Executive Summary

Rebuilding a paper machine is a daunting task, regardless of the size of the upgrade. Valmet’s experience with over a hundred years of machine rebuilds has helped countless mills improve efficiency, productivity and profitability.

Several case studies illustrate the advantages of Valmet expertise. From small rebuilds such as machine screen baskets, through medium rebuilds including evaporators, drying and blow boxes, to comprehensive rebuilds that stretch the entire length of the machine line – Valmet has improved operations at many mills.

The enclosed case studies are reviewed in terms of market demands, mill needs, rebuild scope, special delivery requirements, project milestones and results achieved. The scope of the different projects includes: machine screen baskets, evaporator heating surfaces, vertical impingement drying, blow boxes, tail threading, doctoring, water jet tail cutting, headbox, forming section, press section, dryer section, calender, reel and coaters.
Rebuilds come in all shapes and sizes, available for any section of the fiber, board, paper or tissue mill. As a proven manufacturer with 200 years of industrial experience, Valmet is able to improve any section of your machine line. This white paper will review recent examples of machine rebuilds ranging from small sections to much more comprehensive machine line rebuilds.

Let’s start with examples of smaller rebuilds…

Nine days without a break – machine screen rebuild

A recent machine screen rebuild in Sweden achieves incredible results with paper quality and machine runnability. The Lessebo Mill is located in a densely forested area between large shallow lakes in the inland region of Småland, southern Sweden.

The Lessebo Bruk in Sweden has a long history of paper production going back to 1693, and today it is completely focused on forest based products, with a modern product mix of graphical papers, dissolving cellulose and energy.

When Production Manager Øistein Vedahl (Figure 1) realized they had a screening problem on PM 2 he contacted Valmet for a solution, "Customers were complaining of colored fibers in our superior white paper and threatening to change suppliers. When we opened up the headbox and screens and saw the condition, something had to be done. I am happy to say that with Valmet’s screening solution our customers are really satisfied with our quality, and breaks due to poor screening are a thing of the past."

One screen basket replaces four

The headbox approach used two machine screens in parallel, and when opened mill personnel could see that the baskets were worn out and full of pulp spinnings (strings). This was definitely the cause of the quality problems. The screens were strainer types, equipped with two drilled hole baskets (an outer basket and inner basket). This meant they had a total of four screen baskets to replace. On advice from Valmet, the mill decided to idle one screen and rebuild the other with just one wedge wire screening basket. This was made possible by the use of Valmet’s Nimax LD wedge wires in the screening basket.

With conventional wedge wires and drilled hole baskets, the narrow slot size or hole size needed to guarantee the accept pulp quality leads to an increased pressure drop over the screen basket and can require two or more screens in parallel to achieve the desired screening efficiency. The patented Nimax LD (Laminar Design) wedge wire reduces the pressure drop by optimizing the flow at the screen boundary layer as well as reducing flow resistance through the slots and the following accept channel. The result is high screening efficiency, reduced stringing or spining and excellent runnability.

The rebuilt screen, with Nimax LD wires in the outer basket and a blind metal plate replacing the inner basket, was started in May 2013. "No problems have occurred with screening since start-up," says Øistein Vedahl. "After two months we have fewer breaks than ever and production is at record levels with no
more colored spots in our superior white grade. From having two to three breaks per day, we recently achieved a record run of nine days without a single break. We are now thinking of a similar rebuild of the other basket, now idle, for use in another position."

For Outi Kukkamäki, a screening specialist from Valmet, the results are no surprise, "We have seen this kind of a result in many mills," she says. "For Lessebo Bruk I think we can count the return on investment in terms of days, not months." Vedahl is in agreement. "The main issue," he adds, "is that for our customers, the quality is better than before and we have fewer breaks."

In addition to the quality improvement and the substantial reduction in breaks, Kukkamäki predicts that other savings will soon be evident (Figure 2): "In addition to better paper machine runnability, there are energy savings and less maintenance, because the second screen can be shut down. There are also fewer wearing parts, as there is now only one basket instead of four."

Now for a few examples of medium scale upgrades, in the area of evaporators, blow boxes, and drying; let's start with a particularly challenging installation at a Swedish mill.

Smurfit Kappa Kraftliner switches to Valmet technology – TUBEL heating surfaces

The Smurfit Kappa Kraftliner paper mill in Sweden was having problems with its evaporation plant. The heating surfaces had begun to crack, resulting in unplanned outages, higher costs and sometimes lower evaporation capacity.

