pmpl PROMOTIONAL

MAGAZINE

Paper | Tissue | Subcontracting | Services | Specialty Products



Dear Readers,

Welcome to a new reality, the reality, that a small and unpredictable Covid19 virus, has dramatically changed. Nobody has given us a choice - however fortunately, we people, have an incredible instinct to survive and are able to adapt.

We already operate in the reality, where people are more likely to choose hand towels rather than electric hand dryers. In the world, where we obsessively care about hygiene, and tissue handkerchiefs are in everyone's pocket. In the reality, where consumers willingly buy online (during pandemia, many consumers ordered something online for the first time ever), and each product is packed in a carton box. In the world, where products made of paper are gaining importance because they are safe, as viruses live on their surface shorter compared to other materials.

Digitization and related solutions take the lead. We communicate more often using internet platforms such as Zoom or Teams (although sometimes I have an impression that headphones are welded to my ears) and it turns out that face to face meetings are not always essential. Where we implement virtual FATs and customers collect goods remotely (as PMP, we already operate this way - more in this issue). The new reality is an opportunity for our industry that we should use.

Stay proud that we are jointly building the industry that supports people around the world. The crisis has forced us to discover new paths for instance a different approach to invest (using existing resources such as in Phoenix projects (modernization for Ilim Bratsk) or to consider serial deliveries (delivery of 22 machines for APP)). We encourage you to read the magazine - perhaps you will find inspiration for yourself.

We also count on an inspirational dialogue about how our industry should change. Let the article about 2050 industry vision be a platform for this discussion.

This year's PMP #redefining papermaking marketing campaign has taken completely new colors. We are witnessing a breakthrough and changing the way industry works. Let us be aware of responsibility for ourselves and our successors.

And remember that we are stronger together.

Best Wishes







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pmp NEWS

ASIA

APRIL 2019



We participated CIDPEX exhibition. It took place in Wunahm China, PMP representatives were present at the booth providing info about PMP capabilities.

MAY 2019



Congratulations both to C&S and PMP Teams for successful start-up of TM1 in Hubei, China!

JUNE 2019



Thanks to PMP Team commitment and cooperation with C&S Team, we were pleased to announce that TM#2 in Hubei, China, has started-up successfully!

JULY 2019



We would like to share with you a short press release about our project for Chinese customer Zhejiang Jingxing Paper Joint Stock Co., Ltd. PMP will deliver core technological items, as Intelli-Jet V® hydraulic headbox, Intelli-Nip® shoe press, and Intelli-Sizer® metering size press.

JULY 2019



We are proud that we have the opportunity to support one of the biggest company in the pulp & paper industry all over the world. Our cooperation with APP in the past was very fruitful and PMP was chosen as a supplier of 18 Intelli-Tissue® EcoEc 1600 Premium machines.

SEPTEMBER 2019

As a result of our successful contribution to the development of APP.

NOVEMBER 2019



NOVEMBER 2019



cooperation with one of the biggest companies in the world, APP, PMP was chosen to execute Press & Dryer Section rebuild project for Sinar Mas paper mill, Indonesia. We are happy that we make our

Our experts were present at Paperex 2019, from 3rd to 6th December, in Pragati Maidan - New Delhi, India.

We have fired up another TM for our customer in Mainland China, C&S. TM#3 in Hubei, Xiaogan City is up & running from Sunday, 17th November. The first jumbo roll has been approved. Due to involvement of both teams it is a perfect example of a plug & play solution. Well done!

NOVEMBER 2019



Successful projects are built by passionate and dedicated people. It was a hardworking week. We have just completed another milestone of our new PM project for Suparma, Indonesia

DECEMBER 2019



FEBRUARY 2020



Due to the strong relationship and great job of both teams, PMP has successfully passed the performance tests for C&S Xiaogan TM1 & TM2. PMP's Intelli-Tissue® EcoEc machines have reached performance goals.

MEET OUR EX 17-19th APRIL 2019 WUHAN, CHINA BOOTH : B1C35





pmp NEWS

EUROPE

APRIL 2019

It already became our tradition to organize Easter Art-Workshops. You can watch a movie from the latest event that took place at PMP at our YouTube channel. It was a great fun!

MAY 2019

In may we have hosted guests from Ternopil National Economic University.

JUNE 2019

Our Volunteer Fire Brigade participated in Firefighting Competition on 29 June 2019 at a sports stadium in Jelenia Góra. PMP's firefighters have taken the first place!

JUNE 2019

PMP FAMILY DAY 2019 is history now. We solemnly celebrated our company jubilee of 165 years. Our employees and their families participated actively in company's event. We appreciate children's joy, all collected kilometers and help for The Dabrówka Orphanage, conversations and time spent together. The atmosphere was unique thanks to all of us and even the rain didn't stop our great, music final.

JULY 2019

During the last summer holiday, an exhibition vernissage took place in Karkonoskie Museum in Jelenia Góra. The purpose of the event was to bring closer the history of the paper machine, which had been invented 220 years ago, and rich PMP history, which already has 165 years in the P&P industry.

JULY 2019

Energy saving solutions play a significant role in the P&P Industry. As PMP, we do our best to meet expectations in this field. To learn more about our experts from PMPower (Italy), watch a movie on PMP's YouTube channel

JULY 2019

We are proud to share with you a new marketing movie "PMP Insight". Our history began 165 years ago. Through all these years, we have become a global company, that provides state-of-the-art tailored technologies.

AUGUST 2019

Feel invited to watch our new movie on our YouTube channel from "how it's made series" presenting the production process of Intelli-YD® Yankee Dryer. Our Steel Yankee cylinder utilizes the best materials and technology, and also allows you to save money and energy during the drying process. It is like the drumbeat of the machine it assures that everything sounds great.

SEPTEMBER 2019

PMP Team participated in MIAC that took place in Lucca, Italy. Our representatives were there to answer your questions.

NOVEMBER 2019

Another Intelli-Nip® Shoe Press up & running. We would like to share with you a press release that you can find on our website regarding a start-up of another one, PMP delivered to Smurfit Kappa Morava Paper in Czech Republic! 55.72% dryness after the press is stunning. Incredible performance! Enjoy!

JANUARY 2020

To ensure the continuous development of technology, which is a distinguishing feature of our products, we decided to launch a new engineering and application Office in Łódź.

MAY 2020

PMP actively executes succeeding orders. Machine elements for customers from Mexico and Indonesia left our workshops and it was necessary to organize oversize freight. Two hoods were carried by four vehicle platforms what was spectacular adventure!

MAY 2020

The first PMP Intelli-YD steel Yankee dryer delivered to Poland for FP Kaczory is up & running!

JUNE 2020

PMP will deliver a new press section framework to PM2 or Arctic Paper Kostrzyn.



USA · LATIN AMERICA

APRIL 2019



We are proud to support the

University Fraternity give back

members contribute through

bles and scholarship support.

discussion groups, roundta-

In addition they learn and

share experiences - findings

that prove beneficial to their employers and the industry. In all this CPU try to facilitate the use of our experience to educate and improve the skills of students and younger paper industry professionals.

annual CPU Meeting. The

something to the industry

they love. At present, CPU

members of Couch Pit



APRII 2019



PaperCon was full of additional events for us in 2019. We was at the CPU meeting, but also at the Women's Summit, which gathers women from paper industry.

JUNE 2019



We have a pleasure to announce that PMP is supporting tissue sector growth in Mexico with a new project for a delivery of Crescent Former Intelli-Tissue® Advanced 2100 machine to Convertipap. You can find our press release regarding this topic on our website.

MAY 2020



A long-term partnership with Smurfit Kappa built over the years, based on successful project executions, resulted in another order. PMP will deliver (2) new Intelli-Jet V hydraulic headboxes to SK mill Uberaba, Brazil. It will be the first reference in this country.

AUSTRALIA

DECEMBER 2019



PMP exhibited at APPITA, that took place in Melbourne, Australia. Hope you have met our representatives and participated their presentations.







WHO WE ARE



With Passion & Pride We Create Success Together In The World Of Paper



To Be The Best Supplier of Advanced Technologies



PMP Paper Machinery Producer

A global provider of tissue, paper & board technology



OUR STRATEGIC MARKETS

EuropeNorth America

• Asia

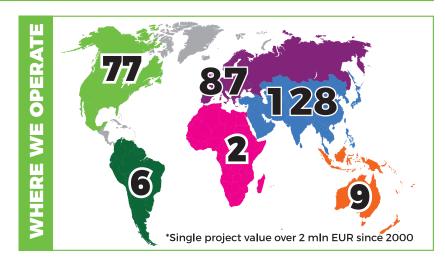


TechnologyExcellent QualityOn Time Delivery

OUR DIVISIONS



Poland, China Italy, USA



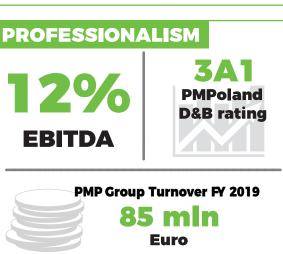


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PASSION



Staff
Development

Experienced and Dedicated Team



Fueling
Our Company
to Achieve Success







Contact us:

- +48 75 755 10 61

Responsibilities:

- Technology Development,
- P&P Capital Project Execution,
- Marketing,
- Application/Sales,
- Designing,
- Engineering,
- Erection Services,
- Mill Services,
- Service Center for Europe.





Contact us:

- +48 426 747 620

Responsibilities:

- Technical project management Tissue
- Application and design group
 stock approach, stock
 preparation, auxiliary systems
- Technical support of the sales process







Responsibilities:

Finances.

Jelenia Góra, Poland

General Manager:

Bogdan Łada

- IT Systems,
- · Human Resources.

Contact us:

- +48 75 755 10 61





Contact us:

- +48 75 755 20 60

Responsibilities:

- Subcontracting Projects,
- Mild Steel Structures.







Responsibilities:

- Rolls Manufacturing,
- Rolls Service,
- Refurbishment Services,
- Maintenance Services.

Contact us:

- +48 52 562 92 00





Contact us:

- +39 340 3924454
- info@pmpgroup.com

Responsibilities:

- Energy Solutions for TMs and PMs,
- Hoods/Steam, Condensate,
- Ventilation; Air System,
- Transfer; Stabilizing Boxes,
- Runnability Systems,
- Plant Surveys, Upgrades,
- Engineering Services,
- Mill Services.





PMP's DIVISION
PMP IB (Changzhou)
Machinery &
Technology Co. Ltd.
Changzhou, China
General Manager:
Frank Yu

Responsibilities:

- Center of Excellence for EcoEc Tissue Machines,
- Engineering, Manufacturing,
- Support for Capital Projects,
- Mill Services.
- Service Center for Asia.

Contact us:

+86 519 86225356





Contact us:

- +1 815 6339913

Responsibilities:

- · Liaison for PMP P&P Business,
- Gauging; Fixturing,
- Subcontract Manufacturing,
- Engineering Services,
- Mill Services.
- · Service Center for North America.



MAJA MEJSNER - Vice President Business Developmen & Marketing - PMP Group

What new paper machine technologies have been ground breaking during 2019? And what can the industry expect to see in 2020?

Tissue fleet worldwide is predominantly driven by Crescent Former technology. Both tissue producers and machinery makers are constantly looking for innovation having in mind reaching impressive tissue quality results and keeping production costs under control. It is sometimes like reconciling water and fire. However all depends what consumers say and are ready to buy. In emerging markets, simplified and robust solutions take the lead. On mature markets, more activity in applying alternative, sophisticated technologies including shoe press and ideas to produce so called texture tissue are observed.

It is crucial to understand, there are many differences in technical age of tissue fleet worldwide. If we take China for instance the fleet is very young - 8 - 10 years as average, whereas in USA closer to 30 years. Also per capita consumption figures are totally different mature markets are even three or four times higher than emerging economies. Mature markets need to focus effort on optimization of their fleet and finding a sweet spot. That is why rebuilds and applying smart, innovative concepts take place. Emerging economies are still on the learning curve - run faster and learn every day - simplicity and flexibility help to maintain business risk and build a strong foundations for the future.

We do not expect violet changes in that trend in 2020 however we still believe, as the industry, we should be driven by innovation. As PMP we are planning to continue efforts to expand our offering to respond well on all needs from all markets.

What new technical demands are you seeing from the market, and how are you responding to that?

