

Mill story

Fushun Mining Group,
Hupo Paper PM1, China



Gathering impressions

The Fushun region

Fushun is one of the industrial and economic development hubs in Liaoning.

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▲ Bridge over the Hun River. Its size varies enormously, from narrow in the country to very large in Fushun.

Fushun is a prefecture-level city in Liaoning Province, China, about 45 km east of Shenyang, with a population of 2,138,090 inhabitants and a total area of 11,271 km², 713 km² of which is the city proper. Situated on the Hun River (“muddy river”), Fushun was formerly romanized as Fouchouen,

Fushun city - key facts:

- Inhabitants: approx. 2,138,090
- Size: 11,271 km²
- Main industries: coal, automotive, chemicals, cement, rubber



▲ Houshi National Forest Park, about 55 km from Fushun city center. Fushun is a renowned tourist center in northeast China. With high mountains and thick woods (40% forest coverage), the city has developed a strong tourist industry.

using French spelling. It is one of the industrial and economic development hubs in Liaoning.

The development of coal mines

The first emperor of the Qing Dynasty, Nurhaci, was born in today's Xinbin County under Fushun's jurisdiction. During the early Qing Dynasty, Fushun fell into a depression for nearly one and a half centuries. It was in 1783 that the new city of Fushun was completed, to the southwest of the old city. The city was occupied by Russia



▲ Fushun city: The monument, known as the Ring of Life, is made up of 3,000 tons of steel and decorated with 12,000 LED lights.

until 1905 and by Japan until 1945. With the Japanese victory over Imperial Russia and signing of the Treaty of Portsmouth, the South Manchuria branch (from Changchun to Lüshun) of the China Far East Railway was transferred to Japanese control. The South Manchuria Railway Company quickly expanded the system inherited from Russia to staggering proportions. One of its actions was to develop coal mines in Fushun. Under the control of the Japanese, the Fushun area became highly industrialized in a 30-years development.

Large population

Fushun has 2.14 million inhabitants, including 1.34 million in the urban area. It is now part of the Shenyang-Fushun built-up area (comprising all the urban and suburban districts of Shenyang and Fushun) with approximately 6,756,379 inhabitants. This

makes Shenyang-Fushun the eighth largest built-up area in China after Pearl River Delta City (including the Guangzhou, Shenzhen, Dongguan, Foshan, Jiangmen, Zhongshan, and Huizhou areas), Shanghai-Suzhou, Beijing, Tianjin, Hangzhou-Shaoxing, Wuhan, and Nanjing.

Economy

Fushun is a highly industrialized area. It has developed as a thriving center for fuel, power, and raw materials and is offering more and more opportunities in textiles and electronics. The world's largest open-pit coal mine, known as the Magnificent West Pit, is located not far from the downtown area. It has been in operation since approximately the 12th century. Fushun has a major aluminum reduction plant and factories producing automobiles, chemicals, cement, and rubber.

Rich in resources

Fushun is rich in wood, coal, oil shale, iron, copper, magnesium, gold, marble, titanium, and marl resources.

Fushun is known as “the capital of coal”. The main coal and oil shale company is Fushun Mining Group, which produces about 6 million tons of coal per year, mainly blending coking coal and steam coal per year. The company also has coalbed methane resources of around 8.9 m³. In addition, it owns geological reserves of high-grade oil shale (about 3 billion tons), of which the exploitable reserve is 920 million tons.

From black coal to white tissue

A new venture for the mining company

Fushun Mining Group is a state-owned coal and oil shale company and has decided to enter the tissue business with ANDRITZ as a partner.

The Fushun Mining Group has nearly 40 companies with about 40,000 employees engaged in coal mining and shale oil production. The company's history dates back to the early 1900s.

Becoming an industrial center

After World War II, the Fushun Coal Mine of the South Manchuria Railway Company was taken over by the Kuomintang, and the Fushun Mining Administration Bureau was established by the Kuomintang Government in 1946. In 1948, Fushun Coal Mine fell under the control of the Chinese Communist Party and became one of the industrial centers for the People's Republic of China.