After analysis and discussions with several suppliers, Smurfit Kappa Kraftliner chose to replace the damaged heating surfaces with Valmet’s TUBEL heating surfaces. But the installation of the new heating surfaces became dramatic: a 350-tonne crane collapsed, and suddenly the standard replacement job became a race against time.

The Smurfit Kappa Kraftliner mill has an annual capacity of 700,000 tonnes of kraftliner. Kraftliner is made from virgin fiber and is used to manufacture containerboard. The mill started up in 1962 and has been continually upgraded and expanded ever since. Now the time had come for the evaporation plant. Stefan Lundqvist, Manager of the Chemical Recovery Plant at Smurfit Kappa Kraftliner relates the thinking at the mill:

"Our evaporation plant had been working well, but we had started having serious problems with cracks in the concentrator heating surfaces. We finally got to the point that it was no longer possible to repair the
heating surface, we had to replace it instead. One option was to switch to a new heating surface of the same design, but made from a material that was more suitable for our conditions. After analysis and evaluation of our options, we chose to switch to a heating surface from Valmet.”

**Change of plans**

Once the choice of technology was made, the effort focused on getting the new heating surface installed as quickly as possible. First, the work at the site went according to plan, but the situation suddenly changed when a crane collapsed. Valmet's Project Manager Charlotta Cederström describes what happened:

"The heating surfaces are very heavy, so for this installation we were completely dependent on a big 350-tonne crane, both to get the old heating surfaces out and to install the new ones. Things got more complicated than we had planned for. We began hoisting the old heating surface, but the main hydraulic cylinder on the crane suddenly bent (Figure 3, inset). Nobody was hurt, but we had to stop the work and change our plans.”

"In order to minimize the time lost due to the collapsed crane we, together with the crane company, immediately started scrambling to find new parts, dismantle the crane and repair it. We also began a range of other activities intended to save time and minimize delays. It was a hectic time, but we had a very open, direct and positive dialogue with the people at Smurfit Kappa Kraftliner, and their positive attitude was a great help. Cranes do not normally collapse, so this site work became very challenging. In the end, we managed to minimize the time lost and the installation was one of our fastest, compared to others with this kind of scope. I think that the support we got through the positive dialogue we had with our customer was one of the main reasons why the people on site could perform as well as they did in this project.”

**Good cooperation leads to results**

Stefan Lundqvist at Smurfit Kappa Kraftliner continues the story: "Our job is to make things work well, and when we run into problems, we focus on finding ways forward. A big challenge in a case like this is to make sure things remain safe, even when the plans for the work change as much as they did here. The cooperation with Valmet worked well, and many other people acted very professionally and made outstanding contributions. All in all, the end result was very good. Despite the setbacks, we ended up with only a small delay. I should also add that our concentrator has been working very well since it was started in autumn 2013.”

*Figure 3. A 350 tonne crane was used replace the heating surfaces. The main hydraulic cylinder (inset) bent, requiring expert project management to minimize delays.*
TUBEL for highest availability

In kraft pulp mills, black liquor is evaporated before it is burned in the recovery boiler. The evaporation takes place in large evaporators that are heated with steam. Anders Wernqvist from evaporator sales at Valmet, describes Valmet’s experience with evaporator installations:

"To date, we have completed more than 400 big evaporation and condensate treatment projects around the world, gaining lots of experience. We have several different technologies for evaporating black liquor. In the concentrator part of the evaporation train, we usually recommend our TUBEL evaporators. They feature a design where the black liquor is evaporated on the outside of hot tubes. The tubes are robust and stable mechanical components, and this gives our evaporators a very long life time. Another big advantage is that the heating surface can be easily washed clean during operation. This ensures a high evaporation capacity and avoids the costs of hydroblasting.

The installation at Smurfit Kappa Kraftliner also made it possible for our customer to lower their steam consumption when their leaking heating surfaces were exchanged for our tube-based technology. I’m really happy about the very good experiences our customers have had with the TUBEL technology, both from upgrades of existing plants and in new plants."

The next rebuild involves improving productivity and cost savings with new blow boxes...

Hamburger Hungaria boosts efficiency with HiRun P blow boxes

The Hamburger Hungaria mill, located in Dunaújváros, Hungary, 70 km south of Budapest, has always aimed to achieve better results and has been able to improve the productivity and efficiency of its PM 7 year after year. First started up in 2009, the machine produces 100% recycled brown liner and corrugated medium. It has an annual capacity of approximately 470,000 tonnes, a width of 7.8 m and an original maximum production speed of 1,400 m/min.

