



Careful inspection of sheepskins at wet blue selection.

Tannery of the Year: Dire Tannery, Addis Ababa, Ethiopia

Now a diverse industrial group, Dire Industries' beginnings, as well as its heart and soul, are in the tannery it acquired on the outskirts of Ethiopian capital Addis Ababa in 1972.

In the early 1970s, Bedada Chali fulfilled an important ambition. After years of trading hides and sheepskins in different parts of Ethiopia, first working for an uncle and then on his own, a small tannery became available for purchase eight kilometres from the centre of Addis Ababa and he made his move. This facility, the Dire Tannery, which these days processes 600 cattle hides and 5,000 sheepskins per day, prides itself on being a pioneer, having been one of the leaders in the Ethiopian leather industry in moves from semi-finished to finished leather and from primary treatment to secondary treatment of effluent. It's part of a wider group now, Dire Industries, which has various other strings to its bow, including a second tannery at Modjo, a footwear manufacturing division and

even a farm that cultivates flowers.

Upon taking over the Dire Tannery, Mr Bedada was the only Ethiopian business figure to run a tannery in Ethiopia at the time; he specialised in making belt leather for the local market. There were other facilities in the country at the time, but their owners were from Armenia, Greece, France and elsewhere. Mr Bedada's son Elias, who today is deputy general manager of the Dire Industries group, recalls vividly that many of the operations at that time were carried out by hand. There was great upheaval in this period of Ethiopia's recent history, with Emperor Haile Selassie I being deposed in September 1974 by a communist regime, which moved quickly to nationalise most manufacturing



operations in the country. When government representatives came to Dire Tannery to inspect it and take it over, Mr Bedada was able to convince them that the facility was too small to be of interest to them and they let him continue; the rest of Ethiopia's leather production was nationalised with the Dire facility remaining as the only privately owned tannery in the land "throughout the 15 years or so" that passed before, in the words of Elias Bedada, things returned "more or less to normal". By the 1990s, private companies were coming into the Ethiopian leather sector again and now all tanneries are privately owned. For its part, Dire Industries became a limited company (with shareholders) in 1993. "We used to export raw hides, then pickle and now it's finished leather," Elias Bedada says. "This has been a long journey, but we are now surrounded by professional, well qualified people. Our team works hard."

An important part of this team is his younger brother, Biniyam, who is now the manager of Dire Tannery. Young, intelligent, hard-working, US-educated and with an international outlook, he has important ambitions for the tannery's future and has a clear understanding of how important this part of his father's business empire remains to its founder. "The tannery is still my father's passion," he says. "There are probably parts of the group that he visits only a few times a year, whereas it's rare for him to allow a week to pass without coming here. It's in his blood. He always knows what's going on here and what needs following up. He keeps up with what's going on around the global industry too and wants to keep travelling overseas to see developments for himself and expand his knowledge further."

Because primary treatment is not enough

Biniyam Bedada says his father's main driving forces are his passion and determination, adding: "He wants to push the tannery to maximum capacity and work in a way that shows we care for the environment, for our workers and for our neighbourhood." Ten years ago Dire Tannery was one of a group of five facilities in Ethiopia that secured a grant from the United Nations Industrial Development Organization (UNIDO) to set up primary effluent treatment on site, with Italian



Former Ethiopian prime minister, Meles Zenawi (left), presents Dire Tannery founder, Bedada Chali, with an award for performance in exports.

tanning technology provider Italprogetti supplying much of the equipment. Dire's founder quickly set about extending this to carry out secondary treatment on site too. This is important because the Ethiopian government has made it clear it wants all tanneries in and around Addis Ababa to relocate to a purpose-built site in Modjo, about 80 kilometres to the south. The new site will have a common effluent treatment plant. "The environment ministry wants that move to happen immediately," Biniyam Bedada explains, "while the industry ministry wants to find funding first to help construct the treatment plant. Everyone agrees we have to move; it's only a question of when. The environment ministry is very strong because we have a lot of emphasis here on having a green economy."

