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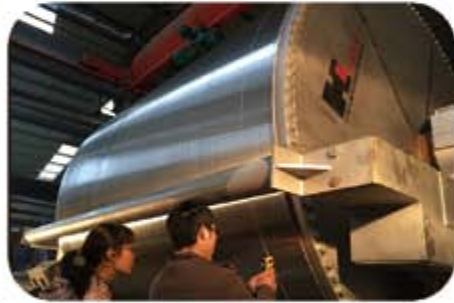
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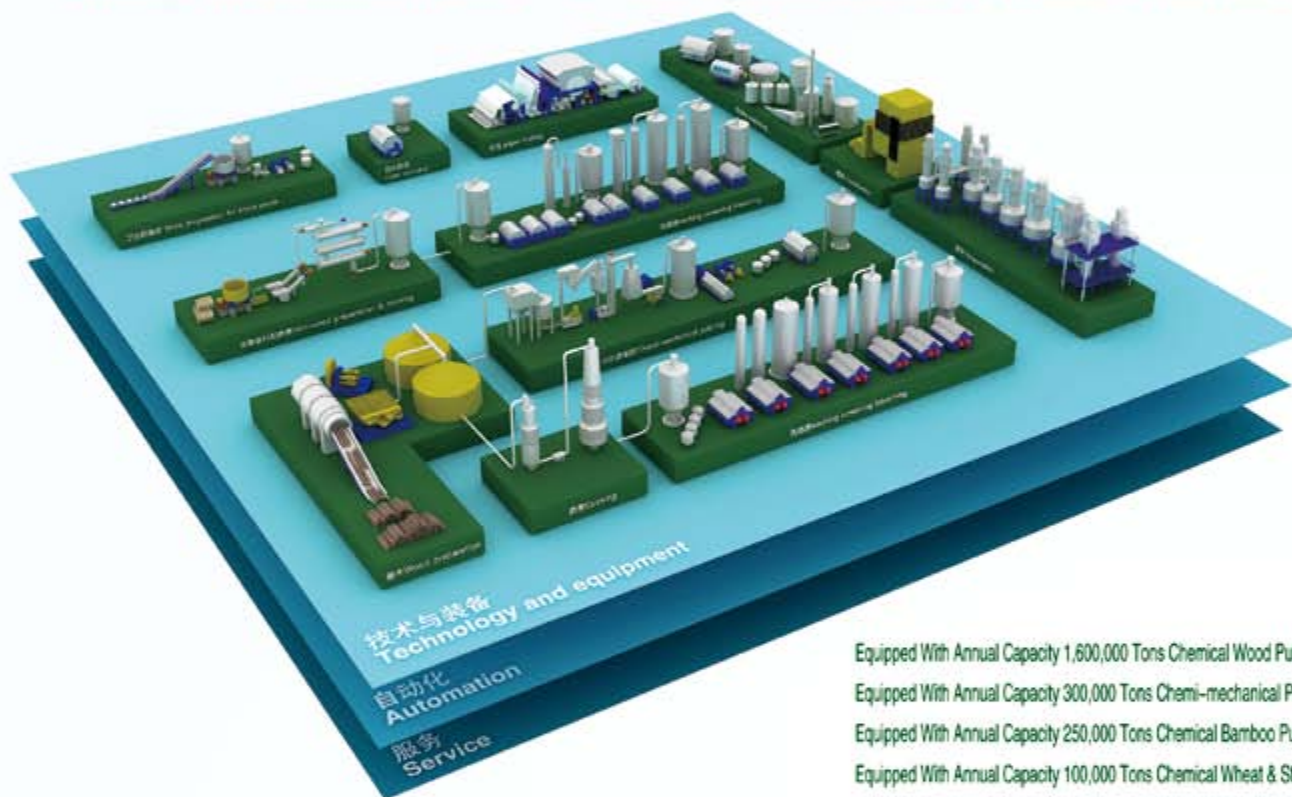
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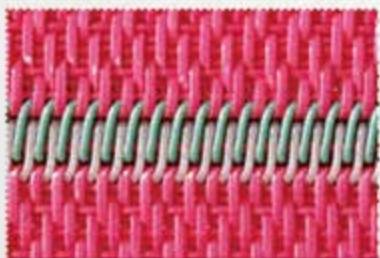
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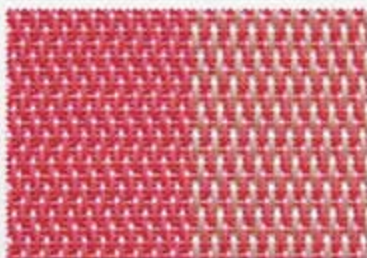
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Industrial Adjustments and Global Responses to China's New Policy on Waste Paper

 China Pulp and Paper Industry Publishing House

In the end of 2017, China's *Catalogue of Imported Waste Management* (the "Catalogue") was released jointly by five Chinese national authorities, including the Ministry of Environmental Protection, the Ministry of Commerce, the National Development and Reform Commission, the General Administration of Customs, and the General Administration of Quality Supervision, Inspection and Quarantine. The Catalogue makes it clear that, the unsorted waste paper (HS-code: 4707900090) from household garbage, or mixed paper, is included into the forbidden list of importation.

In early 2018, the *Environmental Standards for Importation of Solid Wastes that Can be Used as Raw Materials* was released by the Ministry of Environmental Protection of China. According to the new policy, the impurity rate of imported waste paper was lowered from 1.5% to 0.5%. The impurities mainly refer to wood waste, scrap metal, waste glass, waste plastics, waste rubber, waste fabrics, waste absorbent, aluminum-plastic paper packaging, thermal paper, asphalt moisture-proof paper, stickers, decor paper, wax-coated paper, waxed paper, oiled paper, silicone paper, copy paper, etc. These two new policies mentioned above have had different effects on the supply of imported waste paper, the supply of domestic waste paper, papermaking companies, trading companies, etc.

1. Influence on domestic waste paper supply

The new policy brought opportunities to China domestic waste segment because

domestic waste can be the only substitute for foreign waste. Moreover, waste paper is used as main raw material in China paper packaging industry, which developed rapidly in recent years.

For one thing, the new policy led to constant price increase of domestic waste paper, and waste paper supply failed to meet the demand. For example, the average price of domestic waste paper even reached a record high of 3000 yuan/ton in September, 2017. However, there also have been sharp fluctuations in the price of waste paper. For another, it accelerated the implementation of the *Regulation on Waste Paper Converting*. The introduction of this regulation promotes the integration of China's waste paper recycling and processing, speeds up mergers and acquisitions of related enterprises, and improves the overall strength and ability of risk resistance. Meanwhile, it could also promote technology optimization in waste recycling, improve the efficiency of waste supply chain, and help to realize sustainable development of waste paper recycling in China.

2. Influence on China paper manufacturers

Waste paper is considered as the main raw material for China paper manufacturers, who consumes about 77.5 million tons of waste paper, or equivalent to 63.29 million tons of waste paper pulp (or recycling pulp) in total per year. Of the total pulp demand in China paper industry, recycling pulp accounts for 65 percent, among which 24 percent is from imported recycling pulp and 41 percent is from domestic recycling pulp. Imported foreign waste paper takes up more than a third of total waste paper



demand in China.

China's imported ban on mixed waste has the greatest impact on ivory paper board segment, because the mixed waste is mainly used in ivory board production. Nine Dragons, Lee&Man, and Dongguan Jianhui Paper are some leading ivory board manufacturers in China. However, the imported ban has limited influence on those big paper enterprises who use #8 and #11 American waste paper as raw materials.

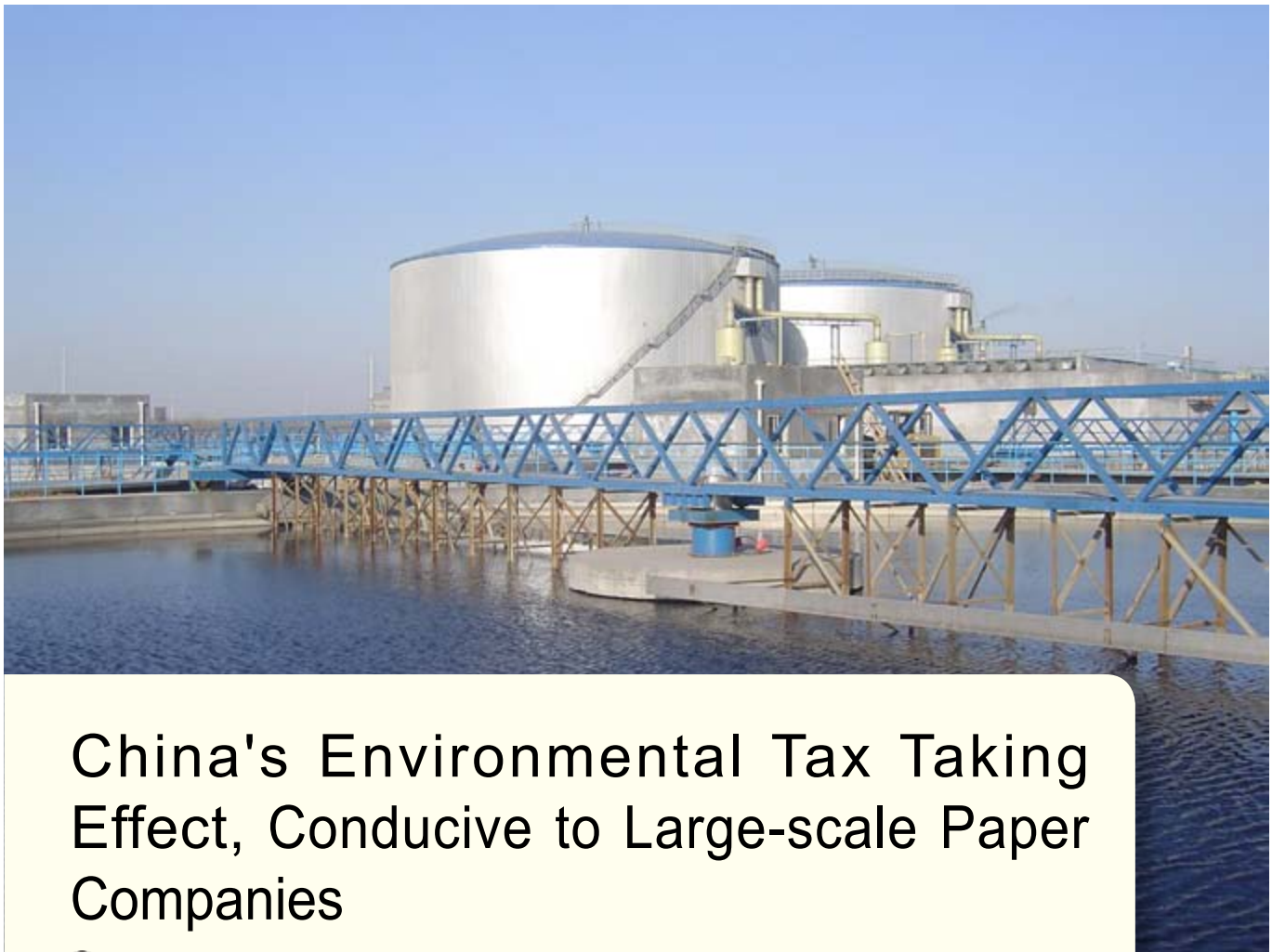
After the implementation of the imported ban, more and more domestic waste or higher-grade waste paper were used by ivory board makers to replace imported mixed waste paper. And the market price of ivory board and other packaging paper grades even reached a record high in recent ten years, thus bringing significant benefits increase for China paper industry.

3. Influence on overseas waste paper market

Compared with China waste market, overseas waste market can be affected more obviously by the new mixed waste ban and higher purity demanding of China.

