



PRESS BOOK

WHAT WE DO

Efficient technologies
in tissue making

"It is with great pleasure that we present the first edition of this small booklet, which brings together recent news, articles and press releases about Toscotec.

This booklet makes no claim to be a scientific publication, but only to summarise and offer a snapshot of the intensive activities undertaken by the company in recent years.

Our industry has changed greatly over the last decade. New markets have experienced rapid growth, while traditional and mature ones have adapted to reflect the important issues in our lives.

Energy, emissions and sustainability in general are the issues faced most frequently in our everyday lives, and likewise in the paper & tissue industries.

In the following pages, you will be constantly reminded of these terms, which are a common denominator in all our activities. Toscotec's mission is increasingly oriented towards the development of new products, the presentation of a comprehensive service offering, the design of turnkey plants and the best possible customer care during sales, project development and the post start-up period. While implementing this mission in recent years, we have continued to achieve our technology and business targets, keeping in mind that sustainable growth must be driven by careful consideration of energy and environmental issues.

For this reason we have decided to include a logo in our most recent marketing campaign as a reminder of this focus. In any case, we firmly believe that our commitment is not solely a feature of the marketing campaign, but something we have always applied to our deliveries and projects right from the outset. We hope that as you read the following pages, you will gain a better and more thorough understanding of Toscotec and its products, capabilities, activities, facts and figures."

Toscotec S.p.A.



Every Toscotec system delivers maximum energy efficiency with minimum environmental impact.

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TOSCOTEC REACHES ITS RECORD STARTING UP TEN MACHINES IN THREE MONTHS

Lucca, 12th February 2013 – Italian tissue machine supplier Toscotec S.p.a. has announced the achievement of a striking result starting up ten of its tissue machines in little more than three months. From 15th October 2012 to 31st January 2013 Toscotec has closed a tight schedule of complete TM start ups in three different continents: Africa, Europe and Asia.

Among these projects there are turn key solutions, tissue plants equipped with AHEAD-1.5M and MODULO-PLUS in Energy Saving configuration with different scopes of supply, but all including engineering and overall services for international customers as Vinda, Sipat S.A., C&S Paper and MP Hygiene. Not only different markets, but different environments and cultures also make flexibility a prerequisite if a tissue machinery supplier such as Toscotec is to remain

highly competitive. The implementation of a reliable service structure has also contributed to the success of the Italian company. Thanks to a worldwide structure, which includes Toscotec Asia & Pacific in Shanghai and Toscotec North America in Green Bay, Toscotec has made its Service Team available to the customers for all ten tissue machines supplied with a comprehensive package of services aimed at increasing efficiency and output, including training, maintenance and process assistance.

Today Toscotec with its associate Milltech hold a leading position in fast delivery and installation combined with the state of the art technology, offering a wide range of products adapted to the constant evolution of worldwide tissue producers' demands.



A TOUGH CALL FOR TISSUE

Optimal use of tissue technology in Western Europe requires some mature decisions.

By Davide Mainardi, Sales & Customer Care Director, Toscotec

Western Europe might be a mature market, but in tonnage terms, the region's business is worth fighting for. Unlike Asia, Western Europe need for additional tissue lines is limited, yet its highly competitive climate means that the cost per tonne of tissue, and therefore productive efficiency, is critical.

When they can be justified for capacity, and the myriad permissions granted, then greenfield mills are the most straightforward to design and engineer, but they are rare in Western Europe. It is far more typical for us to be challenged with an existing building, and the need to integrate with machinery, piping, electrical systems and so on, for a replacement machine or a rebuild. Even a converter which chooses to build its own tissue production capacity is likely to be installing its machine without the

luxury of new premises, as is the case with Toscotec's recent project at MP Hygiene in France.

The cost of such projects is a key to competitiveness, so technology which can slot within an existing footprint, and which minimizes civil works, gives a major advantage.

This applies not only to the tissue machine, but to all related systems. Note that MP Hygiene believes its new tissue machine to be one of the most efficient in the world, without the luxury of a greenfield approach.

To give another space-related example, one innovation in the approach flow which we recommend is the replacement of the mixing tank, agitator and discharge pump with a simple concept which performs the functions of all these elements (the TT Mix).

The principle is very simple provides effective mixing while reducing space required and energy consumption.

The pulp factor

A key area for all tissue mills is fibre flexibility. In Europe where new projects tend to be built around an existing infrastructure this is particularly challenging. The softness and bulk imparted by eucalyptus pulp, and more recently, its favourable pricing, means tissue mills seek to use it more in their furnish instead of softwood. There is a price to be paid, however, because softwood pulp's long fibres impart strength or tensile to the sheet. This not only impacts the final product, but runnability, too.

The fibre mix must be considered in production line design, from pulper to rewinder. Each pulp flow (softwood

and hardwood) needs to be controlled appropriately and refining must be adapted to the fibre's needs. Then there dust: short fibre pulps like eucalyptus create more of it, which affects the mill environment, a factor stringently controlled in Europe. Solutions to remove dust at source therefore need to be considered. The impact on the structure in the sheet caused by the reduction in long fibre can also affect the web transfer from yankee to reel, which needs to be considered, as does the pressure during pope reel winding on a sheet which is potentially weaker - an area to which Toscotec has devoted considerable R&D. This discussion should not neglect de-inked pulp (DIP).

Collected fibre can be ever more challenging to process, but tissue producers in Western Europe should also prepare for declining volumes of newsprint in the region, diminishing an important source of DIP which may impact pricing, quality and ultimately, availability.

A final comment on pulp: there are in Europe a few cases where both slush pulp from a local or integrated supply is used in addition to dry pulp.

If a tissue machine is dealing with both types, it must be borne in mind that a sheet derived from slush pulp will leave the press section at a lower dryness level, and the yankee/hood arrangement must be able to compensate.

This is where a Steel Yankee Dryer (TT SYD), is recommended, because of the superior heat transfer compared with cast iron.

Quality expectations

In the relatively wealthy nations of Western Europe the expectations of quality are high and consumers expect even basic products to be of a high standard. This brings us back to bulk - a characteristic which depends

on many factors, not just nip-load control. The choice of a single or double press will affect it as will the size of the suction press roll. Creping blade angle and stability, and the use of ceramic blades rather than steel are also influential. Ceramic blades also provide durability and consequently reduced downtime.

A shoe press is bulk-friendly but limits speed, so this trade-off needs to be examined when specifying a tissue machine in Europe, where high output may be essential for competitiveness. The balance of drying between the yankee cylinder and hood is also central to bulk retention.

Responsibility for bulk goes beyond the mechanics of the tissue machine. Choice of refining disks and control of the refining process can influence it, as can the use of chemicals, and post-tissue machine factors such as rewinding and converting.

Fit for the future

Tissue quality just part of the big picture when it comes to meeting the demands of producing tissue in Europe. In such a competitive and regulatory environment, the use of energy and water are highly significant. While Toscotec's innovations in TT SAF (Short Approach Flow) technology, and of course TT SYD, have shown significant opportunities to reduce energy consumption, the possibility to achieve energy savings through recovery has been clearly shown by our sister company Milltech. Energy recovery should be seen alongside the reduction in primary energy consumption as a means to reduce carbon footprint and increase efficiency.

The regulations surrounding water are particularly relevant in areas of southern Europe where water can be scarce. To address this, we consider it essential not only to reduce the quantity of water used in the process, but to

maximise water recycling. As with energy, it is not just what you put in, but what you recover. Water and energy are central to emissions, but in Western Europe, noise is also an important factor.

The impact is not only registered in the mill where employee protection is at stake, but also in the mill's vicinity.

The proximity of housing is a particular issue in Europe, and Milltech has been working closely with customers on external noise abatement.

Western European mills have responded faster than their North American peers to the need to upgrade technology to meet market demands. Energy has been historically more of an issue in Western Europe, where producers have also needed to be more flexible in the grades which a single machine is expected to produce.

As Western Europe's tissue producers consider their production assets, whether and how to invest, they should of course keep quality, sustainability and efficiency at the forefront. But with the challenges and demands of upgrading capacity in Europe, it is necessary to dig deeper.

It is essential to consider net capacity, for example. In other words the real output of saleable paper and not just the nominal capacity of a tissue line. Can the mill rely on service after start up to minimize downtime, and can a supplier provide a turnkey service and thus keep control of the project's duration and the disruption it causes?

As producers to the south and east invest in their assets and seek new markets to deal with over-capacity at home, the tissue makers of Western Europe, from independents to multi-nationals, need finely-honed processes to ensure they stay in the game.

LITHUANIA'S GRIGISKES STARTS CONSTRUCTION OF NEW TOSCOTEC TISSUE LINE

Lucca, 19th July 2013 - Implementing the expansion of its paper business, Grigiskes AB has recently signed a contract with Toscotec for a new tissue line with a maximum capacity of 110 tpd.

Grigiskes AB company group is one of the leading regional player, operating in pulp and paper, packaging and wood industries, employing around 900 employees, with a yearly turnover of EUR 84 Mio.

Grigiskes AB is Lithuania's only producer of tissue products, working in this type of business for 190 years. Company's history counts since 1823, when the first paper manufactory was founded in Kuckuriskes that later years was incorporated into Grigiskes Group. Through many years the company was expanding and grew up into the biggest pulp and paper manufacturer in the Baltic region.

Today, Grigiskes Paper Mill is a private company belonging to the Grigiskes AB Group, operating 3 PMs with an annual tissue paper production of 28,000 tons. Grigiskes owns the brands called GRITE and GRITE PROFESSIONAL.

Today, GRITE is a renowned brand not only in Lithuanian market, but in all the surrounding countries as well.

The focus of the brand is to create cosiness, comfort and safety to the consumer. GRITE has a wide variety of consumer hygienic paper and away-from-home products: toilet paper, towels, napkins, handkerchiefs, folded towels, wiping paper, etc. With a market share of 41 percent for toilet paper and 33 percent for kitchen towels in Lithuania, this company exports more than 60 percent of production to 22 countries worldwide.

