Kössler Report

Newsletter | Edition 20 | 01/2016

Dear Customers, Valued Business Partners,

First of all we would like to wish you all the best, good health and lots of success for the New Year that has just started. May 2016 be a good year for you, especially regarding the energy output from your hydropower stations.

Compared to previous years, the market environment of the hydropower industry has become quite challenging. Energy prices are on a permanent low and power requirements have stagnated due to the lateral movement of economic growth as a whole. High investment costs for ecological measures aimed at the implementation of the European Water Framework Directive make high demands on hydropower station operators. Yet we can still see a positive turnaround in the medium term regarding the generation of renewable energy from hydropower. Our optimism is not least based on the closing arguments of the UN Climate Conference in Paris and the joint commitment of nearly all member states to replace fossil energy carriers by renewable ones in the medium term. It is now a matter of positioning hydropower as one of the main pillars of renewable energy production and to implement this intention in national energy strategies. As fellow campaigners we are at your disposal at any time.

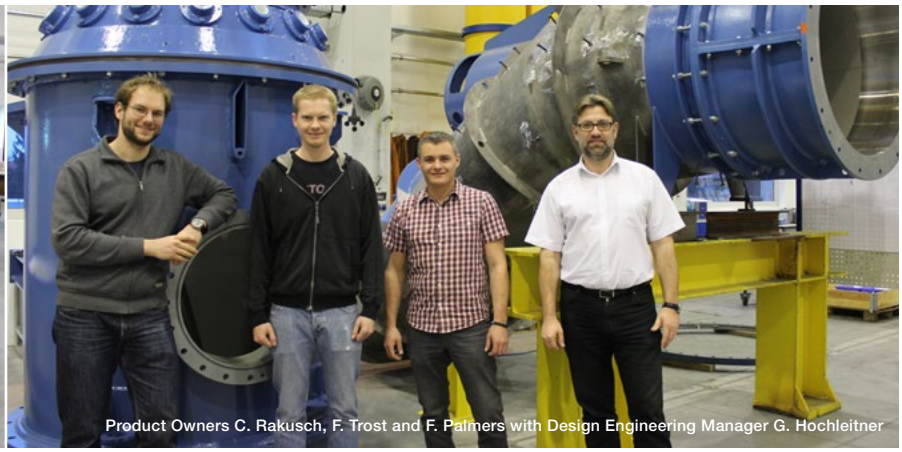
In your capacity as a long-term customer you have probably come across our young and committed technicians on several occasions. In this edition they are talking about their tasks as product managers and introduce our series of eQ-Solutions offering optimum solutions for de-centralized small hydro power plants. Our AMB Department is happy to report about the good order situation in view of the rising demand for services and plant modernizations. We also bid a cordial welcome to Mr. Manfred Eder who joins Kössler as Chief Operations & Technical Officer. After 27 years at Voith Hydro, Manfred Eder changed to Kössler and introduces himself in this edition.

The Management Board of Kössler hopes you will enjoy reading this Report

CFO Christian Binder, CEO Josef Lampl, CTO/COO Manfred Eder

eQ-Solutions: Standardized Compact Turbines for Smaller Output Ranges

StreamDiver HEPP Bruksfors

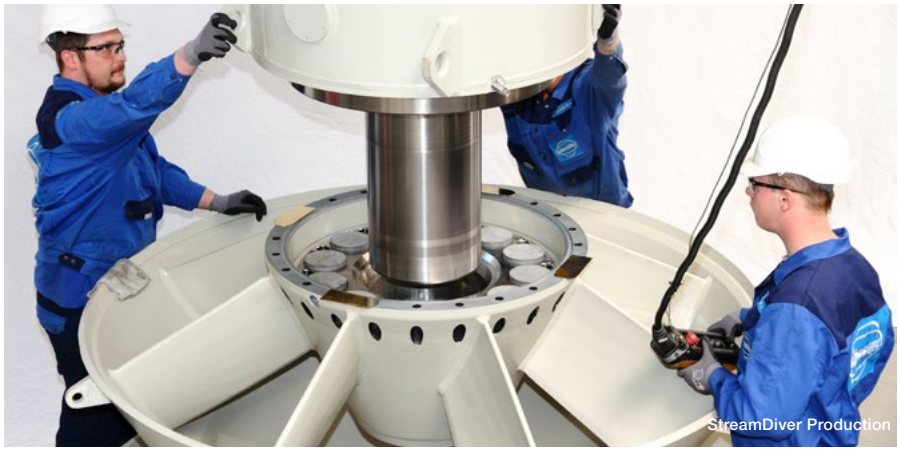

Product Owners C. Rakusch, F. Trost and F. Palmers with Design Engineering Manager G. Hochleitner

Worldwide, the micro and small hydro sector offers a significant potential that can make a vital contribution to generating energy from renewable sources. It is therefore essential to offer optimized solutions for this segment, both in terms of economy and ecology.

