



## Tannery of the Year: JBS Couros, Itumbiara, Goiás, Brazil

*Six years ago, JBS had no tanneries: now it's the largest producer of leather in the world. This achievement has come about through acquisitions, and then through careful planning, restructuring and investment in innovation. The tannery at Itumbiara is one of the clearest examples of the speed and the scope of the progress that the group's leather division, JBS Couros, has made.*

It's easy to forget that, while JBS is, in its own words, "the leading producer of protein in the world", with a daily slaughter of more than 80,000 head of cattle at its meat packing plants in Brazil, the US, Australia and elsewhere, it is a newcomer to making leather. Nevertheless, across its 25 tanneries, its leather division, JBS Couros, now employs 10,000 of the group's 185,000 people. JBS Couros came into existence in 2009 when the group acquired Bertin, tanneries and all. It took the step out of a commitment to add as much value as possible to the material it produces and, in the space of five years, it has become the largest producer of leather in the world.

Of these tanneries, 19 are in Brazil, where the group has its headquarters and one of the 19, the plant at Itumbiara in Goiás

state, is the subject of this Tannery of the Year report. It was in this state, in Anápolis, that the JBS meat business began in 1953, although back then it had a slaughter rate of just five head of cattle per day. The history of the Itumbiara tannery is shorter, but still interesting. Production began here in late 2002 under the ownership of another company, Braspelco, which was once the largest exporter of leather in Brazil, but ran into difficulties midway through the last decade, leading to its acquisition by Bertin before Bertin, in turn, was acquired by JBS in 2009. Bertin had run the plant until 2007, but then had mothballed it.

Within two years of setting up JBS Couros, the group had carried out a full review of its network of tanneries in Brazil and decided to make the Itumbiara site one of only five to focus on crust and



finished leather. The other 14 facilities around the country produce wet blue and are mostly located close to JBS abattoirs. The company said in 2011 that it had already invested more than \$60 million in making its finished leather tanneries, including the Itumbiara site, as up-to-date as possible in terms of the tanning machinery and other technology installed. JBS Couros marketing and sustainability manager, Fernando Bellese, who was part of the Braspelco team that ran the original Itumbiara tannery, says now that JBS worked hard to build the site up after taking it over. "It's not just about the facility," he says. "It's about the knowledge and the skills of the people who worked here, bringing those in, and then adding value yourself."

The company carried out its 2011 review because it believed putting its network of tanneries on the most efficient footing possible was essential. Efficiency savings will help it pay for its investment in technological innovation, and a more coherent set-up will help it continue to grow its leather division. In 2013, Brazil's herd size was 193 million head of cattle, and the slaughter rate was 42 million head. JBS Couros's projection is that Brazil's cattle slaughter will go up to 52 million by 2020.

## A furniture focus

Itumbiara is already working at full capacity, processing 220,000 hides per month to crust and finished leather. More than 85% of production goes for export. At Itumbiara, the main focus is on producing crust for automotive leather and finished leather for furniture upholstery. Big-volume sofa producers are prominent among the customers. "We are set up for big volume," Fernando Bellese explains. "We are well suited to work with big companies that want continuity of supply." His colleague, Luis Costa, who is the commercial manager of the Itumbiara tannery, says there are some indications of demand for furniture leather going down, but insists this is not a problem. "We can use the same hides for automotive leather," he says. Mr Costa adds that demand for chrome-free leather is going up; between 10% and 15% of the crust Itumbiara produces at the moment is chrome-free; a year ago the proportion was under 5%.

All of the wet blue the tannery brings in is from JBS wet blue plants and all of it is made from Brazilian hides, around 75% of which come from the Zebu breed of cattle, famous



*There are a number of areas for taking lunch breaks within the JBS Itumbiara site.*

for its hump. "All of the bluing units manufacture using the same recipe and the same production process," Mr Bellese continues. "There can be differences from place to place, but after retanning, we are able to achieve a high level of consistency."

