Newsletter on Eco-labelling and Eco-friendly Products

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Eco-Friendly Leather

Contents

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Eco-labelling and Eco-friendly Products

Foreword

Leather products are an important export market for us. Tanneries in general, however, produce a lot of pollution. Whether air, water, solid or environment, in all these forms of processing, pollution is widespread. We have large factories processing and producing leather goods in places like JUJMAU near Kanpur and a number of small and medium scale leather units in Tamil Nadu.

With new environmental restrictions coming in force both in EU countries and in the USA, there are now strict specifications being laid down to have eco-friendly products in the market. ISO standards further take into consideration the environmental conditions within and around these leather producing units. It is thus now becoming absolutely essential to bring about changes necessary to ensure clean manufacturing and processing units.

In this issue of CERC-ENVIS, an effort is made to put together several important aspects of eco-friendly leather product requirements. Information collected from different articles as well as global reports on the issues of leather industry, with specific aspects of cleaner leather technologies have been covered. While it is true that quite a few leather units have now switched over to environmentally improved systems, a lot remains to be done. While China is advancing in eco-friendly products at a much faster pace, we shall have to also obtain eco-friendly leather labels at a much faster rate. Global competition is now forcing us to do so. If we cannot cope up in this area, our economy may get adversely affected in the days to come. The earlier we realize the importance of eco-friendly leather production, the better it is

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Eco-labelling of leather gathers global momentum

(While eco-labelled products are now in great demand in Europe and in USA, it is yet to pick-up in our country. Central Leather Research Institute (CLRI) is the pioneering organisation that helps the leather industry obtain eco-labeling in this area.)

Eco-label is becoming a major determinant along with price and quality in the European and American leather markets. Environmentally sound products enjoy the competitive advantage. Eco-lable is a form of certificate ensuring that a product is produced with least harm to the environment and it is safe to use. Life Cycle Assessment (LCA), the journey of a product from its raw stage to the final consumer product level, is the route of eco-label.

The significance of eco-labelling of leather products for greater market access for Indian leather in the Western markets was highlighted at a seminar organised in Chennai jointly by Central Leather Research Institute (CLRI) and Carl-Duisberg Gesellschaft (CDG) of Germany. Dr D Chandramouli from CLRI in his presentation on eco-labelling said "consumers are looking for products which cause less damage Eco-labelling of leather gathers global momentum to the environment and are safe to use. Eco-label provides an assurance to the consumers." He said companies around the world are restructuring and competing with internal improvements in environmental performance and are trying to improve their image through eco-labels for products and environmental management standards for the whole organisation.

Eco-label, even now, is a voluntary labelling system for consumer products, designed to help consumers to select and encourage manufacturers to make products which do least damage to the environment.

National eco-labelling systems are the most dependable and objective. However, it is an evolving concept and variations exist in meaning and scope. Various countries have formulated eco-labels and they are known by different names such as Eco-Mark in India, Blue Angel in Germany, Green Seal in US, Huan in China to name some. OKO-TEX Standard 100 is a well recognised German label for textiles. OKO-TEX 116 provides limit values for leather and leather clothing. SG, also of Germany, is specially created for testing leather products. Netherlands' Milieukeur has established criteria for footwear. They include chrome release not to exceed 120 mg/pair and emission not more than 0.33 mg/kg; the finishing agents have to be water-based, discharge of waste water must be through purification system and waste has to be recycled or dumped in a secured site.

Green Seal of USA, a non-profit environmental labelling organisation, develops standards category-wise by involving industry, environmentalists and consumer groups.

In India eco-labelling for leather is stumbling on the totally dissolved solids (TDS) issue. Tanneries in the developed countries do not face this problem as the salt-dominated treated tannery effluents are mixed with common sewerage system where in it gets diluted. The first condition for eco-labelling of leather is compliance to the environmental norms like Water Act of 1974, Air Act (1981) and Waste Management Act (1986).

The other criteria are usage of recyclable or reusable or biodegradable packing materials and meeting with specific norms tests for various chemicals. Though there are two ISO-certified tanneries and more are likely to be certified, eco-labelling of Indian leather may take some more time until the TDS issue is sorted out.