Since several years, tissue manufactures talk about cost per tonne production and how to minimize media consumption maintaining high tissue quality. Sophisticated technical demands play minor role. Looks like recently essential solutions and simplicity take the lead. Compared to a previous decade when tissue lines were robust and were designed to run for even 35 years nowadays a perspective is much shorter and people are ready to accept compromises meaning cost reductions (different materials, lower execution standards etc) and a much shorter production time horizon of a particular line - a conclusion is they accept a shorter line lifetime. Attractive ROI factor is crucial - in Asia (China) - 3-4 years, other areas of the world 5-6 years. This might be astonishing however these are facts. If investors are ready, they want to apply plug & play scenarios. If we imagine that in 1970s sometimes even 4 years were needed to build a mill, today - as the industry, we have manged to squeeze that timeframe to 1.5 year - from a contact signing to paper at reel. That is impressive. We build mills different way - simplified buildings (basement free), lego bricks philosophy of an erection process, more standard, repeatable solutions and so on. Some investors are agile and go ahead with multiplied orders at once - especially in Asia. As PMP, we are experiencing that right now with two customers. Process planning in case of such orders is very different and that is an excellent example how to achieve a synergy effect - to cumulate similar purchases, to safe time on similar activities, to make sure operators can be trained on one machine and run any other installation in a different location. This way we become more effective and can shift our business to the next level.

At PMP, we believe there are still two important factors to keep in mind: safety and transparency. No matter what, all of us need to make sure applied solutions are safe for users and for the process. Machinery providers should give people a choice and stay transparent, to make sure a buyer compares apple to apple and what are the consequences of certain choices (for instance mild steel instead of stainless steel, thinner elements instead of thicker element, lower quality pump instead of top quality pump etc). We all are responsible to keep tissue business in a good condition and to grow it.

What developments have you made in terms of energy?

Last 3 years, as PMP, we focused efforts on development and optimization of our EcoEc Premium line (single and one and a half trim tissue machines) to ensure an ultra-low media consumption level - the best possible. Running references proved our theoretical calculations were correct and even we managed to exceed expectations. It makes us feel proud to realize our machines are amount the best in the world taking cost per ton factor into account.

Year 2019 has been an outstanding time for PMP. We have been awarded by APP with (18) Intelli-Tissue® EcoEc Premium 1600 lines for Rudong mill, China that will bring 620 000 t/a of high quality tissue and (4) Intelli-Tissue® Eco Ec Premium 1800 lines for OKI mill. Indonesia, that will bring 165 000 t/a. In both cases we are talking about 1.5 trim machines (3650 mm). PMP Intelli-Tissue® EcoEc Premium technology corresponds well with a Sustainable Development Strategy of APP and guarantees achieving ultra-low media consumption (total energy usage: steam & electricity as low as 1.74 MWh/t), while keeping premium quality of a final product. In addition, this technology has been also appreciated by our long term partner C&S from mainland China who decided to purchase (3) more machines of that type following (9) lines purchased previously.

Encouraged by superior results of medium EcoEc Premium lines, we have developed double width TM with shoe press and incorporated this solution in our offering. Intelli-Tissue® Ultra line has been introduced to the market during Tissue World Milan and CIDPEX trade fairs. A new line was developed under a WIDE project and its main driver is to ensure the best media consumption in the world (Crescent Former type). WIDE stands for Wise Solutions, Innovative, Durable, Energy Efficient. Wise solutions meaning all ideas that help to improve tissue quality such as double layer headbox, shoe press and others. Innovative - user

friendly - solutions that correspond with robust solutions and users preferences as well as PMP smart concepts, with industry 4.0 flavors. Durable - of high quality, a compact - modular construction, trouble-free operation (TM efficiency as high as 95%, that offers a comfortable performance. Energy Efficient TM - of lowest possible media consumption (steam consumption as low as 1.68 t/t of paper on certain grades in case gas in not available in the location and a TM runs with large dia steel YD and a cap). Intelli-Tissue® Ultra is our response for corporate customers and mature markets, where a blend of sophisticated technology & reasonable costs is expected. It is a continuous process however we are planning to move forward with innovations and to become more visible in more demanding market segments.

What trends are you seeing generally in the tissue market and the current global economic climate? (e.g. is there a slowdown in tissue growth in China? Do you expect to see a global recession, or challenges from the impact of Brexit or China/USA trade wars, etc? What do you make of increasing demand in emerging economies? How are pulp prices impacting the industry?)

Tissue industry is still healthy even we observe regional overcapacity. 10 years ago most of new tissue machines were single width, then we observed double width machines being popular. Nowadays, there is more interest to install 1.5 width TMs as a way to be able to increase annual capacity faster that in case of single width machines and to stay more flexible compared to double width TMs production scenario. For the first time, PMP provided two machines of that size couple of years ago for GCPU in Indonesia. We got another order of that type machines in 2016 from Hebei Jinboshi Group CO., LTD, Baoding City, Hebei Province, China. Than we have been swapped by orders from C&S and APP. It is not a coincidence for sure and this trend cannot be ignored.



Our industry is also affected by local regulations either environmental or political. For instance in China mills closures in bigger cities take place and then creating new mills in rural locations are required to maintain annual capacity. Another trend: replacing outdated technological solutions with modern ones (instead of 10 lines to run one line only). In addition, consolidations play more important role than in the past. It is pretty common now that corporations are building expansion plans based on worldwide presence taking into account their working style and requirements for machinery and standardization. Tissue industry is not local anymore! This way tissue makers have found a way to balance their business models and to open themselves on new opportunities and reduce a risk of failure. It is also edifying that technical age of tissue fleet worldwide is very low compared to for instance paper machines. There is more space for implementation of modern ideas like industry 4.0 solutions as people do not need to think about basic problems.

We truly believe in growing economies including Eastern Europe and Latin America. We are very proud to support Convertipap in Mexico - our first tissue reference in this country. We are taking care of Intelli-Tissue® 2100 Advanced line in a turn-key scenario and the start up in scheduled for summer next year. After our experience with Smurfit Kappa group in Mexico, it is an important and memorable project in tissue sector.

What environmental/sustainable demands are you seeing from customers? How are you responding to that?

Sustainability is a DNA of our industry. Consumers are conscious - they want to buy safe products without contamination and of high quality. Tissue products directly affect their lives. The society is getting more responsible and want to preserve our planet for next generations. We have started to pay more attention to resources and their utilization. That is why a key word in tissue business is energy and all solutions that help to minimize its usage are appreciated. Producers of tissue and machinery pay more attention to invest in technologies to make sure a production process is optimized and utilization of resources is decreased to minimum. That is a global trend.

As PMP we continue efforts to create and offer solutions for the future. Our marketing campaign in 2020 is called #redefining papermaking. Our intension is to intensify activities to continue a dynamic company growth. Our next target in tissue filed is to lower steam usage to the level of 1.5 t/t (in case of Crescent former machine with large steel YD at least 18 feet and Intelli-Cap®). A reuse of waste heat in this scenario can, on the one hand will help to save money, on the other, will correspond well with a sustainability trend.





PMP is supporting the dynamic development of one of the biggest pulp and paper companies in the world for almost 20 years. One of the significant examples of our partnership was the delivery 25 Intelli-Jet V[®] Hydraulic Headboxes for both, tissue and paper machines.

On 24 of May, 2019 APP has decided to award PMP with another project. This time scope of supply covers (18) eighteen complete Tissue Machines to APP's new mill in Rudong Jiangsu, China. APP has decided to execute the project together with PMP, due to excellent cooperation in the past and the state-of-the-art technology implemented by PMP worldwide. APP has chosen Intelli-Tissue® EcoEc 1600 Premium, from a wide span of tissue making solutions offered by PMP. It is a perfect match for APP, thanks to premium tissue quality provided from the 1st day, very low media consumption, high capacity of the machine and high efficiency (over 95%). Furthermore, the project has a high return on investment what sealed the agreement between both companies.

All eighteen (18) Tissue Machines will be designed and manufactured with the same concept to produce tissue from 11,5 up to 22,0 gsm at the reel. Machines are designed for a maximum speed of 1600 m/min. Intelli-Tissue® EcoEc 1600 platform is a perfect balance between achieved capacity and optimum energy savings.

In the scope of supply of each machine, there are PMP's core technological items such as:

Intelli-Jet V® - 5-channel, single layer, hydraulic headbox. Implementation of Intelli-Jet V® headbox secures hydraulic stability, sheet edge quality, perfect basis weight profile as well as low electric power consumption of the fan pump. Intelli-Former® - Crescent Former type, a compact design with the optimum catch of the jet beam from

the headbox and efficient dewatering.

Intelli-Press® - Single press design with a cantilevered framework. Intelli-Press® is equipped with Intelli-SPR® - Suction Pressure Roll dia. 1421 mm with PU cover and high Nip load up to 115 kN/m. This solution enables to maximize the amount of water removed from the sheet while keeping product quality at the highest level, lowering media consumption and boosting machine capacity.

Intelli-YD® - Steel Yankee Dryer dia. 18 ft (5480 mm) manufactured with the highest quality, certified materials, with optimized shell structure what brings high drying efficiency with ultra-low media consumption. Intelli-Cap™ - Exhaust Cap over the Yankee Dryer assures efficient moisture removal at the same time providing a significant decrease of media consumption compared to conventional solutions.

Intelli-Reel® - Reel providing efficient, high speed, continuous paper winding and perfect parent roll structure. As an addition, PMP has provided parts of approach flow equipment, mechanical drives, steam & condensate system, lubrication system, hydraulic system, wet dust & mist removal system, machine controls, as well as all necessary training, shop floor assembly and start-up supervision.

New machines will strengthen APP position on Chinese tissue market adding capacity of premium products with low green footprint thanks to ultra-low media consumption provided by PMP's Intelli-Tissue® EcoEc line.

About APP:

Asia Pulp and Paper Group (APP) is one of the largest pulp & paper companies in the world. Started in 1972 with Tjiwi Kimia producing caustic soda, now run operations across Indonesia and China with an annual combined pulp, paper, packaging product and converting capacity of over 19 million tons per annum. Responsible for delivering quality products to meet the growing global demand for tissue, packaging and paper in more than 120 countries across six continents.



IS IT TIME TO

DEFINING PAPERMAKING?

CHALLENGES & IDEAS FOR THE FUTURE

Stop for a moment. Look around you. Take a look at what surrounds you. Pay attention to technology, values people appreciate, our environment, tasks at work and how we execute them, the pulp & paper industry and processes that correspond with paper-making. Now imagine - what will life and papermaking be like in 2050? What technologies will be in use? How will papermaking process, projects and tasks look like? How will we care for our planet? Well, it is a challenge to become a clairvoyant, however if we listen carefully and take a closer look to our so far achievements, the future will be drawn in brighter colors. As a starting point - get ready for the journey to the past.

Back To The Past

In 1990s, our industry was pretty healthy. Significant number of newsprint and writing & printing machines were launched. Tissue industry was warming up. Containerboard sector was stable. The American pulp & paper industry was a true leader in a global scale employing 1.4 million people directly and producing products valued at more than \$200 billion per year. It was ranked among the nation's top 10 manufacturing industries. The industry was characterized by both large high speed mills and many small specialty mills. In 1994, in USA, almost 550 mills were in operation producing 82 million tons of paper and paperboard and 10 million tons of pulp. The entire industry worldwide

back then was 300 million tons. In 1990s, Canada, Scandinavian countries and Japan were perceived as main competitors of USA. Among emerging markets: Chile, Indonesia, Brazil and South Africa were on a radar. China was not discussed deeply. However papermakers fully understood a pressure on performance and competitiveness, as the industry was far the most capital intensive manufacturing industry and at the same time among the most energy intensive.

The industry installed a significant number of newsprint machines (fast and wide). Tissue technology was built based on Crescent Former concept with casted Yankee dryers (by far the most popular) and TAD machines. In containerboard sector shoe press technology started to play an important role. A general trend was: build larger, faster and winder machines. The industry vision for 2020 was strongly connected with sustainable forest management, environmental performance, energy performance, improved capital effectiveness, recycling as well as sensors and controls. It was clear for everybody that product development is essential to the long term success of the industry. Papermakers started to talk more about fibers and their characteristics including genetic technology. Definitely the industry was interested to stay healthy and, at the same time, to make sure paper was used in many sectors.

