Providing impetus

Services
BUCHEN’s SafetyService – a comprehensive work safety package

International
Spectacular scaffolding services for Heathrow Airport and an oil rig in Norway

Group News
The new “face” of REMONDIS
EDITORIAL

Dear Readers!
Dear Business Partners!

We are really pleased to be able to present you with this first ever edition of our joint magazine put together for both BUCHEN and XERVON customers. The reason for doing this is to provide you with an even more detailed overview of the extensive services offered by the two companies which complement each other so well.

Moreover, this step further underlines our belief that we are able to implement projects and services that are of interest to both groups of customers, especially as BUCHEN and XERVON often work for the same customers in many different sectors. Pooling together information promotes cooperation and creates synergies from which you can benefit, too: a well-organised sales division with a single contact person for each customer, joint planning processes on site at our clients’ and much, much more – this all means optimised and more efficient services.

It is not without reason, therefore, that together the two companies cover the field of “industrial services” within the REMONDIS Group. With around 10,500 employees and a turnover of approx. 900 million euros, the potential of the two companies is huge enabling them to serve customers far beyond the European borders.

In the future we will also be appearing with a new corporate design to highlight our unity and create a joint identity in line with that used by the other REMONDIS companies. This also includes a new logo which is to be gradually introduced throughout the group. Such a move not only emphasises that each company is a part of the group but also signifies the universal goal of all REMONDIS companies to provide their customers with quality products and services. As part of this process, BUCHEN and XERVON’s holding company, Buchen IndustrieService GmbH, has been given a new name and will be operating as REMONDIS Maintenance & Services GmbH in the future.

There is indeed a great deal of common ground between the two companies at all levels of business. You will be able to find out where in this edition of our magazine – for example our collaborative work at H&R Ölwerke Schindler in Hamburg, our joint appearance at the MAINTAIN exhibition, which is being held in Munich at the beginning of June, and a joint project in China.

In addition, you will be able to read about a number of other projects which we are sure you’ll find both interesting and informative.

Last but not least, we would like to thank you for all the projects we carried out with you in 2013. We look forward to mastering the challenges facing us in 2014 with the same levels of commitment and motivation as always.

We hope you enjoy reading this edition of up2date!

Hans-Dieter Behrens
Andreas Rittel
Carsten Lange
Olaf Karrass
Matthias Ebach
Franz-Josef Englisch
Jürgen Lennertz
Andreas Rittel
H&R’s two refineries in Hamburg-Neuhof and Salzbergen primarily manufacture special products based on crude oil such as softeners, paraffin and petroleum white oil as well as base oils. The two business locations, both of which have a long-standing tradition, supply high quality products that have been manufactured using state-of-the-art technology.

H&R extends contracts with XERVON

SUCCESSFUL LONG-STANDING PARTNERSHIP NOW INCLUDES A SECOND REFINERY

XERVON is H&R’s preferred partner when it comes to maintenance work. It has been working for the company’s special refinery in Salzbergen since 1995 – and since 2006 it has had full budget responsibility for all maintenance matters at the site including purchasing, managing spare parts and coordinating all subcontractors. This extensive contract has not only been simply renewed just recently. Its scope has also been extended to cover a second location: since 01 June 2013, XERVON has been operating a business unit at H&R’s refinery in Hamburg-Neuhof as well.

Over the years, the Salzbergen Refinery has gradually handed over more and more responsibilities to the maintenance specialist XERVON. Their aim: to achieve the highest possible levels of plant availability whilst still making use of any opportunities to cut costs. Whether it involves new-build or re-build projects, repair work, shutdowns or preventative...
maintenance tasks: XERVON has been in charge of all maintenance work since 2006.

Under the watchful eye of XERVON’s site manager, Johannes Ruping, a competent team of specially trained staff from a variety of trades organises and performs any work that needs to be done. In addition, their tasks include purchasing, managing spare parts and taking over financial responsibility for the spare parts depot as well as coordinating all subcontractors.

The processes are mapped out using XERVON’s SAP system. All contracts with third-party suppliers which involve repair work – no matter what kind of repair work this may be – are handled by XERVON. This service provider is, therefore, the sole contact person for maintenance issues at H&R.

By providing comprehensive maintenance services, XERVON makes sure plant availability is kept at the same high level and that costs are optimised

When XERVON took over full budget responsibility, it assured its client that it could keep plant availability at the same high level and, over the long term, also achieve significant cost savings. This goal has already been reached. Whilst Ruping was not prepared to reveal the exact reasons for their success, he did say: “It is only possible to achieve high levels of availability if you are on site all the time, have a team of well-trained and highly motivated specialists and can react flexibly to new situations.”

XERVON has now been given the additional task of carrying out similar services at Salzbergen’s sister refinery in Hamburg-Neuhof which is operated by H&R Ölwerke Schindler GmbH. To be able to do this, XERVON opened up its own business unit on the premises of the refinery in Hamburg on 01 June. The business unit manager there, Markus Wallerich, now heads a team of commercial and technical staff who are responsible for repairing the pumps, compressors and other pieces of equipment. Moreover, the unit is in charge of handling spare parts, including procurement, and is being actively supported by those in Salzbergen.

“H&R’s aim is to see the positive cooperation work in Salzbergen being repeated in Hamburg and for synergies to be created at the same time,” explained Ruping and Wallerich. “We have already proven in Salzbergen just how successful our concept is.”

The synergy work doesn’t stop there though: as BUCHEN also has framework agreements at these two H&R refineries, XERVON has been working together with their BUCHEN colleagues for a while now when preparing projects. Short meetings are held regularly to discuss and coordinate upcoming activities that involve both companies – such as tank inspections. Over the long term, this cooperation work will be further intensified in order to be able to offer the client an even wider range of services from just one provider.

“It is only possible to achieve high levels of availability if you are on site all the time, have a team of well-trained and highly motivated specialists and can react flexibly to new situations.” Johannes Ruping, XERVON site manager

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Creating a safe working environment

BUCHEN IS NOW OFFERING A FULL RANGE OF OCCUPATIONAL SAFETY SERVICES WITH ITS SAFETYSERVICE PACKAGE

Being a specialist for high quality industrial services, BUCHEN also has decades of experience of occupational health and safety. Companies operating in the chemical and petrochemical sector can now benefit directly from this extensive know-how by outsourcing work safety at their plants to BUCHEN.

