

Mill story
Hengan Group,
Jinjiang PM15 and PM16, China

Gathering impressions

Fujian province, Jinjiang city

Located in Fujian province, Jinjiang city is an industrial hotspot but rich in culture as well.

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▲ Tea field in the Wuyi Mountains, located in northwest Fujian Province. They became a UNESCO World Heritage Site in 1999.

Fujian, formerly romanized as Fukien or Foukien, is a province on the southeast coast of mainland China. Fujian is bordered by Zhejiang to the north, Jiangxi to the west, and Guangdong to the south. Taiwan lies to the east, across the Taiwan Strait. The name Fujian came from the combi-



▲ Fuzhou, the capital and largest city of Fujian, ©Rolf Baur.

nation of Fuzhou and Jianzhou (a former name for Jian'ou), two cities in Fujian, during the Tang dynasty.

Because of its mountainous nature and the numerous waves of migration from central China in the course of history, Fujian is one of the most linguistically diverse places in all Han Chinese areas of China.

Local dialects can become unintelligible within 10 kilometers. This is reflected in the expression that "If you drive five miles in Fujian, the culture changes, and if you drive ten miles, the language does".



▲ Cao'an Temple on Huabiao Hill near downtown Jinjiang, is considered to be the only extant Manichean temple in China.

Fujian is one of the more affluent provinces with many industries, spanning tea production, clothing, and sports goods. Many foreign companies have operations in Fujian, for example Boeing, Dell, GE, Kodak, Nokia, Siemens, and Panasonic.

In terms of agricultural land, Fujian is hilly and farmland is sparse. Rice is the main crop, supplemented by sweet potatoes, wheat and barley. Cash crops include sugar cane and rapeseed.

Fujian leads the provinces of China in longan production, and is also a major producer of lychees and tea. Seafood is another important product, with shellfish production being especially prominent.

Jinjiang City is a county-level city of Quanzhou City, Fujian, People's Republic of China. It is located in the southeastern part of the province, on the right or south bank of the Jin River, across from Quanzhou's urban district of Fengze. It has an area of 721,7 km² and a population of 1,986,447.

Jinjiang is known for the large number of foreign-invested factories operating there, especially in the clothing and name-brand footwear industry. Many migrant workers come from elsewhere in Fujian and even from outside the province, committing themselves to long-term contracts.

Jinjiang city - key facts:

- Inhabitants: approx. 1,986,447
- Size: 721.7 km²
- Main industries: textiles and clothing, footwear

Jinjiang people speak the Quanzhou variant of Minnan dialect, which is largely intelligible to speakers of the Xiamen/Zhangzhou variant (which is also spoken by most Taiwanese).

The Hengan Group

China's largest tissue producer

Local entrepreneurs have achieved a 20% market share in premium tissue for the Chinese market since launching the company in 1985.



▲ Main entry of the Hengan mill in Jinjiang.

The first steps

Established in 1985, Hengan was one of the earliest foreign investment enterprises to enter the sanitary napkins market. Following the rapid expansion of the hygiene products market, the Hengan Group's business has grown steadily over the years. Now the Group has become China's largest sanitary napkins manufacturer, second-largest disposable baby diapers manufacturer, main adult diaper manufacturer, personal hygiene products manufacturer, and

household paper manufacturer. Hengan has total assets amounting to more than twenty billion Hong Kong Dollars and a staff of around ten thousand. Now the Group has a nationwide sales and distribution network and owns 23 subsidiaries in 14 provinces.

Broad product range

In addition to sanitary napkins, Hengan also manufactures other personal hy-

giene products. Step by step, the Group has established several brands that are now famous, such as ANLE sanitary napkin, ANERLE sanitary napkin, ANERLE baby diaper, ELDERJOY adult diaper, and MISSMAY tend-and-protect products. In 1999, ANERLE sanitary napkins received the „China's Famous Brand“ awards from the China National Industrial and Business Bureau.

Quality as the key to success

For years, Hengan has believed that the quality of the Group's products is one of the major reasons for the Group's success. The Group's products meet the highest quality requirements by strengthening the quality

◀ Hengan is one of the market leaders in China in tissue production. The high variety of end products can be found in nearly every supermarket.



control system. At present, Hengan's main manufacturing facilities and products have obtained ISO 9001 certification.

