



ILTA
Since 1950

JILTA

Journal of Indian Leather Technologists' Association

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Synopsis of Objectives

- An Association with over 550 members from India and abroad working since last 72 years for the growth and development of Leather and its allied industries.
- Organize seminars, symposiums, workshops in order to share information, knowledge & latest development and interactions for the benefit of all concerned.
- Organize Human Resource Development programmes on regular basis.
- Publish for over 72 years, a technical monthly journal namely “Journal of Indian Leather Technologists’ Association” (JILTA), widely circulated through out the World.
- Publish books for the benefit of the students at various levels of study, for the Research Scholar and the Industry.
- Work as interface between Industry and the Government.
- Assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies for the growth of the Industry.
- Assist small and tiny leather goods manufacturers in marketing their products by organizing LEXPOs in Kolkata and different parts of India.



Indian Leather Technologists' Association

[A Member Society of International Union of Leather Technologists' and Chemists Societies]

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Since 1950

**JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION
(JILTA)**

DECEMBER, 2023

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

Indian Leather Technologists' Association is a premier organisation of its kind in India was established in 1950 by Late Prof. B.M.Das. It is a Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS).

The Journal of Indian Leather Technologists' Association (JILTA) is a monthly publication which encapsulates latest state of the art in processing technology of leather and its products, commerce and economics, research & development, news & views of the industry etc. It reaches to the Leather / Footwear Technologists and the decision makers all over the country and overseas.

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(Member Society of International Union of Leather Technologists and Chemists Societies)

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Economic Impact of the Global Unrest



The current geopolitical conflict in the Middle East due to the ongoing conflict has brought fresh global headwinds for the Indian economy. Ever since the war broke out earlier, international crude oil prices have risen over 5 per cent and US bond yields have breached the 5 per cent-mark to hit 16-year high levels. The economic impact of global oil supply has important implications for India – a net importer of crude oil – to deliver price stability.

Analysts say that India continues to see macroeconomic stability at this moment, but is vulnerable to one key risk - supply disruption in crude oil prices because of escalation in the conflict, resulting in a spike in crude oil prices. International crude oil prices may rise significantly if significant Middle East powers do not get involved in the conflict. If that happens, it may lead to selling pressure in the market.

With major oil producers e.g., Saudi Arabia and Russia have announced oil supply cuts of a combined 1.3 million barrels per day (mbpd) till the end of the year, the global economy already is facing an oil market deficit. Now, with oil prices hovering above the \$90 per barrel-mark, the escalation of the conflict towards other Middle Eastern oil producers is concerning and requires careful monitoring, especially given the global economy's 'higher for longer' interest rate scenario. The oil supply is unlikely to be threatened unless the issue expands to other nations in the region and becomes a proxy conflict between the US and other major stake holding nation.

"Brent had crossed the \$90 mark but then retreated. Now, we can use the \$90 number to be the threshold beyond which there is trouble for the world economy," said Shantanu Bhargava, Managing Director, Head of Discretionary Investment Services, Waterfield Advisors. When oil prices rise, the cost of production for various industries and energy costs for businesses and households also surge, driving global inflation higher. High energy prices and new inflationary trends could undermine the efforts of central banks to bring inflation under control.

With this pertaining issue, central banks across the globe will continue hiking interest rates, which will slow down the global economic growth. The global economy faces high inflation again as crude oil prices rise. If oil prices stay high, the US, India, China, and other major nations that import oil may see substantial import inflation. India - a net importer of crude oil which fulfils as much as 85 per cent of its energy needs through imports, may see a heavier import bill if international crude oil prices keep rising throughout the year. It can result in a trade deficit, as India has to spend more on oil imports, which can, in turn, put pressure on the country's current account balance. "High crude oil prices hurt India impacting its currency stability, possibly worsening the government's fiscal deficit (the government is likely to absorb higher prices by cutting excise duty), widening the current account deficit (CAD) further impacting currency adversely and affecting the profit margins of sectors such as aviation, paints, tyres and chemicals," said Waterfields' Shantanu Bhargava.

CAD is a key indicator of the balance of payment of a country and in the current scenario of the momentum picked up by crude rates, every \$10 dollar rise in Brent futures potentially widens the CAD by 0.5 per cent, according to market experts.

"Every 10 dollar rise in Brent crude prices widens India's current account deficit by 0.5 per cent. Consequently this depreciates the INR and leads to imported inflation," said Dr. V K Vijayakumar, Chief Investment Strategist at Geojit Financial Services. High oil prices push the US dollar above against its peers, which in turn, is a downside for the Indian rupee. Since India pays for oil imports in dollars, a higher oil import bill can lead to an increase in demand for dollars, potentially weakening the rupee against the dollar. If the crude oil price continues to rise, it could have a significant impact on some specific stocks and the broader economy. The Indian crude oil basket has averaged ~\$80.1 per barrel in the first five months of FY24. But the price of the Indian crude basket touched \$90.7 per barrel in the first week of September.

If Brent crude prices remain elevated for the remainder of the fiscal year, we anticipate that the full-year average price for Indian crude oil basket could be ~\$86-87 per barrel, according to estimates given by brokerages.

High international oil prices will raise the average Indian crude basket price and the oil marketing companies (OMCs) including Indian Oil, Bharat Petroleum Corp Ltd (BPCL) and Hindustan Petroleum Corp Ltd (HPCL), will register losses in gross refinery margins.

“As we approach the pre-election period, we anticipate that OMCs will absorb a significant portion of the elevated global crude prices. The government may also consider partially sharing this burden with OMCs by reducing certain duties and taxes on retail fuel prices,” said CareEdge Ratings.

An increase in international oil prices may lead to higher fuel prices, which can trigger inflationary pressures. According to the Reserve Bank of India (RBI), the sustained increase in prices is expected to lead to a lower aggregate demand as households and firms are left with less disposable incomes to spend on non-energy goods. This is how domestic consumer prices respond to an oil supply news shock. Surprise changes in oil prices can also influence the price and wage-setting in the economy by altering the inflation expectations of firms and households, and so, domestic economic activity falls on impact of such a shock.

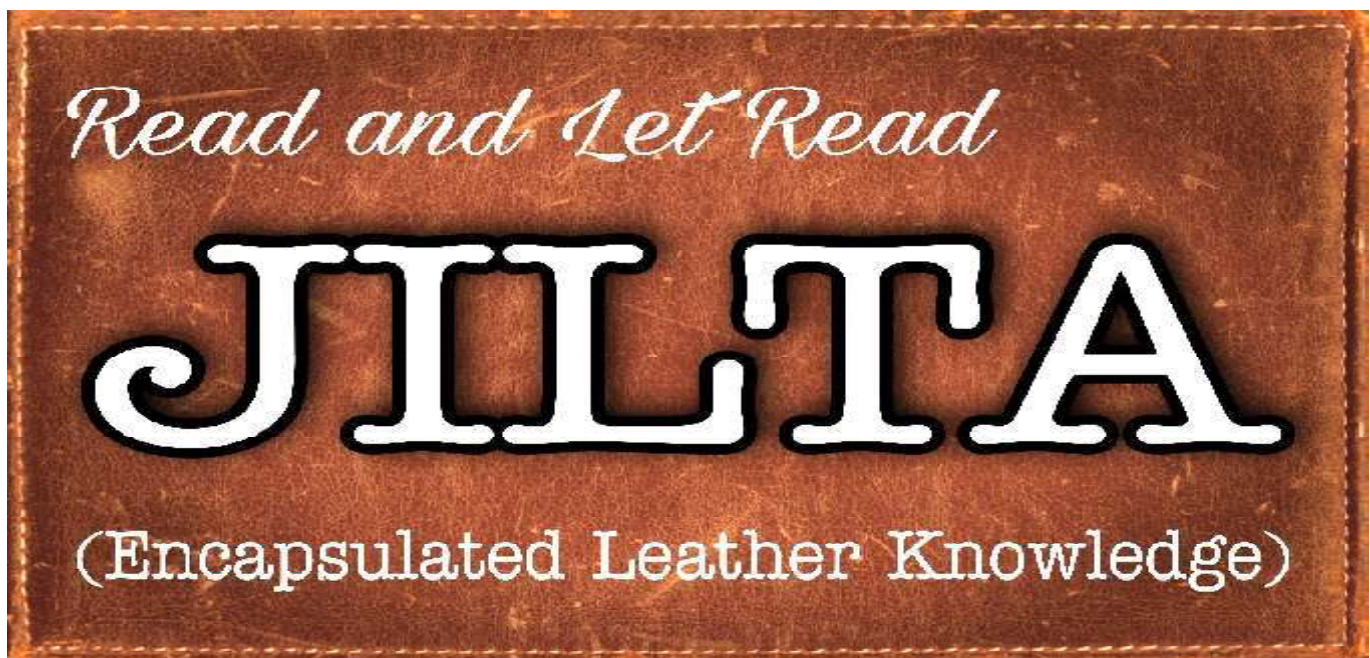
The government often subsidizes fuel prices to protect consumers from the full impact of rising oil prices. “If the crude oil prices remain at their elevated level for longer, the government may need to increase subsidies or absorb a portion of the price increase, leading to a higher fiscal deficit”, according to ICICI Securities.

In simple words, the government bears the difference between the market price and the controlled price of oil and gas end-products such as kerosene, diesel, liquified petroleum gas (LPG). This is likely to widen the fiscal deficit - expressed as a percentage of the country’s gross domestic product (GDP).