Coal mining

Fushun is known as "the capital of coal" for which once had great coal reserves. As a state-owned company, most of the Fushun coal reserves are in the hands of the Fushun Mining Group. It owns three main coal mines, including Laohutai Coal Mine, West Open Pit, and East Open Pit. Due to the decline in coal reserves, coal production has fallen drastically in recent



years. The West Open Pit will probably be closed in 2019, and Laohutai Coal Mine in 2026. The main coal products for these three coal mines include blending coking coal and steam coal, which

are high-quality coal grades for steelmaking. The Fushun Mining Group is also rich in coalbed methane resources, totaling around 8.9 billion cubic metres.



◀ Fushun Mining Group is a state-owned coal and oil shale company with about 40,000 employees engaged in coal mining and shale oil production – and now tissue production.



Hupo Paper

A new subsidiary to operate the tissue mill

Fushun Mining Group established Hupo Paper Co. Ltd., with more than 700 employees, to operate the new tissue mill.

Potential for new business

With the demand for tissue products increasing by about 10% each year in China, the officials at Fushun Mining Group saw an opportunity. Most of the tissue mills in Northeast China have been decommissioned since they began losing their competitiveness in the late 1990s due to outdated technology and infrastructure. Now the region is a hot market for papermakers again. "Since 2009, more than 400 small paper mills have been shut down, or their production

has been limited because of energy and environmental issues," says Han Fang, Vice General Manager of Fushun Mining Group. "There is now a chance for new paper mills, which can fulfill modern requirements for economy of scale, energy savings, and environmental safety." This is why Fushun Mining Group decided to step into a totally new business area – tissue production. The 60,000 t/a from the new ANDRITZ machine, which was started up at the end of October 2011, is a good

beginning for the two million t/a of paper production planned for the future.

The machine supplied by ANDRITZ has a wire width of 5.6 m and a design speed of 2,000 m/min. The furnish is virgin market pulp. Parent rolls from the machine are converted into tissue products at the mill site. A new subsidiary, Hupo Paper Co. Ltd., was established to operate the mill. Hupo Paper now has more than 700 employees.

PrimeLine™ W8

High-speed tissue machine with 5.6 m width



PrimeLine technology for Hupo Paper

Tradition and innovation for tissue production

Fushun moved into tissue production and selected ANDRITZ, which has an excellent record in helping newcomers like Hengan, Guitang and Hwagain operate their mills.

“For us, the most important factors when selecting a supplier for the stock preparation plant and the machine were the quality of the final product, the operational costs, and the advanced technology,” Han says.

He notes that ANDRITZ has many references in China with good performance. “During the investigation phase of our project, we had discussions with all suppliers,” Han says. “We also visited several mills (Hengan and APP Suzhou among them) where the technology was delivered by ANDRITZ. We were impressed with the proven and reliable technologies and the good and stable paper quality.”

Wang Xicai, Chief Engineer at Hupo Paper, was also impressed. “The technical documentation that we received from ANDRITZ was very impressive,” he says. “It was very professional and comprehensive, especially the machine layout. This contributed to a smooth erection and start-up.”

“During the erection and start-up, ANDRITZ professionals really showed us compassion and patience in getting to know the new tissue machine,” Han says. “This helped us to develop our skills in producing high-



“There is an opportunity here for new mills which fulfill modern requirements for scale, energy savings, and environmental safety.”

Han Fang
Vice General Manager
Fushun Mining Group

Han Fang (left) with Michael Pichler, head of ANDRITZ Pulp Drying and Paper

quality tissue products. The equipment and cooperation with ANDRITZ was perfect.” Yan Tinggang, General Manager of Hupo Paper, feels comfortable about the mill’s future. He is satisfied with the low operating

“We were very satisfied with ANDRITZ’s good cooperation and performance during the project.”

Yan Tinggang
General Manager
Hupo Paper

tional machine within the next two years, “depending upon market demand.” Hupo Paper’s products are being sold exclusively in Liaoning and the neighboring provinces.

ANDRITZ is local in China

“Fushun is adding to its mining business by moving into paper production,” says Michael Pichler, head of ANDRITZ’s Pulp Drying and Paper division, “and they do not have a long tradition of tissue making. They elected to buy equipment from an industry leader, and one with a strong base in China. ANDRITZ has an excellent record in helping tissue newcomers like Hengan, Guitang, Hwagain, Chenming, and Nanning Phoenix

start-up and operate their production units. Even the huge APP started in China with two machines from ANDRITZ in 1998.”

