Holmen Braviken in Sweden is very satisfied with its new 780 ADMT/D TMP line. Compared to the mill’s prior TMP process, energy consumption has been reduced by some 400 kWh/ton. Both tensile strength and light scattering properties have been greatly improved as well, enabling superior print quality.

“We reached well our main goal - saving energy. We also estimate that the payback period will be shorter than expected,” states the line’s production manager, Mr. Lennart Nilsson.

www.metso.com/pulpandpaper
How a dream came true

The new Setúbal PM 4 is the largest and most sophisticated paper machine in the world for the production of uncoated fine papers. The 11.1 m-wide (wire) PM 4 will produce close to 500,000 t/y. This is equivalent to 1,900 t of paper per day or 80 t an hour. In terms of speed, the new paper machine will be able to process 1,800 m/min, corresponding to 30 m/s of paper. It forms the heart of the largest office paper plant in Europe.

The entire Setúbal project has been developed around this massive machine, designed to produce paper with excellent properties in terms of smoothness, printability and runnability. Once running at full capacity, the paper machine will use the pulp produced at the existing pulp mill. A lot of completely new features have been incorporated, preceded by extensive trials in close collaboration with suppliers. Assembly work on the machine started in Setúbal on January 19th this year, and just the equipment contracted from Metso had a weight of 4,000 t. The piping alone represents 700 t, not to mention around two hundred pumps and more than 00 km of cabling.

In other words, this was a huge and ambitious – and arduous – project! The question is, how was it possible that a Portuguese group has achieved this with the precision of a Swiss watch, German punctuality and an adherence to the budget that every nation, especially in times like these, would be proud to claim as one of its characteristic traits?

The answer is simple: Portucel Soporcel has just picked the best of everything. And it has once again proven that patience is a virtue. The idea of building a new paper machine has been talked about in the company for a long time. However, it was only when Semapa, a Portuguese industrial conglomerate, acquired a majority stake in the capital of Portucel Soporcel in 2004, that this brainchild became reality – indeed not before the financial framework was diligently tied.

And it was Pedro Queiroz Pereira, who, together with his sister owns more than half of the assets of Semapa, pulled the strings. His grandfather, Manuel Santos Mendonça, started the production of sulphate-bleached eucalyptus pulp and his father was the biggest individual shareholder of both Companhia Portuguesa de Celulose and Socel, two companies that were merged to form Portucel in 1976. Pedro Queiroz Pereira is a very modest person and does not want to over-emphasise his role in this context, but in fact he knows that in order to run a business successfully you have to make people dream. And growth is the only way to make dreams come true. That’s why he explicitly underlines that the Group is committed to growth.

Therefore, I am almost certain that we will hear again from this company in the not so distant future. When the next dream comes true…
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Portucel Soporcel production sites (pulp and paper) are ISO 9001, ISO 14001, OHSAS 18001 and chain-of-custody certified (FSC and PEFC).
Official opening in presence of Portuguese President

On 6th of November, the President of Portugal, Aníbal Cavaco Silva, presided over the official opening of the Portucel Soporcel group’s new paper mill in Setúbal. The completion of this investment project closes what is regarded as the last window of opportunity for investment in this sector within the European Union.

At the end of the ceremony, President Cavaco Silva awarded the medal of the Order of Industrial Merit to Pedro Queiroz Pereira, Chairman of the Board of Directors of the Portucel Soporcel group, and declared that “Portucel is an example and it is examples like this which should be held up to help the Portuguese nation find its course for the future and to build up its self-confidence. In terms of Portugal’s interest, what is really important is the contribution this mill will make to increasing the productivity and competitiveness of our economy internationally.”

The President was welcomed by Pedro Queiroz Pereira and by José Honório, the CEO of the Portucel Soporcel group, at an event attended by hundreds of guests drawn from government bodies, public authorities, clients, suppliers and the workforce. Pointing out that “we are looking at one of the largest investment projects ever undertaken in Portugal” and that “it offers an example for modern industry”, Pedro Queiroz Pereira declared that “there are solutions for nearly all the problems (facing Portugal), so let us show the determination needed to put them into practice”.

During the ceremony, the paper machine, the core element of the new mill, was blessed by the Bishop of Setúbal, Canavarro Reis.

Production tests on the machine started on 15 August and operation at full capacity is planned to be achieved in 2011. The machine has demonstrated excellent production capacity and production speed, in the first 45 days after the start of production tests, has already reached 75% of the design maximum.

The Portucel Soporcel group has recorded extremely positive performance, managing to operate a full capacity and to increase its paper sales, up by 8.1% during the first nine months of the year. At the same time, the Group has successfully controlled its costs, which have evolved very favourably over the year. The Group is therefore extremely confident of rising to the challenge of its new paper mill in Setúbal.

Visiting the new paper mill: José Honório, CEO, Pedro Queiroz Pereira, Chairman, Aníbal Cavaco Silva, President of Portugal and Carlos Brás, the paper mill manager (from left)

Guests assembled before the ceremony

Pedro Queiroz Pereira during his speech
Pedro Queiroz Pereira is the chairman of the board of directors of Semapa, the group that bought Portucel in 2004. His family owns more than half of the assets of Semapa and Portucel Soporcel, and he was the one to push the red button for the start-up of the paper machine at 4.30 pm on 15th of August.

pew: Was the installation of a new paper-making line already in your mind, when Semapa acquired Portucel five years ago?

Pereira: I was aware that this was probably the next step but we took our time to validate the project. We also needed some time to create the necessary financial conditions to make such an investment.

pew: So you were more or less ready to invest 500 million Euro in that project?

Pereira: My role is very simple and very complicated because I’m the one who chooses the people and I am the one who has to motivate these people. This is easy and complicated at the same time.

pew: It’s an art to make difficult things look easy…

Pereira: …and to have things done through other people.

pew: Your family has a long history in this industry; your grandfather Manuel Santos Mendonça started the production of sulphate bleached eucalyptus pulp – the plant in Cacia, a mill that nowadays belongs to your Group, was inaugurated in 1953.

Pereira: I attended that inauguration when I was a child – just four years old. I still have vague images of three steps that were at the entrance of the building in my mind. When I visited the plant again, 50 years later, I recognised these stairs. However, emotions shouldn’t play a role in investment decisions.

pew: Your father was the biggest individual shareholder of Companhia Portuguesa de Celulose and Socel, two companies that were merged to form Portucel in 1976. However, he was dispossessed after the revolution in 1974. So the family tradition in pulp and paper is obvious. It is interesting to see that two of the current major paper projects in Europe, the mill in Setúbal and the new paper mill of the Palm Group in King’s Lynn, UK, are done by companies with a family tradition in the background. Are they doing better these days?

Pereira: Obviously, companies that are family controlled and capital companies or publicly owned firms have different characteristics and both have strengths and weaknesses. But in the last two years we have seen some corporations having their own problems, and some family controlled companies making their way a little bit more easily. That’s a fact. But I think this is just a coincidence, not really a question of being better run or better managed. Besides, family owned companies are all different – there are big families and there are small families like mine.

For instance, the Espírito Santo Bank in Portugal belongs to a family with more than 300 members and mine just has two, me and my sister. It depends on so many things. I wouldn’t say it’s an advantage to be a family owned company. There is only one main difference: People are generally more motivated when they know who is boss or which family is at the helm than when they don’t know whom they are working for.

pew: The President of the Republic and the Minister of Economy, Innovation and Development attended the official inauguration. What does this day mean for you?

Pereira: For me, at my age, this is certainly very, very important. This is a very, very important milestone in my career as an entrepreneur.

pew: It looks as if the world’s economy has passed the darkest moment. This means that your timing, to reach full capacity in 2011, is just right.

Pereira: We think we will be in a very good position when the markets recover. And we think we will have an increased net profit, which will probably give us the possibility to grow in the future outside of Portugal.

pew: So I understand that right – it would be possible in the future to grow in pulp and paper outside Portugal?

Pereira: Yes. We are looking into some investment opportunities in Brazil, Uruguay and Mozambique but we are still studying. However, we are committed to growth, and so that’s part of our job every day.
José Honório, CEO Portucel Soporcel

“We did two remarkable things: stick to the budget and stick to the timescale!”

_ipw:_ You had the first test runs after 15th August. This was the date you decided to aim for on 19th October 2007, more than two years ago. However, the installation of a new paper production line is an enormous task with a lot of unpredictable events, and it seems like a miracle that you have been able to be on time like a Swiss clock.

_José Honório:_ Yes, and we are very proud of that! I would say for a German it is quite natural but for Portuguese people it is quite a challenge. We decided at that time that we should be Germans: stick to the programme. And we were able to do two remarkable things: stick to the budget, and stick to the timing.

_ipw:_ How did you achieve that?

_José Honório:_ We have very competent people in the Portucel Soporcel group and we set up a project team that was responsible for carrying out this project. The project was discussed on a weekly basis between all the teams and the Executive Committee. We also installed webcams on the site; that means each one of us could simply open the laptop and see how things were progressing in the field. And very important was the full commitment of the entire group that this project should be a successful one, and that we had to stick to time and to budget, because the public assumed so. And so it was a question of delivering what we have promised to everybody.

_ipw:_ Sounds like: Yes, we can! _Honório:_ Yes, we can, and yes, we did! Because a lot of people can but don’t.

_ipw:_ In fact, nowadays a project of such a size is rare in Europe.