World is going to face similar conflicts in the very coming days and is going to impact economy of the developing nations and will destabilise the super nations as they will be impacted by the conflict due to their direct participation in the conflict and their endeavour to safeguard economic interests. Ultimately, common people are going to suffer. Simultaneously, India will prosper in export of skilled manpower to different corners of the world for re – constructions well as management of assets of the developed nations too.

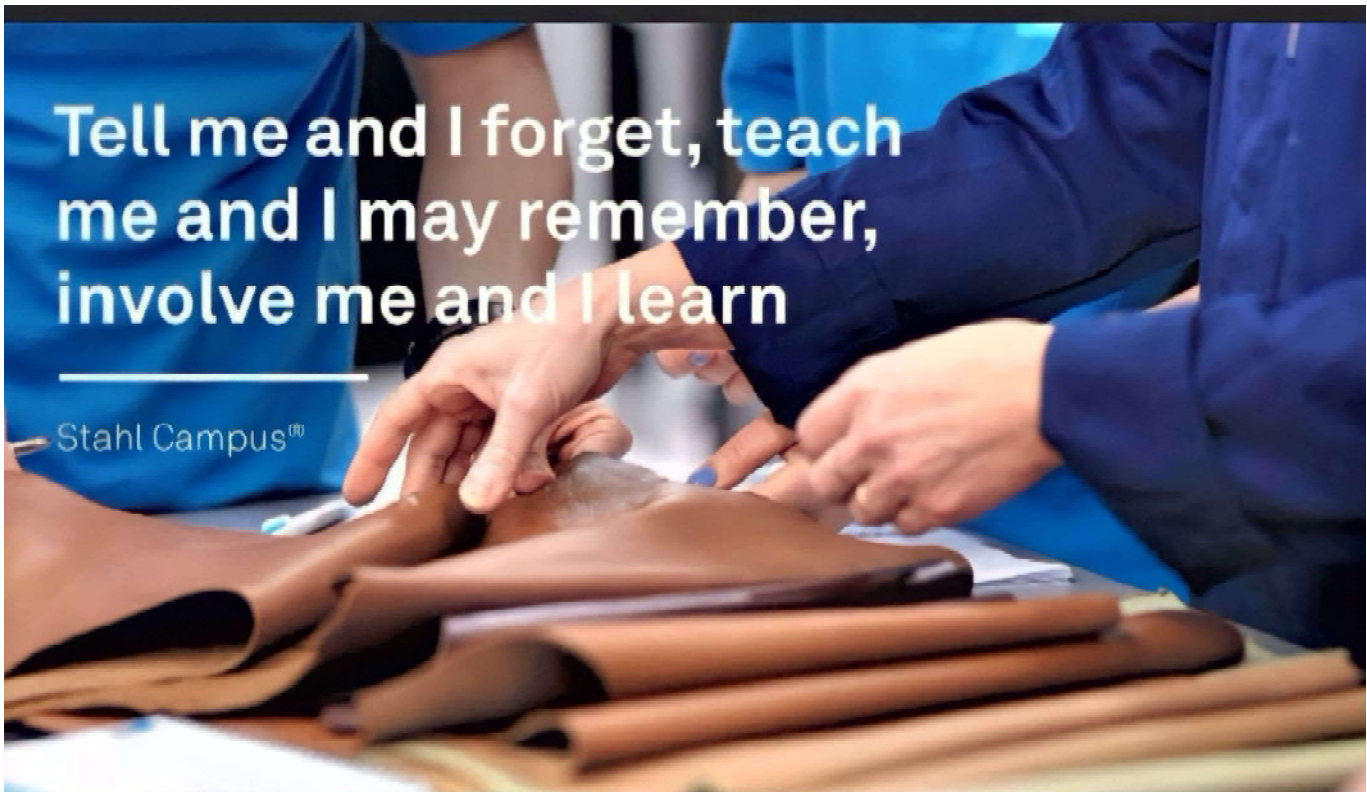
Goutam Mukherjee

Dr. Goutam Mukherjee
Hony. Editor, JILTA





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As an active proponent of responsible chemistry, Stahl has established the Stahl Campus[®] training institute in its Center of Excellence for sustainable leather technologies in Kanpur. With our Stahl Campus[®] Leather Modules, we can offer training and information, such as responsible chemistry and sustainability in leather production. We believe that in this way, we facilitate transparency that inevitably will lead to a better supply chain with responsible chemistry.

Our approach is modular, making it easy to tailor learning programs to specific needs. Stahl Campus[®] has at its core the drive to unlock human potential and make that new

competitive advantage. By providing the possibility of sharing knowledge, we embrace our role in the dynamic leather and chemical industry. Stahl Campus[®] is a great opportunity to strengthen skills and capabilities in order to make working methods more efficient by sharing experiences and studying products and procedures.

If you're interested to receive more information on Stahl Campus[®], please contact Prasanna Maduri (Prasanna.maduri@stahl.com).

If it can be imagined, it can be created.





ILTA
Since 1950



Stahl

We imagine sustainable pickle-free leather tanning

If it can be imagined,
it can be created.

Tanners benefit from higher process efficiency, reduced water, chemical and salt consumption and a reduced environmental impact. This makes it possible for tanners to have an efficient process that is also sustainable and yields ecofriendly premium leathers.

High-quality leather no longer forces a choice between responsible processes and efficiency. The main benefits of a pickle-free system that avoids salt oxidation during pickling are:

- Reduction of water consumption by up to 40%
- Shorter process time on cow, sheep and goat
- Cleaner effluent, TDS reduction by up to 40%

STAHL SECURES ISCC PLUS RE-CERTIFICATION FOR FACILITIES IN GERMANY AND THE NETHERLANDS

Stahl, a leading provider of coating technologies, announces the successful re-certification of two manufacturing sites, in Germany and the Netherlands, according to the ISCC PLUS standard. The re-certification of the sites by certifying body TÜV NORD means Stahl can continue to scale up its use of renewable feedstocks across its polyurethane portfolio and beyond. This will enable the company to offer customers more products containing attributed renewable raw materials. The development marks a key step forward in Stahl's supply chain transparency ambitions, targeting greenhouse gas (GHG) emission reductions across the value chain.



The ISCC PLUS-certified products manufactured at Stahl's Waalwijk and Leinfelden locations include selected polyurethane coatings for flexible materials such as textiles, film and paper. The polyurethanes are made with between 20% and 70% renewable attributed biomass and recycled content. These products have the same performance as traditional fossil-based alternatives.

Renewable content is measured and verified using the mass balance methodology. This is a calculation-based approach that tracks the flow of materials through complex supply chains. Mass balance-certified products, such as those adhering to the ISCC PLUS standard, typically contain a mix of renewable- and non-renewable-derived feedstocks. The mass balance principle ensures that the percentage of renewable feedstocks always remains consistent, from sourcing to finished product.

Michael Costello, Group Director of ESG at Stahl:fl *"Mass-balance certification verifies that Stahl's manufacturing sites adhere to the highest standards of traceability, which is required to produce high-performing products containing both fossil- and renewable-derived feedstocks. Certification also requires a transparent chain of custody for the renewable raw materials used by the reporting company. This is essential to mitigate potential upstream supply chain risks, making ISCC PLUS certification a key tool for promoting greater supply chain transparency across the industry."*fl

Lidia Martínez, ESG Supply Chain Transparency Manager at Stahl:fl *"We are pleased to offer customers more mass balance-certified products made with ISCC PLUS-certified raw materials. Thanks to our re-certification, we can keep expanding our range of mass balance-certified polyurethanes made with bio-based, bio-circular and circular raw materials. ISCC PLUS re-certifications are an assurance of the quality and transparency of Stahl's mass balance bookkeeping. Alignment with ISCC PLUS is one of the ways we support the responsible sourcing of renewable feedstocks by providing proof of traceability."*

About ISCC PLUS

ISCC – International Sustainability and Carbon Certification – is a certification system that offers solutions for the implementation and certification of sustainable, deforestation-free and traceable supply chains for a wide range of bio-

based and circular materials. These include biomass waste and residues, non-biological renewables and recycled carbon materials. Independent third-party certification ensures compliance with high standards of ecological and social sustainability, as well as traceability, throughout the supply chain. All ISCC PLUS certificates are publicly available via the ISCC PLUS portal.

About TÜV NORD

A leading certifying body with more than 1,200 expert auditors all over the world, TÜV NORD provides professional audit and certification services across a range of industries, from aerospace to food service. TÜV NORD has been Stahl's certification partner since 2022 when it certified compliance with the ISCC PLUS standard at Stahl's Waalwijk and Leinfelden sites.

(Stahl News – 18/07/2023)

**STAHL DEMONSTRATES PROGRESS ON ESG AMBITIONS WITH
SECOND CONSECUTIVE PLATINUM ECOVADIS RATING**



Stahl, a leading provider of coating technologies for flexible substrates, has been awarded a Platinum rating by the sustainability rating agency EcoVadis for the second consecutive year. For the 2023 EcoVadis assessment, Stahl's rating increased by three points compared to its 2022 score, reflecting the company's improved performance in the area of labour and human rights.

