR is based on the combination of a conventional MBR process and sequential feeding. The so-called SMBR process simplifies biological wastewater treatment and filtration within one tank. This unique technique is possible as the scouring air within the SMBR reactor is used both for “mechanical” purposes (membrane cleaning), mixing within the reactor through loop flow generation and biological functions (oxygen supply for wastewater clarification through microorganisms).

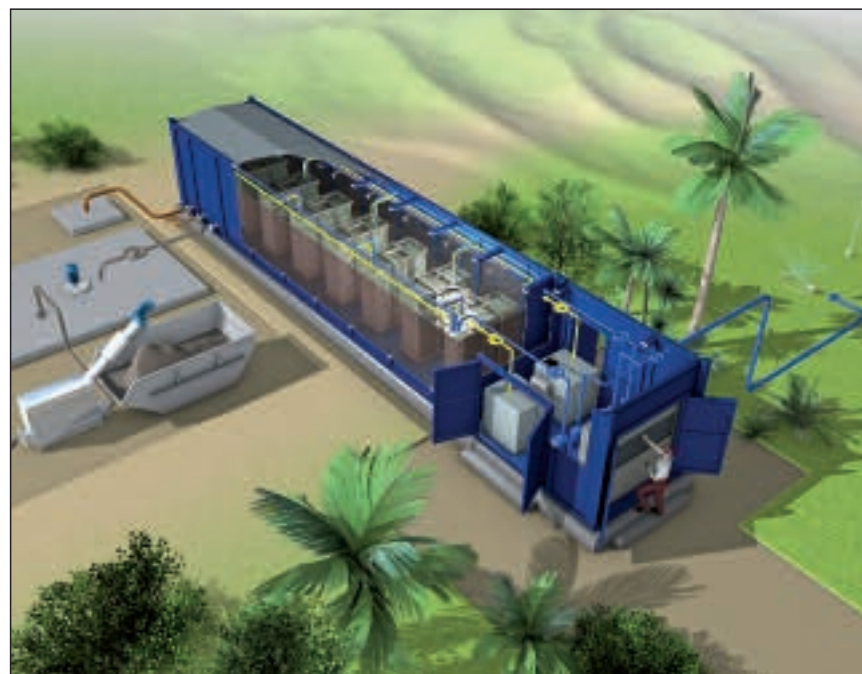
Air tubes are provided below the filtration unit that reduce the air intake by up to 60 % compared to conventional MBR plants. The wastewater is biologically treated within the aeration tank and periodically drawn off through the membrane modules by applying an underpressure. Filtra-

tion with ultrafiltration membranes that have a pore size of 40 nm (1,500 times smaller than the diameter of a human hair) retains virtually all germs and bacteria. The discharged permeate can be reused as service water or for irrigation.

Due to the low mean loading with average filtration performances, frequent chemical regeneration as typical for flat membranes is reduced to intervals of approx. 4 to 8 months. The generated excess sludge is drawn off periodically and stored in a tank. As an option, the sludge can be thickened mechanically.

The concept of the HUBER BioMem® sewage treatment plant offers the customer a quick to implement, individually adapted and cost-effective solution that meets his specific requirements. HUBER standards guarantee high quality of engineering and products: engineering, optimisation and service from one source – from specialists with a global know-how.

BU Filtration & ReUse



HUBER BioMem® SMBR for container



HUBER BioMem® SMBR for building

HABA drinking water reservoir system with HUBER equipment

HABA-Beton, Nußdorf/Austria builds a drinking water storage tank



Concrete is a reliable, well-proven material. Virtually all drinking water storage tanks are made of in-situ concrete. There are drinking water reservoir systems available in GFK and PE material. Heinz Bruno Bernhauser of HTI Schmidt's Weyland at Schärding, Austria had the idea to offer a system made of concrete. The well known company HABA-Beton manufactured the first prototype at their factory in Nußdorf, Lower Austria and exhibit it there. Since May 2010, planners and Wassergenossenschaften are welcome to visit the prototype on the company's grounds. HUBER supplied the following components as basic equipment:

- Partition wall between the valve and water chamber
- Attack-proof door TT 2.1 with louvre and fly grid
- Air filter plant L25 complete with safety valve and manometer

The partition wall is installed as end wall in the water-filled connection piece between the water chambers

and valve chambers each and includes all passage openings required.

- Intake line with inlet blast pipe
- Strainer
- Overflow and ventilation line
- Bottom outlet
- Access

The air filter plant L251 for hygienic conditions inside the storage tank is



Valve chamber with air filter plant L251 after installation

equipped with a HEPA filter, class H13, complying with DIN EN 1822-1. This filter class is defined by a gravimetric separation degree of 99.95 % and is for example also used in hospitals to filter the supply air to operation rooms which needs to be germ-free. More details are provided on our homepage www.huber.de under “drinking water storage”.

With this product HTI and HABA offer the operators comprehensive safety and certified quality – all from one source and with high quality components. Building and refurbishment of drinking water storage tanks will be presented also at IFAT 2010 on the joint stand “Blue Facts – Internationales Kompetenzzentrum Trinkwasser” (international competence centre for drinking water).

BU Stainless Steel Equipment

Expansion of Benin's water supply systems

HUBER stainless steel products installed in West Africa



The government in West Africa put out for tender a project for the expansion of the water supply network of the city of Cotonou and Benin. The African state of Benin is a country in West Africa. It borders Togo to the west, Nigeria to the east, Burkina Faso and Niger to the north and with its small southern coastline the Bight of Benin. In order to improve the quality of life there, water supply systems are going to be expanded and optimised. The planned project is to cover the following fields:

- Mobilisation of water resources
- Wastewater treatment
- Reintegration of the water utilisation plant Védoko and pump station P1 in Védoko.

The French construction company Sogea-Satom / Vinci Construction won the project and cooperated with HUBER. Stainless steel parts were also supplied to HUBER Burkina Faso for a similar project. HUBER sold for both projects in total 8 manhole covers, four manholes, one ladder

and 12 grid covers. The installation of the products went off without problems and to the full satisfaction of the customers in West Africa.