The chemical and petrochemical sector is subject to stringent work safety regulations. Besides ensuring their employees attend all necessary training courses, companies must, for example, have the right equipment on site such as respiratory protection masks, fall protection systems and devices for measuring gas levels. Employees working at refineries must be equipped with gas measuring devices and smoke hoods or wear heavy respiratory protection equipment. Another important task here is to manage and service the wide range of safety devices and pieces of equipment – so that they are fully functional wherever and whenever they are needed.

Reliable equipment 24/7
As the wide-ranging work safety requirements are not directly part of their core business, chemical and petrochemical companies must invest both time and money in this area. Working together with BUCHEN, therefore, provides an ideal and cost-effective solution. Olaf Waterstrat, Safetyservice project manager at BUCHEN commented: “Our industrial service specialists are very experienced and know all about safety issues at chemical plants. We know which equipment protects employees best and have the knowledge required to regularly test and service the devices.” This creates advantages for the company’s customers: they can concentrate fully on their business and, at the same time, be secure in the knowledge that their employees are using the best possible work safety equipment.

A one-stop shop
In line with its exemplary safety standards, BUCHEN offers an integral system of high quality safety logistics.

“It is often considerably more difficult for refineries to manage their safety devices as they require so many different types of equipment. The employees generally don’t have the specialist knowledge needed to maintain the technology either.” Olaf Waterstrat, project manager at BUCHEN UmweltService GmbH
This includes enabling customers to hire equipment to add to their own stock of safety material or even to have BUCHEN supply all safety devices needed. BUCHEN has set up three regional workshops in Germany which are responsible for handling respiratory protection devices. By doing so, the company can guarantee that they can deliver the equipment to their customers at short notice. The teams of qualified technicians at the workshops service the safety devices so that they are always handed over in full working order. Moreover, if required, BUCHEN can take over all work safety administration work on behalf of their customers. This involves keeping an eye on inspection deadlines, servicing the equipment and documenting devices that have been handed out and returned.

**TOTAL opts to work with BUCHEN**

One of the company’s first customers to make use of BUCHEN’s novel SafetyService package is the TOTAL refinery in central Germany. This refinery is located on an industrial estate in the City of Leuna and is one of the most modern of its kind in Europe. BUCHEN is now in charge of all safety logistics at the plant. It is, in particular, responsible for supplying and servicing around 100 self-contained breathing apparatus systems, 600 smoke hoods and 1,000 gas measuring devices as well as servicing approx. 2,500 fire extinguishers. BUCHEN has set up a service point at the TOTAL refinery in order to be able to provide its on-site services. Its personnel are, therefore, always on hand to manage the safety equipment and to ensure safety standards remain at the same high and reliable level throughout the plant.
Aurubis is the world leader in copper recycling. A major shutdown took place at its plant in Hamburg in September and October 2013 which meant all machines there came to a standstill. Such large-scale shutdowns are only held every 20 years and practically all plant parts undergo a general overhaul during such projects. The XERVON scaffolding specialists were also there erecting and dismantling scaffolds wherever and whenever they were needed. By the end of the period, they had used around 900 tonnes of scaffolding material and set up and taken down approx. 1,200 scaffold structures.

XERVON RESPONSIBLE FOR PLANNING AND INSTALLING ALL SCAFFOLDING

Keeping things moving during major shutdowns
Whether it involves suspended scaffolding, indoor scaffolding, simple work platforms or stair towers: a whole range of different types of scaffolding is always needed during shutdowns so that the various specialists have safe access to the areas where they have to perform their work. Only a small number of scaffolds are able to be put together before a shutdown begins – all others must be erected within an incredibly short space of time once the machines have been turned off.

XERVON also took part in the project at the Hamburg plant with a team of up to 80 scaffolders, who were all in action at the same time to erect and dismantle working and protection scaffolds whenever the steel workers, masons, pipe specialists, insulation specialists and experts from other industrial trades needed them. Besides setting up a large number of "normal" industrial scaffolds, they also had to erect unique complex structures such as fully surrounding a 30m-long, indoor chain conveyor system that jutted upwards at a steep angle and needed to be covered by a free-standing scaffold so it could be overhauled.

**Overcoming tight spaces & narrow gaps**

The most difficult challenge, however, of this scaffolding project was the complicated logistics. XERVON project manager, Bernd Dietze, explained: "During this shutdown, we didn’t have much space to store materials on the actual premises itself and so the material brought in by the trucks each day had to be erected immediately." Moreover, many of the scaffold structures had to be set up in places that were very difficult to access – for example inside boilers and furnaces that could only be entered via manways. More often than not, these small openings, through which the scaffolding material had to be passed by hand, were not at ground level but between five and ten metres high. "A 3,000 cubic metre indoor scaffold structure, for example, was put up in the heat-recovery boiler. That involved 54 tonnes of material that had to be first passed through a manway so it could be erected and then passed back again after it had been dismantled," said Bernd Dietze, describing one of the more complex situations they had to face.

For many years now, this experienced project manager has been working at the Hamburg site with his team of scaffolders as part of a framework agreement. Looking back, however, he cannot remember a time – as was the case here – when four large furnaces had to have their refractory-lining replaced all at the same time. "The scaffolds inside the furnaces were up to twelve metres high and had to be gradually erected to match the speed of the bricklayers’ work."

Some of the scaffolding work had to be performed wearing respiratory protection masks (half or even full masks) and protective clothing – for example when suspended scaffolding was installed inside the scrub and cooling system. This area has two 20m-high cooling towers and, starting at the top, the specialists had to build two 3x3m suspended scaffold structures that each reached 12 metres down into the two towers. Actually building the structure was not a difficult task. However, even non-professionals can imagine that erecting scaffolding wearing a respiratory mask and protective clothing cannot be done quickly and is not particularly pleasant either.

Faced with these difficult conditions, the scaffolders worked in day and night shifts around the clock to ensure everything was ready on time. "That was certainly not an easy job but we completed our tasks according to schedule and without a single accident," concluded Dietze.
The most remarkable feature of this new system is that it fits into a single container! This means it is both easy and economical to transport and makes it particularly suitable for international projects. Just two days are needed to set it up beforehand and detach it afterwards – much quicker, therefore, than standard tank cleaning systems and less costly, too. For the most part, the equipment runs mechanically as a conscious decision was made during the planning stage to only install electronic parts if they were absolutely necessary. The result: it is easier to maintain and, if the worst comes to the worst, the tank cleaning experts are also able to repair it themselves on site.