Ref : Joseph Vackayil, Indian Express, Mumbai
Http://www.financialexpress.com/old/fe/daily/20001

ECOMARK CRITERIA FOR FINISHED LEATHER

(The Gazette of India, Extraordinary, Part II-Section 3(i), No.58, Jan 27,2000)

GENERAL REQUIREMENTS :

The manufacturers shall produce consent clearance as per the provisions of the Water (Prevention and Control of Pollution) Act, 1974, and the Air (Prevention and Control of Pollution) Act, 1981, along with the authorisation for Hazardous Waste Management, if required under the Environment (Protection) Act, 1986, for seeking Ecomark certification from the Bureau of Indian Standards.

The product packaging shall display in brief the criteria based on which the product has been labelled environment friendly.

The material used for product packaging shall be recyclable or reusable or biodegradable.

PRODUCT SPECIFIC REQUIREMENTS :

S.No.	Parameters*	Limits	Test method, As per
1.	PH of aqueous extract of leather	Not less than 3.5 & if less than 3.5, the pH difference on dilution by a factor of 10 differential number, should not be more than 0.6	LC:18 of IS 582: 1970
2.	Formalehyde,mg/kg, Max	200	**
3.	Pentachlorophenol (PCP), Mg/kg, Max	5#	IS 14575:1998
4.	Aryl amines released from Azo-dyes (Sum parameters) ***, mg/kg, Max	30#	**
5.	Hexavalent Chromium, mg/kg, Max	3	**

The Eco-mark for leather certifies that only Eco-related parameters are assured and the quality related parameters are through self-declaration complying buyer's requirements. In such cases, the finished leather shall carry only Eco-logo (without ISI mark). In case the buyer's requirement calls for conformity to Indian Standards, the manufacturer shall have to apply for BIS Standard mark also

** Indian standards on the methods of test are being developed by BIS in line with acceptable international norms

Ref: *www.cpcb.nic/website/eco-mark*

EXPORT PERFORMANCE

India's export of leather and leather products for five years

	(Value in Million US$)				
	2003-04	**2004-05**	**2005-06**	**2006-07**	**2007-08**
Finished Leather	555.71	607.73	636.27	724.00	766.93
Footwear	767.73	910.77	1045.24	1236.91	1475.83
Leather Garments	301.08	329.44	333.30	309.91	343.99
Leather Goods	539.21	585.72	660.17	706.28	784.95
Saddlery & Harness	**52.71**	**61.71**	**77.52**	**82.33**	**105.81**
Total	**2216.45**	**2495.37**	**2752.50**	**3059.43**	**3477.52**
% Growth	**18.20%**	**12.58%**	**10.30%**	**11.15%**	**13.67%**

The EU Ecolabel for Leather Footwear

The EU eco-labelling scheme, which is voluntary in nature, aims to promote the sale in the EU of products having a reduced environmental impact, viz. reduction of water and air pollution during processing, minimizing the risk of allergic reactions from chemicals used during the fabrication and finishing stages and the use of recycled material for packaging. The following criteria for leather footwear (published in 2002) replace those published by the Commission in February 1999 making them more stringent :

* The average concentration of residues of Chromium (VI) in the final product should not exceed 10 ppm;
* No residues of arsenic, cadmium or lead are to be found in the final product (previously small residues of these substances were permitted);·
* The amount of free and partially hydrolysable formaldehyde should not exceed 75 ppm (for textile components) or 150 ppm (for leather components);·
* Tannery waste water should contain less than 5mg Chromium (III) per litre (previously, no such requirement was applicable);
* Pentachlorophenol and tetrachrolorophenol should not be used (previously, no requirements were applicable to tetrachrolorophenol);·
* No azodyes that cleave to any of the 22 aromatic amines set out in the eco-label criteria should be used;·
* Certain N-Nitrosamines should not be detected in rubber footwear components (previously there was no such requirement);
* C10-C13 chloralkanes are not to be used in leather, rubber or textile footwear components;·
* The use of volatile organic compounds during the final assembly of footwear is not to exceed the limits specified;
* Footwear is not to contain PVC (this is also a novel requirement);·
* Footwear is not to contain any electrical or electronic components;·
* Cardboard packaging for footwear is to be made of 80% recycled material, and plastic packaging out of 100% recycled material·
* The footwear must meet certain durability criteria specified by the Commission