In early 2011 the company has already modernized the dry section of existing TM5 with the installation of a Toscotec Steel Yankee Dryer TT SYD-15FT.

The project was successful, with a 25 percent of energy savings and 40 percent of capacity increase.

The good cooperation between the two companies has driven the decision to continue with this new order.

The new Toscotec's line includes AHEAD-1.5S Crescent Former tissue machine with single-layer headbox, single press configuration and a Steel Yankee Dryer (TT SYD-15FT), machine auxiliaries including vacuum pumps, stock preparation plant for virgin pulp and electrification & control system.

Milltech, Toscotec associate will be also deep involved in the project providing a natural gas heated hood with three stages heat recovery system, machine dust and mist removal system, hall ventilation system. A two unwind stands tissue slitter rewinder TT WIND-M and an automatic roll handling system complete the supply.

The machine design speed is 1,900 mpm with a net web width of 2,750 mm. The project will be managed by Toscotec on an EPC (Engineering and Procurement) basis.

The turn-key project will be focused on energy savings and low emission concepts with a great attention to the environmental issues.

"For us, the environment is a main issue. We have been trying to reduce CO₂ production for some years now, and we always remember that respect for the environment is an issue that many people have at heart in our country. So these are the main reasons why we recognize in Toscotec the right partner for our continuous growth" Mr. Pangonis, president of Grigiskes Company Group, said.

NEW TOSCOTEC ECO-SUSTAINABLE TISSUE LINE FOR EUROVAST'S CARTIERA DELLA BASILICA IN LUCCA

Lucca, 15th October 2013 - The Italian company Eurovast has chosen Toscotec to supply new machinery for its Cartiera della Basilica Lugliano-Bagni di Lucca (LU) plant.

The machinery with a maximum production capacity of over 30,000 tonnes/year and winder paper size of 2,800 mm will go into production in the first quarter of 2014.

Eurovast, a limited liability company managed by the Romano's family and headed by entrepreneur Vincenzo Romano, is at the forefront of the Lucchese paper making industry. It has been working in the tissue market since the beginning of the '90s.

The company currently has a production capacity of more than 70,000 tonnes per year with a total plant surface area of 36,000 m² (three paper production plants and two processing plants located in the Lucca region in Bagni di Lucca, Villa Basilica, Lanciole, Capannori and Borgo a Mozzano). The production chain starts with the raw material and the fibres that are selected directly from Cartiera della Basilica. These are then transformed in the converting area of Eurovast S.p.A. plants. Products are developed paying particular attention to health, safety, practicality and eco-sustainability. The company has followed a dynamic and innovative path, which resulted in bring-

ing Rotolotto® to the shelf in 1994.

Rotolotto® is the first single roll (typical of the industrial sector) for domestic use. For Eurovast this product was the driving force for growth and expansion that continues today with a complete range that includes the Fior di Carta® and Fior di Carta Lifestyle® brands. The new machinery is a MODULO-PLUS Crescent Former in double press configuration and Steel Yankee Dryer TT SYD-3200MM with a maximum speed of 1,500 m/min; it's the ideal solution for meeting the demand for a high quality product together with the need for energy savings and emission reductions.

Care for the environment and the desire to install an eco-sustainable and innovative system were Eurovast's determining factors in choosing to offer the consumer manufacturing excellence in a rapidly expanding sector.

The machinery will be installed at the existing site following the dismantling of the current machinery. Engineering services, assembly supervision, commissioning and start-up are all taken care of by Toscotec.

This new investment made by Eurovast will ensure the continuation of the growth process that begun in 2007 and allowed the company to adopt new paper making systems aimed at improved paper quality.

For example, the purchase in 2008 and 2011 of new machinery for the paper transformation plant led to an improvement in product quality and aesthetics.

Attention to health, safety, energy saving and eco-sustainability, which is the fruit of a privileged relationship between the company and its clients, make up the driving force in choosing Toscotec as a reliable partner for this project.

The partnership between the two companies will long continue given that last October, on the occasion of the celebrations for the sale of Toscotec's 100th Steel Yankee Dryer, Eurovast was awarded as the first company in the world to have installed the TT SYD Yankee Dryer in 2000 in its Botticino plant.





TURKEY'S PARTEKS INVESTS IN A NEW TOSCOTEC TISSUE LINE

Lucca, 21st August 2013 - The Italian leading paper machinery manufacturer Toscotec will supply a complete tissue production line to the Turkish company Parteks. The tissue line will be installed in Kayseri capital of the same district in the Central Anatolian region. The line will be started up in the first half of 2014.

Founded in 1996, Parteks Paper Co. is a fully integrated large manufacturer of tissue paper for household and community, corrugated cardboard and fluting paper. The existing plant, that houses the TM1 tissue machine (started up in 2007), the PM1 fluting machine and corrugating line, covers an area of 100,000 square meters. Converting facility for tissue is close by the plant. The company employs around 300 people. Thanks to the huge investment process in the last two years, Parteks focuses on adding value to its brand

name and products. The tissue paper is produced with recycled paper and virgin pulp.

Panda and Senta are well-known tissue paper brands produced by Parteks.

"Eco-friendly since we are in the business" is the Parteks slogan. By its means, the company acknowledges the values of quality, tradition and interest in the environment and the community. According to this slogan and to this



philosophy the new Toscotec project will be focused on reduced energy consumptions, usage of selected raw materials in the manufacturing process, recovery and re-usage of the process water, low emissions (noise and pollutants) as well as on green energy adoption with the application of a steel yankee dryer technology. The delivery, based on an intensive energy-saving concept, includes the approach flow featuring ultimate Toscotec technology TT SAF®, broke line, a MODULO-PLUS tissue machine with single-layer headbox, single press configuration and Toscotec Steel Yankee Dryer TT SYD-12FT. The supply will also comprise an electrification and controls package, tissue machine auxiliaries like a natural gas heated hood, steam & condensate system, provided by Toscotec associate Milltech. A two unwind stands Toscotec rewinder TT WIND-P will complete the package. With a width of 2.85 m and a design speed of 1,600 mpm, the new production line will produce 75 tons a day of high-quality facial, toilet and towel grades, despite the mill is located at 1,050 m above the sea level.

Toscotec is one of the market leaders for tissue machines with numerous installations worldwide.

With this latest order the company continues on its further expansion also in the challenging middle east market. With this latest order, the 10th in 2013, Toscotec continues its expansion also in the challenging middle east market strengthening its position as one of the worldwide leading suppliers of tissue machines.

WORKING TOWARDS A BRIGHT FUTURE

Bel Papyrus and Toscotec continue their collaboration with a project designed to get the best tissue out of a challenging raw material.

By Marketing Department, Toscotec

Several African countries now support sophisticated tissue production facilities, one of which is Nigeria, where Bel Papyrus has been consolidating its leading position in the region. With its investment in a new Toscotec line in Lagos this year, PM3, taking its annual production capacity above 45,000 tonnes, Bel Papyrus is something of a pioneer among tissue producers in the dynamic ECOWAS countries in West Africa. A further investment project due for completion in September 2015 will take Bel Papyrus to 75,000 tpy. The original sloped wire machine started up in 1990 (PM1), followed by a MODULO Crescent Former line in 2004 (PM2). Nigeria is expected to see growth in tissue consumption of around 6 percent for the foreseeable future according to RISI's Outlook for World Tissue. This is a similar rate of growth as predicted for the whole continent, although Nigeria, with a population of more than 150 million, accounts for around 10 percent of Africa's consumption alone, even when South Africa's relatively substantial consumption is taken into account.

Africa's total tissue consumption of around 2 percent of the world total is a small but important part of a big picture: Toscotec has notably sold 25 lines to China alone in the past three years compared with a handful in Africa in total. But the company nonetheless sees Africa as a country moving towards more sophisticated technology, and therefore one which requires commitment and attention. A specific brief from Bel Papyrus combined with challenging local conditions was also particularly suited to Toscotec's specialism in turn key (Engineering and Procurement) projects, where it builds or sources, and engineers the complete installation, from stock preparation to rewinder. The location of the project is never an impediment, and complex recycled paper plants are very much within its expertise, as well as the more standard virgin fiber lines.

Stock preparation

To begin with stock preparation, Bel Papyrus wanted to create the best quality recycled fiber-based tissue paper it had ever produced, with higher brightness of not less than 80°ISO and fewer specks. However it needed to achieve this using a lower

quality raw material. The fiber source which Bel Papyrus had in mind for its new line was practically unselected waste paper, as opposed to the selected, mainly white waste paper it has used for its existing lines. The furnish mix is expected to be 60 percent mixed office waste, 30 percent waste magazine paper and 10 percent old newspapers. It soon became clear that Bel Papyrus needed a stock preparation system which was capable of dealing with the toughest of furnish, so it had to feature all the appropriate technologies.

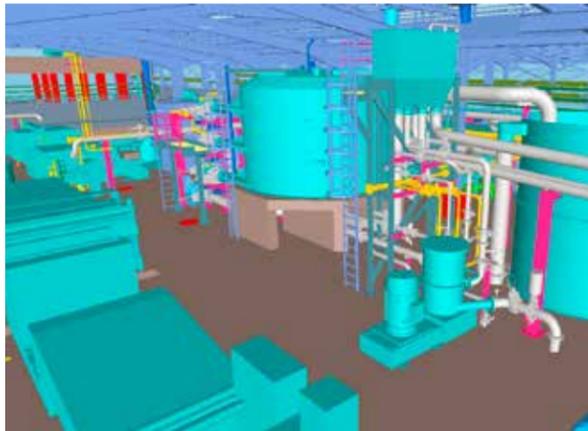
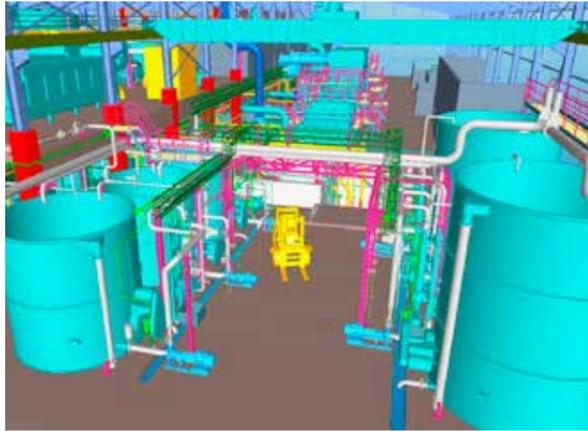
The new installation features two separate stock preparation lines – one for virgin pulp and the other for recycled fiber. The lines have been designed to allow a mix of furnish in due course, although this was not the initial intention. As turnkey supplier, Toscotec commissioned and engineered the stock preparation installation using top quality equipment, representing the best available technology from each sub-supplier, including high consistency pulping, screening, flotation deinking, low density cleaning, first loop washing, fast hot dispersion system, a first oxidative bleaching, second washing and finally a second (reductive) bleaching stage.