Much-travelled, and a keen participant in a number of international leather sector groups, Fernando Bellese says he is aware of criticism of JBS Couros in the wider industry because of a perception that JBS's vertical integration (from abattoir to finished leather) "distorts the market". He points out that the leather division may have first option to buy hides from the group's meat plants in Brazil, but that it has to pay the market rate for any material it buys. "We do buy almost 100% of the hides the meat division produces, but we only want JBS Couros to be successful as part of a successful leather industry," he says. "And we believe it's important to share what we are doing and to work transparently, through our involvement in international organisations, in independent audits and in environmental and social monitoring." The different divisions in the group run independently, he continues, and they all aim to produce good results. Like any meat company, it's important to JBS to sell its hides to increase its margins, just as it would on the open market. He acknowledges that to have the first option to buy this material

is an advantage, but is adamant the business runs in the correct way.

## Innovation in action

With 70,000 square-metres of space, a commitment to innovation, a powerful parent company and very large production volumes, there is, naturally, a high level of interest among suppliers of chemicals and machinery in what is happening at Itumbiara. It's not uncommon for senior executives from European-based companies to base themselves in the tannery for days at a time to observe workflows and watch at close hand as technicians try out new ideas. The plant employs almost 1,500 people, but there is a very high level of automation on the shop floor, including adjustable platforms with robotic control from Feltre, and several units of the same company's angled, high-speed hide selection device, the Viewer.

Amid this new technology, older, but clever, ideas are also on show. For example, there are sewing machines on the line after splitting, whose purpose is to allow an operator to stitch (neatly, but only temporarily) the holes humps leave in Zebu hides when cut away (see technical section). Commercial manager, Luis Costa, explains that tanners' battle with the Zebu hump is a long-standing one. In earlier times, a team



### From a technical point of view

#### (1) Overview of operations

JBS Itumbiara is located on the outskirts of the city of Itumbiara, being one of 25 JBS leather producing plants globally, 19 of which are in Brazil. This tannery began manufacture under different ownership in 2003, but JBS purchased the plant after two years of closure and recommenced manufacture in 2009.

The tannery processes 220,000 hides per month (10,000 hides per day) from wet blue and wet white at a 90:10 mix to the crust state. At present 60% of this production is for automotive leathers, and 40% for furniture leather. Half of the production is sold as crust leather, the remainder being finished as furniture leather. At the present 1,496 people are employed at this site, with approximately 40% of this team being women.

#### (2) Manufacture and processing

The wet blue leather supply to JBS Itumbiara is from five separate JBS wet blue plants. The hides are mainly Zebu type, and all are delivered chilled less than 24 hours after slaughter to these units. There is an even balance of intake from these units and the processes used are the same, although there are some slight amendments to account for some machine differences to ensure a standard input.

Apart from the massive size of this plant, the striking feature is the way that hides are transported between machine operations throughout wet operations. These systems are manufactured by Feltre, and result in a rational and efficient flow. First the hides are loaded in batches of 400 hides into six wetting back drums of 4 x 3.5 metres, for a one-hour soak. They are then dropped onto a delivery chute set beneath each drum to transport the hides to a stainless steel collection trough set along the rear of these vessels.

Here, hides are clipped onto an overhead chain conveyor system that delivers the hides for through-feed samming. Out-feed is onto a conveyor that raises the hides over the top of a stacking unit for inspection into six levels of quality grading.



The robot delivers the load onto a holding station set next to the splitting machine before being transferred by the conveyors onto the jack. The load is rotated 90° for presentation, height adjustment and angled to optimise handling.



After a one hour wet back, the wet blues are dropped onto a stainless steel chute fitted with a conveyor to move the load forwards into a reception trough. They are then clipped onto a chain conveyor for delivery to the samming operation



After samming, hides are delivered by belt conveyor for inspection, then automatic delivery to four grading platforms beneath the inspection unit that self-adjust for height. They are also fitted with conveyors that enable a load when complete to be moved forwards onto a holding station.



When required, a load is moved by conveyor from the holding station onto a robot set on rails. This robot can swivel the load, and automatically deliver the goods to the designated splitting operation.



The graded hides are then automatically stacked onto individual platforms located within the stacking unit. Each platform is fitted with a conveyor belt, and when a load is complete it is transferred onto an identical platform set alongside the stacking unit that serves as a holding station as both conveyors move the load forward with synchronised movement.