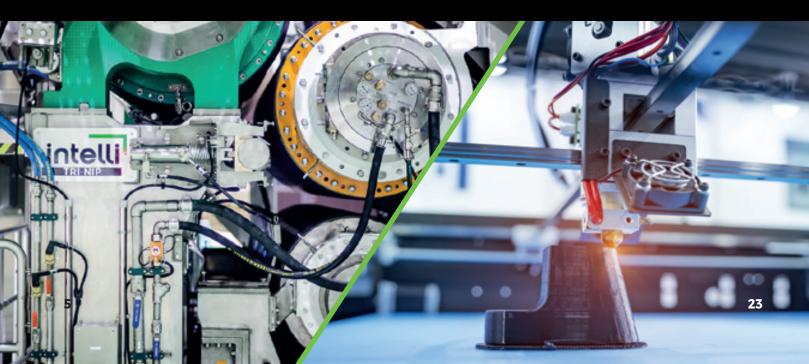
Our World in 2020

What do we experience today? Global warming is a serious problem, carbon dioxide emissions reduction is one of the top priority. The world has shrunk - it is much easier to travel and transport ready products as well as diseases. E-commerce fuels the pulp & paper industry growth all over the world - who would ever predict that Amazon (established in 1994) will become one of the most important creators/drivers of our industry? Especially containerboard and tissue sectors stay healthy. Our industry looks different that in 1990s. There are fewer paper machines and the market is strongly consolidated. The entire industry is over 430 million tons today. Almost all predictions from 1990s are correct. The only thing that is different than expected is a condition of newsprint & white papers sectors that are in serious troubles. The reaction of the industry is standardization, repurposing of existing assets and becoming more open on alternatives.

Since several years, paper and tissue manufactures talk about cost per ton production and how to minimize media consumption maintaining high paper quality. Sophisticated technical demands play minor role. Looks like recently essential solutions and simplicity take the lead. Compared to a previous decade when tissue and paper lines were robust and were designed to run for even 35 years, nowadays a perspective is much shorter and people are ready to accept compromises - meaning cost reductions (different materials, lower execution standards etc.) and a much shorter production time horizon of a particular line - a conclusion is they accept a shorter line lifetime. Attractive ROI factor is crucial - in Asia (China) - 3-4 years, other areas of the world - 5-6 years. This might be astonishing, however these are facts. If investors are ready, they want to apply plug & play scenarios. If we imagine that in 1970s sometimes even 4 years were needed to build a mill, today - as the industry, we have managed to squeeze that timeframe to 1.5 year - from a contact signing to paper at reel. That is impressive. We build mills different way - simplified buildings (basement free), lego bricks philosophy of an erection process, more standard, repeatable solutions and so on. Some investors are agile and go ahead with multiplied orders at once - especially in Asia. We are experiencing that right now with two customers in Asia. A process planning in case of such orders is very different and that is an excellent example how to achieve a synergy effect - to cumulate similar purchases, to safe time on similar activities, to make sure operators can be trained on one machine and run any other installation in a different location. This way we become more effective and can shift our business to the next level.

I personally believe, there are still two important factors: safety and transparency. No matter what, all of us need to check if applied solutions are safe for users and for the process. Machinery providers should give people a choice and stay transparent, to make sure a buyer compares apple to apple and what are the consequences of certain choices (for instance mild steel instead of stainless steel, thinner elements instead of thicker element, lower quality pump instead of top quality pump, etc.). We all are responsible to keep our businesses in a good condition and to grow it.

Imagine that paper and tissue machines that are built today will be still in operation by 2050 or coming to the end of their life. Decisions that we make today will affect the future so we need to take responsibility. For our actions.



DEFINING PAPERMAKING

Unfold the Future - Roadmap 2050

Some interesting ideas regarding the future of our industry were put together by CEPI some years ago. If we take an assumption that people in the future will prefer sustainable bio-based goods to other materials how can we reshape our industry?

First of all, it is important to take the highest possible value from resources we have - wood, virgin and recycled fibers as well as alternative raw materials. To reduce global warming effect, we need to still focus on reduction of CO2 emission. The way to that is to invest in best available technologies and to join forces with other industries.

CEPI also underlines the value of cooperation and interaction especially when new concepts should be tested. So far the pulp & paper industry does not prefer to take too much risk. Papermakers prefer to pick robust solutions - meaning to be on a save side. However we need to realize that without trying new things we will not move forward. The solution suggested by CEPI might be to move step by step to deploy new solutions applying the following model: 10 years to research, 10 years to test, 10 years to build and finally 10 years to run and optimize. Is it sufficient? Everything is faster nowadays so it is very possible we will be forced to rethink that model and squeeze it and become more agile. My observation is that our industry is pretty hermetic. If we dare to become more open, travel more and look at other countries and papermakers, we might find smart solutions more quickly.

Moreover, in 2015, 17 Sustainable Development Goals (SDGs) that were designed to be a blueprint to achieve a better and more sustainable future for the world all were published by United Nations General Assembly and intended to be achieved by the year 2030. At least four of them resonate with our industry: clear water and sanitation, affordable and clean energy, industry, innovation and infrastructure and finally climate action. We should be in line with them to make sure we support ourselves and others.

Understanding that setting a goal without a plan is just a dream, in summer 2019, at our company, we organized creative workshops to figure out how we should change and what to focus on to be ready for 2050 to support our customers. Below are key takeaways we have learned/realized.

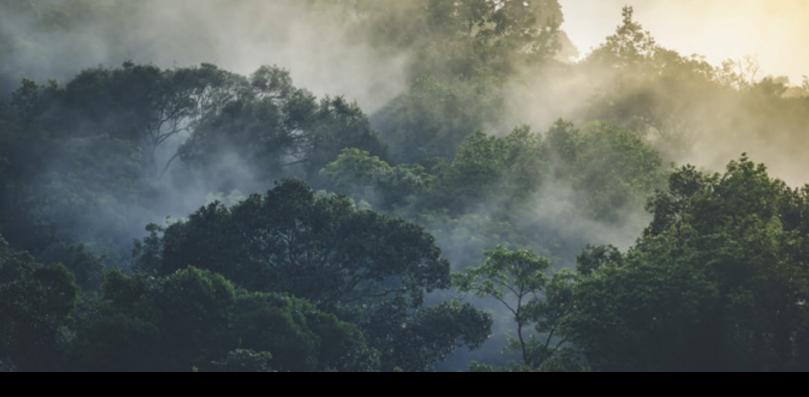
#REdefining papermaking - it is a step by step process. Everything starts with an idea to pick the best available tech solutions, to produce paper without water, to reduce heat demand in a paper machine, to produce paper trouble free and with less personnel needed.

#REinvent yourself - to make our industry a better place, we need to start from ourselves and ask a guestion what can I do to improve my work? Imagine if each of us will improve 1% everyday within next couple of years we will create new solutions, innovations and will make our life easier. We also need to look how to develop others. CEPI indicated 7 recommendations how to overcome challenges regarding future competences of pulp & paper industry workers: promote versatility, up-skilling - life-long learning, facilitate mobility, anticipate skills, create conditions for high-quality mentorships, raise awareness and attractiveness of the sector, provide a one-stop-shop for a coherent skills strategy. So it means we need to be those mentors and become a true example for future papermakers, to show them this industry is a right place to be and stay longer.

#REthink innovation/#REshape technology -

what type of innovations are available today? What are breakthrough technologies? The only way to move forward is to focus efforts on creating new solutions or get inspiration from other market segments. In case of our activity - we have improved shoe press technology for containerboard lines, then we moved to white papers and now based on what we have learned, we are developing ideas for tissue mills. It is important to realize nothing happens immediately. Creation process takes time. Each step clears mind and helps to understand a full picture.

#REcreate nature/#REmember about sustainability - taking care of our nature crucial as the Earth is our home. Saving resources is essential. As a machinery company we asked ourselves a question - what we can do to help? Within recent years, we have significantly slimmed our machines - so less stainless steel is used, we have optimized sizes of keep elements again generating savings on materials applied. Then



we have focused on technology development especially those that help to minimize energy consumption like shoes presses, steel YD and cans, hoods systems etc. To continue works, based on needs, from time to time, we launch working groups to brainstorm about so called obvious things knowing that there is always something to improve.

#REuse energy - zero waste philosophy is a great indicator how we can act. Taking a mill into account, first of all it is wise to use as less energy as possible applying modern solutions, then if there is some energy left reuse it (cogeneration systems etc.). The next step might be what can be a great supplement to our operations? For instance in Australia, AP Maryvale is planning to use warm water from a process to grow fish.

#services REvolution - a lack of competent staff, a pressure of time and finally laziness drive us to the next destination - a smarter service. VR and AR technologies will definitely help us all to communicate more efficiently and help one another without spending countless hours travelling. This way we will also save our environment (no flights). Communication ways defined in science fiction movies like Back to the future or Star Wars might become reality (holograms, plasma screens etc.) very soon. Get ready to explore.

#RElationship values - we are this industry, we can learn from each other, inspire each other and succeed together. Why not to create a central One-Stop-Shop for our industry to draw experience and fix problems faster? One of a great initiative last year driven by WIN (Woman in Industry) and Tappi was 1st Virtual Conference. How about development in a worldwide scale? Why not to create a common program to support pulp & paper industry?

#REnew fibers - there are two sides of a coin - first to use less fibers, then to use alternative fibers. An obvious driver is to produce more lightweight product. We - as a machinery company - focus of continuous optimization of the headbox (layering solutions) as well as a stock prep system configuration. There are more and more opportunities referring to alternative fibers: such as nanofibers and plant based fibers (tomato, coffee, etc.) to create smart blends.

If Not Us, Who? If Not Now, When? - What Is **Needed Next?**

In conclusion, we are entering an era of opportunities. It is the first time that paper is a winner over plastic. Lots of people realized, if we all continue to use plastic the way we used to we will kill our planet and we leave nothing behind us for the next generations.

So, it is time for paper - that does not harm our environment. We need to create ideas to apply paper in alternative applications (car industry, civil industry and many more). There is only one condition: a papermaking process should be optimized, based on best available technologies to utilize essential amount of energy and water.

Some years ago Domtar promoted a nice slogan: I love paper. We may now add one more: #REdiscover paper power.

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PMPoland S.A. PMP NEW **ENGINEERING OFFICE** IN ŁÓDŹ, POLAND, **HAS BEEN LAUNCHED!**

To ensure continuous development of technology, which is a distinguishing feature of PMP products, in October 2019, PMP (Paper Machinery Producer) launched a new engineering office in Łódź, Poland. A new entity is dedicated mainly to support tissue business. Sebastian Grabowski has been nominated as Director of Design and Application Office.

Łódź is a big city, located in central Poland. It is a large, rapidly growing industrial and technological hub, also named as engineering and scientific center of papermaking, as Politechnika Łódzka (University of Technology in Łódź) educates students in papermaking and polygraphy.

The employment target of the new office is 40 engineers - experienced experts as well as young professionals, also from outside of the paper industry. Such a blend ensures a fresh point of view and creates a proper synergy effect so that it will be possible to develop innovative solutions, which will guarantee the competitive advantage both for PMP and customers.

Most activities of the new branch will be focused on technology development in tissue sector of PMP. Moreover, there is a project & application team responsible for technical management and projects leadership, starting from sales support to full execution of process in a broad sense.

"An opening of the new office in Łódź is a significant step in PMP development process that has been going for years. It will strengthen a leadership position of PMP as well as contribute to a perception of PMP as the preferred leading supplier of solutions for the Paper Industry" - Sebastian Grabowski said, Director of the Design and Application Office.