International Sales



Safety access ladder with fall arrestor and manhole cover set in concrete

MBR plant supplied to Canatiba

Order received from Latin America's biggest jeans manufacturer



Sao Paulo

CANATIBA textile factory in Sao Paulo was founded in 1969. Today, they produce more than 10 million m² of jeans fabric at three different locations. All three production facilities are equipped with a conventional type of biological wastewater treatment stage. More stringent legislation and increases in production have forced the company to invest into the expansion and upgrading of its

wastewater treatment plants. Due to space constraints, the customer could not expand his plant. The only possible solution was to change from conventional biological treatment to a MBR system to be able to meet the increased requirements. In cooperation with our Brazilian partner NEOTEX we carried through pilot tests at one of the three production facilities from August 2008 to January 2009. In addition

to excellent reduction rates (COD >95 % / BOD >99 % / SS = 0) the additional effect of decolorization could be achieved, which had not been possible to the same extent with the conventional plant. The results were so convincing that the customer decided to install this new technology. In April this year, Canatiba finally placed with HUBER SE the 1.4 million EURO order for upgrading their wastewater treatment facilities with four VRM 30/480 units and a RoMesh size 5 screen as pre-treatment unit with 0.5 mm mesh to retain fibrous material.

The project was concluded on the basis of a financing model offered by HUBER. The order received from Canatiba is already the second large project from the Brazilian textile industry after the order placed by Coteminas in 2009. The MBR plant with four VRM[®] 30/400 units installed at Coteminas, one of the biggest producers of home textiles in Brazil, was put into operation in August 2009 and has since even exceeded the expected effluent qualities.

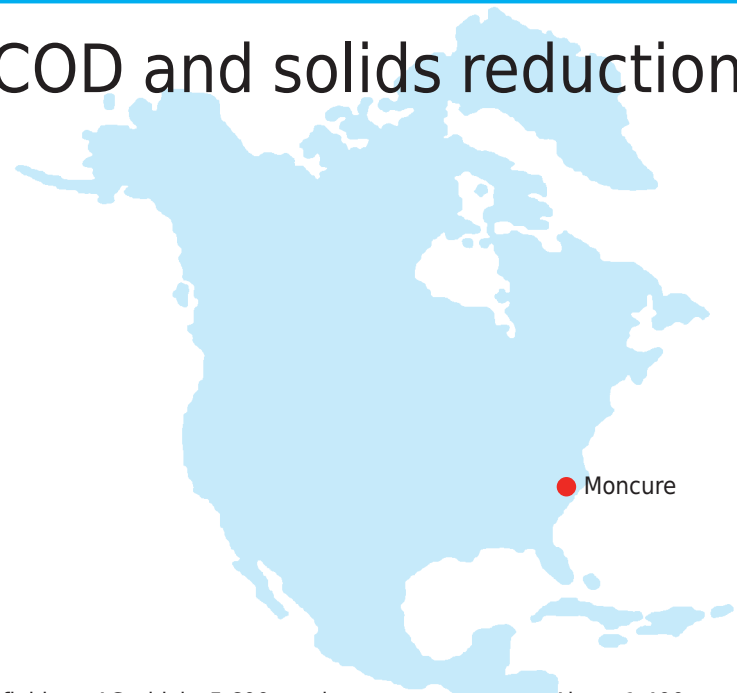
BU Industrie



Trial unit "Shakira" at Canatiba

Another reference installation in a wood industry company: Pfeleiderer AG, North America

COD and solids reduction in wastewater to be reused



Moncure

Pfeleiderer AG with its 5,600 employees at 22 locations in North America and Western and Eastern Europe produces HDF and MDF products for furniture industries, specialized and do-it-yourself trade and the interior construction market. Pfeleiderer supplies a wide range of carrier materials and surface finishing products to customers in more than 80 countries worldwide.

Pfeleiderer's subsidiary Uniboard has moved from La Baje, Canada to Moncure in North Carolina, USA with the aim to become the US market leader in the manufacture of laminate floorings. At its new location, Uniboard has production capacity for more than 1,600,000 m³ chipboards and medium and high density fibreboards

per year. About 1,400 employees are working for Uniboard at Moncure. What are MDF fibreboards? MDF boards are medium density fibreboards that consist of glued wood fibres. It today seems impossible to do without fibreboards in the field of furniture and internal construction.

The production of fibreboards comprises of three main process steps: During chipping the wood is moulded into the desired shape. After this process, chips still display different sizes. Smaller parts end up in the top layer of the board while larger bits go into the core. The chips must not be damp for the next steps involved in the manufacturing process. For this reason, drum dryers extract moisture from the wood. This is followed by the

sifting process where rough and fine chips are separated; sorting plants then remove any sand or metal particles.

During the pressing process, glue is added to the chips. The materials are mixed and form a so-called "chip cake". At 250 °C and under high pressure, a press ensures the required composition. The panels are then allowed to cool in large star coolers. In the process of MDF fibreboard production, wastewaters with high pollution loads are generated at different places. These wastewaters show very high solids concentrations (DS) of 4,000 mg/l and COD load of more than 15,000 mg/l.

Most innovative wastewater treatment technology is applied to treat the wastewater as perfectly as possible to make it available to be reused in the MDF production process or for exhaust air cleaning. Approximately half of the total wastewater is generated in washing processes and during pressing of the chips before these are introduced into the drum dryer. The other half of the wastewater is generated in the exhaust air treatment process that consists of a wet electric filter with integrated washer and a biofilter. Normally, the exhaust air from the drum dryers is treated in this way. Pfeleiderer Schweiz AG, Switzerland contacted HUBER at the end of 2008 with the request to cooperate in developing a concept

for the treatment of different process flows from a refiner (defibrator), press water and exhaust air treatment. Their focus was on reuse and recycling of process water to minimize their consumption of fresh water. Due to the excellent experience made in the treatment of similar wastewaters at Kronospan, Switzerland, the treatment concept was clear very soon: The wastewater flow of approx. 15 m³/h is prescreened by a curved screen prior to being passed to a 400 m³ mixing and balancing tank where the flow with its different freights and pH values is equalized. The RoS 3 Screw Press is fed with the constant equalized flow. By addition of flocculants, COD values can be reduced to approx. 8,250 mg/l and DS to approx. 1,600 mg/l. The Screw Press effluent flows by gravity into a 40 m³ storage tank from where a constant volume flow of approx. 15 – 20 m³/h is pumped into the dissolved air flotation plant HDF 3 with chemical treatment stage. This chemical treatment includes precipitation with FeCl₃ followed by pH correction. Flocculants are added after the pH raise to 7 to generate macroflocs from the colloids and floatate them by means of micro bubbles in the dissolved air flotation plant. The floatate sludge produced is dewatered by another RoS 3 Screw Press unit. The dissolved air flotation plant with chemical treatment stage allows to reduce COD to 4,125 mg/l and DS to below 110 mg/l. The virtually solids-free flotation effluent is

introduced into sandfilters prior to being treated in a reverse osmosis plant. The treated process water can now be reused in the MDF manufacturing process, for example in the gluing process, wood chip washing or exhaust air treatment.

