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Content

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MP lands major customer in Morocco

 **MP is making headway in North Africa. Spearheaded by Werner Goeminne, general manager MP Morocco, they had already added the state refinery to their portfolio. Now the first step has been made towards a long term cooperation with the JLEC thermal power plant in El Jadida.**

The power plant operates 4 steam turbines, each 350 megawatts. An expansion is planned in 2013 and 2015, each time with another 350-megawatt unit.

Major maintenance to 350 MW turbines

Werner Goeminne: "The expansion has been commissioned to a consortium of Daewoo, Mitsui and Mitsubishi, which will deliver and install the two new turbines. MP Morocco will be responsible for the long-term maintenance of these units."

Moreover, negotiations are taking place on the allocation to MP Morocco of the big annual overhauls of the four existing turbines, which

are of ABB and Alstom make. "Meanwhile we have already assisted in the major overhaul of a turbine, particularly in terms of supervision and onsite machining. To that end, different parts were made in our Zwijndrecht shop, in cooperation with specialized partners" says Werner Goeminne.

Interventions onsite

Furthermore, MP Morocco already done several other interventions at the JLEC Power Plant, such as on a boiler feedwater pump, an extraction pump and a feeder pump. The

works were executed both onsite as well as in MP The Netherlands, where shafts, rotors and impellers were made for the pumps. MP succeeded in completing all assignments on time.

Werner Goeminne concludes: "JLEC has great potential as a customer, especially for major overhauls of the steam turbines. The future looks good."

More info:
werner.goeminne@maintenancepartners.com



One pump does not make a summer, but two of them...

 **Jack Frost has left his mark. Maintenance Partners The Netherlands therefore had to come to the rescue at Cabot.**

Cabot Corporation is a chemical company specializing in specialty chemicals. Cabot produces carbon black at its plant in Botlek in the port of Rotterdam. Carbon Black is used in the manufacture of industrial rubber, plastics and car tires.

Broken boiler feed pump

Ron van der Windt, Technical Manager: "During the last frost, one of the production lines was down, with all its consequences. There was frost, and because of the stop, all kinds of impurities settled down in the system. Moreover, due to a defective filter system, a large amount of impurities ended up in the boiler feed pump."

One accident lead to another. When starting up the production line, the boiler feed pump completely jammed. The damage to the pump, a KSB type HGM 3/6, was considerable: both the pump shafts and the balancing disk were badly damaged and the press house was torn.

Ron van der Windt: "Given the increasing demand for carbon black and the unavailability of the production line, the pump had to be restored as soon as possible. Fortunately, the spare pump was in the MP workshop for preventive maintenance. This one too needed some minor repairs."

One new pump from two old ones

Due to the long lead times, ordering a completely new pump was not an option. Therefore, we decided to make one good pump with parts of the two bad ones. This called for some adjustments.

For this 'new' pump MPNL has manufactured a new pump axis and a balancing disk and made a variety of mechanical modifications to the pump components of the two pumps. All in just two days.

As a result, Cabot didn't have to wait for weeks for the delivery of a new pump and/or components. MP overhauled the pump completely within 4 days and the field staff have placed it on-site during the weekend.

"Cabot was very impressed by the speed with which MPNL carried out the work, so that they suffered only small production loss. The cooperation between Cabot and MPNL (workshop and Field) for this revision was felt very positively by the customer, partly due to the flexibility of our employees," Ron van der Windt concludes.

More info:
ron.vanderwindt@maintenancepartners.com



Maintenance Partners nv
Van Aerdstraat 11, 2060 Antwerpen, België
Tel. +32 (0)3 544 32 16
Fax +32 (0)3 544 32 48
info@maintenancepartners.com
www.maintenancepartners.com

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Introducing Maintenance Partners' NEW business units

As of today Maintenance Partners goes to the market with a new, clear positioning: MP Rotating, MP Wind and MP Power will come forward as three business units under MPSE's umbrella. Each in their own market, leading in know-how, experience, equipment and quality of service.