#REDEFINING PAPERMAKING



#REINVENT YOURSELF



#RETHINK INNOVATION



#**RELATIONSHIP** VALUES



#RENEW FIBERS



#RECREATE NATURE



##EUSE ENERGY



#REMEMBER ABOUT
SUSTAINABILITY



#REDISCOVER
PAPER POWER



SERVICES #₹EVOLUTION



#RESHAPE
TECHNOLOGY



#REORGANIZE
PROJECT EXECUTION



EXCELLENT QUALITY #₹€ QUIRED





PMP PLATFORM





Intelli-Sizer® **Size Press**

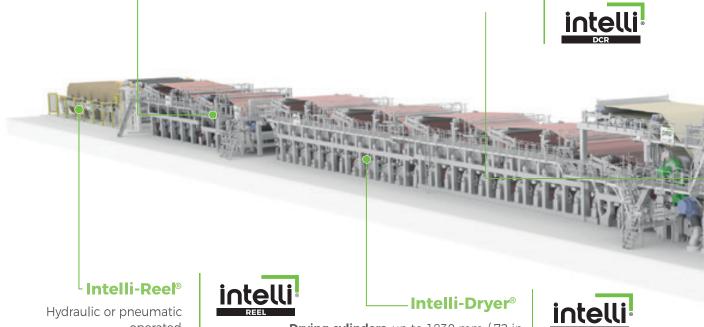
Sizing agent: starch, PVA, pigment **Solids content:** up to 18% (starch) Surface sizing weight: up to 8 gsm total A structure made of high quality materials (carbon fiber, composites)



Press Section

Counter rolls: plain, Intelli-DCR® Nip range: up to 1400 kN/m Dryness after press: up to 53%





operated

Drying cylinders: up to 1830 mm / 72 in Pressure ratings: 10 bar **Drive:** by felt rolls (silent drive)

Steel type cylinders



CONCEPT FOR PAPERMAKERS







Intelli-Former®

 Increase of wire section dewatering capabilities
 More efficient water removal enables shorting the wire table of fourdrinier



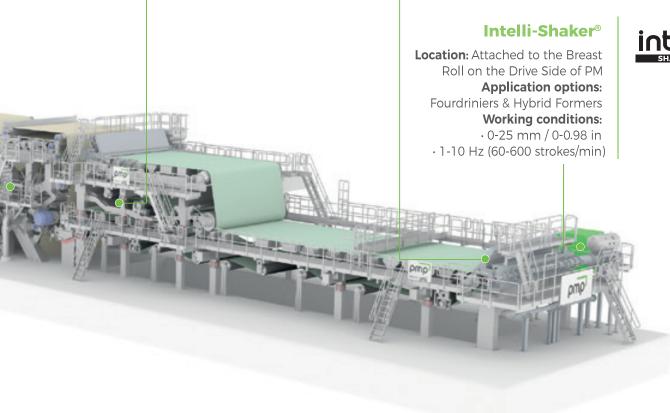
Intelli-Jet V[®] Hydraulic Headbox

Type: hydraulic (with or without CP)

No. of channels: 2-12

No. of layers: single or multilayer









PMP PLATFORM





TM Efficiency higher than

Intelli-Hood®

Gas or steam heated hood to ensure high thermal efficiency and energy savings



Intelli-YD® Steel Yankee Dryer

Steel Yankee Dryer combines high drying efficiency with ultra-low media consumption



Intelli-Reel® & Tail Threading

Provides perfect parent roll structure, user friendly design and automatic operation



CONCEPT FOR TISSUEMAKERS









95 %

Media Consumption

Steam as low as 1.9 T/T Electricity 345 kWh/T average

Intelli-SPR® **Suction Press Roll**

Dia up to 1400 mm / 55.1 in SPR maximize the amount of water removed from the sheet (high dryness up to

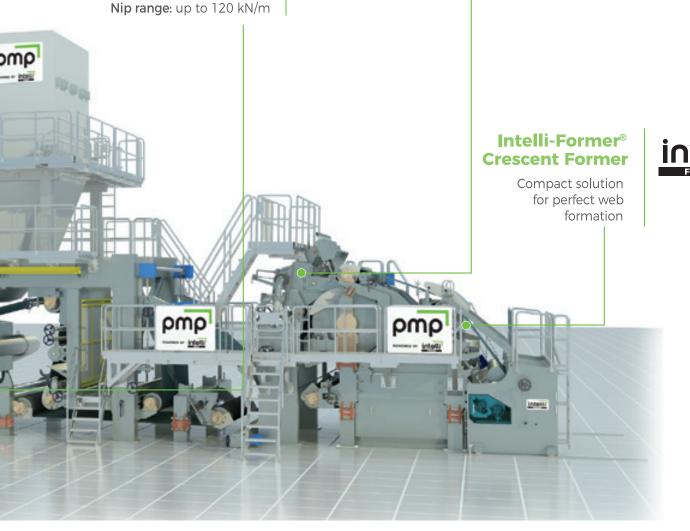
48% after press)



Intelli-Jet V® **Hydraulic Headbox**

Single or multilayer headbox guarantees premium tissue quality







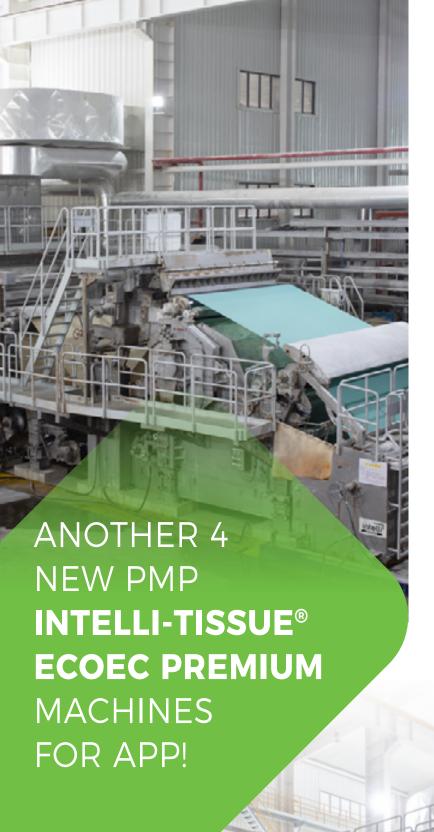
PMP has signed a contract for a delivery of (4) new Intelli-Tissue® 1800 EcoEc Premium machines for APP, this time for Oki mill in Indonesia.

PMP is perceived by APP as a strategic partner in dynamic development and tissue market expansion. A partnership between both companies has become stronger due to a project for (18) Intelli-Tissue® 1600 EcoEc Premium lines for Rudong, China that will bring 620 000 t/a of high quality tissue.

PMP Intelli-Tissue® EcoEc Premium technology corresponds well with a Sustainable Development Strategy of APP and guarantees achieving ultra low media consumption (total energy usage: steam & electricity as low as 1,74 MWh/t), while keeping premium quality of final product. PMP machines ensure efficiency higher than 95% which is in line with APP requirements.

PMP scope of supply for OKI mill include 4 new complete PMP Intelli-Tissue® EcoEc Premium machines with core technological components such as PMP Intelli-Jet V® Hydraulic Headbox, Intelli-Former® Crescent Former, Intelli-Press® and Steel Yankee Dryer with Steam heated Hood. Scope of delivery also includes mechanical drives, steam and condensate system, dust removal system, mist removal system, lubrication system, design, erection, start-up & supervision.

This contract is going to be executed by two PMP Group divisions: PMPoland (Poland) and PM IB (China) to provide Optimum Costs Solutions as well as excellent communication platform.



Tissue sector is performing a continuous growth worldwide, and this trend is about to even strengthen in the coming years. Currently tissue papers are daily necessities of every human being. Taking current trends into account, Latin America and Eastern Europe are the key areas that are ready to grow.

Convertidor de Papel SA DE CV (Convertipap) is a paper producer that decided to follow above trends and to expand its tissue business. Company was established in the year 2000, in Mexico. At the time, it produced kraft paper and just 10 tpd of napkins. Now, the family business has strategically expanded and has two plants located in the Mexican Republic; one in Ixtapaluca, State of Mexico, and the other in the state of Tlaxcala. But it's not over, currently Mexican producer decided about another investment, that will shift its business to the next level.

The company just announced a market expansion that will be possible thanks to the investment in the new tissue machine, that will be added to its already impressive fleet. Convertipap decided to award PMP (Paper Machinery Producer) with an order for a delivery of Intelli-Tissue® Advanced 2100 Tissue Machine.

PMP will supply a new Crescent Former Intelli-Tissue® Advanced 2100 machine with a maximum capacity of 41,000 tpa, reel trim of 2850 mm and the maximum balance speed of 2100 mpm. Machine will produce high quality tissue with the basis weight range of 12.5-40 gsm at the reel.

The new project will be an exciting step in the Mexican's market development. Convertipap presents an aggressive development strategy with a plan to continue its increase of the market share. One of the main goals is to become the preferred tissue supplier in the Mexican region, offering a wide span of premium tissue products.

PM6 will be equipped with state-of-the-art equipment designed and manufactured by PMP, including core technological units, such as hydraulic headbox Intelli-Jet V®, Intelli-Former® CF type, Intelli-Press®, gas heated yankee hood Intelli-Hood®, 15' steel Yankee Dryer Intelli-YD® as well as reel Intelli-Reel® with extended rail storage. Scope of supply will cover also stock preparation system, dust & mist removal systems, recovery steam generator, mechanical & electrical drives, steam & condensate system, vacuum system, lubrication system, TM controls, baseplates, start-up supervision and training services. Delivery and start-up are scheduled for the middle of 2020.

The whole project will definitely open the door to success both for Convertipap, that is continuously developing in the Mexican market, but also for PMP, as their first tissue project in Mexico will be its flag reference in the Latin American market.





12 September 2019, Poland - Paper Machinery Producer (PMP) recently signed a contract for the delivery of two rebuilds for the Press and Dryer Section for Asia Pulp & Paper Sinar Mas' (APP) Pindo Deli Mill in Indonesia. The agreement is the result of an earlier successful cooperation between PMP and APP, signed off in August 2018.

The scope includes the supply of press section rebuild with new Intelli-Nip® Press and Intelli-Nip® Module 1500. This state-of-the-art technology will ensure higher dryness following the press section and will improve the paper quality in the mill.

The scope of supply for both projects also includes design, on site transportation and services. As part of the contract, PMP will also be delivering new core items for the dryer section rebuild.

PMP is a global provider of tissue, paper & board technology and has been supporting the pulp and paper industry for over 160 years, executing projects on 6 continents, in 34 countries. The Company has its headquarters in Jelenia Góra, Poland and has 6 facilities in 4 countries (Poland, USA, China, Italy). PMP is a recognized international player in both the paper & tissue industry. Learn more: www.pmpgroup.com

PMP has signed a contract for a delivery of Intelli-Jet V® Hydraulic Headbox, Intelli-Nip® Shoe Press and Intelli-Sizer® Metering Size Press for Zhejiang Jingxing Paper Joint Stock Co., Ltd. The agreement has been established in April 2019. The items will be implemented on PM10 in Pinghu, Zhejiang, China.

The main goal of the rebuild is by adding the metering size press to increase the strength and paper surface quality, as well as the efficiency to lower the cost. The machine with new PMP key sections will produce kraft-liner board with basis weight of 200-320 gsm, design speed of 550 mpm and sheet width on reel 4950 mm.

The New Intelli-Sizer® Metering Size Press with carbon fiber metering heads will ensure the uniform of starch application and dramatically increase the sheet strength and quality, reduce the sheet breaks for better runnability. The change of configuration for press section by adding new Intelli-Nip® Shoe Press with Intelli-DCR® as second press will maximize the amount of water removed from the sheet and optimize machine efficiency. The Intelli-Jet V® Hydraulic Headbox will replace the current local cushion headbox which helps for better basis weight profile, sheet formation and fiber orientation.

The scope of supply includes design, supply and onsite services. The delivery and start-up is planned in the first quarter of 2020.





On August 2018, PMP has signed a contract for a press part rebuild of PM#2 in Smurfit Kappa Morava Paper, Czech Republic. On September 2019, a new core technological component, PMP Intelli-Nip® Shoe Press has been launched. This last 2 years have been very productive of projects for press part modernization or new press.

PMP Intelli-Nip® Shoe Press technology is a connection of two main advantages - media consumption reduction and paper properties enhancement. This solution is attractive for papermakers all over the world. Yearly, PMP executes many of projects regarding press section for machines which produces more than 3 500 000 tons of paper per year. It is possible to increase production efficiency for even 40%, after PMP components implementation.

The main goals of project for Smurfit Kappa Morava were to increase production through speeding up the machine, improve runnability of press section and increase dryness after press.

After rebuild, the machine produces fluting and testliner in basis weight range of 100-170 g/m2 (main basis weight: 120 g/m2) from 100% waste paper. Maximum operating speed is 600 m/min. Sheet width at press section is 2650 mm and maximum nip pressures are:

- 1st nip 80 kN/m,
- · 2nd nip 120 kN/m,
- 3rd nip 1250 kN/m.