Before the implementation of the new policy, China paper enterprises mainly imported foreign waste from America (#3 waste paper), Japan(#3 waste paper), Britain(#A2 waste paper), Europe(#A2 waste paper), Australia(#3 waste paper), and South Korea(#3 waste paper). Imported mixed waste (5.7 million tons) takes up about 20% of total imported waste (28.5 million tons) in China, according to the data from RISI, an information and consultative company in forest and related industry. America (35%), west Europe(32%) and Japan(22%) are the three biggest trade partners with China in foreign waste market. Noticeably, since America is the biggest mixed waste source of China, it may be influenced most by China's new import ban due to America's limited consumption capacity locally.

It's predicted that China's higher purity demand of imported waste may temporarily influence some overseas waste recovery and supplying companies, whose business chain of recycling, sorting, baling and transport all needs to be re-adjusted according to the new norm of China. For example, for the baling company relying on machine sorting, manual sorting may also be added in sorting process to meet the new requirements. In addition, with the improvement of waste standards, percentage of qualified foreign waste may be decreased, thus causing average cost increase of foreign waste. And the returning rate of imported waste may be lifted accordingly, which will also push up the price of imported waste paper as well.



China's Environmental Tax Taking Effect, Conducive to Large-scale Paper Companies

● Shi Shaohui (China Pulp and Paper Industry Publishing House)

In January 1st, 2018, the *Environmental Protection Tax Law of the People's Republic of China* came into force throughout the entire territory of China, replacing and ending the pollutant discharge fee system that had been in effect for the past 38 years. The environmental protection tax aims not to increase government financial revenue, but to guide waste discharging companies to strengthen pollution control, reduce pollutant emissions and promote ecological civilization by applying different tax rates according to different levels of pollution. Companies shall pay environmental protection tax after discharging air, water and noise pollutants, as well as solid waste directly to the environment, according to the Law.

The Law makes it clear that, the tax rates range from 1.2 yuan to 12 yuan per unit of atmospheric pollution, and 1.4 yuan to 14 yuan per unit of water pollution. Provincial-level governments can decide the tax rates in the range given by the Law based on the

detailed local situations, such as environmental carrying capacity, current pollutant discharge status, and economic and social ecological development goals.

For the tax rate of solid waste and noise pollutant, there's a unified national standard of tax paying. Solid wastes shall be classified into coal gangue, tailings, smelting slag, hazardous waste, etc. The tax amount per ton shall be 5 yuan, 15 yuan, 25 yuan and 1,000 yuan respectively according to the classification. Noise pollutants shall be classified into six pollutant levels. Once a new pollutant level reached, the tax shall be doubled depending on the tax standards, ranging from 350 yuan to 11,200 yuan per month.

The implementation of environmental protection tax is especially conducive the development of large-scale paper companies. And it helps to further consolidate the leading position of those papermaking giants. For one thing, the move from “fee” to “tax” could elevate the compulsiveness during the implementation. And local governments can also be more willing to enforce the law and punish polluting firms who violated the rules. Those leading paper companies who has had standard formalities already will not be affected. For another, in the previous pollutant

discharge fee system, there was only one way to reduce the fee payable, namely a 50 percent reduction of air and water pollution fee if the firm polluted at least 50 percent less than the local standard. However, due to technology restrictions, it's difficult for companies to reduce the concentration of discharged pollutants to 50 percent less than national or local standard. So the companies that can enjoy the preferential policies are extremely limited.

But now, two levels of tax paying system are created in the new environmental tax policy, based on the degrees of polluting firms. According to the new law, firms that pollute 30 percent less than the standard can receive a 25 percent tax reduction, and that pollute 50 percent less than the standard can receive a 50 percent tax reduction. Certainly, those companies with better environmental capacity will benefit more from the two-level tax curtail policy. The new policy strengthens the advantages of low pollutant emission for large-scale enterprises, and makes the most of the preferential tax curtail policies, thus helping to consolidate their leading position in the paper industry.





Pulp and Paper Products Listed as “Double-high” Items by Chinese Government

The comprehensive list of Environmental Protection 2017 (“The List”) was lately submitted by the Ministry of Environmental Protection of China to 14 national departments, such as the National Development and Reform Commission, the Ministry of Finance, the Ministry of Commerce, the People’s Bank of China, etc. And it was released to the public meanwhile.

Since 2007, *the comprehensive list of Environmental Protection* has been continuously revised for times under the guidance of the State Council of China. The List consists of two parts, among which the first part introduces 885 items with “high pollution and high environmental risks” (“double-high” items), and the second part introduces 72 kinds of key machinery for environmental protection. The “double-high” products refer to more than 50 kinds of items that can bring about pollutants (such as sulfur dioxide, nitrogen oxides, chemical oxygen demand, ammonia nitrogen, etc.) in the production; 40 kinds of items that can bring about volatile organic pollutants (VOCs); 200 kinds of items involved in heavy metal pollution; and 570 kinds of other items with high environmental risks.

Noticeably, semi-chemical pulp (code:22010102, 22010201) still remains in the list of “double-high” items.

The List plays a positive role in various fields, such as taxation, trade and finance. Many “double-high” products have been canceled and forbidden successively in importation, converting and trading. And paper companies are also encouraged to reduce or avoid the purchasing, production and utilization of those pollutant items.

Furthermore, companies could get tax deduction if purchasing the special machinery listed in the *Preferential Items Catalogue of Income Tax for Companies Purchasing Key Environmental Protection Machinery* (or the *Catalogue of Key Environmental Protection Machinery*). For example, 10 percent of machinery payments can be deducted from company income taxes in the same year, or deducted in the next five years if the deduction amount is insufficient then. And many banking institutions have also adopted differentiated credit measures based on the Catalogue now.



Lately, corrugated caseboard market has experienced great fluctuations in China (Figure 1), which in turn influenced its upstream and downstream industries to a certain extent. The development of corrugated caseboard has become a hotspot topic of China paper industry.

1. Supply

Over the past decade, China corrugated caseboard market has showed an increase in its supply volume, average capacity of single machine, and concentration of paper mills(Figure 2). China top ten caseboard manufacturers contributed 64% capacity to the national production capacity, and top ten corrugated paper manufacturers contributed 39% to the national total capacity. The industrial concentration of caseboard is relatively higher than that of the corrugated paper, which is the reason why price fluctuation of corrugated paper is usually more obvious than caseboard during price volatility. There's a high overlap rate between caseboard and corrugated paper mills among top ten companies in both segments. With a tighter environmental policy

implemented in China, most small paper mills or those not meeting the environmental standards may be eliminated gradually. It's predicted that the market share of large-scale corrugated paper companies will be increased, and industrial concentration will be lifted in corrugated paper segment.

2. Costs

For the corrugated caseboard manufacturers in China, 70% of the total cost is spent on fiber materials. Since the fiber source of corrugated caseboard production is mainly from waste paper, 70% of the total cost of corrugated caseboard production is used for waste paper purchase.

Therefore, the market price of corrugated caseboard is closely correlated with waste paper costs. The price fluctuation is basically the same for domestic waste paper and corrugated caseboard(Figure 3). In addition to waste paper costs, coal energy and transportation expenditures could also influence the total cost of corrugated caseboard more or less.

3. Future prospect

According to RISI, an information provider in the paper industry, the output of China homebred corrugated caseboard will continue to increase for the next five consecutive years. By 2022, China's output of corrugated medium will reach 53.65 million tons, and the average growth rate will be about 2.9% in the next five years.

The output increase mainly depends on the constant capacity expansion. According the statistics, there will be 4.4 million tons of new capacity in 2017 and 5.3 million tons in 2018. From 2019, the newly added capacity will add up to 12.23 million tons. The capacity increase remains in a relatively high level compared with previous years. Noticeable, there's not much new capacity announced in the steady period of corrugated board in the first half

of 2016. But expansion enthusiasm soared again in the second half of 2017. Lots of new projects were announced by large-scale paper companies, such as Nine Dragon and Lee&Man. And small paper companies also quickened their steps to launch new projects. New projects announcement is no longer confined to developed coastal areas, but extends to inland regions. Especially for Hubei province, new capacity announced after 2017 accounts for over 30% of the total new capacities.

For the perspective of demand, it's predicted that the consumption of corrugated caseboard will remain in a modest increase for the next five years. By 2022, the consumption of corrugated medium will reach 54.45 million tons in total, and it will increase at an annual growth rate of 2.8% in the next five years, which keeps up with the pace of market supply.

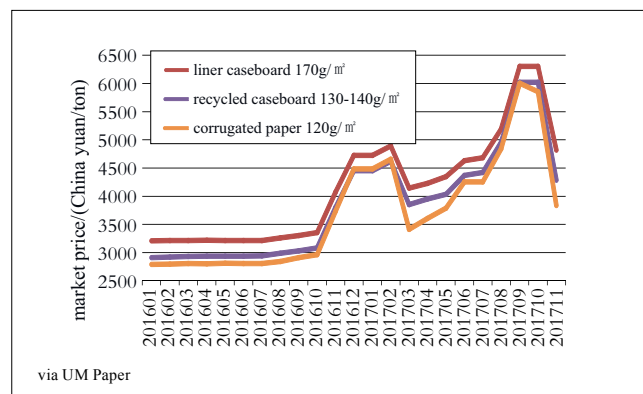


Figure 1 Price fluctuations of China homebred corrugated caseboard

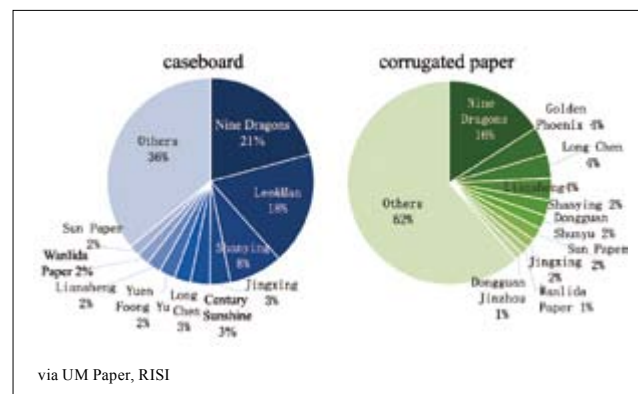


Figure 2 Capacity concentration of China homebred corrugated caseboard

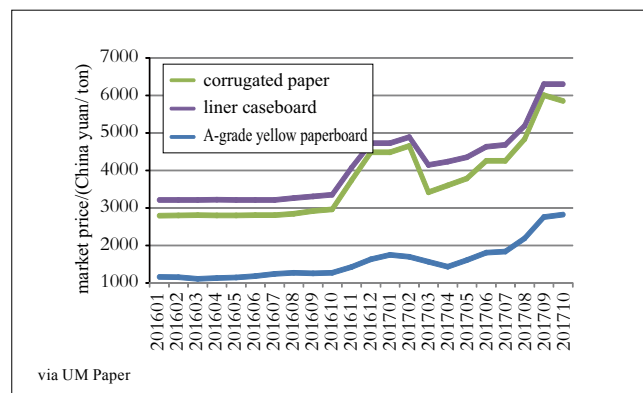


Figure 3 Comparison between China waste paper and corrugated caseboard

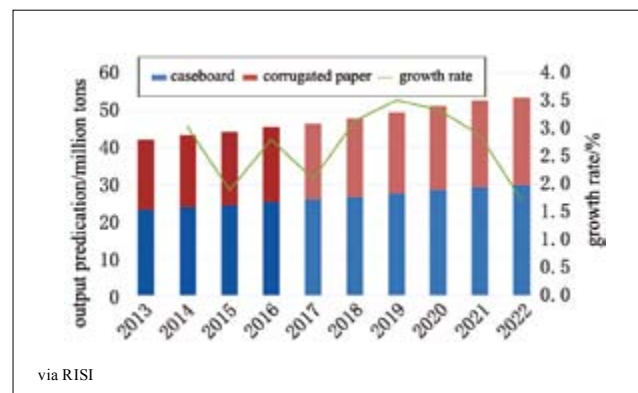


Figure 4 Predications for the output of China corrugated caseboard



Unbleached Household Tissue, a New Favorite in the Market

Shandong Tranlin Paper and Sichuan Vanov Group are typical tissue paper makers; Sichuan province is a manufacture center in China.

