



Tannery of the Year: Meihua Leather Company, Xinji, Hebei province

A specialist in making double-face articles from sheepskins, Meihua Leather is a leading light in the important tanning town of Xinji, helping the cluster rebuild its reputation by investing in high-quality raw material, clean and thorough methods of production and state-of-the-art environmental management.

Specialist sheepskin tannery Meihua Leather Company, finalist for China in the fifth Tannery of the Year programme, has been one of the few bright spots in the recent history of the important leather manufacturing city of Xinji in Hebei province. High-profile actions on the part of the authorities there, beginning in the spring of 2014, have led to widespread public criticism of the leather industry in Xinji, particularly with regard to the environmental performance of tanneries. Closures quickly followed, sometimes temporary sometimes not, of a number of the most poorly performing businesses. Meihua Leather's production, on the other hand, has continued uninterrupted and its relationships with its key customers (mostly major international footwear groups) have simply become stronger. Meihua is staying in Xinji and is investing

intensively and working hard to become better and better at what it does.

In the face of the shutdowns that began in Xinji in April 2014, Meihua took unilateral action. The trouble all over town concerned the treatment of effluent. Some tanneries were taking far too little care in pre-screening and pre-treating their own output and, as a result, Xinji's effluent treatment infrastructure was unable to cope. The closures seemed to happen suddenly, taking many industry commentators, not say Xinji tanners themselves, by surprise. The reality is that the problem had been building up for a long time. Eighteen months or so further down the line, it all appears to make more sense. The authorities in Hebei province had issued many warnings but tanners in trouble had always seemed to find a way



of putting off making the necessary improvements to their set-ups, of buying themselves extra time. Something changed after the new central government came into power in March 2013 and began a crackdown, not just on poor environmental management, but on corruption. Around the time of the Xinji tannery closures, national television news was reporting government officials losing their jobs over this issue, with many even going to jail. And as this new way of doing things took hold across China, the delaying tactics ceased to work and officials in Hebei too began to turn words into actions and the long-threatened padlocks at last appeared on tannery gates in Xinji.

Xinji "a special case"

In April 2014, the president of the China Leather Industry Association (CLIA), Su Chaoying, confirmed the closure of a number of tanneries in Hebei province but said the situation there is "a special case". Mr Su said the local authorities in Hebei had warned tanners in 2012 that municipal effluent treatment plants would no longer accept untreated effluent from tanneries and that companies that wanted to continue to make leather there would have to install their own primary and secondary effluent treatment operations at the tanneries. In March 2014, the provincial authorities began ordering the closure of the tanneries that had not complied. "Some smaller tanneries have been closed," Mr Su said, "but Hebei remains an important centre for tanning and for the manufacture of leather garments. The closures are a special case, but one that we have taken seriously." He said the CLIA had told tanners in the area they must comply with the effluent treatment directives of the provincial authorities and had offered to send its own team of experts to Hebei tanneries to advise them on the best way to set up primary and secondary effluent treatment.

It would be inaccurate to think of this as bad news for the whole of the leather industry, in China, in Hebei or in Xinji. The best in the business had long been tired of being tarred with the same brush as corner-cutting neighbours. In a set-up such as Xinji's, everyone in the city knew the municipal wastewater treatment plant was falling considerably short of being able to function adequately, but there was no way any company could prove its share of the blame was small or non-existent; everyone was held equally responsible for the



Part of the range of leather dyeing for two-face leathers for footwear.

problem with no distinction between polluters and perfectionists, between the careless and the careful.

Home from the west

Meihua Leather believes its track record should put beyond doubt its claim to be a leading light in the Xinji tanning industry. It received the CLIA Eco-Leather Mark Certificate in 2012 and last year, following the closure of some of its neighbouring tanneries, it became the first operator in the leather industry in Xinji to open its own wastewater treatment system. Work on the project began amid the furore of May 2014 and by October of the same year the Meihua Leather wastewater treatment plant was up and running. The company was also the first tanner in Hebei province to receive a gold rating from multi-stakeholder body the Leather Working Group, in November 2014. It is also working to set up a bonded logistics park, which should allow it to import materials from outside China and export production to customers overseas free of duty.

