



Part of the soaking, unhairing and liming department at Xingye Leather Technology

Tannery of the Year:

Xingye Leather Technology Company, Anhai, Jinjiang City, Fujian Province, China

The Xingye Leather Technology Company, part of the leather cluster in Jinjiang City in Fujian Province, believes it stands out from the crowd because of the way it treats its people and the investment it has made in improving its environmental practice.

Xingye is currently processing 14,000 raw hides each week in addition to about 10,000 wet blue. Its output at the moment is between five million and six million square-feet per month of finished leather, 80% of it for footwear uppers and 20% for bags.

The tannery operates seven days a week; employees who work on Sunday have another day off instead. Most of the raw material is steer hide, which the tannery processes from raw and wet salted, but handles mostly from wet blue. Around 60% of the material is

imported from the US, Australia, Brazil and Europe, and 40% is local. Executive vice-president, Cai Jianshe, explains that about 60% of imported hides come from the US. "The US has a big and stable volume," he says. "There is a lot of availability. The availability from Europe is less stable; the US is better for us in terms of value for money."

Mr Cai insists that Xingye has good relationships with its raw material suppliers. The high price of hides has been an issue for the entire industry for a year, but the tannery believes keeping relations



Part of the reverse osmosis plant. Now in operation for one year, approximately 50% of the treated effluent is sufficiently high quality that it is reused in leather making.

with its suppliers positive is important. "We can't lower the cost," says Mr Cai. "We can only perform at our best." Xingye did buy a sizeable quantity of hides when prices were low in 2009, and that affordable stock lasted for a good proportion of 2010. Now it's about achieving a balancing act, he says. Xingye continues to purchase wet blue "selectively" to increase its production without having to invest in extra beamhouse capacity.

New finishing plant

Most of the company's investment is going into a new finishing plant a few kilometres away from the main site, which it hopes will allow it to increase its output of finished leather from current levels to about 10 million square-feet per month. It may take two, three or even four years, but Xingye is serious about achieving this target. When it reaches full capacity, the new site, parts of which are already in operation, will contribute around four million square-feet of this leather, with the rest coming from the finishing operation that will remain at the original Xingye site.

The tannery started in 1992, the

brainchild of the family of current chairman Wu Huachun. There were around 100 employees at the time of the launch; now 766 people work at the plant, 60% men and 40% women. Three years ago, it built a new administration building. It's ISO 14001 accredited, and is currently undergoing assessment by the Leather Working Group, the multi-stakeholder group that assesses the environmental performance of tanneries and awards gold, silver and bronze status to those achieving the best results. Xingye is hopeful of achieving gold and the environmental protection authorities of the province of Fujian are now holding Xingye up as a beacon practitioner of good environmental practice, asking other tanneries in the province to visit the Anhai facility and attempt to imitate it. In October 2010, representatives of 70 tanneries from throughout Fujian attended a seminar event at Xingye, hosted by the environmental protection authorities. There were talks in the company's impressive lecture theatre and demonstrations of the effectiveness of the company's practices, including seeing Mr Wu and other

members of the senior management team drink water processed at the Xingye treatment plant. Xingye says it was happy to help and that none of the secrets of its success were in danger of being breached on the day; being asked to take responsibility for leading the way on environmental practice is a compliment, the company says. Moreover, it believes that excellence in environmental matters will help it be competitive in the years ahead, internationally as well as in the Chinese market. If so, it will provide some return on the investment of around \$7.5 million that it made in its treatment plant in 2009 and 2010.

What gives Mr Wu confidence that there will be demand for his leather even if he almost doubles his production of finished leather in four years is that the Chinese market is becoming bigger and bigger. He puts annual footwear consumption at 1.8 pairs per person for people living in cities and around one pair per year for people living in the countryside. However, the urban population is growing as cities and their factories continue to attract people who used to work the land. "That's going to



From a technical point of view

(1) Overview of operations

Xingye Leather Technology Company is situated in the city of Jinjiang in Fujian Province. Established in 1992, the production from this tannery now stands at approximately six million square-feet per month of mainly shoe upper leathers for the Chinese market in the range 1.1–1.5 mm, with about 10% for bag manufacture. The input mainly comprises 14,000 US brined steer hides, and 10,000 wet blue hides per week. These wet blue are from the US, Australia and Brazil, with about 40% provided from within China. Almost all of the leathers are based on chrome tannage for nappa-type leathers. Specialised lines are produced as chrome-free for children's footwear. Clariant's EasyWhite tannage is being investigated, together with semi-vegetable tannages.

(2) Manufacture and processing

The raw material feed to the tannery is continuous, with two weeks' production input of brined hides held on site in a temperature-controlled environment. There are two input weights, being 10 and 16 tonnes, according to the capacity of the 20 wooden soaking and unhairing drums manufactured by Yuto.