● China Pulp and Paper Industry Publishing House

With the development of living standard in recent years, people's concept of consumption has shifted gradually from pursuing practicality to safety, function, perception, and even creativity. Nowadays, unbleached tissue paper tends to be more and more popular in China, and its market share increases year by year. Now it has been considered as a leading paper grade with green and healthy philosophy in household paper segment.

1. Standard

In China, the *Industrial Standard of Unbleached Tissue Paper: QB/T 4509-2013* ("the Standard") was formulated and released by the Ministry of Industry and Information Technology of China. According to the Standard, unbleached tissue refers to the household paper grades used in daily life that are made from 100% natural fiber pulp, including unbleached toilet paper, napkin, paper towels, etc.

There are different requirements for unbleached tissue production compared with bleached tissue. Firstly, it shall be made from 100% unbleached virgin fiber pulp. Dyes,

pigments, toxic and harmful chemicals shall not be added in the process of production. And the content of fluorescent substances must be qualified for testing. Secondly, the brightness of unbleached tissue shall be lower than or equal to 55%. Thirdly, the softness shall be lower than or equal to 220mN for unbleached napkin, and lower than or equal to 450mN for unbleached toilet paper. Fourthly, in terms of paper absorbency, it also carry out different standards of horizontal water suction height for single-layer paper towel($\geq 15\text{mm}/100\text{s}$), single-layer toilet paper($\geq 20\text{mm}/100\text{s}$), and double or multi-layer tissue($\geq 30\text{mm}/100\text{s}$).

2. Raw materials

Natural fiber for papermaking is mainly classified into wooden and non-wooden fiber. Due to the relative lacking of wood resources in China, wheat straw, bamboo, bagasse, reed, corn stalks and other non-wooden fibers are taken as alternative fiber materials in the production of unbleached tissue paper. Without bleaching or only mild bleaching, the pulp remains relatively original color. The elimination of bleaching chemicals avoids the formation of adsorption of organic halide (AOX). For mild bleaching, environmentally friendly bleaching agents (such as oxygen, ozone, hydrogen peroxide, biological enzymes, etc.) and bleaching methods (such as oxygen delignification) are applied in the semi-bleaching process. And then mechanical solution can be used to realize full defiberation of pulp fibers and lower the residual lignin content. Therefore, the pulp becomes relatively stable and light yellow in color, which can be directly used in the production of unbleached tissue paper.

3. Manufacturers

Shandong Tranlin Paper Group is one of the earliest unbleached tissue manufacturers in China. 100% unbleached straw pulp is taken as the raw material in the production of paper products, which have passed the United States FDA and EU food grade AP test. Now it is China's "National Key new Products", the Shanghai World Expo franchise products. Tranlin has several manufacture bases in



Gaotang(Shandong province), Jiamusi(Heilongjiang province), Dehui(Jilin province), etc. Tranlin plans to establish a comprehensive straw processing project of 3.75 million tons annually, including five unbleached pulp production lines of 300 thousand tons, ten tissue production lines of 30 thousand tons, and five kitchen paper production lines of 60 thousand tons.

Sichuan Vanov Group uses bamboo pulp as raw materials to produce unbleached tissue products, including facial tissues, paper handkerchiefs, and toilet paper. It has formulated a forest-pulp-paper integrated industrial chain. Bamboo biomass refinery technology is applied in pulping process to preserve the flexibility of bamboo fiber. The bamboo fiber has strong antibacterial, mite-killing, odor-resistant and anti-ultraviolet functions. It's predicted that Vanov's *BABO* brand household paper products will lead a new trend and lifestyle. Now it has entered Singapore, Britain, the United States, Australia, and Canada paper market.

In addition, there are some other unbleached tissue manufacturers in China, such as Ningxia Zijinghua Paper Co., Ltd, Guangdong Shaoneng Group Co., Ltd, Guangxi Huaxi Paper Group Co., Ltd, Jiangsu Shuangdeng Paper Co., Ltd, etc.

4. Industrial layout

Sichuan province is considered as the most concentrated area for unbleached tissue production in China. Sichuan has enriched bamboo resources and takes bamboo pulp as raw materials in the production. At present, Sichuan province has an annual production capacity of 450 thousand tons of unbleached bamboo tissue medium, and 500 thousand tons capacity of unbleached bamboo tissue paper and related paper products. The products supply fall short of demands.

The representative enterprises are Sichuan Youfun Paper Co., Ltd, Yibin Paper Industry Co., Ltd, Sichuan Jianwei Fengsheng Paper Co., Ltd, Sichuan Vanov New Materials Co., Ltd, Sichuan Petrochemical Yashi Paper Co., Ltd, etc.





Innovative Achievement of China Independently-Developed Paper Machinery (III):

Technologies Applied in the Key Components of Paper Machines

● Zhang Hongcheng, Zhang Hui

In recent years, China's homebred paper machines and key supporting components have achieved great progress in operation speed, wire width, energy saving, compactness and automation. The overall operation performance of China homebred paper machine will be discussed in the next issue. In this issue, the key supporting components of paper machines will be clarified below.

1. Headbox with dilution water

Nowadays, the deviation of profile basis weight is usually controlled by means of regulating the consistency with dilution water on modern high-speed paper machines. This regulating method is featured with high precision and efficiency, and the

ability to keep the slice from deformation. Based on the existing air-cushion headbox technology, Zhejiang Huazhang Technology (formerly Hangzhou Meichen) and Henan Dazhi Paper Machinery have developed the dilution water hydraulic headbox with independent intellectual property.

The dilution water headbox (Figure 1) developed by Henan Dazhi Machinery has been applied to PM6 5600/1500 horizontal twin-wire forming paper machine in Henan Jianghe Paper Co., Ltd. Specifications: slurry volume 1423L/s; designed slurry consistency 0.9%-1.5%; slice width: 6180mm; upper slice trimmers: 61 sets; distance between upper slice trimmers: 102mm; distance

► Technology

between dilution white water valves: 60mm; the max. diluting water volume: 7%-12% on total slurry volume.

2. Twin-wire former

The twin-wire former has a better performance compared with that of the traditional one. It could realize sheet dewatering from both sides to improve the sheet two-sidedness, raise dewatering efficiency, forming quality, as well as the productive capacity. Moreover, short and closed forming area makes it more adapted to high-speed operation. And a more compact internal structure of the former helps to lower its space requirement. The twin-wire former (Figure 2) developed by Dazhi Machinery has been installed on PM6 5600/1500 paper machine in Henan Jianghe Paper Co., Ltd. It realized various dehydration methods, such as pressurized dehydration, pulse dehydration, centrifugal dehydration and vacuum dehydration. The innovative progress has been made in the regulating device for slurry jet location and jet angle, elastic pressurized dehydration shoe, arc-shaped dehydration tank and air-flow interference reducer, as well as white water collectors.



Figure 1 Headbox with dilution water developed by Henan Dazhi Paper Machinery Co., Ltd.

Maximum vacuum degree of various dehydration devices is as follow: dehydration tank: -5kPa; upside-down suction box: -7.6/-10/-20kPa; high-vacuum box: -20/-33/-65/-65kPa; vacuum couch roll: -45/-65kPa.

3. Shoe press

Shoe press technology is featured by high web-dryness, good operating efficiency and improved product quality, making it one of the major effective solutions for energy conservation of paper machine. It's predicted that in the near future, traditional roller press will be completely replaced by shoe press that is more adapted to the medium and high-speed paper machines (500-1500m/min). The newly developed shoe press (Figure 3) by Shandong Changhua Machinery is of great innovation. Firstly, there are four functional areas (static pressure nip, dynamic pressure nip, oil discharging area, and oil level holding area) between shoe plate and blanket, which could strengthen the lubrication and form a proper pressure distribution. Secondly, the sealing device that matches frame type oil seal with wear-resistant sleeves prolongs the lifetime and brings about good sealing effect. Thirdly, roll shell forging technology was applied to accommodate with the alternating stress resulted from high linear pressure. The innovative achievement for shoe press facility has been applied in practical production.

4. Film transfer sizing

Based on the traditional surface sizing methods such as dip sizing and roll coating technology, film transfer surface sizing was newly developed by China's paper machinery suppliers, such as Shashi Light Industry Machinery Co., Ltd (SLMC) and Shandong Changhua Machinery Technology Co., Ltd. The modular bar film transfer equipment developed by SLMC meets the needs for paper



Figure 2 Working site of the horizontal twin-wire former in Henan Jianghe Paper Co., Ltd.

mills to transform the dip sizing type to a film transfer sizing equipment. And modularization reduces the transformation period and expenses. Figure 4 shows an example of the transformation of Hunan Xiangjiang Paper Co., Ltd by SLMC—a 3300/600 dip sizing type to a film transfer sizing machine. Additionally, SLMC also provided Shandong Tranlin Paper Co., Ltd with a 6100/1200 bar-type film transfer sizing machine.

5. Curtain coating

Curtain coating has become a hot topic of research thanks to its outstanding features compared with the traditional blade coating and metered sizing press coating. The application of curtain coating have extended from specialty paper to other paper grades, especially the coated ivory paperboard, light-weight coated paper, kraft cardboard and coated cardboard.



Figure 3 Shoe press facilities by Shandong Changhua Machinery Technology Co., Ltd.

The curtain coater (Figure 5) developed by SLMC has been installed on a coating machine in China National Pulp and Paper Research Institute (CNPPRI), meeting the requirements for curtain coating pilot test at an operating speed of 800m/min. The *EvenCurtain* coating machine manufactured by SLMC is suitable for the paper machines with width of 880-6000mm and operating speed of 1800mm/min. It can be applied in the coating of most types of paper grades, and meets different requirements



Figure 4 An example of transformation to film transfer sizing machine



Figure 5 The pilot test curtain coating machine developed by SLMC and CNPPRI

of operating speed and coating demands. It also satisfies the use of high solid content coatings. The *EvenCurtain* coating is also featured with accurate coating lip straightness ($\pm 0.004\text{mm}$), high polishing degree of flow channel ($\leq \text{Ra}0.02\mu\text{m}$), good coating coverage, and accurate coating weight control in both cross direction ($\leq \pm 0.5\%$) and machine direction, as well as excellent operating stability.

6. Steel Yankee dryer

When it comes to the tissue machine, cast iron Yankee dryer is now being gradually replaced by the steel Yankee dryer. Compared with iron, steel has the advantages in toughness, heat conduction and safety performance. The steel surface coated with hard alloy is much harder than cast iron. The carbide coating is able to improve the sheet quality and prolong the lifetime of dryers and maintenance cycle. It is of great significance for energy conservation because the cylinder thickness of the steel dryer can be reduced by about 30%, which means that the heat conducting efficiency can be increased under the same condition.

Nowadays, advanced and world-class steel Yankee dryers have been developed by some Chinese machinery suppliers, such as Shandong Xinhe Paper-making Engineering Co., Ltd and Liyang Jiangnan Dryer Manufacture Co., Ltd., which is widely applied in the paper industry of China and the globe.

Next issue: Innovative achievement of China independently-developed paper machinery(IV)- Overall operation performance of China homebred paper machines.



Technical Features and Application of the Twin Roll Wash Press

● Wenrui Machinery (Shandong) Co., Ltd.

Efficient pulp washing equipment plays a vital role in the energy conservation and emission reduction of the pulping process. The twin roll wash press with high outlet consistency was lately developed by Wenrui Machinery (Shandong) Co., Ltd. Being able to realize capacity expansion and efficient operation, it has achieved widespread application.

1. Operation principles and features

Twin roll wash press manufactured by Wenrui has two series of SJA and SJB. The former refers to pulp feeding from both sides with replacement washing function, applied to black liquor extraction in pulping line; the later refers to pulp feeding from bottom without replacement function, applied to pulp concentration.