When a selected pack is required for splitting, a robot moving on a rail track built into the floor locates itself adjacent the holding station, with conveyor transfer onto the robot. The robot then automatically delivers the load onto a jack that presents the goods in the most effective way for the splitting operation. There are four identical lines as described, set side by side, operating in two shifts with 211 team members.

Shaving operations are similarly managed by using five Rizzi and two Flamar shaving machines. After shaving the hides are transported over the top of these machines onto a horizontal conveyor where they are blue trimmed. This is followed by an innovative operation where the characteristic Zebu hump is trimmed from the hide. This is carried out to leave two cut edges that can be aligned, then stitched together to create a flat hide. This provides an advantage in dyeing and retanning processes as tangling is reduced, and there is better circulation of chemicals within the batch. It also means that tension applied in subsequent machine operations and the stresses that develop in drying are more uniform. Both the uniformity and shape are thus improved.

Dyeing processes are performed in two rows of drums set on opposite sides of a central mezzanine and chemical storage area. One row comprises seven conventional wooden drums fitted with shelves and manufactured by Michelin that process up to 700 hides per load. A more recent installation of a second row of seven Hüni deep-shelf drums is used for processing loads of between 200 and 500 hides.

The weighting of dyes and other chemicals is determined by Hüni computer management. The weight of each chemical is displayed on the balance, and the manual addition of chemicals onto the scales is supported with an alarm that gives warning of any incorrect weighing. Each bag of powder chemicals is then identified with a barcode that records both the operative and the batch number of the chemical for traceability. As each chemical is added according to the process requirement, these are hand-scanned by the operative to ensure that the chemicals are added to the designated drum in the correct order and time. All liquid chemical and water additions are computer managed.

There is also a pilot plant fitted with six drums that can process between one and 30 hides for development work and small-scale loads.

There are four identical toggle drying lines fully equipped with machine linkages. Each line comprises a samm-setting machine, which is supplied with hides clipped and suspended from an overhead rail system. On out-feed, the hides are wet stretched and staked, then toggle dried using modified drying units that incorporate heat recovery systems and provide 35% energy savings.

Two other identical lines provide samm-setting, wet stretching-staking, vacuum drying, wet stretching-staking, and drying using Cartigliano tunnel drying conditioning units. After drying the hides have the hump stitching trimmed away, before vibration staking and trimming. A stucco application is performed on a conveyor line, followed by buffing. There are



*After shaving, the hump area typical of Zebu-type cattle is trimmed from the hide, then the two cut edges are sown together. If a hole has developed, a piece of off-cut is stitched into place to create a complete flat hide. This stitching is trimmed away before conventional staking.*



*Part of the line of seven Hüni deep-shelf drums in the dyeing department. Seven conventional wooden drums of 4.0 x 4.0m by Michelin are placed on the opposite side of the service mezzanine.*



*After dyeing the load, which can weigh up to 7,500kg, is dropped into a stainless steel container. Once tipped onto the floor adjacent the samm/setting machine, the hides are clipped on to a chain conveyor for delivery to this operation.*



seven identical lines dedicated to these operations.

After inspection, finishing is managed on seven double cabinet spray lines fitted with steam drying cabinets. One of these is equipped with a roller coating machine that can be moved into position using rail tracks as required. There is a second roller coater, but this is not linked to a drying line and is used for oil applications. On spraying, the fiftieth hide of each batch is measured visually for colour across the whole hide under standard light, and one hide in every one hundred measured for colour using a spectrophotometer.

There are also five Mostardini embossing machines and one Bergi rolling machine. For textured effects and softening leather there is a row of 11 Italprogetti milling drums, and a second row of 11 Erretre milling drums.

Each hide carries two identification codes: the first is stamped at the wet blue plant to identify the slaughterhouse of origin, the wet blue plant and the date of tanning. The second stamp provides a link to processing detail within Itumbiara for full traceability.

### (3) Solids management

- Shavings are being deposited to landfill, but part is being treated to create hydrolysate and recovered chromium. This recovery plant is undergoing development to receive shavings from the whole tanning group in Brazil, and is already providing hydrolysates for fertilisers and chemical products. The recovered chrome after processing is being used within the dyeing industry and new chrome products. Wet blue trimmings are being deposited in licensed landfill.
- Crust and finished leather trimmings are sold and used for small leathersgoods.
- The sludge from the tannery is deposited to licensed landfill.
- Wood and broken pallets are being chipped and used on site as bio-fuel.
- There is segregation of the different solid wastes, but in addition, the workforce is encouraged to bring domestic waste from home to the factory to ensure the best options for recycling.

