



Ostrich skin handbag being sewn in the leathersgoods department. This is fully integrated with the tannery, and the leather items are sold from the tannery shop and through other retail outlets.

Tannery of the Year: Nakara, Windhoek, Namibia

When you operate the only full-service tannery in a country like Namibia, you have to be prepared to work with a wide variety of material. Windhoek-based Nakara has built up a reputation for being able to tackle just about anything.

It's a long way from central Asia to the south-west corner of Africa, but interesting parallels in climate, between the Kyzyl-Kum and Namib deserts, have meant that the Karakul sheep have been able to thrive in both places. Originally from Uzbekistan, attempts to transfer the sheep to Namibia 100 years ago succeeded and sheep-farming is now one of the country's most important industries. As well as milk, meat and wool, the Karakul breed of sheep yields a particularly prized pelt, greatly in demand among the world's top fashion houses to make garments and accessories. Nakara made its name tanning, processing and finishing these pelts. Today Nakara specialises in similar material from the Dorper breed of sheep, also

known as Glovers. These pelts, at pickle stage, are one of the main export specialisms of Nakara, a tannery on the north side of Namibia's capital city, Windhoek.

Until Nakara (the name is a combination of Namibia and the Karakul breed of sheep) set up in 1980, most of the pelts went to specialist tanneries in Europe for processing. Nakara founder, Kevin Davidow, believed he could use skins expertise he had built up in his native South Africa to add value to the raw material on home soil. He has worked tirelessly since then to develop a network of knowledgeable and appreciative clients, many of them in the southern Italian leather cluster of Solofra, where companies,



according to Mr Davidow, can work magic on the skins. He says: "I admire the beautiful, soft leather they make. I don't know what they do to it, but it's like it can float on the air when they've finished with it." He estimates that the tanning cluster in that part of southern Italy gets through a minimum of 100,000 skins a day, with sheep and goat coming in from all over the world.

It's important to these Italian operators to import the pelts at pickle stage because this allows them to take the material in any direction they like afterwards, be it vegetable- or chrome-tanned. If the material reached Italy as wet blue, the customer would be stuck. Nakara is working hard to win the understanding of the Namibian government in this matter; the government says it would like to add even more value in Namibia before export, which is fine in theory but fails to take into account the very particular circumstances surrounding the Dorper skins and the fact that Italian buyers have the option of turning to suppliers in South Africa (where farmers have also been successful in breeding the sheep). The government imposed a levy of 15% on exports of pickle in 2008. Wet blue would sell to other customers, but not at the same price as the knowledgeable Italians are willing to pay. "Pickle or wet blue; it doesn't make a difference in terms of adding value or job creation," Kevin Davidow insists. "The levy hasn't changed anything in two-and-a-half years, so it's not working, except in the sense that the government is getting the revenue from the levy, but it punishes the business. It would work better if they offered incentives instead, say \$5 for each pickle skin, \$7 for wet blue and so on."

Nakara knows a lot about adding value. It runs a finished goods workshop beside the tannery, where skilled women work at sewing machines making wallets, belts, bags, jackets and other leathergoods, using the material produced on site. The company runs three retail outlets stocked with its own products, one at the tannery site (a factory shop that is popular with bargain hunters). There are also two classy boutiques, in downtown Windhoek and in the seaside town of Swakopmund, where the goods sell at extremely attractive prices to European tourists.

Other raw materials

Apart from pickled Dorper pelts, Nakara has also developed a talent for tanning game skins, another Namibian speciality. Springbok



HORNS AS NATURAL CO-PRODUCTS

Animal horns have value and are processed at the tannery. The horns are cut close to the root, and the inner bone removed from the outer horn. This can be done by simply tapping the horn until the bone separates, but sometimes soaking and drying is required for loosening. The horn and bone can then be sterilised and polished. The photograph shows Kudu horns and bone on an Kudu skin. The long straight horn in the centre is from an Oryx.

are an important source of meat there. They live in large numbers on the extensive farms spread across the country, often competing for grazing land with sheep, goats and cattle. "Farmers are usually happy to have game on their land," Kevin Davidow explains, "but they need to receive some sort of return on them and to be able to control the population because otherwise springbok would take over."

