



Gansu Hongliang Leather Limited tannery near Lanzhou.

Tannery of the Year: Gansu Hongliang Leather Limited, Guanghe County, Gansu Province, China

Located among the hills and caves of Guanghe County in the north of China, the Gansu Hongliang wet-end tannery employs 300 people in a newly built facility. The company's focus is almost entirely on making upper leather for women's fashion footwear and the company enjoys strong ties to some of China's most prominent footwear brands.

Li Chen, chairman of Gansu Hongliang Leather Technology Limited, is a veteran of the hard but noble work of collecting hides from the cattle farmers spread across the expanse of China's north-west. Strictly speaking, his base 100 kilometres from the old Silk Road city of Lanzhou, capital of Gansu province, is in the geographical centre of the country, but it's always referred to as the north-west. The Gobi Desert begins a few hundred kilometres to the west, and there are road signs on new, impressive toll-controlled highways for Lhasa, capital of the remote autonomous region of Tibet.

Farmers here are used to harsh conditions, but are willing to sell their cattle hides to people they know and trust, people who understand their culture, people who pay cash most of the time. Li Chen's name began to resonate with them 20 years ago when he first arrived here, bringing eight years' experience of trading cattle hides across China. A Muslim like many of the people in this region, he quickly built a reputation for fairness and for reliability and became a dominant player in gathering hides from Gansu, as well as from neighbouring provinces in this area, which has a large share of China's total usable, for livestock rearing purposes,



View of the pilot and development plant comprising six drums. In addition there is a set of tumble drums for dye evaluations.

grassland, and of its cattle population (around 130 million in total, according to the UN Food and Agriculture Organisation).

After years of selling the hides he collected to tanneries in the region (of which there were once at least 40) Mr Li decided to set up his own in 1997, and Gansu Hongliang Leather Limited was established in Guanghe County, part of the Linxia Hui autonomous prefecture set up for Muslim people in the region. An important part of his motivation, he says, is that he wanted to create jobs there and to help Gansu and the surrounding provinces add as much value as possible to the raw material on their doorstep.

The original tannery became too small in the second half of the last decade and work began on a new, bigger building in 2008. Production in this second-phase of the facility began in June 2010. About 100 local people made up the original Hongliang workforce; now the company has 650 employees and is turning over a sum of around ¥300 million (\$46 million) a year.

Another major change that the business has undergone has been to carry out crust and wet blue production in Guanghe, and transporting the hides at a skilfully negotiated preferential air-freight rate to Guangdong Province in the south of the country, to a finishing plant Mr Li built there, in Jiangmen City, in 2006. He has negotiated the special price of RMB ¥1.8

(less than 30 US cents) per kilo in weight, which works well because, by the time the tannery has turned a raw hide into crust, its weight can easily fall from an initial 25 kilos to just two. So a crust hide costs Li Chen less than ¥4 (just over 60 cents) to air-freight down to Guangdong, when the standard rate would be closer to three times that amount. The air freight company drives from Lanzhou airport to the tannery to collect the cargo, with a driver from the finishing plant meeting the plane at the other end; it's a distribution system that works well and gives Hongliang a competitive edge, the chairman feels.

In touch with fashion

Li Chen's reasons for developing the Jiangmen City finishing plant are connected to a desire to stay closely in touch with the fashion demands of his customers, who include many of the biggest and most successful manufacturers and retailers of women's footwear in the Chinese domestic market. The trends consultants are more active down there (Jiangmen is only 100 kilometres from Guangzhou, provincial capital and China's third biggest city) and the design teams of the footwear firms that buy his leather tend to develop and try out their ideas in Guangdong laboratories. Many international suppliers of leather chemicals are on hand to supply advice and products to help Hongliang give its

customers the looks, colours and textures they are searching for. The best suppliers, in Hongliang Leather Limited's opinion, are the ones that operate globally. As well as their insight into the world of fashion, they are the best at providing support, and for big tanneries such as Hongliang, seem happy to visit every year to demonstrate what their new products can do. Technicians travel to the tannery to carry out on-site tests; if the tests produce good samples (how well a chemical product works can depend on a range of factors, including water quality, equipment and the type of raw material) the tannery can choose to incorporate these innovations into its production mix. Advising the company on how to become greener is another important contribution these global players can make. "This is very important for us," Li Chen says. "It helps us prepare products for the future. There is good communication between our technical teams and theirs and we run joint research projects. This relationship also means we can invite some of their expert technicians to come and advise us, give talks and help train our people. One of the best examples of this has been experts from Italy coming to advise us on what we need to do to produce semi-veg and veg-tanned leather for our customers."