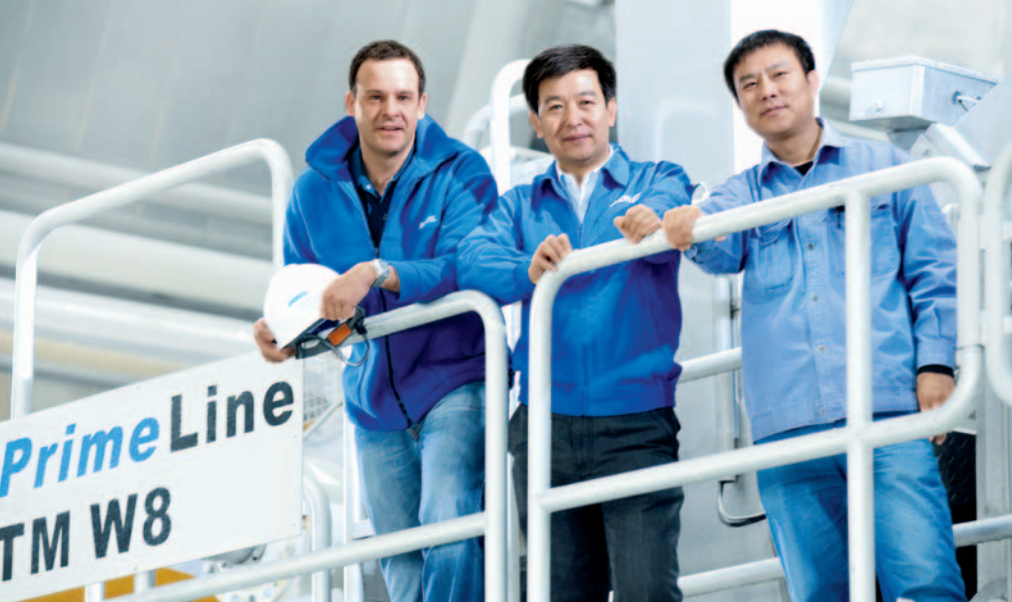
Of course, when making an investment decision, price is an important factor. By standardizing machine modules and adding manufacturing capabilities in China, ANDRITZ has been able to reduce the cost of its PrimeLine tissue machines in China significantly. “Only companies with a high local content have been able to reduce their costs to be able to offer these savings,” Pichler says.

ANDRITZ has a facility in Foshan, Guangdong Province, with more than

1,200 employees focused on manufacturing, sourcing, engineering, and automation. The Foshan workshop offers Chinese customers fast response and is familiar with local customs and requirements. “The ability to offer extended services is very attractive to newcomers to the paper industry,” Pichler notes. “In addition, we are developing our Chinese operations to become a manufacturing base for global sales, which requires European quality and precision.”

The PrimeLine™ W8 CrescentFormer machine at Hupo Paper. The 5.6 m wide machine has a PrimeFlow two-layer headbox and a PrimeProFiler F dilution control system. ▼





"The output of the new tissue machine is the best quality I have experienced in my career."

Han Biao,
Vice General Manager
Hupo Paper

Martin Schratter, Start-up Engineer from
ANDRITZ (left); Bai Bingchen, Vice General Manager for
ANDRITZ China's tissue business (center); and Han Biao,
Vice General Manager Hupo Paper.

ANDRITZ delivered its first tissue machine to China in 1998, and has since sold an additional 30. "With our experience in managing projects in China, our experts know how to work with a newcomer to make sure that everything is seamless," says Bai Bingchen, Vice General Manager of ANDRITZ's tissue business in China. "We know how to provide sufficient training to support." According to Bai, the turnkey ANDRITZ plant was appreciated because everything from the stock preparation to the reel came from one company. "This makes it easier to start-up and operate, and enables us to provide fast and well-targeted services," he says.

"Sad to leave the project"

"We supplied Hupo Paper not only with the tissue machine, but also the stock preparation, including two virgin fiber lines and a broke line," says Martin Schratter, ANDRITZ Start-up Engineer.

"We also delivered the approach flow and fiber recovery system for the machine, and auxiliaries like the lubrication and hy-

draulic systems." The tissue machine is a *PrimeLine*TM W8 CrescentFormer with a *PrimeFlow* two-layer headbox and a *PrimeProFiler* F dilution control system. "The machine has a single *PrimePress*, a *PrimeDry* Cast Yankee, and a *PrimeDry* EquiDryF hood system with zone control," Schratter continues.