Kudu, oryx, eland, hartebeest offer other examples of antelope that Namibian farmers frequently shoot for meat, either for export to high-paying customers in Europe and the US, or for their own consumption and that of their farmworkers and their families. The skins of all of these animals make regular appearances at the tannery door, although an outbreak of rabies two years ago reduced the kudu population and most farmers are still letting their numbers build back up. In many cases, the skins of these animals make their way through a network of traders to Nakara and the company has developed recipes and techniques to tan them all. This varied supply chain network ranges from local community butchers who acquire and slaughter a cow, sell the meat to their neighbours and bring the hide to Nakara, to full-time hide and skin traders who travel from farm to farm collecting raw material. Some of these traders operate on a large enough scale to wait until they have a truck-

load available before calling the tannery. Others operate on a more hand-to-mouth basis. The arrival of a skin dealer at the farmer's front door is usually welcome. Farms in this part of Africa can cover huge areas of land, sometimes as much as 50,000 hectares. "The farmer may not have seen another soul for days," Kevin Davidow explains. "The dealer will bring news of the local community and even from Windhoek. The dealer will often look at the skins the farmer has in his store, make a calculation of how much is there and make a cash offer. The farmer trusts him and usually won't even count or check. There is a lot of trust. The dealers enjoy a good mark-up, maybe 50% or 60%, but the volumes are usually small, so they make a living, even if they are not rich."

Typically, a kudu skin can yield around 22 square-feet of leather, an oryx 20 and eland 40, a hartebeest 17 and a springbok eight.

In the hunt

Under special circumstances, Nakara has to handle special hides and skins, always with the correct documentation from the Convention on International Trade in Endangered Species (CITES). Zebra is another animal that farmers have to keep under control because they multiply readily and are competitors with cattle and sheep for valuable grazing land. A handful of times a year, farmers or the authorities in Namibia



From a technical point of view

(1) Overview of operations

Nakara tannery was established in 1980 for processing small game skins together with a small shop making and selling leather goods. After considerable expansion, the tannery now processes sheepskins to the pickled state for export, and both bovine and exotic hides for lightly finished furniture leathers. In addition, a range of game skins including zebra, springbok and kudu are processed for decorative purposes, but also designed and made up on site into a range of exotic leather goods. These include bags, belts, rugs and leather clothing that are sold both from the tannery shop and through retail outlets owned by the company.

(2) Manufacture and processing

In this operation the management of raw hides and skins is complex. Bovine hides are received in the wet salted condition from abattoirs, but also in the wet blue state. Sheepskins are also processed to the pickled state only, and although there are fluctuations in availability, the tannery input needs to be continuous throughout the year. The input of these two raw materials is similar in weight, being about 50 tons in total.

In addition, exotic skins are processed, with an input of approximately 10 tons/week. These are received from the nearby abattoir where game are processed for meat exports to Europe, but also from controlled culling between May and September, which is also the time of the main hunting season. In addition, skins are collected by dealers from farms all across Namibia where game is killed for food for the workforces all year round. There are also small lots or single skins that are processed for individuals.

All of the different skin species are processed separately, and have to be graded according to size, thickness and condition. This includes mainly springbok, but also zebra, kudu and oryx: in addition there are elephant, rhino and cheetah and other species killed under licenced control and in strict accordance with CITES Convention. Some pieces are not suitable to be



Typical delivery to the tannery of game skins collected from farms across Namibia by independent dealers.



General view of the beamhouse. The processing vessels are of various sizes and configurations to suit sheepskins, bovine hides and exotic skins.



Metal detectors are used to scan each piece for buck-shot (oryx in this example) before lime splitting to avoid blade damage.



Fleshing sheepskins before lime painting for hair recovery.



processed with the hair on, and there is a mixture of wet salted, dry salted and air drying used for preservation.

SHEEPSKIN MANUFACTURE

A conventional soak is followed by green fleshing, then lime painting and piling for hair loosening, with the hair hand pushed from the skin. The hair has no value, but reduces the load on the effluent treatment plant. After reliming the skins are delimed/bated and pickled. They are then fleshed, selected into seven grades, then packed in barrels for export mainly to Italy. Although the tannery does not commercially process to the finished state, sample skins are tanned and processed to crust to check and ensure that the processing remains secure.

FURNITURE LEATHER MANUFACTURE

Soft furniture leathers is a company speciality, and these are manufactured from bovine, oryx and kudu hides. The processing of the exotics is similar to normal soft chrome tanned furniture production, but with two exceptions:

- Hides have to be scanned with a metal detector before lime splitting: a bonus is paid to detect shot as this causes considerable damage to the splitting blade.
- The butts are normally 12-15 mm in substance, but the necks are up to 30mm, and these need re-splitting creating middle splits.

After dyeing to shade the hides are toggled, conditioned, vibration staked, and tumbled. Finishing is mainly very light and pigment free to maintain a natural handle and appearance.

Some of hides are also are vegetable tanned in a two-day tanning process for heavy leathers. These are used for belting, harness, insoles and various leathergoods.