_José Honório:_ Indeed, several European countries tried to convince us, through their ambassadors, to set up this new project in other locations than Portugal, because it is a very important project in the sense that the level of employment is important. Then it is a project that will increase exports, and so produce tradeable goods. And this is extremely important; it is even more important today than it was two years ago. But even two years ago, a project that sells tradeable goods is a project that can live on a global market, because it competes with everybody around the world.

Of course the Portuguese government also tried to keep this investment in Portugal; the Portuguese government has one advantage in the sense that we are a Portuguese group. So we had a very professional discussion with the Portuguese government; and, taking everything into account, we decided to go for the investment in a new paper mill, and also to go in the sense that the paper mill should be installed here in Setúbal, where we would also benefit from the synergies of integrating an existing pulp capacity production into paper.

_ipw:_ Were you tempted to move to another country?

_José Honório:_ Yes.

_ipw:_ Which European countries were you talking about?

_José Honório:_ I don’t want to name the countries, because the three European governments that talked to us were extremely professional, independent in the sense that they never tried to say they were better than their neighbour or another country. But they did their utmost to show what they could bring to the table.

_ipw:_ By 2006, you were ready to go ahead with this project. Why was it postponed?

_José Honório:_ We had two situations in 2006 that we did not expect. One was that three European governments together with Portugal tried to attract our investment and this prolonged the negotiation process. Then we chose Portugal and our government had to submit our project to the European Commission for approval. And the European Commission took an unexpected length of time to come to a final decision. This was the most important issue. The second was some increase in delivery times by equipment manufacturers.

_ipw:_ How closely did you follow the progress on the construction site?

_José Honório:_ Very closely: I had a look every-day.

_ipw:_ I imagine that this is a very important achievement.

_José Honório:_ Of course it is. Especially as we are located in a small country on the western edge of Europe and don’t have, compared to others, a long tradition in this industry: Former Papéis Inapa plant started producing paper in 1969 and Soporcel in 1991 and we are focused on uncoated wood-free. I think we are the only major European producer focused on just one segment.

_ipw:_ Maybe that’s the secret of your success.

_José Honório:_ I don’t know if it is a secret. What I know is that we are extremely focused and very concentrated on our business case, and we intend to keep
Honório: new project.

Customers at a very early stage in that project.

We have been able to develop all the remaining pulp that we produce here in Setúbal.

ipw: When will you reach full capacity?
Honório: I’m not going to tell you that because every engineer will tell you that the learning curve of every machine is a different one. What I can tell you is that in 2011, if everything goes according to what is scheduled, we will be producing the total output of 500,000 tonnes.

ipw: You plan to export the output of the new paper machine outside Europe?
Honório: Our intention is to sell the tonnage of the new paper mill without affecting the existing business we have in the other paper mills. That’s why, during this phase of the start-up, we put the system in island avoiding paper machine downtime.

ipw: When you started production, you had orders for seven weeks. So there are already contracts signed and there will be more contracts.
Honório: You know, since the beginning, all our paper mills have produced at 100% of their capacity. Our business model is, in my view, unique and different from others, because it is fundamentally based on premium products and mill brands, because we have shown a very strong commitment towards the sector and because we are investing. Moreover, we have a strong brand reputation at end users, high quality standards and we are constantly promoting our mill brands. This way, we have been able to develop very good long-term relationships with our customers.

ipw: You certainly have involved your customers at a very early stage in that new project.
Honório: We have involved our customers from the moment that we decided to develop this project. We also discussed with them some ideas about the project.

I think that some didn’t believe that we would put up a new paper mill, and we got very funny comments. I can remember that once I received a phone call from someone from the industry saying to me, “You are very brave”. I’m not so sure if the intention was that maybe we were doing our job or if we were completely out of our minds doing this project. But I took it as a compliment.

ipw: Were you hit by the financial crisis that just occurred in the hot phase of the project?
Honório: We were very lucky. In 2005, we refinanced all the existing debt the Group had at that time. When we decided to commit ourselves to this project we decided that we absolutely must have a very sound financial balance sheet and since then we have not had any additional financial requirements. But this crisis has an impact on market conditions, as according to the most recent data, uncoated wood-free market consumption decreased by around 15% in Europe and the same amount in the United States, and of course it is not the best thing to launch a new paper mill with a capacity of 500,000 tonnes. What we feel is that our business model has proven so far to be very resilient, because we continue to have an impressive part of our sales of premium products and mill brands.

ipw: You also installed a new CHP (Combined Heat Power) plant. Was the new plant started up parallel to the paper machine?
Honório: CHP production started just before the production started in the new paper mill, so everything is in tandem. In order to minimise risks we connected the new paper mill to the pulp mill, and this was very effective during the start-up of both installations.

The technical concept we have behind the CHP gives us the highest efficiency of the paper mill reducing eventual downtime caused by steam or energy failures. For steam, the concept contemplates the installation of two similar groups of the same capacity, and the back-up from the existing pulp mill. For energy, the CHP delivery is made in the same substation of our property, where the paper machine is connected, and from there to the grid. Any disturbance imported from the grid will automatically put the system in island avoiding paper machine downtime, which by the way, has already occurred twice.

ipw: But this independence from the grid won’t be the only advantage from the CHP...
Honório: The main reason to install this power plant was to get security and independence and to hedge against any distortion in energy prices: It is again a decision of decreasing the volatility of the risk. When we look into the consumption of natural gas in Portugal, we are an important consumer. Owning the CHP gives us another opportunity of having a direct relationship with the countries that are natural gas suppliers for Europe and so we have a broader base of relationships in what concerns the gas supply.

ipw: However, this plant is only part of a broader energy concept within the Group.
Honório: We have what we call the energy basket that is being implemented at the three sites we have in Portugal, composed of the new CHP here in Setúbal together with the two new biomass power plants under construction at Setúbal and Cacia sites and the new steam turbine for the existing biomass cogeneration CHP at Figueira da Foz site where we also have, associated with others, a CHP plant with natural gas. Moreover, we have a biomass cogeneration CHP already in place in Setúbal and Cacia, associated with the pulp mills, and the cogeneration with the fossil fuel associated with the older, existing paper mill in Setúbal. Once these energy basket projects are concluded, we will have a production of electricity that will correspond almost to 5% of all the electricity that is produced in Portugal.

ipw: When will that be concluded?
Honório: By the end of next year all the projects will be finalised.

ipw: What are you going to do then?
Honório: We are concentrating on the next development step for this Group.

ipw: Thank you for the interview!
“Specialization and total quality are the bases of our success”

The GROUP has built its plant on an industrial estate covering 120,000 m² (1,291,672 square feet): 2,000 m² (21,526 square feet) of offices, 12,000 m² (129,156 square feet) of warehouse and a further 28,000 m² (301,389 square feet) now being built. In addition to that the GROUP has branch warehouses in 22 different key industrial cities in Spain for a total of an additional 40,000 m².

Since we are well aware of the high standards of quality now demanded, the CUÑADO GROUP has constantly endeavoured to maintain the most stringent quality assurance organization. For this purpose it has a team of professionals, independent of the commercial organization, who are concerned exclusively with quality. The work of these technicians consists in approving suppliers, checking manufacture, reception and storing of materials, verification of certificates and testing and control of supplies to customers. The GROUP also holds the ISO 9001 Certificate.

At the Group’s modern offices, a young and active commercial team employed full-time, supplies a fast and efficient service, combining long experience with the support of the most modern data-processing equipment to ensure effective stock control, expediting of orders and administration.

Each of the companies in the GROUP is specialized in a different product, in order to have much deeper and more thorough knowledge of the market and may thus be better prepared to collaborate with their customers.
A complex puzzle to work as an integrated system

The opening of the new paper mill at the Setúbal industrial complex represents a landmark in the history of the Portucel Soporcel group. The heart of the project, the world’s largest and most sophisticated paper machine for the production of Uncoated Woodfree (UWF) paper, was started up by the Chairman of the Group, Pedro Queiroz Pereira, on the afternoon of August 15th, and the official opening has just been celebrated in the presence of the Portuguese President and the Minister of Economy, Innovation and Development and a large number of the company’s customers.

Once an annual capacity of 500,000 t/y has been reached, the Group’s annual paper output will have risen to 1.55 million t, confirming its position as the European leader in the production of office paper and boosting its already strong position on the North American market.

A cogeneration plant is also connected to this project. It produces annually around 580 GWh and is the biggest natural gas-cogeneration plant in the country. The new paper machine needs 110 t of low pressure steam and six t of medium pressure steam per hour. The design for the new cogeneration plant has in practice meant building a “plant within a plant”. In order to ensure the reliability of the production process, it was decided that all the main equipment would be duplicated. As a result, this cogeneration plant (80 MW) has two sets of equipment: two natural gas turbines, two boilers and two chimneys.

This megaproject has been in study and development since 2002 and marks a new world record for an industrial unit of these dimensions, bearing in mind the timeline for its completion and the contracts involving almost 80 suppliers, both national and international, including main equipment, civil construction, assembly and engineering. This is also the largest pile work project ever undertaken in Portugal. Each section of this colossal construction has been designed as a piece in a complex puzzle to function as an integrated system.

Great care was taken from the earliest stages to ensure that the project stayed within budget. Investment in the new paper mill has totalled EUR 550 million, with an additional budget of EUR 75 million for the cogeneration plant. Tests on the processing sections started on July 1st, using paper reels from the existing Setúbal mill working at full capacity. In the run-up to the preliminary start-up, commissioning tests were conducted in April, May and June for a huge array of equipment, including the principal components of the paper machine and complementary equipment, the distributed control system, compressors, chillers, cold water systems, water treatment, transformers and electrical switchboards, as well as connections to the EDP power grid for operation of the plant. The co-generation plant, with the first firing set in late June, was ready to provide steam for the scheduled start-up of the paper machine.