The cleaning agent – normally crude petroleum, gas oil or water – is pumped into the tank directly via the machine. Additional pumps are not necessary. A further technical advantage is that very little electricity is needed to start the system and get it running. A mechanical bypass connected to the pump makes it possible to regulate how much liquid passes through – accurate to 100 litres. Thanks to the high performance pumps that have been fitted into the system, three jet washers can be used simultaneously. The greater the number of jet washers in action, the faster the tank contents are heated up. Once this stage has been completed, specific areas of the tank are then targeted and cleaned by increasing the pressure and using a single jet washer.

In order to improve the cleaning and vacuuming process, the BUCHEN specialists have developed the so-called “inline pipe nozzle” that also works in reverse flow and so is able to serve as a suction nozzle. This can be used, for example, to clear blocked pipes or to heat up the solid sludge at the bottom of the tank so that it liquefies more easily and can be suctioned off more quickly. Once the cleaning work has been finished, BTTS’ compact system is even able to clean itself.

In short: this novel system makes it much easier to clean tanks, is safer for both people and the environment and cuts costs – all of which are very important for our customers.
Intelligent materials management as part of an efficient maintenance strategy

SPARE PARTS ALWAYS ON HAND DESPITE LOW STOCKS

The management of procurement activities, suppliers, warehouses and stocks all have a direct influence on acquisition prices as well as on life cycle and process costs and the costs of capital employed. Such activities determine the operational availability of production plants as well as the efficiency of production processes.

Surprisingly, the management of spare parts is often pretty low on a company’s list of priorities. On behalf of its customers, XERVON develops, organises and implements materials management concepts that add value to the business and create additional cost savings thanks to its systematic maintenance strategy. Synergies can also be tapped into by building up networks that link different business locations or even different customers – to achieve the end result of always having sufficient quantities of spare parts on hand to keep plants operating, whilst having as little capital tied up as possible.

This primary target of efficient materials management – ensuring spare parts are available when they are needed and keeping stocks as low as possible i.e. low amounts of capital employed – is in fact two opposing goals which XERVON always succeeds in balancing out in the most efficient way. The big challenge is to make it possible for the management of the materials to be standardised, transparent and clear using a uniform system. All areas that come into contact with materials management – such as purchasing and procurement, warehousing and logistics, standardisation as well as interfaces to other systems (accounting, documentation etc) – are affected by this in equal measure. If the best possible maintenance strategy is to be achieved, then materials management must be added to the equation.
Using modern instruments
The most important steps on the path to having low volumes of capital tied up in spare parts and yet having sufficient spare parts on hand when they are needed are:
- Standardisation of the range of items
- Supplier concepts
- Part-specific procurement & storage strategies
- Efficient warehousing

XERVON uses modern eCl@ss systems when carrying out its standardisation processes. Thanks to this classification code, each part is given a number. The features of the parts (the material, surface coating etc) are specified so that identical parts are easy to recognise and spare parts can also be clearly picked out. This is the only way to be able to determine, for example, whether two pump seals, which look exactly the same, are in fact identical and can be used as a spare part so that there are no unpleasant surprises once they have been installed.

By using certain types of software applications (e.g. SAP MM = materials management), XERVON is able to pool together and link data so that stocks and quantities are kept as transparent as possible. This includes creating and regularly updating an electronic list of items, setting up an automated collective billing system and using electronic procurement platforms to name just a few.

Factoring in employees
Which takes us to another important characteristic of our efficient materials management concepts: keeping things simple. Thanks to our solutions, even users who are not application specialists in, for example, SAP MM are given simple options and tools so that they, too, can implement the organisational structure of a modern materials management system efficiently. The easy-to-use applications take away their fear of handling what are effectively highly complex structures and enable all those involved to benefit from the system. Here an example: XERVON is currently in the process of setting up a web shop that links the customer’s different business locations. That, however, is not all: it is not only going to include the customer’s own stocks but also those of relevant suppliers and contractual partners. As a result, the customer benefits from a pool of spare parts that reaches far beyond his own factory gates. When he needs to look for and procure a spare part, it will be as simple as using a search engine or buying from an online retailer.

Heading in new directions
However, procuring relatively new spare parts is not so hard. What is considerably more difficult is getting hold of older spare parts. Besides the loss in know-how due to demographics, this problem has become one of the main topics of the maintenance business. Faced with this backdrop of ageing production plants, whose spare parts are no longer even supplied by the original manufacturer, XERVON has been creating networks that link manufacturers, service providers and users. These systems incorporate many different business locations so that, if the worst comes to the worst, an urgently needed spare part can be found within a short space of time. Adopting this idea of a network as a means to procure spare parts also opens up completely new avenues: if, therefore, the spare part from your own store fails soon after it has been installed, the network enables you to get hold of a replacement part quickly. Transferring know-how is also possible in such a transparent network.

Future-oriented research work
In order to push forward the further development of our efficient materials management structures, XERVON is playing an active role in a number of different research projects. One such project is ‘RESIH’ (resource-efficient maintenance logistics) where the declared goal is to achieve a more efficient use of resources in logistics systems involving spare parts. This joint project analyses the present consumption of resources and looks at ways to sustainably reduce such consumption by implementing suitable maintenance measures.

A further research project looking at logistics has resulted in the creation of the so-called "Chem-Log-Net", a logistics network for spare parts which all chemical industrial parks in the German state of North Rhine-Westphalia can access. The aim here is to develop a cross-company solution to
optimise stocks of spare parts. Both research projects are due to run until mid 2015 and have already thrown up some interesting facts and results.

Some real life cases
The results of this research work have already been absorbed into the processes used to draw up materials management concepts at XERVON’s maintenance locations. This has primarily been made possible thanks to the ongoing exchange of information and the intensive but friendly cooperation work. Many innovations have, therefore, been able to be introduced which benefit our customers – as can be clearly seen by one of our recent projects. Our assignment was to take over full management of a spare parts depot on behalf of a customer who had stores at two different locations. As part of the system we introduced, we classified all parts which also included the extensive task of identifying identical parts. The project lasted for several years and led to material numbers being decreased by over 20 percent. A laborious task that has, however, brought a steady return year on year since the project was completed.