Four separate water loops allow best fiber recovery, water cleanliness and reduction of fresh water consumption by re-use of part of the process water.

Toscotec also supplied a reject treatment system and a sludge dewatering plant which is pre-prepared to provide incineration when required.

It is essentially a one-and-a-half-loop deinking line. A second deinking loop could be added to make it a two loop line, but Bel Papyrus has certainly commissioned a very comprehensive system to achieve its ambitious aims in terms of quality. It is, however, possible to by-pass certain stock to 38 percent including fines in the pulper which is reduced in the de-inking line down to 2 percent at the machine chest inlet. The yield from the de-inking line (in terms of fiber) is up to 65 percent. Fresh water is at a premium in Lagos and water consumption has therefore been kept to a minimum.

With the use of filtered clarified water wherever possible, fresh water consumption is around half that of



single-layer headbox, single press configuration and Steel Yankee Dryer (TT SYD-12FT). The design speed is 1,800 mpm and web width 2,850 mm. Further equipment within the scope of supply includes a steam generator, air compressors, a TT WIND-P slitter rewinder with three unwind stands, plus a calendaring station and jumbo reel wrapping machine.

The configuration of the new tissue machine takes into account the demanding nature of the raw material.

Even though the deinking line has proved its ability to generate bright, clean pulp, the mill still took precautions such as having a long felt run and particularly rigorous felt cleaning and conditioning so as to leave nothing to chance.

Toscotec adapted the layout of the tissue machine, rewinder and ancillaries to fit in an existing building and modified an annexed building to accommodate the stock preparation plant, and in particular the deinking line.

Continued cooperation

As Bel Papyrus prepares for PM4 in 2015, the cooperation between this visionary Nigerian company and Toscotec continues. Riad Baloukji, managing director of the Boulos Group of companies which includes Bel Papyrus, explains the motivation for this continuing relationship: "Besides the long term and successful cooperation between our companies, the decisional factor for choosing Toscotec once again for this challenging project was its ability to provide 'state-of-the-art' equipment and realise complex 'turn-key' projects worldwide." Bel Papyrus will have practically tripled its capacity in less than three years, showing ambition and belief in the region's potential as a market for quality tissue products.

The ability to turn the most challenging raw material into not just an acceptable product, but one appreciated for its brightness and quality, will send a strong message to the market about how local challenges need not curtail ambition.

an equivalent line installed where fresh water is more plentiful. Power is also something of a challenge. To guarantee continuity of power in an area where the electricity can be cut off without warning, Bel Papyrus has been obliged to build a substantial facility with gas and diesel generators which almost equals the size of the main machine hall.

The result is that the paper machine is working towards its 1,800 m/min potential, and power will not be a restrictive factor.

The tissue machine

The new tissue machine, which started up in June this year, is a Toscotec AHEAD-1.5S Crescent Former model with

BEL PAPYRUS STARTS UP THE NEW TOSCOTEC TISSUE LINE PM3

Lucca, 12th July 2013 - On June 2013, the Nigerian tissue producer Bel Papyrus Ltd, member of the Boulos Group Of Companies, started up their new Toscotec supplied complete tissue production line installed in Lagos (Nigeria).

The new Toscotec's line, with an average production of 23,000 tons per year, includes AHEAD-1.5S Crescent Former tissue machine with single-layer headbox, single press configuration and a Steel Yankee Dryer (TT SYD-12FT), machine auxiliaries, stock preparation plant for virgin pulp and for recycled paper including deinking cells, 2-loop washer system and a hot dispersion system and the electrification starting from medium voltage cabinets and control system. The supply contract also includes: steam generator, air compressors, a three unwind stands tissue slitter rewinder TT WIND-P with a calendaring station and a jumbo reel wrapping machine. The machine design speed is 1,800 mpm with a net web width of 2,850 mm.

The project has been managed by Toscotec on an EPC (Engineering and Procurement) basis.

The new line, designed according to the Best Available Technology (B.A.T.), for tissue production, will allow the Nigerian producer to guarantee its own requirements for the existing converting facilities and to consolidate its leading position in the West African tissue market (ECOWAS countries) raising the company's total production capacity above forty five thousand tons per year.

"Besides the long term and successful cooperation between our companies, the decisional factor for choosing once again Toscotec for this challenging project - said Mr. Riad Baloukji, Managing Director of Boulos Group of companies - was its vocation to provide "state-of-the-art" equipment and realize complex "turn-key" projects worldwide."

Toscotec is very pleased with the third consecutive order for major project received from Bel Papyrus. PM1 (a Sloped Wire Machine) and PM2 (a MODULO Crescent Former) were supplied in 1990 and 2004 respectively.

On top of the above, Toscotec is presently studying on site in Nigeria the layout of the paper mill number 4, expected to be of a capacity of 28,000 tons per year, and to start production in September 2015, which will further consolidate the position of the Group in the tissue supply for the whole West African market with a foreseen capacity of 75,000 tons per year.



ALL IN THE PREPARATION

The pulp and water processes in a tissue line offer considerable potential for energy saving, through intelligent, tailored design.

By Cristina Brocchini, Technical Manager, Process & Project Engineering Department, Toscotec

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The use of raw materials in the production of tissue has evolved over the last few years in favor of short and recycled fibers and there are distinct regional variations in raw materials usage as well. With this in mind, stock preparation has taken on more significance than ever before in ensuring high quality standards and tissue machine runnability.

But alongside these issues, the energy factor has come into sharp focus for both environmental and economic reasons, and our research and development activities have uncovered significant new opportunities for stock preparation to contribute to overall production efficiency.

Except where stated otherwise, all the technologies described are now in operation in real mill situations based on TT SAF (Short Approach Flow) technology (patent pending). Whether the producer is using dry pulp bales, slush pulp or waste paper, many of the same principles apply.

Compact, not compromise

As you might expect, the story starts with the pulper. The design is compact, but without compromising capacity thanks to increased working consistency. A redesigned impeller minimizes batch timing (batch time should be a consistent priority through any pulper optimization) and improves performance thanks to superior slushing.

The bottom line is that efficient mixing at a higher consistency – in other words the same quantity of fiber processed with less water – also brings significant reduction in specific power consumption. In refining, probably the essential design initiative is the new pattern designs on refiner disks. These have been developed to respond better to the different types of pulp which mills are handling, particularly the increase in short fiber, and to maximize the flow rate over the disk size. In the approach flow, one of the central innovations is the replacement of the mixing tank, agitator and discharge pump with a simple concept which

performs the functions of all these elements (the TT Mix). The principle is very simple and is based on a mixing funnel. The key is to introduce the substances to be mixed in the correct way and then leave it to the extremely efficient vortex action of the funnel to provide effective mixing while reducing space required and energy consumption. The machine stand tank provides another opportunity for upgrade. By keeping this as small as possible through thorough analysis of the individual mill situation, one can ensure the quickest possible grade and color changes at minimum energy consumption, but without risking the pressure pulsations and variations in consistency and color which can result when the machine tank is eliminated altogether.

Reduce volumes, speed up cleaning, improve efficiency

Of course all volume reductions help to speed up routine cleaning procedures, which any mill would welcome. Static mixers have a reputation for gathering a build-up of fibers, but this can be avoided using the solution already described which does away with the mixing tank (TT Mix has no inserts and no moving parts – the elimination of moving parts is another key focus of our research, because of its

positive implications for maintenance and energy saving). Automatic cleaning sequences further rationalize the management of the line and create more efficiencies.

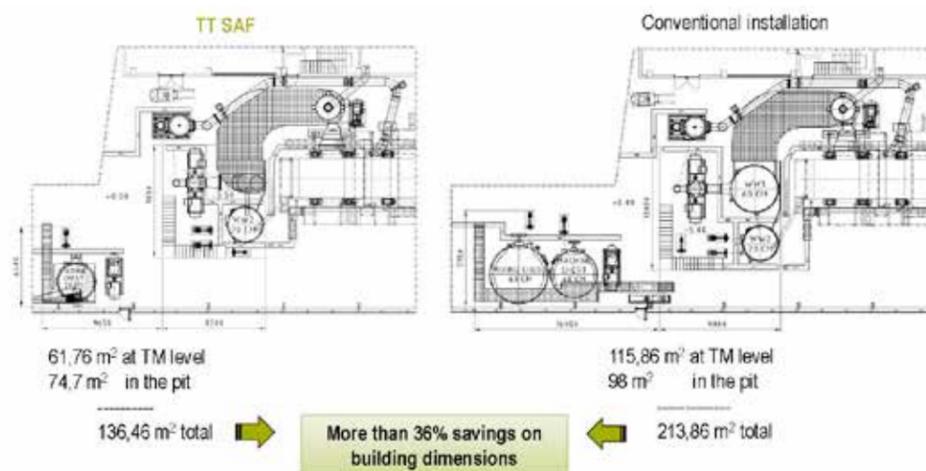
Screens provide an excellent opportunity to improve operational efficiency. We have found that stringing and deposits can be avoided by careful selection of foil rotor/basket combinations, basket size and type and rotor speed. Selection of a multi-foil rotor helps to minimize hydraulic pulsations.

The re-engineering of the screen has been focused on the fluid dynamics and ease of maintenance. Overall, such carefully-considered screen design ensures a constant speed of stock through the basket, saves energy and ensures high deflocculation.