### (4) Water and environmental management

#### [a] WATER

The water used for processing is abstracted from the nearby river. Targets are set within each department for water use, with incentives for meeting these targets. At the present water consumption stands at 36 litres per kilo of wet blue processed.

After chemical dosing within effluent treatment, the water – which contains both nitrogen and phosphorous – is sprayed onto four areas of farmland each of 32 hectare near to the tannery. Soil samples are taken across these areas and analysed for the N:P:K balance and calcium and magnesium so that any nutrient amendments can be made if required. Soil from 40 sampling points, each at 0-20, 20-40 and 40-60 cm depths are taken at each area and analysed for N:P:K values, calcium and magnesium, and electrical conductivity (EC) for sodium. Groundwater is also sampled at 18 metres depth at 27 locations for EC as part of environmental control.

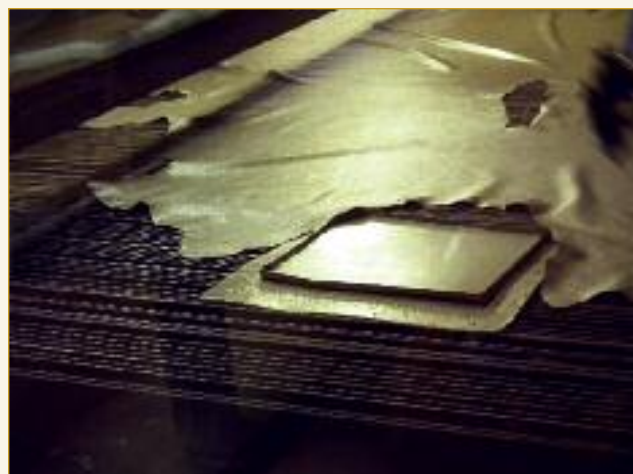
Adjacent this grass land, JBS employees have planted a mix of 5,000 indigenous trees towards a total of 13,000 trees. This is with approval of the landowner and funded by JBS.



*There are two rows of tumble drums in JBS Itumbiara as part of finishing operations.*



*Hides being offered to one of the seven identical spraying lines.*



*As part of control, samples are placed in a tray and passed through the spraying unit at the same time as a batch undergoing spraying to measure the weight per area of finish application.*



*Within effluent treatment, after chemical dosing, solids are removed from the surface of flotation units. Rotating scoops, as shown, are used to remove these solids before dewatering by centrifuge.*

## b) EFFLUENT TREATMENT

All of the wastewaters discharged from the tannery are coarse screened, then delivered to the effluent treatment plant set within farmland at approximately 3km from the tannery.

The volume for treatment is 1,500 m<sup>3</sup> per day, and on receipt is held in a collection sump of 400 m<sup>3</sup> capacity. Mixing is provided by aeration, and the effluent is abstracted for dosing with lime to pH 9.0-10.0 and coagulant and polyelectrolyte. The precipitates created are removed using two flotation units operating in parallel. Because of the size of the collection sump, the effluent is checked every hour to ensure the most effective dosing



*Instead of biological treatment and discharge, the effluent is used for land irrigation. Rich in nutrients, four areas totalling 128 hectares are sprayed from rotating irrigation lines onto grassland adjacent the tannery.*

levels. There is no biological treatment: this is in order to retain nutrients for land irrigation. The treated effluent is delivered to a 4,000m<sup>3</sup> holding sump which serves as a reservoir for the irrigation system.

## [c] ENERGY

All of the energy required for heating and drying purposes is provided using a wood burning steam generation plant. The pre-cut logs consumed are provided from licensed and approved sources. In addition, broken wooden pallets and waste wood is chipped and used as fuel on a second stand-by boiler. Emissions from the boiler and from ducting within the tannery are monitored by an external company. Ⓢ

from the facility set up an informal organisation called Amigos do Cupim (Friends of the Hump) and travelled to supplier abattoirs to try to help improve workers' ability to take the hide off a slaughtered animal with minimum damage. "People still visit abattoirs," he says, "but the 'association' doesn't exist any more."