In 2013, pre-dryer section runnability became a bottleneck for PM 7. The mill decided to investigate the possibility of improving runnability in the first dryer group, which would consequently reduce draw from the press to the dryer. This would be the next step in improving production line efficiency.

An additional aim was to save on costs in the spare part sealings of the blow boxes. The existing concept had a feature that wore out the sealing material rather quickly, resulting in high annual operating costs.

Excellent runnability and low draw

Hamburger Hungaria became interested in Valmet’s HiRun blow box technology, which addresses both their targets and has also proven its capabilities in numerous reference cases in recent years. HiRun P is a new solution with passive drilled bottom rolls for improved runnability.

The mill set strict requirements for the delivery. They included a stable web run at 1,400 m/min (with the possibility of a future speed increase up to 1,500 m/min), lower press-to-dryer draw, higher time efficiency and a longer lifetime for the blow box sealings.

The HiRun P system (Figure 4, next page) was successfully started up at the beginning of January 2014. The test run met all the requirements for a stable web run, fewer breaks in the first group and lower draw. The guarantee for the sealing lifetime was also fulfilled.
"It was an easy decision for us to select HiRun, since it is known as the industry standard technology in terms of dryer runnability," says György Szilas, Production Manager at Hamburger Hungaria (Figure 5). "I am very pleased with Valmet's competent approach and attitude; Valmet people helped and worked with us to improve machine line competitiveness and productivity."

According to Attila Bencs, Mill Manager (Figure 5) at Hamburger Hungaria, "Any action that reduces costs and improves efficiency is important. The HiRun P blow boxes were one step forward in our development process. Valmet made this a pleasant and smooth project."

The next rebuild involves Valmet and a board mill solving production obstacles together...

**OptiDry Vertical improves production capacity at Wolsan Haman**

At the Wolsan Haman mill, part of Dong Il Paper, South Korea, the testliner and fluting machine PM 1 was experiencing production capacity limitations, especially during the cold season due to irregular steam supply capacity. The mill was seeking greater flexibility for drying and the OptiDry Vertical with gas heating gave them just that.

The 4.7-meter web width machine had a speed limitation due to lack of drying capacity. In general, there are three ways to solve drying capacity limitation problems (Figure 6). One solution is more drying...
cylinders with a 3-level drying section; another is more drying cylinders with a longer drying section; or, finally, a short drying section with Valmet’s OptiDry Vertical air dryers with several heating options. The two cylinder drying capacity solutions are expensive and require a lot of construction work and long shutdown times; they also require more steam capacity, which was not available at the Wolsan mill.

Valmet’s revolutionary OptiDry impingement drying technology (Figure 7) has been developed to replace and improve traditional cylinder drying. In impingement drying, hot air is impinged at high speed against the web to create high drying capacity. The returning air is used to carry out the evaporated water. Valmet has three impingement drying solutions offering different benefits for papermakers. OptiDry Twin for drying capacity and bulk savings, OptiDry Vertical for drying capacity increase, especially in rebuilds, and OptiDry Horizontal for curl control.

Installation of an OptiDry Vertical impingement dryer at the beginning of the dryer section not only enhances drying, but can also allow the steam pressures of the cylinders to be increased without sticking while the dry content is raised, thus improving the drying effect of the current equipment as well. In many cases OptiDry Vertical is the only possible way of increasing production if the machine is drying-limited and there is no extra space in the machine room. The dryer will be located in the basement so there is no need to find space for extra drying cylinders and to relocate the dry end equipment. This means less construction work and a shorter shutdown time.

OptiDry Vertical offers increased drying capacity without adding machine length. The average production capacity increase with one dryer is around 15%, giving the potential for a speed increase. With OptiDry Vertical technology it is possible to dry all paper and board grades without changing the end product quality and it suits different drying layouts.

**Great results at the Wolsan mill**

The target of the rebuild was to increase the drying capacity by 14%, to improve the runnability, to even out process conditions during the cold season, and to get more flexibility for drying. After the short seven-day shutdown, the rebuilt machine was started up in May 2012. The machine speed was increased from 1,050 m/min to 1,200 m/min with 180 g/m² end product.

*Finally, we’ll look at larger scope rebuilds, starting with a comprehensive production efficiency upgrade at an LWC mill…*

**Stora Enso Veitsiluoto improves runnability and efficiency**

PM 5 in Stora Enso’s Veitsiluoto mill in Kemi, northern Finland, is able to produce more than 700 tonnes of high-quality LWC paper per day. In 2011, the company decided to invest in improving the line’s
runnability and production efficiency. With Valmet's help, PM 5 was upgraded to increase efficiency. As a result, the number of production breaks and the amount of broke were significantly decreased.