Soaking and liming is managed over a two-day period, and a hair-saving process is operated. All loading of drums and movement of goods is by forklift truck, with the limed hides lifted to the service mezzanines behind each of the two elevated 3P fleshing machines. These are feed-through machines and after fleshing the hides drop to floor level for on-line trimming, before feed for splitting to substance on Linta whole hide splitting machines.

Chrome tanning takes place in 25 tanning drums of 4.0 x 4.0m dimensions. Ammonia-free deliming systems are used to minimise the nitrogen content for effluent treatment, and a chrome recycling system is operated.

After sorting and shaving, the hides are dyed in either five stainless steel tri-compartmental drums, or 10 dye drums of size 3.3 x 3.0m, all of Chinese manufacture. Stainless steel tanks are situated above each drum for the collection of exhaust float from a re-chroming process. This is then made up to strength and reused up to five times before discharge, then starting a new cycle.

There is a laboratory on site, and leathers are made to standards set by the China Leather Industry Association. There is also a production plant for small-scale wet processing comprising six wooden drums for moderate sized loads, and 15 stainless steel drums for small-scale and pilot investigations.

There are four different finishing workshops on site for different leather types. There are two Cartigliano automatic feed systems where leathers after samm-setting are fed into wet stretching (wet staking) machines for extension and softening, before feed into high-speed drying and conditioning cabinets. There are also two lines where after samm-setting, the leathers are wet stretched, then automatically delivered onto vacuum drying plates. There is heavy use of natural drying using pole-conveyor systems running through roof areas, but also under covered delivery



One of the two feed-through whole hide fleshing machines with feed tables to the limed splitting operation.



Lime fleshed hides being pulled flat and trimmed, with feed to the lime splitting operation.



Part of the dyeing department. There are five stainless steel tri-compartmental dyeing vessels, and ten 3.0 x 3.0 m² wooden dyeing drums in this department.



and parking areas.

In addition to feed-through staking, more than 50 milling drums manufactured by Xinji Julong Leather Machinery Company are used as approximately 70% of the production is for nappa-type leathers.

(3) Co-products and solids management

- All of the limed splits are sold.
- Hair from the hair save process is taken away and used for composting.
- Fleshings are sold for rendering.
- Limed cuttings and trimmings are sold and processed into regenerated leather.
- Chrome tanned shavings and trimmings are collected and processed into hydrolysate for retanning.
- Chrome precipitates are filter pressed, and then taken by specialised company for controlled disposal.
- Ash from the boiler plant used for brick manufacture.
- General waste is segregated at source, and when possible sold, the remained being deposited under licence. ☺



One of the two Cartigliano wet stretching (wet staking) machines with feed to high speed drying and conditioning units.



Team of ladies operating a feed-through horizontal toggle drying unit.



Line of milling drums. There are more than 50 milling drums on site used to create various finishing effects.

push the numbers up," Mr Wu says. "The China Leather Industry Association has said that our consumption will double and I think that is correct, that the total will double in four or five years. It will be an enormous number, perhaps an extra two billion pairs a year, and China's production of leather will have to increase. Yes, sports shoes may use only 25% leather and 75% synthetic materials, and that trend will continue, but casual shoes will continue to use leather. Also, at the moment 50% of shoes produced in China go for export, but this proportion will decrease; we're going to need the shoes for the domestic market." He says Chinese consumers have a high regard for leather and will continue to do so as they pursue luxury. Xingye now has a diverse group of shareholders, all Chinese.

Picked as a pioneer

Purchasing director, Adam Wang, says the company's relationship with suppliers of leather chemicals is good and that the level of support these suppliers offer in China is high. When specialty chemicals provider Clariant introduced its new Easy White Tan tanning process at the end of 2010, it said the new idea, based on its Granofin Easy F-90 product, would make the tanning process leaner, cleaner and safer than ever before, with the use of salt no longer necessary. This claim came after six tanneries around the world had been invited to test the new process out. Xingye was the only tannery in China to earn that distinction. It's now moving to a second-phase trial and is hoping to use the new process to do a combination tannage to

produce semi-veg tanned leather, which it believes will interest its footwear clients.

Adam Wang joined the tanning company three years ago from one of the major leather chemicals suppliers, so he knows how this works from both sides of the fence. "It's a very competitive market here now, so they have to stay on top of it," he says. On the machinery side, he explains that support can come from locally based agents if there is a small problem to fix, although anything major will require a technician to come to Anhai from the supplier company, often from Italy, but also from Korea. He is always on the look-out for new ideas from machinery manufacturers and says he has a particular interest at the moment in new ideas for his company's finishing operations. Investments in



technology such as Cartigliano's drying and conditioning machine is saving the company a lot of time. In the rainy season, it can take two days for hides to air-dry, but the Cartigliano machine makes this possible in 30 or 40 minutes.