Source : www.hktdc.com/info/mi/a/baeu/en/1/X00PWGW/1/Business-Alert

Environmental Issues in Leather Products Industry

(A number of aspects that have to be addressed during leather processing operations by which environmental pollution could be reduced / removed have been outlined here)

Wastes and chemicals released to water system are the main pollution concerns for the leather industry. They are produced during washing, dehairing and tanning of the leather. The washing of skins removes dirt, salt and some organic matter from the raw material. Lime and sulfides are used to dehair the skins. The waste water from this process is very alkaline, contains toxic sulfides and is the main cause of the high BOD* and suspended solids in the waste stream. The second processing step is de-liming to remove the lime in the skins and soften them by enzymatic action. The first dump of this process contains ammonium sulfate, enzymes and some protein. In the third step the skins are tanned using the chrome tanning process, which is standard for the industry. The solutions contain chromium as chromium sulfate salt and some free acid. About 75 per cent of the chromium present combines with the hide.

The use of chromium in the tanning process is an environmental problem attracting considerable attention in developing countries. Tanning with soluble chromium salts, basic chromium sulfate, enhances the physical and chemical properties of finished leather. Currently it is the most widely used tanning method in the United States and most other countries. Environmental and health concerns have resulted in a number of initiatives to reduce its presence in the waste stream, improve fixation on the leather, recycle chromium from effluents (EPA 1995a), and use aluminium and titanium as alternatives (EPA 1995b). Environmental and health concerns led Chromium to be banned in leather products for the export market by the Bangladesh government as of June 1, 1990.

In the final processing step, colour and fatliquor are employed to colour and oil the leather to make it as soft or as firm as desired. A number of chemicals are used in these steps, and about 90 percent of the load is fixed to the leather. The spent solutions are mildly acidic, with a pH between 4 and 6. BOD and suspended solids are relatively low (US AID 1994)

The Indian government has numerous laws in place that effect the leather industry. Although compliance is generally weak, State Pollution Control Boards have in the last few years ordered closures of, and imposed fines on hundreds of tanneries for pollution infractions. Common effluent plants have been a major effort of both Central and State governments, and have been established in all areas where tanneries are clustered (Jha 1997). Using domestic policy to establish and enforce proper waste treatment is an essential proactive step for the export sector given the emphasis on certain waste streams in eco-labeling programmes,