The start-up of this industrial unit was viewed with considerable excitement in the international markets. The new paper machine (design drive speed 1,800 m/min) has certain very special features and is different from any other machine in the Group, starting with the machine width (10.4 m) and certain features of the equipment which are entirely innovative. Construction of the new mill has...
not had any very significant impact on the Group’s other mills, which have been working non-stop with an above-average order book. From the beginning, the orders for paper from the new mill have been assured for almost two months. Straight to the company’s strategy: “To produce what we sell and not to sell what we produce”.

The Setúbal complex already contained a PCC plant, with a capacity of 50,000 t/y, which has now been expanded to 170,000 t/y: CO$_2$ is supplied to the new plant through a piperack, 600 m long and 1.20 m in diameter. The PCC plant has five new reactors and in addition to using lime as raw material, the system for feeding PCC to the new plant also uses carbon dioxide from the lime kilns (fossil) and from the recovery and biomass boiler. Thereby, it is helping to reduce the overall CO$_2$ emissions of the whole production site in Setúbal. A paper machine of this size and with these characteristics also requires an integral water circuit. According to Portucel Soporcel, it is almost a closed circuit.

One of the major innovations in the new paper mill lies in the design of the robot operated stores for reels and pallets, functioning in direct interconnection with the despatch section. This solution has drastically reduced the need for the large areas required in conventional storage. The automated reel store has a capacity for around 18,540 t of paper and can store a total of 6,270 reels, divided into office, offset and customer reels. The store is equipped to receive/deliver 186/164 reels per h, thanks to the concept of horizontal storage in frames adjusted to the different diameters in use and the possibility of grouping several reels together for transport in each of the two transelevators which lift and convey the paper reels for transport and storage. This store has an important function: it allows the paper machine to produce different paper types non-stop, irrespective of cutting capacity in the processing or despatch sections for the quantities manufactured. In addition to the technical specifications, the criterion established for this store was to be able to absorb ten days’ average output from the new machine (one complete manufacturing cycle) and around twelve days’ output of printing formats from the existing paper mill.

The storage facility is extraordinarily vast: 28.4 m high, 93.2 m long and 42.3 m wide. It is free-standing, with the actual storage racks supporting the exterior building. Operating downstream from processing, the pallet store is also free-standing; with a height of 28.4 m, a length of 122 m and width of 47.1 m, it caters for approximately 31,900 pallets, corresponding to a capacity of 16,600 t. This store is designed for an anticipated inflow of 215 pallets per h, conveyed by nine transelevators which will place them in the different racks, and an outflow of 320 pallets and per h, assuring fast transport of pallets from the store to the despatch area. Pallets are delivered to a point approximately 15 m from the loading platform, allowing for up to eight trucks to be loaded simultaneously when working at full capacity.

The main pieces of equipment in the converting area are three small-format cutting machines with an annual capacity of 360,000 t and three printing formats (folio) cutting machines (200,000 t/y). All cutting machines are supplied by AGVs (automatically guided vehicles), using laser guidance systems. The system is coordinated by the PPMS (production planning management system), through communication interfaces created in each piece of equipment.

The new paper mill also allows the Group to achieve a strategic goal: incorporation in paper of all the pulp produced at the Setúbal site. Previously, two thirds of total pulp output was sold on the market (510,000 t). Now, a large piperack measuring 650 m transports the pulp to the new papermaking line. The treatment of pulps and additives is one of the most critical aspects in the operation of the new mill, due to the ground-breaking characteristics of the paper machine. Higher standards had to be met in the preparation of pulp and...
additives. Moreover, 17 different types of chemical additives are used. Therefore, attention centred on testing the refiners and respective pilot tests started in 2008. In all, the new mill has ten refiners. Moreover, in order to obtain a high quality standard in washing pulp, two presses were acquired for this purpose.

Another innovation at the new Setúbal mill relates to the fibre recovery filter: 100% of the process water is filtered and thus more fibre recovered. In addition to the machine and waste screens, screens in the virgin pulp fed to the refiners were installed. They filter the pulp in order to reduce impurities and to protect the equipment. The new mill is supplied with borehole water, using a decalcification system and sand filters as well. Innovative technological solutions have also been adopted for the treatment of chemicals and additives, specifically the filtration of all additives at the point of addition and preparation of the salt in a saturation tank. In addition to the eucalyptus pulp, this mill is currently supplied with some softwood pulp in bales and a 100% automated bale pulping line has been fitted for this purpose. The aim is to maximise the efficiency of this high speed paper machine at the start, but this production tool will be reduced in the long term.

Control of an electrical network with power capacity on the scale of the new mill required the best supervision system currently on offer: the SCADA, compliant with standard IEX 61850. The new project represents a great leap forward, with new advantages in terms of energy saving. This is because of a large percentage of variable speed electrical engines that permit gains of 10 to 30% in efficiency compared to fixed speed systems. The processing facilities in the Group’s new paper mill are controlled by a dedicated DCS (Distributed Control System).

The whole system uses modern communication, including engine control and instrumentation which meet the Profibus standard.

In view of the high levels of automation and efficiency sought, the development of the information system (PPMS and PIMS) for the new mill in Setúbal has represented a huge challenge for the IS, in terms of technical and functional complexity. The new facility is a model “smart mill”, in which all the operations are supported and monitored by the information system, like the nervous system in the human body.

Right from the signing of the first construction contract, involving earthworks and piling, preparations were made to accommodate the contractors. At peak times, about 1,600 people were working on the site and Portucel Soporcel can be deservedly proud of the safety standards achieved. It has been officially rated as excellent in accordance with the parameters of the ILO (International Labour Organisation). All in all, the new paper mill project created 350 jobs.

Milestones

2002 – First marketing and feasibility studies for the new paper mill
2003/4 – Pilot tests with the potential suppliers of the paper machine
2005 – Strategic study designed to rethink the project
2007 – Final decision on the paper machine supplier, signing on October 19th the contract with the Finnish company Metso Paper and on November 2nd with the consulting company Pöyry Forest Industries
January 2008 – Beginning of the construction (piling) of the new paper mill at Setúbal
February 2008 – Beginning of the construction of the cogeneration plant within the industrial complex of Setúbal
March 2008 – Start-up of the training programme for human resources at several levels
September 2008 – Beginning of the assembly of the automated warehouse
19 January 2009 – Beginning of the installation of the paper machine
April/May/June 2009 – Commissioning stage, all equipment parts and systems are tested for the start-up
End of June 2009 – First firing of the cogeneration unit
01 July 2009 – Start-up of the converting area, using paper reels from the existing paper mill
15 August 2009 – The new Setúbal paper machine starts production

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Answers for industry.
Ángelo Loureiro

“I had a dream”

**ipw:** In March 2008, the Prime Minister laid the cornerstone marking the beginning of the construction of the Group’s new paper mill. Production was started up in mid-August. What was the biggest challenge during the construction phase?

**Ángelo Loureiro:** This project, as every project, had very particular facts that had to be taken into consideration. Let me give you one example: during the feasibility studies, we concentrated deeply on the technology and lay-out of the new paper mill but also on all the interconnections with the existing pulp mill for the supply of pulp and steam as backup, with the extended PCC (Precipitated calcium carbonate) plant and with the existing effluent treatment plant expanding the capacity. The timing of the implementation of all these interconnections without disturbing the runnability of the existing pulp mill was in fact one of the biggest challenges.

**ipw:** Who was part of the project team and how was the work organised?

**Loureiro:** In order to make sure that such a huge project runs with only minor problems, the organisation was based around experienced engineers who have worked before in similar projects in the Group. This resulted in a small but effective team of area managers and discipline managers, with contact based on an open door policy, in addition to the formal project meetings. Most of the team members had been involved with the PM 1 and PM 2 projects at Figueira da Foz mill, PM 3 at Setúbal mill, environmental and energy projects in the Group and people from Pöyry.

**ipw:** What would be your description of how the construction phase went?

**Loureiro:** Nothing is perfect in this world! There were different periods of time which were very tough and when a lot of energy was required to keep things on track. From the beginning, the team was aware that the purchase time schedule had full priority in order to release the engineering information for the engineering consultant to speed up their work for the layout and loads definition and consequently for the detailed engineering to provide drawings for the construction. In this particular issue, we were very successful, sometimes with three negotiations per week, while respecting the company’s rules.

At the same time, before we could do anything else, the piling works started and it turned out that the driving machines were not available in the quantity required. In total we had to make 5,000 piles 20 m into the subsoil due to the type of soil and because of earthquake rules. This situation caused some delay and consequently an overlapping of the works for the structure of the PM building and piling.

The progress of the PM building was in line with the time schedule and the next milestone was the installation of the overhead cranes, required for equipment installation. I would like to highlight that at this stage our main objective was to allow Metso to start their PM installation by the very beginning of February according to the contract but we were extremely ambitious and gave the go-ahead on 19th January. This was really a great achievement!