In his previous work, Adam Wang had the opportunity to see inside many tanneries across China. He insists that Xingye is one of the best, pointing out unusual features such as its air-conditioned raw materials warehouse. The on-site laboratory is accredited by the China National Accreditation Service for Conformity Assessment (CNAS) and is a resource that Xingye prizes highly. Issues such as chromium VI are not really playing on the minds of major Chinese footwear brands at the moment, Mr Wang says, but even if they have not made specific demands in this area, they have made it clear to their suppliers of leather that any instance of chromium VI being detected in shoes that go on sale to Chinese consumers will be their, the tanneries', responsibility. "So we do test for this," the purchasing director continues. "If it was the US or Europe you'd maybe have to have a certified test from a third party and include all the certification, but here it's less formalised." The company already produces a chrome-free range of leather for baby shoes.

Workforce issues

Of Xingye's 766 employees, about 70% of them at the moment come from outside Fujian Province. The current thinking in the company and among other tanners in the area is that Fujian has become a comparatively prosperous place in recent years with the tenth highest per capita gross domestic product (GDP) in China, at almost \$10,000 in 2010. For this reason, local people are believed to be keener on commercial work these days than on jobs in which you have to get your hands dirty. Fujian's per capita GDP is half that of Shanghai and Beijing, but almost double the levels of neighbouring provinces such as Jiangxi or further away places like Sichuan from where a lot of the workers come. The human resources department at the tannery works hard to maintain good communications with the local authorities in these provinces to aid its recruitment drives. It's possibly even more satisfied with the informal recruitment network that springs into life among its workers when



Xingye Leather Technology's new administration building in Anhui, Jinjiang City, China.



The exterior of the main tannery is carefully planted with trees, shrubs and flowers.



Range of nappa-type leathers manufactured by the company and displayed on-the-last.



From a technical point of view

(4) Water treatment and environmental management

The water supply to the tannery is directly from the main city supply, although this is supported by rainwater collected from the factory roof. Approximately 3,000 cubic-metres of water per day are required for leather manufacture, but a reverse osmosis plant installed one year ago enables 50% of the treated tannery effluent to be recycled, thus reducing the total water consumption to 1,500 cubic-metres per day. All of the water used in manufacture is automatically delivered to the selected processing vessel.

When finally discharged from recycling procedures, the chrome wastewater is collected, precipitated, and then settled, with the sludge finally dewatered on a filter press. The filtrate and supernatant are then discharged into the main effluent treatment plant.

The effluent treatment plant is completely enclosed in a single building. After aeration to remove sulfide, the different wastewaters are mixed, chemically dosed with ferrous sulfate and settled. A flotation unit is employed to skim grease and scum from the effluent before feed to the



Surface skimming of grease and floating solids from the mixed effluent as part of the main effluent treatment.



All of the air within the enclosed effluent treatment plant is continuously extracted, then wet scrubbed to remove odour.



Permeate of clean water from reverse osmosis for reuse in leather production.

an opening develops; people call friends and family back home and tell them to come to Anhai, assuring them that the pay and working conditions are good.

As is well documented, rates of pay have been going up steadily in the last few years and it's become harder to find enough workers. There is a minimum wage, but anecdotal evidence suggests most private companies are having to pay much more than the minimum. Xingye believes it may be paying its workers as much as 15% or 20% more than its direct rivals in the Jinjiang area, where there are at least 50 tanneries. Money aside, Jason Wong, the company's human resources director

points out several other elements of the company's treatment of its people that have helped spread its reputation as a good employer. All worker dormitories have air-conditioning, hot water and televisions. Other entertainment comes in the form of ping pong and karaoke, for which there are organised competitions. Every two months, combined birthday celebrations take place, with gifts for the people whose birthdays have fallen in that period and cake, singing and dancing for all. There are more formal parties at the time of big national holidays, with professional entertainers hired for the occasion.

Holiday entitlement

At statutory holiday times such as the Lunar New Year, the company has taken the step of closing the tannery for two weeks to allow workers to have a decent break with their families; the legal requirement is seven days. Xingye pays bus and even air fares for its workers to get home at New Year, and if people come back to the tannery on time, they qualify for a bonus of 40% of those travel costs. Still on the subject of holidays, a plan is in place to give tannery workers extra discretionary holiday for them to take when they like. Workers from outside Fujian will have ten days to take when they choose, if pressure of work allows. Workers



The new wet blue to crust department. Top centre shows the plinths for supporting the two rows of dyeing drums, and structure for the feed mezzanine.



Two spraying lines have just commenced operation. A roller coating machine is currently being installed for the centre unit.