Nevertheless, Dire Tannery still harbours some hope that if it can achieve the same level of environmental performance by carrying out secondary treatment effectively at its current location, the same as it would be able to achieve in Modjo, it may be able to continue producing leather there. If not, it will move; Modjo, after all, is already the location of the group's other tannery. "Government in Ethiopia can work very quickly," the tannery's manager says. "If it takes a decision, the decision's made and you have to move on."

Abattoir rota

Dire Tannery still works with hide and skin traders with whom Mr Bedada began building up relationships decades ago. A devout Muslim, he woke up in time to say the first prayer of the day before sunrise, but instead of going back to bed afterwards, he went immediately to the marketplace to start picking up skins and trading, stealing a march on the competition. "Later, he understood how important it was to operate internationally and, therefore, that there was a need to learn English," Elias Bedada says. "So he got into the habit of getting up even earlier, at about three o'clock, to listen to language tapes and learn English."

A great deal of Ethiopia's slaughter remains informal, with people carrying much of it out in their own backyards. The major cities have abattoirs, but even the one in Addis Ababa, a city of four million people, only has a daily slaughter capacity of 800 head of cattle and there is a complex rota system in place for distributing the hides among the 12 different tanneries that operate there. They each take turns to take the hides from capital's abattoir for ten days at a time. If your turn coincides with a period of fasting and low meat consumption, which are more frequent for Ethiopian Orthodox than for most other Christian communities, it's



From a technical point of view

(1) Overview of operations

Dire Tannery is situated at the original site where manufacture began in 1972. Once open countryside, the tannery is now surrounded by housing and other industries. Manufacture has expanded step by step from belting leather for local use to the manufacture of indigenous hair sheep and bovine hides into a full range of leathers.

The daily input stands at approximately 600 bovine hides and 5,000 sheepskins. This produces weekly around 80,000 square-feet of bovine leather for shoe uppers, and 150,000 square-feet of sheepskins. Of this total, 50% is for shoe upper leathers and 15% linings, 30% gloving and 5% garment leathers. Most of this leather is finished, but there are sales of both bovine and sheepskin in the wet blue state to local tanneries. The tannery employs 480 people.

(2) Manufacture and processing

Approximately 30% of the bovine hides are received from the main slaughterhouse in Addis Ababa, the remainder from all across the country. These hides are sorted into two grades – tannery run (TR) and rejects – then salted and stacked down.

Sheepskins are also received from the many different regions within Ethiopia. Similarly to the bovine production, sorting is into two grades, but the TR are also segregated according to hair colour: black or (mainly) brown. The TR sheepskins are re-salted as required and stacked according to the source of supply for control purposes, although there is some blending of smaller lots. The rejects are all mixed together and, because they do not receive priority treatment, are often air-dried. Goatskins are also received and graded, but these are then transported to a second tannery that the parent group, Dire Industries, runs at Modjo.

The transport of goods into work does not lend itself to mechanisation. This is because the tannery was originally located on a steep slope, and has then been expanded over 40 years. Seven years ago new buildings were constructed to



On receipt at the tannery, the sheepskins are sorted according to colour and grade. They are later dyed black, dark brown or lighter colours.



Sheepskins and bovine hides are processed using the same drums and in the same wet processing department, but this shaving machine is dedicated to shaving bovine wet blue.



After shaving, sheepskins, bovine sides and bovine splits are trimmed in one area in preparation for dyeing and retanning in a single bank of dyeing drums.



The pilot plant comprises both stainless steel and wooden drums of various sizes for development work and sampling purposes.



rationalise manufacture, but the transport of goods remains difficult. The movement of goods is fast and continuous, but sub-divided into parts of a full load. All of the soaking and liming processes are performed in eight wooden drums of size 3 or 3.5 metres in diameter. These are elevated, and are hand-loaded from service walkways.

Each bovine hide has a wet-salted weight of around 12 kilos. These are processed with an input weight of 5,000 kilos in a 24-hour soaking-liming cycle, using a five-hour enzyme soak and hair-burn process. Fleshing is performed on a single whole hide fleshing machine as whole hides where the hump is not prominent, but sided beforehand if damage would be inevitable. This is followed by trimming, then tannage at full substance.