Another area in which time savings and therefore energy savings can be achieved is in control loops. Research and experience have shown that control loops dead time can be minimized by reducing volumes without affecting outcomes, but with the benefit that the line can respond more quickly to changes in production parameters.

This adds to the gains already made in the mixing, machine and white water tanks. Equally, attention paid to first pass retention will always be rewarded.

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This measure of the percentage of useful fiber which makes it through to the tissue machine in the first pass through the approach flow system is aided by efficient flume and deaerator design. Overall, the higher the first pass retention, the less pumping energy is required. The TT Deaerator itself has no moving parts which require maintenance and it uses centrifugal forces to reduce entrained air. Customized sizing in terms of dimensions and open area ensure optimal performance and energy saving. It also allows a reduction in the flume size and length and elimination of the white water silo. On this point, management of air in the system is of course critical, as entrained air can cause loss of machine performance and sheet breaks.

Consider your pumping options

Pumping is another major source of energy consumption in the tissue mill and therefore provides an ideal opportunity for energy saving. Minimizing the pumping energy required through intelligent mill layout and accurate piping design is the first obvious step, but there are technology issues to contend with, too. For process pumps attention should be paid to ensure selection of the most efficient solution in terms of impeller design and shaft sealing type. Within the vacuum system there is the option of the tradition system with liquid ring pumps or the more recent applications of turbines and turbo blowers. We work with all these technologies, but it is worth considering the costs and benefits of each. Even the tissue market has moved towards the turbines that in the past were mainly used on large paper machines because of their capacity. While they operate at higher speeds than liquid ring pumps and therefore require more frequent and specialized maintenance, one turbine can typically do the work of several liquid ring pumps.

The downside of this is that if the turbine needs maintenance, it is far more likely to cause a complete shutdown of the system, whereas, as an example, two out of three liquid ring pumps could still keep the show on the road, albeit at reduced output. Enter the turbo blower, which can also do the work of

several liquid ring pumps, but operates at slower speeds and can be specified in even smaller sizes than turbines. The caveat is that while maintenance might be less frequent, it can still be very expensive. They have been used in paper and board, but hardly at all in tissue. This could change as knowledge of their attributes becomes more widespread. So how about the energy requirements for these vacuum system options?

The installed power for each solution is similar, but turbines and turbo blowers offer viable heat recovery, unlike liquid ring pumps, so energy savings are possible. The energy saving potential is greater for turbines, but this can be offset in the case that the turbo blower assures more reliability and reduced maintenance. So far, turbines and turbo blowers tend to favor larger installations, but the technology is under development, and the balance of benefits and drawbacks for each solution is likely to change. Of course it is not just about the components, but also the way they are engineered into the system as a whole. If liquid ring pumps are chosen, note that fresh water consumption can be minimized thanks to the use of a closed loop water circuit over a cooling tower.

And this type of installation would also ensure energy saving thanks to the use of colder water for the vacuum pumps ring.

Headbox carries on the good work

This particular story goes as far as the headbox. It has proved possible to redesign the headbox screen to boost cleaning efficiency and reduce energy consumption while maintaining the high deflocculation and other benefits of the original.

The focus in the TT Headbox itself has been to ensure quick response to product changes – after all, you can have the most nimble stock preparation system in the world, but if the headbox’s response is lethargic then all benefits are lost. Management of turbulence is the key, thus avoiding unhelpful pressure drops which entail unnecessary extra power consumption.

Easy maintenance is ensured by lateral access doors which make cleaning of all parts a simple task. The headbox translates the hard work done in stock preparation into stable paper quality, with consistent formation, CD and MD profile

and tensile strength.

From an energy point of view, the main target has been to reduce the installed power on the fan pump, while maintaining high output and quality.

And the flexibility of the headbox also allows this goal to be achieved by playing with operating consistencies and increasing them as much as possible without compromising paper quality.

All efforts to optimize the size of stock preparation and approach flow elements, from TT Mix and flume design to piping layout, help to minimize the footprint of the whole installation. Beyond the energy and time savings to be gained from such attention to detail, there will also be a reduction in necessary civil works, which helps to keep down the cost of initial investment. Recent projects have proved that it is possible to achieve nearly a 50 percent reduction in approach flow installation footprint compared with a conventional installation. This results in meaningful savings.

The next steps

Evolution never stops, and the current focus is on the water cycle, and technologies to minimize power consumption in the process of mixing air and water for the

flotation process. Once again we should emphasize the need to optimize layout to reduce the power required for pumping. Elimination of unnecessary tanks and reduction of tank volumes has already yielded strong results. The desire to reduce chemical use still further also continues to inspire research, with hydraulic mixing being a key focus of our attention. And of course stock preparation is part of a complete project, with numerous energy saving opportunities which we are working on constantly, but which could provide material for several articles.

Today, it is only really as a turn key supplier with expertise throughout the tissue making process, that it is possible to optimize production from an energy perspective, and indeed from all perspectives. At the root of all successful R&D and its application in the real world is detailed knowledge of worldwide market needs.

The experience of working in different countries with various raw material mixes and energy sources (steam, natural gas, LPG, fuel oil, diesel etc), yields not only the best solutions for specific local conditions, but results in a cross-fertilization of ideas from one situation to another. This is brain storming at its most effective.

	TT SAF	CONVENTIONAL INSTALLATION
Mixing tank agitator	Not existing	17,6 kW (60 m³ tank)
Mixing tank discharge pump	Not existing	6,4 kW
Machine chest agitator	6 kW (20 m³ tank)	8,8 kW (40 m³ tank)
Fan pump	590 kW	620 kW
Total	596 kW	652,8 kW

Average reduction of energy consumption around 9%

Data written in the tables represent the absorbed power and are referred to a TM production of 100 ton/day.

	TT SAF	CONVENTIONAL INSTALLATION
Mixing tank	Not existing	30 - 60 m³
TT Mix	0,5 m³	Not existing
Machine chest	6 - 20 m³	30 - 40 m³
Flume & Silo	Not existing	90 m³
Flume & Stand Pipe	40 m³	Not existing
Total	46,5 - 60,5 m³	150 - 190 m³

Average reduction of storage volumes in approach flow system up to 75%

TOSCOTEC OPENS SHANGHAI FACILITY TO BETTER SERVE THE ASIA PACIFIC MARKET

Shanghai, May 2013 - In order to keep pace with the astonishing growth of the Asia Pacific tissue market, Toscotec S.p.A. has successfully established its Chinese subsidiary, Toscotec Paper Machine (Shanghai) Co. Ltd. Toscotec is proud to be able to contribute to the Chinese economy by employing local young engineers and highly qualified personnel for the construction of state-of-the-art machinery.

The new company, a Wholly Owned Foreign Enterprise (WOFE), is located approximately 40 minutes' drive from Shanghai downtown and 20 minutes from Pudong International Airport, in the Gaohang district of Shanghai, and has a total covered area of 1,500 m² dedicated to paper machine manufacturing and commercial offices.

Toscotec Shanghai's mission is to become a benchmark for tissue technology in the Asia Pacific region, to provide the best service level to its Customers and strengthen the company's presence in one of the world's most significant and fastest growing markets. With a skilled team of permanent engineers from both Italy and China, Toscotec Shanghai is now in a position to manufacture and deliver tissue paper machines to its prestigious clients. The Shanghai Service Team will be able to provide a full range of services such as mill site surveys,

fast delivery of spare parts and mill staff training. Already active in the Asian market since early 2000, Toscotec S.p.A. has developed a strong commercial network in the Far East in recent years with the result that today fourteen tissue machines have successfully started-up for prestigious Chinese clients and an additional fifteen are to be started-up in 2014.

Alessandro Mennucci, CEO of Toscotec Italy, proudly declared: "This start-up, together with our existing commercial network, brings Toscotec closer to our Asian clients, wherever they are located."

A NEW TOSCOTEC STEEL YANKEE DRYER FOR THE JAPANESE TISSUE PRODUCER MARUTOMI

Lucca, 9th April 2013 - The Japanese Tissue Producer Marutomi has chosen the excellence of Toscotec Steel Yankee Dryer to replace the existing 12 FT Cast Iron Yankee on Fujine mill, located in Fuji, Shizuoka Prefecture.

The PM1 tissue machine features a crescent former configuration with a sheet width at pope reel of 3,140 mm. The new Toscotec TT SYD-12FT, will be installed within the end of 2013. The installation will allow to increase the production speed as well as to guarantee a considerable energy savings, one of the key item in Japanese tissue industry, where Toscotec, thru its agency Shinsei Corporation, has already been experienced.

The supply will be provided according to the local regulation and to the JIS (Japanese Boiler Association) standards. Related services will be also part of the scope of supply. Founded in 1955 as a small mill with one 1.2 m wide tissue machine and nine employees, Marutomi now has 13 TMs in total and, focusing mainly on bath tissue from recycled paper, has grown into one of Japan's largest producers of toilet rolls with a market share that it estimates to be around 14 percent. For raw material, it uses only 100 percent recycled fiber with about 95 percent of its production being toilet tissue and the remaining 5 percent facial tissue.

With this further sale Toscotec re-states its leadership as a global supplier of energy saving solutions to the tissue industry and as steel yankee dryer manufacturer worldwide.



HEAT IS ASIA'S HOT TOPIC

An energy-focussed approach is just what Asia needs right now.