Scope of supply includes also design, manufacturing, pre-assembly, assembly on site and start-up supervision.

Furthermore after start-up, PMP Intelli-Nip® Shoe Press reaches 55.72% of dryness after press (by 1000 kN/m, 150 g/m2).





The Pulp & Paper Industry significantly changed within the last decade due to significant trends that have impacted various areas of the industry. Some sectors, such as tissue and containerboard are pretty stable and prosperous. According to Fisher International, almost 2,500 machines produce newsprint and printing & writing grades, which are in decline. More efficient machines will survive, but there is a large quantity of those machines that are no longer attractive. In addition, the world today is striving to reduce media consumption and become eco-friendly. New technologies are becoming more and more popular among papermakers. They allow mills to reduce not only media consumption, but also reduce production costs and enhance efficiency. The question posed is, what to do with non-profitable machines? Another trend is re-purposing assets that are no longer attractive. Several cases included relocation of a machine. By using state-of-the-art technological solutions such as hydraulic headboxes, shoe presses and film sizers, it is possible to give a machine new life and to be successful.

Global market trends

Pulp & Paper demand is driven by some significant trends. Board & tissue grade demand is healthy due to the growth of e-commerce (boxes used for transportation of goods), fast lifestyles (eating out, ready-to-cook products), continuously increasing number of single-person households (single portion packages), the aging population (higher demand for hygiene and healthcare products), and sustainability. Those trends primarily apply to containerboard and tissue sectors. In containerboard, producers aspire to lower basis weight and maintain product strength. Another important thing is media consumption. A high efficiency culture is a crucial approach. We can also see the decline of newsprint, because of technology and digital media development such as smartphones.

Machine re-profiling/conversion ideas - a blend of core technology items and refurbished parts

The main objective of a Phoenix Concept® rebuild is to combine new key core technology items such as an advanced hydraulic headbox, hi-tech press section and metering size-press with refurbished parts from the existing machine. The project might be based on a relocated machine or it might be a blend of even two or three existing lines with new technology elements. The main target is to significantly lower the investment costs, by up to 40-50%, when compared to installation of a completely new paper machine. The process might include conversion of an existing machine to a different paper grade (for instance newsprint into containerboard/tissue or heavy containerboard grades into lighter applications). The project typically covers: understanding the goals of the rebuild, precise calculations, on site measurements and equipment condition assessments, machine relocation (if applicable), conceptualizing of the new line, scheduling, design and manufacturing of new equipment, refurbishment of existing equipment, pre-assembly (combining new machinery and refurbished parts), all necessary tests, transportation to the mill site, engineering commissioning, technological start-up and post-start up assistance.

Get ready for challenges - machine conversion obstacles

Primarily - technology. A conversion candidate should correspond effectively with the corrugators it will serve. Newsprint machines and printing & writing machines are more attractive to convert if they are already equipped with hydraulic headboxes with a consistency profiling system, shoe press technology and size press technology. Those technologies are essential to build an attractive new containerboard machine. Some investments might be required in the stock prep area. So far, access to recycled fibers is an added value for the process. Pay attention to auxiliary systems as well. It is relatively easy to re-profile a newsprint machine into a fluting/liner. There are basically three areas to pay attention to.

When discussing technology, there are a few areas that should be concentrated on, starting with the wet end. Generally, it will be necessary to add at least one additional layer of paper, making a hydraulic headbox and a top wire unit recommended. This allows the machine to reach the higher grammage range a board machine requires as well as to improve paper properties. It is also required to check the expected dryness after the press as the web is thicker - shoe press technology helps a lot in this case and will allow you to significantly increase the dryness (4-10% more compared to previous technologies) resulting in steam consumption reduction as well as better paper properties (bulk and stiffness). Finally, it might be reasonable to apply a size press (especially for lighter containerboard grades) to improve paper properties. During the re-designing process, it is very important to make the line more energy efficient, more environmentally friendly and easier to operate an maintain. Flexibility, efficiency and adaptation to dynamic market trends become crucial.

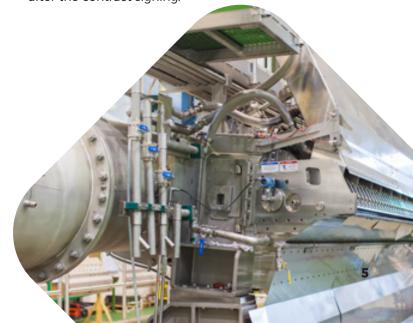
Secondly - logistics. The geographical location itself is crucial. Proper access to raw materials and consumers is required to run a mill in an effective way. Ask yourself the question who will buy my products?

Finally - business profitability. Two stages should be considered - the investment phase itself and then running the new line. Definitely green field investments are much more demanding than brown field. We may avoid a tiring and complicated process of getting permissions to build a mill infrastructure and to build a team to run the business. Therefore, brownfield sites have a big advantage over greenfield sites to go ahead with a conversion. A pre-visibility study is extremely important to make sure the line will meet technical paraments and what investments are required to convert the line. Precise calculations of the business model of a new line is recommended as well.

Machine conversion projects are possible and they can be very successful when they are planned well. It is pretty similar to any capital investment project in our industry. There are more and more examples worldwide of machine conversions including the North America region. Within the last couple of years there have been several conversion projects announced or completed in the USA and Canada.

Massive rebuild in Russia - case study

Today, my intension is to focus on the biggest PM rebuild project PMP has ever delivered. 4 years ago, our customer, one of the leading companies in Russia with great financial outcome, planned to expand its market share and to increase its export within next several years. The best solution to support those ambitious plans was to ensure spectacular results and build a competitive advantage by providing state-of-the-art key core technology items. The company owns 2 paper mills and 3 pulp mills, and invests a lot in equipment modernization and new machines. We started to discuss the project in the spring of 2016, and it was clear that the rebuild would be massive, complex and very demanding. The main goal was to increase the capacity of the existing machine by over 100,000 tpy, as the customer wanted to boost its pulp & kraft liner exports to China by almost 1 mln tonnes, up to 2.4 mln tonnes per year. This rebuild was a big step forward to reach this goal. Moreover, according to global market trends, they wanted to decrease average product grammage and improve sheet strength. Another objective was to improve machine runnability and paper properties. Targets defined were improved formation by ~5%, increase the solids entering the dryer section to 42%, increase the solids from the couch into the press section to a minimum of 21% and maintain a brightness in the range of 16 to 17.5. This was a challenging rebuild that was planned to ensure the additional export of kraft liner for the Asian market. This was all scheduled to start-up 18 months after the contract signing.



Originally, the 250" machine was producing 2 ply kraft liner with a grammage between 115-250 gsm that was produced from 100% unbleached softwood kraft on the top ply and a mix of unbleached softwood (65%) and hardwood (35%). The machine speed was 1,970 fpm and it produced 186,000 tonnes per year. For this rebuild, we have delivered key core technology items, such as a hydraulic headbox and press section. The targets mentioned above would not be achievable without selection of modern technological solutions. PMP's scope of supply covered: a stock approach upgrade, an existing primary headbox rebuild, a new top ply Intelli-Jet V® hydraulic headbox, a fourdrinier and mini fourdrinier, a new press section with a Tandem Intelli-Nip® Press, a dryer section, reel rebuild, new control system, new hood, new exhaust air system, sheet stabilizing system, S&C System, mechanical drives and a lubrication system. PMP was also responsible for a wide scope of engineering services. PMP performed a rebuild machine audit and design engineering as well as erection and start-up supervision.

To accomplish the goals of this massive rebuild, it was necessary to put together couple of smaller sub-projects into the one main project. Some parts and entire sections of the machine needed to be refurbished. New parts needed to be perfectly fit into existing machinery and all equipment had to work together smoothly. Before that, these new components needed to be well designed and manufactured. A demanding designed process was one of the most (if not the most) important points of this machine rebuild. All audits, analyses and measurements needed to be precise and carefully done. More than half of the existing machine needed to be changed. To make sure all of the equipment will be manufactured well, we produced and assembled most of machinery in our facility. Executing such a massive rebuild we had to schedule each part precisely. A large amount of processes had to happen simultaneously and some of them needed to happen sequentially. It is worth mentioning that location was another challenging thing. The paper mill is located in Russia, far from our facility in Poland, where components were manufactured. Moreover, the industrialization level of this area is very low, which when dealing with a complex conversion project like this one, resulted in various inconveniences.

After the rebuild the paper machine produces 2 ply kraft linerboard with a grammage between 90-220 gsm. The furnish on both plies is a mix of unbleached SW and HW. The machine was sped up to 2,953 fpm and produces 295,000 tpy. Our team was responsible for erection and start-up. The first paper at the reel appeared in October 2019. After that both teams needed to work for optimization of machine to reach guarantee levels and reach higher performance. That process required great communication and clear cooperation.

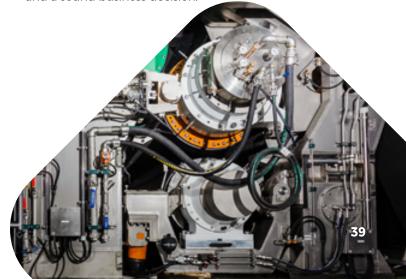
Results - tips for successful machine conversion

Installation of our state-of-the-art components allowed the customer to meet their targets and start their ambitious plans of expanding their Asian market share. Their main goal was to increase capacity by over 100,000 tonnes per year to 295,000 tonnes per year of kraft liner, and now, the mill is meeting production and quality goals.

Let's discuss the requirements for success. First of all, success requires a non-standard approach with a great response to changes during the process. A flexible approach is key - when refurbished equipment is involved, being able to identify and implement required changes from the original plan is essential. The risk can be reduced at the beginning by precise judgement of the available resources. Success also requires very good coordination skills and a high focus on the final goal. This type of project has a wider than typical scope of activity when compared to a new machine project. It requires more effort in process integration including technology, logistics and on time delivery. It is crucial to build a strong team of open-minded individuals. Proper team interaction during the entire project span is essential and needs to drive the process actively forward. Now, we are coming to a fundamental question: how much money can be saved by adopting this approach? The Phoenix Concept approach used above, resulted in significant savings in investment cost, which is a great achievement.

Conclusions

Is a "Phoenix" type machine conversion something that adds value or only a fad that will fade away? Today's business climate forces companies to change the way they spend their dollars and look at assets that were one considered obsolete and find new ways to re-purpose them. The goal of this kind of project is to optimize investment cost allowing you to achieve the best return. Reborn machines are smart solutions, where technology is tailor-made - key elements are new, less important parts - refurbished. Skills, team experience and modern technology make changing the production profile of a machine possible and a sound business decision.



PMP DELIVERED THE FIRST STEEL **YANKEE DRYER** TO POLAND FOR FP KACZORY, POLAND!

In November, 2018, PMP (Paper Machinery Producer) signed a contract for a modernization of a tissue machine that includes a delivery of a new Intelli-YD® steel Yankee dryer to FP Kaczory paper mill located in Poland. It is a great pleasure to announce that PM#2 with new equipment is up & running. The start-up took place in 4th quarter of 2019.

Thanks to an optimized design, PMP Yankee dryer achieves up to 15% higher drying efficiency compared to previous technologies. Intelli-YD® allows to save energy and money and ensures high durability. PMP has 18 working references of steel Yankee dryers all over the world and the project for FP Kaczory is the first reference in Poland.

PM#2 produces tissue with a maximum operating speed of 1500 mpm and paper trim 3150 mm. This steel Yankee dryer diameter is 4500 mm, shell length is 3550 mm and maximum operating pressure of Intelli-YD® reaches 9,5 bar. PMP scope of supply included also spare parts, erection and start-up supervision services.



Arctic Paper Kostrzyn S.A. has been continuously working on modernizing its machine fleet for last several years. The priority is, invariably, an increase of production capacity, an improvement of final products' quality parameters, and implementation of environmentally friendly & energy-saving solutions. Arctic Paper Kostrzyn S.A. for years, has been partnering with PMP applying ambitious technological projects. In addition, both companies support the idea of "good, because it is Polish".