The sheepskins average 1.5 kilos in wet-salted weight, and are processed with an input load weight of 4,000 kilos. The soaking time is 16 hours, followed by unloading and draining, and then painting with a lime sulfide paint and piling for three hours for hair loosening. This is followed by hair pulling: it is not cost-effective to process the recovered the hair for further use, but this operation reduces the strength of the final effluent for treatment when compared to the hair-burn option. The liming process is then completed in 16 or 18 hours. The longer time is applied to the black selected skins as these have a slightly different process, including three final wash and draining cycles instead of two.

All of the production is chrome-tanned, although chrome-free processing of sheepskins is being investigated. The tanning processes are operated in four tanning drums that are manually loaded from the front of the drums, with servicing from a rear service walkway. When tannage is complete the loads are dropped onto the floor, and the sheepskins loaded into a number of recycled blue barrels. There is a slope to the floor in front of the drums that is sufficient for the loaded barrels to be easily and efficiently slid into an adjacent area for stacking, covering and draining and aging for 48 hours. This is followed by blue sorting and selection.

Considerable care is taken within the TR sorting operation with selection first into four different sizes according to area, then into five different quality grades, plus two grades of rejects. The rejects from selection in the raw state are similarly inspected to recover any higher grade skins.

Bovine sides are sammed, and sorted into six grades on off-take, before blue splitting according to required substance. Both sides and sheepskins are shaved using three shaving machines, each piece being checked across the area for substance. Sheepskins are dyed to more than 70 different shades at present, and six different retanning processes are used according to end product. After unloading, both sheepskins and bovine sides are samm-sett, then vacuum-dried on three vacuum-drying machines. Drying is completed by airing off using an elevated pole-drying conveyor system that runs under the roof throughout the tanning and dyeing areas.

Sheepskins are processed to the crust state for gloving leather, then shaved to ensure accurate substance before dyeing. However, some black and other special colours (both sheep and bovine) are dyed and crusted, then re-dyed for very intense colour development and to ensure complete dye penetration. Softening is provided mainly by through-feed vibration staking coupled with dry milling, then drying on a



Sheepskins and bovine side leathers follow the same basic drying procedures. Vacuum-drying is followed by pole-drying.



For accuracy of substance, bovine leathers are often dry shaved. These leathers – black and selected colours – often demand very intense colour, and in this event are re-dyed.



These leathers are being dried on a horizontal throughfeed toggling unit after staking and dry milling.



horizontal toggle-drying unit before trimming.

Side leathers are mainly buffed for corrected grain finishing, and all leathers are finished using a single roller-coating machine and a single spraying machine, both fitted with steam-drying cabinets. Light plating or embossing is performed as required, and operations completed by final inspection and packaging.

(3) Solids management

- Trimmings from limed hides and limed splits are sold for gelatine manufacture.
- Wet blue splits from splitting bovine hides are retanned and finished by other small- or medium-sized tanneries.
- Trimmings of leather before and after finishing are sold for the manufacture of small leather items, often stitched together for children's school bags and satchels.
- All used containers and bags, recovered wood and metals are segregated, cleaned and sold.
- Shavings and trimmings from tannage are collected daily for deposit at municipal landfill.
- Tannery sludge, hair and precipitated or dewatered chrome sludge is deposited at the municipal landfill site.

(4a) Water and environmental management

The water used by the tannery is provided mainly from two bore holes, with approximately 20% via municipal supply.

(4b) Effluent treatment

The effluent treatment plant was installed 10 years ago and is based on UNIDO design, with a grant provided by UNIDO. The operation has since been modified, and the present volume for treatment is approximately 250 cubic-metres per day.

The wastewaters are segregated within the tannery in the following manner. There is a single gully within the tannery for draining the tannery wastewaters from processing, apart from drainings and washings from chrome tannage, which are separated at source. All of the sulfide washings and drainings are discharged over a period of approximately three hours, and screened through two stainless steel self-cleaning screens. During this time the production is managed so that there are no discharges taking place from any other leather-making processes.