By Marco Dalle Piagge,
Sales Manager Asia & Pacific

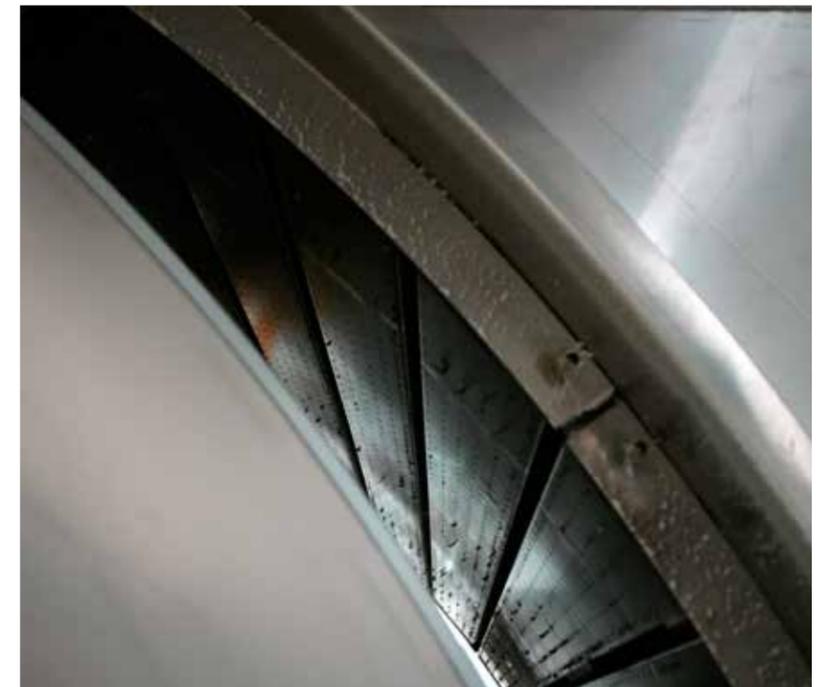
Asia is a vibrant place for anyone involved with tissue. Our experience bears this out: we have sold 25 tissue machines to China in the past three years, and in the period October 2012 to February 2103 alone, started up 10 projects.

This high level of activity in Asia has taught us many things, but the most fundamental insight is the significance of energy efficiency for the region's tissue makers. The Steel Yankee Dryer (in our case TT SYD) is the technology of choice in Asia, and is still evolving. We have delivered 40 to this market in the past three years which alone suggests that energy is top of the agenda. But while the benefits of steel as opposed to cast iron have been widely discussed, there are many other aspects of tissue making which offer opportunities to increase energy efficiency to Asia's tissue makers. In this article, we focus on the interaction between yankee and hood.

Between hood and Yankeeew

Hood drying requires up to 30 percent more energy per kg of water evaporated than Yankee drying, so as a starting point, it is beneficial to the process to maximise the drying potential of the Yankee, possibly by considering a larger diameter unit, and then specifying the hood according to production priorities and local conditions, especially in terms of available energy sources.

C&S Tissue, to which we supplied a total of six new lines last year in Jiangmen, Tanghsan in the northern prov-



ince of Hebei, and Chengdu in Sichuan, south west China, has been a case in point. Local conditions have dictated that none of the new tissue machines has a gas-heated hood. The hood merely sucks out the mist generated by the Steel Yankee Dryer (TT SYD), so the dryer is effectively doing all the work. Our answer has been to specify our largest ever SYD at 16FT (4.88m) in diameter. In our experience, Asian tissue manufacturers are becoming more interested in energy and quality rather than just speed and capacity. It is net tonnes or actual output which matters rather than theoretical capacity. In this regard, speed itself can be a distraction, when it is overall efficiency that is the most important figure, as a measure of net energy consumed per tonne of product produced.

This is particularly relevant in China, where the lack of gas which C&S has

to deal with is a common problem. Guangdong for example, has virtually no gas at all. Most 30 to 50 tpd tissue machines in China rely on coal to generate steam. If mills on sites without access to gas have plans to step up to higher production levels, they will have to consider that coal is simply not able to produce steam at as high a rate as gas. We believe, however, that speeds close to 1,700 mpm are realistic, and with world-class runnability, this can still put a mill in a strong position.

Time to focus on the hood

Given the optimum Steel Yankee Dryer, it is the hood which completes the picture in the drying section, and the addition of Milltech to our group of companies has provided a new perspective on this. Whatever the fuel source, the benchmark for all tissue making operations should be that it makes no sense to let the hood's exhaust simply heat the atmosphere. Heat recovery should be the starting point in planning any new tissue machine or rebuild. This can be

MONO e ^{MT}	Mono system Gas
STEREO e ^{MT}	Duo system Gas/Steam Yankee Hood
HYBRID e ^{MT}	Hybrid steam Yankee Hood
SMART e ^{MT}	High level of Heat Recovery Hood
MULTIGEN e ^{MT}	Cogeneration Duo Yankee Hood

broken down into various categories, but the most relevant for Asia is what we call R1, which represents air-to-air heat exchange within the hood system, by which heated exhaust air is utilized to pre-heat the fresh air before the exhaust to the atmosphere occurs.

The difference between good and excellent performance is all about stability and balance.

Even using conventional equipment, it sometimes may be possible to increase overall energy efficiency by some percentage points.

Strategies to achieve this include optimising the balance between yankee and hood drying, and between the contribution of the dry and wet ends of the hood. Stability of the process is another essential optimisation factor: achieving uniformity of dryness, with reduced peak-to-peak dryness variation in the sheet, allows the system to be set for higher overall dryness which requires less energy to maintain and will also result in less rejected paper.

The hybrid solution

One solution, which is about to make its debut in China in an as yet undisclosed location, is the hybrid hood, in which the degree of heating contributed by the hood, and in different sections of the hood, can be easily varied, from zero (suction only) upwards. Typically a hood will blow hot air in the wet end, while in the dry end, the hood's role is limited to suction. This is a good solution where energy reduction is a priority, with reasonable drying capacity, and in combination with proper heat recovery systems. The best solution for pure



energy efficiency, as stated, is to dry with the Yankee alone with the hood just providing suction, but to respect a mill's needs both for energy efficiency and output, a hybrid solution can be ideal.

The optimum balance between Yankee and hood will depend on the grade of tissue produced in terms of drying capacity. For low basis-weight products such as toilet and facial tissue, the most popular grades in most of Asia, the wet-end-only heating concept is generally fine, where the dry end of the hood merely acts as an exhaust system. Other factors may affect efficiency in drying, such as hood cross nozzlebox design, hood operating distance to the Yankee surface and hood frame stability at temperature (up to 650°C). Continuous R&D developments are being evaluated in this regard to achieve better machine performance.

Balancing output and input

Depending on priorities most tissue producers in Asia have the option either to increase output for the same or less specific energy input, or to maintain the same level of output but sensibly cut

energy consumption. And yankee/hood drying is not the only area to investigate. The favoured raw materials in tissue production have become short and recycled fibres, and Asia is no exception. There are distinct variations within the region, because some parts of Asia are more advanced in gathering recycled paper than others. But throughout, stock preparation has taken on more significance than ever before to deal with new fibres and ensure high quality standards and boost tissue machine runnability. There are significant new opportunities for stock preparation to contribute to overall production efficiency. Bear in mind also that a 1 percent increase post-press dryness can lead to a reduction of overall drying energy consumption of up to 4 percent, so the press section is an important part of the drying picture, too. While our recent opening of a new manufacturing and service facility in Shanghai for Toscotec is an acknowledgement of the importance of the Chinese market, there are other Asian markets where reduction in energy consumption is increasing in importance, and it is to such markets that we are naturally inclined. South Korean tissue makers are looking closely at their energy profiles, and Japanese producers are starting to rebuild tissue machines with energy consumption in mind. We believe South East Asia will follow shortly, as the benefits of an energy-focussed approach become clear.



UNLOCK THE ENERGY POTENTIAL

A thorough review of drying strategy on a tissue machine can pay handsome dividends.

By Paolo Raffaelli, Technical Manager, Toscotec

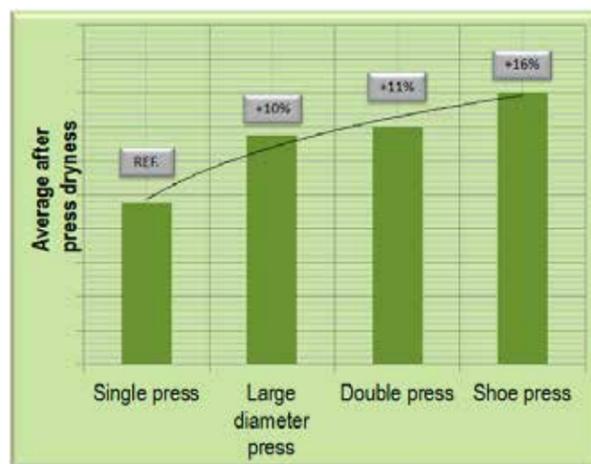


Better drying performance should be a key target for all tissue producers. In times of rising energy costs and pressure on margins, the benefits of improved drying can make a tangible difference to a mill's fortunes. In developing TT Drying Optimisation for Energy Saving (TT DOES), we have investigated strategies for critical areas of the tissue machine which can contribute to greater efficiency and higher output if required. Our broad conclusion is that, depending on priorities, most tissue producers have the option either to increase output for the same or less specific energy input, or to maintain the same level of output but sensibly cut energy consumption. But most revealing is the technological approach that achieves these aims. The key components in drying are the yankee dryer and the hood, which are an inseparable team. Hood drying requires up to 30 percent more energy per Kg of water evaporated than Yankee drying, so as a starting point, it is in general beneficial to process maximising the drying potential of the Yankee, pos-

sibly by considering a larger diameter unit, and then specify the hood according to production priorities and local conditions especially in terms of available energy sources.

Yankee progress

We have established from long experience that the Steel Yankee Dryer (TT SYD) can deliver more heat with the same steam pressure inside than its cast iron counterpart. Recent research has taken the TT SYD's performance to a higher plane, thanks to the design achievement of an optimum ratio of the height, width and pitch of the dryer's ribs as well as of the shell thickness which has increased the overall heat exchange capability at a given steam pressure, while strength and therefore safety is maintained or increased. Further factors to optimize Yankee performance include head insulation, which can reduce steam energy loss by up to 6 percent. The shell integrated design, the selection of water-proof and



heat-resistant insulation panels, accompanied by stable containment of this insulation material, are essential factors to guarantee the maximum effectiveness of the head insulation. Given the optimum Steel Yankee Dryer, it is the hood which completes the picture in the drying section. Choice of hood is not straightforward, because there are many options.

Local energy availability and individual production requirements are critical parameters when specifying the hood, and the options need to be understood.