SJA twin roll wash press is combined with dewatering, displacement and pressing functions. Pulp feeds to distributor from both sides, then uniformly distributed on roll surface in axial direction, and the three stages

of washing shall be completed. Firstly, pulp dewaterers due to feeding pressure and level differential, and forms continuously uniform sheet on roll surface; secondly, as rolls are rotating, pulp is thickened to consistency of 10%-14%, followed by displacement with washing water; thirdly, displaced pulp is thickened to desired high consistency by twin roll mechanical pressing force.

Major features:

- (1) Combination of dewatering, displacement and pressing, less water consumption, higher washing efficiency;
- (2) High production capacity, available to large-scale project, effectively reduce construction investment and production cost;
- (3) Medium consistency feeding, high consistency output, reduce feeding volume and energy consumption, improve concentrating efficiency;
- (4) Dewatering by gravity, no requirement for high-level building, high capacity for unit area, less area

► Technology

occupation, less civil work cost;

(5) Less extracted liquor with higher black liquor concentration, higher extraction rate, less washing loss, reduce evaporating cost and chemical consumption in bleaching;

(6) High automation, easy to artificial intelligent operation, reliable performance, high efficiency.

2. Techniques and advantages

(1) Special process facilities and machining equipment. Apply tailored process equipment and heat assembly technique, large numerical machining lathe, to ensure the complete assembly accuracy, machining and positioning accuracy for the roll and the performance.

(2) Uniform pulp distributor. Design the channel section and baffling reflex structure. Reduce fluid resistance, ensure an uniform distribution, completely avoid blockage to improve washing efficiency.

(3) Reasonable channel structure. According to equipment specifications, a suitable flow channel was designed to prevent filtrate back flow, increase filtrate velocity and drainage amount to prevent rewetting and increase outlet consistency.

(4) Reliable, convenient seal arrangement. Apply hydraulic lifting, locking and air seal design to improve equipment maintenance efficiency and reduce labor strength while the sealing is reliable.

(5) Advanced automation control. Implement sequence control design strictly according to process and

equipment operation procedures, achieve one-key safe start-up and shutdown to avoid wrong operation. Meanwhile, depending on several factors related to twin roll wash press, decide essentially controlling factors, automatically judge and control related factors to ensure the equipment running reliability, safety and system stability.

3. Application

Depending on market demand, different sizes have been developed in 700, 900, 1500, and 220 diameter suitable for different capacity and pulps. More than 90 sets were delivered to wheat straw, reed, bagasse, HW chemical pulping, and HW mechanical pulping mills in China, as well as chemical wood pulping mills overseas. With inlet consistency of 3%-8%, outlet consistency of 20%-30%, good operating performances were achieved. The equipment is also applied in wood based ECF bleaching system, water consumption, effluent discharge and steam consumption for washing and bleaching per ton pulp are 13m³, 10m³ and 400kg respectively, with power consumption obviously reduced. The series have met the demand for various capacity and various pulp grades, accounting for over 50% of the sales volume of Wenrui's all products.

4. Conclusion

Wenrui continues to push international development strategy and expand overseas market. Presently over 30 sets of twin roll wash press are in operation in Indonesia and India market, with over 80% share of products exported. 18 sets of SJA2284 (roll dia. 2200mm, roll width 8400mm) were delivered to a 2.8 million t/a hardwood pulping line in OKI Pulp & Paper, Indonesia, with single machine production capacity reaching 4500t/d, and successfully started up at one trial. It's proved that twin roll wash press can be a good choice for large-capacity pulping project. China homebred pulping equipment has gradually entered high-end market in the globe.



Features and Advantages of the Improved Multi-disc Concentrator

Wang Zegang, Cui Lisheng (Shandong Chenzhong Machinery Co., Ltd.)

Multi-disc concentrator is a key equipment in pulp concentration and processing. It could strengthen its filtering power depending on the vacuum area produced by the filtrate pipe. Through the distribution valve, it is able to make the filter disc on the rotor shaft operate in four working states of natural filtration, vacuum filtration, pulp stripping, and pulp cleaning, thus finishing pulp concentration through constant circulation. Before the optimization, the inlet pulp consistency was 0.5%-1.2%, and the outlet pulp consistency was 8%-12%. After the upgrading of the multi-disc concentrator, the inlet pulp consistency is 0.8%-2.0%, and outlet pulp concentration can be as high as 14%.

1. Structural features

The CDI multi-disc concentrator is more compact in inner structure than that of the conventional multi-

disc concentrator (Figure 1). Its operation principles are shown in Figure 2. The structures of the filter disc, rotor device and distribution valve are shown in Figure 3-5. The filter disc is featured by an internal hollow welding structure. The main body is welded with stainless steel bar with a diameter of $\phi 4\text{mm}$, and the external surface is covered with a 40-60 mesh polyester filter wire to increase the effective area of filtration. Moreover, the rotor device is designed as an internal hollow and external hexagonal structure, which could improve slurry agitation efficiency, and prevent deposition of fibers under low concentration conditions. The newly updated distribution valve has four pipe structure designs, including turbidity filtrate, clear filtrate, ultra clear filtrate, and ventilatory pipe. The filtrate classification function greatly improves the range of filtrate utilization.

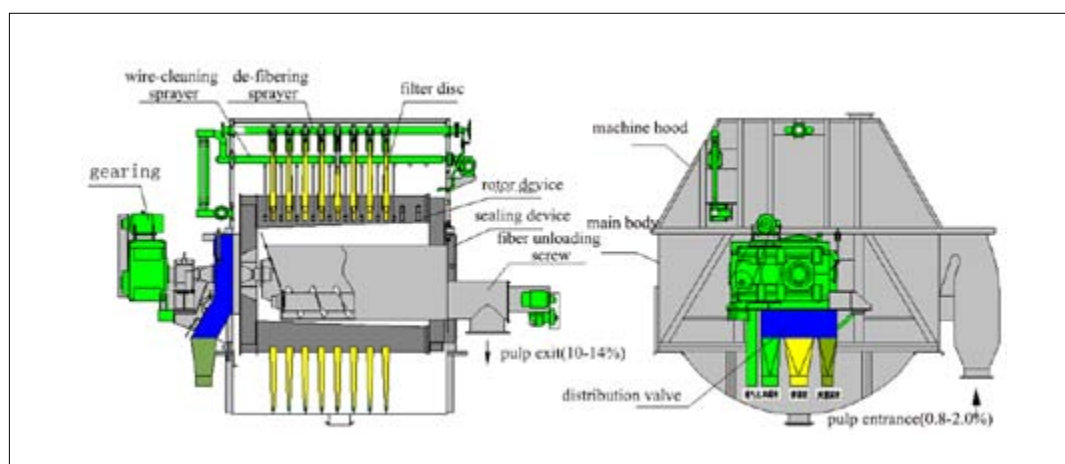


Figure 1 Structure of CDI multi-disc concentrator

2. Technical advantages

(1)Overall structure: Compared with the conventional multi-disc concentrator, CDI concentrator removes the collecting trough between filter discs. Through the adjustment, CDI concentrator can be shorter in length, more compact in structure, lighter in weight, and lower in installation expenses.

(2)Filter disc: Minimization of internal space optimized both the operation and filter efficiency.

(3)Sector-shaped plate: Relying on its special design, the solid sector plate made from stainless steel could support the filter, and realize a maximum free filtering space. The standard wire is made from highly qualified synthetic materials.

(4)A central shaft is replaced by large-diameter hollow rotors, which could realize continuous slurry agitation in the cylinder. Firstly, the rotor brings about effective agitation, and improves the evenness of pulp distribution. Thus, the static mixer is no longer needed. Secondly, decayed pulp areas are also eliminated between discs. Thirdly, it is able to work in high-concentrated conditions. The maximum slurry concentration allowed can be as high as 2%. Fourthly, changes in slurry flow and concentration cannot cause obvious impacts on its normal operation.

(5)The slurry after filtering and concentrating will become a porous fiber layer on the disc plate. The slurry concentration can be as high as 14% after

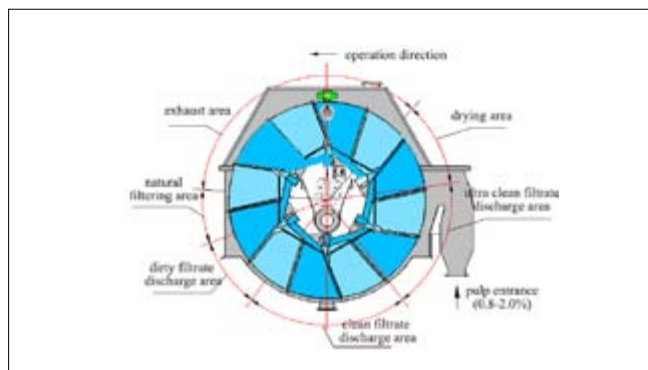


Figure 2 Operation principles of CDI multi-disc concentrator

passing a long drying compartment.

(6)Updated distribution valve: Bottom of the valve is linked with the vacuum waster pipe, which could connect it with clean filtrate and ultra clean filtrate respectively. And the proportion of filtrate can be adjusted at any time through the manual valve.

3. Effects

Through a series of structural optimization, the CDI multi-disc concentrator effectively improved the pulp quality by eliminating decayed pulp area and avoiding slurry pollution. The production efficiency was greatly improved with the elevation of slurry concentration. The updated distribution valve is used to further subdivide the filtrate grades and improve the efficiency of the filtrate. It is predicted that the specially designed concentrator with advanced technologies will be further applied and promoted in pulp and paper market.



Figure 3 Filter disc frame



Figure 4 Rotor

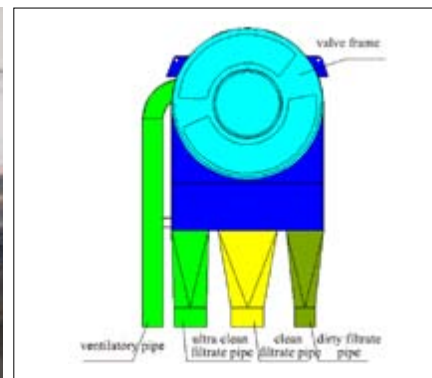


Figure 5 Updated distribution valve



A Design on the Energy-Saving and Environmental-Friendly Bobbin Fibre Paper Machine

✎ Xia Jirui, Zhang Fengyu (Shandong Xinhe Paper-Making Engineering Co., Ltd.)

Large amount of solid waste can be generated in the production of high strength corrugated medium and case board by waste paper. In order to make the most of waste residue and sludge, Shandong Xinhe developed two kinds of bobbin fibre paper machines that could produce bobbin fibre paper by using waste paper boxes, waste residue and sludge as raw materials. The sludge addition amount can be 15-20 percent in the process of production. Two bobbin paper machines(150t/d and 200t/d) have been put into operation in Pinghu Long Chen Paper (Zhejiang province) and Hubei Long Chen Paper(Hubei

province) respectively. It has been proved that Xinhe's paper machines brought about qualified products and reasonable configuration, and promoted energy conservation and environmental protection.

1. Bobbin fibre paper machine with 150t/d capacity

1.1 Specifications

trimmed width: 3200mm;
basis weight: 200-500g/m²;
operation speed: 110m/min;
designed speed: 150m/min;
nominal output: 150t/d

Equipped with an updated counter flow former, this paper machine is featured with even pulp distribution, proper ratio of MD tensile to CD

tensile, large pulp feeding with overflow and a good bonding of different layers. Equipped with Φ1800mm flake-shaped cylinder mould made from stainless steel 304 and six sets of formers, it can be used in bobbin fibre paper production with various basis weight.

1.2 Major features

(1) Rectangular tapered pulp distribution and counter-flow forming(Figure 1)

Besides good control of raw material and beating process, it is also important to ensure even starch spray for a better combination between different layers. The spray amount of Pinghu Long Chen Paper is usually 24kg starch per ton paper.