We asked Wim Schelfaut, COO of Maintenance Partners, the reason for this new strategy.

Wim Schelfaut: "The purpose of this strategy is to offer our customers at home and abroad an even better, more direct service. By deploying in any of the disciplines - rotating, power, wind - sales people with years of experience in their field, we want to get a better and faster notion of what the customer wants. In each discipline, a specialized engineering department is placed. By putting specialists in the vanguard, we then respond quicker and more correctly. They immediately understand the demands of the customer and they can translate it in a clear, correct way to the daily operations of Maintenance Partners."

MP Rotating

MP Rotating is the business with which, over the years, Maintenance Partners has built a strong reputation in the industry and that is to date still the mainstay of our business. This business unit focuses on repairing and upgrading all rotating equipment up to 100 MW, both for mechanical equipment such as compressors, steam turbines, pumps, etc. as for electrical machines such as motors and generators.

Yves De Craecker, Business Development & Commercial Manager: "It's a big misconception that we only concentrate on

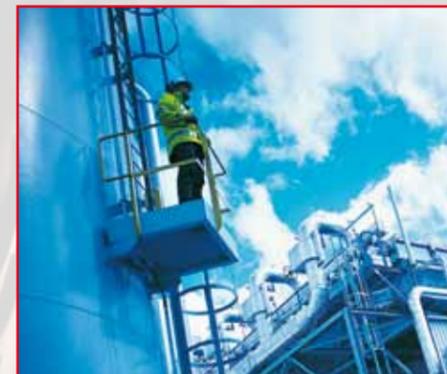
the larger machines. Smaller devices, up to 1 MW, still represent over 50% of our turnover and create an excellent base load for our shops in Belgium and in the Netherlands."

The creation of three business units with clearly defined responsibilities and organizations, also sheds light on the strategy of each unit. "It is now very clear to everyone that the strategy of MP Rotating is focused on partnerships with major customers and on an even better service in general, based on our strengths such as flexibility, transparency, quality and of course safety. This results in great customer satisfaction, which automatically leads to more cooperation and of course

more business. Beautiful examples are SKW in Germany and the Mondi group, one of the largest paper producers on this planet, but also quick interventions at Borealis, Total, Sabic, and other industrial companies", Yves De Craecker concludes.

Elsewhere in this newsletter you can read some success stories that are a result of this new approach.

More info:
yves.decraecker@maintenancepartners.com



MP Power

Gertjan Bakkum, project manager: "In the new organization MP Power is principally engaged in the planning of field service and workshop activities such as rotor overhauls and repairs of stator parts. These are implemented in collaboration with Mitsubishi Power Systems Europe for Mitsubishi Gas and Steam Turbines but also for other OEM machines. Furthermore, we also carry out inspections on Solar Gas Turbines (Centaur Taurus 50 & 60) including Zero Hour Overhauls and we can also do full controls upgrades."

MP Power is responsible for assignments from the Power Stations in Europe, North Africa and the Middle East. The business unit operates from MP Zwijndrecht and Abu Dhabi and of course cooperates closely with all

Mitsubishi Front Offices in the various countries where Mitsubishi is represented. 10 people work for the unit, spread over Project Management, Business Development and Mitsubishi Engineering.

Gertjan Bakkum: "We cooperate closely with MP Rotating to perform the workshop related activities such as inspections and repairs, but also for making new components. Our collaboration with MP Wind will soon gain momentum, because renewable energy is clearly on the rise. In the new Power Stations, more and more wind turbines are in operation. Furthermore, there is a growing trend to fuel gasturbines with alternative combustibles, such as biogas, to reduce emissions."

Besides the regular Mitsubishi customers, MP Power has a great portfolio of clients for whom

they perform work on a regular basis, such as Felix Schoeller (paper), Goodyear (tires), Stute (food), Notore Chemicals (fertilizers, Nigeria), NVA Therm Freiberg (energy), Hella Lippstadt (car parts), Ilte SPA Moncalieri (graphic arts), Stadtwerke Aalen (energy), and Ruzomberok Mondi (paper). With the latter company MP Power has recently signed a contract to perform a general inspection, a controls upgrade and the provision of Hot Gas Path Parts and Consumable Parts.