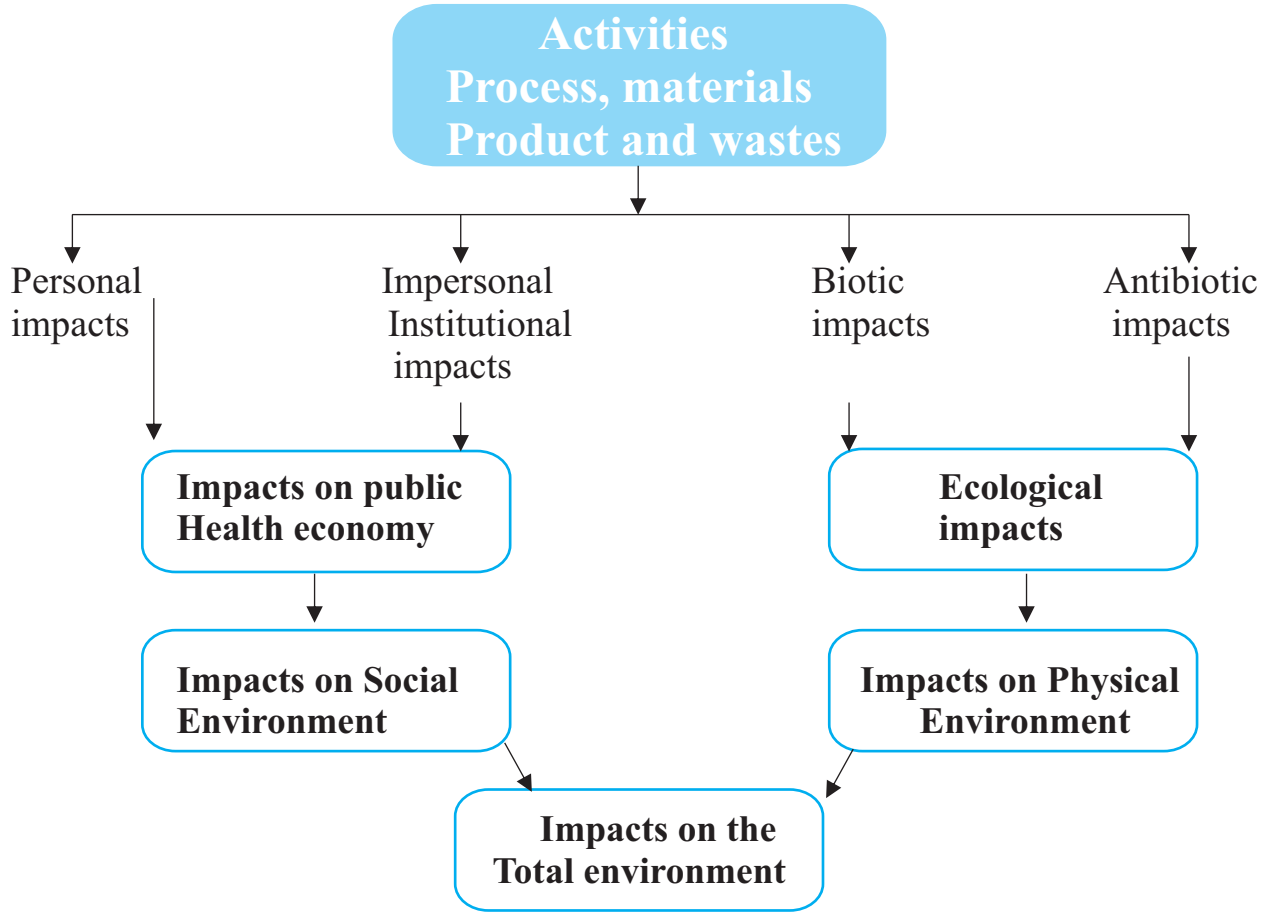
The typical waste streams for leather production are outlined below which documents the results of a pilot project on cleaner production in a developing country's tannery. The costs of remedying the pollution problems and the payback period are quantified.

Summary of Recommended Pollution Prevention Opportunities

Unit operation	Pollution prevention action and environmental/product quality benefit	Cost	Payback period
Chromium Tanning	Recycle chrome tanning - decreases Chromium to less than 3 mg/l	$20,000 (saves $60,000 per yea	r4 months
Solvent Discharge	Change to water-based lacquer finish decreases VOC usage by 60-90 per cent	None	To be determined
Water use	Change to batch wastes - decreases water usage by 20-40 per cent	None	To be determined
Solid waste	Save leather trimmings for reconstituted leather - decrease leather waste by 60-80 percent	10,000	To be determined
Sulfide waste	Destroy sulfides by air oxidation - decreases sulfide waste by 95-98 percent	30,000	To be determined
Suspended solids	Primary treatment - dresses suspended solids by 70-85 percent	100,000	To be determined
Sludge from Efluent	Dry sludge for land application - allows disposal of sludge as fertilizer	20,000	To be determined

BOD* — *Biochemical Oxygen Demand* *Ref: http://leather.webindia.com/enviro.htm*

Representation of the various impacts on the total environment



Sources of Solid and Gaseous Wastes in a Tannery

Process	Solid Waste	Gaseous Pollutants
1. Raw Materials	--	Odour from putrefaction
2. Curing	Used Salt	Odour from rotten hides
3. Soaking	-	--
4. Liming	Lime Sludge	Odour
5. Unhairing	Hair, bristle	Odour
6. Defleshing	Fleshings	Odour of flesh
7. Deliming	--	Odour of spent deliming liquor
8. Veg. Tanning	Spent tan bank tan liquor sludge	Odour of tannis
9. Chrome tanning	Chrome tanned shavings	Chromium
10. Finishing	Splits, whitenings	Smell of laquers dust
11. Treatment of Effluent	Sludges	Odour of sludges