GAME AND EXOTIC MANUFACTURE

A major component is springbok which are processed for rugs, bags and clothing. Due to the high volume of skins in the peak season, these are soaked, circular shaved, then pickled using acid/salt pH 2.5. This ensures that the hair on springbok and other skins will remain intact up to one year,



Painting with sulphide/lime paint for hair loosening



Wheel shaving zebra skins to remove surplus flesh and achieve uniformity of substance. This is a very skilled operation and cannot be replaced successfully by other methods.



Springbok skins tend to form rolls in retanning/dyeing. To avoid this action the skins are stapled belly to belly before loading the tricompartmental processing vessel.



This toggling unit is dedicated to small skins, and drying is by forced air draft without any additional heat.



although skins are normal held up to six months.

Zebra are normally received air dried. They are softened by paddle soaking for one day, then drum soaked, followed by a 36 hour pickle to pH 2.5. Circular shaving is highly skilled, but essential to ensure uniformity of thickness, and to cut away the hard shell area in the neck parts. This shaving is followed by chrome tannage and a light retan and fatliquor. After toggle drying, the skins are inspected, and any flay cuts are sewn together. The skins are then spray conditioned, and stapled flat to dry on wooden drying boards.

Occasionally thick heavy hides such as elephant and rhino are processed. In this event the soak may take up to five days, comprising five one-day soaks with bactericide to soften the hide. These are then split to create a grain split of 4 mm, then often soaked for another day. After a one day liming they are split to substance, relimed, chrome tanned and processed as normal.

LEATHER GOODS MANUFACTURE

An important aspect of this operation is the production of a wide range of leather garments, ostrich bags and accessories, game skins and products. This is an integral part of the exotic manufacturing component that is completed with finished luxury goods. All design, cutting, stitching and finishing is carried out on site, with about twenty people engaged in this operation.

(3) Co-products and solids management

- Horns from game animals have value as co-products.
- All wet blue fleshings and middle splits are exported to China.
- Empty chemical polycrates are re-used for storage of pickled exotic skins such as springbok.
- Waste packaging and sheep hair have no commercial use and are deposited to landfill. Chrome shavings, waste from splitting, trimmings and dewatered sludge are categorised as hazardous waste and taken for disposal by the municipality. There are two levels of charge made for disposal of these solids.



Zebra being wetted after sewing any flay cuts together, followed by drying while stapled to drying boards for flattening.



Furniture leathers are very soft and only lightly finished.



Considerable stocks are held in the finished state to enable fast response to customer requirements. These are in a standard range of colours and textures.



Trimmed springbok skins manufactured for decorative uses.



Display of clothing to in-house design based on exotic skins, with bovine furniture hides in the background.

become sufficiently concerned about the behaviour of a leopard, a cheetah or an elephant and request permission under CITES to put the animal down. With a big cat, the problem is usually that it has begun to kill unusually high numbers of livestock. Cheetahs, Kevin Davidow explains, sometimes kill for sport rather than just to eat. On occasion, these animals can present a threat to human life too and farmers can receive permission to shoot them, or call in a specialist hunter to do the job. This can happen with elephants and rhinos, too, although the most frequent threat a rogue elephant presents is to crops. The meat will go to the people in the local community, a reward for the anguish they have had put up with, and with CITES permission in place, the hides and skins find their way to Nakara.

"Elephant skin feels like iron or concrete," the tannery's founder says. "You have to split, it at least four times in soak, in lime and after it is in wet blue, taking great care throughout the process not to damage the grain. The key is, the soak. You have to soak it for about five, days or this holds up production like crazy. The reward for this is that an elephant hide can yield about 400 square-feet of leather."

Cattle hides complete the Nakara raw material supply chain. They come as wet blue from a tannery run by near-neighbour Meatco, a packer operation owned and run by a co-operative of Namibian cattle farmers. The Nakara managing director describes these wet blue hides as something of a

commodity. A variety of cattle are bred on Namibian farms, including Brahman, Simmental and Afrikaner. Fine scratches from thorn bushes and branding are the main issues Nakara has with the quality of the hides, but in such a dry climate, at least ticks and other parasites present less of a problem. At current rates, around 300 cattle hides go into production at the tannery every day along with, perhaps, 100 game skins. "If we could get more game skins we could sell them," Mr Davidow explains, "but it's less structured and much more informal. We can't affect the farmers' decisions on when to shoot game. Those decisions come from the farmers' need to cull and the need for the farmers, their workers and their families to eat." One animal, an oryx, say, would give enough meat for all of these people for a week or more. An eland would give more, perhaps 500 kilos of meat.