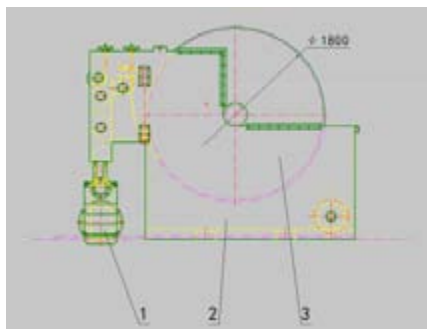


Figure 1 Counter flow former

1-rectangular tapered pipe
2-former 3-cyclinder mould

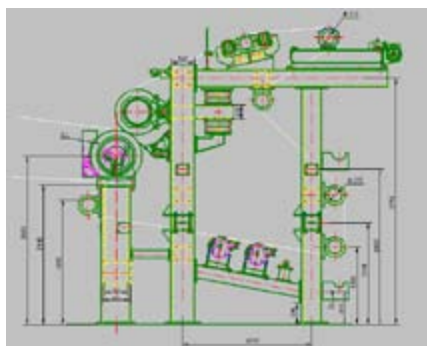


Figure 2 Pre-pressing section



Figure 3 Bobbin fibre paper machine in Pinghu Long Chen Paper

(2) Due to high basis weight and high moisture content, the vacuum pre-press section is designed for pre-dehydration of paper sheet before pressing. It could also prevent web flopping on returning roll (Figure 2).

The press section includes one vacuum press and two sets of large-diameter roll press ($\phi 1300\text{mm}/\phi 1300\text{mm}$) with extended nip. The linear pressure of the three presses are designed to be 100kN/m , 250kN/m and 280kN/m , respectively. The designed linear pressure for felt is 4kN/m . The sheet dryness can be reached more than 50% dryness after leaving the press section.

(3) The drying section is equipped with 24 sets of $\phi 1500\text{mm}$ dryers. The working pressure of cast iron dryers is 0.5MPa .

The sheet dryness before entering the drying section can reach a maximum of 52%, and a heat pump steam condensing system is installed in the dryness section.

Energy consumption:

air steam: $1-1.1\text{t/t}$;

power: a maximum of $210(\text{kW}\cdot\text{h})/\text{t}$;

water consumption: no fresh water, only white water used.

2. Bobbin fibre paper machine with 200t/d capacity

2.1 Specifications

paper grade: B and C grades bobbin fibre paper medium

basis weight: $300-600\text{g/m}^2$ (mainly in 300m^2)

trimmed Width: 3300mm

operation speed: 150m/min

designed speed: 160m/min

2.2 Major features

Advantages of 200t/d paper machines over 150t/d ones:

(1) Seven formers equipped, 600g/m^2 bobbin fibre paper available.

(2) Press section adopts a K-model press and two sets of large-diameter roll presses, which could keep the sheet entering to drying part at a dryness of 50%-52% even if operation speed and output are increased.

(3) Drying section is equipped with 24 sets of $\phi 1800\text{mm}$ dryers and two sets of dryer cleaners. Small gear box driving system can lower the operational noises and make the running stable.

Both two paper machines mentioned above could manufacture bobbin fibre paper with good formation and quality level above B grade. For instance, the 360g/m^2 bobbin fibre paper made by Hubei Long Chen has good properties in layer bonding strength ($\geq 300\text{J/m}^2$), ring crush strength ($\geq 12\text{N}\cdot\text{m/g}$), and density ($0.73\pm 0.02\text{g/cm}^3$).



Looking into Paper Industry through Official Statistics

Output and Benefit Increase of China Paper Industry

👤 Yang Chenming

The year of 2017 has witnessed remarkable growth of China paper industry, as can be seen from the data released by National Bureau of Statistics of China. In 2017, China paper and board output increased smoothly to reach 125.42 million tons, with the cumulative increase rate of 3.1%. The cumulative export delivery value was 31.47 billion yuan, a year-on-year increase of 3.6%; the sales-to-output ratio was 97.8%, a year-on-year decrease of 0.6%. For paper and paper products segment, main business income and total profits turned out to be 1,520.3 billion and 102.86 billion yuan, increased by 13.6% and 36.2% year-on-year respectively. (Table 1)

For regional output in different provinces, in 2017, the output of Guangdong's machine-made paper and board was 21,777.4 thousand tons, ranking the first in China. Shandong province (21,775.0 thousand tons) ranked the second only with a slight gap of 2.4 thousand tons. The combined output of paper and board in the two provinces accounted for about a third of the country's total output. In addition, Zhejiang province ranked the third in the country with the output of 19,112.1 thousand tons, and Jiangsu province ranked the fourth with the output of 12,776.8 thousand tons. Paper and board output in Fujian and Henan was 7,799.0 and 6,975.4 thousand tons respectively. The output of other provinces is below 5,000 thousand tons. (Table 2)

Table 1 Major financial indicators of China paper and paper products segment in 2017

Indicators	Figure	Year-on-year increase/%
Paper and board output/thousand tons	125,420	3.1
Number of related enterprises	6,681	-0.3
Investment in fixed assets/billion yuan	309.10	1.2
Turnover/billion yuan	1,541.31	13.7
Main business income/billion yuan	1,520.30	13.6
Total profits/billion yuan	102.86	36.2
Number of unprofitable enterprises	677	-8.9
Total losses of unprofitable enterprises/billion yuan	4.1	-46.8
Total assets/billion yuan	1457.58	5.1
Total current assets/billion yuan	683.73	8.3
Accounts receivable/billion yuan	164.96	8
Inventory value/billion yuan	130.73	13.7
Inventory value of finished products/billion yuan	50.18	19.6
Total debts/billion yuan	794.3	3.4
Operation costs/billion yuan	1318.61	12.7
Operation costs of main business/billion yuan	1301.95	12.5
Sales expenses/billion yuan	43.76	10.2
Management expenses /billion yuan	53.1	8.7
Financial expenses/billion yuan	22.23	-1.9
Interest expenses/billion yuan	20.42	2.7

Table 2 Areas with paper & board output above one million tons in 2017

Rank	Administrative areas	Output /thousand tons
1	Guangdong province	21,777.4
2	Shandong province	21,775.0
3	Zhejiang province	19,112.1
4	Jiangsu province	12,776.8
5	Fujian province	7,799.0
6	Henan province	6,975.4
7	Hunan province	4,022.8
8	Hebei province	3,721.1
9	Anhui province	3,503.8
10	Chongqing Municipality	3,289.9
11	Guangxi Zhuang Autonomous Region	3,008.9
12	Tianjin Municipality	2,864.3
13	Hubei province	2,767.2
14	Sichuan province	2,370.7
15	Jiangxi province	2,110.4
16	Hainan province	1,751.6
17	Liaoning province	1,069.0
	Total	120,695.4

Nine Dragons Paper: Leading position consolidated, with its capacity hitting 17.35 million tons/year in FY 2018-19

Nine Dragons Paper (Holdings) Limited is a listed paper manufacturer on the main board of the Hong Kong Stock Exchange who primarily manufactures linerboard, high performance corrugating medium and coated duplex board products. In the second half of 2017, Nine Dragons' turnover increased by 34.1% year-on-year to approximately 25.65 billion yuan, profit attributable to equity holders was about 4.33 billion yuan. If exchange losses were excluded, profit attributable to equity holders turned out to be 4.35 billion yuan, increased by 117.3% year-on-year. The sales volume dropped by 10.7% to



6.3million tons(among which duplex board dropped by 15.3%), and the average net profit reached 690 yuan per ton if the exchange losses were excluded, according to the financial report(1st July, 2017-31st Dec., 2017) released by Nine Dragons recently.

Taken together, Nine Dragons' turnover increase mainly benefited from the price hike of various paper grades recently. From the perspective of cost, Nine Dragons, as a paper giant in China, enjoys relatively higher import quotas and stable recycling channels of waste paper, thus benefiting a lot from big price gap between domestic and imported pulp.

Equipped with captive power plant, supported ports and other required infrastructure, Nine Dragons could further expand its advantages in raw materials as well as cost. The profit per ton reached a new record during the last five years, and the gross margin hit 24.5%, according to the report.

Nine Dragons continued to expand its production capacity in the second half of 2017. The linerboard product line with capacity of 350 thousand tons at the Vietnam base has already commenced production in August 2017, bringing the Group's total designed capacity to 14.05 million tons/year, among which the capacity of linerboard, high performance corrugating medium, coated duplex board and environmental fine paper

is 7.6million, 3.4million, 2.6million and 0.45million tons respectively. Furthermore, another 1.4 million tons production capacity will be put into operation before the end of 2018, with 0.35 million tons in Quanzhou, Fujian province, 0.55 million tons in Chongqing, and 0.5 million tons in Hebei province. And 1.85 million tons capacity is planned to be put before 30th June, 2019, with 0.6 million tons both in Shenyang, Liaoning province, and Dongguan, Guangdong province, and 0.65 million tons in Quanzhou, Fujian province. It's predicted that the designed production capacity will reach 17.35million tons/year in the 2018-2019 financial year, thus further consolidating Nine Dragons' leading position in pulp and paper industry.

Chenming Group: Total turnover hitting 100 billion yuan, with new projects promoted on the way

In 2017, all the economic targets of Chenming Group (stock code: 000488) reached a historically highest level, and Chenming's overall strength developed greatly with its total turnover exceeding 100billion yuan(\$15bn), said Chen Hongguo, chairman of Shandong Chenming Paper Group Co., Ltd.



It's predicted that Chenming's net profits will reach

3.6-3.9billion yuan in 2017, rose by 74%-89% compared with that of 2016 (2.06billion yuan), according to Chenming's financial report. Compared with 2016, the year of 2017 has witnessed the growth of gross profit rate, which was mainly brought by the market price increase of fine paper, coated paper and ivory board that Chenming takes as major paper grades. Furthermore, Chenming's good profit performance also benefited from the newly operated liquid packaging paper project (600 thousand tons) in Chenming's manufacture base in Zhanjiang, Guangdong province.

For further expansion, new projects are being promoted to implement now in Huanggang Chengmin Pulp& Paper Co., Ltd., in Huanggang, Hubei province, including the major project of specialized viscose fiber (500 thousand t/a) and some supporting projects such as the production of sodium hydroxide (320 thousand t/a), hydrogen peroxide (170 thousand t/a), chloroacetic acid (150 thousand t/a), epichlorohydrin (240 thousand t/

a), refined glycerol (260 thousand t/a), carbon disulfide (50 thousand t/a), sulfuric acid (420 thousand t/a), calcium chloride (232 thousand t/a), etc. The total investment of this project amounted to 11.4 billion yuan, of which 10.2 billion yuan is for the project construction.

Vinda Int'l: Tapping into southeast Asia premium tissue market, with total capacity up to 1.28million tons by the end of 2018

Vinda International Holdings Limited is a listed company on the main board of the stock exchange of Hong Kong held by Essity Group, a world leading hygiene products manufacturer spun off from SCA. Vinda Group's total revenue grew by 12% to HK\$ 13.5 billion in 2017. The revenue from tissue segment was HK\$ 10.9 billion. Softpack, kitchen towels and wet wipes recorded notable



increase in revenue. The revenue from personal care segment reached 27% to HK\$ 2.6 billion, accounting for 19% of the Group's total revenue (2016: 17%). Both incontinence and feminine care business in mainland China delivered double-digit organic growth in revenue. What's more, revenue growth from e-commerce stood out among various sales channels, accounting for 21% of the Group's total revenue.

During the year, Vinda tapped into Southeast Asia premium tissue market by rolling out *Vinda Deluxe* series to various supermarket chain stores in Malaysia. *Vinda Deluxe* is also available through wechat e-shop in Singapore. The majority of the baby care business of Vinda is in Southeast Asia. The market share of Vinda's *Drypers* brand takes the first and third position in Malaysia and Singapore tissue market respectively.