Chinese expertise is also welcome in this regard, with speakers from the country's two universities with a major interest in leather production—Sichuan University and the North West Institute of Light Industry in Xianyang—also regular attenders at Hongliang. These links to the universities have proved to be a good source of technical talent for the tannery; Guanghe may be remote for people from many parts of China, but those in the know in the leather industry recognise it to be a good place to work and there has been no shortage of graduates willing to work and develop their careers there.

Customer knowledge

On the customer side, the biggest and best are good at providing samples of the leathers they require, but the tannery also carries out its own research and has the freedom to make its own suggestions to these important players.

Five hundred of Mr Li's employees are in the south, more than in the wet-end plant at Guanghe. It was a move that was two



From a technical point of view

(1) Overview of operations

The tannery processes 3,000 hides per day from the raw state to the crust condition as chrome tanned leather.

The production is predominantly based on raw indigenous cattle hides, and is central to an established collection system owned by the company. This involves approximately 50 people operating from 16 hide stores spread across the collection area. The hides are purchased from farmers and small slaughter houses, and the network stretches up to 500 km from the tannery. There is considerable experience within this operation and it involves a high level of trust between the organisation and the farmers; it is firmly established as it has been steadily developed over 23 years, and the tannery is seen as a logical step in adding value.

Over and above raw hide processing, about 20% of the production is based on wet blue purchases. These are not limited to wet blue manufactured in China. None of the wet blue or crust leathers are sold to other tanneries.

Construction of this new tannery began in 2008, and production commenced June 2010. It is strategically placed, as it has been built next to the major highway running through the region. It is also adjacent a major state-owned collection point that is under construction for hides and skins, and leather in the wet blue and crust state for farmers, dealers and tanners. This is one of five similar collection points being set up within the province.

All of the leather from the tannery is sent to the company's finishing plant located near to the shoe manufacturing factories in Guangdong. The volume is approximately 150,000 square-feet per day, with about 80% of the production for ladies' shoe leathers, 10% for men's shoe upper leathers and 10% for bag leathers.

At the present some 260 people are directly engaged in manufacture at the Gansu Hongliang site, and about 50% of this team are female. About 80% of these employees are Muslim, but the tannery operates a conventional six day week Monday to Saturday.



Two days' hides are held in store at the tannery. Considerable stocks are held at other locations and can be rapidly moved to the tannery.



There are 20 drums in total being used for soaking and liming. All of the movement of raw, limed and chrome tanned leather is based on forklift trucks.



The limed hides are hooked individually onto an overhead feed conveyor to the fleshing operatives.



The fleshing machine is elevated, and the fleshed hides are loaded into containers and moved from the area by the fleshing team.



(2) Manufacture and processing

There is considerable space and light within this tannery. At any one time there are sufficient hides on site for two days' input. The supply of hides is continuous and carefully managed from the 16 collection stores set up throughout the company's collection area, and considerable quantity of hides is available at all times. It is also a secure system for good preservation as the temperatures in this region are normally below 25°C in the summer, dropping to -20°C in the winter time.

There is no grading of hides on arrival at the tannery as an assessment has already taken place at the collection sites. Having said this, the staff at the tannery also have experience in hide collection, so there is a rough weight grading as the input loads are made up. Hides that are larger or smaller than the norm are pulled out and made up into special loads.

The hide input is normally 3,000 hides per day, but the supply is spasmodic, and can double at the peak times, so the tannery has to carry surplus processing capacity.

The average input load comprises 400 pieces, with an input weight of 10 tonnes. These are soaked and limed using a hair-burn process over a period of two days. The drums are all fitted with automatic timing devices, and are serviced by an automatic water supply.

After unloading the drums, the limed hides are hooked onto a conveyor system that delivers them to an elevated fleshing machine. After fleshing they are lime split to the substance required. The tanning department consists of 32 drums, which are exclusively used for chrome tanning. Another 20 drums for tanning are being installed at the moment, and will be brought into use in June this year. All of these drums are of conventional construction, and have been manufactured as part of a Sino-Italian joint venture.

After tanning, the hides receive their first detailed inspection. As each hide is assessed, it is manually taken down and stacked according to estimated area and quality. There is massive storage area for the wet blue stocks, and the capacity can run to half a year at a time.