Source : Environmental Implications of Leather Tanneries (ISBN 81-7024 564 8) Dhulasi Birundha Varadarajan, Saradha Krishnamoorthy

Eco-friendly Biotechnological Solutions for Leather Industry

Processing industries including leather processing are an outcome of socio-economic activities that have adversely affected the environment. Leather industry uses hides or skins which is a waste product mainly from slaughter houses. The tanning process, however, involved in making leather causes environmental pollution of a very high order. Pre-tanning and tanning processes contribute 80% - 90% of the total pollution in the industry. These processes generate noxious gases such as hydrogen sulphide, ammonia and solid waste (like lime, chrome, tannins, sludge, proteins, etc.).

The two major problems for this industry are (i) availability of good quality water and (ii) the treatment of such large quantities of effluents. Almost 70% of the pollution originates from pre-tanning operations. Biotechnological processes can help in use of enzymes for de-hairing process and in treatment of wastes to reduce the level considerably. Application of biotechnology/enzymes can be used at most stages in the leather-making industry (except the actual tanning process). Some of the important stages of leather processing involving biotechnology are :

Soaking : Carbohydrases and proteases shorten wetting times, loosening of the SCUD, initiation of FIBER OPENING, and production of a product with less wrinkle. Examples : Perdol VEL, Basozym S20, Quicesoak, etc.

Dehairing : Proteolytic enzymes from various sources (e.g. from bovine or porcine pancreas, bacterial, fungal or plants) along with little lime and sulphide is used in de-hairing. The mixture is applied onto the flesh-side, causing the hair to be loosened, which can be removed easily. Microbial proteases exhibit several advantages in terms of scalability, efficiency and pollution control. Examples : Basozym L10, Microdep C, Forezym LM, etc.

Bating : Proteases are used under alkaline or acidic conditions for bating. Examples : Microbate Liquid, Trupozym, Merpizym 4581, NovoBate 160, etc.

Degreasing : The advantage of using lipases is that it gives a more uniform colour and a cleaner appearance. The surfactants can be substituted with more biodegradable surfactants and lipases can reduce the surfactant dosage by at least 50%. Examples : Debazym LP1, Greasex, reazym LP, etc.

Recent developments have resulted in tremendous advancement in the production and application of bio-products in various leather processing steps. The challenge to the bio-technology research is to produce enzymes with sufficient specificity at a low-cost for different formulations that are specific for use with cow, buffalo, goat and sheep-based raw materials. Application conditions for biological materials would also need to be fine tuned for making shoe-uppers, garments, gloves and industrial leather. Extremozymes from halophiles and alkaliphiles can be developed for this purpose.

In brief, it can be stated that in future, biotechnological processes that reduce environmental pollution in leather industry may be used to bring down the pollution to near-zero level. However, this will be at an additional cost for adopting greener processes.

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Leather tanning information

WHAT IS TANNING

Leather is made from animal skins or hides which have been chemically treated to preserve quality and natural beauty. The chemical procedure used to ready raw animal hides for use is called "tanning." A piece of hide or skin which has been tanned produces a strong, flexible leather which is able to resist decay and spoilage. The majority of leather made today is produced from tanned cattle hides, though many types of hides can be used, including those from horses, pigs, goats, calves, labs, deer, kangaroos, reptiles, seals, and walrus.

STAGES OF TANNING

Raw animal skins go through several steps during the tanning process. Depending on the type of hide used and the desired end-product, the steps taken during tanning can vary greatly. CURING Animal skins or hides are first "cured," a process which involves salting and/or drying the hide once it's been stripped from the animal. Because this step needs to be performed almost immediately upon removal from the animal, it often takes place inside the meat-packing industry or at a nearby factory.

SOAKING

Once the hides have been cured, they are then soaked in water for several hours to several days. The water helps to rid the skin of salt, dirt, debris, blood and excess animal fats.

FLESH REMOVAL

After soaking, animal hides are moved through a machine which strips the flesh from the surface of the hide.