In the meantime, civil works for the converting facilities and robotised warehouses started very slowly and required a lot of energy to catch up the time schedule. Rainy weather is not very common in September/October in this region but it did happen affecting the progress of further civil works for the sheeters’ foundations and causing some delay in the building construction. Those were very tough times arranging for mechanical installation starting by the end of February this year keeping the milestone for starting test-runs on the sheeters at the beginning of July. Going back to the PM, it is worth making some reference to the electricity, piping and instrumentation contracts. Start-up was very slow, and in this respect we thought that, to some extent, the shortening of personnel at a certain level of intermediate management in the structure of the main suppliers required an extra effort and coordination of the subcontractors that made their life difficult in performing according to requirements. Anyway, the main milestone was achieved but it did require constant pressure on the contractors in order to keep the delays under control and to keep up with the time schedule. This was a very difficult period, but this is also what we are paid for!

**ipw:** What were the crucial reasons for choosing Metso as supplier for the paper machine?

**Loureiro:** First of all, the full package of the paper machine suppliers did include other equipment than the paper machine itself, namely pulpers, winders, rewinder, roll wrapper and roll conveyors, and PM screens. In order to minimise the risks of the PM concept, we performed pilot machine tests with both suppliers, and both competitors showed up the reliability of the technical solutions we would like to implement in this project. We also made an evaluation of the package as a whole and at the end of the day the decision was based on a technical and economical approach of the full package.
**ipw:** How did the cooperation with Metso go?

**Loureiro:** After the decision-making process, we did a lot of pilot tests for detailed technical definitions of the different elements of the paper machine concept, and an RCM (Reliability Centered Maintenance) analysis in order to guarantee the best solutions. The installation of the paper machine started eleven days before the planned schedule and the commissioning phase was carried out with a good understanding from both parties of the priorities of the interfaces between the different contractors, with a common goal to achieve the stock on wire on schedule.

**ipw:** Was there outstanding cooperation with one or more suppliers you would especially like to highlight?

**Loureiro:** It wouldn’t be fair to highlight one or more suppliers with outstanding cooperation, since all of them have done their best to achieve our goals. However, we have learned about what we should do to avoid some errors we made during the selection phase.

**ipw:** How much time do you calculate for the learning curve?

**Loureiro:** Of course this depends on the efficiency figures we are talking about. However, for a global efficiency of 86% and being conservative, we would say that a three year period is required.

**ipw:** What does the fact that you have participated in this important project mean for you personally?

**Loureiro:** I have been working in this industry since 1970, just after my graduation in chemical engineering. During all these years, I have developed my skills in different areas of the paper industry, namely engineering, technical assistance to sales, projects in general, operations management, expansion of the existing paper mill with the installation of PM 3, and finally the implementation of this new mill. What else would a paper engineer in any part of the world like to achieve three years away from retirement? I can only sum it up like this: I had a dream!

**ipw:** Thank you for the interview!
The Portucel Soporcel group is one of Portugal’s strongest brands in international markets and will be Europe’s leading manufacturer of UWF (Uncoated Woodfree Paper) when the new mill reaches full capacity. It is also Europe’s largest manufacturer of bleached eucalyptus kraft pulp (BEKP) and indeed one of the largest in the world.

The company employs more than 2,200 people and plays an important role in the national economy. Even before the start-up of the new paper mill, it represented approximately 3% of Portugal’s exports of goods, which, together with its domestic sales, account for 0.7% of the national GDP. When the new mill reaches full capacity, the Group will account for approximately 4% of total Portuguese exports, with a high coefficient of domestic value added. Portucel Soporcel produces approximately 92% of its electric power from biomass, and is responsible for around 10% of the total conventional containerised cargo handled in the national maritime ports.

So far, with a production capacity of 1.55 million t of paper, considering already the new paper mill, and 1.35 million t of pulp (of which almost 1.1 million t are integrated into paper), the Group has generated in 2008 a turnover of more than EUR 1,100 million.

Once operating at full capacity, the new paper mill will boost the Group’s annual exports by more than 400 million euros. This will be added to current annual exports of more than 950 million euros to more than 90 countries over five continents, corresponding to approximately 90% of its paper and pulp sales. And even against the background of the global economic recession and its impact on manufacturing industry, unparalleled in the sector’s history, Portucel Soporcel recorded 3.8% growth in overall paper sales in the second quarter of this year in relation to the same period in the previous year. It goes without saying that figures including sales of the new paper production will only be available next year.

With the majority of its products sold in Europe, the Group has its own sales network, with support structures in the main European markets and in the United States. Over the years, it has deployed an extremely successful mill brand development strategy which now collectively accounts for roughly 60% of manufactured product sales. This strategy was leveraged by unique quality and service levels and the continuous reinforcement of brand awareness and prestige within which Navigator, the world’s best selling premium office paper, plays a highly prominent role. At the European level, the Group is a leading supplier of bleached eucalyptus pulp to the specialty paper segment that accounts for
The origins of Portucel Soporcel date back to the 1950s when a team of experts made the Cacia mill a world pioneer with the production of sulphate bleached eucalyptus pulp. Today, half a century later, the Group continues to pursue this capacity for innovation and entrepreneurial spirit.

With a view to restructuring the paper industry, Portucel acquired Papéis Inapa in 2000 and Soporcel in 2001, two strategic moves that were decisive in consolidating the sector in Portugal and which also led to the creation of the Portucel Soporcel group, which today is a worldwide reference. Throughout the years, its firm conviction in the strong potential of the eucalyptus, a tree especially suited to Portuguese climate and soil, has brought further improvements in the production of paper for printing and writing.

In 2004, Semapa (a Portuguese industrial conglomerate, listed on the Lisbon stock exchange, with interests in cement, paper and energy, consolidated net profits before minority interests stood at EUR 137.4 million in 2008) acquired a majority stake in the capital of Portucel Soporcel, initiating a whole new cycle for the Group. It consolidated its position on the international markets and in 2006 announced the construction of the new paper mill in Setúbal.

The production processes adopted are also exemplary in terms of sustainability and energy efficiency insofar as they use forest biomass, a renewable fuel, as their main source of energy. The Group is currently the largest national producer of biomass energy. Once up and running, its large-scale capital expenditure projects in the energy sector will allow the Group to increase its energy output by 80% and to account for approximately 5% of all power generated in Portugal.

As an immediate effect of its energy policy, based on a reduction in the use of fossil fuels, the Group has successfully cut its carbon dioxide emissions by 45% over the last six years. At the end of 2008, accrued CO₂ retention in its woodlands corresponded to approximately 6.9 million t.

The new paper mill project in Setúbal was developed together with an investment programme in the other units in Cacia, Figueira da Foz and Setúbal: projects currently underway correspond to an investment of approximately EUR 900 million for modernising technology and reducing environmental impact, of which EUR 175 million are channelled to energy production, mostly from renewable sources. All projects will be finalised in the course of next year.

The majority of the company’s land is covered with eucalyptus plantations

The History

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AICEP Portugal Global is a publicly owned business agency dedicated to the development of a competitive business climate which contributes to the globalisation of the Portuguese economy. Its business model is based on a close alliance with Portuguese companies, acting as a public sector partner and provider of value-added services, enjoying a fundamental role in providing information, and facilitating the internationalisation process.

AICEP assists, in all aspects, Portuguese and foreign companies which, individually or as part of a group, have annual revenues of more than EUR 75 million, or represent investment projects of more than EUR 25 million. Therefore, the agency has been working closely with Portucel Soporcel, supporting its promotional and commercial activities towards developing exports and its investments in Portugal and abroad. In its role of coordinating body for the negotiation of incentives to special regime projects (that are submitted to a specific negotiation procedure), the agency signed in 2006 an incentives contract with the company “About the Future” for their new paper mill at the Setúbal industrial site. Also, this project was recognised as having fundamental importance to the country’s economy and therefore considered as PIN, National Interest Project, meaning that all bureaucratic procedures related with the project’s licensing were pushed through quickly.

Basílio Horta, chairman and CEO of AICEP, has followed the progress of the project closely since 2000 and stresses the importance of the pulp and paper sector’s activity for Portuguese economic growth: “Being the 4th largest net exporter and representing 0.8% of GDP and 4.6% of exports, this sector has also been continuously increasing its investments in the environment, in compliance with the most stringent environmental requirements and in CHP, resulting in a very high energy self-sufficiency (92% generated by CHP). The imports coverage rate is at about 40%, contributing positively to the country’s balance of payments”, he said. The Portucel Soporcel group is currently Portugal’s third largest exporter and with this investment it will increase its total production capacity to 1.5 million t/y. This will strengthen the company’s position as one of the key players in this industry in Europe and the rest of the world. Horta underlines, “This investment, along with the other investments being made by the pulp and paper industry will surely reinforce the Portuguese leadership position in the European Market”.

Horta acknowledges that the new paper mill, naturally, will have a quite significant effect on the region. But, “It will be even more important in a region like Setúbal, very sensitive to the economic crisis due to the existence of a very important automotive cluster”, he says and adds, “It is also noteworthy that the whole project will comply with the most demanding environmental standards established in Europe and that the architectural concept as well as the volumetric aspect of the new mill were optimised to satisfy the Setúbal bay natural requirements.”

AICEP is not only involved in the project in Setúbal, but is also part of a wider plan being pursued by the Portucel Soporcel group. This plan is nearing completion and has involved a total capital outlay of approximately EUR 900 million, divided between its industrial units in Cacia, Figueira da Foz and Setúbal.
Congratulations to the «About the Future» Team on the successful start-up of the new PM4 in Setubal.

AstenJohnson is proud to be a major clothing supplier on this state-of-the-art machine!