Dyeing and retanning takes place in a row of 12 elevated dyeing drums of conventional construction, and the major method of drying is vacuum drying followed by airing off on



The splitting team is large and coordinated. The tannery only chrome tans the grain split, the flesh splits being sold for leather production elsewhere.



Part of the tanning department. Once the installation of the tanning drums and services is complete, 52 drums will be in use.



Part of the wet blue sorting team. There are many different selections made according to size and quality.



The wet blue stocks are considerable, but also include purchases from other sources.



an overhead conveyor system. In addition, tunnel drying is used for drying softer leathers and for bagging leathers. There are no staking operations on site, and once dry, the leathers are inspected and graded. The pieces are then packaged for delivery to the company's finishing department located at Jiangmen City in Guangdong Province.

(3) Co-products and solids management

- All of the lime splits are sold for split leather production.
- Most of the fleshings are collected from the tannery by an external provider and turned into bio gas.
- Chrome shavings are sold to other companies for manufacture into leather board.
- Chrome precipitates are filter pressed, then disposed of at a government controlled site as there is no established outlet for this waste.
- Dewatered sludge from effluent treatment is deposited in landfill. A company is being developed by the Chinese authorities for making compost in the future.
- Ash from the coal fired steam generation plant is used in brick manufacture. ☺



Some of the production - for softer shoe leathers and bag leathers - is dried using a continuous feed drying tunnel.



Part of the team of six women in a vacuum drying team.



After vacuum drying, the pieces are placed on the overhead pole drying conveyor to complete the drying operation.

years in the planning before the move in 2006, and it has proved visionary, so much so that Li Chen says now that he wonders if Gansu Hongliang Leather Limited would otherwise have come through the enormous changes that the Chinese domestic footwear industry has experienced in the last five years.

He harbours a suspicion that the Gansu operation on its own might have been too remote, at a distance of 2,000 kilometres, from the company's clients to be able to keep developing at the same pace as they are. Moving the finishing plant to a distant and very different part of China was a big decision for Mr Li, but he carried out his research carefully and soon felt sure he had made the right choice.

Developments in the north

The plant in Guanghe County also has customer requirements at the forefront of what it does. Recent demand from footwear groups such as Aokang and Belle for ammonia-free liming, for veg- and semi veg-tanned leathers necessarily affect the work that goes on there. Growth in Guanghe is fundamental to the company's ambitions. Construction of a third phase of the Guanghe tannery is already planned and will include a finishing operation. Around 30% of the company's finished output is black leather. The plan is to produce standard black shoe upper leather in Gansu Province and have the company's southern resources concentrate exclusively on other fashion colours and special

fashion finishes, either in response to ideas that customers want to try out, or to carry out firmed-up design decisions.

However, for black shoes and boots, Mr Li is convinced it will make commercial sense to produce the finished leather in Guanghe, where labour and the cost of doing business are cheaper. The location in the north is good because a substantial proportion of China's raw materials are here, which makes you wonder why other tanning groups across China have so far failed to move in on the action. There are new highways and new high-speed rail links across the region are under construction. Lanzhou airport has good connections. However, this is a land of traditional values and Mr Li places great store in the relationships he has spent a



Although leathers are only processed on site to the crust state, the display at the tannery shows the range of leathers mainly produced for ladies shoes.

business lifetime building up. Other tanneries coming to the region would find it tricky to call on farmers and try to collect hides from them. They already have a buyer for their hides, one who has been knocking on their doors for decades, paying them what they regard as a fair price, usually in cash. Any other leather producing companies that are active at the moment are working through agents, he says, which means that even those that are able to stake a claim for some of the local raw material are paying a premium, putting themselves at a price disadvantage compared to Hongliang Leather. For many of those operating close to eastern and southern seaports, it's probably a lot easier to bring in hides from Europe, Brazil or the US.

If you take everything into account—labour, energy, transportation costs for raw material and so on—the cost of production in Gansu Province, compared to Guangdong, is lower, in Mr Li's estimation, by a factor of ¥0.7 per square-foot of leather, taking into account that Hongliang's output is for women's shoes, which usually cost more and use less material than men's. Women love shoes and are prepared to pay a higher price for them; it's the way of the world.