The total number of sheep pelts moving through the tannery at the moment is perhaps 220,000 a year. Nakara is a joint-venture partner in an operation called Namskins with meat company Hartlief. Hartlief processes the meat while Nakara takes the skins. The sheep are bred for meat. Today's figure is tiny compared to the peak in popularity of Karakul skins in the mid-1970s when, Mr Davidow says, something like five million went into production. His explanation is simple: fashions have changed. People used to dress more formally than they do today. Twenty or 30 years ago, women

everywhere in the world would wear things like lambskin stoles as part of a formal outfit for an evening at, say, the theatre. These days, jeans will usually do.

Water concerns

Tanning any hide or skin is a challenge in a dry country such as Namibia. There are only two rivers in the whole country that run continuously and there are notices in hotels asking visitors to respect the preciousness of water (by limiting showers to four minutes maximum, for example). Last year's rainfall of more than 1,000 millimetres was three times the average, making the mood around water supply positive at the moment. The Nakara tannery is in Windhoek's industrial area with a brewery, a power station and an abattoir for neighbours. The city has floated the idea of building a new common effluent treatment plant for all of these businesses. It is reported to be looking at three tenders for this and has set up a trial for analysis. This is one possibility for progress, but it's also possible that Nakara could improve its own effluent treatment instead. Rather than pay the city more, it would invest on its own and pay a smaller fee to the authorities because its effluent would be cleaner. "I would like to recycle and reuse water. It's a valuable resource to me," says Mr Davidow. "We want to invest in this in the next two years, possibly in reverse osmosis. The better the effluent we produce, the less we will pay."

In isolation

In some respects, it seems that people in Namibia feel a little isolated. The country is more than twice the size of Germany, but has less than half the population of the metropolitan area of Berlin. It's not the most difficult place in the world travel to, with direct flights to and from Europe, (Frankfurt and Munich) on the regular schedules at Windhoek airport, but visitors often have to travel through neighbouring South Africa. This, coupled with the small number of tanneries in Namibia, makes visits from chemical and machinery suppliers a rare occurrence. As a direct consequence, Kevin Davidow explains that this can make Nakara's relationships with suppliers of chemicals and machinery a bit of a challenge. "A good supplier is one who can carry stock," he says. "No one here does, but in South Africa they do. So if I talk to a chemical company and they say they have to bring a particular product in from Europe,



From a technical point of view

(4) Water treatment and environmental management

WATER TREATMENT

Rainfall in the Windhoek area of Namibia is normally around 365 mm/year. However, the main dam for the city holds sufficient water for two to three years at present levels of consumption. The tannery abstracts water directly from the mains supply to four linked tanks each of 10,000 litres capacity. These provide cold water to the tannery, but also act as a buffer for emergency use.

When water is required for processing it is automatically mixed to temperature using pre-heated water at 70°C that is drawn from a 10,000 litre tank. Any mixed water that is not to temperature is returned to the water storage area and held in two more tanks of total capacity 20,000 where it is allowed to cool, then serves to top up the cold water supply.

EFFLUENT TREATMENT

At the moment all of the domestic effluent from Windhoek is treated separately from industrial wastewaters by the municipality. Industry - mainly an abattoir, brewery and the tannery - is located in a cluster with each manufacturer treating their own effluent. Samples for analysis are taken by the authorities, and the companies are charged according to composition and volume. Full treatment is not necessary as the effluents are delivered to large lagoons outside the city and evaporated to dryness.

There are, however, plans to create a new treatment works for both the industrial and domestic effluents, and this involves the recovery of high quality water for reuse. Once these plans are clear, the tannery effluent treatment will be upgraded as appropriate. Reedbeds are currently being investigated as a means of secondary effluent treatment as a suitable area is available.

At the present the sulfide containing wastewaters are received in sump, then delivered to a pair of 40,000 litre aeration tanks. Manganese sulfate is added to the effluent when aeration starts, and once the volume is complete additional catalyst is added for efficient sulfide oxidation. After six hours aeration the effluent is pumped into a primary settling vessel, with the supernatant flowing into a small collection sump that receives all of the tannery wastewaters. Coarse solids are separated from these wastewaters using a rotary screen set on top of a cluster of three linked holding tanks used for balancing the effluent, each being 40,000 litres capacity. The mixed effluent is pumped from these tanks at constant rate over 24 hours for chemical dosing and settling of precipitates. These precipitates are mixed with the primary sludges, then dewatered using a pair of elevated filter presses. The volume of supernatant from this plant is approximately 120m³/day, and this is discharged for lagoon evaporation together with other industrial effluents. ☉



The two aeration tanks were originally used by a brewery, but at 40,000 litres capacity and fully enclosed they are ideal for this purpose.