Construction of the accommodation block for the workforce for the four new leather manufacturing units.

activated sludge treatment system. This treatment plant is situated on two floors within the building, and manages an anoxic section as part of the removal of nitrogen. The air is continuously extracted from the building, and the exhaust air wet-scrubbed to remove odour, and to ensure that the surrounding area is odour-free.

After final clarification, the treated effluent is treated by reverse osmosis with about 50% recovery as clean water for reuse within processing. The remaining effluent is discharged into the town sewage system for ultimate delivery to the sea which is about 30 kilometres away from the tannery.

ENERGY

- The main factory is very spacious, and provides lots of natural light.
- To save electrical energy in the future, a shift has started towards larger processing vessels, operating at slower speeds and employing deep shelves, in all departments.
- Coal is the main form of energy supply, and there is a separate laboratory on site for measuring the coal for calorific value, moisture, sulfur, chloride and ash.

Four new retanning and finishing departments

A new finishing operation has very recently been brought into operation on a new industrial site approximately four kilometres from the main tannery. A department in the same building for processing from the wet blue to crust state is expected to be brought into operation in July this year. The capacity of this plant will be 1.5 million square-feet per month.

Next to this a second factory of similar size is being built, with two more identical units planned for construction, with full production planned by 2013. There will be specialisation within these units. The first is dedicated to calf leather production, the second men's shoe upper leathers, but the designation of the remaining two units is yet to be decided. The effluent treatment plant for all four units is being built, and will be in operation in time for the first wet-end to be brought into operation.

At the same time housing for the workforce is under construction, and within the manufacturing site trees are being planted as part of landscaping.

The first of these new production units is very spacious with a considerable amount of natural light. The finishing machinery is set out with considerable space between each operation to ensure easy movement of goods and to enable flexibility. The department is fully fitted with feed-through staking machines, presses, roller coating and spray lines. There is also a separate area dedicated to trial finishing. ☺

in many countries are used to benefits of this kind, but it's new in the tanning sector in China. Xingye is happy to be a pioneer in this regard, and it acknowledges that it's

part of a wider worker-retention strategy. An ongoing training programme ranges from showing shop-floor workers new skills to help them make progress in their careers to

arranging for outside speakers to come in and talk to the management team on subjects such as communications and quality programmes. On occasion, members



Accreditations and Awards

- Member of SATRA since 2006.
- Platinum customer award 2007, from Quanzhou Branch, Industrial Bank Com. Ltd.
- Top 10 Enterprise of Leather Industry in China Light Industries, 2009.
- Other awards include "Genuine Leather and Eco-leather Mark", "Famous Brand of Fujian Province", Industry Technology Centre Fujian Province"
- The company is being assessed for approval by the Leather Working Group in June 2011, and seeks Gold Standard.®

of the management team have even secured funding and support from the company to complete MBA programmes. For everyone there is an improvement programme to which anyone in the company can submit a suggestion. If the suggestion is implemented, the person

who came up with the idea receives an award. One recent example that came from the shop floor was the suggestion that applying heat at specific points could speed up the hang-drying of hides. This has worked well, generating considerable cost benefits.



The tannery's onsite research and development centre.

"We need our workers if we are to have a future," Mr Wong says. "If we don't have the people, we can't make leather. Labour costs are becoming more expensive every year, but we have been able to afford this so far and we try not to worry about this too much. Now (April 2011) labour costs are 15% higher than they were at the start of the year, but we try to increase our workers' salaries if we can; they need the money to live well. Labour costs are an investment; if the workers are motivated, they will be more productive, so it's win-win."

Good pay and conditions are helping the company achieve a staff turnover of around 10% per year, which it claims is much lower than the rates the other tanneries in and around Jinjiang are experiencing. This is the company's reward for trying to treat its workers as well as possible.

Relations with the local authorities are strong. Xingye is the second-biggest contributor of tax revenue in Anhai after major personal hygiene products manufacturer Hengan. The authorities in the wider Jinjiang area present an award every three years to the enterprise that contributes "most harmony" to city life and the winner on the last two occasions, in 2008 and in 2011 has been Xingye. The company has also won recognition from television channel CCTV as the company in the Jinjiang area that employees feel most emotionally tied to (the judging process is said to be complicated, but the trophy is there at the tannery for everyone to see). Nationally, the ministry for light industry named the company in the top ten producers of leather in 2009. It has close links to the China Leather Industry Association and is an active donor of funds to charities, such as a senior citizens' community centre close to the tannery, but it also helps fund building projects in the local area for new schools, roads and bridges. One local school, the Yang Zheng Middle School, where Xingye chairman, Wu Huachun was educated, received a donation of one million Yuan (more than \$150,000) on the occasion of its eightieth anniversary in 2009. It used the money to buy teaching equipment. "We try to be the best neighbours we can be," Jason Wong explains. "This has been a polluting industry and we owe it to society to innovate as much as possible to eliminate pollution and to give something back."®