Standardized compact turbines – the so-called eQ-Solutions range – are ideal for such applications. They comprise systems with proven Kössler quality regarding material selection, production and operating safety for man and machine, with a strong focus on essential functions and equipment. Owing to their technically mature design, the construction of these turbines can be deliberately kept uncomplicated and compact.

It is precisely this compactness that makes these machines so economical at the locations mentioned above. The focus on essential, well-functioning components results in an immediate reduction of investment costs, as well as medium to long-term cost efficiency in areas such as maintenance, spare parts and service.

Regarding space requirements, one compact system within the Kössler portfolio particularly stands out: the StreamDiver. This propeller turbine obliterates the need for a conventional power house, as it can be integrated straight into existing weir systems or transverse structures. Non-adjustable guide vanes and runner blades render complex sensors and adjustment mechanisms unnecessary. The compact design makes it possible to keep interferences with the riverscape at a minimum.


StreamDiver Production

Gerald Hochleitner, Head of Design Engineering at Kössler, also underlines the universal applicability of the StreamDiver: “Utilizing the turbine-generator unit in shaft constructions or as a residual water turbine is equally straightforward. Depending on the existing water volume, several machines can be combined in modular design.” The advantage of such an application lies in the controllability and also the maximum availability of the plant. For maintenance purposes, individual turbines can be removed separately, without causing a standstill of the entire power plant. Continuous energy production is therefore guaranteed.

But the development of the StreamDiver not only focused on commercial considerations but also on environmental aspects. The permanent magnet generator contributes to the overall efficiency of the machine and is designed in such a way that it does not need oil or grease as a lubricant. This is achieved by the water flow around the generator, which allows that the plant is cooled and lubricated exclusively by operating water.

Another economical aspect of the Kössler compact turbine series is their standardization based on a modular design. The series carrying the name eQ-Solutions and excelling by particularly short delivery, assembly and installation times comprises Francis, Pelton and Kaplan turbine solutions in the output range up to 1200 kW.

Due to the fact that the turbine and partially the generator and the auxiliary units are pre-assembled at Kössler, the transport and on-site installation costs can be reduced to a minimum. “The advantage for our customers lies mainly in drastically reduced lead times compared to individually designed plants. There are also cost benefits due to standardized type ranges,” states Florian Trost, Design Engineer and Product Owner of Francis turbines at Kössler.


Product Owner F. Trost with Francis eQ-Solutions


Product Owner C. Rakusch

Apart from investigating the commercial aspects of plant design, our Product Owners are also responsible for the further development of applied technologies and innovation management. Part of their job is to develop and define the technically most advanced standards and to adapt production methods accordingly.

“The know-how of our technicians, decades of experience in turbine construction and the latest technical findings from our Voith R & D Center are at the heart of each individual system. This also applies to our eQ-Solutions series. When it comes to the quality of our machines we never make any compromises,” assures Christian Rakusch, Design Engineer and Product Owner for Pelton turbines. In our small turbine range we utilize the same hydraulics as for larger plants. This is why we are able to guarantee maximum performance data and high investment security. Naturally, all components and production stages are subject to our strict quality control.

In addition, innovative solutions should not be neglected. For vertical Kaplan turbines, alternative materials are now used for the guide vane area. The former cast iron guide blades are replaced by a stainless steel supporting body with a polyurethane profile of the hydraulic contour. The technical advantage of this method is its absolute corrosion-resistance. Due to the smooth surface and the precision of the casting process, the polyurethane blades have perfect hydraulic profiles, whose performance and efficiency is in no way inferior to the metal version. On the contrary: especially during a repair of the hydraulic profiles in the event of damage caused by foreign objects, the plastic material definitely convinces.

Florian Palmers, Design Engineer and Product Owner of Kaplan turbines, adds: “It is important to have the finger on the pulse, take up innovative trends at the earliest stage and implement them in our products to the highest


Product Owner F. Palmers

quality. This is why we never stop working on improvements of our turbine series."

Developed for economical applications in the lower output range under consideration of the latest technological and ecological findings and produced in the quality for which Kössler has been renowned for decades – this is how the advantages of the eQ-Solutions series can be summarized. Josef Lampl, Kössler CEO, adds: "The technical know-how and the quality standards of large plants are also incorporated into our compact class. A perfect combination of economy and Austrian quality – this is what our products stand for." //

Advantages of Compact Turbines

- Standardized series
- Focus on essential functions
- Renowned standards regarding quality, production and operating safety
- Shorter delivery times
- Reduced assembly requirements
- Guaranteed performance values due to the application of proven turbine hydraulics
- Particularly economical solution due to minimal operating and maintenance costs
- Universal applicability
- Ecologically advantageous due to innovative solutions