Stora Enso's Veitsiluoto mill is an integrated production facility manufacturing office papers, coated papers from mechanical pulp and sawn products. It is the fourth largest paper and board mill in Europe. At the same time, Veitsiluoto's PM 5 has the honor of being the world's northernmost paper production line. It has the capacity to produce more than 700 tonnes of high quality NovaPress LWC every day.

At the end of 2011, Veitsiluoto made the decision to invest in improving PM 5's runnability and production efficiency. The previous major changes to the production line were made in the mid-1990s, but preliminary surveys into new development options for PM 5 had been made since 2000.

"We wanted to improve the paper machine's efficiency over time by decreasing the number of production breaks and shortening the break time. One objective was to also decrease the amount of broke created at the reel. At the same time, we had our own efficiency development project in progress: a new operating model was sought for the LWC paper machine to enable operating the production with fewer personnel," says Markku Åman, Production Manager of the printing paper mill.

From the start of the project it was obvious that the improvements sought could not be accomplished with just a few tricks, but technological improvements were required throughout the production line (Figure 8). In April 2012, Valmet was chosen to carry out the upgrades.

**Upgrades throughout the machine line**

From the point of view of the operators of PM 5, the most significant change implemented during the project concerned tail threading of the paper web, whereby two tail threading units were added to the press section. The upgrades made work easier at the press section.

"In this project, the scope of the implementation was exceptional in that it was a complete tail threading project from start to finish; from the press section to the reel. As soon as the tail threading starts, we reach the first upgraded component, the PressForce. The line now uses nearly every tail threading unit that Valmet offers for the paper grade. Usually, the upgrades concern smaller subsections," says Pekka Matilainen, Global Technology Manager at Valmet, who participated in planning the project.
The dryer section’s runnability package was also upgraded during the project. The runnability boxes located at its start were upgraded to use the latest technology.

"Before the upgrade, we suffered from a typical problem where a minor fault somewhere interrupted the process at the drying stage. We sought to improve the situation with new VacRolls and runnability boxes by decreasing paper web breaks. The solution proved successful. Certain changes were also made to eliminate an edge flutter problem in the double-fabric area (TwinRun), and with these changes, we also reached our targets," Markku Åman says.

Some of the technologies were chosen only after the sales project had already been started. At Veitsiluoto, potential causes of breaks were considered and it was decided that the 3rd press doctoring should be upgraded during the modification work. It was included in the package because poor doctoring is one factor contributing to breaks caused by precipitation. According to Åman, the new double doctor has been working superbly.

**Reducing the amount of broke**

Several different technological improvements were implemented during the project, but which technical measure was the most significant?

"Reel area tail threading was the topic that we had to consider most carefully in advance. However, the technology chosen started to work from the first tail threading and has been reliable ever since," says Åman.

Throughout, well-tested technology was employed in the project. Pekka Matilainen thinks that the most atypical solution used with PM 5 was the middle threading and spreading to both directions implemented in the reel-calender area: "This solution was employed to decrease the amount of broke created during a break. When threading takes place in the middle, roll bottom formation is fine after just a few rounds, and there is less broke."

Åman confirms the observation: "Earlier, when threading took place at the edge, there was approximately three kilometers of broke per parent roll during a break. Now the figure is 500–600 meters. This means that there is nearly 2.5 kilometers less broke per break."

The amount of broke is also decreased by the fact that there are fewer breaks. And with fewer breaks, less energy is wasted as it is not used for producing the extra broke.

The tail threading warranty tests included precisely defined test values for tail threading run-throughs, which were reached. According to Åman, the values defined for the project are constantly being monitored. Performance and efficiency have remained within the target values.
From paper to paper in eight days

Stora Enso and Valmet signed an agreement on the Veitsiluoto PM 5 upgrade work in April 2012. The major installation work was carried out during week 42 of the same year, with a scheduled maintenance shutdown of a week. Preparation work had already been started by then. The success of the project required careful planning and doing as much as possible in advance, before the actual shutdown. According to Åman, the work was completed within the schedule.

"The implementation from paper to paper during the shutdown took eight days. A highly competent, experienced team both from us and from Valmet participated in the installations. At that stage, it started to become obvious that we had made the right choice about the technology."

The project's business benefits and payback period are based on the improved efficiency. When the line is operating it produces marketable LWC as efficiently as possible.