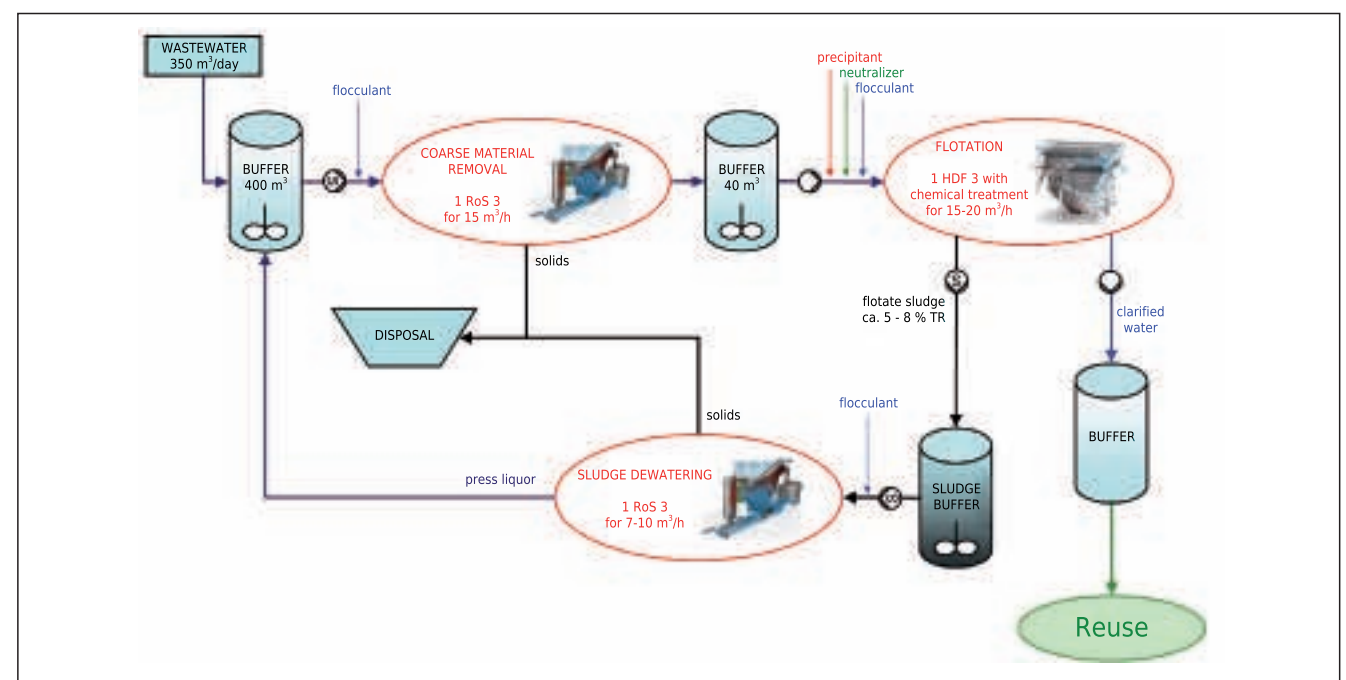
With this wastewater treatment concept, Uniboard is able to operate its production with zero discharge of water. A major benefit of our solution is the reduced consumption of chemicals. Pretreatment with the Screw Press RoS 3 reduces solids by 60% as mentioned above. Otherwise, precipitant consumption would be very high as the fine suspended matter would cause the precipitant to be reacted to exhaustion. Another advantage is the small design of the flotation plant.

Due to pre-treatment with the Screw Press RoS 3, a smaller flotation plant is sufficient, as the limiting factor with flotation is the solids feed per m² and hour. After installation and successful start-up in April 2010, the plant has proven its efficiency in achieving the required guarantee values. Due to our extensive experience in the treatment of wastewaters generated in wood industries, we have been successful in implementing another reference project at Pfeleiderer AG, USA, in addition to our multiple other reference installations.

BU Industry



ROTAMAT[®] Screw Press RoS 3



Wastewater treatment concept

Another sewer grit recycling plant installation in Switzerland

New plant for sewer grit treatment with process water recycling



In 2001, the company Bolliger & Co. started to operate at Grenchen in Switzerland a plant for the treatment of sink pit contents that processes about 5,000 t of raw material per year. Some of the treated material is reused as secondary building material. Due to the good experience they have made with this plant and in view of the huge market potential in the field of sink pit content treatment the company decided to invest into another plant.

On 1st May 2010, the first recycling plant for sink pit contents in the Swiss canton Bern was opened at Aarberg. An innovative treatment concept with an optimised use of energy was developed in cooperation with Bolli-

- Grit treatment / fractionation
- Process water treatment/Sludge treatment

Material acceptance:

The input material, consisting of road sweepings and predewatered sink pit contents, is fed into the system's acceptance and feed tank and mixed by a wheel loader. Due to seasonal variations and different catchment areas also the composition of the delivered raw material can vary greatly. That is why material mixing is necessary to ensure a constant plant operation. The liquid materials are at first passed through a 60 mm bar screen to remove coarse matter.



Sewer grit acceptance station

discharged to the acceptance tank with the rest of the material. Also the drainage water from the acceptance point for the liquid raw materials is pumped into one of the two acceptance tanks.

Grit treatment / fractionation

The special feature of this installation is that a fully automatic crane feeds the material to be treated into a dosing station, the HUBER ROTAMAT® Grit Treatment System RoSF 7, from where the material flows by gravity without the need for any additional conveyors or pumps. This significantly reduces the energy demand and wear of conveying units during the process.