In 2019, PMP successfully rebuilt a press section of PM#1 with a new Intelli-Nip® shoe press included. The solution proposed by PMP improved dryness after press from 43% before rebuilt to 48% after rebuilt. The technology of the shoe press also enhanced properties of paper, and also significantly improved PM efficiency.

PM1, 5300 mm @reel, after rebuild, produces offset paper, with a grammage range from 60 to 100 gsm. The operating speed after rebuilt is 1000 mpm. PMP's scope of delivery included: press section equipped with the Intelli-Nip® shoe module (maximum design pressure 600 kN/m, shoe module diameter 1100 mm); this is the first PMP reference for a module with a smaller diameter. In addition, PMP provided controls, replacement parts, and assembly and commissioning supervision.

As a result of so far a fruitful cooperation, in April 2020, PMP signed another contract with Arctic Paper Kostrzyn team, for a revamp of a press section, this time for another machine. The purpose of the rebuild is to improve the condition of the section framework and to eliminate vibrations.

PM2, 5300 mm @reel and an annual capacity of 160,000 tons, produces single-layer wood-free graphic paper with a grammage range from 60 to 170 gsm. The scope of supply will cover an entire new framework, including press roll swing arms, savealls, platforms, mechanical drives as well as assembly and commissioning supervision service. The framework will be entirely made of stainless steel. The investment is planned for the summer 2021.

PMP SUPPORTS **DYNAMIC DEVELOPMENT** OF ARCTIC PAPER KOSTRZYN S.A.



PMP WILL DELIVER (2) NEW INTELLI-JET V® **HYDRAULIC HEADBOXES** TO SMURFIT KAPPA **UBERABA MILL** IN BRAZIL!

In February 2020, PMP (Paper Machinery Producer) has signed a contract for the delivery of (2) new Intelli-Jet V® Hydraulic Headboxes for Smurfit Kappa's paper machine (PM5) located in the Uberaba mill in Brazil.

Thanks to a long-term relationship and successful cooperation in the past, PMP has reached an agreement with Smurfit Kappa. This new project will ensure a competitive advantage of Uberaba mill in fast growing Brazilian market. Moreover, this is an opportunity for PMP to enter the market and have a great reference in Brazil, first in its history.

PMP Intelli-Jet V® hydraulic headbox allows reaching outstanding performance. It ensures an impressive basis weight profile, superior sheet formation, and great fiber orientation. Over the years, PMP Intelli-Jet V® hydraulic headbox has become an iconic solution in the Pulp & Paper Industry. Currently, there are over 170 PMP's headboxes working successfully on 6 continents.

The main goal of this rebuild is to significantly improve the quality of paper that is produced for the Brazilian market, enhance sheet formation, and reach better control on all speed range and improve cross-machine BW profile.

PMP will supply a new top layer Intelli-Jet V® Hydraulic Headbox, a new bottom layer Intelli-Jet V® Hydraulic Headbox with CP system, both equipped with attenuators, as well as engineering services. Delivery of all equipment and start-up is scheduled for the last quarter of 2020.





PRZEMYSŁAW PIETRZYK

When running a business, sooner or later, we will be put in a position that we ask ourselves, how to present an offer to the customer in a way to make him buy our products. Nowadays, standard approach to be the best is not enough to win a project. Competition is strong, markets are full of various marketing materials, more things are offered for lower price and new advanced technologies are decoy to convince people to purchase.

It is possible to gain knowledge from subject literature, attend specialist trainings or just wing it and believe in self abilities and, sometimes, in good luck. In paper industry any of those things guarantees winning. You can search in vain an answer for a question, how to convince customer, sell a paper machine and make him satisfied for many years.

Each supplier has its own methods. Every customer has its favorites. So how do you make your methods outperform your competitors' methods and your customer has changed a long-term supplier to your company? Moreover, how to cause the world's largest Pulp & Paper corporation buys a complete paper machine from you for the first time?

PMP, a company with over 165 years of tradition, has cooperated with APP for many years. PMP delivered mainly hydraulic headboxes to APP. As a company, PMP had in its portfolio and on the reference list complete tissue machines, but for some reason it could not sell a complete installation for APP. Many offers were presented and many technical and commercial meeting were organized. PMP technically and technologically did not differ from the competition. Prices were more

competitive in most cases and yet - something was missing. APP had long-term suppliers in mind. So we had to displace them with something unusual.

Before the succes that PMP achieved by selling 22 complete tissue machines to the largest Pulp & Paper corporation, which is APP, PMP had to accomplish lots of design work, prove the advantage of its project over the competition projects, reduce production cost, respond faster than competition and at the same time guarantee high-end parameters.

It was this non-standard approach that resulted in the development of a machine that could meet all these requirements. PMP decided not to limit themselves to stereotypes and standards. We listened to customers, asked about their requirements and wishes. We did not reject any of the exorbitant requests, which often seemed impossible at that time. We collected the lowest required parameters of media consumption and all information on the quality of paper that we had to achieve. We have determined the daily production of paper and the ambitious price per machine required by the market. It was all quite simple. However, the next step was much heavier. We had to meet all these requirements so as to create something that every customer could not resist. Our goal was clearly defined. You just needed to find a way to achieve this.

The main components of the machine have changed, which are responsible for paper quality, media consumption and production. PMP performed countless calculations, simulations and analyzes of each important component separately. We consulted with non-paper companies to have the opinions of people who were not related to the

industry, who could bring some freshness into the paper business. Optimization work of the design and execution was also carried out on the basis of our references, which allowed reducing the cost of manufacturing of a complete tissue machine. We focused on improving parameters without raising production costs. It was a difficult task that we met. Optimal costs were achieved, among largely, thanks to the partial production of the machine in the Chinese branch of PMP IB, Changzhou.

In recent years, PMP has provided many references with developed solutions for the Asian market. Working machines have proved that the goals we set for ourselves are achievable. However, we did not finish on these solutions and these parameters. We set further ambitious goals and decided to present it to the APP. We offered not only machines that exceed the technology and parameters of our competitors' installations, but also exceed those of our previous machines. We wanted to break our already high records.

We were organizing a meeting after the meeting. We wanted to be there as often as possible to live in the APP mind permanently. We presented everything we have achieved. We have shown that we have more ideas and that we can provide even better machines. We presented previous achievements and dozens of calculations and simulations that ensured that what we guarantee is achievable. We showed PMP capabilities, our new solutions, we presented our approach to the topic and pointed out our strengths. We organized meetings even when there was no such need. All to show that we care. We wanted to consolidate our message.

During the meetings, we also showed our standards of cooperation, our approach to corporate clients, openness, flexibility and a high level of communication. It was all beginning to bear fruit. APP has begun to invite us more often to its paper mills and financial centers. The conversations were more and more detailed and specific. Again, we listened to the client's needs with an open mind so as to be one step ahead of the competition. We designed the machine that the customer wanted to have, with the parameters that we previously specified. Especially for APP, we have redesigned the press section. Just a few years ago, the machine we offer today would be on the same shelf with things impossible to do. Today, thanks to a non-standard approach, an open mind and well-done design work, PMP has a product that in the automotive world would be an electric car with a range of 1000 km, with sports car performance and all of that at the price of a standard compact car.

Before we signed the contracts for 22 machines, we traveled between China and Indonesia to all branches of our client. In recent years, we've spent lot of energy for convincing APP to our product. We implemented the plan we had outlined earlier. We have achieved our goal thanks to persistence, commitment and passion. Cooperation with such a large paper corporation also gave us a lot of experience and knowledge, which we will use in the future when offering more machines. The ability to provide 22 units also showed us places not yet optimized.

Today, we are thinking about the next improvements to our installations. We set ourselves further ambitious goals. If there is room for another reduction in media consumption, we want to achieve it. We already have more ideas that we will offer with pleasure in future projects for APP and all our current and potential customers.





The market of Russia has been always an attractive and important area for PMP. In the past the company (under the name Fampa) delivered many paper machines into this region. After the company transformation, PMP presented itself again in 2004 by taking part in the Pap -For exhibition in Saint - Petersburg. A year later a strategic decision was made to truly focus PMP activity and efforts on Russia. For this purpose PMP joined forces with an Russian company Unitservice LLC, which became an official representative of PMP Group in Russia.

By today PMP has been rewarded with quite a number of projects in Russia. The major part of them are new sections or rebuilds of paper machinery (i.e. Intelli-Jet V® headboxes, Intelli-Reel®, Intelli-Nip® Shoe Presses and Intelli-Sizer® Presses). Following the trends in the global paper industry Russian papermakers will decide to improve runnability of existing paper machines via modernizations with erection of new sections that allow decreasing media consumption.

It is worth to mention about projects delivered to JSC Ilim Group - PMP executed five projects. The first was dedicated to the delivery of a new Intelli-Reel® for PM#2 (reel width: 4300 mm, operating speed: 800 mpm) which is producing fluting. The next three were dedicated to PM#7, manufacturing offset & printing paper of 6840 mm reel width and operating speed of 700 mpm. PMP Group supplied a new Intelli-Jet V® hydraulic headbox, then performed upgrade of the dryer section and finally, upgrade of the PM wet-end. Recently, at the beginning of 2019, PMP delivered for PM 2 a new Intelli-Jet V[®] hydraulic headbox with CP. The cooperation between our companies keeps on developing and PMP believes that in the nearest future our paths will cross again with new projects.

Recent massive and very important project in the Russian market was delivery for one of the biggest papermaker. You can read more in the article on page 40. PMP has been also coperating with LLC Aleksinskaya Paper Mill (SFT Group) since 2015 in the area of PM#1 rebuild. The first step was delivery in 2015, but the equipment (new wet-end, Intelli-Jet V® hydraulic headbox, Intelli-Nip® Shoe Press, Intelli-Sizer® Pudle Size Press) was stored and finally started-up in 2018 with the new elements delivered for the second stage of the project (MiniFourdrinier, new top Intelli-Jet V[®] hydraulic headbox, modification of Headbox from the first stage, new top wire and modification of the bottom wire, Jumbo Press, Intelli-Shaker®). Moreover, at the beginning of 2020 PMP delivered a new Intelli-Reel for PM #1.

PMP also supported the companies Kuban-Papir LLC, L-Pack LLC, International Paper Svetogorsk, JSC Mayak. Recently cooperation with Consolidated Paper Mills has begun: for Polotnyano-Zavodskaya Paper Factory and Sukhonskiy Board and Paper Mill we will deliver headboxes in 2020.

PMP is also interested in delivering our products for the market of Ukraine.

The first significant milestone for PMP presence in Ukraine was the delivery of the first ever Intelli-Nip® shoe press to PJSC Rubezhanskiy Board and Packaging Mill, Ukraine. The cooperation with PJSC Rubezhanskiy BPM started in 2006 and develops up till now. PMP received an order for a new Intelli-Jet V® headbox with CP system, wire & press rebuild,

new Intelli-Nip® Shoe Press and new Intelli-Reel® for their PM#2 fluting machine with 850 mpm operating speed and reel trim of 2820 mm. In 2007 PMP delivered an Intelli-Reel® for PM#1 fluting machine. In 2008 the scope of supply to PM#3 (producing white top liner papers) included PM relocation with wire, press section and reel modernization. The cooperation with Rubezhansky Mill brings a lot of satisfaction and still goes on.

Apart from this, PMP delivered a headbox and reels for PJSC Kokhavinskaya Paper Factory and a headbox for LLC Zhitomirskiy Board Mill.

Today PMP interests in Ukraine are represented by Vladislav Tishchenko, who helps to promote our products on the market of this country.

To sum up, PMP is ready to support both tissue & papermakers of Russia and Ukraine sharing its knowledge and experience.

The future looks bright

The Pulp and Paper industry in Russia has a long tradition and wide experience. There are many paper machines, however of relatively long operation life. According to FisherSolve data base in Russia and Ukraine there are 43 TMs with average technical age 21 years and 150 PMs with average technical age 27 years. Both Russian and Ukrainian producers face the challenges of today's world - constantly growing media prices (energy, gas/steam, water) and raw materials. It is challenging to achieve lower media consumption with outdated equipment. Luckily, favorable locations of both countries allow good access to resources like wood and pulp. Nevertheless, the entire industry is looking today for smart solutions that allow not only to exist on the market, but first and foremost, step by step development.