"I can honestly say that we have reached the main objectives set for the project. The efficiency objectives included the impact on personnel. We can now operate the machine with just two professionals. Of course, this requires extensive expertise from them, but at the same time, it brings more interest and variety to their work," Åman says. A third employee is located at the dry end of the production line with the job of operating the rereeler, as the PM 5 coater is not directly connected to the previous parts of the process. The focus of further development is currently on the final part of the production process, in improving the quality of the finished product.

"Thanks to the upgrades implemented at PM 5 in 2012, we can now get a web out of the machine that is approximately four centimeters wider than before. This is largely thanks to the VacRolls and the new runnability boxes. If we could cut an equally wide web at the cutter, we could bring the material benefit all the way to the customer. This would require some additional investments on the coating machine. A proposition on this has already been made," says Markku Åman.

The final case study is for a specialty paper machine comprehensive rebuild...

Project Leopard at Sappi Alfeld

Sappi is one of the world's largest producers of high quality, coated graphic papers. Unfortunately, no matter how good those products are, the introduction of the iPad, the Samsung Galaxy, the Kindle, and a raft of other electronic media devices have put a large dent in graphic paper demand.

At this crucial crossroads, Sappi could easily have introduced the unimaginative management philosophy of cut, cut and cut some more. However in the case of Sappi Fine Paper Europe's Alfeld mill, a much bolder approach was taken; to significantly expand into the lucrative market for specialty papers.

"The existing PM 2 at Alfeld was losing us a lot of money", says Sappi Fine Paper Europe CEO, Berry Wiersum. "And a graphic paper machine sitting in the middle of four other paper machines which were more than paying their way in specialties made no sense at all."

"Our existing specialty papers' customers were telling us that they liked the idea of a 'big' machine," continues Wiersum, "One that could cope with larger orders, and one that could ease the transition from using lots of plastic to using lots of paper instead – a growing trend in Europe."
Let Project Leopard commence!

The history of the idea for what was to become known at Sappi as Project Leopard started at the Alfeld mill itself. The name came from an action photo of a Leopard leaping from one rock to another on one of Sappi’s customer calendars – a perfect illustration of the plan for PM 2.

One of those people instrumental in the idea of the transformation of PM 2 is director at the Alfeld mill, Dr. Stephan Karrer (Figure 10). "We had an unusual situation at Alfeld, four specialty machines that were doing really well in a growing market and one graphic machine that was struggling in a declining market. The four specialty machines were running 24/7, 365 days a year, and the graphic paper machine was subject to commercial standstills due to lack of orders. We had to do something.

"We thought about having a minor rebuild, and tackling specialties that way around," continues Karrer, "But specialties is our business, and we were not convinced we could deliver the quality, particularly at the speed of PM 2, which is much faster than a 'normal' specialty machine. Then we came up with the bold plan of going the whole way and doing a complete rebuild."

The concept for the new PM 2 was for a world-class, prototype specialty machine with a width of 5,150 mm that could handle intricate grades of basis weight range 40-180 g/m² and run at a production speed of 1,200 m/min. This would mean that production would leap from the five or six tonnes per hour norm for a specialty machine to 20 tonnes per hour. The machine would also have to cope with numerous, complex grade changes.

It was a clear plan from the start that PM 2 was going to become a star paper machine in the world of specialties.

In May 2011, the Alfeld team including Karrer presented to Sappi’s European management team in Brussels the ambitious plan to rebuild PM 2 (Figure 11) into what he described as "something fantastic that will increase our specialties by 135,000 tonnes/yr."

Karrer describes the management team at the presentation as going completely silent after the ambitious plan for PM 2 was put forward, which was then broken by CEO Wiersum, uttering "Wow!"

Another 14 months later, in July 2012, and after a lot of serious studies, discussions and site visits, Project Leopard commenced, and Valmet was appointed as the main supplier for the project.
Sappi Alfeld: a demanding customer

Valmet's scope of supply was a complex and all-encompassing one; the new PM 2 has a completely new headbox with dilution circulation, forming, press and dryer sections rebuilt. One of the essential ingredients in the rebuild is a brand new solid casting 6.4 m diameter Yankee cylinder with hood. The machine also has a completely new coating section with air dryers plus two ValCoat coating stations, a multitip calender rebuild with existing Nipco rolls, a reel rebuild and broke collection. The automation supplied also included a DNA quality control system and machine control PCS7.