A veteran of the highly regarded Spanish sheepskin leather industry, Daniel Sánchez Esteve has been in Xinji working as Meihua's technical manager for almost eight years. He says that under the old system, Meihua's waste went to the municipality but says it was obvious that the system did not have sufficient capacity. "It was fortunate that the government began to impose strict restrictions," he says. "There certainly was a

problem and the restrictions were the correct way to deal with it."

Ironically, Meihua started operating in 1980 in Xinjiang, almost 3,000 kilometres to the west of Hebei. Xinjiang was attractive to a producer of garment leather as it has its own supply of sheepskin and is within easy reach of buyers in Russia and Kazakhstan. Meihua began to make its own finished products in 1988 but moved the whole business to Hebei province eight years after that. "We are here in Xinji out of choice," says John Dong, who runs the company now with his brother Kelvin. Their family is from Xinji and their father, the founder of Meihua, moved back simply because he wanted to return to his home town. At that time, garment leather production was a principal focus for the Xinji tanning community but, for Meihua at least, something changed around the turn of this century. Its sheepskin leather was, suddenly, in demand, not just for garments, but to help Deckers Outdoor Corporation manufacture its rapidly growing flagship product, the UGG boot. An iconic product in what Deckers calls the "luxurious comfort" segment of the footwear market, UGG was growing internationally on the way towards become a billion-dollar brand for Deckers and the group needed greater volumes of high-quality sheepskin to use, wool-side on the inside and flesh-side on the outside for warmth and comfort, on the boots. In 2002, it came calling on Meihua and the two companies have been business partners ever since. Meihua still runs its own



From a technical point of view

(1) Overview of operations

Xinji City Meihua Leather Co. Ltd. has been operating as a tannery on the present site since 2003, being located within a leather industrial area within the city of Xinji. Up to 23,000 sheepskins per day are processed mainly as twin face (double-face), some shearlings for lining leathers, and rugs. Around 90% of this production is for footwear, some of it staying on site for use in an adjacent footwear manufacturing unit that the company has set up. Meihua employs 1,600 people in total.

(2) Manufacture and processing

The raw material comprises approximately 75% wet salted Australian sheepskins, the balance being dry salted sheepskins from the US. The sourcing of this raw material ensures a relatively large and uniform area for each skin, a tight structure and dense wool.

On receipt the skins are opened, trimmed on a conveyor, and tumbled to remove surplus salt. They are then re-trimmed on a conveyor line and made up to batch size.

As the first stage within a 34-day manufacturing operation, the air dried skins are soaked for 12 hours using 36 conventional wooden paddles, with an input of 200 skins per load. Wet salted skins are similarly soaked, but at 600-900 skins per load in 10 steel woolskin processing drums that have been manufactured in China to meet Meihua's specification.

After unloading and draining, the skins are green fleshed within a bank of 10 fleshing machines and the wool sheared to length. This is then followed by a second fleshing to provide a very clean flesh part and open the fibre structure.

Plastic paddles of 11m³ capacity are then loaded by conveyor belt for washing then pickling, each containing 600 sheepskins and operating on a 24-hour cycle. The skins are then piled for three days to stabilise.



Wet salted sheep skins are soaked in a batch of steel woolskin processing drums. Dry salted skins are less flexible at this stage and need soaking in paddles.



After soaking and draining, all of the sheep skins are first time fleshed which also flattens and extends the skins. They are then wool sheared to length, then fleshed a second time as shown to create a very clean and uniform flesh part.



All of the retanning and fatliquoring operations are performed without any dyestuff additions. These tipping paddles are designed to enable a fast unloading of these natural skins with minimum handling strain for the operatives.