EcoVadis is a globally recognised, evidence-based rating platform that assesses the performance of more than 75,000 organisations against key sustainability criteria across four categories: Environment, Labour & Human Rights, Ethics and Sustainable Procurement. For the 2023 EcoVadis assessment, Stahl received an overall score of 80 out of 100, up from 77 in 2022. This score indicates an advanced level of sustainability maturity and ensures that Stahl retains its Platinum rating. This is awarded to the top 1% of companies assessed by EcoVadis. Stahl achieved its first Platinum rating in 2022, having undergone its first EcoVadis assessment in 2015.

Ingrid Weijer, ESG Performance Manager at Stahl:fl *"We are proud to have maintained our Platinum EcoVadis rating for the second year in a row. This score reflects Stahl's ongoing commitment to transparency and the new policies and initiatives that were introduced over the past 12 months. But we are not perfect, and the EcoVadis evaluation criteria are becoming more demanding, so we will continue to work to improve our performance into next year."*

Progress in the Labour & Human Rights category

The 2023 EcoVadis assessment revealed the progress Stahl is making in the Labour & Human Rights category, where Stahl scored 90 out of a possible 100 points. This reflects the company's recent work to improve its health and safety management systems. In particular, the majority of Stahl's global manufacturing sites are now ISO 45001 certified and more than 94% are ISO 14001 certified. Stahl has also taken steps to improve its approach to employee career development and well-being. These include the creation of an individual career plan for all employees and the introduction of a new company-wide employee satisfaction survey.

Stahl moves forward with 2030 ESG ambitions

Stahl has set a 2030 target to maintain its EcoVadis Platinum rating by working closely with its value chain partners to help them reduce their impact. In 2022, 83% of Stahl's total spend on raw materials was sourced from EcoVadis-rated suppliers.

(Stahl News – 19/09/2023)



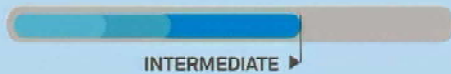


Only the top 1% of companies worldwide are **platinum-rated**

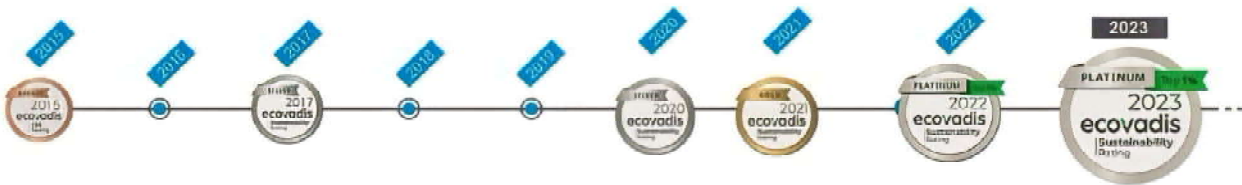
For the second consecutive year, Stahl has been awarded an EcoVadis Platinum rating. This follows an improved result in the 2023 assessment, led by higher scores in the Labour & Human Rights category.



Carbon Management Level



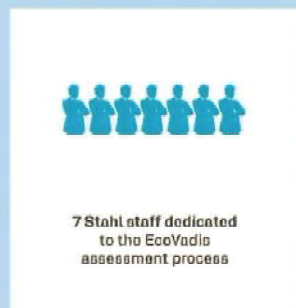
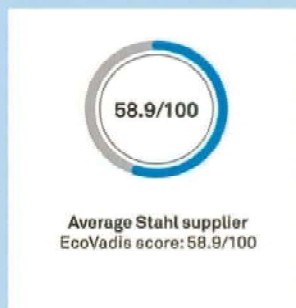
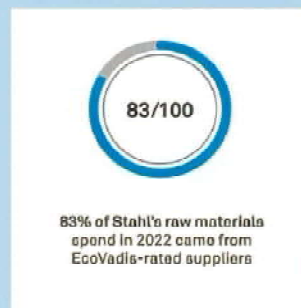
OUR JOURNEY BEGAN IN 2015



2022 OVERALL SCORE



2022 INDIVIDUAL SCORES



From the desk of **General Secretary**



MOTIVATIONAL LECTURE AT GCELT

As per decision taken in the 561st E. C. Meeting held on 30/11/2023, Visiting Lectures will be organized on 10th of every month in Conference Room of GCELT, Kolkata from January, 2024 onward.

The 1st Lecture of the series will be delivered by Mr. Aloke Sengupta, Director, M/s ASG Leather Private Limited, Kolkata on the topic "Entrepreneurship Development".

22nd SANJOY SEN MEMORIAL LECTURE

The 22nd Sanjoy Sen Memorial Lecture will be organized by our Association on Monday, the 15th January, 2024 (as 14th January, 2024 being a Sunday).

Update of the progress will be shared in due course.

5th PROF. S. S. DUTTA MEMORIAL LECTURE

The 5th Prof. S. S. Dutta Memorial Lecture will be organized by the Southern Regional Committee of ILTA on 2nd February, 2024 at Chennai Trade Centre during India International Leather Fair'2024.

Update of the progress will be shared in due course.

14th ASIA INTERNATIONAL CONFERENCE ON LEATHER SCIENCE & TECHNOLOGY (AICLST)

ILTA is on the way to organize the 14th Asia International Conference on Leather Science & Technology (AICLST) in the year 2026 at Kolkata, India as endorsed by the IULTCS Secretariat.

It is proposed that this would be organized during the Platinum Jubilee Celebration year of ILTA from August, 2025 to July, 2026, preferably nearer the time Chennai Trade Fair in February, 2026.

Planning & Details of the program would be shared in due course.



(Susanta Mallick)
General Secretary

BEREAVEMENT

With profound grief and a heavy heart, we announce the sad demise of Shri Paresh Chandra Mukherjee on 27th November' 2023. He was a senior Life Member of ILTA.

May his soul rest in peace and May God give strength to the Members of the bereaved family to bear the irreparable loss.

RECEIVING PRINTED COPY OF JILTA EVERY MONTH

We have started to post Printed copy of JILTA from April' 2022 to members and all concerned as it was before Covid period. Simultaneously we have been sending the e-copy of JILTA through email also to all the concerned receivers.

If you are not receiving JILTA by Post or through email, may please verify your Postal Address and/or Email Id with our office at the earliest.

PUBLISH YOUR TECHNICAL ARTICLE

Faculties, Research Scholars and students of various Leather Institutes may wish to publish their Research / Project papers in an Article form in this monthly technical journal, JILTA.

Interested author may sent their paper (in MS Word format) along with a PP Photograph and Contact details like Email, Mobile etc. to our email IDs : admin@iltaonleather.org / jiltaeditor@gmail.com

Members are requested to :-

- a) Kindly inform us your '**E-Mail ID**', '**Mobile No**', '**Land Line No**', through E-Mail ID: admin@iltaonleather.org or over Telephone Nos. : 24413429 / 3459. This will help us to communicate you directly without help of any outsiders like Postal Department / Courier etc.
- b) Kindly mention your **Membership No.** (If any) against your each and every communication, so that we can locate you easily in our record.

YOUTUBE CHANNEL & FACEBOOK PAGE OF ILTA

An official **YouTube Channel** namely **ILTA Online** and a **Face Book Page** namely **Indian Leather Technologists' Association** has been launched for sharing the activities of our Association since November' 2020 and July' 2021 respectively.

You may find all the Lives / Video recordings of different Seminar, Symposiums & Webinars on both of these social medias along with our website www.iltaonleather.org time to time.

You are requested to kindly do **Like & Subscribe** the YouTube Channel and "**Follow**" the FaceBook Page to get regular updates on the activities of our Association.

General Secretary and the Members of the Executive Committee are available to interact with members at 18.30 hrs, at our Registered Office on every Thursday



ILTA
Since 1950

Solidaridad

With over 50 years of experience in developing sustainable solutions to make communities more resilient, Solidaridad has been working on many different issues, from supporting marginalized communities to fostering a more sustainable supply chain.



Castor



Tea



Sugarcane



Leather



Textile



Palm Oil



Aquaculture



Dairy



Fruits &
Vegetables



Gold



Soy



Cocoa



Coffee



Livestock



Medicinal Plant

Solidaridad

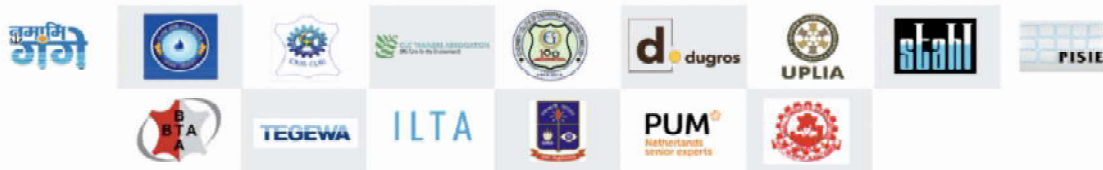
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GRANTS PROGRAMME 

**EFFECTIVE WASTE MANAGEMENT AND SUSTAINABLE
DEVELOPMENT OF MSME TANNING COMPANIES IN KOLKATA
LEATHER CLUSTER (BANTALA)**

2022-2023



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Application of Lean Tools in Leather Processing Industry



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ABSTRACT :

The value and non-value-added process in a leather manufacturing process is differentiated. The batches / week attainable at each process / station is studied. The utilization rate at each process / station is calculated. The idle time at each process / station is calculated. Ergonomic assessment using RULA is done for unhairing operation.

Keywords : leather process, ergonomic assessment, RULA

I. CLASSIFICATION AS VALUE ADDED AND NON-VALUE-ADDED ACTIVITIES

A process of manufacturing raw skin to 30,000 square feet of upper leather is taken for study^{1,2,3}.