Debate about domestic market size

The domestic women's footwear market in China is a fine segment to be focused on

right now. This is an ongoing debate for us, and even the China Leather Industry Association has admitted that it finds it difficult to piece together a completely reliable picture of footwear consumption in China, but the organisation's president, Madam Zhang Shuhua, said towards the end of last year that she felt an average across the nation of 1.5 pairs per year was probably accurate at the moment. However, she said her organisation expects that figure to double in the coming years. A doubling of the consumption of shoes in China, with its population of 1.3 billion, has huge implications for raw materials, tanners and footwear manufacturers everywhere. It means the global footwear industry will soon have to find a way of sourcing enough raw materials, including leather, to supply China with an extra two billion pairs of shoes a year.

Li Chen's take on these figures is interesting. He anticipates that demand will double and has been trying to stock up on raw material for about a year and storing it so that he can take in his stride any sudden rush for leather on the part of his customers. His store of wet blue and crust is "maybe the largest in China", he says. His area of expertise is shoe uppers for the women's market. According to the research he has carried out—which he says is extensive—today, in China's cities, the average woman buys five pairs of shoes and two pairs of

boots each year: three pairs of shoes for spring and summer, plus two and two pairs of boots for winter. In the countryside, things are different, and two pairs per woman per year is the figure for footwear consumption that Li Chen believes to be accurate. Nevertheless, seven pairs of footwear for each female member of the urban population is a huge figure.

For illustrative purposes, the CIA World Factbook's figures for 2007 suggested the male population of China was slightly larger than the female. It also suggested an urban population across China of 562 million people (42.3% of the total population). If we assume, stressing that this is for illustrative purposes only, that the proportions of men and women are the same among the urban population as in rural communities, we could put the number of Chinese women living in cities at more than 272 million. Li Chen says they are averaging an annual consumption of seven pairs of shoes and boots each, giving a total of 1.9 billion pairs. It means that, if he's correct, the overall consumption figure for China must be much, much higher than two billion. It's almost two billion before any men or anyone living in the country buys any shoes at all. Those same CIA Factbook figures give a rural population of 767 million. And, making the same assumption as above about urban and rural populations having the same proportions of men and women, the male urban population is around 290 million. At a conservative estimate, we could examine the effect on the overall figures of rural people buying one pair of shoes per year and urban men buying 1.5 (clearly very conservative numbers). This would add 1.2 billion to the total and put China's total footwear consumption today at 3.1 billion pairs a year, a billion more than many industry observers believed until now. Play with the numbers further to put rural consumption at 1.5 pairs per year and urban male consumption at two pairs per year and you have a total that is closer to 3.5 billion pairs.

Mr Li thinks the figure of seven pairs per prosperous city woman per year is unlikely to go much higher, say between now and 2015. However, people in smaller towns, influenced by friends and family or by people they watch on television or see in magazines, will imitate them and growth of the overall total is certain to come. The idea of the total doubling still resonates with him



From a technical point of view

(4) Water treatment and environmental management

Water for production use is abstracted from the nearby river and held in an ornamental reservoir near to the front entrance of the tannery.

As part of obtaining a low chromium content in the final discharge from site, all of the chrome containing waste waters are collected, and then dosed with sodium carbonate to form a precipitate of chromium hydroxide. The settled sludge is then pumped to a filter press for dewatering and to form a cake for disposal. The filtrate, together with the settled supernatant, is discharged to the main effluent treatment plant.

The water consumed in manufacture is 0.71 m³/hide, and main effluent plant has a capacity to treat 3,000 m³/day of effluent in the summer. However, this drops to 2,500 m³ in the winter when the temperature drops to -20°C.

All of the wastewaters from manufacture are first mixed and aerated to remove sulfide. The balanced effluent is then dosed using ferrous salts for chemical precipitation, then, after primary clarification, the settled effluent is delivered into an activated sludge treatment system. After secondary clarification, the effluent is fed into an anaerobic stage maintained at 25°C. This is employed for further lowering of COD, and for the reduction of nitrogenous compounds. The resulting effluent is then subjected to further activated sludge treatment as a form of tertiary treatment. After tertiary settling the effluent is discharged from the site. The sludges from each settling and clarification unit are mixed for dewatering by filter press.

The outflow is automatically monitored for ammonia as nitrogen, COD and pH. The performance of this plant is monitored on site, and records show the analysis for COD: NCr is respectively 75 - 85: 4.2: 0.8 mg/l against the National Standards of 100:15:1.5 mg/l. The suspended solids value is negligible, and the pH between 6.5 and 7.0.