More investment in technology will come in the years ahead, the company insists. As suggested above, the volumes that need to be processed are on the increase and the Itumbiara tannery's customers are, like everyone else's, demanding. "Not all of the projects are big, though," Luis Costa continues. "For example, we are also investing in some smaller software projects for time control and that kind of thing."

## The importance of being traceable

There is another advantage for JBS Couros in belonging to a powerful packer firm: traceability. An alpha-numeric code is stamped onto hides at raw stage and goes

all the way through to finished leather. It identifies the slaughterhouse and the date of slaughter, which makes it possible to trace the group of farms from which the abattoir sourced cattle that particular day. It's true that most tanners can trace back as far as the abattoir, but it would be unusual in the leather value chain for abattoirs to share with tanners information about the farmers they buy from.

Traceability is a serious subject at JBS Couros. Its 'responsible sourcing' strategy has several strands, but its main objective is to make sure the cattle it buys for its meat packing plants are from sustainable sources. This involves careful monitoring of data compiled and made public by Brazil's ministry of the environment to make sure any farmers involved in illegal deforestation or social conflict supply no cattle to JBS. "The ministry has a blacklist," Mr Bellese explains, "and our purchasing system captures the data every day. Any supplier who appears on the list is automatically banned. Our

purchasing team would not be able to source cattle from these suppliers even if it wanted to because the system will not let them." To illustrate the point, he says that just over 3,000 farms on a list of 70,000 that feature on this supplier database were blocked between January 2010 and December 2013. "Farms can be unblocked, but to achieve that, the farmer has to sign up to a programme of good practice with the government," Mr Bellese continues. "It's very strict."

## Land and water

The wider JBS Group has a division dedicated to environmental best practice across all business units and this division, JBS Ambiental, has, naturally, taken a keen interest in helping the tanneries reduce the impact they make on the environment. Separately, JBS Couros has its own environmental team, responsible for a series of initiatives at Itumbiara including one to produce organic compost using residues



*Leathers for dispatch in both the crust state and finished condition are similarly packaged. Tubes are used to form a compact form to the batch, and to prevent creasing damage on folded edges.*



*Pre-cut logs from renewable sources are used as fuel for steam generation. Wood from packaging and damaged pallets are also chipped and similarly used.*

from tanning processes. Nutrients in the form of nitrogen and calcium from sources such as liming baths are going into an irrigation system that is in use on farmland surrounding the tannery, with four spraying units covering around 30 hectares each. For

this project, the company uses the term "fertirrigation", to indicate that it's much more than just water that is going into the soil and the crops. So far, analysis suggests a 25% improvement in crop yields from these fields, a substantial benefit for the farmer for

no outlay, almost enough to have farmers the world over beg leather producers to set up tanneries beside their land. It's a system whose origins go back ten years, to the Braspelco days, suggesting that any possible detrimental effect to the soil or on crops would have come to light by now. "The results have been extensively tested," says Fernando Bellese. "It's being monitored closely by the state and federal environment agencies, and we are running our own tests too on soil and water samples. It has worked well on soya and on reforestation projects involving eucalyptus trees. Another area of land has shown a big improvement in its yield of a type of grass that burns very well and which we are using to heat water for the tanning production process."

The effluent treatment plant, which is three kilometres from the tannery and completely surrounded by farmland, was in working order when JBS acquired the facility in 2009, but the company has since spent around \$1.3 million to improve it.

Other improvements at Itumbiara include a 17.3% decline in the amount of water required to process a kilo of raw material from wet blue to finished leather: the figure currently stands at 36 litres of water per kilo. Ideas from around the JBS Couros network of tanneries that are ripe for emulating include capitalising on renewable sources of energy, such as rice husks, shells from cashew nuts and tallow from its own production processes in its boilers. Separately, a wet blue shavings recycling plant at Campo Grande in Mato Grosso do Sul won the Kurt Pulitzer Prize for Technology in 2013, an award promoted by the Brazilian Chemical Industry Association, ABIQUIM. The winning project was one in which a hydrolysis process separates protein from chrome in wet blue shavings. The protein, in powder or liquid form, is sold as raw material to chemical companies for use in the manufacture of new products for the leather industry, while the extracted chrome can be reused in the tanning and retanning processes, or sold to other industries.