From a simple suction hood to gas-heated, the best solution will vary from mill to mill.

Gas is the most effective fuel for drying, although in some cases, steam is the only available source of heat. Gas hoods are now far less challenging than in the past, and the benefits in terms of flexibility of capacity and overall efficiency make them an attractive proposition. Bear in mind also that it is easier with gas to keep the hood system clear of fibre build up than with steam.

The benchmark: recover the heat

The benchmark for all tissue making operations should be that it makes no sense to let the hood's exhaust simply heat the atmosphere. Heat recovery should be the starting point in

planning any new tissue machine or rebuild, and it can be broken down into four main categories: R0, R1, R2 and R3. Establishing at the outset which of these categories applies to the mill in question helps to focus the heat recovery strategy.

R0 heat recovery is only applicable to a gas hood. In this case, the exhaust air from the hood is used to generate fresh steam via a recovery boiler, which delivers additional steam to the Yankee.

This solution has to be estimated with great care according to the hood specific working conditions.

R1 represents air-to-air heat exchange within the hood system, by which heated exhaust air is utilized to pre-heat the fresh air before the exhaust to the atmosphere occurs. R1 is the standard form of heat recovery which is utilized when working with a steam-heated hood.

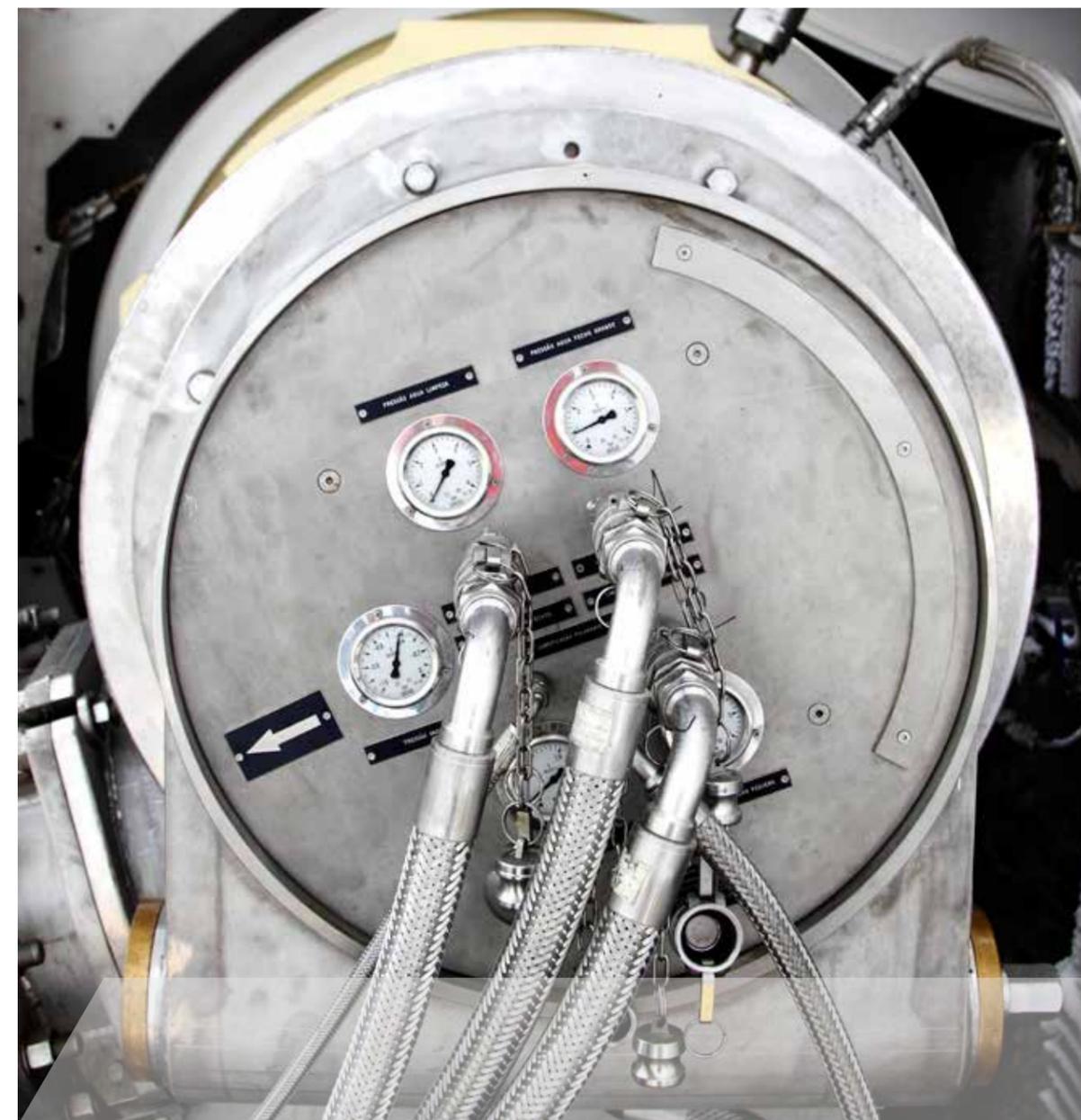
R2 and R3 are typically applicable to gas-heated hoods. R2 is normally based on an heat exchange air-to-water which contributes to hall heating and ventilation systems within the mill. This provides a way of heating buildings through recovered exhaust heat, although it is climate and season dependent. R3 heat recovery involves the installation of a heat exchanger which is used to heat process water. An example of its potential benefits, R3 could be used to keep process water at higher temperature levels to be used for dilution water, machine showers, approach flow circuit, and this could increase the machine's performance because of higher drying efficiency. Maintaining also the process water balance temperature at a certain level improve the final sheet formation.

Stability and balance

These four categories give a broad overview of the possibilities for heat recovery in tissue production, but the difference between good and excellent performance is all about stability and balance. Even using conventional equipment, it sometimes may be possible to increase overall energy efficiency by some points percent. Strategies to achieve this include optimising the balance between Yankee and hood drying, and between the contribution of the dry and wet ends of the hood. Stability of the process is another essential optimisation factor: achieving uniformity of dryness, with reduced peak-to-peak dryness variation in the sheet, allows the system to be set for higher overall dryness which requires less energy to maintain and will also result in less rejected paper.

One solution which is has also been applied is the gas or steam hybrid hood, in which the degree of heating contributed by the hood, and in different sections of the hood, can be easily varied, from zero (suction only) upwards.

Typically a hood will blow steam or gas-generated hot air in the wet end, while in the dry end, the hood's role is limited to suction. This is a good solution where energy reduction is a priority, with reasonable drying capacity, and in combination with proper heat recovery systems. Actually for reasons



mentioned, the best solution for energy efficiency is to dry with the Yankee alone with the hood just providing suction. But to respect a mill's needs both for energy efficiency and output, a hybrid solution can be ideal.

Finally the steam hood, can also use recovered heat in the form of condensate from the Yankee, just as the hood's exhaust air can heat incoming air, to keep efficiency at a high level.

The ideal balance between Yankee and hood will depend on the grade of tissue in question in terms of drying capacity. For low basis-weight products such as toilet and facial tissue, the wet-end-only heating concept is generally fine, where the dry end of the hood merely acts as an exhaust system, just keeping the air temperature high enough to avoid water droplets inside the hood.

You can even use this set up for heavier grades, if you are prepared to sacrifice some speed.

Other factors may affect efficiency in drying, such as hood cross nozzle box design, hood operating distance to the yankee surface, hood frame stability at temperature (up to 650°C). Continuous R&D developments are being evaluated in this regards to achieve better machine performances.

The role of the press section

Despite the importance of the Yankee dryer and hood, the contribution of press section should not be underestimated, nor indeed that of the headbox and former: the final result is always attributable in part to the nature of the pressing process, and the initial formation of the sheet. So we need to take a step backwards in the process to review the pre-dryer areas.

The headbox is where the cross direction profile is created, so factors such as turbulence and fiber build up need careful management and fine-tuning, as do the convergence angle on

the headbox slice and the free-jet length. It is all about optimum fiber distribution thru microturbolence and monitoring this factor is essential for efficiency, quality and runnability.

Extending the press section effectiveness can provide more consistent and higher dryness. Beyond the basic format of a single suction press, the options to increase dryness out of the press section include creating a double press, increasing the diameter of the suction press or ultimately utilizing a shoe press, which offers the greatest nip width of all.

Bear in mind that a 1 percent increase post-press dryness can lead to a reduction of overall drying energy consumption of up to 4 percent, so the press section is an important part of the drying picture.

In our experience, tissue manufacturers are becoming more interested in energy and quality rather than just out and out speed and capacity. It is more widely acknowledged today that it is better to run a tissue machine at lower speed and produce great quality with maximum efficiency, than operating at high speed but with less efficiency. It is net tonnes or actual output which matters rather than theoretical capacity. In this regard, speed itself can be a distraction, when it is overall efficiency that is the most important figure, as a measure of net energy consumed per tonne of product produced.

Whatever a tissue mill's circumstances and ambitions, the optimisation of drying performance is always an exercise which will pay back.



NEW MILLTECH YANKEE HOOD AND AIR SYSTEM FOR WEP A CASSINO TISSUE MILL

Lucca, 18th November 2013 - Milltech, the Lucca-based supplier of advanced solutions for drying to the tissue and paper industry, owned by Toscotec, started up a new SMART e^{MT} Yankee Hood complete with Air system and Heat Recovery, at Wepa Cassino tissue mill in August 2013. This investment allows Wepa to achieve significant improvements in production and consumption, while offering the best solution for a safe, quick installation within the existing machine.

The SMART e^{MT} Yankee Hood, designed in accordance with the best available technologies, uses multiple heat recovery stages to recover exhaust energy.

With this important new upgrade the Cassino mill can now optimize the production cycle and achieve a real improvement in paper quality, while decreasing energy consumption and environmental impact. Wepa Cassino is located in the Centre of Italy, close to Rome; it is part of Wepa Group - a leading company in tissue manufacture.