The tannery uses part of the effluent for washing floor areas within the site, and for washing machinery. It also intends to make use of the effluent in some parts of leather processing.

COMMON EFFLUENT TREATMENT (MULTI-INDUSTRIAL)

The tannery occupies part of a 260-acre site owned by the company. In June 2011 work is to start on another effluent treatment plant adjoining the tannery with a capacity of 10,000 m³/day. This will enable production to increase at the tannery, but will also serve as a common effluent treatment plant for other industries—dyeing, cotton, agriculture, food processing—with charges levied by the company to those industries. This service will be extended to the few rival tanneries that remain in the area. ☺



The effluent plant processes up to 3,000 m³/day, and the photograph shows the mixing of ferrous sulphate which is used for chemical dosing before the activated sludge treatment.



Tertiary treatment comprises a second activated sludge treatment.



After final settling, the effluent is discharged to the river. This treated effluent is automatically analysed and monitored for COD, N, and chromium.



strongly; it's just that the base his calculations start from is substantially higher than the figures we have seen until now. He consults frequently with big footwear companies that concentrate on China's domestic market and says their projections tally with his. They are opening new shoe stores right across China and selling more shoes online. Perhaps it's a good job he has been stocking up on raw materials. The Hongliang chairman is confident enough of ongoing strong demand and of future success to be preparing to float on the Shenzhen Stock Exchange in 2012. Between eight and ten large footwear manufacturers are preparing similar moves; as a partner working as closely with them as it can, the Hongliang Leather Technology Company believes it can follow suit.

Local authority support

The company believes it has backing from the local authorities for its ambitions, and the evidence is compelling. Within sight of the Guanghe tannery, a new raw materials centre is being built. It is one of five facilities that the public sector is building and will run across this region. There will be an abattoir and facilities for pickling and distributing cattle hides. Li Chen's belief is that this new set-up will allow his company to consolidate its "dominant position" as the main collector of these hides, help it keep its prices down and keep its major footwear customers buying.

Good relations with the authorities have earned the tannery the right to take water for production from the nearby Tao River, a tributary of the great Yellow River, which flows through this region. The company has its own purification plant at the entrance to the tannery site.

Raw hide consumption at the Hongliang tannery averages 3,000 per day, although at peak production times, which the company says are in April and July to meet manufacturers' seasonal surges, this can rise to 6,000 hides per day. From this, the company makes a daily average of 150,000 square-feet of leather. The target for 2011 is 50 million square-feet. At the moment, only 5% of raw materials come from outside China. Li Li Chenkes the quality of hides he imports through an agent in Hong Kong from the United Kingdom because, he says, the grain works particularly well for women's shoes.

Hongliang Leather Limited has been the



Accreditations and Awards

- Award for High Technology Enterprise for region by local government (top award for China) [top right]
- Top 10 Leather Making Enterprises in China, 2009-2010 awarded by the Chinese Government [upper middle right]
- Top 10 Leather Making Enterprises in China, 2010-2011 awarded by the Chinese Government [next to 2009-2010 award]
- Award 2007-2008 for enterprise (AA+ Accreditation for local bank and concerns credit status.)

recipient of a long list of local, regional and national awards, ranging from certificates from a bank confirming AA+ credit status to confirmation from the China Leather Industry Association that the company is one of the top ten leather producing companies in the whole country for 2011.

Most of the people, between 80% and 90%, who work at the Guanghe facility are local, but the site is far enough from Lanzhou and other major centres of population for a 500-bed workers' dormitory facility to be popular. The staff canteen, which serves breakfast, lunch and dinner, is well regarded and the food is free. The main administration building has accommodation for managers on one floor, comfortable rooms with private bathrooms. The company insists that all employees receive good salaries and other benefits, including health insurance. Sundays are work-free, allowing those workers who are

within touching distance to visit their families. For some, perhaps 10%, who come from other provinces, visits home have to wait for official holiday times such as Chinese (Lunar) New Year. According to state law, workers are entitled to seven days' holiday at New Year, but it is company policy at Hongliang Leather to offer more, to give workers more time at home, work permitting.

Back at the tannery, there are facilities for basketball, table tennis and cycling, and groups of workers gather for tai chi, singing, drawing and painting. The company has multimedia training resources that it makes available to workers who want to further their careers, and there are bonus payments for people who achieve good qualifications. According to the company, all of this combines to make a business that the employees believe in, and they want to share in its future success.