AstenJohnson, a Passion for Paper.
Distinctive papers for the international market

The new paper mill represents a crucial framework for the company’s development, as the properties of the paper the new mill produces are highly valued by the consumers in the core segments where Portucel Soporcel is present: office and graphical. With this new reality, the Group will be able to reinforce its strategy, based on added value premium products and the development of lower grammages.

Currently with annual exports in excess of EUR 950 million to around 90 countries in the five continents, Portucel Soporcel expects to increase its exports to approximately EUR 1,250 million, as the paper output from the new mill is destined almost exclusively for the international markets.

The products comply with the chain of responsibility in all stages, from raw materials, sourced from forests planted specifically for this purpose, using sustainable management practices, through to efficient paper production resulting in a unique product, which is truly ecological, biodegradable and recyclable. These are important distinctive factors in an international market which is increasingly selective and demanding in relation to environmental issues.

The commitment towards the production of lower basis weight paper is today one of the most visible aspects of the company’s pioneering approach to environmental issues. The Group has broken new ground in the production and marketing of 75 g/m² office paper, with a quality comparable and in most cases superior to standard 80 g/m² office paper.

The high levels of machine performance, quality consistency, printing quality and multifunctionality of the papers, added to the quality control throughout the production chain and the use of the best raw materials and most modern technology, have resulted in the wide market recognition as the top European manufacturer of uncoated woodfree papers.

Within the range of premium products is Navigator, the world’s best selling premium paper brand in the office paper segment, and others such as Soporset, Pioneer, Inacopia, Discovery, Explorer, Target and Inaset. Navigator is regularly sold in more than 80 countries, over five continents, and has been considered by independent studies as the European brand with the highest perceived quality and the best brand performance (weighted average of technical and marketing attributes). Navigator, Discovery, Pioneer, Inacopia, Target and Explorer are some of the office paper brands the company offers for professional or home use. Soporset and Inaset are reference brands in the graphical market, both in offset and preprint. The high printing quality of these brands relies on intensive technical tests and market research. All the brands are available in the most important and relevant sizes and basis weights, adapted to end-user and professionals’ needs.

The graphic paper brands of the Portucel Soporcel group lead the European rankings in different categories of the sector, according to the most recent international study aimed at European printers – over 750 interviews in 23 countries. The conclusions of this study, which assesses, among others, quality, prestige and evolution of the main offset and pre-print brands in Europe, point to the consolidation of Soporset’s leadership.

The Soporset, Inaset and Pioneer graphical paper brands appear in the top 10 positions in terms of brands’ spontaneous recognition. Soporset is once again considered the brand with the highest spontaneous recognition and the most widely used offset paper brand by the European graphic companies.

Overall, Portucel Soporcel provides unique printing solutions, through continuous investment and research, towards the development of new products and brands which exceed expectations of modern paper users, whether in the office, at home or in the offset printing room.
Congratulations, Portucel Soporcel Group

On behalf of all cut-size converting suppliers, E.C.H. Will and Pemco congratulate the Portucel Soporcel Group on the successful start-up of their production facility in Setúbal, Portugal.

With the widest sheeter in the world and the most efficient and flexible packaging equipment, we look forward to the impressive production figures, which the Portucel Soporcel Group will reach.

As the suppliers and partners in the cut-size converting department, we are committed, today and in the future, to a successful project.
Metso’s delivery included a complete state-of-the-art OptiConcept paper machine line from headbox to roll handling, with related air systems and some stock preparation equipment. The company also supplied an extensive automation package, including a quality control system with web-wide non-scanning moisture measurement, wet end analysers, machine controls as well as runnability and condition monitoring system.

The OptiFlo II headbox includes turbulence generator technology with wedges for a homogeneous slice jet. It provides excellent planarity, formation and strength properties. IQDilution Pro basis weight profiling provides rapid and precise positioning, allowing improved sheet quality and minimal variability. Edge flow channels regulate the flow at headbox edge areas for uniform slice jet flow profile.

The OptiFormer gap former with loadable blades includes a roll and blade process which gives stability, runnability and dewatering with high-capacity. The blade geometry ensures quality – particularly formation. The symmetrical dewatering allows good filler and fines distribution control.

The OptiPress press section includes two straight nips, the first is a press roll nip, the second press is a SymBelt shoe press nip that provides a long dwelling time and a high press impulse. This ensures a good dryness level. Separate nips give good profiles; the shape of nip can be easily adjusted without affecting operation of other nips. The web is fully supported when taken through the entire press section to the dryer section. Separate tail threading is not required. The PressRun blow box keeps the paper web in contact with the dryer fabric in the draw between the press and dryer sections. When air is flowing out of the blow box, underpressure is created in the area between the blow box and the dryer fabric. This keeps the paper web in contact with the dryer fabric preventing it from fluttering. The SymRun pre-dryer section/SymDry after dryer section include single-tier pre-dryer section and last dryer group of after dryer section double-tier. HiRun 4000, HiRun 2000, SymRun Plus-runnability systems in the drying section guarantee wrinkle free web run with less breaks. Thus, the machine can be operated with high velocity and the draw difference be optimised. Tail threading in the single-fabric area is performed automatically without ropes. The paper is surface sized with a starch solution at the OptiSizer to give it the required surface strength and stiffness. It uses an advanced application technology with a unique sealing blade to ensure an even and defect-free film formation at the higher end of the running speed range. The use of the sealing blade also enables the required starch circulation amount at the sizer to be smaller than with more traditional application concepts.

High drying capacity and energy efficient TurnDry air dryer were inserted after the OptiSizer. TurnDry is an air dryer for simultaneous non-contact web turning and drying. The non-contact turning is based on the air cushion generated between the web and the turning dryer. The Setúbal PM 4 has a 2-nip OptiSoft SlimLine soft calender. It effectively controls the paper roughness level, twosidedness and caliper profile. The calender running parameters, load and temperature can be chosen to maximise bulk and minimise twosidedness. This calendar utilises the well-known multizone-controlled technology with innovative sliding bearing assemblies. The deflection-compensated roll has a high number of individually controlled loading zones for accurate caliper profiling with immediate quality recovery after web breaks. The self-loading technology means precise nip control and enables very low nip loads. The paper is reeled with an OptiReel Plus center-driven reel. Instead of controlling just the linear load and tension in the roll, as is done traditionally, it uses a third parameter, torque, to control reeling tightness. This parameter is adjusted via the primary and secondary center drives, which also contribute to a wider nip load control window. Excellent parent roll build-up minimises reeling-related losses, improves downstream runnability, and makes it possible to wind larger diameter parent rolls. The parent roll diameter is 3,850 mm.

The WinDrum winders are of a new design. This model is designed for web widths over 10 m. A lot of effort has been put into the machine dynamics, i.e. to design the machine to be as stable as possible at these widths. This includes large diameter winding drums, a stiff rider roll beam in both the machine and the vertical direction, and stiff frames. The winders are fully automated, including butt-joint splicers. The web separating devices of the WinDrum winder represent new thinking in web separation to reach performances not possible before on very narrow webs as well as wide webs. This is done with the accurate bows based on Metso linked sectional rolls and high-precision spreading beams. Even the aligning tools and process have been redesigned to give more exact bows.

The wrapping machine is fully automated and realised with the company’s non-hydraulic principle, which means that all actuators and components that have traditionally been hydraulic are now either electric gear motor operated or pneumatic. Moreover, the StreamLine wrapping machine features optimised wrap material selection to provide efficient use of materials, thus improving wrapping economy. The fully automatic conveyor system conveys the paper rolls from the winders via the wrapping machine to automatic intermediate storage and further to trailer loading.
SYRAL congratulates PORTUCEL-SOPORCEL for the successful start up of Paper Machine ATF «About The Future»

“Our high quality maize starch together with SYRAL’s expertise in enzymatic conversion played a significant role in achieving the correct paper properties from the beginning.”
Luis CANO
Technical Account Manager

“This project was built on our long term relationship with our customer”
Pedro ASENSIO
Sales Director

“SYRAL further demonstrates support to the growth of our valued customers by investing in a new starch drier at the Zaragoza site.”
Javier PEMAN
Plant Manager in Zaragoza
The scope of Pöyry’s consultancy included complete mill engineering, site services, commissioning and start-up services. The assignment was implemented as an EPCM (Engineering, Procurement, Construction Management) project, accommodating the company’s requirements. From the very beginning, Portucel Soporcel placed Pöyry’s experts in its site organisation.

Pöyry’s involvement started with a new paper mill project feasibility analysis, which was carried out in 2003. Afterwards, the company performed the pre-engineering study for the project in 2004. The mill-site layout, department layouts, and flow diagrams for the main processes were presented in this study. For this project, the front-end engineering study was carried out in 2006. Technical descriptions, layouts and flow diagrams, and an implementation plan as well as investment costs and risk analysis were developed and analysed.

In September 2007, Portucel Soporcel commissioned Pöyry to update the technical concept and cost estimate of the above-mentioned front-end engineering study. In October 2007, an implementation decision was made for the project and Pöyry was assigned to start the detail engineering.

In conducting its engineering, the mill site was investigated. Pöyry also reviewed the mill site’s connections to the pulp mill, effluent treatment plant, fresh water wells, PCC (filler) plant, power plant, natural gas line and roll conveying from the existing mill. Additionally, its engineers carried out the design of the bale pulp storage and pulper station, additive plant, stock preparation, paper machine, finishing department, paper roll storage, converting, pallet warehouse and shipping, fresh water supply, extension of the existing effluent plant, changes at the pulp mill, maintenance facilities, offices laboratories and personnel facilities and mill logistics. A major tool used for the project was the ‘Virtual Mill’, Pöyry’s solution for creating, storing, maintaining, searching and accessing technical information. The Virtual Mill software consists of different applications, including ProElina, WebPub, 3D modelling software and DocHotel. After completion of the project, the Virtual Mill tools and databases are still useful, enabling an efficient interface between the engineering service concept and the maintenance system.