At another XERVON location, the company was able to identify multiple uses for spare parts (e.g. in standard chemical pumps) and so establish focus areas for maintenance work and, ultimately, for storing the necessary spare parts. By setting up so-called service centres, the business locations now have more cost-efficient stores with minimum volumes of stocks. Moreover, this move has led to a further increase in the levels of expertise within the workshops themselves. A more commerce-oriented optimisation solution is the so-called MOLINA concept with which large stocks of material become "off balance sheet items".

As far as the balance sheet is concerned, these stocks are listed at MOLINA, a consortium of banks which can often operate with very favourable rates of interest. The physical warehousing and the actual operations of the materials management processes remain unchanged. Advantages are created here in the area of ownership and interest rates. A genuine win-win situation.

Conclusion
The setting up of a robust materials management concept – that goes beyond one single business location and yet develops bespoke solutions for each individual production facility – clearly opens up potential opportunities to streamline business operations. What is important here is to create transparent networks that unite different locations. This is the only way to create concepts that add value to a business and that intelligently unite maintenance and procurement strategies.
Full service package for biogas plants

BUCHEN’S FULL SERVICE PACKAGE ENSURES PLANTS RUN SMOOTHLY

With its biogas plant service, BUCHEN offers its customers a full service package covering the cleaning, inspection and servicing of biogas plants. Demand for these services is growing rapidly. This increasing demand is not only due to the current legal regulations but also to the ever-growing number of operators who are opting to build these plants to tap into a source of sustainable energy.
Important safety measures include, for example, measuring technology to protect the environment as well as personal protective gear for the employees.

One problem faced by plant operators is the deposits – such as sand, crystallised struvite or other materials – that build up in the biogas plant’s fermenter or liquid tanks. If left there over a long period of time, these deposits can reduce the fermentation area which, in turn, lowers the performance of the plant. Moreover, such deposits can decrease the amount of heat released by the pipes in the fermenter. It is, therefore, essential that biogas plants are cleaned by professionals at regular intervals.

Across Germany – for a wide variety of plants
The “carefree package” developed by BUCHEN comprises the complete range of services needed for biogas plants. One important component is emptying and cleaning the tanks. To be able to do this, the content of the fermenter is sucked out using a heavy-duty vacuum system and then temporarily stored. This means that neither the materials that are suitable for producing energy nor the liquid content that can be used by agricultural businesses as a fertiliser are lost. Other services include removing the coating from the containers and recoating them, providing a filter and catalyst service as well as cleaning gas coolers, heat exchangers and pipes. Whether it be a Nawaro plant on a farm or a high performance, industrial fermenter: BUCHEN’s wide range of services is suitable for practically all types of plant and can, therefore, also be used for waste digestion plants, dry fermentation and wastewater treatment facilities.

Comprehensive services with stringent safety standards
As part of its full service package, BUCHEN also takes on all project management tasks as laid out in the latest legal regulations regarding the operating of biogas plants. Such tasks include risk assessment, budgeting, time management, workplace health and safety, environmental matters as well as explosion protection measures. In addition, its safety concept comprises shutting down the plants and then using nitrogen to make the system inert so that the plant can be accessed and cleaned safely. The package available to biogas plant operators is rounded off by the maintenance services offered by BUCHEN’s sister company, XERVON. XERVON, for example, services, repairs and fits all types of pipes or installs so-called ORC (Organic Rankine Cycle) systems to generate additional electrical power using the surplus heat from the biogas engines.

Thanks to its profound knowledge and extensive range of equipment, BUCHEN is able to tackle more unusual challenges as well. The company’s specialists have years of experience of cleaning chemical plants and are well versed in all aspects of health and safety. These provide important benefits for plant operators and are further good reasons for opting for the full service package currently being offered by BUCHEN.

A reliable partner for successful solutions
The projects already carried out by the company underline just how important it is to have specialists perform the biogas plant services. Whilst cleaning the high performance fermenter at the Heidelberg sewage treatment plant and preparing it for inspection, the container was found to be damaged. As a result work had to be delayed until the container was made structurally safe.

Stringent safety measures were required to clean the waste digestion plants operated by BRS Bioenergie in Deißlingen where biogas is produced in two large fermentation tanks. BUCHEN removed 360 cubic metres of solid and residual materials from the containers wearing respiratory protection equipment and observing strict safety standards at all times.

Specialist technology was needed at the Brandholz biogas plant in Usingen, Hessen. One of the main focuses of this project was the leachate tank in the interior of the plant that is used to collect fermentation liquid. Thanks to their special equipment, BUCHEN was also able to work in the narrow space between the fermenter building and the leachate tank – a compelling argument for Rhein-Main-Deponie GmbH to award the contract to BUCHEN, who had already cleaned another biowaste plant for them in the past. The specialists needed seven days for this project which involved emptying the containers as well as cleaning the container walls and pipes. A good 700 cubic metres of content was removed from the tank.
Refineries and chemical and petrochemical businesses need tanks of all shapes and sizes to store their intermediary and final products. All these tanks have to be inspected regularly, cleaned and, where necessary, repaired and coated. This is a classic case for the XERVON specialists from Kösching near Ingolstadt who have been coating the inside and outside of tanks using a variety of special processes for over 35 years now. XERVON is one of the leading companies able, for example, to coat large-scale industrial tanks using a hot spray system.

Just recently, XERVON successfully completed a project to coat the outside walls of liquid gas tanks and this is a perfect example of this hot spray system. Two giant cylindrical steel tanks, each almost 50m long and with a 5.5m diameter, and two other 100m-long tanks needed to be coated at the manufacturer’s production hall to ensure they were both abrasion and shock-proof as well as protected against roots. This was all necessary as the tanks are to be placed below ground and covered by at least 80 centimetres of soil.

A special coating material for underground tanks was used
High quality results are guaranteed thanks to the extensive monitoring work that is performed both during and following the application of the coats.

The spray work has to be carried out quickly, as it doesn’t take long for the material to set.

Attached to the tanks once they have arrived. As soon as this work has been completed, the coating specialists will travel there with their blasting and spraying equipment to check that the coated surfaces have not been damaged during transport as well as to blast clean and coat the untreated surfaces before the tanks can be placed under the ground.