The equalised mixed fraction (4-6 t/h) is passed into the HUBER ROTAMAT® Wash Drum RoSF 9 where 25 mm screening takes place and material < 25 mm is washed out of the coarse material fraction. The grit-water mix from the underflow of the Wash Drum flows by gravity via a chute into the two subsequent HUBER ROTAMAT® Grit Washer RoSF 4 units. A static magnet removes metal parts while the mix is flowing through the chute to protect downstream equipment.

The capacity of the two grit washers is approx. 3 t grit / solids per hour. They wash the grit, remove organics, classify and dewater it. Grit washing takes place in a fluidised sand bed that is stirred and kept in suspension by a rabble rake device. Upflowing washwater lifts the separated fine fraction and lighter organic material beyond the sand bed from where these are discharged via the organics outlet and overflow.

The separation grain size is 0.2 mm with a separation efficiency of > 95%. The aim of < 5 % loss on ignition in the washed grit is reliably achieved by the HUBER ROTAMAT® Grit Washer RoSF 4. The 0.2-25 mm grit/gravel mix is discharged at intervals, dewatered statically and discharged into a tank. The floating organics and fine fraction are discharged along with

the water flow. Along with the oversized grain (material > 25 mm), the overflow from the grit washer flows into a coarse material washer where high-intensity washing with wash

The wash water required for preliminary washing in the HUBER ROTAMAT® Wash Drum RoSF 9 at the beginning of the treatment process is taken from the clear phase in the circulation water tank. Due to the use of circulation water after removal of most of the mineral material the wear of pumps and spray nozzles is significantly reduced in contrast to previous process variants that used the water directly after screening.

Process water treatment:

The overflowing wash water from the sedimentation tank and the excess clear water from the circulation tank flow by gravity into the HUBER Dissolved Air Flotation Plant HDF where the rest of the flocs and suspended particles are removed from the wash water through generation of micro bubbles. The wash water is



HUBER Dissolved Air Flotation Plant for process water treatment

water takes place and powerful turbulences are generated by means of compressed air. The result from this process is a washed coarse material fraction > 25 mm and a wash water phase with a high organic load. The wash water flows into the subsequent 2 mm HUBER ROTAMAT® Rotary Drum Screen RoMesh® that separates the organics and discharges them to a press that dewateres the material to approx. 35 % DR.

The filtrate is added to the rest of the screened wash water flow and flows along with the wash water into circulation water tank, which serves as water storage tank but also as settling tank for removal of most of the fine minerals. A pump delivers the sediments from the circulation water tank into a separate tank where they are thickened by adding flocculants.

collected in a tank; it has now the quality required for the washing process in the HUBER ROTAMAT® Grit Washer RoSF 4. This quality of water is further intended to be used to wash trucks, as wash water for the spray nozzle bar of the HUBER ROTAMAT® Rotary Drum Screen RoMesh® and as service and wash water in the plant area. The generated flotote and sediment sludge is passed on to the subsequent sludge treatment line while the excess water from the complete system is discharged to the public sewer system.

Sludge treatment:

All sludges generated in the different process stages (thin sludge acceptance tank, sedimentation tank, flotation plant) are collected in two storage tanks that serve as buffer and mixing tanks in which the collected sludges are mixed and dewatered via a decanter to > 60 % DR. A screw conveyer delivers the dewatered sludge to a storage bunker from where the sludge is loaded onto trucks by wheel loaders and transported to a landfill.

Electrical control:

The electrical control system for the entire plant is designed for fully automatic plant operation. Operating staff is only required for raw material feeding and disposal of treated materials. In contrast to conventional plants the electrical control system could considerably be simplified as a large part of the control equipment for pumps could be omitted and due to the smart spatial arrangement of all plant components.



Grit treatment: HUBER Wash Drum RoSF 9 with two subsequent HUBER Grit Washer RoSF 4 units, coarse material washer, ROTAMAT® Rotary Mesh Screen RoMesh® for organics removal and compaction

ger. This concept included the same HUBER machine types that have proven their efficiency in the Grenchen project. The new recycling plant at Aarberg is designed for the acceptance and processing of liquid and predewatered sludge from sink pits and road sweepings.

The liquid phase flows then through a HUBER ROTAMAT® Micro Strainer Ro 9 with 6 mm bar spacing from where it is discharged to one of the two acceptance tanks equipped with stirrers. The separated solids are

Layout data (raw material in tons):

- 1.000 t/a road sweepings
- 7.000 t/a predewatered sink pit contents
- 1.500 t/a liquid sink pit contents

The aim of the collected material treatment is its separation into the following fractions:

- Gravel / stones / material > 25 mm (washed)
- Gravel / grit 0.2 – 25 mm (washed for reuse)
- Organic / plastic materials
- Sludge

The materials resulting from separation into fractions can be recycled or reused but, most of all, the material volume for disposal is reduced.

- Material acceptance



Smart pump technology arrangement to ensure easy access for maintenance

Green Building – HUBER has understood the signs of the time

New team in the Business Unit Industry



The new “green building” team of the Business Unit Industry is responsible for sustainable building projects. But what exactly is a “green” building?

The experts of the energy and environment sector are still undecided how exactly to define the meaning behind the two words as long as the market is still in the early phase of development. But they agree that buildings can only be green buildings if they prove the resource-protecting and eco-friendly use of energy, water and building materials.

Other factors are cost-effective occupancy and management of the building as well as a healthy living and working environment. In the wider sense, even social and ecological aspects are decisive for whether a building is a green building.

Time is ripe for a new team in a new market

In times of climate change, rising energy costs and scarce resources, sustainable building planning is, more than ever, a highly topical and explosive issue. HUBER got on board

Nick Meeten from New Zealand and Wolfgang Schnabl of HUBER DeWaTec to be close to the action as this promising future market is emerging. The new two-man team in the industry department offers now solutions for the optimisation of existing and newly built large buildings, such as shopping centres, hospitals, hotels and office buildings. HUBER has already sold 30 MCB and 10 VRM® plants for this field but the potential of this market is much higher. To explore this potential, the new “green building” team offers in addition combinations of the products Bio-Mem®, ThermWin®, RoWin and machines for mechanical wastewater pretreatment.

Experience and expertise from New Zealand

Nick Meeten has gathered extensive experience in the planning and implementation of sustainable building concepts in New Zealand, Italy and England. As manager of Water-Guru and design engineer for building and development projects, he supervised numerous projects with systems for heat recovery from was-

tewater, low energy heatings and intelligent control systems. His development of a climate control plant with extremely low power consumption for a shopping centre was granted the award of innovation for engineers. We are happy that Nick Meeten, as new “green building” team leader, will now use his prize-worthy expertise to develop HUBER solutions.