HAIR REMOVAL

The hides are then transported to a large vat, where they are immersed in a mixture of lime and water, which loosens the hair from the skin. After a 1-10 day soak, the hair is mechanically removed from the hide.

SCUDDING

Stray hairs and fat which were missed by machine, are removed from the hide with a plastic tool or dull knife in a process known as "scudding." Scudding is done by hand.

DELIMING

After the hair and debris has been cleaned from the skin, hides are delimed in a vat of acid. After the lime has been pulled from the skin, hides are treated with enzymes, which smooth the grain of the leather and help to make the resulting product soft and flexible.

TANNING

Hides and skins are often treated several times during the process of tanning. Which type of tanning procedure is used, depends largely on the hide itself and the resulting product intended.

VEGETABLE TANNING

Hides which have been tanned with a vegetable tanning agent solution produce flexible, but stiff leathers, such as those used in luggage, furniture, leashes, belts, hats, and harnesses. Vegetable tanning consists of stringing hides on large frames, located inside large vats, and exposing them to tannin, a natural product found in the bark, wood, leaves and fruits of chestnut, oak and hemlock trees.

MINERAL TANNING

Mineral or chrome tanning is performed on skins which will be used for softer, stretchier leathers, such as those found in purses, bags, briefcases, shoes, gloves, boots, jackets, pants, and sandals. Hides which are tanned with minerals are pickled first in an acid and salt mixture. From there, hides are soaked into a chromium-sulfate solution. This process is much faster than vegetable tanning, and is usually a 1-day project.

DYEING PROCESS

Depending on the desired product, the hides then go through a dyeing process, which also involves adding moisture back into the skin. Hides which have been vegetable tanned are bleached and them soaked with oils, soaps, greases and waxes

to make them more pliable.

ROLLING

Rolling leather running the skins through a machine, which works to firm the leather to make it stronger. After the rolling process has finished, leathers are stretched, where they dry out in a heat controlled room.

FINISHING COMPOUND

The final step in the tanning process involves finishing the skin. This is done by covering the grain surface with a chemical compound and then brushing it. Light leathers are buffed and sandpapered to cover imperfections. Leathers which are buffed for long periods of time become suede.

Waxes, pigments, dyes, glazes, oils, waxes and other solutions are also added to make the leather more appealing to the buyer.

POLLUTION

Environmental pollution has been a major issue in leather industry. Chemicals used in the leather processing happen to be the main cause of this pollution. These chemicals mainly in the pre-tanning processes are lime, sodium sulphide, salt, solvents etc. The wastes from the tanneries are, again, let out into the drain which in turn empty into the main sewage causing hazards to those using this water.

The attention of the leather industry is therefore focused towards revamping the processes, recovering the systems to improved and effective effluent treatment techniques to make the leather processing eco-friendly to the extent possible.

Source : www.essortment.com/all/leathertanning-rdcu.htm

The major production centers for leather and leather products are located in:

Tamil Nadu - Chennai, Ambur, Ranipet, Vaniyambadi, Trichy, Dindigul

West Bengal Kolkata

Uttar Pradesh Kanpur, Agra & Noida

Maharashtra - Mumbai

Punjab - Jallandhar

Karnataka Bangalore

Andhra Pradesh - Hyderabad

Haryana - Ambala, Gurgaon, Panchkula and Karnal

Delhi.

Environmental Awareness Non-existent : A Case from Egyptian Tanneries

(Environmental awareness is non-existent in Egyptian Tanning industry. Here is a case study presented in Leather International.)

With the object of increasing awareness about the needs and advantages of using friendly environmental methods in tanning processes in the Egyptian tanneries, the Technological Institute for Footwear and Related Industries in Spain (INESCOP) together with the Egyptian Ministry of Trade and Industry (MTI) have been collaborating since January 2005 on the European LIFE project with support from the European Commission partially financing the costs.

Since the beginning of the Ecotan project, different activities have been carried out: the elaboration of a questionnaire regarding environmental issues that was completed by 25 Egyptian tanning companies, a diagnostic report including a compilation of the main results obtained from the questionnaires in addition to carrying out Initial Environmental Reviews in different Egyptian tanneries. These activities have allowed a better understanding of the present environmental situation in Egyptian tanneries, with the objective of knowing the sector's main environmental needs.