Focus on innovation

In order to keep up with the world market, Hengan places high emphasis on product innovation. Through research and development and technological improvement, the quality of Hengan's products continues to meet international standards, keeping up with the latest market developments in the world. This strategy ensures that Hengan maintains its competitiveness in the tissue market.

Listed on the Stock Exchange

On December 8, 1998, Hengan successfully gained its listed status on the Union Stock Exchange of Hong Kong Limited, which is a great milestone as well as a new stage in the company's development.

Expansion strategy

Ever since the start-up of Hengan's first ANDRITZ tissue machine in 1998, the company's strategy has been marked by expansion: several state-of-the-art tissue machines were ordered and started-up and ANDRITZ played a major role in the success of Hengan's business.

“Growing with you for a better life.”

Mission of the Hengan Group:
We will continue to adhere to our corporate spirit of “Integrity, Diligence, Innovation and Dedication”. Our goal is “to build an effective corporate management and to develop a quality, ethical and enthusiastic staff team”. By building an excellent corporate culture, reinforcing our brand image, and focusing on consumer and market needs, Hengan International will become China's leading corporation in the manufacture and distribution of fast-moving family consumer products.



Hengan dreams of tissue

The perfect partner: ANDRITZ

Today, the Hengan Group is the largest producer of sanitary napkins and baby diapers in China. A story of success that was “written” together with ANDRITZ.

Pioneering Hengan

The dream to produce quality tissue grades in China started very simply, but with boldness for Hengan. The basic idea was to produce higher quality tissue and hygiene products for Chinese consumers than they were getting from local producers.

Xu Lian Jie, CEO, and his management team, decided to build a state-of-the-art mill at Changde, Hunan Province, starting with 30,000 t/a production. In addition to proving the “quality” concept, the new company needed to establish distribution channels for new brands.

“Our aim was that the first time anyone tried a Hengan tissue product, a mother, a hotel purchasing agent, or a supermarket manager, they would feel and sense the

quality,” Xu says. The company knew that loyalty would be built upon a very personal connection. According to Xu, Hengan has over 15,000 account managers and sales people working in about 800,000 stores across the country. As he puts it, “Our people believe in our products, and express their confidence to consumers.”

Supported by extensive in-store marketing, creative packaging, and media advertising, Hengan is a force in the marketplace. In only 15 years, it has become widely re-cognized, and is strategically focused to maintain that position. Says Xu, “We are adding a lot of capacity to secure our place as the number one tissue producer for the long term.”

The Hengan way of running a tissue company also required a wise selection of business partners: ranging from procurement of pulp and consumables to the production and converting technology. Of great importance to Hengan management was the selection of the tissue machine itself.

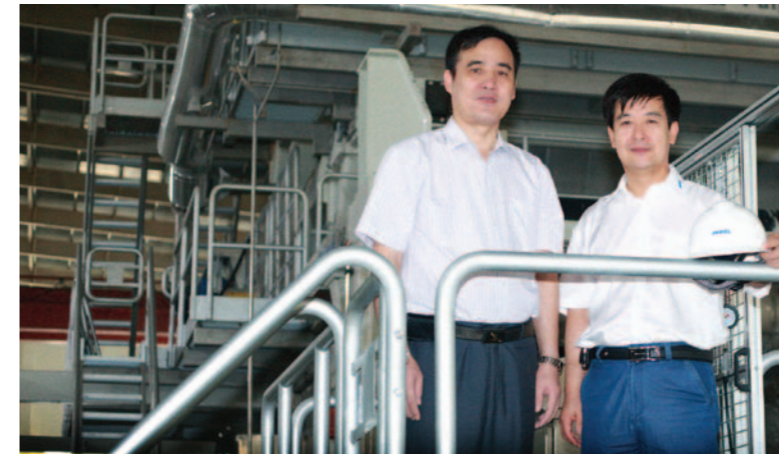
Making the best tissue

“ANDRITZ has been critical to our tissue strategy,” says Zhang Qun Fu, Hengan General Manager. Zhang oversees the company’s technical design, layout, and construction. “Making the best tissue starts with the best equipment. “When we first talked with ANDRITZ, they were like us in the Chinese tissue business. They had something to offer, but were not yet established.”