For the detail engineering, an organisation supported by the Portucel Soporcel’s project team was formulated. The detail engineering team carried out tasks which included engineering management, time scheduling, project standards and instructions, and secretarial services. Procurement services as technical enquiry specifications and tender comparisons were also included. The architectural design included facades and three-dimensional perspective drawings. In the area of civil and structural engineering, the Pöyry team carried out the design of the paper machine and winder foundations. As for process engineering, tasks included flow diagrams and operational instructions. Furthermore, mechanical engineering was conducted, including department layouts, three-dimensional modelling and civil guide drawings.

Piping engineering consisted among other things of 3D design, P&I diagrams, piping arrangement drawings and isometrics. Pöyry’s experts also provided HVAC design, which included basic design, calculations and checking of suppliers’ detail drawings. In the area of electrical engineering, the company provided expertise on power supply and distribution, process electrification, building electrification, electrical room design and installation design. Instrumentation and automation engineering including DCS design, configuration and installation design, along with network engineering as conceptual and logical design, was also provided. During the implementation phase, Pöyry’s site team supported the project team in the engineering, building construction, installation, commissioning and start-up phase. Site manager, civil liaison engineer, scheduler (installation, commissioning and start-up), installation supervisors, commissioning and start-up support (process, HVAC, mechanical and piping, electrification, instrumentation and IT services) were located on site. In the peak period during the commissioning and start-up phase (June, July and August 2009), Pöyry’s site team consisted of 25 specialists. During the installation phase, engineering tools for each discipline were placed on site, enabling the necessary changes in the engineering documents to be updated and distributed directly and effectively by the installation team. The handling of documents at site was centralised in a common filing system. Pöyry’s mill engineering documents, as well as those from suppliers, were uploaded into the DocHotel system, which guaranteed that the latest version of any document was available and easy to distribute to all parties.

In addition to the high-quality paper, good runnability and efficiency of the process, environmental aspects were also taken into account in the technology and engineering. The energy efficiency, fresh water consumption, effluent load, raw material utilisation, carbon footprint and noise level were the key issues in designing this competitive mill.

Pöyry

Comprehensive consultancy

Pöyry acted as the main engineering consultant for Portucel Soporcel’s new paper mill project. The assignment is a continuation of teamwork that goes back many years. The Group and Pöyry have had a long-standing co-operation in a number of important projects over the years. Pöyry’s involvement with Portucel Soporcel includes engineering services related to the construction of the first paper machine (PM 1) and the second (PM 2) at the factory located in Figueira da Foz.
Portucel Soporcel took a single-supplier approach in equipping its cut-size converting department at their new mill. The project features three cut-size converting lines within the cut-size converting area supplied by companies of the Körber PaperLink Group (KPL): E.C.H. Will, Pemco and W+D-Langhammer. Heading the KPL team, E.C.H. Will was also responsible for selecting and arranging sub-suppliers, from paper reel to finished pallet.

Ultimately, the facility’s cut-size converting department includes two E.C.H. Will high-speed 16-pocket cut-size sheeters, with Pemco dual high-speed packaging lines and W+D-Langhammer automatic palletisers. These lines are primarily for large orders of A4 and letter-size products. The third line focuses on flexibility and productivity, with an E.C.H. Will 8-pocket sheeter matched to a flexible Pemco packaging line, a bulk packaging line and a W+D-Langhammer high-speed palletiser.

Integrated Manufacturing Execution System (MES) software talks with the mill’s production planning system (PPMS), helping to maximise productivity and reduce waste by intelligent management of the entire converting process.

“Having begun operation with the first two lines in September, we are already seeing the benefits of working with E.C.H. Will,” said project manager Angelo Loureiro. “We value not only the equipment, but also their expertise and service.”

The relationship between KPL and Portucel Soporcel was formed years before this project. The Group’s mills currently run eight E.C.H. Will-Pemco cut-size lines. The KPL companies’ solid understanding of their partner’s technical and marketing needs has led to comprehensive system solutions that fulfill their sales and marketing requirements. E.C.H. Will, Pemco and W+D-Langhammer have increased production through automation – smartly integrating the MES into the customer’s existing order and material management – as well as through fast changeover times, higher packaging speeds and expanded format and pallet specifications.

E.C.H. Will also brought this challenge to sub-suppliers, to achieve even higher labeling speeds for pre-printed pressure sensitive, thermal printed and top labels (reams and cartons), as well as...
automated pallet labeling. Capabilities also include ink-jet marking, sheet insertion and strapping. “We’re extremely satisfied with the results, and the great efficiency and flexibility these choices afford us,” said Ângelo Loureiro. “All three KPL companies have delivered on their reputations for looking after customer needs.”

The Portucel Soporcel group sought the most reliable cut-size converting equipment. And the need was met by E.C.H. Will’s 16-pocket cut-size sheeters, each having six double unwind stands with zero-speed splicing, and the ability to produce more than 800 t/d of cut-size paper. Speed reaches 256 reams per minute. First installed at Setúbal, these sheeters are world’s widest (3.48 m).

Connected to each sheeter are two Pemco high-speed packaging lines: Model 395 ream wrapper (up to 140 reams/min, kraft and polypropylene wrapping), Model 124 ream inspector (ensuring that only good quality reams proceed to the case packer), Model 137 stacker accumulator (600 ream capacity allowing the line to run even with a downstream stoppage), Model 162 case packer (up to 30 cases/min), Model 123 case inspector (ensuring that only good quality cases proceed to the palletiser). Completing each line, W+D-Langhammer delivered a high-speed, heavy-duty palletiser for up to seven layers (max 2.3 m high, 1.5 t/pallet), to fill shipping containers more efficiently. One operator can manage both palletisers on a 16-pocket line, thanks to a sub-supplier’s fully automated pallet labeling solution and Automated Guided Vehicle (AGV) pallet pick-up. AGVs also deliver the reels to the sheeter.

While the two 16-pocket cut-size lines focus on output, the flexible 8-pocket cut-size line combines versatility and productivity. At 400 m/min, the 8-pocket sheeter, sporting five double unwind stands with zero-speed splicing, can produce up to 100 reams/min and all formats between A4 or letter-size and 30.84 x 45.72 cm. Hole punching is flexible, too, with four punching units to meet various market requirements. With automatic slitter positioning and quick-change features, the machine is designed to minimise format change times.

Discharged reams are directed into one of two packaging lines, either a bulk line for cases with 2,500 loose sheets, or a highly flexible Pemco line featuring: sheet inserter (from sub-supplier, inserts top and bottom promotional sheets used with clear polypropylene wrap), Model 33 ream wrapper (up to 100 reams/min, kraft and polypropylene wrapping, semi-automatic size change), Model 124 ream inspector (ensuring that only good quality reams proceed to the case packer), Model 137 stacker accumulator (480 ream capacity, allowing the line to run even with a downstream stoppage), Model 163 case packer (up to 22 cases/min, semi-automatic size change) and case inspection/rejection (ensuring that only good quality cases proceed to the palletiser). The palletiser is identical to those on the 16-pockets lines. High automation, a moveable touch-screen and excellent accessibility facilitate operation with minimal manpower.

The brand new plant allows E.C.H. Will to demonstrate their expertise as a turn-key supplier, drawing on experience from installations around the world. “It’s turn-key in that we developed the systems, specifying and adjusting them to meet requirements optimally, and delivered, installed, set-up and readied them for testing,” noted Klaus Aarestrup, managing director. “Yet, it was also a partner relationship, communicating closely at every stage. We help with their planning, sourcing and relevant technical matters.”

The Manufacturing Execution System (MES) keeps production running smoothly by bridging the gap between the Enterprise Resource Planning system (an ERP called PPMS) and local machine controls.

Furthermore, ExpertOnline contains all relevant operation manuals, programs, software, etc., and, when the mill requests, it provides remote access to the machines by KPL experts. This allows quick diagnosis of machine disturbances and immediate support, either online or by sending an expert onsite. It’s also used for training and updating documentation.
ABB

Paper machine drive solution for improved productivity

ABB’s top knowledge and quality within the Paper Machine Drive Solution enabled a fast and on-time startup of PM 4 in Setúbal. Both the progress of start-up work and the quality of the equipment were excellent. All the agreed deadlines relating to the start-up, test-runs and production were promptly on schedule.

"The cooperation between ABB, the end customer, consultants and paper machine manufacturer has been smooth and successful. The project proceeded well without any major problems," says Toni Haapala, project manager from ABB. "The technical descriptions and customer needs were clear and even though some changes came during the project, those were clarified fast and efficiently. All parties had the ability and willingness to stay focused on their goals which centred on implementing the most modern paper mill in Europe."

ABB’s PMC800 paper machine drive delivery for Setúbal consisted of two winder sectional drives, rewinder and pump drives with 81 ACS800 Multidrive inverters and motors and process drives of 324 ACS800 Multidrive and Single-drive inverters. Altogether the mill has 405 inverter units for the process motors. The paper machine, winder and rewinder drive systems also have a test rig for the ACS800 Engineering Demo unit, the PMC800 Dataloggers, the 800xA Process Portal Operator Stations, the GOP2010 control panels, and for remote connectivity to the drive systems. The delivery also included installation supervision, training, startup and stand-by services.