The sulfide-containing effluent is delivered into two sumps for catalysed aeration using dome diffusers. The first sump is filled, then oxidised as a batch operation and emptied into a balancing and equalisation sump. During this time the second sump receives sulfide-containing effluent until filled, and this alternating cycle is repeated.

Once drainage of the sulfide-containing wastewaters is complete, the tannery commences discharge of the other used floats and washings from soaking and neutralisation, retanning or dyeing processes. These are screened using the same self-cleaning screens as the sulfide effluents but with the discharge directed into the balancing and equalisation sump.

The equalisation tank has a capacity of approximately 70% of the total effluent volume, and as part of primary clarification the effluent is dosed with aluminium salts and polyelectrolyte. The supernatant from this operation is then delivered to a final holding tank that has sufficient capacity to



All of the knives used for trimming throughout the tannery are made from used splitting blades.



The finishing department is fitted with two finishing lines comprising a single roller-coating machine and a spraying unit.



Final grading of leathers before packaging and dispatch.



All of the effluent is screened through this pair of self-cleaning stainless steel screens that operate in parallel. Wastewaters are collected in a small collection sump after screening, then directed for either oxidation of sulfides or for general balancing.



All of the chromium-containing wastewaters are precipitated with lime, and the settled sludges then dried using two sand filters. The supernatant is delivered to the balancing tank.

hold the effluent for three days where it is continuously aerated. When the tank is almost full, the effluent is pumped to a second clarification tank for a final settling before discharge from the site. The tannery is investigating the best way to convert this final holding tank into an activated sludge treatment plant.

All of the chrome-containing wastewaters are separated on discharge from the tanning drums and delivered to a holding tank where they are stirred and dosed with calcium hydroxide, then left to stand for precipitation of the chromium

hydroxide. The settled sludge is then discharged by gravity to two sand-gravity filtration and evaporation beds for dewatering. The tannery is to amend this procedure into a chrome recovery system.

(4c) Energy

All of the steam and hot water consumed within the plant is from a boiler that is fired by heavy and light oil. ⦿

tough luck. Your tannery could also come up on the rota at festival time, when slaughter goes up.

Group commercial manager, Zewge G/Meskel, says slaughter rates across the country have remained relatively constant in recent years and he believes the volume would be enough to sustain 20 or 30 tanneries in Ethiopia if they all took production all the way to finished leather, he says. "No one knows what will happen to the price of raw material, but in this region, Ethiopia is the country with a 100-year tanning history, so we believe we can be a centre of production for the whole of this part of Africa. People are already importing hides and skins from Kenya, Uganda, Sudan and elsewhere."

Expansion plans for Dire Tannery and, probably, most of its rivals may need to wait until the situation regarding the enforced move to Modjo becomes clearer, but something Mr Zewge makes clear is that Dire Tannery will not lack the backing of the banks when the time comes. Its credit is better than good. Its relationships

with the Commercial Bank of Ethiopia and with the Awash International Bank are long-standing. "Trust is very important," he says. Biniyam Bedada takes this further, saying that it's well known in Ethiopia that the company "will do what we promise to do". In March of this year, it received a certificate from the customs authorities confirming that goods it has imported can go straight to the tannery without the need for checks and inspections, and, in June, his father was a guest of honour at the launch of new container ships at the port of Djibouti, landlocked Ethiopia's main gateway to the world. Pride of place in the Dire Industries boardroom goes to a photograph of Mr Bedada receiving an award for performance in exports from former prime minister, the late Meles Zenawi. "He isn't just a businessman; he's an elder statesman," his son says of the Dire Tannery founder.