It started in 1998

Zhang likens Hengan’s progress to that of moving from infancy to adulthood. “From our birth to becoming an adult, continuous advances in technology have kept pace with our goal of delivering products that our customers desire. From our first project together with ANDRITZ in 1998, we have succeeded as partners and have grown dramatically.”

ANDRITZ is the preferred supplier of the stock preparation and tissue machine technology, having built a strong reputation since the start-up of the first *PrimeLine* machine in 1998. In 2012 alone, four 60,000 t/a ANDRITZ machines started up at Chongqing and Jinjiang. Four more machines are on order for start-up in 2014.



◀ Li Xinjiu, Hengan General Manager for Papermaking (left), and Bai Bingchen, ANDRITZ China’s Vice General Manager for Tissue, at the new machine in Jinjiang.

“Making the best tissue starts with the best equipment.”

Zhang Qun Fu
General Manager
Hengan Group

▼ Zhang Qun Fu, Hengan General Manager (left) and Klaus Gissing, ANDRITZ Vice President for Tissue and Air Engineering, discuss the new machine’s performance.



▼ Overview of the ANDRITZ installations for the Hengan Group: all tissue machines were delivered including complete stock preparation and automation systems.

Customer name	Country	Delivery (scope of supply)	Width (mm)	Speed (m/min)	Start-up
Hengan Chongqing PM24	China	<i>PrimeLine</i> TM W8 (Steel Yankee)	5,600	2,000	2014
Hengan Chongqing PM23	China	<i>PrimeLine</i> TM W8 (Steel Yankee)	5,600	2,000	2014
Hengan Changde PM18	China	<i>PrimeLine</i> TM W8 (Steel Yankee)	5,600	2,000	2014
Hengan Changde PM17	China	<i>PrimeLine</i> TM W8 (Steel Yankee)	5,600	2,000	2014
Hengan Jinjiang PM16	China	<i>PrimeLine</i> TM W6 (Steel Yankee)	5,600	2,000	2012
Hengan Jinjiang PM15	China	<i>PrimeLine</i> TM W6 (Steel Yankee)	5,600	2,000	2012
Hengan Chongqing PM12	China	<i>PrimeLine</i> TM W8	5,600	2,000	2012
Hengan Chongqing PM11	China	<i>PrimeLine</i> TM W8	5,600	2,000	2011
Hengan TM7	China	<i>PrimeLine</i> TM CrescentFormer	5,550	2,000	2008
Hengan TM5	China	<i>PrimeLine</i> TM CrescentFormer	5,550	2,000	2007
Hengan TM3	China	<i>PrimeLine</i> TM CrescentFormer	5,550	2,000	2005
Hengan TM2	China	<i>PrimeLine</i> TM CrescentFormer	3,650	2,000	2002
Hengan TM1	China	<i>PrimeLine</i> TM CrescentFormer	3,650	1,650	1998



PrimeLineTM W8
High-speed tissue machine with 5.6 m width

Innovative features for Hengan's tissue lines

PrimeDry Steel Yankee technology for efficient drying and energy cost savings. Giants made of steel for Hengan's tissue machines.

From zero to two million

Before 1998, Hengan produced no tissue. By 2012, it led the Chinese market with a 20% share, producing 1.2 million t/a of high quality products. The forecast is for two million tonnes capacity by 2020. The pioneers who started Hengan boldly bet on their ability to meet the needs of China's growing increasingly urbanized society. And they exceeded expectations for growth and profitability.

Hengan has won loyalty for its brands, and respect throughout the industry for its distribution networks and quality of manufacturing. "I am proud to see China's rising quality with paper grades, and Hengan is leading the way," says Li Xinjiu, General Manager for Papermaking. "Hengan's first *PrimeLine* machine set a new standard. World class quality, speed, and efficiency were the highlights. As the years have passed, our quality has gotten even better, and our operating costs are lower."

Steel outperforms

One of the advances in technology has been the *PrimeDry* Steel Yankee, which is now preferred on the Hengan machines. It has become well-known that the *PrimeDry* Steel outperforms equally sized cast iron Yankees, especially when it comes to energy efficiency.