More info:
gertjan.bakkum@maintenancepartners.com

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First revision project in Central Africa. MP opens the gate to the continent.

 With the complete overhaul of a compressor at the Nigerian fertilizer plant Notore, Maintenance Partners gains a bridgehead in Central Africa.

The Notore plant in the Nigerian port of Onne is a major fertilizer producer and the only one in Central Africa that produces urea nitrogen. It raises a total production capacity of 1.5 million tons per year.

Maintenance Partners was asked to rehabilitate a small steam turbine, which drives a compressor that is crucial for the production of fertilizers. In particular, the rotor of the steam turbine has been completely overhauled to "like new" status. This happened in the new rotor shop in Zwijndrecht.



Bridgehead in Central Africa

"This successful overhaul is our first project in Central Africa," said Gertjan Bakkum. "It opens the door to this new market, which will enhance the turnover and employment in our Zwijndrecht plant."

The project brought already a positive result: MP / MPSE could sign in on a tender for the relocation, refurbishment and installation of a large gas turbine for power generation in the Notore plant in Onne, Nigeria.

"If we get this new project, it will undoubtedly boost our sales in this region," Gertjan Bakkum concludes.

More info:
gertjan.bakkum@maintenancepartners.com



Wind MP Wind

The business unit Wind focuses on product and service activities for the European onshore wind industry. That includes three areas:

Total maintenance on wind turbines as they exit the warranty period of the OEM. This is usually after 10 or 15 years. It allows the customer to completely outsource the following activities:

- Preventive Maintenance
- Corrective Maintenance, including 24/7 emergency service
- Supply of parts
- 24/7: Monitoring of production and technical data
- Replacing the main components, including the crane
- Repair of Generators, Gearboxes, Main bearing / shaft and Transformer
- Overall management of wind turbines including reporting
- Special "Condition monitoring system" for 24/7 measurement of the main components.

Maintenance activities for wind turbine manufacturers of wind turbines still under warranty. Some examples: Nordex, Repower, Fuhrlander, WinWind, STX



Revision of the main components for the local service companies and 'Power Producers' (wind turbine owners), working in Europe.

Collaboration with the other business units

MP Wind employs some 14 people, including a business unit manager, engineers, sales engineers and field service engineers. Furthermore, it collaborates closely with the MP workshops, where the overhaul of the main components takes place.

Pascal Collin, Business Development Manager: "We support the customer from the workshop that is closest to the wind turbine. The synergy with other BU's fits every bill. We call on:

- Engineers for calculation of major maintenance projects / contracts.
- The knowledge of generators, gearboxes and transformers which in principle can be repaired in every MP workshop.
- Field service engineers who can be assigned in a flexible way for maintenance and service of wind turbines. This way we can perfectly cope with big peaks.
- Diagnostic engineers who can measure out complete wind turbines, both electrically and mechanically.

Active in the emerging wind energy markets

Pascal Collin: "In France, Belgium and Luxembourg, we offer total solutions under the name Maintenance Partners. In Spain, Portugal, Germany and the Netherlands we work together with local partners in order to offer a complete solution. Often, these are companies that already have years of experience, specifically in maintenance. They have a huge installed base. With the competences of Maintenance Partners, these local companies are able to develop into a "one stop shop". For the future, countries like UK and Italy are standing in line and let's not forget the Baltic States, where in the coming years a huge growth in onshore wind business will take place."

International customers and successes

Pascal Collin: "We've already got a few success stories to tell, such as the installation of our CMS system on 6 Dewind wind turbines



in Luxembourg and Belgium, a partnership with our German partner PSM for the overhaul of Nordex, Repower and Fuhrlander "MD-1500KW" type generators, the overhaul of dry transformers for a Dutch IPP, and the project management of a Turbo Wind T400: dismantling, transport, complete refurbishment and sales of the wind turbine from France to Italy" (see further in this newsletter).