Internal tank coatings: it’s all about the right materials

Tanks used for storing corrosive or aggressive liquids or liquids hazardous to water are subject to the stringent legal stipulations set out in the Federal Water Act when they need to be coated. XERVON is well versed in all these requirements and is able to use its extensive experience gathered from the numerous projects it has carried out at crude oil tank farms and refineries, in the chemical industry and at plants processing hazardous materials. XERVON internal coatings and linings are made of epoxy resin, conductive epoxy resin, polyurethane, polyurea, vinyl resins, phenolic resins or of diverse types of film. Depending on the material, they are applied using hot spraying up to 80°C and at a suitable pressure, using compressed air or airless spraying or they are sealed if the material is a film.
BUCHEN UmweltService recently carried out a project at the Signal Iduna Park in Dortmund, Germany’s largest football stadium and home ground of the Bundesliga team Borussia Dortmund. Their task was to repair the south stands and to remove the concrete – that had been damaged by chloride – from the steps of the stands using high-pressure water equipment. The salt used to remove snow and ice from the stands during the last few winter seasons had damaged both the epoxy resin surface and the concrete directly below it. The typical signs of chloride damage were most noticeable in the rows closest to the pitch.

Stringent safety measures had to be put in place as other work was also being carried out on the stands at the same time. The surface material together with the water created a paste-like mixture which flowed into a gully structure that the BUCHEN team had set up at the bottom of the stands. From here, it was continuously suctioned off with an air conveyor system and stored in vacuum containers. At the end of the project, the containers were then taken to a processing plant for disposal. The professional disposal of this material had been included in the waste-management concept drawn up by the company before the project began. Thanks to the process used, neither the grass surface on the pitch nor the drainage system installed in the grounds were affected by the work.

In order to prevent this situation from getting worse, both the damaged epoxy resin coat and 20 millimetres of the concrete surface had to be removed from an area covering 500 square metres.

The high-pressure water jets (2,500 bar) made it possible for the concrete and coating to be removed without any dust being produced. Additional blast-cleaning abrasives, such as granulates, which would have only increased the volumes of material that had to be transported away, were not needed even though the concrete was of a very high quality and very strong. A team of five BUCHEN experts carried out the work using two 2,500-bar, high-pressure water machines, a high-pressure spray gun and a manual device for removing the surface.

Besides preventing dust, high-pressure water jets are also a resource-friendly way to remove coatings as they need relatively low volumes of water. Moreover, just a small team of employees can remove large surface areas. At the end of the assignment, the client praised the BUCHEN team for the high quality of their work and for coordinating the teams preparing the subsurface. In the meantime, the renovation work carried out on the home ground of Borussia Dortmund – eight times winner of the Bundesliga – has been completed and the results are truly impressive.
Keeping the power flowing

CLEANING A GAS PRE-HEATER AT A COAL-FIRED POWER PLANT IN WILHELMSHAVEN

BUCHEN KraftwerkService GmbH cleaned two gas pre-heaters – both with a radius of 5.6 metres – at a coal-fired power plant in Wilhelmshaven. Each gas pre-heater was cleaned twice to ensure the best results were achieved.

In order to secure high quality results, these specialists for power plant services have developed their own computer-controlled, automated cleaning system that flushes out air and gas pre-heaters quickly and cost-effectively using pressurised water. The gas pre-heaters normally rotate themselves during the cleaning process. This was not possible in Wilhelmshaven, however, as the client had requested that the pre-heaters be completely disconnected from the plant’s system. As a result, electricity had to be supplied from the local grid. The problem here: it had the wrong frequency. BUCHEN Kraftwerk-Service, therefore, used a transformer to change the frequency of the electricity from the grid to the required level.

This, in fact, created an additional advantage as the team was able to regulate how fast the pre-heaters rotated and consequently had an even better control over the automated cleaning process and was able to adjust it precisely to their needs. At the end of the assignment, the perfectly cleaned gas pre-heaters were reconnected to the power plant and are once again doing their jobs – much to the satisfaction of BUCHEN’s client.

Cleaning gas pre-heaters

Gas pre-heaters are used to reheat the cleaned flue gases from the flue gas desulphurisation and denitrification systems. The flue gas cleaning process cools the gases down to such an extent that – due to thermal convection – they are unable to be removed via the chimney. The clean gases, therefore, are heated up to a temperature of more than 80° Celsius in a gas pre-heater to create the right air flow in the chimney. Cost efficiency is achieved here by using the heat from the untreated, hot flue gases – this also protects the chimney and its flues.
Property refurbishment specialists

SOFT SKILLS ARE A MUST WHEN REFURBISHING OCCUPIED BLOCKS OF FLATS

Converting and redeveloping existing buildings is one of the more demanding tasks for those working in the construction sector. Having said that, though, fully refurbishing blocks of flats is a true challenge for all those involved – especially if the flats are occupied.

XERVON Bauwerkserhaltung, a company specialising in building preservation work, has also been focusing on this particular field of business since 1999 and now has a long list of references of successful maintenance and refurbishment projects involving occupied residential properties. It is not only important here to execute the work in a correct and professional manner. The only way the project can be a real success is if the company performing the work understands the needs of the residents and treats them with the right amount of tact and sensitivity. This is especially true for the XERVON project manager responsible for the on-site work. He is the intermediary between the tenants and the tradespeople and must take the residents by the hand and help them through the renovation period. Soft skills are needed here so that the tenants feel involved in and support the project.
The Thorr estate in Bergheim was fully refurbished – both inside and out – much to the joy of the local residents. Thanks to the intensive support provided by the company, the disturbances caused by the building work were kept to a minimum.

The installation of energy-saving measures at the Thorr estate in Bergheim, Germany, was executed in the same professional manner. Here, four buildings containing a total of 25 occupied flats had to be refurbished and modernised.

Another extensive maintenance project carried out by the company was on Eythstraße in Düsseldorf, Germany. Here they were responsible for improving the energy-saving measures and refurbishing 84 flats. In four separate stages, the outside walls of the occupied flats were re-insulated and all windows replaced, a new roof was laid, solid balconies were built onto the façades, the 12 stairwells were renovated and repainted, all of the flats’ front doors were replaced and all kitchens and bathrooms modernised. All outside walls were insulated and plastered. Moreover, all water pipes and electrical installations were replaced, the bathrooms were modernised and a new heating system was installed that is partially run on solar power. The old balconies were removed and new balconies built onto the façades. During this project, XERVON coordinated and carried out 16 different types of building work.