By the end of 2017, Vinda's total annual designed production capacity reached 1.1million tons. It's predicted that the total capacity will reach 1.28million tons by the end of 2018 after 0.12 million tons capacity in Hubei province and 0.06 million tons capacity in Yangjiang, Guangdong province to be added in the second half of 2018.

Vinda is a leading tissue and hygiene products manufacturer in Asia. It has ten manufacture bases with well-equipped facilities in mainland China, one in Taiwan, China and two in Malaysia, as well as one converting factory in Australia.

● Dynamics of CPPIA members ●

CPPIA: China Pulp & Paper International Alliance

Tranlin Paper: Planning to initiate a world biggest straw pulp and paper comprehensive project

Shandong Tranlin Straw Utilization Co., Ltd., a subsidiary of Shandong Tranlin Group, plans to establish a straw comprehensive utilization project with an annual straw treating capability of 3.75 million tons, which will be the world's biggest comprehensive pulp and paper project with non-wood fibrous material developed in a single mill. The documentation drawing-up for environmental assessment has been started, which is drafted according to the requirements in *Technical Guidelines for Environmental Impact Assessment of Construction Projects* by the Chinese government.

With wheat straw as the raw materials, the project includes five unbleached pulp production lines (0.3 million t/a each), ten household paper production lines (0.03

million t/a each), five kitchen paper production lines (0.06 million t/a each), two food wrapping paper production lines (0.3 million t/a each) and two pulp products production lines (0.3 million t/a each). Some supporting projects will also be established, such as five fluvic liquid fertilizers production lines (0.75 million t/a each), other public auxiliary engineering projects and environmental protection engineering projects, etc. After the accomplishment of the projects, it is predicted that the designed annual straw converting capability will reach 3.75 million tons in total. The products and the annual capacities of the production units include 1.5 million tons of commercial unbleached straw pulp, 0.3 million tons of kitchen paper, 0.6



million tons of food wrapping paper, 0.3 million tons of household paper, 0.6 million tons of pulp products and 3.75 million tons of fulvic liquid fertilizers with 20% of fulvic respectively.

The project, covering an area of about 1,536,000m², is planned to set in Tranlin's paper mill in Gaotang, Shandong province, China.

Sun Paper: Significant profits increase and new investment in Lao



Shandong Sun Paper Industry Joint Stock Co., Ltd. performed well in 2017 financial year. The growth rate of total operating revenue, operating profit, income before taxes, net profit attributable to shareholders, and basic earnings per share all exceeded 30 percent. In 2017, the total operating revenue increased by 4.4 billion yuan to 18.9 billion yuan(+31%); the operating profit increased by 1.5 billion yuan to 2.9 billion yuan(+103%); income before taxes was doubled to hit 2.9 billion yuan(+100%), with an increase of 1.5 billion yuan; the net income

attributable to shareholders added up to 2.0 billion yuan(+89%), with a year-on-year increase of 0.9 billion yuan; basic earnings per share was up to 0.78 yuan(+90%).

Sun Paper also plans to invest another USD 140 million to the chemical pulp project of 300 thousand tons in its Laos manufacture base. Another two new wood chip cooking boilers, a biomass thermal power plant, an alkali recovery boiler, a biomass bubbling boiler, an extraction and condensation heating turbine generator set, and other supported devices are also on the installation list. It's predicted that the total investment of the Laos base will be increased from USD 290 million to USD 430 million after the completion of the increase in total investment.

Century Sunshine: Promoting new concept packaging, and realizing 200% y-o-y increase of profits and taxes

Shandong Century Sunshine Paper Group Co., Ltd. created an "Internet+paper packaging" industry chain, and provided one-stop packaging solution services from waste paper recovery, papermaking, creative design, printing, carton-making to logistics distribution. Sunshine Paper has become a coated/uncoated white top testliner manufacture base

with high capacity, advanced technology & equipment and qualified products, and has also been recognized as a world-class preprinting base. Sunshine paper is one of the China Top 16 papermakers and global Top 100 papermakers as well.

Noticeably, all the financial indicators of Century Sunshine reached a record high in 2017. The base paper output was 1.35 million tons, an increase of 4.5% year-on-year; sales volume of base paper was 1.26 million tons, including 30,000 tons of export base paper and 3,500 tons of pre-printed exports, which increased by 61% and 75% year-on-year respectively; total turnover was up to 6 billion yuan, 35% higher than 2016; profits and taxes added up to 800 million yuan, an increase of 200% year-on-year.



Shashi Light Industry: Entering India market under the guidance of “the Belt and Road” initiative

In January 2018, after standing out from the competition with some global and local well-known machinery suppliers, Shashi Light Industry Machinery Co., Ltd.(SLMC) finally became the successful tenderer in the bidding for an order from Khanna Paper Mills Limited, a paper mill located in India. SLMC will help Khanna Paper Mills to upgrade two coating board production lines, including its PM1’s 3000mm project and PM2’s 2200mm project. It’s predicted to be completed in May and July, 2018 respectively.



In February, another order came into force with India Sripathi Paper and Boards Private Limited. SLMC will provide the film transfer sizing machine to Sripathi, and the delivery deadline is the end of June, 2018. It’s also the second-time cooperation with Sripathi besides the order of coating machine in 2017.

SLMC is a R&D and manufacturing base for medium and high-grade coating and finishing equipment in China. Following “the Belt and Road” initiative put forward by Chinese government, SLMC has drawn global

attention gradually by providing China's state-of-the-art coating and finishing equipment to the paper mills throughout the world.

Huazhang Technology: Deepening cooperation with Japan Kurita Machinery for the filter press development

As one of the five biggest filter press manufacturers in China, Huazhang Technology (HK01673) developed an automated tilting filter press that was nominated as the first name brand machinery in 2017 in Zhejiang province, China. The cooperation with Kurita Machinery, a Japan filter press leader, has also achieved win-win progress for both sides. Through the cooperation, Kurita Machinery sought a reliable partner to improve product cost-effectiveness, and Huazhang further developed the quality of its filter press and other related products as well.



Huazhang Technology is a technology-based enterprise listed on the Hong Kong Stock Exchange. It has more than 20 years' experience in electrical automation, headboxes, environmental protection equipment and engineering in the papermaking industry. Founded in 1930, Kurita Machinery has become a world-class filter press maker that has advanced filtering, pressing and separating technologies through global resources integration, and it also enjoys a good reputation in the high-end market. Thus, the strong alliances between Huazhang and Kurita is supposed to achieve win-win development for both sides in the future.

Shandong Changhua: The pioneer of China shoe press development

Shandong Changhua Technology Co., Ltd has independently developed the shoe press equipment featuring innovated design, advanced technology, high operating reliability, outstanding energy-saving and automation performance, which can be a better choice for the paper machine with 500-1500m/min speed and for the upgrading and optimizing of paper machines.



Changhua has lately offered shoe press upgrading services for the paper machine of Shandong Meijie Paper Co., Ltd. The paper machine, with a width of 5260mm and operating speed of 700m/min, mainly manufactures corrugated medium and board with the basis weight of 110-170g/m². The shoe press equipment was installed on the second press section with a designed pressure of 1000kN/m.

In addition, Changhua has also provided shoe press solutions for a 4800/550 paper machine and two 5300 paper machines for Dezhou Taiding New Materials Co., Ltd a 5650/1000 paper machine for

Shandong Quanrun Paper Co., Ltd and a 3400/650 cardboard machine for Shandong Huajin Paper Group, etc.

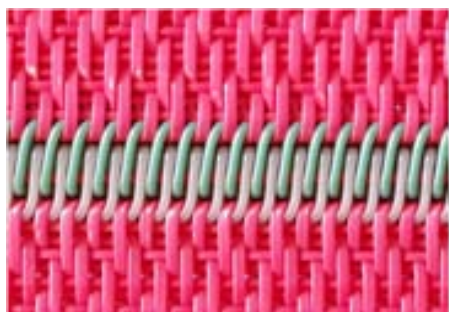
The newly developed shoe press equipment is of high innovation. Firstly, four function areas (static press nip, dynamic press nip, oil discharging area, oil level holding area) between the shoe and blanket could help strengthen lubrication and form a proper press distribution. Secondly, the new sealing model adopted frame-type oil seal and wear-resistant sleeves, which greatly prolonged the service life and sealing effect of the whole sealing system. The sealing components with four-side concave structure could also enhance the sealing power between shoe plate and related rotary equipment. Thirdly, roll forging technology was specially developed to deal with the alternating stress resulted from high wire pressure.

Taipingyang Special Fabric: The supplier of high-strength flat yarn dryer fabric

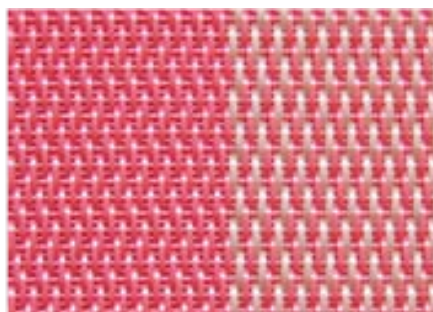
The high strength flat yarn dryer fabric developed by Taipingyang Special Fabric Co., Ltd has been widely applied in the production of specialty paper, fine paper and packaging paper, and further exported to many countries and regions. The fabric is featured by smooth fabric surface, stable operation, high anti-hydrolysis ability, strong fouling resistance ability, stable quality and high cost performance. And the application of advanced technologies and equipment laid a solid foundation for the manufacture of high strength flat yarn dryer fabric.

The technologies and facilities adopted in the manufacture of the fabric:

- (1) Apply Germany-imported high strength anti-hydrolysis filaments with great stability and anti-friction features which can satisfy the need of high temperature and moisture environment in the drying part of high speed paper machines.
- (2) Adopt the rapier loom with heavy width imported from Germany, with which high



PEEK spiral loop



PPS dryer fabric edge



Imported steel wire for connection

smoothness, good consistency and great stability of fabric surface can be attained; JR-1F loom machine with 12.9m width and weft lock strength reach up to 6.5t/m from Juergens in Germany; TCX1115 loom machine with 10.5m width and weft lock strength reach up to 8t/m from TEXO in Sweden.

(3) The design of PPS edge, PPS filament with high anti-hydrolysis, top anti-friction and strong intensity features; adopt special methods to weave 2 PPS edges of flat yarn dryer fabric to enhance the strength, the anti-friction and anti-hydrolysis features of fabric edges.

(4) Wire plug apply semi-automatic wire plug machine based on electronic jacquard component which is developed independently to enhance the interface quality and efficiency.

(5) Adopt PEEK spiral loop and wire feed imported from abroad, with higher anti-hydrolysis, stability, strength and anti-friction than ordinary spiral loop, which also largely enhance the strength and life of the interface.

(6) Adopt wire interface press machine under the conditions of given tension, temperature and pressure to handle the interface making it much finer and smoother.

(7) Functional and decorative zipper stitched by hand makes wire feed more convenient to save time and increase efficiency.

Outstanding Pulp and Paper Machinery and Chemicals Suppliers in China

Front cover/ Yingde Liangshi Industrial Materials Co., Ltd.
 Inside front cover/ Shandong Xinhe paper-making Engineering Co., Ltd.
 Inside back cover/ Wenrui Machinery(Shandong)Co., Ltd.
 Back cover/ Anhui Taipingyang Special Fabrics Co., Ltd.
 39/ Shashi Light Ind. Machinery Co., Ltd.
 40/ Shandong Chenzhong Machinery Co., Ltd.

41/ Weifang Hicredit Machinery Co., Ltd.
 42/ Sichuan VANOV Technical Fabrics Co., Ltd.
 43/ Dalian Microstone Machinery Co., Ltd.
 44/ Yingde Liangshi Industrial Materials Co., Ltd.
 45/ Huazhang Technology Holding Limited
 46/ China Pulp & Paper International Alliance(CPIIA)
 48/ Tianli Machine Building Co., Ltd.



