



Soon after arrival, the splits are trimmed and sorted for further processing. ALL CREDITS: WTP



Jinan Luri Junda Leather Technical report

The Jinan Luri Junda Leather company is situated in Shuangquan, close to Jinan in Shandong Province, around 450 kilometres south of Beijing. Occupying a rural setting, the tannery sits on the site of an old brickyard, complete with original water tower, chimney and brick kiln. Founded in 1990, the tannery produces suede and finished splits for the footwear, glove and garment industries, with a production capacity of 50,000 square-feet per day. The tannery purchases most of its wet blue splits from JBS with these coming from that company's production facilities in Brazil, the US and Australia. First impressions are of a contrast between the style of the modern office buildings and that of the older original structures and features left behind from when the site was a working brickyard, dating back 50 years before the tannery

started. The site of the tannery itself measures approximately 50,000 square metres.

Manufacturing and Processing

Wet blue splits, mostly in the form of whole hides, are brought in from suppliers under two specific weight categories – 3-7kg and 7-10kg. In order to cover the 50,000 square-feet daily production, 100,000 splits per month are brought in. The splits are stored in a custom-built basement underneath one of the production buildings. Naturally cool and dark, the store has a capacity for over three months' production and was very well stocked during *World Leather's* visit owing to the current low prices.

Once taken from storage, the splits are trimmed and sorted. At this stage, the inspection criteria are based on veins, size and



overall appearance. Where practical, the shoulder section is removed from the hide to leave as large a butt portion as possible but in some cases the hides are sided. By using a single supplier for the most part, Junda can be assured of the consistent quality of its raw material and, as such, its processing can be tailored to this.

To this end, there is no need for rechroming to be carried out. After an initial soak, the splits are sammed to an approximate moisture content of 45% and then taken for splitting on one of the company's two splitting machines. Splitting thickness will alter for different end-products but for shoe uppers, which account for almost 95% of the production, the splits are taken down to 2mm prior to shaving at 1.4-1.6mm. All the waste materials from the splitting and shaving operations are bagged up or boxed and sent for leather-board production. During the splitting operation, any viable splits will be processed and used for industrial glove manufacture. Splitting and shaving machines are from domestic suppliers.

In the dye house, 30 wooden drums, all of which are 3m x 3m, are used to process 1,000kg loads. The drums are loaded from a mezzanine floor with chemicals that have been prepared in the chemical holding area. The stock holding of bulk chemicals is drawn from on a daily basis and for the individual processes, the required chemicals are weighed and bagged up. Using cut-down intermediate bulk containers (IBCs), the chemicals are transferred to the drums by hand carts and by fork trucks to lift the IBC bottoms up to the mezzanine drum-loading floor. The water for the processing is distributed via an automated dosing system, with the heating of the water coming from solar heating modules on the roof of the tannery.

After retanning, dyeing and fatliquoring, using a combination of domestic and European chemicals, the splits are loaded onto pallets to allow for some drainage before the drying operation. Given an initial light samm-set to remove some of the free water but also to flatten, the splits are then slicked onto steam heated stainless steel A-frames. Thirty-three of these in-house designed and manufactured drying frames take care of drying the majority of the smaller splits, with the water vapour allowed to escape due to the well-ventilated design of the building and fans placed above the units in strategic places to dissipate the steam.

A five-table vacuum dryer is used for initial drying of the splits that are too large to be accommodated on the frames. Once removed from the A-frames, the splits are hung on a hanging chain conveyor and taken around the roof space for final drying. At the point of being hung on the conveyor, they first pass through what was the old brick kiln, now converted to a heated drying chamber. In the winter months, where temperatures can drop as low as -10°C, this chamber can be heated to between 70°C and 80°C. During the spring and in particular the summer months, where temperatures can reach as high as 40°C, the ambient temperature in conjunction with the arid climate, is sufficient to dry the leather completely.

Once dried, the dyed splits are stored in piles according to their product type and colour, to await further finishing. For the majority, this will be for suede, but a certain proportion will be pigment finished for safety boot uppers. Over time, a proportion of the 50,000 square-feet capacity will be moved towards more high-value products and through working closely with



Dyed splits are dried out on heated frames. The open nature of the buildings allows air movement to assist evaporation.