ABB’s paper machine drive solution enables improved productivity by means of enhanced data logging, maintenance tools and expert services, either on site or remotely.

Edifer

Outpacing civil construction works

Edifer’s participation in the project in Setúbal has consisted of civil construction work on the warehouse, processing and shipment areas as well as in the execution of the pipe rack connecting the pulp factory to the new paper mill.

The biggest challenge of this project was to meet the tight deadline while the execution project was simultaneously being prepared by Portucel Soporcel. Edifer is familiar with these demanding contracts which imply a con-
Construction model requiring high integration of precise logistic expertise and workflow, and this project reflects the company’s strong technical capacity to undertake projects of such a demanding nature.

Edifer is a privately-owned Portuguese business group operating mainly in the construction industry in the private and public sectors. It is one of the largest Portuguese construction groups, with a technical reputation for engineering and construction quality. Presently, the Group’s subsidiary companies operate in five areas: Engineering and Construction, Real Estate, Industry, Business Development, and Environment and Energy.

The business unit Engineering and Construction covers all interventions related to engineering works, public works and building construction. With notable experience in all these sectors, it is the core business of Edifer. The Real Estate division represents the company’s direct investment in the property sector. Edifer Imobiliária is a benchmark brand associated with high quality and high value products. Industry covers the industrial and manufacturing operations. Through Edimetal, it enjoys market leadership in the provision of corporate image services, facades, exterior cladding solutions and special finishings. The Business Development division is aimed at the diversification and expansion of Edifer’s activities. It focuses strongly on high added-value markets, with a global strategy of positioning in key areas (health and other social facilities, roads and other transport infrastructures) and the creation of a diversified base of concessions.

The Group’s Environment and Energy unit concentrates its present and future expertise on this domain which is relevant in terms of diversification, particularly on renewable energies and specialised public services.

**TM System Finland**

Reliable and energy-efficient solution for trim handling

TM System Finland has delivered two separate trademarked Trimvac trim handling systems to Setúbal: one system for PM 4 and one large-scale system for the converting plant. The converting plant trim handling system also includes a dry trim handling system for start-up and PM shut-down periods, and a dust removal system for the sheeters. In total, a trim handling system for eleven machines was delivered.

The converting plant’s Trimvac system is one of the largest systems of its kind ever delivered. Portucel Soporcel already had ten years of experience with the Trimvac system, so it was a natural and safe choice to choose it for this new mill, too.

The large number of cut-size and folio sheeters in this project require a reliable and energy-efficient solution for trim handling. Different sheeters have variable demands for trim handling. The width of the trim varies, requiring different features for the systems. Due to the size of the converting plant hall, the longest distance from the sheeter to the Trimvac separator is more than 150 m. The duct elements, such as t-connections, elbows etc. for the trim handling system had to be carefully designed in order to minimise the pressure loss of the system and thus energy consumption. All dampers and special parts of the ducting were therefore developed and designed by TM Systems.

One of the most important features of the Trimvac system is that it will not disturb the sheeter trim cutting. The tension of the trim can be adjusted to fit different production demands.

In addition to the Trimvac system, the customer requested a dry trim handling system for the commissioning period of the sheeters and for the periods when the machine is shut down and the pulpers are not in operation. The dry trim handling system consists of a chopper fan with a booster fan because of the long transporting ducting. The chopped trim is collected into a baling station, also delivered by TM Systems. The dry trim handling system uses the same ducting as the Trimvac system. The operator can thus freely choose which trim handling system to use.

The trims from the PM 4 calender, and the trims from the rewinder and lab sheeter, are collected into the Trimvac separator which is located in the vicinity of the reel pulper. With this system, trim handling, even at the maximum speed of the calender, is trouble-free. With a conventional type of trim handling this may not have been the case.
Nowadays, energy consumption is an important aspect when considering the purchase of a trim handling system. The Trimvac system is also highly competitive energy-wise; in the converting plant, it only uses one third of the energy of a conventional dry trim handling system or a high vacuum trim handling system. The vacuum inside the separator is controlled by a frequency converter which enables energy usage optimisation for different productions. Energy efficiency was one of the key issues in the engineering design. The energy consumed per transported trim flow is the lowest ever built by TM Systems.

The Trimvac trim handling system only has one vacuum fan. Unlike the chopper fans, the vacuum fan has no cutting knives etc. which require frequent maintenance. Because of the vacuum in this trim handling system, the environment is kept clean, thus minimising the cleaning costs. The Trimvac system has already been installed in more than 700 paper mills.

**MAN Turbo**

**TURBAIR vacuum systems for extreme flexibility and adaptability**

Portucel Soporcel selected trademarked TURBAIR for the vacuum system for the new PM 4. The ecological and economical advantages were strong factors in the final decision.

The TURBAIR vacuum system consists of two multi-stage blowers type RC 118-4 for the forming and press section of the paper machine and one single-stage blower type RT 71-1 exclusively for the felt conditioning. Vacuum ducts, water separators with extraction pumps, exhaust air silencing and the plant control technology were all designed in close co-operation with Pöyry and the project team of Portucel Soporcel.

In addition, a comprehensive training programme for the mill’s operation and maintenance personnel took place during the commissioning and optimisation phase of the PM 4. Main advantages of the Turbair vacuum system include energy saving with exhaust air heat recuperation, low electrical drive power consumption, no sealing water required, constant vacuum on all PM suction points, independent of the fine paper basis weight, high reliability thanks to a robust and proven design as well as less space requirement for the equipment.

More than 1,000 TURBAIR blowers are currently in operation worldwide. Some of the most recent references are: Holmen Paper Peninsular PM 62 in Spain, Palm Paper Lynn PM 7 in the UK, Myllykoski Plattling PM 11 in Germany and Oji Nan-tong PM 1 in China.
Raumaster Paper has successfully started up a comprehensive core handling line at the new mill in Setúbal. The total delivery from the Finnish supplier consists of several subsystems: a robot picks up parent cores from storage and transfers them to the CleanCut core cutter. Cut cores are automatically transferred up to two winders by a line consisting of about 100 m of conveyors and several core lifts.

The recycling line transfers the butt rolls from the sheeters to the stripper and, after inspection, the stripped cores are passed on through sorting and a buffer storage back to the main stream. It consists of two core robots, several lifts, multi-floor storages and conveyors. The pulper is fed by two lines. Butt roll unwinding line consists of a stripper and a wide belt conveyor. Broke roll splitter
features a traversing cutter enabling a steady material flow into the pulper. The heart of the delivered system is the patented CleanCut process, which paves the way for new standards in core cutting. Cleanliness, cut surface quality and cutting accuracy meet even the most stringent requirements.

Raumaster Paper’s process know-how extends over the entire paper handling technology and logistics in paper mills, converters and printing houses. The FINMaster roll finishing concept integrates parent reel handling, winding, core handling, roll handling and wrapping, broke handling, warehousing, sheeter operations, vehicle loading and related automation into a complete single supplier delivery. The main target of the new concept is to improve the productivity of the paper finishing and converting processes. The supplier provided all products and services from the efficient system layout engineering to skilled site supervision and training.

**Mota Engil**

**Execution of piles, earthworks, paving and buried infrastructure**

Mota Engil was responsible for the foundations of the new paper mill, composed of piles of variable diameters from 400 to 1000 mm in a total amount of 98,000 m. Two systems were used when building the piles: moulded piles and piles riveted in concrete.

The moulded piles consist of piles in diameters of 400, 500, 600, 800 and 1000 mm. Piles foundation in situ refers to foundation composed of piles made of reinforced concrete, whose execution starts by drilling, then reinforcing and concreting, with inclusion of pipes in the ground in order to ensure the soil’s containment and thus the drilling stability, or drilling by using thixotropic sludge or not.

Riveted piles in concrete of 457 mm diameter were used for the foundation of the paper machine’s main body in order to obtain the highest levels of consolidation for operating this machine. This method consisted of riveting the metallic coating to the piles concreted in situ. The piles or the metallic coating were riveted exactly in the position referred to in the detailed drawings, with the necessary dimensions and depths, by pile-driver. The order also included earthworks and street paving around the mill, as well as the buried networks: water, electricity, sewage and rainwater.

### Quantities

<table>
<thead>
<tr>
<th>Buried Piles:</th>
<th>98,000 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthworks:</td>
<td>150,000 m³</td>
</tr>
<tr>
<td>Structural Steel:</td>
<td>3,200 t</td>
</tr>
<tr>
<td>Asphalitic Concrete:</td>
<td>10,000 t</td>
</tr>
<tr>
<td>Pipes for buried infrastructure:</td>
<td>18,000 m</td>
</tr>
</tbody>
</table>

**Automated warehouse trucks**

- fast delivery and short payback time
- very long life cycle up to 20 years
- modular solution that can be tailored to customer needs
- minimized injuries and no damaged goods

For over 60 years Rocla has been the way-maker in intelligent material handling solutions. First AGV installations took place in 1983, and since then Rocla has delivered and installed almost 8000 automated guided vehicles in more than 1000 applications worldwide.

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A look on the construction when the piling was done in May 2008
Brunnschweiler

Aerothermic installation and ventilation system

Once again, Portucel Soporcel has put its trust in Brunnschweiler for the supply of the aerothermic installation and the ventilation system. The collaboration dates from 1991 and, at the turn of the year 2007/2008, the company received its third order from the Group, for the supply and installation of the hood and ventilation turn-key system, the hall ventilation system and the HVAC installation for the project in Setúbal.