Tissue machines average reel trim is 2.5 m and machine speed is on average 900 mpm. In Paper area, the average reel trim is 3.5 m, machine speed is 450 mpm. It is also expected inefficient lines will be replaced. There are three scenarios, in our opinion:

- green field investment / medium-size lines;
- · brown field investment (with the utilization of second-hand lines - relocated plus repurposing of assets);
- · rebuilds of existing assets.

The main focus and opportunities can be found in the field of modernizations of existing machines. PMP exchanges outdated and inefficient sections into new core technological items, like Headboxes, Shoe Presses or Size Presses, to reach higher runnability and capacity or better quality of paper (e.g. bulkness, roughness or dryness after press). Additionally, PMP offers customers Phoenix Concept rebuild - the type of projects adding new value for existing machinery including production profile change, especially popular is conversion of newsprint-making machines into containerboard-making machines. The main idea is to combine key, new technological items like a Hydraulic Headbox, a New Wire, a Press Section or a Reel and refurbished parts from the existing machinery. The project might be based on relocated technological line or might be a blend of two existing lines and new technological units. The main focus is to maintain the balance between good quality of final product and reasonable investment costs. PMP clearly understands that those types of projects required: understanding goals of the rebuild, precise calculation, on-site measurements, scheduling, design of new equipment and manufacturing of new units, pre-assembly at PMP facility, all necessary tests, transportation to the mill site, adjustment, optical alignment and erection at the site, engineering commissioning, technological start-up and post-start-up assistance. For sure PMP feels that those types of projects are expected by both Russian and Ukrainian markets.

Stay in touch

Partnership with PMP Group is an opportunity to lower capital investment costs and operating costs of installation. PMP brand describes high quality and safety of machine for operators and production process. Geographical location of PMP Group allows to respond quickly to any needs, while Russian-speaking project managers ensure precise communication. Moreover PMP sales representative Unitservice LLC supports for years and constantly put efforts into PMP brand be well known on these markets, working with PMP Sales Office in Europe under the leading sales director Mr. Marek Myśliwiec and Vice President Sales - PMP Group Mr. Wojciech Niemczyk.





The Chinese Paper Industry Insight

China, during the last 70 years, i.e. in the period from the founding of the People's Republic of China to the present day, has made one of the greatest economic changes in the history of the modern world. This also applies to the sphere of paper production. In 1949, the total annual paper production was just 0.1 million Mts. In 1978, when Deng Xiaoping began reforms opening China to the world, total production increased to 6.32 million Mt. During this period, the Chinese paper industry also began its very dynamic growth, at that time total paper production global share was less than 4%.

China's economic transformation was characterized by a rapid growth rate and gradual transformation into a market system focusing on integration with the global economy. During the transformation, traditional Chinese industry experienced dramatic changes. Most companies in the paper industry were state-owned and thus operated as part of a government planning system that did not count profit as a measure of success, and some companies could only maintain thanks to government subsidies. The economic transformation required a complete revaluation of the business model and active struggle on the market which consisted of both domestic companies and international producers. Currently, we can see the results of this incredible global route of the Chinese paper industry which production in 2019 amounted to 151.692.991 MTs, that translates into a 26% share in the global paper market. China also has the largest number of paper mills in the world located mainly in the line between Guangzhou and Beijing with machines with an average technological age of 8 years for tissue and 14 for paper.

China As a Strategic Market For PMP

Our company carried out its first orders on the Chinese market as a Beloit branch in the early 1990s. After establishing PMP, it was a natural move to look for new orders in such a promising market. After successful orders for Vinda Paper and Lee & Man, the management of our company in 2007 decided to build a new branch located in Changzhou (Jiangsou province) about 200km from Shanghai. The basis for this decision was a need to offer our customers a production and service centre located as close as possible to Asian markets. PMP IB officially started its activity in 2008 focusing in the first years of activity on the production support for the tissue business. Currently, PMP IB employs more than 100 experienced employees and has its own production facility as well as own engineering and project management department. Annually can make 10-12 complete tissue machines, which are pre-assembled at PMP IB workshop, as well as complete sections of paper machines like reels. An important part of the activity are also on-site services that provide comprehensive technical support for our customers as well as for the operators of machines from other suppliers. In addition to activities related to the paper industry, PMP IB also conducts activities in the field of build-to-print, performing various technological elements for other industrial sectors according to designs provided by customers.

Current PMP Reference Base & New Opportunities Ahead

signpost for the entire economy. The last two plans for the paper industry assume to produce better quality paper and reduce media consumption. PMP's offer perfectly fits these assumptions. For the tissue industry, we have our Intelli-Tissue® EcoEc platform ensuring ultra low energy consumption while maintaining the best quality product. In the paper area, Intelli-Jet V® Headboxes with dilution system and Intelli-Nip® Shoe Press which can be equipped with Intelli-DCR® roll in tri-ex configuration are state-of-the-art solutions helping to build a significant competitive advantage.

Currently, on the Chinese market, PMP has 64 working references made both for medium-sized companies and for the largest market players such as APP, Nine Dragon, Lee & Man, Sun Paper, YFY, and C&S. China is the biggest Tissue producer in the World with very demanding internal market. That's why over the years we have focused especially to support Chinese tissue sector with our proven technology. Our tissue references covers 13 Intelli-Jet V® Headboxes (also double layer) and 23 complete Intelli-Tissue® lines (also green field projects). Presently our customers ordered 21 new Intelli-Tissue® EcoEc lines which will be launched by 2021. This plan also includes 18 Intelli-Tissue® EcoEc machines for APP which has a big expansion plans related to opening of new production site in Rudong city, Jiangsu province.

PMP from the beginning of its activity has focused on long-term relationships and providing equipment thanks to which our customers become market leaders. Our operating philosophy has been valued by repeated orders from customers such as C&S,YFY and APP who are very satisfied with the quality of paper produced on our machines.

Until recently, the prospects of the Chinese paper industry were very optimistic, despite problems with raw material supply caused by the ban for RCP implemented by Chinese government, we have seen a correlated with GDP growth in paper production by 6% CAGR. However, recent coronavirus pandemic situation have posed another challenge to the Chinese market that will probably accelerate the consolidation assumed by the Chinese government (Ta target is to have top 15 players with over 2 million tons capacity annually by the end of 2020).

After production drops in communications papers, an increase is expected in the hygiene sector. The containerboard sector will strongly depend on the moods of consumers who can stimulate it with a faster development of the e-commerce industry due to the forced discovery of it by people in quarantine. In the background, there are also recommendations of the Chinese government that will require the implementation of energy-saving solutions to ensure a very high quality product. PMP offers in this field a whole range of modern solutions for both tissue manufacturers (Intelli-Tissue® EcoEc platform) and paper (Intelli-Jet V® Headboxes Intelli-Nip® Shoe Press, Intelli-Sizer® which can be equipped with spray type application etc.). Our goal is to provide more environment friendly, high-quality and value-added products and respond well of challenges of the new reality.





Before 2000, PMP was a part of an American corporation - Beloit. Polish entity was a Center of Excellence for hydraulic headboxes and tissue machines. Knowledge about the North American market, experiences gathered through the years of executing projects with Beloit, were a great base for PMP to explore this area of the world independently.

The USA market is characterized by advanced technology and strong cost control ability (a low media consumption) that stabilizes its profitability. Chances for the paper & tissue makers in the USA market are e-commerce, eco-trends (paper straw except for plastic), a shelf-ready Packaging (a workload, a printability), a sector of luxury packaging, fast-paced lifestyles, and "to-go" packaging. Also, hygiene and healthcare standards are improving and demand for paper is rising.

An important role in the USA market presence plays PMP Americas - one of PMP's divisions, located in South Beloit, Illinois, United States. The facility manufactures parts for the subcontracting business, especially for the aerospace and the automotive industries. Their modern equipment including 5-Axis machining capabilities, precision grinding, and turning, is a perfect fit for the high tolerance requirements of the aerospace industry. PMP Americas is also the liaison between PMPoland S.A. and the US market, a corporate support in the area of the Paper Industry, and the main branch responsible for manufacturing of Specialty Products.

In the area of the Paper Industry, PMP Americas is responsible for the North American market and supports the implementation of projects in this area. With the US team, the company can provide a better communication (in the native language of local customers) and a rapid response to the needs of buyers in this part of the world. Representatives of the PMP Americas support PMP's Headquarters at every stage of the project - from a signing of the contract through a start-up and an optimization.

PMP Americas is also expanding in the Paper Industry and has designers on staff to provide a local design and a fabrication support for smaller rebuilds. They can offer vast range services of all rolls and headboxes for North American customers.

An advanced technology and a superior quality was a key factor to step in the North American market. The first capital project in the USA under PMP name was executed for Marcal Paper Mills in New York. PMP delivered a new Intelli-Jet V® Hydraulic Headbox that produces tissue (basis weight range 19.5 - 22.8 gsm) with the operation speed of 1900 mpm. A pondside width is 5522 mm. PMP has been supporting blue chip customers including P&G, International Paper, Sonoco, PCA and others providing sophisticated rebuilds.

Currently, there are a couple of large projects for one of the biggest corporations in the Pulp & Paper Industry in the world that are noteworthy. The purpose of all rebuilds are to change the production profile, improve efficiency, and a final product quality, but the main goal is to increase capacity. Another important thing is to stay environmentally friendly. PMP is a good choice due to advanced technology offered that has been recognized worldwide to be high-quality, high-efficient, and ultra-low consumption solutions. A scope of supply includes PMP first Intelli-Nip® Shoe Press in the USA market, and an iconic solution in Pulp & Paper Industry - Intelli-Jet V® Hydraulic headbox.

PMP provides high-quality products and services for the Pulp & Paper Industry and owns 7 facilities in 4 countries, which ensures a wide scope of supply.

- PMP is famous worldwide for production of robust hydraulic headboxes and that is the most significant product offered in the USA market. Intelli-Jet V® hydraulic headbox improves critical paper properties it ensures impressive basis weight profile, superior sheet formation, and great fiber orientation. Highest manufacturing standards guarantees spectacular quality of final product and no headaches for papermakers. So far PMP provided 23 headboxes to USA including 5 over 7500 mm pondside.
- Intelli-Press® press section in various configurations meets requirements of all paper grades. Modernizations in the press section bring paper machine efficiency increase and paper properties improvements (stiffness, tensile strength, burst strength, density, or bulk). With a new press section runnability of the machine is significantly increased.
- PMP's state-of-the-art Intelli-Sizer® size press is design to improve paper properties such as strength aspects, printing abilities, etc. by adding chemical substance to the paper web. It is a new trend observed in USA.

- Intelli-Reel® guarantees precisely repeatable, efficient, and safe winding process.
- Simple felt, spool, and wire rolls as well as the more complex rolls such as suction rolls and cc rolls.
- PMP manufacturing close tolerance machine parts, 5-Axis machining, grinding, and turning (specialize in prototype machining and build-to-print for all industries).

Process Variability Analyses neutralize variation, sheet barring, draw fluctuations, etc.

Nowadays, the USA has the highest per capita consumption of paper (over 215 kg) in the world, and production in the USA takes 20% of the world's production (82 mln tons per year). There are over 300 paper & tissue mills with almost 600 machines working in the USA. It seems like it is a mature and saturated market and there are few opportunities for new expansions, however, in recent years, continuous growth in certain sectors has been observed. New producers have appeared, competition is now intensified and very strong, consolidations take a lead. An advanced technology that ensures high-quality products and high profitability due to low media consumption creates a competitive advantage. The most healthy are containerboard and tissue.





Latin America is an emerging market that is very attractive. In this region import of paper and tissue is high because it is necessary to fill the gap between a low production and a high consumption. Nowadays, Latin America have evolved its economy and improved its standards, what makes it a good place to expand sales of paper products.

Trends in Latin America look similar as those observed worldwide. A growth of e-commerce, fast-paced lifestyles, increasing number of single-person households causes that, in Latin America, in last 5 years a constant growth of containerboard and tissue grades, have occured. On the other hand, a digitalization makes newsprint and printing & writing are the most shrinking sectors. In Latin America, machines average technical age is 26 years. If you look at a production and a consumption of each paper grade on that market, there is 2,000,000 million tons of containerboard and tissue consumed more than produced, so papermakers are planning to increase capacity within next 2 years to fill this gap.

References plays a significant role in reliability and visibility of the company on the market. The Latin American market pays attention to high business profitability (a production cost of a ton of paper) and a final product quality. PMP has so far 6 capital references on that market that are quite interesting.