Mauri Laurikainen, Valmet's senior paper technology manager for paper mills says of the PM 2 project: "From the beginning when the concept was first presented, it was clear this was going to be an unusual one – a totally online concept with finished products coming off the end of the machine. Added, interesting challenges are the wide basis weight range and the differing specialty grades, at the same time being produced on a wide machine at speed. The Yankee cylinder of course was an absolute must to obtain the base paper surface quality.

"We trialed many of the grades at our pilot plants in Finland making sure that the coatings and calendering demands would work across the grades needed," continues Laurikainen. "There is no doubt that the Sappi Alfeld mill was a demanding customer for this project, but they knew what they wanted and they always came to us with their ideas in a cooperative fashion."

A carnival atmosphere

Wim Devens, the company's manager of central technology and engineering (Figure 12) was Project Leopard's leader from the Sappi side, he says: "We went through the whole process with the main suppliers, and in the end it came out that Valmet had the experience and know-how in specialties, as well as the facilities for the casting of the Yankee cylinder. There was also a gut feeling among the team at Sappi that Valmet was the right choice of supplier."

With the order in place, it was then left to Devens and the project team, the mill team, and the suppliers – which were all overseen by a steering committee made up of the senior management of both Sappi and Valmet - to ensure the deadline for timing was met, as well as the guarantees of quality. But first, there was transportation of the massive Yankee cylinder to arrange.

The journey itself from Sweden to Germany by boat and barge was not so much of a problem, but the road trip from the river port to the mill was full of challenges, says Devens: "It took over 100 local authority approvals to allow the Yankee to pass through towns and villages and over bridges to the mill. Street lighting had to be dismantled, high voltage cables lifted and over 120 trees had to have branches sawn off – 10 trees had to come down completely.

When the Yankee finally arrived in Alfeld, it was to something of a carnival atmosphere as this was not only one of the most exciting projects the town of Alfeld had seen for some time, but it was also the biggest engineering project going on in the whole of Germany which was being hit by the economic
turndown. Devens said, "When the Yankee arrived, it was as if the whole county had turned out to watch, people were out on the streets, and houses alongside the route were hosting barbecues and parties. We had a small viewing area in the woodyard, and on the first weekend something like 1,500 visitors came to see the huge Yankee."

The race is on
On the 30th of August 2013 the 'old' PM 2 was shut down and the serious race to the finish began, there were only 39 days available for the installation of the Yankee (Figure 13) and the rebuild.

Valmet gave the assurance that the project would take 39 days, and on October 12th 2013, exactly according to plan, there was stock on the wire. "We couldn't quite believe it," says Devens.

On the 17th October, and again absolutely according to plan, Alfeld produced the first two saleable jumbo reels. "It was part of the agreement with Valmet that we had to have two jumbo reels full of saleable paper to go out to our specialty customers," adds Devens.

Since then, by the first half of 2014 more progress had been made and PM 2 could produce all of the top quality grades required for its demanding, discerning customers to its own quality benchmark Q1. So what is next? Devens says: "Well, the work doesn't end for us until the end of July. We are now in the optimization stage, and we are ironing out the problems that go with that. This machine has quite a task ahead of it; we are expecting it to do all grades from 50 to 180 g/m² with calender, without calender, with coater, without coater, one side, two sides, all those different parameters, and all at high speed. It is a high expectation we have."

Devens concludes: "We are really happy all in all with how it has gone and we have had splendid support from Valmet whenever we have needed it during the installation and start-up phase."

"Biggest experience of my life"
Perhaps the most important person to finally ask about the success of the PM 2 project is mill director, Dr. Stephan Karrer who originally came up with the concept: "Apart from the birth of my two children, this project really has been the biggest experience of my life. The last few months optimizing the start-up have been tiring for everybody, but it makes me so proud that the whole PM 2 team are still so delighted to be working on what is going to be such a remarkable machine when it is fully up to speed."

Summary
Regardless of the rebuild size, Valmet has the expertise and proven track record to safely and reliably carry out your project from start to finish. Our capabilities extend from the point that logs come into the woodyard all the way to finished rolls leaving the mill. Special delivery requirements are not a problem, as Valmet looks forward to accomplishing demanding projects with our mill partners.
This white paper combines technical information obtained from Valmet personnel and published Valmet articles and papers.

Valmet provides competitive technologies and services to the pulp, energy and paper industries. Valmet’s pulp, paper and power professionals specialize in processes, machinery, equipment, services, paper machine clothing and filter fabrics. Our offering and experience cover the entire process life cycle including new production lines, rebuilds and services.

We are committed to moving our customers’ performance forward.