A WORLD CLASS

Recovery

On the evening of Sunday 23 March 2014, a catastrophic event took place in the recovery boiler at Heinzel Group's Zellstoff Pöls mill near Graz, Austria. A water leak caused an explosion that ripped through the boiler leaving it irreparably damaged and needing a complete replacement. The event sparked off a flurry of activity at both the mill and the chosen supplier, involving timescale, efficiency and quality that would make the project deliver like no other. ANDRITZ once again accepted the challenge.

Zellstoff Pöls, as well as being a high quality, specialist, integrated mill, is also massively important to the local area as a supplier of energy and district heating to some 15,000 residents. The mill has even won a prestigious Austrian national award for its production of renewable energy and heating. The explosion that evening meant that action had to be taken - and fast.

Siegfried Gruber, Head of Project Engineering, Zellstoff Pöls, takes up the story, "As I drove into the mill on Monday 24 March 2014, it was clear that something enormous had happened to the recovery boiler at our mill. From the outside the façade was visibly damaged, but it was when I took a look inside that the seriousness of what had happened became clear. It was a scene of absolute devastation, and it was clear before we could do anything else we would have to make the building safe - even the enormous steel girders in the plant were bent and twisted by the sheer force of the explosion.

"Although it was very bad, we count ourselves fortunate that there were only two minor personnel injuries, and it was certainly a shock to those people that were working there that night."

Also fortunate was the fact that Zellstoff Pöls is one of those mills that has a backup recovery boiler - although with only 50% capacity of the mill's needs. The spare boiler was fired up quickly to continue pulp making to keep its virtually brand new, ANDRITZ-supplied speciality paper machine running and to at least partly supply market customers with pulp as well as most local residents with district heating.

IMMEDIATE ACTION HAD TO BE TAKEN

Nonetheless, immediate action had to be taken in an effort to get back on track and bring the mill back to 100% production again. Gruber says, "Within a few weeks, we came up with a plan internally – for instance, what the boiler should look like, capacity and environmental demands, and then we went to the potential suppliers."

One area of project management that is not often reported on is the amount of work undertaken by the sales and project quotation teams when an event occurs like the one at Pöls. The un-

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The recovery boiler project started up with liquor 17 months from the signing of the contract.

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Head of Recovery-Line & Environment/Energy
Zellstoff Pöls (L)

SIEGFRIED GRUBER
Head of Project Engineering
Zellstoff Pöls, (R)

planned nature of the boiler explosion meant that there was no luxury of time, and the very small team of experts in the quotation department had to pull out all the stops. Antti Mattelmäki, Sales Manager, Recovery Boilers at ANDRITZ explains: "This was a once in a lifetime event for many of the people involved in the project; we had to get to work fast on the quotation for the new boiler, despite the fact that there were a lot of unknowns."

This is one of the areas where records were shattered. The ANDRITZ Recovery Boiler division managed to deliver complex quotations and plans that would normally take as much as a year to complete in just three months.

"The customer in this case was really in a hurry, and three options were on the table; replace the boiler with an exact replica; build a completely new boiler with housing; or put a new boiler in the existing housing. There were a lot of differing parameters and possible scenarios, and each one of those quotations takes a lot of man hours," adds Mattelmäki. "Fortunately, ANDRITZ had similar reference deliveries which we could utilize when it came to technical demands."

In the end Zellstoff Pöls management were convinced that ANDRITZ technology was the way to go, and a decision was made to go ahead with a brand new recovery boiler installed in the existing building, but with an increased capacity from the old 2,200 tds/d to 2,600 tds/d of liquor per day. The new boiler would also produce more steam, from 350 t/h to 400 t/h at 500 °C and 80 bar. And of course, the new boiler would have significantly reduced emissions to continue with the mill's proud environmental distinction.

The contract for the project was signed on 11th July 2014, not even four months after the boiler explosion.

A BIT OF A SQUEEZE

But of course there were the main project challenges to contend with now. The new, higher capacity boiler had to be squeezed into the existing building, which had to be completely repaired and made ready for what was to be a larger, and completely different shaped boiler. So the challenge baton was passed from the sales team on to the ANDRITZ Recovery and Power project team.