The mill is an important and modern facility, which is completely integrated with a 5,600 mm width tissue machine, converting lines and automatic storage system.

Its capacity is more than 60,000 t/year.

Milltech, which has formed part of the Toscotec Group since 2012, specializes in machine hoods, dust extraction systems, Yankee steam and condensate systems and energy recovery. Its main purpose is to maximize the use of modern technology to minimize energy consumption throughout the drying process.

Milltech's keen eye for customer service and expectations, is in the tradition of all Toscotec companies.



L.C.PAPER 1881 CHOOSES TOSCOTEC TT DOES SOLUTION FOR PM2 REBUILDING

Lucca, 9th December 2013 - Toscotec with its associate Milltech have been awarded a contract to deliver a major dry-end rebuild of the L.C.Paper 1881 SA PM 2 in Besalu, Catalunya - Spain.

The start-up of the rebuilt machine is scheduled for the second quarter of 2014.



L.C. Paper was formed in 1881 on the back of the Industrial Revolution and is now well regarded for its production of niche tissue products contained with two tissue machines (PM2 and PM3) annually producing 45,000 tonnes of tissue for the AfH market.

The main recognized company product is OnePly® tissue paper that is produced on PM3 from virgin pulp while on PM2 actually every kind of paper is made from 100 percent recycled paper. This range of products includes Table 72,37 g/m² and Exterkraft 50 g/m². The products are certified by the ISO 14001 European policy and the Ecolabel tag, both of them ensuring an extraordinary attention to the environment. Apart of this L.C. Paper is also well recognized in the European tissue market for its attention into the energy reduction problems and on its leadership of cogeneration application.

In 1993, the Company introduced a cogeneration plant. It was the first plant with a diesel engine of 6.5 MW in Spain that was expanded in 1999 with a second 6 MW engine.

In 2009 L.C. Paper launched PM3 with a patented process that takes gases from the cogeneration plant to dry the paper by the means of an innovative hood provided already by Milltech. In 2011 the first diesel engine was sold and in 2012 L.C. Paper installed a new gas engine. 6 MW of this energy will be used for feeding the new hood by Milltech on PM2 with a

further decrease of energy consumption. Toscotec 's delivery includes a major rebuild of the PM2 dry end and press section, which will be replaced with a TT DOES (Drying Optimization for Energy Saving) package.

This will features a double presses solution with a rebuild of the felt run, a new TT SYD-15FT with doctoring system and a Duo-system Yankee hood, SMART e^{MT} type from Milltech. The wet end hood is burner feeding type, the dry end hood could be fed either by cogeneration gases or conventional burner (normally with COG on is switched off). Exhaust gases are used to generate two stages of steam (high and low pressure) through steam generators in addition to the heat recovery to pre-heat the make-up and combustion air. Maximum drying production with a machine trim width at reel of 3,050 mm will be 130 tpd. With this new intervention the PM2 consumption will be lower than 1,350 kWh/t. According to the L.C. Paper CEO Joan Vila, this investment will allow to increase the competitiveness of the Company.

"After a detailed analysis of our project we decided to choose once more Milltech and Toscotec for the innovative solution they were able to introduce, that is aligned with L.C. Paper business philosophy as well as for the previous positive experience we have done on PM3", he said.



IT'S *tissue!*

THE ITALIAN TECHNOLOGY EXPERIENCE 22th JUNE – 30th 2013

In Lucca, the first ever edition of this one-of-a-kind event: 9 days of full-on technological innovation, culture and entertainment to discover the capitals of Italian excellence in tissue.

Nine days of full immersion in the Italian Tissue Valley for some firsthand experience of the technological innovation behind the tissue industry's leading equipment suppliers, complemented by an exclusive cultural experience. **It's Tissue!** The Italian Technology Experience was held from June 22nd to 30th in Lucca, the first venue to host this international event for industry operators and everyone with an interest in the world of tissue. A rich and diverse programme of meetings, information and in-depth analysis, but also art, music, culture and much more, in a natural continuation of Italy's unique excellence in tissue technology and production.

It's Tissue is neither a trade fair, nor a festival or a convention, but a special event created by the Tissue Italy Network, made up of 12 leading Italian tissue industry equipment suppliers, which every three years will bring together clients and companies and provide them with unique

insights into each of the member companies' own technological innovations. The Open House formula allowed participants to gain hands-on experience of the Network's world of production, starting in Italy's leading tissue center Lucca, then moving on to the "packaging valley" in the Bologna area and Reggio Emilia, before finally arriving in the northern city of Lecco. In order to analyze fundamental business issues and global economic trends in tissue, a plenary forum became a round table discussion with the public and some of the world's leading tissue experts, who were joined by renowned economists, opinion leaders and international journalists.

To make the event even more captivating and dynamic, **It's Tissue** offered a programme of cultural experiences in the enchanting historical center of Lucca, organized specifically for participants and beginning with an exhibition of the work of one of the greatest photographers of the

20th century, Henri Cartier-Bresson, followed by a concert by a world famous pop star. Each evening during the event international jazz artists performed live in the remarkable Piazza Anfiteatro and every day, in the Basilica di San Giovanni, visitors were able to attend recitals of music and a selection of operas by Puccini. Because what event in the home town of this great composer would be complete without a series of concerts devoted to his work?

This artistic experience was complemented with visits to the Paper Museum in Pescia and to other museums in the province of Lucca, including those in the heart of the Carrara marble quarry district to discover the secrets of Michelangelo,

and to the historical bronze foundries in Pietrasanta, where the world's greatest sculptors continue to work to this very day. Itineraries were dedicated to physical and inner wellness with "all-nighters" at local health spas, shopping in top Italian fashion brand outlets, and wine and oil tastings at local wineries and farms.

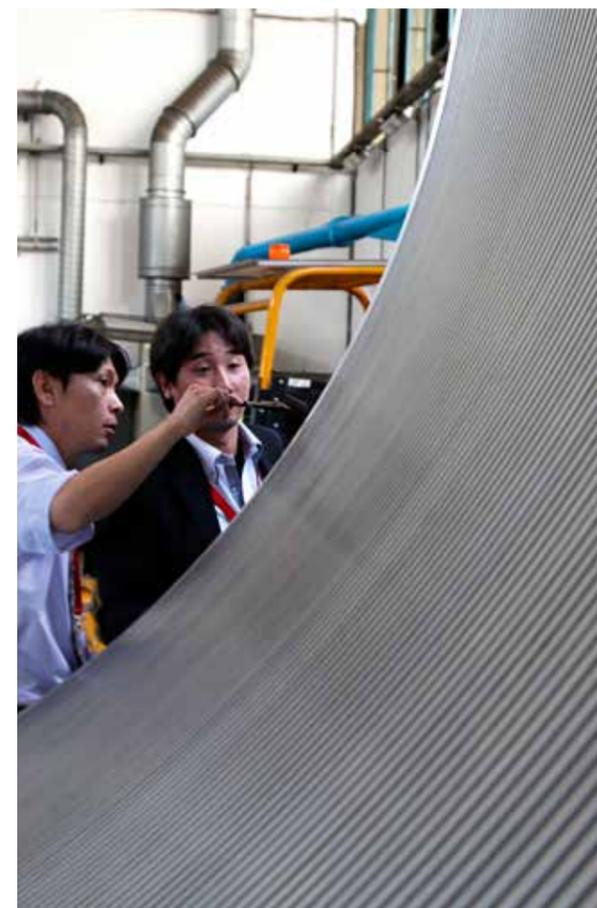
It's Tissue was presented to the world as an opportunity not to be missed, offering the chance for a full immersion experience in Italian excellence, in a setting steeped in history, where tradition and innovation are combined in an ideally synergic relationship, unlike any other in its sector, organized by the Tissue Italy Network.

Tissue Italy: member companies in alphabetical order

A. Celli Paper S.p.A. Lucca
Elettric 80 S.p.A. Reggio Emilia
Fabio Perini S.p.A. Lucca
Futura S.p.A. Lucca
Gambini S.p.A. Lucca
MTC - Macchine Trasformazione Carta S.r.l. Lucca
Omet S.r.l. Lecco
PCMC S.p.A. Lucca
Pulsar S.r.l. Bologna
Recard S.p.A. Lucca
TMC – Tissue Machinery Company S.p.A. Bologna
Toscotec S.p.A. Lucca

TOUCHABLE TECHNOLOGY

Lucca, July 2013 - During *It's Tissue* Toscotec had the pleasure of welcoming more than 220 customers to experience its "Touchable Technology".



A unique opportunity to dive into the Toscotec world of design and manufacturing to gain some firsthand experience of the technological innovation, manufacturing, quality and services behind one of the tissue industry's leading equipment suppliers. "Know-how" and "Experience" are the main concepts Toscotec wanted to convey to its prestigious guests during a comprehensive guided tour through its production facilities.

Customers were accompanied by the company's engineers to see the top level metalworking technologies used in both tissue line construction, and particularly in the manufacture and assembly of the TT SYD (Toscotec Steel Yankee Dryer). The second Toscotec tour session was entitled "Comprehensive Solutions and Rebuild Projects".

The customized design of equipment supplied, with a focus on real customer needs, even when they are about to upgrade existing machines, ensures that customers can exploit the solutions provided to the full.

Toscotec's experience bears out the company's main guidelines: understanding customers' production goals, working with them right from the technical definition stage to deliver fully integrated plants, proposing the best advanced technologies available, and focusing on product quality and



saving energy. Toscotec is a leading worldwide supplier of turnkey tissue projects, designed based on production priorities and local constraints, especially in terms of available energy sources.

During *It's Tissue* week, Toscotec showcased the company's most recent turnkey project for delivery to its client Petrocart (Romania). The project will be started up next January.

Each customer was given the chance to appreciate all the special features of plant design, from the new approach flow system TT SAF (Short Approach Flow, Toscotec proprietary machinery), to the most recent Toscotec rewinders: a market-leading solution to reduce investment and space and maximizing savings.

Finally guests were able to attend the presentation of the new integrated dry solution: TT DOES!