Three inter connected tanks used to mix and balance the effluent flow. A rotary screen is positioned on top of these tanks to remove fine solids.



Conventional filter presses elevated to enable easy sludge removal.



I'm already doubtful. It would only be very seldom that we would look to bring in a whole container-load of a product ourselves. If suppliers at least have the product in stock in South Africa it's better. We try to choose chemicals that are obtainable."

On the machinery side, things are even more difficult. Mr Davidow continues: "We have few real relationships. We had a visit from one drum supplier recently, but on the whole no one comes to see us and that is a problem because it means we have to do all the maintenance ourselves, although we usually get a response by email or phone and companies tell us what they think the problem might be. But if they say they don't know, we have to work it out." Technical director, Michael Schiller, says that if companies have technicians visiting tanneries in South Africa, Nakara will be happy to share the air fare to encourage them to make the detour to Windhoek. He adds that Italian machinery provider Gemata is "good at this, at including us", but says it's true that there are other machinery companies Nakara has not seen in years, "if ever".

Use of leather

Furniture upholstery is the principal application of Nakara leather, and the tannery is currently producing around 30,000 square-metres of material for this market every month, mostly for customers in South Africa. This includes game and bovine leather. "South Africa consumes a lot," says Kevin Davidow. "It's a big economy and leather furniture is popular there; it's in keeping with African tastes. However, my estimate is that 60% or 70% of the leather going into furniture in South Africa at the moment comes from China. Our leather is different. It's full aniline leather and the game leather is semi-exotic. So much material is made into heavily pigmented leather these days. I call it rubbish. There should be a campaign to teach people and help them understand better what leather is, that it's a by-product and that it's something natural." He adds that people in Africa tend to have a clearer understanding of this because they grow up with nature and appreciate natural leather with its scratches and defects because it works well with the rough-wood furniture that people like to have in their homes.

Some of the tanned springbok skins go for leathergoods and interior design applications, often with the hair on. The zebra the tannery is able to process is even



The tannery has expanded over the years, but the present workflow is complex and is now undergoing streamlining.

more popular for interior design, with clients in Russia, the UK, Canada, Australia, Italy and South Africa forming a waiting list at the moment. "We can't get enough of them," the Nakara managing director observes. "If we had four times the number of zebra hides we could sell the skins. It needs a CITES certificate, of course, but the zebra can only be hunted when the farmer has a permit, and on the strength of that, we fill in the necessary forms and can have the CITES permit within one week."

Help for the workforce

Nakara has 130 employees at the moment. Most come from the nearby township of Katatura. The tannery sometimes offers support to the children of its employees to help them in their education, taking each case on its merits. There is a pension fund for all and people can use that as a home-building project if they want to. In the case of some of the more senior members of the workforce, the company has bought houses for them, purchasing the properties in the company's name and allowing employees to pay the money back through their monthly salary. Kevin Davidow asks: "Why should they pay rent for the rest of their lives? If they went to the bank with this request, I'm afraid they'd never get a loan, but we want them to have their own houses."

Employees at all levels are entitled to ask for smaller loans, with requests, typically motivated by the immediate need to cover things like funeral expenses, or perhaps school clothes for children. A programme is also in place to make sure all members of the workforce see a doctor when required.

This can be through paying half the premiums of a medical insurance package. For staff who do not have medical aid, which is most of the people at Nakara, the company pays for a consultation and medication from a private doctor. However, if they require further treatment such as an operation and do not have medical aid, they go to the state hospital. As in many parts of Africa, HIV and AIDS have been a concern in Namibia. A 2008 survey found that HIV prevalence is highest at 27% in the 30-34 year-old age group. The ministry of health and social services has been working hard to expand antiretroviral treatment to all parts of the country, especially the rural areas. Nakara's experience is that people who are HIV-positive can work at a normal level. Mr Davidow says his only feeling is that he prefers to know if one of his workers is HIV-positive and prefers them to take part in the antiretroviral drugs programmes.

Other community projects that receive regular support are schools and kindergartens which raise money among local businesses for school trips, Christmas parties and sports tours. The tannery's name also features prominently during a charity cycling event that Kevin Davidow organises every year in October. A 30-strong Nakara team will take part this year in various races, with riders and support team displaying the company name on their uniforms.

Mr Davidow believes that Nakara is a good example of "what should happen to leather", with an estimated 90% of his output full aniline rather than corrected grain, presenting it to the public "the way leather should be, rather than leather that looks like plastic".