Bernd Zuschin, Senior Project Manager, Recovery and Power, for ANDRITZ says: "There were a lot of uncertainties, and a lot of unknowns; for instance, how secure were the foundations? And how about the structures that didn't seem damaged, how reliable would they be? In the middle of all this was the fact that we knew from experience what a demanding customer Zellstoff Pöls is, particularly when it comes to mill standards and quality."

Simultaneously with the engineering works, the clearing and damage assessment work on site began with a vengeance. High tech laser scanning of the steel structure was performed to assess the factual condition of it and to get a proper basis for the engineering teams. Says Zuschin: "Finally 3,800 tonnes of material had to be removed and many adaptions to the existing structure were to be made. In parallel to that we had to reinforce or even renew concrete foundations and platforms to take into account the bigger dimensions and loads of the new boiler.

"But it wasn't just a case of brute force and cut out whatever we could, there was equipment remaining in the boiler house that belonged to other mill areas and damage to them would have caused a complete mill shut down. It was also a very delicate operation."

(L to R): Christian Perschler, Project Manager, Zellstoff Pöls, Winfried Weber, Head of Recovery-Boiler Department, Zellstoff Pöls, Mari Räsänen, Senior Project Manager, ANDRITZ, Olli Knuuttila, Commissioning and Start-Up Manager, Recovery Boilers, ANDRITZ, Bernd Zuschin, Senior Project Manager, Recovery and Power, ANDRITZ.

At the end of December 2014, the recovery boiler house was clear, all the foundations had been verified and reinforced where needed, and work could begin on adapting the steel structure for the new boiler to be installed.

And then of course for the next challenge - getting the larger boiler in.

Mari Räsänen, Senior Project Manager, ANDRITZ, says, “The new boiler has 20% more capacity, which means increased dimensions of the boiler and its appending equipment, so engineering was complicated and modifications to the building had to take place. In addition, we received detailed feedback from site concerning what equipment could be reused and what not; this further squeezed the short time available for the engineering and supply process.”

At the same time all this activity was taking place, ANDRITZ installed a simulator for the Zellstoff Pöls recovery boiler team, an exact replica of the new recovery boiler operation system that allowed the operators to get hands-on training, even before the boiler was installed. Christian Perschler, Project Manager, Zellstoff Pöls, says, “The simulator has been a fantastic addition to this project; it is an identical system with all identical operator displays, controls, and interlocking. It has meant that we could actually iron out any potential problems with the boiler before we even started up. In fact, we did have a small problem when starting up with natural gas, but we were able to simulate the problem and solve it on the simulator beforehand.”

Georg Krogger, Automation Project Manager, ANDRITZ, adds, “With the help of the simulator, we were also able to speed up the software FAT and commissioning of the boiler. In future our simulator will even provide the capability to test process and software changes before implementing them at the boiler. ”

RAMPING UP TO START-UP

In early 2015, the parts for the boiler began to arrive at the mill, first the pressure parts, and then a big milestone was achieved in April when the steam drum was hauled up using a special crane installed on top of the boiler house. It was at this time that the installation work on the project was ramped up to make sure that the start-up timeline was adhered to, and for the next six months the installation teams were working around the clock. Installation was slightly more complicated than it typically is at a greenfield project – in this case, the existing building required specialized lifting equipment and erection methods as access was extremely limited.

The pressure test took place in early September 2015 and shortly afterwards the commissioning of the first systems started. As the main milestone for Zellstoff Pöls, the first liquor fire-up was in mid December. After some optimization period, the test run took place with no interruption took place with no interruption from early January until the boiler was taken over by Zellstoff Pöls on the 6 February 2016 - not even 19 months since the contract signing.

“We had the perfect start-up; together with ANDRITZ, we broke the world record for a new recovery boiler”, says Gruber, “and we are amazed at how unbelievably stable the boiler is; we achieved 100% availability during the one-year observation period.

“In terms of the technology we have chosen, we have made a step in the right direction, and although the explosion in 2014 was devastating, it has meant that we have been able to bring our emission reduction goals forward by a good 10 years, as we have made sure that we have installed the very latest technology. In fact, we estimate that we have brought down our emissions by 40-50% with the installation of this new boiler,” says Werner Duer, Head of Recovery Line, Zellstoff Pöls. “In addition, we have significantly reduced our odour emissions to the air by now burning mill waste gases in the boiler and we have increased efficiency by using steam extracted from the turbine for sootblowing.”