Table 1.1. Raw Skin to Finished Upper Leather - 30,000 sq.ft.

| Sl. No. | Process | Processing Time in hrs | Value Added activities | Non-value added activities |
|---------|----------------|------------------------|------------------------|----------------------------|
| 1 | Soaking | 7 | 7 | |
| 2 | paint liming | 24 | | 24 |
| 3 | unhairing | 32 | 32 | |
| 4 | reliming | 72 | | 72 |
| 5 | fleshing | 32 | 32 | |
| 6 | washing | 0.25 | | 0.25 |
| 7 | deliming | 0.75 | | 0.75 |
| 8 | bating | 0.75 | | 0.75 |
| 9 | pickling | 1.67 | | 1.67 |
| 10 | chrome tanning | 1.5 | 1.5 | |
| 11 | basification | 1.5 | | 1.5 |
| 12 | wetback | 1 | | 1 |
| 13 | pretanning | 0.58 | | 0.58 |
| 14 | rechroming | 1.75 | | 1.75 |

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| Sl. No. | Process | Processing Time in hrs | Value Added activities | Non-value added activities |
|---------|----------------------------|------------------------|------------------------|----------------------------|
| 15 | overnight | 12 | | 12 |
| 16 | retanning and fatliquoring | 2.67 | 2.67 | |
| 17 | fixing | 2 | | 2 |
| 18 | sammying | 32 | 32 | |
| 19 | setting | 32 | 32 | |
| 20 | vacuum drying | 32 | 32 | |
| 21 | hooking | 6 | 6 | |
| 22 | staking | 32 | 32 | |
| 23 | buffing | 32 | 32 | |
| 24 | finishing | 13 | 13 | |
| 25 | Total in hours | 372.42 | 254.17 | 118.25 |
| 26 | Total in days | 16 | 11 | 5 |
| | | | 68.25% | 31.75% |



Table 1.2. The process time with achievable number of batches in a week

| Sl. No. | Process | Processing Time in hrs | No. of Batches per week |
|---------|--------------|------------------------|-------------------------|
| 1 | soaking | 7 | 24 |
| 2 | paint liming | 24 | 7 |
| 3 | unhairing | 32 | 5 |
| 4 | reliming | 72 | 2 |

| Sl. No. | Process | Processing Time in hrs | No. of Batches per week |
|---------|-------------------|------------------------|-------------------------|
| 5 | fleshing | 32 | 5 |
| 6 | tanning drum | 0 | 31 |
| 7 | post tanning drum | 20 | 8 |
| 8 | sammying | 32 | 5 |
| 9 | setting | 32 | 5 |
| 10 | vacuum drying | 32 | 5 |
| 11 | hooking | 6 | 28 |
| 12 | staking | 32 | 5 |
| 13 | buffing | 32 | 5 |
| 14 | finishing | 13 | 13 |

Table 1.3. The utilization rates of various stations:

| Sl. No. | Process | Section Output per week | Line Output per week | Utilization |
|---------|---------------|-------------------------|----------------------|-------------|
| 1 | soaking | 24 | 2.33 | 9.71% |
| 2 | paint liming | 7 | 2.33 | 33.29% |
| 3 | unhairing | 32 | 2.33 | 7.28% |
| 4 | reliming | 2.33 | 2.33 | 100.00% |
| 5 | fleshing | 5.25 | 2.33 | 44.38% |
| 6 | drum tanning | 30.5 | 2.33 | 7.64% |
| 7 | post tanning | 8.4 | 2.33 | 27.74% |
| 8 | sammying | 5.25 | 2.33 | 44.38% |
| 9 | setting | 5.25 | 2.33 | 44.38% |
| 10 | vacuum drying | 5.25 | 2.33 | 44.38% |
| 11 | hooking | 28 | 2.33 | 8.32% |
| 12 | staking | 5.25 | 2.33 | 44.38% |
| 13 | buffing | 5.25 | 2.33 | 44.38% |
| 14 | finishing | 12.92 | 2.33 | 18.03% |

Table 1.4. The idle time at each section is calculated in hours

| Sl. No. | Process | Cycle Time | Section Process Time | Idle Time (in hrs) |
|---------|---------|------------|----------------------|--------------------|
| 1 | soaking | 72 | 7 | 65 |

| Sl. No. | Process | Cycle Time | Section Process Time | Idle Time (in hrs) |
|---------|---------------|------------|----------------------|--------------------|
| 2 | paint liming | 72 | 24 | 48 |
| 3 | unhairing | 72 | 32 | 40 |
| 4 | reliming | 72 | 72 | 0 |
| 5 | fleshing | 72 | 32 | 40 |
| 6 | drum tanning | 72 | 5.5 | 66.5 |
| 7 | post tanning | 72 | 20 | 52 |
| 8 | sammying | 72 | 32 | 40 |
| 9 | setting | 72 | 32 | 40 |
| 10 | vacuum drying | 72 | 32 | 40 |
| 11 | hooking | 72 | 6 | 66 |
| 12 | staking | 72 | 32 | 40 |
| 13 | buffing | 72 | 32 | 40 |
| 14 | finishing | 72 | 13 | 59 |

- The value added & non-value added activities in a leather process is established.
- The utilization rates and idle time are also calculated for each process / station.

II. **ERGONOMICS** (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. RULA and REBA are two common assessment methods. In this paper RULA is applied for manual-unhairing process and the results are discussed.

2.1. RULA

RULA (rapid upper limb assessment) is a survey method developed for use in ergonomics investigations of workplaces where work-related upper limb disorders are reported. This tool requires no special equipment in providing a quick assessment of the postures of the neck, trunk and upper limbs along with muscle function and the external loads experienced by the body. A coding system is used to generate an action list which

indicates the level of intervention required to reduce the risks of injury due to physical loading on the operator. It is of particular assistance in fulfilling the assessment requirements of both the European Community Directive (90/270/EEC) on the minimum safety and health requirements for work with display screen equipment and the UK Guidelines on the prevention of work-related upper limb disorders.

RULA was developed to provide a rapid assessment of the loads on the musculoskeletal system of operators due to posture, muscle function and the forces they exert. It is designed to assess operators who may be exposed to musculoskeletal loading which is known to contribute to upper limb disorders. RULA fulfils the role of providing a method for screening a large number of operators quickly, but the scoring system developed also provides an indication of the level of loading experienced by the individual body parts. RULA is used without the need for any equipment and, after training in its use, has proved a reliable tool for use by those whose job it is to undertake workplace assessments. It can be used as a screening tool or incorporated into a wider ergonomics assessment of epidemiological, physical, mental, environmental and organizational factors⁴.



2.2. REBA

Rapid Entire Body Assessment (REBA) has been developed to fill a perceived need for a practitioner’s field tool, specially designed to be sensitive to the type of unpredictable working postures found in health care and other service industries. A team of ergonomists, physiotherapists, occupational therapists and nurses collected and individually coded over 600 postural examples to produce a new tool incorporating dynamic and static postural loading factors, human-load interface (coupling) and a new concept of a gravity-assisted upper limb position.

The development of REBA aimed to:

- Develop a postural analysis system sensitive to musculoskeletal risks in a variety of tasks.
- Divide the body into segments to be coded individually, with reference to movement planes.
- Provide a scoring system for muscle activity caused by static, dynamic, rapid changing or unstable postures.
- Reflect that coupling is important in the handling of loads but may not always be via the hands.
- Give an action level with an indication of urgency.
- Require minimal equipment - pen and paper method.⁵

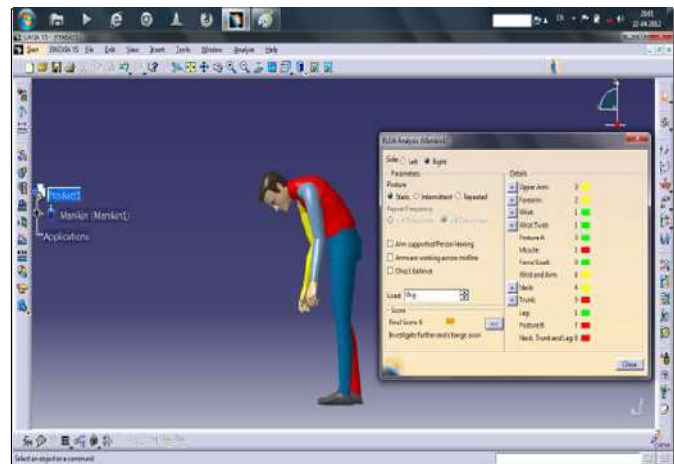
2.3. UNHAIRING – a process that is un-aided



RULA: a survey method for the investigation of work-related upper limb disorders



The backbone is tilted more than 66 degree causing harm to the human musculoskeletal system



A score of 6 indicates that investigation and changes are required soon

When the backbone is not tilted more than 81 degree and one foot has a support to rest on





A score of 3 indicates that further investigation is needed and changes may be required

The challenge lies in designing a beam that gives a score less than 3 !!!