Cost savings and image building with HUBER solutions

Nick Meeten sees the prime market in the Middle East, Asia and North America. But also the Western European market offers potentials. Many big cities, such as Jakarta or New Delhi, are bursting at the seams due to increasing urbanisation (migration from the land into cities). Population figures are continuously rising and with them the load on sewage treatment plants and power and water supply systems. The dependence on



Team “green building”: Nick Meeten (left) and Wolfgang Schnabl (right)

water and power suppliers, frequently unreliable and expensive anyway, can be reduced by integrating sustainable supply and disposal systems already in the construction planning phase of hotels, hospitals, shopping centres and office buildings. Hotels, for instance, can reduce their water consumption if they apply reuse systems. This saves costs and boosts their profits. “Green building” is not only to the benefit of our environment but also easy on the purse of companies and investors. In addition to the financial aspect image improvement due to eco-friendly management can be a lucrative investment motive.

Aid money for the implementation of solutions for sustainable buildings is handled quite differently in individual countries. Israel, USA and Australia award grants for resource protection and eco-friendly systems but only with severe restrictions. In Germany, certifications are offered by Deutsche

Gesellschaft für Nachhaltiges Bauen (DGNB). The following criteria are considered:

- Protection of the environment = protection of natural resources
- Lifecycle cost reduction = maintenance of economic value added
- Health protection / comfortableness in buildings = humane environment / maintenance of social and cultural values

Nick Meeten remembers he once read on the UN website that even the old Romans had better water than half the world population today. With this as motivation and combined with the innovative HUBER solutions, Bavaria will take a leading position in the “green building” market and HUBER will take the market leadership and set sustainable future trends.

Marketing



More and more hotels install sustainable power and wastewater systems

Products, solutions and expertise for clean wastewater

Successful HUBER overall concept for beverage industry



With a tradition of more than 180 years Jamnica is the biggest mineral water and soft drink producer in Croatia bottling about 350 million litres of mineral water and non-alcoholic beverages per year. In 1993 Jamnica became a member of Agrokor Group and has since developed to one of the most modern enterprises in the European beverage industry due to its careful investment into the modernisation and development of its company. The company focuses on the high quality of its products but also wants to communicate its idea of environmental awareness to its customers.

In order to further improve the company’s eco-friendly image, Jamnica developed a concept for the treatment of the production wastewater in their Jana and Jamnica factories. At Jana they bottle spring water and produce soft drinks. Mineral water is produced and bottled at Jamnica. In cooperation with LOVECO, partner of HUBER SE in Croatia for more than 15 years, an offer was prepared for two turn-key plants. The scope of the offer included the following machines of the HUBER program that have well proven over many years:

- ROTAMAT® Rotary Drum Fine Screen Ro 2
- HUBER Dissolved Air Flotation Plant HDF
- ROTAMAT® Screw Conveyor Ro 8t
- ROTAMAT® Screw Press RoS 3Q

To meet the high requirements on effluent quality and ensure the problem-free reuse of the treated water as service water, the innovative HUBER VRM® membrane plant was offered in addition. Owing to their extensive experience in the treat-

ment of municipal and industrial wastewater and reputable references HUBER could win the trust of the decision makers and convince them with the well prepared and detailed offer. The purchase contract for the two wastewater treatment plants was signed at Zagreb at the beginning of 2009. In the following phase of detailed technical planning great accuracy was applied to create construction and pipeline plans, building services plans, wiring and cable diagrams. The work on site was predominantly carried out by local companies and coordinated under the lead of LOVECO.

The first plant erected was that at Jana. It was successfully put into operation in spring 2010. The second part of the project at Jamnica is planned to be completed in the course of 2011. The major part of the wastewater treated at Jana is production wastewater and wash water from machine and pipeline cleaning but also sanitary wastewater is fed into the treatment plant. The first section of the plant is so-called CIP wastewater treatment. “Cleaning In Place”

means that surfaces in contact with the medium are cleaned without the need to dismantle the machine. The CIP wastewater is delivered from a pump station into two aerated mixing and balancing tanks where the pH of the cleaning water is adjusted. The pre-treated CIP wastewater, along with the process and sanitary wastewater, is treated in the ROTAMAT® Rotary Drum Fine Screen Ro 2, size 780 with 1 mm bar spacing.

As the production wastewater shows strongly varying inflows and concentrations, the wastewater is passed through the mixing and balancing tank, which is equipped with a stirrer and aeration system. As an option, phosphate and nitrogen may be added to the mixing and balancing tank to ensure perfect bacteria mass formation in the following biological treatment stage in order to obtain a balanced nutrient ratio. The biological sludge is pumped from the aeration tank into two membrane chambers. Each of these chambers is equipped with a HUBER VRM® ultrafiltration membrane plant, size 30/320. These membranes provide a total fil-

tration surface of 1,920 m². Due to their fine pore width of 38 nm not only sludge is physically separated from the wastewater but also retained are virtually all bacteria and germs. The permeate from the membrane plant is solids-free and crystal-clear. After a four-week run-in phase excellent COD effluent values of below 30 mg/l could be achieved, which is a reduction in excess of 97 %!

Part of the treated wastewater is reused as wash water for cleaning purposes and as wash water for the HUBER machines. The part of the effluent not reused can without problems be discharged to the receiving water course. The excess sludge generated in the biological treatment stage is discharged discontinuously into a storage tank with stirrer for sludge equalization to ensure constant feeding of the ROTAMAT® Screw Press RoS 3Q, type 280. Prior to being fed into the screw press the sludge is conditioned with polymer to obtain a stable macrofloc that is very easy to dewater.

After detailed preparation of the offer and thorough planning, successful supply, installation and start-up performed by HUBER in cooperation with LOVECO, the plant was “handed over” to the well instructed and competent operating staff at Jana. The wastewater treatment plant concept with well-proven HUBER machines and innovative membrane technology has been implemented to the full satisfaction of the customer. Owing to Jamnica’s far-sighted investment policy, they substantially contribute to environmental protection and communicate their idea of ecological awareness to their employees and customers.