After retannage, centrifuges are used to dewater. This operation is followed by a light samm/set to stretch and remove all creases before wheel-buffing.



Some skins require an aqueous degreasing operation at this stage, and this takes place in 10 woolskin processing drums each containing 600–900 skins according to size in a three-hour process. The goods are then tanned chrome-free together with a low fatliquor offer in 39 plastic paddles of identical construction and size to the pickling paddles using a single tanning process.

All of the pickle liquors are segregated from the other wastewater discharges. On discharge from the paddles the floats are filtered using self-cleaning filter screens set in the drainage gullies to remove wool debris. The liquor then flows into a collection sump where it is allowed to settle before the supernatant is pumped to pickle storage tanks. In the recycling process the salt concentration and pH is adjusted, with a further addition of formic acid in the subsequent pickling process. The used tanning baths are similarly segregated and reused, being adjusted for salt concentration, pH and tanning products.

After tannage, the drained skins are heavily buffed on the flesh side using a coarse buffing wheel. This cleaning is very thorough to both clean the flesh part and open and extend the structure for uniform penetration of retanning agents and fatliquors.

A retannage then takes place in 10 woolskin processing drums. Here, a number of different retannages are used to suit the raw material and the final purpose, although none of the skins are dyed at this stage.

After unloading and draining the skins are centrifuged, lightly sammed but with a strong setting action, then buffed a second time using a finer graded buffing wheel. All of the skins are then toggle dried over a period of three to four hours in eight drying units.

After removal from the toggle frames the skins are conditioned on conveyors by water jet spray, then set, followed by carding, shearing/shaving and combing the wool. All of the skins are then degreased for three hours in a series of 11 degreasing machines using perchlorethylene. This is



All of the sheepskins are wheel-buffed to remove fibre and extend the skin structure. This takes place after chrome-free tanning, retannage/fatliquoring (as shown) and in the dried state in conjunction with wool carding/shearing and ironing operations.



After retanning and fatliquoring, all of the natural sheep skins are first time toggle dried. (After dyeing, on second time drying, all of the double-face production is toggle dried, but lining leathers are dried tension-free.)



After first time drying, all of the sheepskins are solvent degreased in a three hour operation; 11 degreasing machines are used at the moment, and this stage is followed by wool and leather dyeing.



These dyeing machines are suitable for both dyeing the wool and dyeing the leather. The number of sheep skins in each load is between 600–900, and can be compared to 200 in traditional paddles used for dyeing.



followed by buffing on the flesh side to raise the nap and de-dust, and then wool shearing/shave, carding and ironing the wool. Each skin is then inspected for looseness, fullness, general defects and colour of the wool and sorted into 10 different grades.

This sequence of events is followed by dyeing processes. Here, the dry skins are first wet back and then wool dyed in batches of 200 sheep skins using a bank of 10 paddles. This is followed by unloading and transfer to wool skin processing drums for dyeing the leather to shade. Stainless steel dyeing vessels are also being used with loads of 600–800 skins both for the wool dyeing and leather dyeing operations.

After unloading the dyeing vessels, the skins are drained, centrifuged, samm/set, and then dried. The double-face sheepskins are toggle dried, but the shearlings for linings are dried tension free using an overhead pole drying conveyor system. This is followed by final shearing/shaving of the dyed wool, carding and ironing.

Finishing operations can be complex to create special effects on the flesh side, but mostly the fixation of dyes on the suede side either using conventional spraying machines and drying cabinets or roller coating applications. The double-face sheepskins are finally inspected, trimmed and graded.