Proper ergonomic design is necessary to prevent repetitive strain injuries and other musculoskeletal disorders, which can develop over time and can lead to long-term disability

III. FUTURE WORK

- Making the process semi-automatic with aid of conveyor beam (motorised) instead of static wooden beam
- Automating the entire process with robots⁶

IV. REFERENCES

1. Wenchi Shou, Jun Wang, Peng Wu & Xiangyu Wang, "Value adding and non-value adding activities in turnaround maintenance process: classification, validation, and benefits", *Production Planning and Control, The Management of Operations*, Volume 31, 2020
2. NPTEL, "Operations And Supply Chain Management" by Prof. G. Srinivasan, IIT Madras

3. NPTEL, "Work System Design" by Prof. Inderdeep Singh, IIT Roorkee
4. Lynn McAtamney and E Nigel Corlett, "RULA: a survey method for the investigation of work-related upper limb disorders", *Applied Ergonomics* 1993, 24(2), 91-99
5. Sue Hignett, Lynn McAtamney, "Rapid Entire Body Assessment (REBA)", *Applied Ergonomics* 31 (2000) 201-205
6. Kiran V. Sagar, J. Jerald & Muhammed Anaz Khan, "An energy-aware optimisation model to minimise energy consumption and carbon footprint in a flexible manufacturing system", *International Journal on Interactive Design and Manufacturing (IJIDeM)* (2023)
7. Ganesh S. Jadhav, M. Arunachalam & Urmi R. Salve, "Ergonomics design and evaluation of the stitching workstation for the hand-crafted Kolhapuri footwear using a digital human modeling approach", *Journal of Industrial and Production Engineering*, Volume 36, 2019
8. Kamala V.; Robert T.P., "Fuzzy-logic-based ergonomic assessment in an automotive industry", *S. Afr. J. Ind. Eng.* [online]. 2022, vol.33, n.4, pp.109-125. ISSN 2224-7890
9. S. Senthil Murugan, S. Ponraja, D. Shyamprasad Varma & M. John Iruthaya Raj, "Human Factor Analysis of Textile Industry Workers Using Various Ergonomic Assessment Tools", *Journal of The Institution of Engineers (India): Series E* volume 104, pages 109-117 (2023)
10. Zahid Shah, Asim Amjad et al, "Prevalence of musculoskeletal problems and awkward posture in a Pakistani garments manufacturing industry", *Malaysian Journal of Public Health Medicine* 2016, Volume 16 (Suppl.1): 75-79





INTERNATIONAL UNION OF LEATHER
TECHNOLOGISTS AND CHEMISTS SOCIETIES
(www.iultcs.org)

News Release from the IULTCS

Geoff Holmes elected as IULTCS Vice President



The IULTCS Executive Committee is pleased to announce that Geoffrey Holmes has been elected as the new Vice President; he will take up the position in January 2024.

Geoff has a long history in the leather industry, having studied Leather Technology at the Leather sellers College at the University of Northampton. Prior to this he graduated with a BSc (Hons) in Applied Science at Kingston University, London.

The IULTCS Executive Committee is very confident that Geoff will make an excellent Vice President and move on to be a successful President in 2026. We look forward to working closely with him in the months and years ahead.

(Source : Email from Julian Osgood – 10/11/2023)



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Valorisation of Invasive Species - For Leather, Fur, Bristle, Meat and By-Products



(Part-11)

Subrata Das, M.Tech (Leather Technology)

Freelance Leather Technologist & Consultant, Chennai

Nutria (or Coypu)



Between mid-17th and mid-20th century, the flourishing fur trade, with its vast international network creating burgeoning demand, every year, in newer markets, significantly depleted numbers of native fur bearing mammals from the tundra, taiga and temperate regions of Russia, Europe and America.

Following its independence from Britain, the United States became an important supplier of fur skins, for most of the nineteenth century, attracting traders and businessmen of gentility, prestige, and affluence. Expansion of the fur trade, to Alaska and the Pacific North West, opened up newer trade opportunities, political mileage and more than adequately compensated the halting of American imports, through British and Colonial ports, following US declaration of independence from Britain. (1)(2)

Nutria fur enjoyed considerable value and desirability in the industry and among traders and customers for its skin, comparable to that from other fur species, such as stoats,

beavers, lynx, Arctic fox and sable. Although the rodent's outer coat of scraggy, waterproof fur looked unattractive, it concealed an undercoat of shorter, dense grey, lush inner layer, of immense economic value, also called nutria, which provided exceptional warmth and comfort in punishing weather.(3) (4)

To make an inexpensive inventory of nutria readily available to hunters and trappers, thus circumventing the necessity of making long and sometimes arduous voyages to Chile and Argentina, three females and a male were imported by Will Frakes, into the US in 1899 from an Argentinean fur ranch, for a nutria farm on the banks of Lake Elizabeth, a shallow but expansive man-made water body, in Fremont, California.

With the number of US fur yielding mammals becoming inversely proportional to the rampant overhunting, nutria was expected to be new and lucrative source of revenue for trappers in rural Texas, Maryland, Louisiana and California.

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Unfortunately, the first breeding attempts of the semi aquatic “swamp rats” were unsuccessful. Later attempts at establishing the population in the US was successful, and it appears from records indicate that “nutria ranches “were widespread along the South Coast and central Valley of California is the 1940s and 50s.

Subsequently, in 1933, a nutria farm commenced operations across Lake Pontchartrain from New Orleans, followed by another entrepreneur soon after. As the first nutria breeding venture was unsuccessful, the farm closed, but not before setting its murid inventory loose in 1937.

Another failed nutria farm in Covington in 1933 , was cited in a report by The Director of New Orleans State Wildlife Department - Fur and Refuge Division.

Tabasco heir Edward Avery McIlhenny, then, became the most famous and subsequently reviled nutria farmer in Louisiana in 1938.

Following a 1930 letter by the state of Louisiana suggesting to E.A. McIlhenny that Avery Island’s extensive swamps in southern Louisiana, would be appropriate for nutria, farming, the Tabasco owner brought six pairs of nutria to Avery Island, in Louisiana 30 miles south of Lafayette-factory site for Tabasco brand hot sauce, sometime between 1938 and 1941, purchasing the fur yielding mammals in 1938, from a New Orleans fur dealer.

Although local folklore suggests that a raging tropical storm compromised holding pens in the McIlhenny farm, allowing as many as 150 of the web footed, orange toothed rodents to escape in the marshes, later revelations establish that the great man himself released them in the hopes of jump-starting a lucrative new fur trade and, given their appetites, managing the spread of such invasive plants as water hyacinth.

The small population of nutria in a good habitat did not stay small for long. Instead of being eaten by alligators in the marshlands, with amazingly fast reproduction rates — gestation takes only 130 days, and there can be as many as 13 pups in a litter – they multiplied rapidly, peaking at about 20 million by the late 1950s. Rather than spurring a new industry, they became undisputed invasive pests.

And, alas, since the obligate herbivores did not confine their dietary preference to just water hyacinth. They chewed miles of Louisiana’s ecologically sensitive marshland down to bare mud, including vegetation that helped sustain Louisiana’s coastline and protected sugarcane and rice fields. They also bred rampantly with other escapees and emancipated numbers of their ilk to create havoc on their new bioregion.

Perceiving huge potential, a number of states, jumped onto the nutria business model., following and imitating the Californian bellwether. In 1930, the State of Louisiana actively endorsed nutria farming among members of its community, and in the mid-1940s, the Bayou State encouraged release of nutria into a state-managed wildlife conservancy near the Mississippi River delta.

The 1940 Louisiana hurricane caused record flooding across much of the Southern United States In August 1940, a category 2 hurricane ravaged Louisiana, the hurricane brought forth strong storm surges accompanied by torrential rainfall, across much Southern United States in general, and to south of the Mississippi River, on the western edge of Lake Pontchartrain, in particular, where the state’s nutria farms were located. With most fences blown down, the holding pens of the farms were fully compromised, allowing the animals to break-out en masse and disappear into the marshes.

In the mid-1950s information began to be received, detailing the destruction upon swamps, levees and croplands, as 20 million nutria wreaked havoc. Natural dykes, which served to hold back Mississippi river water were completely denuded. Irruptive population growth, expansion, over grazing and destructive feeding habits resulted in the destruction of thousands of acres of emergent marshes.

In 1957, when Hurricane Audrey hit southwestern Louisiana, its storm surge diminished and adversely affected the marsh further, as wave after wave of seawater forced the nutria inland, hastening the speed at which the animals diffused in all directions.

The very next year, following widespread coverage of agricultural damage nutria were removed from the list of protected wildlife.

Concomitant with State sponsored promotion of nutria fur as a natural resource, suitable pest management pathways of the



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“swamp rats” began to receive serious attention. The proactive steps brought temporary respite in their wake. In 1965, the nutria was reinstated to the list of protected wildlife. From 1962 to 1982, more than 1.3 million nutria were harvested annually for their fur from the coastal marshes. Reports of nutria damage declined substantially, and periodic inclement and punishing weather helped to rein in their population.(5)(6)(7)(8)

Japan

During Japan’s Nara Period (710-784), the Koya-ike pond, a limpid pool containing natural freshwater, was built by Gyoki (668-749), a venerable Buddhist priest, in Itami city of Hyogo prefecture. The perimeter of the picturesque waterbody was adorned with pillars is adorned with monuments bearing verses penned by Japanese literary luminaries.

Invasive nutria has been reported in the pond and its vicinity. Their exact arrival remains shrouded in mystery. Itami has recorded approximately 10 sightings annually, with reports extending beyond the immediate proximity of the pond.

These aquatic mammals, once an exotic import from South America, have become a source of concern. Local farmers have suffered damage to their daikon radish and “komatsuna” (Japanese mustard spinach) crops. The rodents have also embankments, causeways and dams and footpaths weaving through rice fields.