PMP has been supporting Latin American market development for a while (2017 - PMP's first reference). Thanks to a relationship with Smurfit Kappa built over the years of cooperation on various regions of the world, PMP won the order for SK Los Reyes mill in Mexico and provided a massive project - a delivery of key technological sections for a new PM. The goals were to increase capacity by 100,000 tpy & a machine speed up to 800 mpm as well as a product portfolio widening (fluting/liner). Before the rebuild, 2410 mm machine produced 70,000 tons of fluting and liner (basis weight 130 gsm) annually with an operating speed 550 mpm. PMP delivered technological items to meet customer requirements and improve runnability, i.a. a new Intelli-Jet V® hydraulic headbox, a press rebuild with a new Intelli-TriNip®, a new Intelli-Sizer® size press, a pre-dryer and a dryer section rebuild and a relocated reel rebuild. The PM, after the rebuild, produces 175,000 tons of fluting & liner (basis weight range 100 - 240 gsm) with an operating speed 800 mpm.

Another project executed in 2017, also Smurfit Kappa "Papelsa" in Colombia, was a delivery of a new Intelli-TriNip® Press Section with Intelli-Press® shoe press module and an Intelli-DCR® roll. The purpose of a machine rebuild was to increase capacity and produce 125,000 tpy of testliner & corrugated medium (a basis weight from 90 to 200 gsm) with an operating speed of 700 mpm. A sheet width at reel is 3310 mm. A scope of supply also included auxiliary systems, PM controls, mechanical drives and on site services.

This year, 2020, is very intensive for PMP in terms of Latin America market activities - for both paper and tissue areas. The first project is a new Intelli-Jet V® hydraulic headbox (2815 mm of slice width) for Papeles y Conversiones de Mexico. The project goal is to improve paper properties. PM1 produce 120,000 tons annually (150 gsm, 650 mpm).

15' steel Yankee Dryer Intelli-YD® as well as a new reel Intelli-Reel® with extended rail storage. PMP scope of supply also includes a stock preparation system, dust & mist removal systems, a recovery steam generator, a mechanical & electrical drives, a steam & condensate system, a vacuum system, a lubrication system, TM controls, and baseplates. PMP is responsible for a ide span of services including virtual FAT, a start-up supervision and training services. The machine will produce tissue in basis weight range 12.5 - 40 gsm with maximum operating speed 2000 mpm. A reel trim will be 2850 mm.

Let's move to Brazil. PMP will deliver (2) new Intelli-Jet V® hydraulic headboxes for Smurfit Kappa Uberaba mill. This new project will ensure a competitive advantage of Uberaba mill in a fast growing Brazilian market. PM#5 produces testliner & medium (a basis weight 90-200 gsm) with design speed of 900 mpm. A sheet width at reel reaches 2550 mm. Smurfit Kappa plans to expand capacity of this machine from 59 000 tpy to 92 000 tpy. The main goal of this rebuild is to significantly improve a quality of paper that is produced for Brazilian market, enhance a sheet formation and reach a better control on all speed range and improve cross machine BW profile. PMP will suppy a new top layer Intelli-Jet V® Hydraulic Headbox, a new bottom layer Intelli-Jet V® Hydraulic Headbox with CP system, both equipped with attenuators, as well as engineering services. The delivery of all equipment and start-up is scheduled for summer/autumn of 2020.

PMP offers wide range of products, experience and knowledge gained through over 165 years of activity in Pulp and Paper Industry to both businesses - tissue and paper. In Latin America market PMP's most known solutions are:

- Headbox technology is a part of PMP's Intelli-Tissue® and -Paper® platforms for tissue & papermakers. Over the years, PMP Intelli-Jet V® hydraulic headbox has become an iconic solution in the Pulp & Paper Industry. Currently, there are over 170 PMP's headboxes working successfully on 6 continents - a target goal superior paper properties.
- The Intelli-Press® press section is available in different kind of configuration to meet requirements of all paper grades. All presses configurations can be equipped with Intelli-Nip® Shoe Press or/and Deflection Compensate Roll Intelli-DCR® - a target goal - extra sheet strength and ultra-low media consumption.
- Massive PM rebuild with a target to improve paper properties, increase production output or to change production profile.
- Intelli-Tissue® machines offer capacity from 65 tpd to 270 tpd. Applied technologies (a hydraulic headbox Intelli-Jet V®- single or multi-layer, a Crescent Former Intelli-Former®, a single or double press configuration, equipped with a steel Yankee Dryer 16' - 20' Intelli-YD® and a high temperature hood - steam or gas - Intelli-Hood™ is focused to ensure the best quality of the final product - softness at premium level, an excellent hand feel and an added value, that opens the door to new business areas.





Technology in our hands

Nowadays nobody can imagine everyday life without computers. From the basic calculations to most sophisticated tasks on the production lines technology helps us in everyday life. Computer revolution began in early 1970 and was called Industry 3.0. From that point we started to implement robotic power for tasks which were performed by humans. It was a period of transformation where automation ruled the industrial scene. However, technology was still dependent on human. Programming of Logic Controllers, basic operation scenarios were predefined.

Now from 2010 we witnessed the 4th Industrial Revolu-

tion- Industry 4.0. But what exactly does it mean? It is a very wide combination of Cyberphysical Systems using very large amounts of data (Big Data) that a human would not be able to process or it would take a lot of time. It includes intelligent machines capable of autonomous information exchange, triggering actions, and mutual control. Industry 4.0 is inseparably connected with the concept of Industrial Internet Of Things (IIOT), according to which clearly identifiable objects can indirectly or directly collect, process or exchange data from thousands of sensors operating in real-time and send it via a smart electrical installation or computer network to a local server or cloud server. The most important feature of this interaction is the full automation of processes, where machines and systems perform all activities themselves and learn. Thanks to this, it is possible to develop predictive and optimization models that help the organization anticipate certain irregularities in processes or systems so that actions can be taken well in advance of preventing a problem in the production cycle. This optimization not only helps to optimize production processes but also improves material consumption strategy, planning of supply chain, and product life cycle management. The main benefits of Industry 4.0 implementation are efficiency optimization, cutting down production costs, enhancing work safety and ultimately providing much higher user satisfaction. Continuous devel-

AR, VR - What does it mean?

Under these mysterious abbreviations, there are two intermingle concepts of virtual imaging - Virtual Reality and Augmented Reality. In addition to the image, they can work on all of our senses (touch, smell, sound) which depends only on the equipment we use.

fully take advantage of opportunities offered by Industry 4.0.

opment of technology also gives us access to new tools that are necessary to

The term VR defines all technologies that generate a fully artificial environment. The most commonly used equipment to navigate through virtual models are head-mounted displays (HMDs) and hand controllers for interaction. VR technology can be used based on data obtained in real-time (such as a training simulation showing our employees how to change clothes on an existing machine) as well as detached from reality (like a virtual walk around the 3D project of our paper mill under construction to check the efficiency of transport in communication lines or collision of piping with additional equipment that we want to install). Thanks to the use of Virtual Reality technology during training, greater indicators of knowledge acquisition by employees were obtained compared to methods based on lectures and reading, especially in the case of a new generation of employees more used to using modern video technologies and the VR environment. Manufacturing companies predict that they will lose 2.7 million skilled workers over the next decade because of their retirement, so there's a huge need for implementing AR and VR to keep their factories moving.

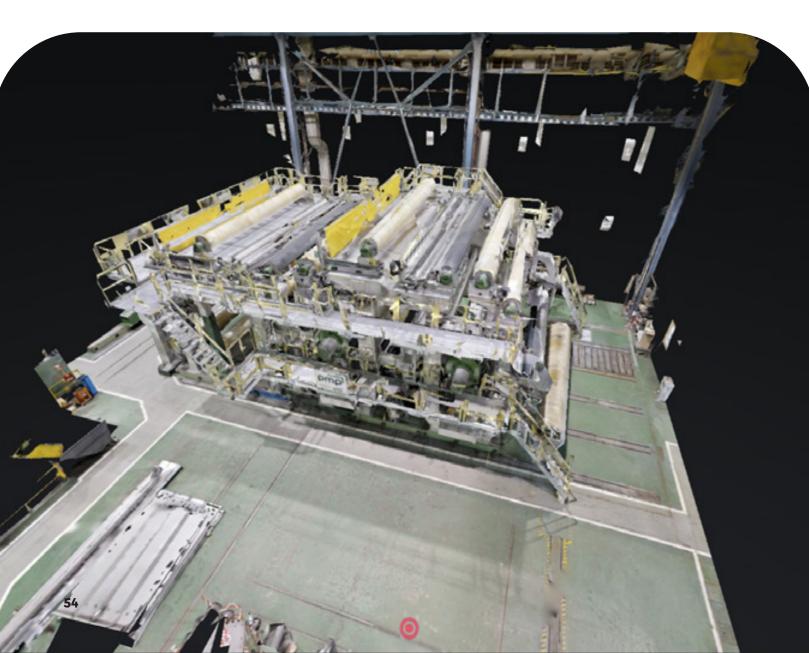
AR or Augmented Reality is a technology that combines the real and virtual world. Visualizations are superimposed on the real image. Unlike VR, it is completely embedded in the real world. Some sources still distinguish MR (Mixed Reality), but the relationship between AR and MR is big enough to group them in one AR family. AR can be displayed on various devices: screens, glasses, handheld devices, mobile phones, head-mounted displays and uses position, distance, and mapping sensors to determine position.

There are several types of AR embedding in reality.

- 1. Marker-based AR requires a special visual object and a device to scan it.
- 2. Markerless AR location-based or position-based (GPS, a compass, a gyroscope, etc.) to provide data based on the user's location

- 3. Projection-based AR Projecting synthetic light to physical surfaces
- 4. Superimposition-based AR Superimposes a deepened matched image based on object or space recog-

AR technology also brings many benefits, thanks to its use we can: shorten the time of complex assembly because each subsequent step is displayed to the employee in real-time, maintenance departments use AR technology to analyze the technical condition of machines (also based on sensors) and predict potential failures, people with basic technical skills can be remotely led by service technicians to solve any problems on the machine in real-time. Currently, at PMP, we are in the testing phase of AR and VR technologies to give our customers even better support in the operation and service of our products.



3D Scanning

A 3D Scanner is a tool that gives a very high potential during the design process as well as an important element in the implementation of AR and VR technology. Scanner operation is based on the transformation of existing space into a digital model. Most devices currently use infrared or laser for this purpose. As a result of scanning, we get a point cloud, which is transformed into a three-dimensional model, which we can later be imported, into design programs and virtual 360' photo view like Google Street View. 3D scanning is a technology that significantly speeds up the work of engineers. If we want to modify an existing element for which we donot have documentation, we can do it with a scanner and then place it in the CAD software to see how the element will work after redesigning. 3D

scanners are used in industrial design, engineering, and production, due to their ability to quickly and accurately record the required data. Thanks to 3D scanners, we do not have to make measurements and inventory using outdated manual methods, which can be too expensive and time-consuming.

We can make a 3D model and on the same day send it to the other end of the world to check whether e.g. a section of the machine that we want to mount does not generate conflicts with the existing infrastructure. 3D scanners help to avoid costly errors and significantly increase design efficiency. In PMP we have large experience with 3D scanning. If you are interested in what benefits it can bring during the implementation of your project, please contact our Sales Engineers.

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Virtual FAT

One of the distinguishing features of PMP is conducting the Factory Acceptance Test at our workshop. This gives us the opportunity to thoroughly check the equipment by our specialists and by the customers to be sure of delivering a perfectly fitted product to the mill. However, the current situation related to the COVID 19 threat caused mobility problems and limited our customers' ability to inspect their machines. To meet this extraordinary situation we have offered Virtual FAT. The concept of this solution is based on live broadcasts (in Full HD quality) of FAT carried out by our engineers. Two-way communication is guaranteed at all times and several cameras allow us to show all machine parts in the smallest details. The broadcast can be recorded and later used for further discussion. Thanks to this solution, our customers can save time and money that would take a trip to our plant. And in the special situation of limited mobility, it is the best alternative to complete the project without delay. Virtual FAT can also be complemented with a 3D scan of the equipment at our workshop, which we are able to realize and send within 2 days to any place in the world at the latest.



##EDEFINING PAPERMAKING