(3) Solids management

- Raw trimmings are sent for gelatine manufacture
- Green fleshings are deposited in landfill
- All wool from shearing at all stages of processing is recovered for washing/scouring and spinning for the manufacture of wool articles.
- Solids – mainly wool fibre residues – that are scavenged from the drainage systems before recycling floats are removed from site for composting purposes.
- Buffing fibre is deposited to landfill.
- Residue from solvent recovery after degreasing is incinerated.
- Trimmings after dyeing are sent for making small leather items.
- There are no splits from manufacture.
- Pallets are reused.
- Barrels and containers are taken by external providers for washing and recycling.
- Waste paper and bags are sold for reuse/recycling.
- Contaminated paper is removed from the site for incineration.
- Dewatered solids from effluent treatment are stored under secure conditions before going for incineration by a specialist company under government supervision.
- Other waste is segregated at source for recycling or licenced disposal.



Some hand spraying operations are performed, but these are mainly for development work.



The suede side is treated with fixatives in finishing to improve colour fastness. Both spray application and roller coaters fitted with a belt feed arrangement as shown are used.

(4) Water and environmental management

[a] WATER

18,400m³ of water was used in manufacture in the last 12 months, and this was all abstracted from bore holes. After effluent treatment to the standards set by Xinji City the water is discharged to the municipal sewage system.

[b] EFFLUENT TREATMENT

Wastewater treatment takes place in two stages in two separate effluent treatment plants. These were completed in 2014, the company being the first to establish comprehensive wastewater treatment approved by Xinji City:

- All of the wastewaters from the dyeing, retanning and fatliquoring processes are processed in a separate water treatment unit that was constructed at the same time as the main effluent treatment plant. In this operation the effluent



The discharged floats from dyeing, retanning and fatliquoring are treated separately in a dedicated wastewater plant. This is equipped with its own filter press to dewater the precipitates that are formed by chemical dosing.



The effluent treatment plant is monitored and controlled from a laboratory set adjacent the main effluent treatment plant. Ultimately, the effluent on discharge is sampled within a locked building accessed only by the municipality for independent analysis.

is first coarse screened, followed by microfiltration to remove any residual wool fibre. The balancing and homogenisation is assisted by air diffusion to prevent any solids settling, and the effluent then chemically dosed. In this stage the pH of the acid effluent is raised, with chemical dosing and polyelectrolyte additions specific to the residual dye content. After settling the sludge is dewatered using a conventional filter press in a building set alongside this plant. The supernatant is discharged from this first stage of treatment, and is then delivered together with the rest of the waste waters to the main effluent treatment plant.

- In the main effluent treatment plant the wastewaters are first screened, then balanced and homogenised with the mixing provided by diffused air. This is followed by pH adjustment and chemical dosing, then settling with continuous removal of settled sludge. The effluent is then subjected to a 24-hour activated sludge treatment operation, followed by conventional secondary clarification.

The supernatant is then subjected to tertiary treatment by applying a second chemical dosing and settling, and a further 24-hour activated sludge treatment operation and clarification.

The tanks used for the biological processing are mainly enclosed to retain heat in the winter months and to minimise wind-blown odour. All of the sludges produced are mixed together for sludge thickening, then dewatered using a pair of conventional filter presses housed in an adjacent building. The removal of the dewatered solids is assisted by a conveyor running beneath each press for delivery to dumpster.

This is an effective operation as, over and above normal considerations, a considerable amount of colour and organic material from aqueous degreasing, retannage and fatliquoring needs removing from an effluent with a comparatively low protein content.

The operation is monitored in a laboratory set alongside the effluent treatment plant, as well as by continuous sampling of the treated effluent. An unusual feature is that this sampling for external analysis is in a separate building that can only be unlocked and entered by the Municipal Authority. No access by the tannery is permitted.

[c] ENERGY

The energy consumed is electricity from the national grid, and heavy duty oil. ⚙️

finished products operation, making finished footwear as an outsource manufacturing partner of Deckers and other products such as rugs and other home textiles; in total, though, 90% of its leather goes into footwear and only 10% into homeware. The company's customer list is long, but more than 80% of business at the moment is with Deckers. To European or North American eyes, this may seem like having too many eggs in one basket, but

the Dong family is happy to continue with this set-up because Deckers is a good customer; business is going well, so Meihua sees no reason to change.