Most of the Egyptian tanneries are located in Misr al Kadima district (old Cairo), also known as the 'Tanners' District' (Sour Magra EL Ayoun), in the South of Cairo. The tanneries located in this area are suffering from a cycle of pollution in addition to the very poor state of their infrastructures. Furthermore, the tanneries in this area use obsolete machinery, without almost any clean technologies being implemented. Generally, the tanneries of old Cairo suffer from deficiencies in the state of the buildings, and the electrical and hydraulics facilities, as well as unorganised distribution of the production process in plant and an insufficient state of order and cleanliness. This situation is caused, partly, by the age of the facilities, which do not only influence the environmental situation, but also the productivity and the quality of the final product.

The Egyptian tanning factories often consist of one or several buildings that have several stores in which different activities in different floors are carried out where generally there is a significant lack of proper lighting and healthy conditions.

In general, the tanneries carry out: beamhouse, tanning, dyeing, and finishing processes. The most used leathers are bovine leathers and buffalo hides, small and large in size, in addition to other types of leather such as caprine.

Most significant aspects

In order to transform the leather into a durable material suitable for the manufacturing of finished goods, the tanner uses a series of chemical products and water. As a result, liquid waste is produced that carries the leather's organic matter and remains of chemical products. In addition, there is solid waste from the mechanical operations and emissions into the atmosphere (solvents from finished products, gases from the combustion in the boilers etc).

Egyptian tanneries, in general, do not have easy access to environmental information and often lack anyone who is responsible for environmental issues. The workers do not receive any type of environmental training, although from the responses to the questionnaire training appeared to have been of interest.
Some other aspects include the following :

In most cases, Egyptian tanneries rarely apply energy conservation practices. Generally the lack of infrastructure in these industries also hinders the installation of water treatment plants. Sources of atmospheric emissions mainly from combustion gases (through boilers) like sulpher compounds, CO2, Nitrogen Oxides, etc. are not being measured in Egyptian tanneries in a large number of cases. Waste materials management is fairly poor. Good ventilation, waterproofed floors, total avoiding of spillage etc. need a lot to be done. There have been cases where dangerous and non-dangerous wastes have not been separated and timely disposal of waste not being done. Thus it can be said that there is hardly any awareness of environmental safety and health in most of Egyptian tanning units.

Conclusions

Most of the Egyptian tanneries have difficulty in accessing information about the environment and possible applications for their company

In general, there is not a person in charge of environmental issues and there is scarce training and awareness with regards to environmental issues

In most cases, the environmental obligations that must be fulfilled are unknown, which makes it even more difficult for Egyptian tanneries to meet existing regulations

Egyptian tanneries have shown interest in knowing more about environmental issues and in training their workers accordingly

In general, Egyptian tanneries do not know how much energy and water is consumed, a practice that could improve saving natural resources

In general, Egyptian tanneries' industrial landfill sites are not treated, meaning that the amount of polluted wastewater is expected to be quite high

Waste management in some Egyptian tanneries is inadequate, with regards to separating it into categories (dangerous and non-dangerous)

Management of waste is generally not known

Egyptian tanneries generally do not know how long dangerous waste can be stored

In general, the security methods used in the dangerous waste materials warehouse should be improved

In most cases the atmospheric emissions from the Egyptian tanneries have not been measured, meaning that it is not known if the companies are within the limits that are permitted by law

None of the surveyed Egyptian tanneries have measured the level of sound emissions

In summary, all of the environmental aspects that have been studied could be improved.

Recommendation :

A good way of improving the environmental situation of Egyptian tanneries is the design and promotion of clean technologies that can be applied to the sector. For this reason, the Ecotan project's main objective is the demonstration of clean technologies to be applied in the Egyptian tanning sector, as well as making them more aware of the need of applying more environmentally friendly processes. This practice could contribute to reinforcing environmental policy and serve as an example for other developing countries.

** Egyptian Ministry of Trade and Industry (MTI)

Http://www.leathermag.com/news/fullstory.php/aid/13084/Environmental_awareness_non-existent.html

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