These refurbishment concepts cover a whole range of details as, by the end of the project, the properties must comply with all valid laws and guidelines – whether it be fire protection measures, the ‘EnEV’ (Energy Conservation Regulations) or the diverse safety regulations. A great variety of tradespeople are needed, therefore, to modernise large blocks of flats. Acting as general contractor, XERVON Bauwerkserhaltung relieves its clients of the time-consuming job of managing this refurbishment work. Using its experience and extensive managerial skills, it monitors the costs, keeps a watchful eye on the quality of the work and ensures everything is finished on schedule.

One of its most recent projects was the "Marthastraße" estate in Velbert, Germany. This involved extending the living space in five blocks of flats as well as installing the latest energy-saving standards. As general contractor, XERVON planned both the structural engineering calculations as well as all necessary building work – a total of 22 different trades. The roofs now have a modern look thanks to the solar panels and the new dormer windows with their zinc cladding. Measures were carried out on all outside walls to cut heat loss and a central heating system was also installed. Ten new turnkey flats were created in the attic space, which XERVON succeeded in handing over to its client during the construction period.
Heathrow Airport is one of the world’s busiest airports. Each year, it deals with over 67 million passengers from its five terminals and more than 90 airlines use the airport. When the official opening ceremony for the new Terminal 2 building (‘The Queen’s Terminal’) takes place on 04 June 2014, one of the central goals of the UK’s most important airport will have been reached: namely to make every journey better and more comfortable for its passengers.

In the UK, they are well known for their reliability, especially when it comes to more complex projects: XERVON Palmers specialises in providing customized and sophisticated scaffolding services for major infrastructure projects such as redeveloping train stations and airports. Just recently, these scaffold experts have been providing scaffolding services and access solutions for a project currently being carried out at London’s Heathrow Airport to construct a new state-of-the-art terminal.

Working close to live airport routes throws up unique challenges, especially when it comes to planning and safety issues. Heathrow Airport is one of the world’s busiest airports. Each year, it deals with over 67 million passengers from its five terminals and more than 90 airlines use the airport. When the official opening ceremony for the new Terminal 2 building (‘The Queen’s Terminal’) takes place on 04 June 2014, one of the central goals of the UK’s most important airport will have been reached: namely to make every journey better and more comfortable for its passengers.

The top construction firm Balfour Beatty has just finished a new, 600m long and 35m wide, split-level pier (T2B). Once it is ready for use, the new satellite building, which is part of the new Terminal 2 complex, will provide 16 aircraft parking stands, nine of which will be suitable for the Airbus A380. XERVON Palmers has been supporting Balfour Beatty during this project. The scaffolding experts have been on site for 18 months erecting large numbers of safe access and scaffolding solutions for the team of workers. At the project’s peak, it provided over 100 trained scaffolding operatives who were needed to set up a wide range of different constructions: from simple stair towers, to underground scaffolding to assist in the construction of connecting tunnels, to escalator constructions and large birdcage scaffolds in the T2B’s atriums – practically every type of scaffold that could be made from the tubes and fittings and modern scaffolding systems was needed for the new pier.

Working on such a busy, sensitive site has thrown up unique scaffolding and access challenges and not only in the area of technology. Construction sites at airports also involve a host of stringent safety measures – for both the personnel and the materials – that have to be adhered to at all times. The scaffolding, for example, was not allowed to impede airport traffic or passenger routes. Working at height, working adjacent to live airport roads and pedestrian routes as well as live occupied buildings, working in a multiple contractor
With over 120 years' experience, XERVON Palmers Ltd. is one of the leading companies in the UK providing customized scaffolding and access services to all industries.

Top priority given to health and safety

The pharmaceutical company, AstraZeneca, has also been working together with XERVON Palmers for thirty years now and has just extended its framework agreement with the scaffolding experts at its Avlon plant near Bristol. Moreover, the XERVON Palmers team was presented with AstraZeneca’s 2012 annual award in recognition of its outstanding performance in the areas of health, safety and environmental protection. XERVON Palmers has been part of the so-called “SAFEcontractor” project since 2009 – the UK’s leading health and safety assessment scheme. Being an accredited member, XERVON Palmers is obliged to adhere to extremely high health and safety standards during all current and future projects.

Working on such a sensitive, busy site provides us with plenty of challenges, but XERVON Palmers are experts in aviation scaffolding and access.
Russian-German team work

EFFICIENT CATALYST CHANGEOUT THANKS TO THE BUCHEN SPECIALISTS

In September 2013, BUCHEN Industrial Service from Ufa in Russia was commissioned to replace catalyst in two reactors at one of the largest refineries in Russia. During the project, they were given active support from Germany, namely from Cologne-based BUCHEN-ICS.

This really was perfect cooperation work: as BUCHEN Industrial Service in Russia was extremely busy carrying out projects in St Petersburg and Syzran, they were given support by their German colleagues. To make sure that the project to replace the catalyst was executed on schedule, BUCHEN-ICS from Cologne reacted quickly and sent a team of experienced specialists to Siberia. Under their management and with their assistance, the Russian-German team removed – under nitrogen – a total of 225 tonnes of catalyst and then screened the fresh catalyst before reloading the reactors using the special "dense loading process".

Catalysts are special substances that make chemical reactions possible and/or increase the rate of a reaction. They are indispensable when it comes to processing crude oil and producing fuels. Catalysts are placed in reactors and can be used for a number of catalytic procedures before they have to be removed from the reactor and, if necessary, cleaned for re-use. A variety of methods can be used to reload the reactors, all of which can only be performed by specially trained experts. Among such specialists are, for example, the so-called "dense loading operators".

Thanks to their training, they are able to reload reactors with large volumes of catalyst using special loading machines. By using this process, the density of the catalyst loaded into the reactor is up to 16 percent higher than other methods. The advantage here: the reactor can work for a much longer period before the catalyst needs to be replaced. The dense loading process is made possible thanks to the rotation of special distribution systems such as rubber straps, brushes, discs etc, all of which ensure the catalyst is distributed evenly in the reactor during the loading process.

Precise knowledge of how the machine works, sure instincts and a great deal of experience, however, are all needed, if this loading process is to be performed successfully. This is true both in Germany and Russia – which was why the cooperation work with the BUCHEN-ICS specialists from Cologne was such as success. The project was completed within two weeks and to the full satisfaction of their customer.
The company has been steadily investing in its ‘Bayer Integrated Site Shanghai’ (BISS), a plant that is located in the Shanghai Chemical Industry Park (SCIP) – an industrial complex which was launched a few years ago. The investments are to be continued in the coming years, too. Indeed, nowhere else outside Germany has Bayer MaterialScience spent so much money. Plans are, for example, to extend production capacities for the polyurethane raw material MDI, for the high-performance plastic polycarbonate and for the coating raw material HDI. The company is particularly proud of its facility for manufacturing TDI, which operates using eco-friendly technology developed by Bayer itself. TDI is a primary product used for making flexible foam such as that found in mattresses and upholstered furniture.