Dyed splits undergoing final drying on one of three 300 metre hanging chain conveyor. The conveyor is used for both drying dyed crust and also airing off pigmented splits.



The original brick kiln has been redesigned to be used as a drying chamber. Being approximately 20 metres wide and 50 metres long, the top of the kiln acts as a storage area but also houses the vacuum dryer condenser where the extracted moisture from the drying operation is reused.



One of the original brick yard buildings. Originally used as part of the administration offices when the tannery first opened it is now used as a storage area.



One of the two sets of membranes used for the end of pipe effluent treatment. The sight glasses show the clarity of the treated water. Prior to discharge, the treated wastewater is automatically sampled and tested by the local authorities.



A bank of nine 24" Deep throat buffing machines. The lack of dust is evidence of the efficiency of the extraction units. The area was built in 2014 and underneath it is housed the storage basement for incoming splits.

customers, chemical suppliers and partner universities, novel products are being researched and produced. To this end, a new waterproof nubuck product has been made, offering the customer improved waterproof properties whilst achieving cost savings compared to the alternative supplies.

For suede production, the splits are first softened by dry milling. For this process, the preference is for the use of octagonal milling drums as opposed to traditional cylindrical ones. On completion, the splits are taken for buffing. With a bank of nine 60-centimetre throat-type buffing machines, the flesh side of the suede is initially prepared to remove extraneous flesh and veins. Following this operation, the splits are transferred to one of seven lightening buffers, all connected to their own independent double air knife and extraction unit. The buffing operation, both for flesh and suede sides, is carried out using 220-grade grit paper.

For shoe upper material, the splits are pigment-coated with a roller-coater and, after passing through a short bank of drying cells, are placed on overhead conveyors to fully dry. From here they undergo embossing and final spray-coat finishes.

In the finishing department, three spray-finishing lines are used to finish the leathers. Two of the lines are dedicated to the pigment-finished splits while the third is used for the suede finishing. The finishes to be used are kept in a well-controlled store. The majority of the finishes are from domestic sources but where the company uses European materials, these are purchased from local agents.

Waste management:

- Splits sold for industrial leather glove production
- Featherings (friable splits) are sold for leather-board manufacture
- Shavings sold for leather-board production
- Wooden pallets broken down and sent for chipping
- Plastic barrels rinsed and reused or returned

Reuse and recycling

All of the wastewaters from processing are sent to a state-of-the-



The well organised chemical store is stocked with dyes, syntans and oils from both domestic and European sources. Being fully air conditioned, the stores are well equipped to deal with the seasonal temperature changes thus allowing the contents to be stored in optimum conditions. The level of stock holding seen is sufficient for approximately two weeks.



art wastewater treatment plant on site. Through biological treatment, settlement and reverse osmosis membranes, the process water is cleaned to such an extent that it can be reused for early parts of the processing and also for watering the internal gardens, washing down, road cleaning and even in the lavatories. After treatment in the company's own wastewater treatment plant, there are checks to make sure the wastewater meets effluent standards; unused treated water is discharged. Prior to discharge, the treated wastewater is automatically sampled and tested by the local authorities.

Energy and water

The energy for the plant comes from the national grid with natural gas used to fire the boiler. All water for production is drawn from an aquifer. Solar energy is used to heat the process water and the tannery is in the process of increasing the number of solar heating modules it has. The solar heating system is used by the government as a model of good practice to show interested parties how such technology can be used most effectively. ☺



The tannery operates a fully functioning workshop on site where certain machine parts can be fabricated. They also re-blade their own shaving cylinders having brought in the spare blades.



Used barrels are all held in one central area. Having been emptied of their contents through process, the barrels are washed out and reused or returned to the manufacturers for refilling.



A pilot scale tannery has been built in a new building block that also houses the laboratory. This building will include further trial tannery arrangements plus more laboratory and teaching space.



The three storey administration block houses various offices, meeting rooms and board rooms. In this room, technical sessions are held every Saturday morning by chemical company representatives and by visiting professors from the local Qilu University of Technology to further improve the knowledge and understanding of the work force.



Biological treatment of the vast wastewater effluent treatment plant. These tanks constructed above ground are 15ft tall. The building in the background with the open roof is where filter cake is stored to further dry before sending off site for treatment.