Equal opportunities

At the moment, 480 people work at the Dire Tannery, 197 of them women. The

company has built up an anti-harassment culture and the women feel safe there, which means the worker retention rate among women is particularly high. Most of the women live in the neighbourhood around the tannery and are able to walk between work and home in ten minutes or so. There is a second shift that usually finishes in the early hours of the morning, so, for safety reasons, the management team has made the second shift 'men only'. Conscious of worker security generally, Dire Tannery pays night-shift workers to stay on until daylight before leaving for home. If there is work to do, they do it, and if not they simply wait the night out. Incidents are few, but there was a spate of muggings, specifically on pay-day, a few years ago. These incidents became an incentive for the authorities to supply a better police service in the district in which the tannery is located, and in the interim, it offered its own security guards to keep an eye on things in the wider local community.

Biniyam Bedada describes the relationship between the management



team at the tannery and the trade union that represents the workers as very strong. Union representatives make considerable contributions to collective bargaining agreements, suggesting ways in which workers can and should increase productivity in addition to their obvious focus on levels of pay.

The site has its own union, the Dire Tannery Leather Union. Representative Fikadu Bekele confirms that the relationship is on a sound footing. "We have a good understanding," he says, "and we have no need of a third party coming in to carry out arbitration when we negotiate. There is no pressure on us, and the company even provides stationery for union communications, for which we are grateful." He makes it clear that money is tight for his members because the cost of living is high. "It's difficult, even with an increase in salary once or twice a year because the cost of living keeps going up," he says. Most members of staff don't own their own homes and rental costs, for a married employee with a family, could easily swallow up half a month's salary. Families' basic healthcare and education needs are taken care of by the state, but after buying food, Mr Bekele makes it clear that most Ethiopian workers will have little money to spare at the end of the month.

Where the leather goes

Around 55% of Dire Tannery's finished leather goes into shoe uppers at the moment, mostly to export customers. Of all the tannery's shoe upper leather, 85% goes for export to customers that include major European footwear brands, although the tannery often ships directly to these brands' outsource manufacturing partners in places such as China and India. The tannery's relationships in these cases are strictly with the brands. "They like our leather," says Biniyam Bedada. "It meets their quality requirements and they pay us a quality price for a quality product. We would love it if their product labelling made it clear that the leather in their shoes comes from Ethiopia, but so far they are not taking this extra step."

The other 15% of the tannery's shoe upper output stays in Ethiopia, supplying local footwear manufacturers, including Peacock, which is itself part of the Dire Industries group and which makes men's shoes for important brands in the US and other markets. Of all the finished leather that comes out of the tannery, 30% goes into gloving, with the main customers in India, Japan, China, Taiwan and the Czech Republic. Ethiopian highland sheepskins make a highly prized gloving leather with a high level of tensile strength. The remaining 15% goes into shoe lining, two-thirds of it for export and the other third going to Ethiopian shoe producers.

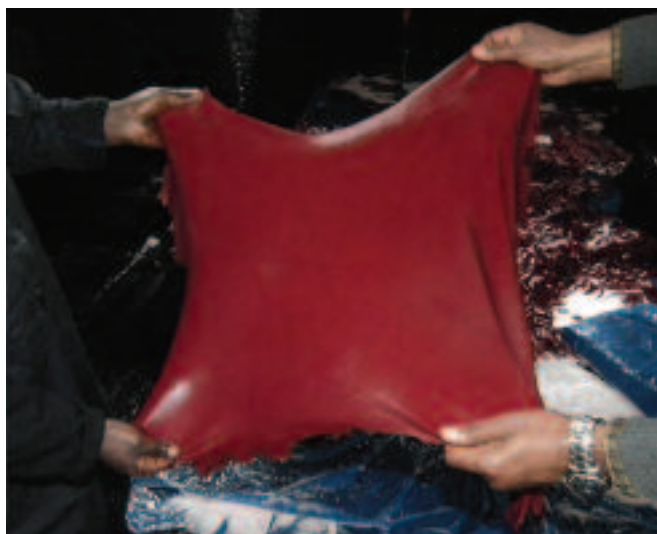
There is ambition and desire among Ethiopian manufacturers to publicise more widely the value of the leather and finished products they are making. Peacock, for example, has had experience of the retail brands it produces for telling it that if trade rules require it to put a label of origin on its shoes, the label should go in as unobtrusive a position as possible, such as at the very bottom of the tongue, with the smallest letters possible so that consumers won't notice. There is a feeling in Ethiopia that these brands are missing an opportunity. There is a great appetite among consumers these days for authenticity, and back-stories of goods produced responsibly and fairly in Ethiopia and other African countries can resonate powerfully in the marketplace.