A foothold in Australia

Current production capacity at Meihua is 23,000 skins per day, which it sources mainly from the US and Australia, making exclusively double-face sheepskin leather. There was a time when it processed

kangaroo skins from Australia too but this was a somewhat short-lived venture and now all of the tannery's leather comes from sheepskin. Meihua has been sourcing dry salted skins from the US for 14 years and wet salted skins from Australia for 17 years. Kelvin Dong is based in Australia for ten months of the year, building up his company's relationships with major skin suppliers there. Around 75% of the skins come from Australia and 25% from the US.



The new main effluent treatment plant at Meihua Leather Co.Ltd.



Rugs made from Tibetan sheep with a characteristic long crinkled wool are a small component of Meihua production.

"Our tannery may be a little different," John Dong says modestly. "It's definitely true that UGG is the main customer for our double-face and that the main cost for us is the raw material. That's why we've set up our own company in Australia to have better control of raw material. My brother Kelvin runs it: he's the strategic one; I just handle production. We feel we have good control over this aspect of the business, and we do have 35 years' experience of producing double-face and 13 years of working with Deckers. We're together with them. We know what our main customer wants, so we can carry out developments with Deckers, as a partner more than as a supplier."

Even someone of Daniel Sánchez's experience has found the situation surrounding the market for sheepskins and other raw materials "difficult to understand" in the last year or so. He describes the phenomenon of previously highly valued

merino skins in his native Spain becoming available on the market for "practically zero" and still no one appearing willing to buy, and he says the garment leather market in Europe has "more or less collapsed", with Turkey and Greece working at much lower levels than in the recent past. Spain and Italy are also failing to take advantage for reasons he finds difficult to identify. Nevertheless, his company has also found it difficult to capitalise on the situation because it needs to source specific skins to meet the demands of its main customer. "The articles we are looking for are very special," he says, "and we have to fight for the right skins, which always pushes the price up. We have tried to find alternatives, in Europe and in Latin America, for example, but we need big skins with fine wool. It's a special product."

Slow processing

When this raw material reaches the

tannery, Mr Sánchez points out, Meihua cuts no corners whatsoever in turning it into double-face sheepskin leather. Drying, ironing, combing and other operations take place once before dyeing and are repeated once again after dyeing, making processing dependent on the skills of the company's workers rather than on automation and machinery and, as a result, slow. "I have spent years teaching the people here to take care," Mr Sánchez explains. "They are good people, with good knowledge and traditions in leather, and good skills, but with this material you have to work both sides with equal care. It's a very special raw material and it requires special attention."

He insists that Meihua has strong relationships with its suppliers and says this applies equally to chemicals and machinery. "We have good relationships with most of the main chemical companies," Mr Sánchez explains. "We don't feel cut off from them here and we are able to make it clear to them what we are looking for: consistency in the products and a good balance between price and quality." When he lists the names of these main chemical companies, they are all European, but he warns that some Chinese competitors in the leather chemicals market are developing quickly. "Some, but by no means all, have really got into gear and are starting to do good work," he says. Something similar applies in machinery; he regards the European and US machinery Meihua has already invested in as better than the technology available locally, but points out that some Chinese machinery suppliers are now exporting to Europe and appear to have a bright future in the global leather industry.

"Honesty is the key," Mr Sánchez says of the secret of maintaining positive relationships with these suppliers. "They do what we need, and always in the same way. We have had some less positive experiences with smaller suppliers in China, not bigger ones. For example, they offer you a cheaper version of a product you need, so you try it once and it's fine, but the second time you try it it doesn't work as well because the product is not consistent."