Perhaps a further advantage of being part of such a big group is that the mechanism is in place for JBS Couros to publicise successes such as the Kurt Pulitzer Prize win last year. Fernando Bellese is pleased about this. He says: "We need to start telling our stories. Examples of bad practice in an industry like ours get lots of attention, whereas, until recently, positive stories were hardly seen.



The more companies share their good news, the better, but it would be best if the leather sector as a whole worked on this. This is a very particular industry; leather is noble and sustainable, but has a bad reputation in many people's eyes, often because of things that used to happen in the past." His feeling is that tanners have, traditionally, been reluctant to try to talk directly to consumers or to engage in debate. However, because of "the way the world is now", there is a need to communicate and to engage. "This is happening," he acknowledges, "but we need to move more quickly; we need to work together on research and on the promotion of leather. There are initiatives, but if tanneries don't engage, the initiatives will prove not to be strong enough, I fear."

## A way of life

As befits a human resources manager, Fernanda Rocha believes that sustainability starts inside the Itumbiara tannery's own four walls, and with its people. Some people initiatives are local, others are group-wide, and the examples are wide-ranging. A package of household cleaning materials is a regular prize for workers with the best attendance records. "It's just an extra help for people," Ms Rocha says. In the same way, every time a new baby is born into the families of the workforce, the company offers a gift of baby products. "The average is eight new babies a month," she continues, "and our interest begins well before the birth. We have a programme to help expectant mothers understand matters of health, for the mother and the baby. We want to help make sure she goes for all her pre-natal checks at the hospital, and to encourage her to take care of the baby and of herself. We have an onsite nurse who works hard on this and one thing I have seen is that a very strong bond forms between the nurse and the workers who have babies."

Once a month, all employees with an impending birthday get together for a joint celebration with the Itumbiara management team. Separately, team-leaders choose the best performing people in a given month to have a celebratory breakfast with managers. Ms Rocha describes this as a great opportunity to hear what the front-line workers have to say, and good ideas have come from this. A recent example is to publish a monthly JBS Itumbiara journal, with articles and useful information, to which everyone on site can contribute.

There is an internal initiative to offer apprenticeships to 16-22-year-olds, either in administration or production roles. It's a two-year apprenticeship, but can represent a strong start to working life for these young people. Fernanda Rocha takes it as a compliment that a substantial number of the 54 apprentices learning skills and gaining confidence at the tannery at the moment are the children of current employees. Also along these lines, rewards are in place for employees to recommend a friend or family member for recruitment, and there is an internal mentoring initiative, opportunities to learn English and other educational activities.

Contact with the local community has included involvement with a local charity that gathers food and clothes to distribute to the needy, plus JBS staff going into schools with the local water authority to talk to the children about the need to preserve water. The tannery also hosts a folk festival every June, for which people come in traditional dress for celebrations of

local music and dance, accompanied by local food. Residents of a nearby home for older people also attend, displaying (and selling) craftwork they make using leather trimmings donated by JBS Itumbiara. All of this has built up in only a few years. "There is a spirit of generosity," Ms Rocha says, "but I think that's part of our culture. Brazilian people are generous."

Fernando Bellese says JBS Couros views Itumbiara as a living link between the ancient activity of raising cattle for meat (and using their hides as a by-product) and the future, using the newest available technology to produce leather in a sustainable and responsible way. "But it's also our passion," says Luis Costa. Another colleague, general manager of the Itumbiara plant, Ramon Torres, says that producing leather in this way is what gives the people who work in the tannery "tesão", which, he explains, is an informal Brazilian word equivalent to "mojo" or "drive". It's a way of life. 🌐



## Control and Accreditations

### LABORATORY SERVICES

There are two laboratories at the JBS Itumbiara site, providing both chemical and physical analysis. All packs are tested according to customer and in-house standards. Chemicals received are also checked against standard samples for conformity, and are only released for processing following laboratory approval.

### APPROVAL AND ACCREDITATION

- ISO 9001 – 2008 certified in 2012
- Leather Working Group Gold Award with Grade A traceability