The thermal conductivity of steel is similar to cast iron, but the wall thickness is thinner due to the high strength of the steel. This increases the amount of the heat transferred, up to about 20%.



▲ The heart of the Hengan machines: 18 ft. diameter *PrimeDry* Steel Yankee.

Safety and energy efficiency

Due to the elasticity of steel any crack development is much more controlled than that for a yankee made of cast iron. With a cast structure, although it is nowadays not often seen, an unexpected event can lead to the sudden development of cracks which themselves cause the cylinder and other immediate parts to need replacing. Because of the elasticity of steel there is no risk of explosions due to unexpected accidents, cracks or thermal shocks. No de-rating is necessary, due to the metallic coating and there is no reduction of the wall thickness during lifespan.

Top quality

The steel yankee shell has a metallized coating, applied according to the highest quality standards. The surface is

harder than cast iron, meaning that excellent creping conditions are ensured, as well as a constant surface quality over the long lifespan of the coating. The metallized surface enables stable coating and creping conditions and extended polishing and grinding intervals. The *PrimeDry* Steel Yankee is calculated and designed using all the current state-of-the-art methods, including for instance Finite Element Analysis. It is welded and machined with the best technology available, in accordance with the high ANDRITZ standards, and is extensively tested and checked. Hengan's PM15 and PM16 have, in fact, the world's largest *PrimeDry* Steel Yankees operating in tissue today. Sitting side-by-side at the Jinjiang mill, they produce tissue in about 1.4 seconds from headbox to the finished roll.

Inner view of a steel Yankee. ▶



Technical highlights



◀ ANDRITZ Double Disc TwinFlo Refiner for optimum fiber development.



◀ ANDRITZ process pumps and agitators.



◀ PrimeLineTM tissue machine. In 2012 alone, four 60,000 t/a ANDRITZ machines started up at Hengan's Chongqing and Jinjiang mills. Four additional machines are on order.



◀ PrimeDry ReEvaporation system for energy savings.

The “twins” have Yankees of the same diameter (16 ft.) with shell lengths of 6.15 m. Two similar machines at Chongqing (PM11 and PM12) as well as the four news orders (PM17, PM18, PM23, and PM24) also have steel Yankees.

Says Bai Bingchen, ANDRITZ China's Vice General Manager for Tissue, “The world's largest PrimeDry Steel Yankees for tissue are not about size just for the sake of size. They are a means to produce high volumes of quality grades at lower energy costs. Hengan is able to form a better sheet and increase production at the same energy input. Or, the mills have the option to reduce energy consumption for a given production.”

The right start for premium tissue

An area of ANDRITZ focus is the upstream processes to the machine itself. For every Hengan machine installation, ANDRITZ also delivered the complete stock preparation and machine approach systems.

The stock preparation system is designed for bleached virgin pulp with a conveying line, pulpers, protection screens, deflakers, refiners, S-series stock pumps, headbox screens, and FP-series fan pumps – all from ANDRITZ. In addition to stock preparation, ANDRITZ also delivered equipment for the broke line and the systems for water recirculation and fiber recovery.

Says Zhang, “Even though we use high-quality virgin pulp, which is much cleaner than recycled, we want our furnish to be extra clean. From the pulper to the machine chest, ANDRITZ helps us maintain a very high standard of furnish quality.”



▲ Hengan's PrimeLineTM machines are equipped with the latest resource-saving technologies: the PrimeDry Steel Yankee and the ReEvaporation system.

Heads above

All new Hengan tissue machines use PrimeFlow headboxes, which use an eccentric shaft for slice adjustment to avoid what is known as slice deflection. In addition, the step diffusor turbulence generator, in combination with the nozzle geometry, deliver superior paper quality. An important feature of the PrimeFlow headbox is a pentagonal/hexagonal outflow pattern of the turbulence generator. This creates a more perfect sheet. Comments Bai, “The PrimeFlow achieves a high level of consistency, or what we refer to as layer purity. When you make tissue at speeds close to 2,000 m/min, precision is a must.”