"The reel is a hydraulically controlled *PrimeReel* equipped with the *PrimeTurnUp* system for fully automatic reel changes."

Schratter says that from contract to start-up, everything went smoothly and according to the plan. "We were able to run the tissue machine from the first day with saleable paper quality," he says. "We are now in the optimization phase for reaching 2,000 m/min. This takes time, of course, but the progress has been excellent. Cooperating with the people at FMG was an amazingly positive experience. I became friends with many FMG people and it was a sad feeling to leave the project when it was over."

Proven technology with fast learners

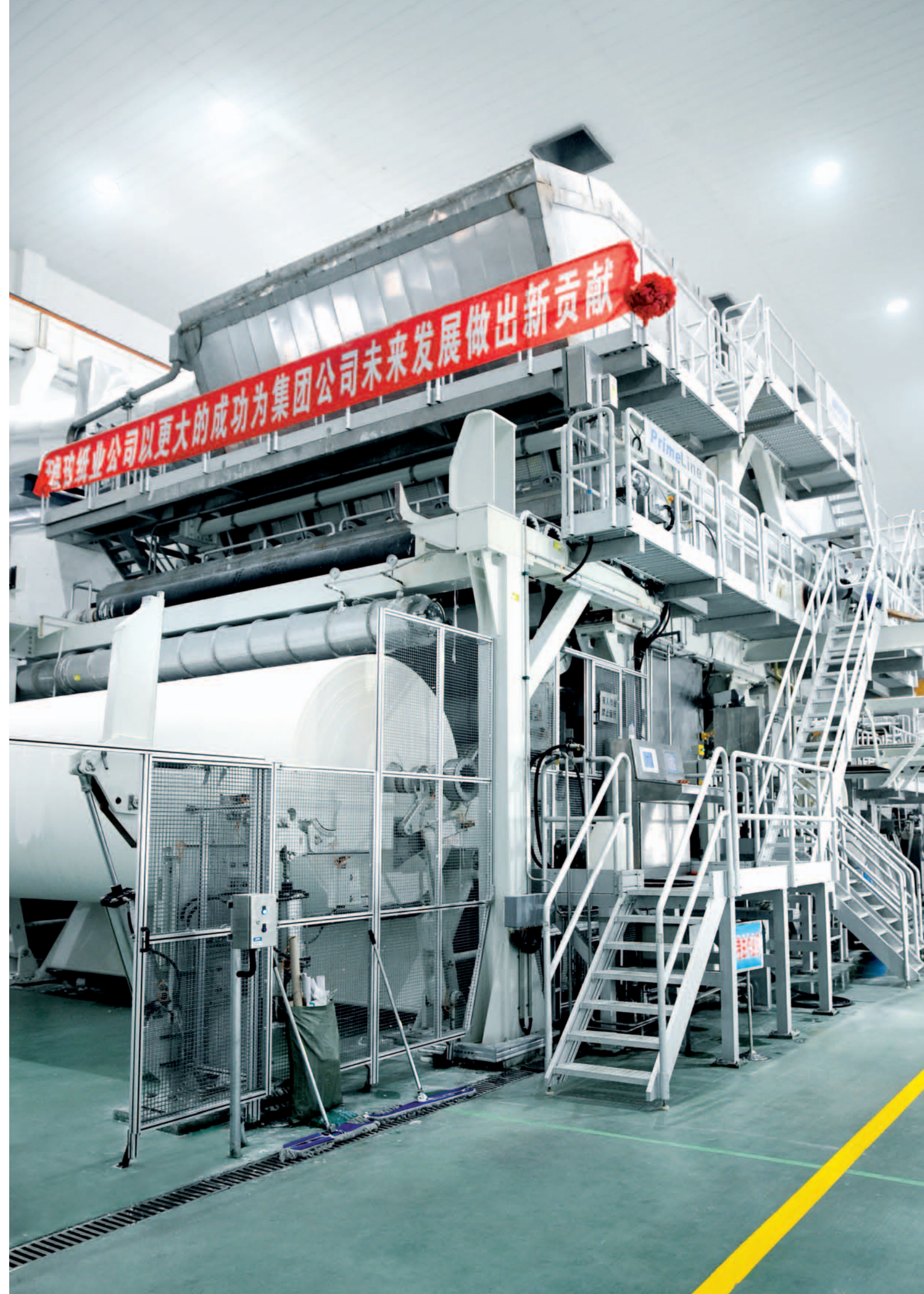
ANDRITZ delivered well-proven technology in all areas of the plant. "There are some unique highlights at this mill, specifically the LC refiner which helps in optimizing the fibers to improve paper quality," says Schratter.