Working for the future

Wind MP is doing everything to get ready for the challenges ahead. Thus the current CMS system is being developed into an "intelligent" control system for wind turbines on and offshore. The system will be able to issue a maintenance schedule, taking account of the weather forecast. Furthermore, residual life predictions are possible for generator, gearbox and main bearing, which is important for preventive maintenance and for investment projects. A lot of energy is being invested in the development of the British and Italian wind turbine markets. The stocking of the most

current gearboxes and generators for customers is another priority.

Pascal Collin: "The installed (MW) capacity of the European Onshore wind turbines is going to double by 2020. Today there are about 70,000 wind turbines installed on the European continent, ranging from 600 to 2500 KW. All of these turbines will exit the OEM warranty in the next 10 years, after which the owner will have to choose from four options: disassembly and installing new machines, continue and do their own maintenance, continue with the OEM, or have the maintenance performed by a third party. In the wind industry too, the trend is towards total outsourcing. In the time coming, Maintenance Partners is going to target on this, in collaboration with local partners and wind turbine manufacturers."

More info:
pascal.collin@maintenancepartners.com

In the spotlight: MP Maastricht



In industrial enterprises in Dutch and Belgian Limburg and beyond, the name MP Maastricht rings quite a bell. Leading enterprises in the region, such as Arcelor Mittal and Sappi, know it's the place to go when they have problems with their electromotors.

MP Maastricht is surely moving at full speed. We made an update with site manager Pascal Marcelissen.

Revision of DC motors

Pascal Marcelissen: "MP Maastricht is known for its expertise in the overhaul of DC motors and has built in its field a clear advantage over its competitors. We specialize in dismantling, overhauling and refitting the commutator and carbon brushes - a crucial part of the armature

of an electric motor. They are spun and milled by skilled technicians in our workshop, after which they are as good as new."

Such a revision of a DC motor is a technically more complex and labor intensive job than that of an AC motor. It requires a deep and specialized knowledge.

Pascal Marcelissen: "The cost of ownership of a DC motor is very high, but then again it offers a lot of advantages compared to an AC motor. For one thing, you can control its speed very accurately. With an AC motor you would need an inverter for that. This is very important e.g. in the paper industry, where you have to be able to perfectly synchronise the rotation speed of different cylinders and rolls within a production line. Through our diagnostic activities - which you can read about elsewhere in this newsletter - and our

revisions, we keep these expensive engines in top condition."

All rotating equipment

But the mechanics of Maintenance Partners are not only known for the depth of their expertise, but also for the breadth of their experience and know-how. So you can call upon MP Maastricht for the overhaul and repair of all rotating equipment such as pumps, blenders, compressors etc. The site is ATEX certified, meaning that they are qualified to work in gas and dust explosion-sensitive environments, and that they are able to recondition special spark proof motors. This is important for the partnership with ABB.

Pascal Marcelissen: "Our shop employs 15 skilled people, including 4 in the field team. They can work in a wonderful workshop,

which we are very proud of. In terms of equipment and methods we are state of the art. It is therefore not a coincidence that we have a host of loyal customers such as ArcelorMittal (steel), Sappi (paper), ENCI (cement), Mosa (tiles), Carbolim (carbonic acid), and many others."

More info:
pascal.marcelissen@maintenancepartners.com





MP Rotating: another success story

Steam turbine rebladed



Success keeps coming MP Rotating's way. For the German paper manufacturer Mondi, a large steam turbine was rebladed, to the satisfaction of the customer.

Mondi is one of the largest paper manufacturers in the world, with 33,000 employees and offices in 30 countries. In their paper mill in Frantschach, Austria, a large steam turbine had to be rebladed. Given the strict deadline, this was a challenging job for project manager Ken Gysbrechts. One he successfully completed.

Ken Gysbrechts: "Not only did we have to replace the last three rows of blades, we also had to repair the curtis wheel and the bearings.

Moreover, we've also machined the casing and overhauled generator. All of this within 7 weeks!"