Responding to the ecological threat posed by these invasive aliens, city officials have taken proactive measures, designating nutrias as a menace to the ecosystem. Nutria was initially brought to Japan for their luxurious fur and were later bred during World War II for military uniforms and sustenance food during periods of severe food scarcity. Post-war, with diminishing demand, the furbearers were set free into the wild, unwittingly unleashing unintended consequences on Koya-ike and its surroundings.

Nutria also known as coypu, are fairly large murids, measuring between 17 and 25 inches from head to haunch, They weigh 7-10 kg. Their tails constitute 58-64% of body length (10 to 16 inches). They grow up to 2 ft in height. It has been observed that up to 80% of nutria don’t survive their first year. Those that do, only live for two or three years. However captive nutria can have a life span of twelve years. Male nutria has a territory sweep

of about half kilometre, while females remain closer to burrows, keeping within about half the distance foraged by males.

Year-round breeding, short gestation of four months, and whelping up to three litters a year with between two and 13 offspring per litter, a single nutria, even if enjoys a three-year life-span is capable of producing as many as sixty descendants, allowing their numbers to explode exponentially. As early as four months of age, the females of the species have been observed to be sexually mature - possessing the capability to bred again, 24-48 hours after delivering pups- which nurse for two months, from their mother, whose nipples, located high on the flanks, permit her offspring to suckle, while swimming in water or standing on the ground. (9)

The arch-bodied, web-footed murids possess protruding incisors of an intense orange colour because these contain iron instead of magnesium. The firm and hard dental constitution enables the animal to voraciously feed on a kilo or more of rhizomes, arrowheads tubers, tule, bulrush, cattails, roots, and cord grass, every day. The chisel-like incisors, which continue to grow throughout the mammal’s lifetime, are occasionally employed to access the soft tissues of snails and mussels.

These detrimental, semi-aquatic rodents make their homes in rivers, bayous, farm ponds, swamps, drainage canals, brackish and freshwater marshes. Their rooting, digging and feeding habits result in erosion laying waste to healthy marshes and creating open water habitat.

The burrowing activity of nutria also destabilizes flood-control levees that secure low lying areas and water retaining levees used in cropland. They tend to burrow, making entrances below the water line for protection against predators. The breakwaters and leveed impoundments, which keep out sea water from arable land, have to be restructured or recast. The digging and burrowing also compromise roads, dams and building foundations causing them to sink, incline or fall. Nutria have also been the cause of destroyed floatation supports of wharves and docks.

Yet another adverse impact of nutria herbivory and overgrazing (also called ‘eat-outs’), is the erosion of stream and pond banks and failure of water control structures due to denuded above ground biomass. (10)

Because nutria are profligate gluttons, evidence of their habitation in an area, is usually indicated gnawed through budding vegetation like chafflowers and arrowheads, with only the nether sections eaten and the incised stems left afloat, or nibbled tips and tops of nascent growth. Nutria cuttings have a 45-degree angle bite. due to the positioning of their incisors, and often have a residual strip attached to the destroyed stem, routinely used to construct grooming and feeding platforms. (11)

The “swamp rats” are established vectors of parasites and diseases that affect people, pets and livestock. They are hosts for septicaemia and tuberculosis, and carry blood and liver flukes. Additionally, the rodents are known to harbour tapeworms, which trigger body rashes, referred to as “nutria itch”. The territorial and aggressive murids have also been known, on occasions to bite humans and dogs, when cornered. They contaminate drinking water supplies and defile swimming pools.(12)

As a consequence of a two-year pilot project to ascertain if the semiaquatic rodents could be completely removed from the Chesapeake Bay area of Maryland, a determined all-out effort to eradicate nutria from the Old-Line state commenced in 2002. Due to the untiring efforts of The Chesapeake Bay Nutria Eradication Project, the entire Delmarva Peninsula was declared “nutria -free”.

Despite the limited success ,as on date, in the U.S., the invasive species reside in as many as 40 states. Stabilized and established populations have been confirmed in in as many as 18, including Arkansas, Oregon, Washington, Florida, Georgia, Alabama, Texas, North and South Carolina and California. they have also been reported from three Canadian provinces. The distribution of nutrias outside their native South America has altogether been by fur farmers. Today, there are established populations of nutria on every continent except Australia and Antarctica. (13)(14)

Due to the precipitous decline of the fur trade and fashion fad failures of attempted revivals, there is limited demand for nutria fur. Musi Furs, Elextra Furs of Montreal Quebec and a number of fur dealers continue to deal in nutria fur, catering to a limited clientele. (15)(16)

The United Nations Comtrade statistics show that between 2011 and 2021, the value of fur imports fell from around

318.8 million euros to 107.8 million euros. The production of fur in the EU has also decreased sharply from 38 million animal skins in 2018 to around eleven million in 2021(17)(18)(19)

At present population levels, the invasive species cannot be eradicated in many countries of the world because the numbers are widespread and well established. Pragmatic steps of containment management policies are permanent control campaigns conducted by state governments or local authorities in response to social and community demands.

Italy, one of the worst affected by nutria, is exploring the possibility of using skins of the invasive species emanating from culling campaigns as a source of income for the leather industry, for making “guilt -free leather” in direct service of societal benefit and wellbeing.

Leather and fur from the non-indigenous invasive mammal is being rebranded as a socially acceptable, sustainable and environmentally friendly alternative pathway to wear fur and leather.(20)

José Luis Rodriguez, a Venezuelan dancer who makes leather accessories in Louisiana, has designed evening gowns and shoulder bags made with a patchwork of nutria skins (21)

Another New Orleans non-profit called Righteous Fur worked to connect trappers to local artists and designers. This initiative provided a use for nutria pelts and teeth (which can be used to make jewellery) that remained after trappers harvested the animal.(22)

Communities in rural Louisiana have a long history of trapping and eating nutria meat, which is lower in cholesterol and fat content than traditional meats. There have been sporadic attempts at mass commercialization of nutria flesh, such as whole roast nutria, “crock-pot” nutria, nutria Fettuccini, nutria culotte de Ragondin à la Moutarde, swamp rat sausages, tamales, empanadas, jerky and other creations but people have been reluctant to embrace nutria for human consumption.

With nutria being associated with fur for seven centuries and more , and being much more valuable to the fur than the leather industry, there seems little possibility of commercially harnessing nutria pelts for leather applications. Unless some



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creative and innovative designer can audaciously showcase creations in nutria leather to fire the imagination of consumers, millions of these fur-bearing, edible, invasive creatures will be condemned to burying or burning after culling, with no other option in sight.

Reference :

- 1) https://en.wikipedia.org/wiki/Fur_trade
- 2) https://en.wikipedia.org/wiki/Maritime_fur_trade
- 3) <https://en.wikipedia.org/wiki/Nutria>
- 4) <https://www.treehugger.com/nutria-animal-invasive-species-5093335>
- 5) <https://wildlife.ca.gov/Conservation/Invasives/Species/Nutria#:~:text=Current%20Distribution,1899%2C%20but%20failed%20to%20reproduce.>
- 6) <https://www.treehugger.com/is-the-tabasco-family-responsible-for-an-infestation-of-nutria-4862551>
- 7) <https://www.washingtonpost.com/archive/politics/2001/04/22/historian-throws-water-on-a-hot-bayou-tale/2da6b184-0265-44ed-bbe4-7cd73a0304c1/>
- 8) https://www.nola.com/300/article_ad2a1b05-79ae-596d-ac9f-e206caf4cef2.html
- 9) <https://www.livescience.com/nutria.html>
- 10) <https://www.usgs.gov/centers/wetland-and-aquatic-research-center/science/developing-techniques-estimating-nutria>
- 11) <https://wildlife.ca.gov/Conservation/Invasives/Species/Nutria/Infestation>
- 12) <https://www.jstor.org/stable/24314874>
- 13) [https://dnr.maryland.gov/wildlife/Pages/plants_wildlife/invasives/inv_Nutria.aspx#:~:text=Nutria%20are%](https://dnr.maryland.gov/wildlife/Pages/plants_wildlife/invasives/inv_Nutria.aspx#:~:text=Nutria%20are%20)
- 14) <http://www.tsusinvasives.org/home/database/myocastor-coypus>
- 15) <https://nutria.com/nutria-fur/coats/>
- 16) <https://www.louisianafur.com/louisianafurdealers.html>
- 17) <https://www.four-paws.org/our-stories/press-releases/a-decade-of-decline-for-fur-industry>
- 18) <https://thefurbearers.com/blog/how-many-fur-farms-are-left-in-canada/>
- 19) <https://www.businessinsider.com/rise-and-fall-fur-industry-faux-mink-2022-2?IR=T>
- 20) [https://bioone.org/journals/wildlife-biology/volume-13/issue-2/0909-6396_2007_13_159_PCOCMC_2.0.CO_2/Population-control-of-coypu-Myocastor-coypus-in-Italy-compared-to/10.2981/0909-6396\(2007\)13\[159:PCOCMC\]2.0.CO;2.full](https://bioone.org/journals/wildlife-biology/volume-13/issue-2/0909-6396_2007_13_159_PCOCMC_2.0.CO_2/Population-control-of-coypu-Myocastor-coypus-in-Italy-compared-to/10.2981/0909-6396(2007)13[159:PCOCMC]2.0.CO;2.full)
- 21) <https://www.nytimes.com/2010/11/18/fashion/18nutria.html>
- 22) <https://www.facebook.com/people/Righteous-Fur/100080946102400/>