Another highlight is the *PrimeProFiler* F dilution control system that improves basis weight cross profiles. The third area that Schratter mentioned is the heat recovery in the hood system, which reduces energy consumption significantly.

Hupo Paper did a great job in preparing everything for a smooth start-up, not only the fibers, but also all other resources and tools needed. The newcomers to tissue are learning fast. "One big challenge was that some of the operators had never seen a paper machine before," Schratter says. "It was really impressive to see how quickly they climbed up the learning curve. Within a few weeks, the operators were able to run the new machine independently."



Picture on the left: *PrimeFlow* headbox.
Picture on the right: control room – ANDRITZ delivered the complete plant automation.



ANDRITZ in China: a success story

The local tissue partner

It pays to have a proven technology and service partner on your side when making important decisions about how to increase the efficiency and profitability of your mill. Equally important is whether that partner has a local presence to give you support before, during, and after completion of your project. As part of the ANDRITZ Group, the ANDRITZ China location in Foshan is well-positioned to be your technology and service partner.



▲ Headquarter of ANDRITZ China in Foshan.

ANDRITZ's first steps into China were in the traditional export mode. In 1997, ANDRITZ formed the joint venture ANDRITZ-Kenflo Foshan Pump Co., Ltd. and began the transfer of technology required to manufacture stock pumps in China. With ANDRITZ as the sole owner, the company has achieved good success in the recent past. The total number of pumps sold into the pulp & paper industry now stands at more than 11,000.

Another strategic move in the pump area has been to consolidate manufacture of the ANDRITZ Vertical Line Shaft Pump (VLSP) in China. The move to standardize

the VLSP has allowed ANDRITZ to be more cost-competitive and to shorten the delivery times. More than 40 such pumps have been sold in China and Southeast Asia to date.

From these beginnings, the company has dramatically increased sales every year such that the installed pump base in China and Southeast Asia exceeds 30,000 units. In 2002 ANDRITZ Technologies Ltd. (now ANDRITZ China Ltd.), a wholly-owned subsidiary was established. All of the functions, including design engineering, sales, procurement, manufacturing and assembly, are handled in-house. In addition to

manufacturing, ANDRITZ China provides after-sales services, project management, engineering, procurement, supplier quality control, and expediting services.

In July 2013, ANDRITZ China opened its first pulp & paper laboratory. The lab has the capability for conducting professional and accurate tests on stock and paper properties, which will be a big help to ANDRITZ engineers doing tests at the many installations sold in China and Southeast Asia.

These tests are often critical for proving performance guarantees or optimizing stock preparation lines successfully and efficient-

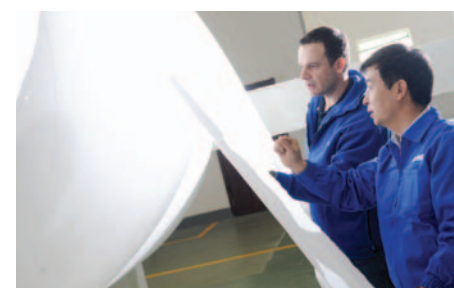
ly. The new laboratory has instruments for measuring stickies, shives, etc. as well as equipment for testing formation, ash content, beating degree, and consistency.

More than 40 references and record installations in Asia confirm that ANDRITZ is one of the leading suppliers of tissue machines, components, and local services for this key market.



"The technical documentation that we received from ANDRITZ was very impressive. This contributed to efficient erection and a smooth start-up."

Wang Xicai
Chief Engineer
Hupo Paper



Great on-site support

Having specialized tools and equipment is important for any technology supplier. But having the experienced people to provide service is even more important. Our people are skilled at raising the production efficiency of your mill or plant. We work closely with you to monitor, maintain, repair, and upgrade your assets. ANDRITZ is by your side with years of experience and proven results.



Perfect results

With PrimeLine tissue technology, it is easy to configure your production to achieve perfect results. Customized solutions are possible or even new developments together with our experts. Fast and smooth start-ups reflect our success.



Own workshop

ANDRITZ China in Foshan has its own workshop, where tissue components are manufactured and pre-assembled according to stringent European quality standards and controls.

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