Poster display within the tannery.



Part of the range of sheepskin leathers for shoe upper leather.



Very intense colour can be developed as shown by this sheepskin, removed from the load after discharge from the dyeing process.



Display of Ethiopian awards and accreditations awarded to Dire Tannery.

Control and Accreditations

LABORATORY SERVICES

The tannery does not have a laboratory for leather analysis. This is provided by the Ethiopian Leather Industries Development Institute in Addis Ababa, with analysis and physical performance to customer specification.

There is a laboratory on site, but this is fitted for management of the effluent treatment plant.

APPROVAL AND ACCREDITATION

Approval and accreditation include:

- ISO 9001: 2008
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Trade not aid

Bedada Chali has been promoting not just the Ethiopian but the entire African leather industry for years, according to his sons. "His belief is that this is a good way to address poverty and unemployment," Elias Bedada says. "We need to industrialise, to manufacture things and then secure trade, not aid. This is a passion for my father, and he believes that if he has done it, anyone can."

Mr Bedada himself says that he thinks leather has an important place in the market because of the way it works with the human body. "Synthetics are not very good at that," he adds. His vision is for a tanning group that will continue for three, four, five generations. The demand will be there, the knowledge and the skills will be, too, so he believes this is entirely achievable.

"He's an eternal optimist," Elias Bedada says. "He only sees good things for leather. He's seen and lived all the recent developments and for him it's just optimism all the way. For example, yes, there are lots of shoes that are made from synthetic materials, but in terms of value, 50% of all the value in the global footwear industry is in leather shoes, and in each leather shoe, 50% of the cost is the leather, meaning that you would have to add together the value of every other component in that shoe to reach the other

50%." He goes on to explain that, at the start of this century, everyone in the Ethiopian leather and footwear sector had to stand back as "a flood of synthetic shoes" came into the country, mostly from China. This devastated the local shoe manufacturing industry; the shoes from China were cheap and looked much more fashionable than traditional Ethiopian-made leather shoes. "It only took a year for people to say they wanted shoes with leather uppers again instead," Elias Bedada says, echoing his father's opinion. "The synthetic ones smelled bad and in January and February, when the sun is very hot in Ethiopia, people felt that their synthetic shoes were practically burning them."

The value of people

As well as a love of leather and a vision for the industry's future, Bedada Chali has given the next generation of leaders of the Dire Industries group a clear understanding of the value of the people who go to work there every day. "He is always thinking of the workers," says tannery manager, Biniyam Bedada, "and encouraging us to do the same. He tells us all the time." Another brother, Husain, led a programme to help key workers at the tannery fund the building of their own houses, depositing money to help them buy land, get the necessary permits and get

construction under way.

Production and technical manager, Asmare Mebrate, who was one of the workers to benefit from this, explains that he has worked at the tannery for 17 years now and that, in his opinion, the relationship between the Bedadas and the workforce is more of a family relationship than a business one. The tannery's chief mechanic, Girma Awata, died of cancer in 2013, but during his illness, Mr Bedada helped him by importing medicine that would otherwise have been unavailable in Ethiopia, and since his death, he has continued to pay this man's salary to his family and to take care of his children's school fees. "I have had direct experience of this kindness too," Mr Mebrate continues. "My wife, Genet, died six months ago after a long illness. Mr Bedada took the time to go and see her in hospital, to ask if he could do more to help her, to console her and to reassure her that he will continue to help me and help our three children. He has done similar things for lots of the workers here. And because I know my boss's mentality, I am trying to take care of the workers in a similar way when I can." He thinks it's possible some people at Dire Tannery might be able to earn slightly higher salaries elsewhere in the industry, but he asks: "Where else could we find this type of family support?"