Lower energy through heat recovery

According to Klaus Gissing, ANDRITZ's Vice President for Tissue and Air Engineering, “Hengan has proven to be an ideal partner for new technological developments. They are always ready to innovate and are not

afraid to take calculated risks to improve quality and reduce costs. We should credit them for pushing us to set new records for steel Yankee performance, as well as the development of our ReEvaporation system, which saves a lot of energy.”

Recovering waste heat and using it in the tissue making process (for example to evaporate condensate from machine) is highly desirable. That is exactly what happens with the world's first PrimeDry ReEvaporation systems which were installed at Hengan. “The ReEvaporation system delivers a large part of the energy that used to go into the atmosphere back into the tissue machine by using waste heat to evaporate condensate,” Gissing explains. “This condensate goes back as steam to the Yankee. Up to 30% of the steam demand for the drying process can be generated out of waste heat, depending on the location of the technology in the hood ex-

haust air flow.” The impetus for the development was that Hengan wanted greater energy efficiency, according to Gissing. “We had an idea for a product to achieve this,” he says. “ReEvaporation is now installed on the new machines at Jinjiang and Chongqing. The benefits from machine to machine range from very good to great.” According to Zhang, “ReEvaporation helps reduce our consumption of gas, so it saves us money.”

The next step: revved up ReEvaporation

Says Gissing, “Our first ReEvaporation systems proved to be valuable in capturing and re-using energy. Now we are thinking broader and bigger, using the tissue machine as a power generator itself. The next step is still on the drawing board, but we are close. Hengan's openness to pioneering is valuable for our own development. Innovation is in their blood.”



“The engineers and technicians from ANDRITZ provide our team with a lot of help.”

Zhang Qun Fu
General Manager
Hengan Group

True partners: Hengan and ANDRITZ

Zhang is quick to point out that not everything is about technology. “The engineers and technicians from ANDRITZ provide our team a lot of help,” he says. “Faster start-ups and better optimization are achieved with our mutual cooperation and hard work. Every day we learn from their valuable observations, comments, and experience.”

According to Bai, “Every start-up has small issues and challenges to overcome. For example, with PM16, there were some small problems with the steam and condensate system. As partners, Hengan and ANDRITZ found the root cause and solved the problems in very short order.”

Future wrapped in tissue

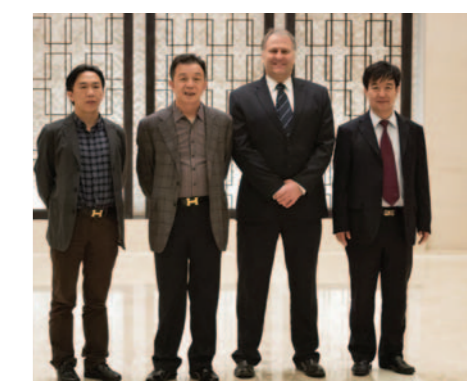
Zhang states, “In the future, tissue making in China will be much more energy efficient. It is a must to be competitive, and to be a leading contributor for sustainable development. Chinese consumers are more aware of issues concerning factories, and they expect more. Our close ties to consumers demand a high level of commitment.”

It can be assured that Hengan will always push for new solutions and new technologies. “Our first focus is on enhancing the consumer experience through advances in softness and strength,” Zhang says. “Secondly, it means energy efficiency and environmental protection.”

We are considered a leader in China for sustainability. This is reflected in the way we run our mills and the high functionality of our machines – including less water and energy consumption.”

“Hengan has proven to be an ideal partner for new technological developments. They are always ready to innovate.”

Klaus Gissing
Vice President of Tissue and Air Engineering
ANDRITZ



▲ (From left to right) Xu Shuishen, Hengan Chief Operating Officer, Xu Lian Jie, Hengan Chief Executive Officer, Klaus Gissing of ANDRITZ, and Bai Bingchen of ANDRITZ.

◀ Connected with customers. Bai Bingchen (left) and Klaus Gissing (center) of ANDRITZ meet at a local supermarket with Zhang Qun Fu of Hengan to see Hengan’s products on the shelves.

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.



"Hengan's first PrimeLine machine set a new standard. World-class quality, speed, and efficiency were the highlights."

Li Xinjiu
General Manager for Papermaking
Hengan Group



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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