Mixing and balancing tank, bio-tank and HUBER MBR system

- ROTAMAT® Micro Strainer Ro 9

BU Industry

IWRM project 'SMART 2' in Jordan partly funded by BMBF

Water Reuse in Jordan



The situation in Jordan

With approx. 160170 m³ renewable water resources per resident Jordan is one of the most arid countries in the world. The demand for fresh water in Jordan significantly exceeds the amount of water available. Even though only 5 % of the land are agriculturally used land, agriculture is the major water consumer in Jordan. The water demand of households amounts presently to approx. 24 %. According to the Ministry of Water and Irrigation (2004) this figure will virtually double by 2020 due to the fast growing population and rapidly developing tourism. According to experts, also the water consumption

for industrial processes is estimated to increase in the future.

Approach: water reuse

Efficient management of water resources on a local scale is required to ensure Jordan's basic water supply. Measures to improve water efficiency can be taken in several fields. Treated wastewater from housing developments for example could be reused for the irrigation of agricultural land. The WWTP effluent is required to contain the dissolved nutrients but must be hygienised to such a degree that its handling does not involve any health risk. Another possibility to close regional water cycles is the

indirect use of highly clarified wastewater for drinking water supply. This can for example be achieved through infiltration of the WWTP effluent into the groundwater, provided hygiene parameter requirements are met and micropollutants eliminated in the wastewater clarification process.

Membrane technology for water reuse

Innovative membrane technologies are ideal to clarify wastewater intended to be reused as service water. Depending on their pore size, such membranes are able to reliably retain both particles and bacteria and even viruses. The combination of aeration and membrane ultrafiltration for example offers the possibility to obtain high-quality service water from municipal wastewater. As the quality of this service water meets Jordanian standards (JS: 893/2006), the treated water can directly be reused for irrigation in agriculture or after additional treatment (activated carbon filtration and soil passage) for groundwater recharge.

IWRM project 'SMART II'

The 'SMART II' project (WTWM02030109), which is partly funded by BMBF, has moved into its second phase. Water reuse options for regions in Jordan that show a high degree of scattered housing developments are to be investigated and demonstrated in this phase. HUBER MBR systems with ultrafiltration are applied to treat municipal and domestic wastewater in order to produce high-quality service water.

In close cooperation with UFZ and TZW, not only a MBR pilot plant is used under this research and development project but also a MBR group solution for a housing development with 130 to 150 residents west of Amman to demonstrate wastewater reuse. The permeate is planned to be reused for agricultural irrigation and after additional treatment for groundwater recharge.

Moreover, a plant-specific concept has been developed and will be implemented, including telecontrol and remote data transmission, for the centralized control of the decentralized plants. The online transmission of important parameters, such as operation pressure or flow rate, will



Exterior view of the containerized MBR plant on WWTP Berching



Mechanical preliminary screen (HUBER ROTAMAT® Micro Strainer Ro 9)

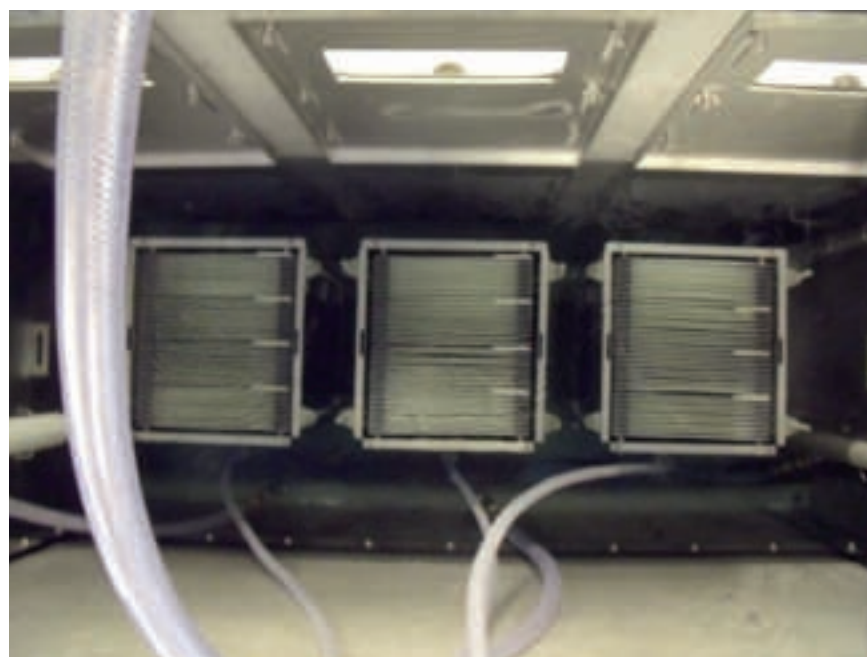
permit telemonitoring of the plant and reduce the requirement of service staff attendance to a minimum.

MBR pilot plant for groundwater recharge

The compact containerized pilot plant consists of an aeration tank with separately mounted membrane ultrafiltration modules (HUBER MCB-4) and a mechanical pretreatment system (ROTAMAT® Micro Strainer Ro9) and handles a daily wastewater flow of 10 m³. The plant is designed for automatic operation and equip-

ped with a system for remote data transmission. Under this research and development project TZW will investigate the elimination of micropollutants, such as medicine residues before the pilot plant will be installed on the Jordanian WWTP Fuheis and operated there with high wastewater temperatures until the end of the project in December 2012. Presently, the plant technology is being optimized at HUBER SE Berching. The MBR pilot plant can be visited at any time.

Research & Development



Membrane filtration module (HUBER MCB-4)

HUBER Service in the US

Customer-oriented local HUBER service throughout the world



The first HUBER machines were delivered to the US in 1994. In 1999, a HUBER subsidiary was founded at Huntersville, North Carolina, and more than 1800 HUBER plants have since been installed and put into operation throughout the US. Very soon it became obvious that we needed to offer our service expertise as close to

the customer as possible so that an efficient local service organisation was developed in the US within only few years.