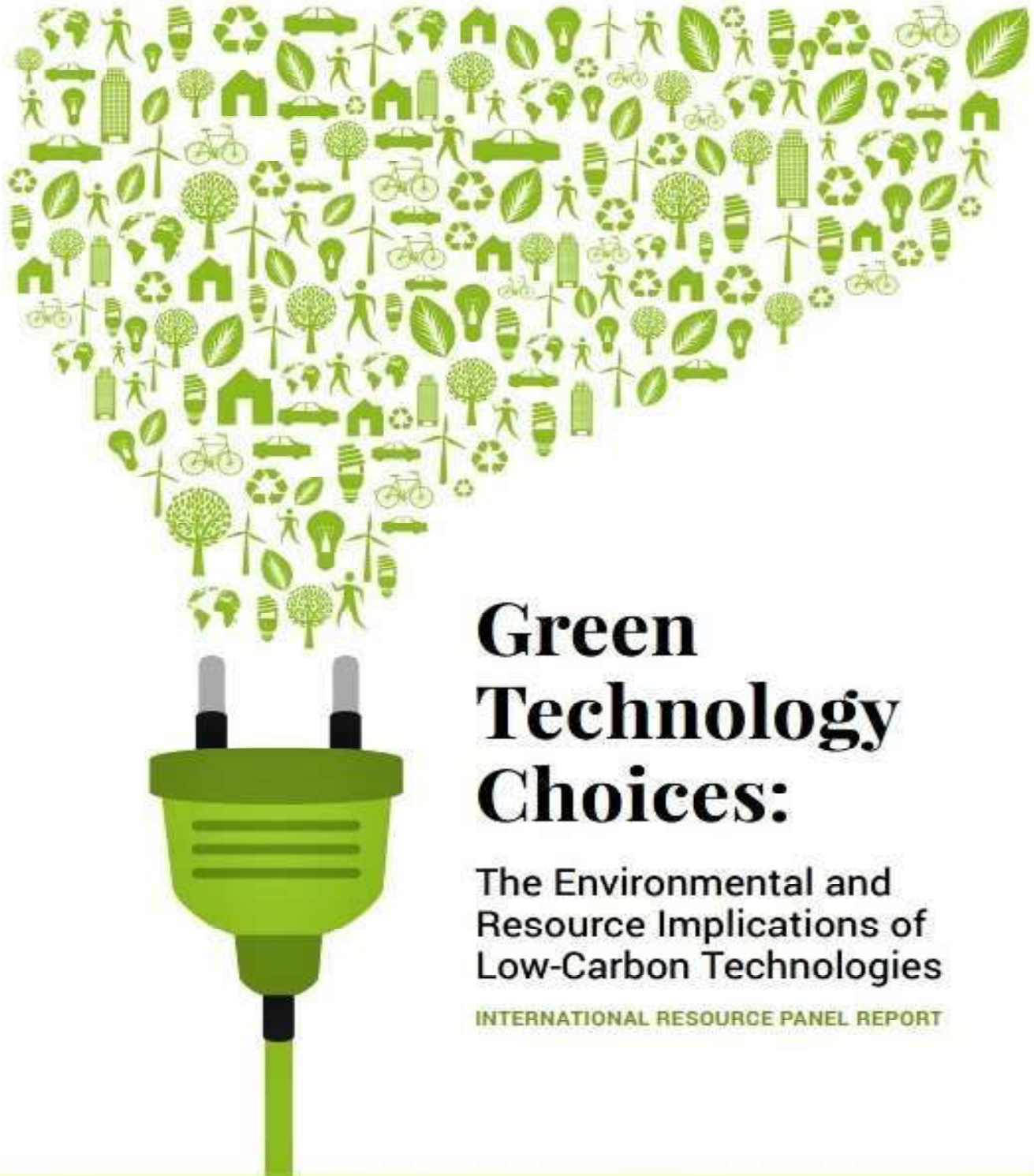




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Green Technology Choices:

The Environmental and
Resource Implications of
Low-Carbon Technologies

INTERNATIONAL RESOURCE PANEL REPORT



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MORE THAN 60 INDIAN FIRMS TO SHOWCASE LEATHER PRODUCTS AT DUBAI EVENT TO BOOST EXPORTS



(Pic Courtesy- Alamy)

More than 60 top Indian footwear and leather goods manufacturers will participate in the Middle East and North Africa (MENA) region’s largest exhibition of such products here from December 11-13. Dubai International Footwear and Leather Exhibition (DIFLEX 2023) is being held in the backdrop of the demand upswing for footwear and leather goods in the Middle East and N Africa (MENA) estimated to be growing at a compound annual growth rate of over 7 per cent and poised to touch upwards of \$20 billion by next year.

The Indian pavilion participation is under the auspices of the Council for Leather Exports (CLE), Ministry of Commerce and Industry, Government of India, and is aimed at boosting exports which stood at USD 5.26 billion in 2022-23, as per CLE data.

Footwear exports, both leather and non-leather exports account for over 50 per cent of the trade. India is the second-largest exporter of leather garments, third-largest exporter of saddlery and harnesses and 4th largest exporter of leather goods in the world.

Verifair, organisers of DIFLEX 2023 which will be hosted at Dubai Festival Arena, Dubai Festival City, said that in all over 250 top-notch footwear, leather and leather accessories producers from across the world are participating in this one-of-its-kind event, showcasing over 10,000 product lines.

“Despite inflationary pressures and the macro-economic environment, consumer spending on footwear and leather products have maintained a growth momentum, with the key demand markets of the UAE and Saudi Arabia contributing a major share,” said Jeen Joshua, Managing Director, Verifair.

In this context, DIFLEX 2023 offers a one-stop-shop for prospecting new business partnerships and sourcing products from multiple global markets under one roof,” Joshua said.

Manufacturers and Producers at DIFLEX are from the leading footwear and leather-producing hubs of Turkey, Egypt, India, Sri Lanka, China and the UAE. Turkey, India and Egypt will have official country pavilions at the show.

The countries which are often included in the MENA region are Algeria, Bahrain, Djibouti, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Malta, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, United Arab Emirates, Palestine, and Yemen.

(Economic Times – 01/12/2023)

BATA INDIA’S NET PROFIT SLIPS TO RS 34.48 CRORE OWING TO VRS OUTGO



Footwear major Bata India Ltd’s net profit slipped to Rs 34.48 crore for the second quarter of FY24 as against Rs 51.1 crore logged during the previous year’s corresponding period.

In a regulatory filing, Bata India said for the quarter ended September 30, 2023, it had earned an operational revenue of Rs 819.11 crore (Q2FY23 Rs.829.75 crore) and a net profit of Rs 34.48 crore (Rs 51.1 crore).

While the company’s direct expenses went down for the quarter under review, the outgo of Rs.40.9 crore towards voluntary retirement scheme pulled down the net.

“Despite navigating through short-term demand headwinds in the quarter gone by, our focus on efficiency and productivity was reflected in robust operating profit margin growth. Prudent expansion of our retail network and marketing investments

continues to be our key strategy,” Managing Director and CEO Gunjan Shah said.

A comprehensive licensing and manufacturing agreement has been signed with globally renowned fashion brand Nine West for bringing on-trend fashion designs to Indian consumers, the company said.

(Telengana Today – 08/11/2023)

AROUND THE WORLD: EXPO RIVA SCHUH & GARDABAGS GOES TO TURKEY



The objective of Expo Riva Schuh & Gardabags goes beyond simply selling exhibition space. Edition after edition (number 100 will be held in Riva del Garda from 13 to 16 January 2024), it aims to create a business platform that promotes the growth of the shoe and leather goods industry.

This offers the market an opportunity to expand its boundaries. However, in order to achieve this, a thorough understanding of the market is essential.

This is the origin of the Expo Riva Schuh & Gardabags Around the World initiative, which consists of a series of activities aimed at getting the event to interact with the institutional, production and distribution realities of the sector around the world. Turkey represents the last stage of this initiative.

Prior to our participation in the World Footwear Congress 2023, organised by CEC - European Footwear Confederation and TASD - Footwear Industrialists Association of Türkiye, we had the opportunity to visit our Turkish exhibitors Özil Ayakkabı, Alpino, Alfa çanta and Eternal and touch their shoe and bag collections, finding the perfect mix of quality, care for materials and details, attention to price and innovative and sustainable contents.

Navigating the Future: Insights from the World Footwear Congress 2023

The main topic of the congress was “ReShaping the Future” and the discussions were focused on innovative strategies, trends, technological advancements and sustainability issues within the footwear industry. Needless to say, it was a rollercoaster of insights!

Embarking on Sustainability

At the heart of it all, Burak ÇELET, the CEO of Desa, took center stage. His perspective echoed loud and clear: sustainability is not a side note; it’s the symphony that defines Desa business model. It goes beyond just sourcing responsibly; it’s about weaving environmental consciousness into the very fabric of their production process.

And across borders, Clementine COLIN RICHARDS, President of the French Shoe Federation, shed light on France’s ambitious plans—a ‘sustainable textile bonus’ to incentivize eco-friendly practices. It’s a call to arms for the industry to embrace responsibility in their materials, their processes, and their impact. Hua LU, the Vice Secretary General of China Leather Industry Association, shared China’s journey towards balancing industrial growth with sustainability.