Bayer MaterialScience has called on some trusted partners to maintain and service these facilities. XERVON’s Chinese subsidiary has signed a framework agreement with Bayer to carry out industrial cleaning services there. Not only XERVON’s presence in China was crucial for winning this contract but also the industrial cleaning know-how of its sister company BUCHEN. BUCHEN will, therefore, be providing them with active support.

A plant component at the TDI facility, which is over 40 metres high, had to be cleaned recently. To be able to do this, two high-pressure pumps from BUCHEN’s company in Bahrain were transported to China. In addition, a combined high pressure and vacuum truck was transported by ship to Shanghai, where it was approved by the local authorities. This machine, which had originally been intended for Germany, can simultaneously suction up liquid and paste-like materials in vacuo and supply high-pressure water up to 800 bar. A masterly logistical performance by the BUCHEN colleagues.

The first job was carried out using this combined truck and completed according to schedule to the full satisfaction of the client. This example clearly shows how a well-functioning international network of branches, such as those built up by XERVON and BUCHEN over the years, can offer a host of advantages for multinational companies. Offering cross-border services provides security, reliability and the assurance that all quality and environmental standards are being observed.
XERVON Norway

Support to build and equip an oil rig

(SUSPENDED) SCAFFOLDING UP TO 120 METRES ABOVE THE GROUND

XERVON Norway AS has been working together with the Norwegian company Kvaerner since 2005. One of their latest projects: building the new North Sea oil rig Eldfisk 2/7 S. XERVON is contributing with management and scaffolding resources by erecting the complex scaffolding needed to construct and equip the platform’s topside.
Being an international specialist for EPC services (engineering, procurement, construction), Kvaerner employs more than 3,000 people and has become one of the leading companies serving all types of offshore platforms. In 2011, ConocoPhillips awarded Kvaerner a contract to build and deliver the topside of its new integrated “Eldfisk 2/7 S” platform which will include both wellhead and process facilities as well as an accommodation module. Since then, the contract has been extended: in addition to its original tasks, Kvaerner will also be responsible for performing the offshore hook-up of the new North Sea platform and providing commissioning assistance.

In the meantime, the new oil rig is being built, coated and equipped at Kvaerner’s yard on Stord. A number of different XERVON scaffolding teams are helping the company to complete the platform topside. They are responsible for installing the various types of complex scaffolds needed so that the technical crews commissioned to equip the platform can carry out their work. This involves both working and protection scaffolds of very different sizes and designs – some of which are in areas that are particularly difficult to access and/or high above the ground.

Almost seventy XERVON scaffolding experts are currently working at the yard to make sure that all sections of this ever-growing topside can be accessed and that those working on the structure have a safe platform to stand on. Besides ensuring that the scaffolding is erected according to schedule, top priority is being given to safety. All work carried out on the topside is subject to a special health, safety and environmental protection management system. Despite the very tight schedules, these stringent safety regulations must be adhered to at all times.

XERVON's project manager, Johan Fredrikson, is particularly proud of this project: "We have been working closely with Kvaerner for many years now and have often been given the opportunity to demonstrate our professionalism. This project, however, is truly unique and especially challenging and we are proud of the fact that our expertise, quality of work, reliability and safety awareness have all helped to make this project such a success."

**Eldfisk** is an oil and gas field discovered on the Norwegian continental shelf in the middle of the North Sea in 1970. Production began here in 1979. ConocoPhillips currently operates a total of four oil rigs in this oil field – three of which are connected to each other to create the so-called Eldfisk Complex. The new Eldfisk 2/7 S platform is due to start production in 2014/2015. With 30 new wells and an additional nine units for water injection, plans are for the platform to produce 70,000 barrels of oil equivalents per day (70 boe/d). Eldfisk 2/7 S will be an integrated wellhead and process platform with an accommodation module (154 cabins) and will be connected to the Eldfisk Complex via bridges.

"**XERVON and Kvaerner have been working together in Norway for many years.**" Johan Fredrikson, XERVON project manager
WVIS is shaping the future of the industrial services sector

DR REINHARD MAASS, MANAGING DIRECTOR OF WIRTSCHAFTSVERBAND FÜR INDUSTRIESERVICE E.V. (WVIS)

Industrial services safeguard quality and reliability, increase the efficiency and availability of technical facilities, create jobs and provide apprenticeships as well as interesting careers in diverse technical, industrial and commercial professions.

A sector with such strong growth potential needs a voice that pools together and expresses the economic interests of the companies, that draws up uniform standards to define quality and sustainability and that creates a unified image. This voice is the WVIS (Business Association for Industrial Services) which was founded in 2008.

Being a global player in this promising growth market, it was a natural move for BUCHEN to become a board member of WVIS e.V. right from the start and to play an active role in the various work groups. XERVON has also been participating in the association’s work which offers a wide range of advantages – above all its interesting network of suppliers and customers as well as its partners from the world of science and research.

The mood in the industrial services sector is one of continued optimism

WVIS’ annual survey of the sector has revealed that industrial services businesses continue to be successful on the international market. Whilst the euro crisis, the weak south European markets and the atmosphere of uncertainty in the German energy industry have left their mark on this dynamic sector, too, the firms offering industrial services are, on the whole, positive about the future.

During the survey, focus was, above all, put on services such as technical cleaning, insulation and scaffolding, which make up 37 percent of the sector, as well as maintenance work i.e. service, repair and inspection work (34 percent).

These services, provided by external professionals, play a vital role in keeping industrial plants, machines and components running smoothly.

The industrial services market has an annual volume of 20 billion euros in Germany alone. The figure for the whole of Europe is estimated to be 100 billion euros. The industrial services sector supports each and every type of manufacturing industry.

Priority topics of our association are, therefore, to optimise training within the industrial services sector, to define which qualifications are required as well as to make the sector more attractive to the general public. With our “WVIS Academy”, we have set up a virtual training and further training portal which is of use to students, specialists and young professionals alike. The work in the service sector is both diverse and challenging and offers long-term and attractive career opportunities.