A new modular approach to efficiency, available both for plant rebuilds and new production lines, combining the application of the latest technology developments introduced for the TT Pressing System (including TT XPress, the new Toscotec Extended Nip Press Solution), the Second Generation TT SYD and the low carbon footprint Milltech Yankee Hood.

A drying optimization for the highest quality tissue using less energy.

Toscotec would like to thank all customers for attending and hopes to see you again in 2015 for the next *It's Tissue*, The Italian Technology Experience.



ECOFIBRAS SL REBUILDS TM5 INTO CRESCENT FORMER

Lucca, 17th February 2014 - Toscotec redesigns the existing tissue machine of the spanish tissue manufacturer to boost production capacity reducing energy consumption.



The Italian Tissue Machinery manufacturer Toscotec have been awarded a contract to deliver a major rebuild to the Spanish mill of ECOFIBRAS ARANGUREN SL., in Aranguren, Zalla Bizkaia - Spain. The rebuild has been designed to reconfigure the existing TM5 tissue machine into Crescent Former configuration. ECOFIBRAS ARANGUREN is the Tissue manufacturing facility of the CEL group, which formerly was KC Aranguren plant, and initiated 2 years ago a new phase as an independent company. This investment is part of the development plan designed to increase production capacity and improve quality to supply current parent reels market, both in virgin and in deinked pulp reels.

The present TM5 is equipped with a suction breast former and sloped wire configuration, double press section and cast iron Yankee of 4,500 mm diameter. The max actual operating speed is 1,370 m/min with a drying

capacity of 101 tpd. In order to produce grades with lower basis weight than today (The required basis weight range is $10 \div 36$ gsm on the wire) Toscotec will supply to Ecofibras a stock preparation upgrading together with the entire engineering, a fully hydraulic step diffuser headbox TT Headbox-SLT and the complete replacement of the wet-end section into the Crescent Former configuration.

The purpose is to get further benefits as well as increase tissue machine operating speed up to 1,500 mpm initially, reduce electrical power consumption, improve formation quality and improve MD/CD ratio. Actually the design speed for the new supplied equipment is 1,900 mpm, that means the possibility to achieve a future operating speed of 1,800 mpm by a following modification of the dry-end section, too.

Ecofibras tissue machine will be the 70th Toscotec's installed Crescent Former.

START-UP OF TOSCOTEC AHEAD TISSUE MACHINE AT SAMJUNG PULP CO.LTD.

Lucca, 19th March 2014 - A new AHEAD line has just begun operating to meet demand in the south korean tissue market.

Samjung Pulp Co. Ltd., an important tissue paper producer in the South Korea, at the beginning of 2014 has begun operating its new Toscotec tissue machine to meet demand in the conventional tissue products segment. The new line has been installed at the Pyeongtaeksi site.

The new crescent former machine features a single layer headbox, a large nip TT SuctionPressRoll-SPR1430 working at 120 kN/m, a TT SYD-12FT Steel Yankee Dryer and the pope reel TT Reel-P. The Toscotec scope of supply included also stock preparation high efficiency equipment, the Milltech thermal oil heated hood and yankee steam & condensate system.

Engineering, erection supervision, training and start-up assistance completed the Toscotec package. The new machine

has a net width of 2.62 m and a design speed of 1,700 mpm. Toscotec's experience in energy efficient systems was decisive for Samjung Pulp Co. Ltd. in the selection of its supplier. Thanks to the strong cooperation between the two teams, the project has been successfully completed in a short time.



TOSCOTEC TO SUPPLY A STEEL YANKEE DRYER TO JAPAN'S OJI GROUP

Lucca, 22th April 2014 - Toscotec has received an order from Oji Paper Co., Ltd. Japan for a TT SYD (Steel Yankee Dryer) to be installed at its production site in Kasugai. The TT SYD has a diameter of 12FT and a face length of 5,750mm and it will replace the existing deteriorated Yankee Dryer.

Established in 1873, the Oji Group has been a leader in the pulp and paper industry in Japan for over a hundred years. The company has perceived the innovation linked to the TT SYD Second Generation born by the Toscotec experience. The new design provides an optimization of the internal grooves and the reduction of the nominal thickness of the cylinder involving a more efficient heat exchange, therefore the increased capacity of drying allows to increase the performance of the machine both in terms of production and speed. In addition field measurements, ensure that the insulation of the heads (Toscotec patent owner), reduces by 5 percent the consumption of steam at Yankee due to less heat loss. Toscotec provide a very competitive, reliable rebuild solution for the tissue industry.

Mr. Mennucci, CEO of Toscotec, states: "We are honored and thrilled to start a cooperation with the Oji Group. We are confident that we will achieve energy savings and drying capacity results".

The installation of the new TT SYD-12FT is scheduled for the end of 2014.



PETROCART STARTS UP THE NEW TOSCOTEC TISSUE LINE IN PIATRA NEAMT

Lucca, 21th May 2014 - At the end of April, the Rumanian tissue producer Petrocart, has successfully started up their new Toscotec complete tissue production line installed in Piatra Neamt, headquarter of the company since 1908.

Based on a turn key concept and an average production of 75 tons per day, the new line includes the stock preparation plant for virgin and recycled fibers, a MODULO-PLUS tissue machine with single-layer headbox, double press configuration and TT SYD-12FT, the tissue machine auxiliary plants including a Milltech hood and steam & condensate system.

A three unwind stands tissue slitter rewriter TT WIND-M completes the Toscotec scope of supply.

According to Petrocart green philosophy, the project was mainly focused on reduced energy consumption, usage of waste paper, recovery and re-usage of the water in the manufacturing process.

The project has been managed on the turn-key basis by Toscotec providing also the whole engineering services, erection supervision, start-up and training.



TOSCOTEC PAPER MACHINE (SHANGHAI) CO., LTD. RECEIVES THE "PANDA D'ORO 2014" FROM THE ITALIAN CHAMBER OF COMMERCE IN CHINA

Shanghai, 14th June 2014 - Toscotec Paper Machine (Shanghai) Co., Ltd. was presented with the "Panda D'oro Award - 2014 edition" from the Italian Chamber of Commerce in China.

The award, aimed at promoting the "Made in Italy" and the Italian style in all its forms and expression, was given during the "Italian Grand Gala" held on Saturday, 14th June 2014 at Jing An Shangri-La in Shanghai.



Toscotec Paper Machine (Shanghai) won the "The Best SME Panda" as "The Italian SME which has successfully invested in the Chinese market in 2014".

The award was presented to Mr. Andrea Palleschi, General Manager of the company, by S.E. Alberto Bradanini, Ambassador of Italian Embassy.

"This is a prestigious award – said Andrea Palleschi, General Manager of Toscotec Paper Machine (Shanghai) Co., Ltd. – that rewards the activity carried out by Toscotec team in developing the Chinese market with products and solutions designed to satisfy the evolving needs of customers, market and regulations in this great country's tissue sector".

Toscotec Shanghai's mission is to be the benchmark for tissue technology in the Asia Pacific region, to provide the best service level to its Customers and strengthen the company's presence in one of the world's most significant and fastest growing markets.

With a skilled team of permanent engineers from both Italy and China, Toscotec Shanghai is now in a position to manufacture and deliver tissue paper machines to its prestigious Clients. Already active in the Asian market

since early 2000, Toscotec S.p.A. has developed a strong commercial network in the Far East in recent years with the result that today twenty-eight tissue machines have successfully started-up for prestigious Chinese clients. Jointly organized by the China-Italy Chamber of Commerce and the Fondazione Italia-Cina, sponsored by the Italian Ministry of Foreign Affairs, the Ministry of Economic Development and the Embassy of Italy in China, the "Panda d'Oro Award – 5th Edition" awarded those Italian companies that most contributed to the development and consolidation of economic bilateral relations between the two countries. The Grand Gala is a unique event that gathers entrepreneurs and representatives from both Chinese and Italian institutions, largely taken up by the Italian and Chinese Press.

This event represents a great opportunity to promote Made in Italy and Italian lifestyle in China.



Every Toscotec system delivers maximum energy efficiency with minimum environmental impact.

www.toscotec.com

Toscotec S.p.A. delivers state-of-the-art technology and a comprehensive range of services for tissue operators worldwide. Supplying standard equipment has never been the approach adopted by Toscotec: by enlarging the company's headquarters in Italy with two new buildings to support production and by merging with Milltech we have created new job opportunities. We are committed to guaranteeing customers maximum results in terms of performance and return on investment.

Toscotec, your partner for the tissue and paper industries, everywhere, every day, for over 65 years.



it's tissue!

2015

THE ITALIAN TECHNOLOGY EXPERIENCE

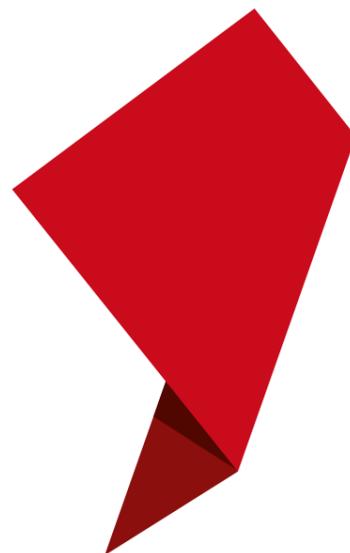
AN OPEN WINDOW ON THE ITALIAN TECHNOLOGY EXPERIENCE

The second edition of **It's Tissue** will take place on June 21-28 2015 in Lucca, Bologna's "packaging valley", Reggio Emilia and Lecco where participants can see, hear and touch technology, working with real products.

There is no substitute for that kind of experience. **It's Tissue** is conceived to give customers the benefit of a week's worth of open houses and additional events in an extraordinary show of productive cooperation between the participating companies.

It's Tissue was launched in 2013 by a group of leading Italian technology suppliers: A Celli, Electric 80, Fabio Perini, Futura, Gambini, MTC, Omet, PCMC, Pulsar, Recard, TMC and Toscotec. They all voted Matteo Gentili for a second term as President.

Thanks to its initial success, **It's Tissue** will continue to bring a valuable dimension to the process of specifying technology for tissue making, converting, packaging and automated handling.



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