China Pulp and Paper Industry Publishing House

A Comprehensive Media Platform for Paper Industry

China Pulp & Paper Industry Publishing House(CPPI) is a comprehensive and professional media platform that is engaged in the publication of *China Pulp & Paper Industry*(the official journal of China Paper Association), along with the business in website operation, conference organization and oversea activities.

Media Platform

■ *CPPI* journal: *CPPI* is the journal of China Paper Association, working as the comprehensive guidance for the strategy, development, upgrading, and management of China paper industry. It is a semi-monthly journal (24 issues/year) having large circulation and coverage in China.

■ Website portal(www.cppei.cn): It is the portal

website for China paper industry, providing the latest information, statistics and service for pulp & paper manufacturing, packaging and printing industries. The English-version website opens a window for oversea enterprises to know more about China paper industry.

■ Wechat account (cppinet): “Cppinet” wechat account, with over 20,000 followers, is the leading and open stage for paper industry, working as an ideal promotion stage that provides the most professional and valuable information.

■ Wechat account (pulp-paper): A new-media platform for technology exchange and information sharing.

■ CPPI weibo: [http://weibo.com/cppi\(sina weibo\)](http://weibo.com/cppi(sina weibo)); [http://t.qq.com/cppinet\(tencent weibo\)](http://t.qq.com/cppinet(tencent weibo))

Conferences & Exhibitions

● China Paper Industry High-level Summit: It is a high-end conference for opinion exchanges among professors and elites in paper industry.

● CPPI Pulp & Paper Technology Forum: The forum sets a free floor for technology exchanges, and it's featured by professionalism, authority and practicability.

● Exhibition Overseas: “China Pulp & Paper Machinery Exhibition Group”, the only nation-wide oversea expo group, represents the highest level of China paper industry. The group has been to Finland, Switzerland, Russia, India, Thailand, and Vietnam, and was honored “The Best-organized Exhibition group”.

●Paper China

Paper China is an English-version magazine published by China Pulp and Paper International Alliance, covering the industrial hotspots, government policy, market focuses, advanced technologies, market information, etc.

China Pulp & Paper Industry Publishing House

Add: No.101, Gongyenan Rd., Licheng Dist., Jinan 250100, Shandong province, China

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E-mail for *Paper China*: paperchina@cppi.cn

Tel: +86-531-88192261



► Information

Business
Directory

Member Units of China Pulp & Paper Int'l Alliance (I): Pulp & Paper Machinery Suppliers and Related Enterprises



Shashi Light Ind. Machinery Co., LTD.

Chairman: Pan Rongdun

Headquarter: No. 21, Beihu Rd., Shashi Dist., Jingzhou,
Hubei Province, China

Tel: +86-716-4314148 Fax: +86-716-8524375

Web: www.slmc.com.cn

E-mail: scb-slmc@vip.163.com

Major products: medium & high-end coating and
finishing equipment, such as coaters, calendars, and
film transfer coating devices.



Wenrui Machinery (Shandong) Co., Ltd.

GM: Jiang Peng

Headquarter: No. 287, Weixunan Road, Anqiu,
Shandong Province, China

Tel: +86-536-4362288; +86-536-4361880

Fax: +86-536-4362807 Web: www.wenrui.com.cn

E-mail: info@wenrui.com.cn

Major products: pulp washing, screening, bleaching
equipment & alkaline recovery equipment, such as twin
roll wash press, vacuum pulp washer, filter, causticizer,
evaporator.



Shandong Changhua Technology Co., Ltd.

Chairman: Zhong Xiarui

Headquarter: No. 178, Nanwaihuan Rd., Phoenix
Industrial Park, Liaocheng, Shandong Province, China

Tel: +86-635-2128866 Fax: +86-635-2128877

Web: www.cnchanghua.com

E-mail: master@cnchanghua.com

Major products: fine paper, packaging and disposable
paper machines, and industrial paper machines.



Shandong Chenzhong Machinery Co., Ltd

Chairman: Tian LiZhong

Headquarter: Tianzhuang Town, Huantai County,
Zibo, Shandong Province, China

Tel: +86-533-8580059

Fax: +86-533-8580366

Web: www.chenzhong.com.cn

E-mail: chenzhong@chenzhong.com.cn

Major products: pulp machines, environmental
protection equipment, specialty wear resistant
materials, oil equipment.



Shanghai Qingliang Industry Co., Ltd.

Chairman: Chen Xiaokang

Headquarter: No. 68, Hexiang Rd., Baihe Industrial Park, Qingpu Dist., Shanghai, China

Tel: +86-21-59741536 Fax: +86-21-59741437

Web: www.shqlsy.com E-mail: shqlsy@shqlsy.com

Major products: packaging, tissue, specialty, and fine paper machines.



Shandong Xinhe Paper-making Engineering Co., Ltd.

Chairman: Zhang Lei

Headquarter: No. 26, Huanghe Rd., Liaocheng Economic Development Area, Shandong Province, China

Tel: +86-635-2933333 Fax: +86-635-2936777

Web: www.sdxinhe.cn E-mail: lcxinhe@126.com

Major products: tissue, case board, specialty and fine paper machines, and steel Yankee dryers.



Zhejiang Huazhang Technology Co., Ltd.

Chairman: Zhu GenRong

Headquarter: Floor 12, Weixing Bldg., No.252, Wensan Rd., West Lake Dist., Hangzhou, Zhejiang Province, China

Tel: +86-573-88866555 Fax: +86-573-88856077

Web: www.hzeg.com E-mail: sales@hzeg.com

Major products: automatic system, solid-liquid separation devices



Tengzhou Lihua Mitex Rubber Roller Co., Ltd.

Chairman: Zhu Hongwei

Headquarter: No. 366, Hengyuanbei Rd., Tengzhou Economic Development Area, Shandong Province, China

Tel: +86-632-5699450/5699298

Fax: +86-632-5699275

Web: www.sdlihua.com

E-mail: sdlihua@vip.163.com;lihua@sdlihua.com

Major products: services including design of rubber roller, optimization of clad material, and manufacturing, processing and repairing of rollers.



Shandong Jiefeng Machinery Manufacturing Co., Ltd

Chairman: Zhang Jixiang

Headquarter: No.275, Kaiyuan Rd., Changshan Development Area, Zouping County, Shandong Province, China

Tel: +86-543-4851388

Fax: +86-543- 4851918

Web: www.sdjiefeng.com

E-mail: jishaichang@163.com;13605431829@163.com

Major products: pulp machines, such as pulping, screening, cleaning and approach pulp machines.

Information



Weifang Hicredit Machinery Co., Ltd

Chairman: Jia Keqin

Headquarter: No. 7, Tongyin Str., High-Tech Zones,
Weifang, Shandong Province, China

Tel: +86-536-2966900

Fax: +86-536-2966999

Web: www.hicredit.net.cn

E-mail: wfkxjx@vip.sina.com

Major products: tissue machines, rewinders, coating
and pulping machines.



Sichuan VANOV Technical Fabrics Co., Ltd

CEO: Zhou Jun

Headquarter: No. 519, West of Xinhua Rd., Cross-
Strait Technology Industry Park, Wenjiang Dist.,
Chengdu, Sichuan Province, China

Tel: +86-28-82782930/82782682

Fax: +86-28-82782920/82782615

Web: www.vanov.cn

E-mail: trade@vanov.cn

Major products: papermaking felt.



Anhui Taipingyang Special Fabrics Co., Ltd

Chairman: Liu Lin

Headquarter: Guanzhen Industrial Area, Taihe County,
Anhui Province, China

Tel: +86- 558-8639313

Web: www.0558tpy.com

E-mail: pmc@0558tpy.com; liulin@0558tpy.com

Major products: dry fabrics, forming fabrics, squeezing
fabrics, filter cloth products



Tianli Machine Building Co., Ltd

Chairman: Ma Lifen

Headquarter: South Wei'an Rd., Anqiu City, Shandong
Province, China

Tel: +86- 536-4252808

Web: www.sdtljx.com

E-mail: tljxmlf@163.com

Major products: a variety of slag separators



Shandong Sinolion Machinery Corp. Ltd

Chairman: Alice Li

Headquarter: No. 2010 Kehang Road, High-tech Zone,
Jinan, Shandong Province, China

Tel: +86- 831-88669288, 88760971

Web: www.sinolion.net; www.sinolion.cc

E-mail: sales@sinolion.net

Major products: winding packaging machine,
automatic packaging assembly line, strapping machine,
intelligent packaging equipment and conveying
equipment



Board Coating Machine



LWC Coating Machine



Film Press Sizer



Soft/Hard Crown Controlled Calender

Coating Finishing Equipment Manufacturing Base For Global Services – SLMC

China Shashi Light Ind. Machinery Co., Ltd. was founded in 1965. On the base of introduction technology from Germany and Finland, and with continuous self-innovation, SLMC has provided more than 500 sets of coating machines, soft/hard crown controlled calenders and film press sizers to the customers all over the world, representing the highest level of China coating finishing equipment.

SLMC has served more than twenty Indian customers, such as Bindal Paper Limit, etc.

The Name Of Customer	Specification Of Machine
Bindal Paper Limited	5000/800 film press sizer
Mehali Papers Private Limited	3750/500 four sets of blade coaters
Ruchira Papers Limited	3250/450 single nip hard calender
Silverton Pulp & Papers PVT. Ltd	3750/1000 drying oven, air turner

Shashi Light Ind.Machinery Co.,Ltd.

ADD: #21 Beihu Road Shashi District Jingzhou Hubei P.R.C

P.C: 434000

Tel: +86-716-4314148

Fax: +86-716-4314109

Website:<http://www.slmc.com.cn/english.asp>

E-mail:scb-slmc@vip.163.com

Excellent equipment supplier perfect stock preparation line solution

Information

As the excellent equipment supplier in China, Shandong Chenzhong Machinery Co.,Ltd. It was founded in 1954, with a long history of 63 years until now. At present, we can provide 1000TPD of OCC pulp line, 300TPD of DIP deinking pulp line, 200 TPD of rice and wheat straw, bagasse pulp line and 70TPD bone dry sludge dewatering equipment project etc. We can provide technology consulting, complete line technology and equipment, pulp line modification and also can guide the equipment installation, commissioning, training, etc. We reach to provide perfect service for our customers.



SHANDONG CHENZHONG MACHINERY CO.,LTD

ADD:HUANTAI COUNTY, ZIBO CITY, SHANDONG PROVINCE, CHINA postcode:256402

FOREIGN TRADE MANAGER LI SHENJU:+008613583326209 smartlshj@aliyun.com

FOREIGN TRADE ASSISTANT LUCIA LI:+008613371581750 limingyinglucia@126.com

Crescent Former Tissue Machine



Suction Cylinder Tissue Machine



Trimmed width: 2660~5600mm

Machine speed: 600~1000m/min

Basis weight: 13~42g/m²



Double Wire Air Borne Drying Pulp Machine

Trimmed width: 2400~6600 mm
 Machine speed: 50~250 m/min
 Basis weight: 600~1200 g/m²



High-speed Rewinder

Trimmed width: 2640~7800 mm
 Machine speed: 1500~2500m/min

SICHUAN VANOV TECHNICAL FABRICS CO., LTD. SHANGHAI JINXIONG FABRICS CO., LTD.

"Customized Design, Considerate Service, Co-creating Value"

--using 4th generation new technology of PMC as the method to improve running efficiency and create new value for mainstream paper making machine



Company Induction

Sichuan VANOV Technical Fabrics Co., Ltd., is belonging to VANOV Group. Company engages in R&D, sales and production field. It owned "GOBEAR" & "VANOV" two famous brand, and is National high-tech enterprise, also passed ISO9001: 2008 national quality. We've achieved more than 50 newly and practical patents and inventions. Company devotes to afford clients paper making clothing with best quality, stable effect, professional service and environmental protection according to standardization, specialization, datamation. We service widely in all kinds of paper machine and PM speed. It recently has Chengdu Wenjiang and Shanghai Jinxiong two large production bases. Company devotes to be first class of PMC supplier in the world and uses 4th generation new technology of PMC as the method to improve running efficiency and create new value for mainstream paper making machine.