Besides the network it has built up with universities and colleges, WVIS is also setting up a specialist training network by working even more closely with chambers of commerce and industry, trade associations and companies.

Depending on the set up of the individual firms, the share of industrial professions lies at around 90 percent. There is, therefore, a particularly great need for training and specialisation opportunities in the many basic professions once a person’s apprenticeship has been completed. Industrial services are important for a well-functioning industry.

The industrial services market has an annual volume of 20 billion euros in Germany alone. The figure for the whole of Europe is estimated to be 100 billion euros.
The new “face” of REMONDIS

THE COMPANY GROUP IS FOCUSING FIRMLY ON THE FUTURE

The REMONDIS Group has been using a new logo design since the beginning of the year. In order to make the public even more aware of just how sustainable the company’s activities are, the REMONDIS logo will appear together with the strapline “WORKING FOR THE FUTURE”. What though does this actually mean?

The new strapline “WORKING FOR THE FUTURE” reflects the obligation of all REMONDIS Group companies to run a customer-oriented and sustainable business. Each time REMONDIS works on behalf of its municipal, private, commercial and industrial customers, it is also working for the future by using the resources at its disposal as efficiently as possible to promote sustainability. REMONDIS sees itself as being a supplier of raw materials and a protector of the environment and climate – both in the water and recycling sectors as well as in the area of industrial services. The company, however, not only carries out its work in order to conserve our planet’s natural resources for future generations. By developing innovative recycling processes, it is also looking to continuously grow the amount of secondary raw materials used in Germany to manufacture industrial products – which currently lies at 14 percent. This is, therefore, also a role model for other countries as systematic recycling is the only way to counteract the impending global shortage of raw materials and the high prices on the world market. This is precisely what REMONDIS has been promoting for many years now.

For REMONDIS, “WORKING FOR THE FUTURE” means doing everything that is technically possible and economically viable to conserve our planet’s natural resources, to prevent climate change and to protect the environment. The future – and with it the future generations – has given us a clear assignment: to conserve our planet and to treat it and its resources responsibly. And so REMONDIS is “WORKING FOR THE FUTURE” to make sure there is a future for the generations to come!

BUCHEN and XERVON – now with the same corporate design

Their services complement each other perfectly and, together, they cover the field of “industrial services” within the REMONDIS Group: the BUCHEN and XERVON company groups. Following the relocation of their head offices to the same address in Cologne, this close link between the two companies has now become even clearer: BUCHEN’s corporate design, including its logo, is to be adapted to reflect the design of the REMONDIS Group. Moreover, the new strapline is to be added to the logos used by BUCHEN, XERVON and their subsidiaries – for running a customer-oriented and sustainable business is top of the list of priorities in the industrial services sector, too. WORKING FOR THE FUTURE.
MAINTAIN 2014 – a new location and a greater choice

Once again, the sister companies BUCHEN and XERVON will be making a joint appearance at the MAINTAIN exhibition this year.

XERVON has been an exhibitor at this international trade fair for industrial maintenance since day one and last year their sister company BUCHEN joined them at their booth. This proved to be a smart decision as a large number of the visitors wished to learn more about their wide-ranging services and find out how the two companies are able to work together efficiently on behalf of their customers.

Having been held at the MOC in the north of Munich for the last seven years, MAINTAIN is to take place at a different location and on a different date this year, namely at the ‘Messe München’ exhibition centre from 03 to 06 June 2014. Moreover, the international trade fair for automation and mechatronics, AUTOMATICA, and the INTERSOLAR exhibition are to be held at the same time and visitors will be able to get into all three exhibitions with their entrance ticket.

Besides the fact that there was only limited exhibition space available at the MOC, one of the key reasons for relocating MAINTAIN and holding it on another date was this opportunity for it to be held alongside the AUTOMATICA exhibition.

The main subject covered by MAINTAIN – the industrial maintenance of production systems – is, therefore, to be extended to include that of the AUTOMATICA – building and modernising production plants. This will certainly result in MAINTAIN becoming even more international. Karin Hilf, the MAINTAIN project manager, believes both the exhibitors and the visitors will benefit from this new format: “With the AUTOMATICA being held at the same time, we are sure that there will be considerably more visitors from the relevant target groups. Holding the two events parallel to each other will be advantageous for both exhibitors and visitors alike. There is a clear structure to the topics covered by MAINTAIN – also within the hall itself – and, as always, we will also be presenting a number of highlights such as the ‘Makers and Markets’ forum and the topical subject of ‘manufacturer services’. MAINTAIN will once again be an important meeting place for all those working within the industry.”

We would like to invite you to the MAINTAIN exhibition at the beginning of June. Why not take this opportunity to learn more about the latest trends and developments in the maintenance sector?!
Both BUCHEN and XERVON’s businesses based in the German city of Stade were presented with the DOW 2013 Safety Award last June. This prize is awarded to companies in recognition of their outstanding performance in the area of occupational safety – in the case of BUCHEN for 445,946 hours of work over a six-year period without a single accident and XERVON for 653,737 hours over a three-year period. BUCHEN was also presented with the ‘Gold Certificate’ having been placed first ahead of the other ten contractors receiving the award.

Moreover, DOW also presented individual awards to three XERVON employees paying tribute to their work in the area of health and safety. These prizes further underline the importance that both BUCHEN and XERVON attach to implementing stringent safety concepts and measures.

On 11 March 2013, a cooperation agreement was signed between Germany (DAkkS, DGMK) and the Netherlands (SSVV) covering SCC and VCA. This agreement mutually recognises both the content and processes of the ‘VCA VGM Checklist Aannemers’ (Version 2008/5.1) and the normative SCC guidelines (Version 2011).

On 03 April 2013, our colleagues from BUCHEN Esman in Turkey were named the ‘Best Service Provider 2012’ by Petkim Petrokimya Holding A.S. In a special ceremony celebrating the company’s 48 years of business, Petkim presented BUCHEN Esman with this award and thanked them for their work and support. Petkim has 14 production plants and is the leading petrochemical company in Turkey. BUCHEN Esman operates a service point with twelve employees at Petkim’s refinery in Izmir where it has a framework agreement to manage waste generated by the plant. Moreover, BUCHEN Esman also carries out industrial services for the company.
Maintenance: Your strategic factor of success.

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- Europe's most important platform—networking included
- Concentrated knowledge from the source—our “MAKERS & MARKETS” Forum

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New dates: June 3–6, 2014
New venue: Messe München
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