The turbine was ready in time, to the satisfaction of the customer. It looks like MP Rotating may well expect more work from that customer in the future. To be continued ...

More info:
ken.gysbrechts@maintenancepartners.com



MP Rotating brings depreciated giant engine back to life

A satisfied customer



A whopper of a motor that looks like it is at the end of its life, a customer who wants to buy time pending replacement. Add to that an explosion sensitive environments... right up MP Rotating's alley.

SABIC is an international petrochemical company with European headquarters in Sittard and a production site in Geleen. The company also has a number manufacturing plants, including plants in Gelsenkirchen (Germany) and one in Teesside (UK). In Sittard and Geleen 2000 people are employed. Worldwide, over 4000 people are employed and the company is still growing.

Explosive

Kristof Decuypere, project manager: "At SABIC, in Geleen (The Netherlands) a stop was scheduled on a synchronous electric motor with a capacity of 12 megawatts at 180 rev/min. To give you an idea: the engine in question is 6 meters high! After preliminary analysis by our colleagues of the Reliability Department, the job was assigned to MP Rotating. The engine drives a hypercompressor that compresses ethylene up to 3000 bar. During the work a similar compressor remained operational on the same platform. Needless to say that this is an EX zone, with a product under high pressure ..."

Thorough preparation

After a very thorough preparation, including a technical scope by the customer, MP made a detailed planning, an RI & E and a JSA. After signing the necessary work permits, the MP team could get to work.

Kristof Decuypere: "In addition to other works on the system, our work was crucial for the entire stop, it was the thread so to say. The customer insisted strongly that quality, lead time and safety were of paramount importance in the project. We could therefore not afford a single mistake."

A case of resuscitation

The first measurement showed that the 40 year old engine was in very bad condition. The insulation left was a mere 30MΩ, very high discharge values were measured and traces of burning in the grooves of the plate were found. The big question was whether the engine could be saved at all. MP had to try to 'resuscitate' the engine and ensure that it remains operational for several years.

Kristof Decuypere: "The stator was moved so that the laminations and the windings of the stator and rotor could be reached. After each step in the process, measurements were made and discussed with all the customer's departments. All eyes were on us. After

cleaning of the windings with dry-ice, more problems became visible. A team of experts was called in to make new gussets for the stator. No less than 350 gussets (25%) were replaced, working around the clock. Also, partial repairs were made to the windings. After that, the stator winding insulation received a proper treatment with insulation resin and semiconductor coating."

To measure is to manage

During the work several measurements and inspections were carried out on the windings in order to monitor the situation and the repair process was adjusted in function of the results. Each successive action resulted in an

improvement of the engine.

The end result is that we have an insulation value of 2GΩ and a fourth of the initial Partial Discharge values with a much better pattern. In other words, from a virtually dead engine, we have made a ready to use unit. Meanwhile, the windings were provided with coupling capacitors to enable PD-measurements during operation. Thus, it is possible for the customer to monitor the engine permanently. Moreover, we were able to deliver a lot earlier than was planned", said Kristof Decuypere.

Strict security measures

Given the fact that work was done in an EX zone, the activities were governed by strict security measures. After removal of the largest plating, a heated tent with two levels was constructed around the engine, provided with locks. Thus the workspace became a confined space and a fire guard stood by each lock, who recorded who was present inside, with a maximum of 4 people simultaneously.

A satisfied customer

Eddy Buysse, manager Engineering: "One of the main reasons why this job was assigned to MP, was because we are very strong in measurements and analysis on medium-voltage machines. The Reliability Department has had considerable stake in this success story. On the one hand, they have performed strict monitoring before the standstill and provided the customer with the necessary advice. This gave the customer the time to prepare and plan the standstill. On the other hand, they always indicated what the next step was during the recovery process. Add to this a very experienced and professional team of technicians and you have the perfect mix to bring such projects to a successful conclusion. Moreover, the customer could see that we constantly had an eye for the safety of everyone. During the tour of our QSE department the customer stated that we set an example for other companies."

More info:
eddy.buysse@maintenancepartners.com