Product Introduction

◆ Twill Weaving Felt

Application to all kinds of packing/culture/special PM

Features: Angle exists between base fabrics, which cannot be compressed

Advantage: Perfect initial adaptability, stable space for containing water, consistent dewatering, enlarging felt service time, reduce PM running cost, promote PM running efficiency.

◆ Seam Felt

Application to packing/culture/pulp PM

Features: Seamed device on the machine, needless to move any roller of the PM and fixed supporting device

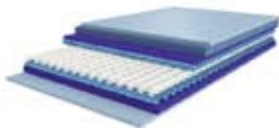
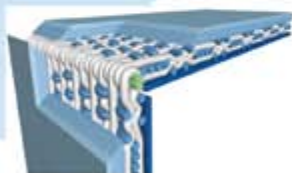
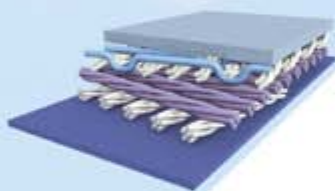
Advantage: the exchanging time of one piece felt can be controlled within 2 hours, which is much less than 4-6 hours of usual.

◆ Non-woven Felt

Application to all kinds of paper

Features: high elasticity, high smooth surface, high density, high ability to maintain caliper

Advantage: better initial adaptability, lower consumption of vacuum system, higher dryness of sheet, more stable property of PM running



We sincerely invite All Paper Mills and Agency to join us and accomplish win-win

Contact Person: Miss Lissa Email Address: trade@vanov.cn QQ: 10193323

Skype: lissa201432 Whatsapp: 008613438494475

SICHUAN VANOV TECHNICAL FABRICS CO., LTD. SHANGHAI JINXIONG FABRICS CO., LTD.

ADD: NO.519,SECTION II,XINHUA AVENUE,CHENGDU CROSS-STRAIT SCIENCE AND TECHNOLOGY INDUSTRIAL DEVELOPMENT PARK, WENJIANG DISTRICT.

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- ◆ Automatically control feeding
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- ◆ Automatically adjust the differential pressure of Micronizer
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- Auto show the fault information



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Professional Solutions For Fine Chemicals in Paper Industry

Paper chemicals for packaging& printing paper

organic retention particles,multi-functional papermaking additives,cleaing chemicals,washing chemicals,defoamer,biocide,coating additives(AZC& PZC, PAPU, grinding dispersant, lubricant)
other chemicals: coating agent for LBP,surface sizing agent,starch enhancer,charge neutralization agent,antiseptic

Chemicals for tissue

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Pulp chemicals

pulp defoamer,cooking additive,pitch control agent,scale inhibitor,binary bleach agent,H₂O₂ stabilizer,reducing bleach agent ,pulp machine felt cleaing agent

Sewage treatment chemicals

flocculant,charge neutralization agent,mid-water defoamer, scale-inhibition and dispersion agent,corrosion inhibitor

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Fine chemicals bring a healthy lifestyle.



Huazhang Technology Holding Limited (hereinafter referred to as "Huazhang Technology") (Stock code:01673.HK) is a research and development, design, manufacturing, sales and provision for value-added service of automation system and solid-liquid separation processing products with a high-quality one-stop integrated service providers. The company has over 20 years experience in the automation systems industry, mainly serving the paper industry and gradually expands to the metallurgical, power, municipal and other industries. According to Euromonitor, a reputable market research firm, Huazhang technology have a leading market share in automation system in the paper industry in China and is competitive with other well-known multi-international enterprises. Huazhang have become one of the leading suppliers in automation system in the paper industry in China. The advantages of Huazhang Technology are strong in research and development and engineering teams with professional knowledge. Using our branding and unique patents and technologies, our strength is enhanced accordingly.



Business Scope:

Drive control system, MCS, MCC, DCS, Headbox, Wastewater treatment system, Sludge dewatering machine, EPC project and Reject RDF.



Huazhang Technology Holding Limited

Room 1101, 11/F, Block 2, Canal Advertising Industry Building, 99 Xiangyuan Road, Hangzhou, China.
Tel: 86-057188994499 Mobile: 86-13924056088 Fax: 86-057188994466.
E-mail: hzt@hzeg.com tony@hzeg.com Web: www.hzeg.com



China Pulp & Paper International



Anhui Taipingyang Special Fabrics Co., Ltd.



Huazhang Technology Holding Co., Ltd.



Qifeng New Material Co., Ltd.



Shandong Century
SunShine Paper Group Co., Ltd.



Shandong Changhua Technology Co., Ltd.



Shandong Chenzhong Machinery Co., Ltd.



Shandong Jiefeng Machinery
Manufacturing Co., Ltd.



Shandong Renfeng
Special Materials Co., Ltd.



Shandong Sun Paper Industry Co., Ltd.



Shandong Tranlin Paper Co., Ltd.



Shandong Xinhe
Paper-making Engineering Co., Ltd.



Shanghai Qingliang Industry Co., Ltd.



Shashi Light Ind. Machinery Co., LTD.



Sichuan VANOV
Technical Fabrics Co., Ltd.



Tengzhou Lihua
Mitex Rubber Roller Co., Ltd.



Tianli Machine Building Co., Ltd.



Weifang Hicredit Machinery Co., Ltd.



Wenrui Machinery (Shandong) Co., Ltd.



Shandong Sinolion Machinery Corp. Ltd.

Printing and Writing paper

unbleached printing and writing paper
(Shandong Tranlin Group)
coated woodfree paper, light-weight paper
(Sun Paper)
xerographic paper
(Sun Paper, Shandong Tranlin Group)

Tissue

unbleached tissue paper
(Tranlin Group)
white tissue paper
(Sun Paper)

Papermaking equipment

multi wire packaging paper machines
(Shanghai Qingliang, Changhua Technology)
Printing and Writing paper machines
(Changhua Technology, Shanghai Qingliang)
specialty paper machines
(Shanghai Qingliang, Changhua Technology)
Suction Former Tissue Machine(Hicredit Machinery)
crescent former tissue machines
(Shanghai Qingliang, Hicredit Machinery, Shandong Xinhe)
shoe press (Changhua Technology)
steel Yankee dryers (Shandong Xinhe, Hicredit Machinery)
headboxes (Huazhang Technology, MCN)

Pulping equipment

pressure screens
(Jiefeng Machinery, Chenzhong Machinery)
pulpers
(Chenzhong Machinery, Jiefeng Machinery)
twin roll press
(Wenrui Machinery)
disc filters
(Wenrui Machinery)
disc refiners
(Chenzhong Machinery)
cleaners
(Anqiu Tianli)

Paper converting equipment

coating machines
(Shashi Light Ind. Machinery)
film transfer sizars
(Shashi Light Ind. Machinery)
calenders
(Shashi Light Ind. Machinery)
rewinders
(Hicredit Machinery)

roll covering

rubber, polyurethane and EPMC coating
coated roll series
(Tengzhou Lihua)
thermal spraying roll series
(Tengzhou Lihua)

Contact: Wenrui Machinery +86-536-4372632 Century Sunshine Paper Group, Sunshine Oji +86-18354263562
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VANOV Technical Fabrics +86-13438494475 Lihua Mitex Rubber Roller +86-632-5699450 Shanghai Qingliang +86-21-59741536
Shandong Tranlin Group +86-635-3961838 Taipingyang Special Fabrics +86-18955867218 Anqiu Tianli +86-536-4252808

Packaging paper

folding boxboard
(*Sun Paper*)
coated/uncoated white top testliner
(*Century Sunshine Paper Group*)
high strength corrugating medium
(*Renfeng Special Materials*)
coreboard
(*Century Sunshine Paper Group*)

Pulp

dissolving wood pulp (*Sun Paper*)
unbleached straw pulp (*Shandong Tranlin Group*)

Specialty paper

food wrapping paper (*Renfeng Special Materials*)
décor Paper (*Sunshine Oji, Qifeng New Material,*)
filter paper (*Renfeng Special Materials*)
overlay wear-resistant paper (*Qifeng New Material*)
base wall paper (*Renfeng Special Materials, Qifeng New Material*)

Dewatering devices

twill weaving/multi-axis felts
(*VANOV Technical Fabrics*)
seamed felts
(*VANOV Technical Fabrics*)
drying fabrics
(*Taipingyang Special Fabrics*)
forming fabrics
(*Taipingyang Special Fabrics*)

clean production

Clean production (*Chenzhong Machinery*)
press dehydrators
one-stop waste disposal solution, including treatment
of both liquid and solid waste(*Huazhang Technology*)

Automation

automatic technology
(*Huazhang Technology*)
Paper Roll Conveyors & Wrapping Machine
(*Sinolion Machinery*)

Exporting countries and area

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India, Vietnam, Iran, Pakistan, Brazil, Russia
Southeast Asia, Oceania, Middle East, Turkey
Czechia, Uzbekistan, Algeria, Peru, Malaysia
Indonesia, Myanmar, China Taiwan

Shashi Light Ind. Machinery +86-716-4314148 Changhua Technology +86-635-2128866
Renfeng Special Materials +86-533-8697708 Shandong Xinhe +86-635-2938333
Sun Paper +86-537-7928006 Chenzhong Machinery +86-13583326209 Hicredit Machinery +86-536-2966966
Jiefeng Machinery +86-543-4851388 Sinolion Machinery +86-531-88602653



Tianli Machinery:

Integrity · Professional · Innovation



**TGC DOUBLE CONE
HIGH-CONCENTRATION CLEANER**

TGC Double Cone High-concentration Separator is an advanced paper pulp purification equipment, especially for wastepaper pulp, as key equipment in wastepaper recovery.

This product has advantages of straight forward structure, high production capacity, easy operation, high purification efficiency, and the de-slagging mouth is free from blockage. The pulp needs only one-time separating and the additional reject treatment equipment is unnecessary. Therefore, the fiber loss is minimal.



TFY-450 HIGH-WEIGHT CLEANER

TFY-450 separately controls the concentration of the coarse slag through axial flushing water in order to effectively control the fiber loss effectively, which could reduce the sections and number of separators. High impurity content in the coarse slag is high, less fiber loss. Block could be avoided in the running process through the dilution of the coarse slag and continuous discharge in every section.



**TSC-600 EFFICIENT
HEAVY-WEIGHT CLEANER**

TSC Efficient Heavy-light separator is a type of positive going separator based on principle of centrifugal force to remove impurities from pulp. It can be used in all kinds of paper purification system to remove sand, small iron, dust, larger ink, and other heavy impurities.



**TMLC-700 BIDIRECTIONAL
CLEANER**

TMLC-700 multifunction separator is a modern type of multifunction paper purification equipment designed by TIANLI company on basis of domestic and foreign advanced technology. It can be applied in paper pulp purification system to remove both light and heavy impurities such as mixed refuse, olefin, adhesive substance, plastic piece, bubble, gas, sand stone, scrap iron and etc.



**TMZC-1000 HELIX
HIGH-WEIGHT CLEANER**

TMZC separator is a patented product specially designed by Tianli Company to solve impurity removal difficulties for paper mills based on the first generation product and the feedbacks from foreign and domestic customers. The configuration of this product is adjustable, according to user requirement, to solely separate heavy impurity or jointly separate light and heavy impurity, consequently reducing user resources investment.



**TXC-150 THIRD GENERATION
LIGHT-WEIGHT CLEANER**

This product mainly removes light impurity such as wax, polystyrene bubble, printing ink mark, heat dissolved conglutinate substance and etc by vortex centrifugal theory. TXC light weight separator is a new type of cost-effective equipment that resolves light impurity interference in OCC

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