“Moreover, the ANDRITZ advanced control system contributes to a well-optimized boiler and provides a good basis for further fine tuning,” adds Winfried Weber, Head of Recovery-Boiler Department, Zellstoff Pöls.

In a commercial sense, the new boiler has also ticked all the right boxes. “We have not had to stop the boiler for a wash for a whole year of operation due to the fact that it keeps itself clean, which of course means more pulp – some 25,000 tonnes more. So now we have created our next bottleneck – in the pulp mill, but that is our future challenge!” concludes Gruber.

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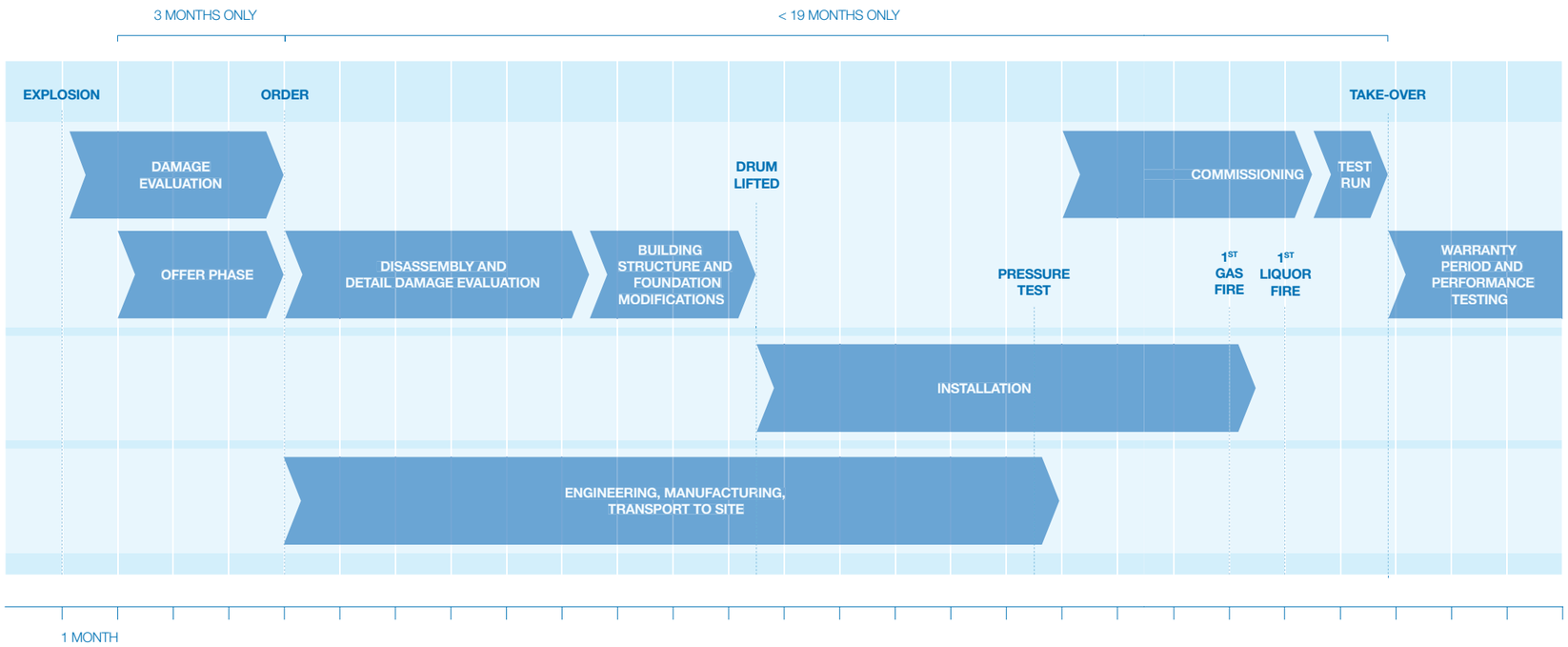
A WORLD RECORD TIMELINE

Reconstruction Pöls Recovery Boiler



The liquor burners. The new boiler has cut mill emissions by 40-50%.

(L to R) Winfried Weber, Head of Recovery-Boiler Department, Zellstoff Pöls, and Georg Krogger, Automation Project Manager, ANDRITZ, in front of the ANDRITZ DCS system.