Next generation

The Meihua Leather technical manager has also been able to build up strong relationships with two important leather schools in China, those attached to the universities of Xian and Sichuan. At Sichuan,



in particular, he has had a lot of direct contact, helping for example to teach at summer schools there. He also has a very good relationship with Professor Bi Shi, an influential figure in the leather industry globally, and particularly in China, for many years. The professor is a member of the Chinese People's Political Consultative Conference (CPPCC) and the most prominent academic in leather chemistry and engineering at Sichuan. He is also a former president of the International Union of Leather Technologists' and Chemists' Societies (IULTCS) and the winner of that organisation's 2015 Merit Award. Chinese technicians are good and becoming better, Daniel Sánchez insists. "Younger people are coming through with good English and open minds," he continues, "and they are proving capable of being good technicians and good engineers. There was a time when the structure was very rigid and people here mostly just used to follow exactly what their teachers or their managers said. In the classes I teach, I have made it clear to the students that I don't have all the answers and that they should not do exactly what I say all the time. Instead, they need to understand things for themselves, they need to think and they need to keep an open mind. Students are changing. I have seen this. They now want to express their own opinions and to try things for themselves. There are a lot of overseas students, which helps, and their relationships with local young people are becoming closer, giving young people here in China something to compare themselves to. Change is always difficult, but the new generation of Chinese students are trying to change things and, of course, that's a good thing."

The ways in which these ties to the universities are helping Meihua Leather include participation, as students, in the summer schools by some members of the Meihua team, as well as university staff travelling to Xinji to offer hands-on training to the company's employees on the tannery floor.

Work-life balance

One benefit from working in a city with such strong connections to the leather industry as Xinji is that most of the Meihua Leather employees live in town and travel between home and work six days a week. Of the 1,600 people who work there, only around 50 have to live on site (because their



The company mission statement as displayed in the main entrance to the tannery.

homes are too far away). Human resources manager, Helen Zhang, explains that this does nothing to detract from the company's ability to arrange social activities, which include monthly birthday celebrations, with cake, for all employees who celebrate a birthday in any given month. There are twice-yearly excursions for everyone on the staff and regular sports activities at the tannery, with ping-pong and badminton the most popular competitions. Other projects have made an impact on the wider community in Xinji, such as a tree-planting exercise that the Meihua team carried out recently and trips to an orchard outside town to pick pomegranates in season for distribution to friends and neighbours of the company. The Dong family maintains close links to the local authorities in Xinji and has supported other social projects, including hospital visits.

A bright future for the best

With 200 tanneries in operation in Xinji now, the city still hosts around 20% of the entire Chinese leather manufacturing sector. The industry is of great importance to the local economy and among local people, in spite of the troubles of 2014, appreciation of leather is high. Chinese consumers want leather in their shoes, handbags, cars and homes and this appears unlikely to change. In truth, this is the case across most of China, Daniel Sánchez observes, but he points out that the leather industry in China needs to have exports in mind too. "And in export markets, what Chinese tanners need to understand is that consumer organisations can be very important," he says. "They

demand quality and transparency and we have to meet those demands. What would happen if consumer groups overseas began putting pressure on their governments to stop importing leather from China? It would be a big problem." He insists that the first thing tanners need to make clear is that they are in the recycling business, recycling a waste product from the meat industry to make something beautiful. He asks: "What would happen to all the hides and skins if tanners did not take them and turn them into leather?"

John Dong is optimistic about the future of the leather industry in Xinji. However, he is of the opinion that more closures will come. At the moment, half of Xinji's 200 tanneries work with sheepskin and the other half with bovine hides. Both types of leather are still in demand but Mr Dong thinks perhaps only 20% of Xinji tanners have a long-term future as producers of leather. "This means the best 20%, of course," he continues, "those who are efficient, keep control of their prices, maintain good strong relationships with customers and look after the environment: they will have a good future. Cheap, commodity leather will move somewhere else, to Cambodia, Vietnam, Bangladesh or perhaps western China, but it will not continue to be made in the traditional leather-making areas in eastern China. Environmental and labour costs are too high here for us to make a commodity product. What we will do here is continue to add value and to make a quality product, a specialist product such as our double-face. We cannot be in the commodity market; we do not want to be." ☺