The Brunnschweiler hood stands out because of its easy dismantling feature, which allows quick access to the drying section to carry out any necessary maintenance work, without losing the required performance of a closed hood which allows inside dew points up to 64.7°C. Roof and panels can be easily and quickly dismantled and this helps the maintenance personnel in their job. Moreover, in this project, materials from a new generation have been supplied without changing the overall philosophy. The new machine has an evaporation of 80,604 kgH₂O/h at the pre-drying section and 18,720 kgH₂O/h at the after-drying section and is totally enclosed by a hood with the following dimensions:

<table>
<thead>
<tr>
<th></th>
<th>Pre-drying</th>
<th>after-drying</th>
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</thead>
<tbody>
<tr>
<td>length m</td>
<td>88</td>
<td>24</td>
</tr>
<tr>
<td>width m</td>
<td>16.2</td>
<td>16.2</td>
</tr>
<tr>
<td>height m</td>
<td>7.9</td>
<td>7.9</td>
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</tbody>
</table>

Furthermore, a new roof type has been supplied, which improves the thermal insulation, the air tightness and the plenum formed by the roof section to allow better suction of the exhaust. The closure between the lifting doors and the aluminium half-height beams has been upgraded with a double closure made of rubber and special felt. The lateral panels of the hood have been designed with a special brake of thermal bridge to reduce the heat leakages to a minimum.

Five exhaust groups of about 775,000 kg/h total exhaust flow and another five blowing groups of 570,000 kg/h total blowing air have been installed in the mezzanine floor. Steam and condensate heating coils of galvanised steel have been made with a special separation between fins in order to allow a better cleaning operation and to avoid the accumulation of dirt. The exhaust flow passes through five stainless steel air/exhaust and water/exhaust heat exchangers provided with an automatic washing system with stainless steel piping.

The complete Optiformer exhaust system was supplied in stainless steel AISI 316L and the drop separators were manufactured in the Brunnschweiler workshop at Munguia. The complete pulpers exhaust system was supplied using nine different pulper exhaust groups. These exhaust and blowing fans were manufactured by Baltogar, part of the Brunnschweiler Group. The company also supplied the ventilation system, including HVAC equipment, for the additive plant, refiner room, vacuum blowers room, PM 4 hall, core handling, roll grinding room and roll storage, folio sheeters and cut-size sheeters hall, process reel store and carton and copier reel store as well as HVAC equipment for diverse electrical rooms. Installation, commissioning and start-up were done by the company’s personnel.

Moventas Santasalo

Drive solutions with minimum vibration and noise

Moventas Santasalo’s application-based drive solutions are integrated parts of the new paper machine. The drive solutions have been designed for absolute reliability at the highest machine speeds, and special attention has been paid to minimising vibration and noise levels.

Moventas is one of the leading experts in mechanical power transmission globally. Moventas Santasalo, a subsidiary of Moventas, provides the pulp and paper industry with drive solutions and life-cycle service support.
SupplierS

■ MSK Covertech

Implementing the future of film shrink packaging

For two complete shrink packaging lines, Portucel Soporcel chose MSK, one of the leading international producers of film packaging machines. Initial negotiations took place in 2007, when, together with Carlos Lopes (project manager for stores and processing), the project team of French and German MSK subsidiaries visited different reference plants. There, the high performance and reliability of the MSK equipment, as well as the film roll availability and the enormous power savings of the pallet shrink frame compared to pallet shrink ovens, convinced the Portuguese project manager.

By the end of February, 2008, MSK finally received the order. After successful completion of the Factory Acceptance Test at the beginning of the year, the machines were delivered this March: two film wrap machines, of the type MSK Flowtech, process different product dimensions with a capacity of up to 120 pallets per h. By adjusting the film rolls horizontally, the devices are able to increase the rolls’ exchange ranges by a factor and thus simplify the operation. In combination with MSK’s powerful pallet shrink frame technique, energy and film consumption are reduced to a minimum. MSK Synchrotech pallet shrink frames use a specially designed MSK hot-air system and are each equipped with two gas supply regulators with which the longitudinal and transverse sides can be controlled independently without having to mechanically adjust the heating elements. The pallet shrink frame adapts perfectly to the different formats in a fully automatic way. Compared to pallet shrink ovens, this leads to significant energy savings with high safety standards. “In the paper, print and cardboard industry, the pallet shrink frame technology replaces the shrink ovens and presents the future of film shrink packaging. This is why major international paper manufacturers like Portucel Soporcel have deliberately decided to go for MSK, the pioneer of shrink frame technique”, explained Rolf Vehreschild, key account manager. Apart from being the only supplier of mechanical power transmission, Moventas Santasalo is able to provide the entire layout engineering. The company also designs and supplies complete and comprehensive modular gear series which meet specific customer application requirements. The customer can rely on one supplier for a turnkey delivery from a motor shaft to a driven machine shaft and get a customised drive solution on each drive position.

Completion of the drying section for which Moventas Santasalo developed special drives

■ M oventas Santasalo

Drive solutions with minimum vibration and noise

labelled with the Santasalo trademark. The company’s products and services are built on decades of experience and cutting-edge technology developed by Metso Drives, Santasalo, Valmet and Sau erwald. Moventas Santasalo is the original equipment manufacturer for all these high-quality brand names in mechanical power transmission. The company’s turnkey delivery of mechanical drive solutions for the Setúbal project comprised the complete mechanical drive solution packages (synchronisation rolls in the press and calender sections and suction rolls in the forming and press sections) including all the requisite accessories. Moventas Santasalo also developed special dryer section drives according to the DRG concept for fast paper machines. The DRG dryer section drive is compact in design and includes all necessary components built into the housing of the gear unit. The unique internal coupling design of the DRG drive permits higher machine speeds, regardless of misalignment resulting from thermal expansions, mounting inaccuracies or distortions in the machine base.

The supplier’s solutions for reeling ensure controlled web tension throughout the reeling process and they run very quietly, minimising noise impact. A compact centre drive unit for the unwinding stand of a winder integrates the functions required for continuous operation of the automated winding process in a single pre-tested unit. A hydraulically operated reel spool coupling engaging mechanism and integrated disc brakes for emergency stop ensure safe and reliable control of the process. Furthermore, the company has delivered trademarked Santasalo modular drive units for sectional drives in the paper machine and the winder. The order also included a spare part package and layout engineering to ensure complete adaptability and optimisation of mechanical power transmission equipment in the paper manufacturing process.

As the only supplier of mechanical power transmission, Moventas Santasalo is able to provide the entire layout engineering. The company also designs and supplies complete and comprehensive modular gear series which meet specific customer application requirements. The customer can rely on one supplier for a turnkey delivery from a motor shaft to a driven machine shaft and get a customised drive solution on each drive position.
Last year, Rocla received an order to supply an automated warehouse truck solution for the mill project in Setúbal. The deal, worth more than EUR two million, represents the supplier’s single biggest deal of automated warehouse trucks so far. It covers around twenty vehicles for transporting reels from production to sheet cutting and for transporting pallets from sheet cutting to wrapping, with an option for twelve additional vehicles. The system also includes an automated battery exchange station.

“After evaluating many AGV suppliers, we chose Rocla because of their advanced technological solution and the best total package”, explained Carlos Lopes, project manager for stores and processing.

The vehicles are based on Rocla’s unique automated warehouse truck concept, which was launched in 2007. “The system’s modularity allows us to offer the same platform for both pallet and reel handling”, emphasised Anselmi Immomen, director of Rocla’s Solution Business.

“And because the vehicles are based on standard warehouse truck technology, our customers are able to utilise Rocla’s international service network,” he went on.

After an intensive planning and manufacturing phase in Rocla’s warehouse truck factory in Finland, the vehicles were shipped to the new paper mill in May and June this year. During the summer, the reel logistics in the new converting plant were commissioned and interfaces to the mill’s control systems and different machine lines were established as planned.

When production in the new paper mill was just about to hit the heights, completely automated reel logistics, equipped with the latest generation of Rocla AWTs and automatic battery exchange systems, were fine-tuned and made ready to automate production in the converting area.

Rocla

Unique automated warehouse truck concept

from the shrink packaging lines, the supplier furthermore delivered the conveyor technique and additional modules, such as cover board feeders and robot-labeling, as well as carry-off logistics.

This project is another important reference for MSK in the international paper industry and it shows once again that the company meets the high demands for energy cost savings, packaging quality, flexibility and packaging performance with their latest state-of-the-art solutions. In the past, numerous renowned paper manufacturers have already been convinced by MSK’s high technical standards and have opted for replacement of their shrink oven techniques with pallet shrink frames.

Some of these paper producers are Amcor, APP, Arjo Wiggins, Chemning Paper, International Paper, Mondi, Nordlandpapier, Tullis Russel and UPM.

The MSK Covertech-Group belongs to the leading companies in the packaging machines industry all over the world. Apart from semi- and fully-automatic shrink and stretch packaging systems for pallet loading units, the supplier also offers pallet conveyor techniques and on-plant handling systems – all of these being their own one-stop products. MSK sets great store by the high availability and safety of their machines and is well-known for its customised innovations.

MSK systems package paper parcels and loose sheets, paper rolls, cardboard and print products on pallets while creating a perfect display effect at the same time.
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