Production of Pelton eQ-Solutions


Production of Francis eQ-Solutions


Polyurethane blades Kaplan eQ-Solutions

Turning Old into New – AMB @ Kössler

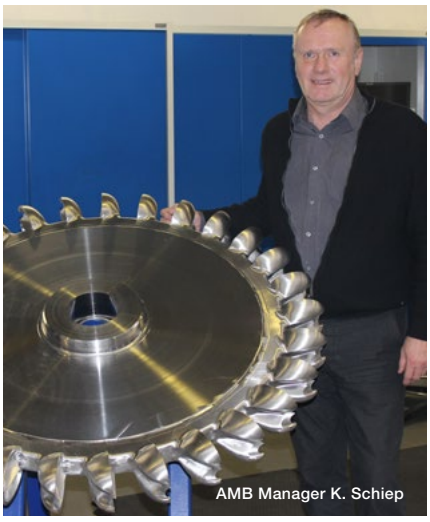
At Kössler, flawless operation, long service life, high availability and safety of small hydro power plants are always in focus. Our Division AMB, consisting of highly qualified mechanical and electric engineers, therefore deals with all issues of service, maintenance and upgrades.

In order to ensure continuous plant availability, our technicians perform periodic inspections and annual maintenance routines. Regular maintenance not only increases the safety and the service life of a power plant but also forms the basis for optimum value retention of the entire plant. Alongside turbine revisions, the range of our services also includes overhauls of the gearbox, the control systems, the hydraulic components and the hydraulic steel structures. In addition we are able to secure the continuous operation of small hydro power plants across many decades by providing all necessary spare parts.

For older systems it is also recommended to carry out upgrades and modernizations that reach beyond regular maintenance routines. Such measures often result in an increase of the performance and the efficiency of the plant. Using appropriate analyses we are in a position to point out existing potentials and suitable improvement options.

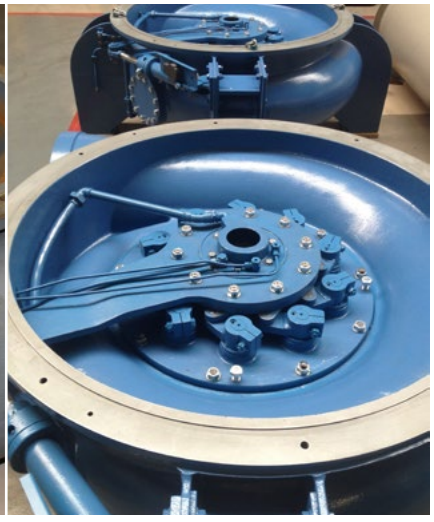
General overhauls make it possible to update the electro-mechanical equipment of power plants to the latest technical levels. In this way, production can be increased and – for example by utilizing new materials – operating and maintenance costs can be sustainably reduced. Ecological aspects also play an essential role. Bearings can, for instance, be converted to oil and grease-free solutions.

Other modernization opportunities are offered by automation. State-of-the-art control systems from Kössler allow the remote diagnosis of your power station. In the event of a failure, any arising problems can be dealt with quickly via a remote maintenance tool and, where necessary, faults can be corrected from outside.


AMB Manager K. Schiep

If there is a problem, our service line is available seven days per week from 7 am in the morning to 7 pm in the evening. You can reach us on extension 777. Our technicians offer telephone support to correct failures or provide prompt on-site service. We know that any plant standstill always goes hand in hand with financial losses. For this reason, fast, flexible and efficient assistance is one of our particular concerns, so that downtimes can be kept to a minimum. //


General overhaul of a Francis spiral turbine



Changes to the Kössler Management Board – Manfred Eder Introduces Himself

Dear Clients,
Valued Business Partners,

As the newly appointed CTO – COO at Kössler and as the successor of Günther Prinz, I would like to use this opportunity to introduce myself personally.

In my new positon at Kössler I will be responsible for project execution, including mechanical engineering, project management, production and manufacturing, as well as on-site and field assembly. Alongside Josef Lampl (CEO) and Christian Binder (CFO), I will be part of the new Kössler Management Board.

I started my career at Voith in St. Pölten in 1987 as a design engineer inside the turbine design department.

From 1992 to 1993 I was part of a software engineering team in our central R&D department at Voith in Heidenheim. The key task of this team was to standardize and develop optimization tools for major turbine components. In 1993 I moved back to Austria to work as Lead Engineer as well as Project Manager, and I was involved in major hydro power projects of all types, mainly in Austria, Romania and Scandinavia.

In 2010 I took on a new challenge as Head of the mechanical department of Voith Hydro AS in Oslo, where I stayed until the end of 2014. In this function I was responsible for managing the mechanical design, project management and field service teams.

Finally, in September last year I was offered the chance to take on a new, demanding and highly interesting task here at Kössler.

I look forward to working with you in the future and hope that there will soon be an opportunity to meet personally.

With Best Regards,
Manfred Eder //

Imprint

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