Primary service aim:

Maximum US customer satisfaction with HUBER products throughout the

whole product life cycle, from plant installation and start-up to reliable and comprehensive after-sales service. Our local service experts closely cooperate with their customers to ensure they achieve this aim, despite the fact that they have to cope with almost any global climate and six different time zones. But they are of



Service group manager HUBER USA, Huntersville, North Carolina Henk-Jan van Ettehoven

course prepared to rise to these big challenges. The HUBER service centre in Germany provides continuous and comprehensive support to the US service team, including regular supplies of original HUBER spare parts and assistance from internationally acting HUBER service specialists who closely cooperate with

the US team to continuously ensure maximum service quality for our customers. Providing customer-oriented and professional product-accompanying service is both an incentive and obligation for us – in the US and worldwide.

BU Global Service



Spares and wear parts stock of our US service centre for a high availability of parts relevant for equipment operation.

Reduced plant operating times to reduce wear and minimise operating costs

Overhaul of WWTP Coquimbo, Chile to re-establish functional and operating safety



Coquimbo is a port city in North Chile and has 161,000 inhabitants. On the local municipal wastewater treatment plant six HUBER ROTAMAT® Complete Plant units are installed for mechanical preliminary treatment and grit and grease separation. High solids loads and the specific materials contained within the wastewater require high efficiency treatment units with maximum plant availability.

This must also include high quality operation and load-dependent inspections and maintenance to ensure a high level of operating reliability. When it came to awarding the order both the plant operators and HUBER were aware of this fact, which finally was the point that led the customer to the decision to select HUBER products.

After years of heavy duty a general overhaul and extensive refurbishment of the installed plants became necessary to ensure the operating

reliability of the equipment also in the future. A service concept was therefore worked out in cooperation with



Perfect cooperation with the HUBER Latin America service team and the plant operators at Coquimbo, Chile

the customer and our service centre of HUBER Latin America at Santiago de Chile. HUBER service specialists from Germany and Santiago de Chile visited the site and analysed the service measures required to be carried out. All their analysis results and the planned service schedule were documented. After the customer had assured the financing he placed the service order with HUBER.

All original HUBER spares and wear parts were shipped to Val Paraiso harbour. The HUBER service engineers picked up the parts and immediately after completed pre-planning started with their service work. Extensive repair was done on the screens and grit trap screws. Also the grease traps and aerators were repaired and major spares and wear parts supplied to be

kept in stock on site to provide the customer with better possibilities to react quickly and thus substantially increase future equipment availability.

Our international HUBER service team with its combined experience was on site more than three weeks. The close and perfect cooperation with the plant operating staff on WWTP Coquimbo rendered possible the transfer of know-how in technology and operation of HUBER plants – for the benefit of our customer. They repaired one treatment line after the other and optimised its operation without interrupting the entire WWTP operation.

This point was of special importance for the customer. The re-established high operating reliability of his plants

ensures their high efficiency in the future and gives the customer other benefits:

- Significantly reduced plant operating times
- Reduced wear
- Reduced operating costs

These were other important factors for our Chilean customer Aguas del Valle. The Global Service team of HUBER Germany in cooperation with the HUBER Latin America service team were able to meet all expectations of our customer in Chile – another step towards our goal: customer-oriented HUBER service expertise on any site in the world.

BU Global Service



Six wastewater treatment lines in the inlet to WWTP Coquimbo

HUBER provides for maximum operating safety

HUBER Service substantially contributes to ensuring plant availability at Wert Leder GmbH in Freiberg, Saxony/Germany



Wert Leder GmbH is a subsidiary of HEWA Group in Freiberg, Saxony/Germany. The company is specialised in leather processing and finishing and produces high quality, large-sized leathers for upholstery industries. The company also cooperates with renowned automobile industries, such as Rolls Royce and BMW. Wert Leder GmbH produces about 5,000 skins per week, which undergo the processes of neutralisation, tanning, greasing, dyeing and cutting.

The wastewater generated in these processes normally shows a high pollution load and its discharge to the public sewer network is only possible against high extra costs. Wert Leder GmbH therefore selected a HUBER solution for the treatment of their wastewaters. Our Business Unit Industry rose to the challenge and started in 2008 to develop a concept that convinced the customer and included coarse material and grease separation, sludge thickening and all peripheral equipment. Of special importance for the company were high plant availability and quality protection of the supplied technology.

They therefore took into consideration to make use of the HUBER services offered in the form of different service contract types (HS1, HS2, HS3). The deciding point for the company was to ensure servicing includes check-up of peripheral equipment, such as the stirrers for the sludge storage tanks or pumps, including all third-party products.

The customer wanted to have a complete service solution from one source. In this respect, HUBER could convince them with its service contract type HS3. This contract includes regular thorough checks for wear of all relevant machine elements as well as performance, process and plant safety tests. This will guarantee Wert Leder the high operating reliability and availability of its plants.

The main features of the contract are the following:

Maintenance:

- Regular check-ups of all machines and peripheral equipment on the basis of HUBER check lists.

- Evaluation of the status of each relevant machine area including accurate examination for wear and according data recording.

- Lubricant replacement

- Agreed replacement of spare and wear parts that are identified to be at the permissible wear limit within the scope of regular maintenance to ensure plant availability until the next regular maintenance.

Special guarantee:

- Functional and operating guarantee between maintenance intervals.

Hotline service:

- Call-back guarantee within 8 hours after receipt of the fault report, even on Sundays and holidays.

48-hour trouble shooting service:

- Guaranteed visit by a HUBER service engineer within 48 hours after confirmation by the HUBER Service Centre.

Product optimisation package:

- Check-up of the overall function and process of the machines including upstream and downstream processes.

- Inspections according to HUBER-equipment-specific HS3 check sheets. The HS3 check sheets are

evaluated in the HUBER service centre.

With our HS3 service contract, we contribute to ensuring operating reliability and hence continuous problem-free operation of the complete work and production process in Wert

Leder GmbH. We would like to take this opportunity to thank Wert Leder GmbH and Hewa Group for their confidence and look forward to a long-term successful cooperation.

BU Global Service



Wert-Leder GmbH in Freiberg/Saxony



HUBER ROTAMAT® Micro Strainer for separation, washout and compaction of solids from the combined water generated in the company's production process

8,000 € collected for a school in Chile

HUBER donations for San Ignacio school at Calera de Tango

● Calera de Tango

Service engineer Markus Rossmann could not believe his eyes when he heard of the heavy earthquake that shook Chile on 27 February. Only 48 hours before he had left Chile where he had taken care of a HUBER service project near Concepción. The terrible extent of the catastrophe became visible in the course of the next days. The earthquake hit more than 12 million Chileans.

Most affected were the people living between Santiago and Concepción near the epicentre of the quake. HUBER signalled its solidarity with Chile and HUBER Latin America and helped with a fund-raising campaign. As representative of all HUBER employees, Markus Rossmann travelled back to Chile, to Calera de Tango near Santiago, with a cheque worth

8,000 €. Together with managing director of HUBER Latin America, Max von Igel, he handed over the cheque to the San Ignacio school. They will use the money to reconstruct their severely damaged schoolhouse originally built in the 18th century.

"I was really surprised to hear that this historic building has Bavarian roots", reported Markus Rossmann from his visit. Indeed, many Bavarian Jesuits emigrated to Calera de Tango between 1712 and 1748 and erected for example a chapel and the nearby schoolhouse. Even today, the Jesuit confraternity "Fe y Alegria" is still the supporting organisation. "Fe y Alegria" means "faith and joy" in English. School director Luis Donoso spoke about faith that would be reflected by the solidarity of people worldwide

and what a blessing it would be to receive these donations. His speech was followed by a moving thank-you ceremony. The school children expressed their gratitude with a very emotional singing and dancing performance.

The HUBER representatives were equally very touched as well as proud to be able to help. Also Guillermo Soto, chairman of the supporting organisation, thanked HUBER SE for the donated money. Max von Igel then explained to the amazed children from how far the cheque was coming and what the company HUBER SE is actually doing. "The earthquake has hit us all and we all must help and cooperate to get back what we've lost, and our children and their education is most important", said Max von Igel after a tour of the damaged building.

The 8,000 € donated by HUBER SE are sorely needed for the San Ignacio school in Calera de Tango and will certainly be used sustainably. Max von Igel obviously has chosen the right aid project. It is due to him and the initiative of Markus Rossmann, and of course all donors of HUBER SE, that the children at the school of San Ignacio can look to the future with a little more of hope.

Marketing



HUBER representatives Max von Igel and Markus Rossmann with the children of San Ignacio and the 8,000 € cheque



Max von Igel tried to put into words his solidarity with Chile.

Dr.-Ing. E.h. Hans G. Huber and Karl-Josef Huber celebrate their retirement from the HUBER SE board of directors

Farewell ceremony for brothers Hans and Karl-Josef Huber after retirement from HUBER SE board of directors

● Berching

Dr.-Ing. E.h. Hans Huber and his brother Karl-Josef Huber celebrated on 30 April their well-deserved retirement from the HUBER SE board of directors. About 100 invited guests from economy, science and politics, including the works council members and executive managers of HUBER SE, came together at Hirschberg Palace. The towers of Hirschberg castle in bright sunlight were certainly an impressive view for the guests who followed the invitation. CEO Georg Huber, Hans Huber's son and successor, had the special honour to welcome all guests in the name of his family and HUBER SE. After 41 years of corporate responsibility for the management of the tradition-rich family business the two brothers changed to the HUBER SE supervisory board in March 2010. Dr.-Ing. E.h. Hans Huber since then is chairman of the supervisory board while Karl-Josef Huber has taken over the posi-

on of vice chairman. In view of the growing number of employees, continuously increasing production area and sales figures, Hans and Karl-Josef Huber can proudly look back on their lifework. Numerous speakers appreciated their merits, among others Bishop Gregor Maria Hanke, Prof. (retd.) Dr.-Ing. Dr. h.c. Peter Wilderer, District Administrator Albert Löhner and former Minister of State Dr. Thomas Goppel. Furthermore, the regional Chamber of Commerce awarded them its golden roll of honour. Dr.-Ing. Oliver Rong, Vice CEO of HUBER SE and son-in-law of Karl-Josef Huber, presented a review on 175 years of company history with the focus on Hans and Karl-Josef Huber's outstanding achievements. As a successful completion of the lively, not at all melancholic ceremony, former State Secretary Hans Spitzner moderated a panel discussion that offered the guests the opportunity to ask

questions. HUBER would be growing continuously like a healthy tree, symbolized Bishop Gregor Maria Hanke and compared the brothers' retirement with the commencement of a new growth ring. In fact, the company counted only about 20 employees when Hans Huber left TU Munich as graduate engineer and took over the family business together with this brother in 1969. Now, in 2010, a workforce of over 950 is employed worldwide, 550 of them at Berching. Bishop Hanke, however, does not expect the two retirees lazy enjoying their well-earned retirement.

In view of their still continuing commitment to economy and science, he sees them rather in active retirement. His 'Thanks and God Bless' were especially for their loyalty to the company's location that provides secure jobs for many people around Berching. Announced as distinctive research personality, Prof. (retd.) Dr.-Ing. Dr. h.c. Peter Wilderer of TU Munich expressed his appreciation in the name of science. Worldwide dialogue with researchers and scientists would be an outstanding feature of HUBER SE, said the water management expert. "On a give-and-take basis HUBER cooperates closely with universities and research institutions.

HUBER offers talented researchers the chance of self-realization and in turn can contribute innovative solutions to combating the water problems in the world. Economy, environment, customers, science – all of them profit from the development of new approaches and solutions." Paul Reiter, top-ranking representative of IWA, the leading international water management organisation, said in his speech that there is much talk about water these days and underlined that HUBER does not talk much but act. He pointed out that HUBER has understood that the worldwide water problems can only be solved with adapted technologies for the specific problems of individual countries. He appreciated that HUBER considers it a duty to offer solutions for all. Live



Ceremony guests gathering in the reception hall of Hirschberg Palace

music performed by the Stadler Quartet accompanied the ceremony and in the opinion of keynote speaker Dr. Goppel was a highlight as perfect as the job done by Karl-Josef and Hans Huber. For everything done with commitment and passion is perfect and its intensity is inspiring. The prominence of the audience would reflect what a major role HUBER plays both economically and scientifically, said Goppel. In his characteristically entertaining manner he reflected on the previous speakers' core

statements. He said, it had been important for the company's substance to have two as distinctive and unique company managers as Hans and Karl-Josef Huber. He excluded all possibility of doubt that their retirement will rather be a change than a leave and expressed the hope that both, in their new position as supervisory board chairmen, will continue to support HUBER SE with their expertise for many years to come.

Marketing

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News for Customers and Friends of HUBER SE

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