China’s rapid industrial ascent came at a cost—environmental well-being. But the narrative is shifting. China, since 2014, has been on a mission to balance the scales. The introduction of the Pollutant Discharge Permit System is a testament to their commitment to environmental stewardship. It’s a dance between progress and preservation, and the world is watching.

Sustainability and Innovation as Yin & Yang

A visual treat was Sergio DULIO’s presentation, where the Ying & Yang of Sustainability and Innovation merged seamlessly. His bold statement lingered in the air—sustainability isn’t a stand-alone concept. It’s entwined with innovation, and you can’t embrace one without the other. The crux? Embrace digital transformation. From biodegradable materials to AI and machine learning, the industry needs a tech-savvy makeover for a sustainable tomorrow.

Tech Talks

Julia PEREZ DE TUDELA NAVARRO from Pikolinos and Jonathan RAM, CEO of Clarks, added their chapters to the tech narrative. We need to consider technology as an ally rather than an adversary resonated—the digital realm isn't a threat; it's a lifeline for innovation and leadership.

People Power

The giants in the industry, like Manfred KRONEDER (Deichmann), boasted astronomical numbers, but their North Star is customer-centricity. It's not about following trends; it's about serving people, from everywhere and anywhere. Gennaro Pigliacampo of Calzaturificio Gensi Group went beyond profits; he invested in an in-house academy, ensuring continuous learning for his workforce.

Beyond the Assembly Line

Personal stories from industry leaders like Clementine COLIN RICHARDS (Paraboot) and Giovanna CEOLINI (Thierry Rabotin) painted a vivid picture of a human-centric approach. It's not just about manufacturing shoes; it's about creating environments where workers thrive. Flexible schedules, cross-functional collaboration, and a genuine investment in the next generation—these are the threads that hold the industry together.

Conclusions

The World Footwear Congress 2023 has been a melting pot of ideas—sustainability, innovation, and people-centric approaches are the threads weaving the future of the footwear industry. It's not just about shoes; it's about stepping into a more sustainable, tech-savvy, and people-friendly future.

(exporivaschuh.it – 13/11/2023)

AUTOMOTIVE LEATHER BENEFITS THE PLANET, REPORTS ONE 4 LEATHER

In a reaction to some OEMs choosing to move away from using leather in their vehicles, One 4 Leather points out that, if the industry stopped using the material, 35 million hides would go to landfill and result in an extra 644 million kg of CO₂e emitted

annually. However, increasing use of leather would save hides from landfill, with more than 64 million kg of CO₂e saved per 10% more hides used.



According to the Food and Agriculture Organization (FAO) of the United Nations, 331 million cattle are processed each year by the meat industry, creating more than 2.18 billion m³ in hides. As meat consumption is on the rise, only more hides will go to landfill. One 4 Leather estimates that 40% of the hides produced (over 3.8 billion kg) go to landfill, with just 18% of the remaining 60% taken by the automotive industry.

The organisation said: “Car manufacturers are keen to promote greener options to leather in the form of PU and PVC materials. However, most leather alternatives contain more than 80% plastic. It's the small amount of plant or vegetable (mushroom, pineapple, cactus) content that grabs the headlines. These composite materials are difficult and currently very expensive to recycle, so they will inevitably end up in landfill.”

(internationalleathermaker.com – 05/12/2023)

EU REACHES AGREEMENT ON FRAMEWORK FOR SUSTAINABLE PRODUCTS

The framework aims to improve products through legislation to ensure they are more durable, easier to repair, use less resources and more recyclable. Secondary legislation will identify requirements for specific products.

Negotiators have agreed that the Commission should prioritise a number of product groups in the first working plan, to be adopted no later than nine months after the legislation comes into force. These include textiles (garments and footwear), furniture and chemicals.



ILTA
Since 1950



The Commission has agreed to manage a public web portal for consumers to search and compare product passport information.

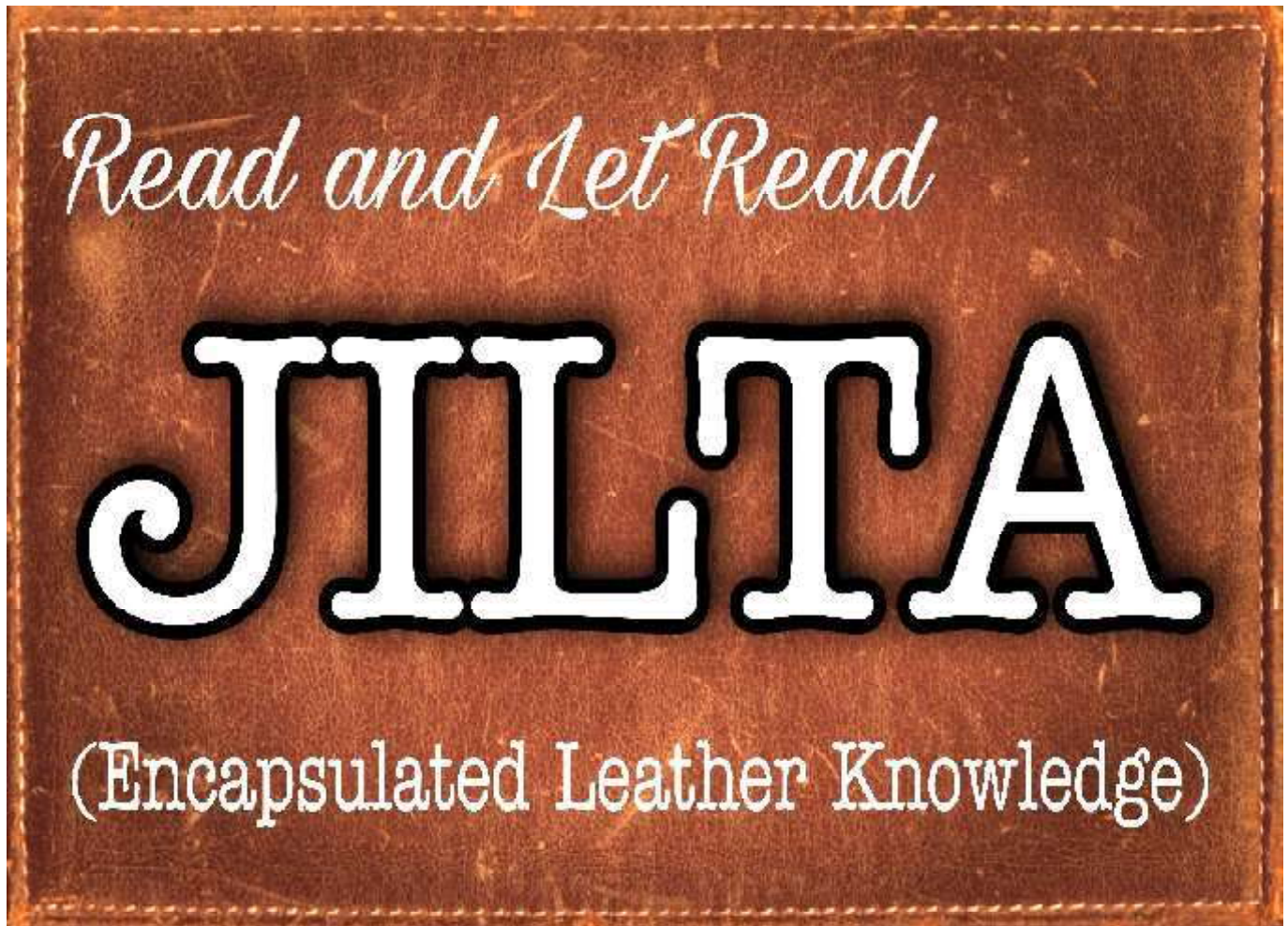
Meanwhile, destroyed unsold goods will need to be reported annually with quantities and reasons. Negotiators also agreed

to ban the destruction of unsold apparel, clothing accessories and footwear two years after the legislation comes into force (six years for medium-sized enterprises). The Commission may also add further products to this ban.

The European Footwear Confederation (CEC) has responded to the news, welcoming the prospective legislation and noting that it will “eventually support the ‘rehabilitation’ of leather, a sustainable and durable material, victim of market demonisation in the last years”.

Now, the European Parliament and Council will need to formally approve the agreement before the legislation can come into force.

(internationalleathermaker.com – 05/12/2023)





Economies in Leather Manufacture by Recycling Process Liquors : A Review of Possible Methods

By J. R. BARLOW

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Abstract

RECYCLING of tannery liquors, rather than rejection after a single use, is a possible means of : (a) economising on the consumption of chemicals ; (b) reducing the volume of water used ; and (c) improving the quality of effluent generated. Point (a) could be most important for many developing countries, since the majority of chemicals have to be imported and are therefore expensive. In regions suffering from water shortage, (b) and (c) could further justify the consideration of recycling methods. Possible methods for recycling liquors at different stages of processing are discussed, with emphasis on the likely benefits and on the requirements for practical implementation.

Introduction

Many developing countries are now carrying out at least part of the processing of their hides and skins, rather than exporting them in a dried or salted form.

However, although the labour costs of processing may be lower than those in developed countries, part of the financial benefit could

be lost since chemicals, the majority of which have to be imported may be far more expensive. In addition, many countries experience a shortage of water and such quantities that they do possess may be required for other, more important, uses. Leather manufacture has traditionally used large volumes of water ; even a modern, efficient process needs approximately 50 litres per kg of raw hide. Therefore, the need to conserve water is a second stimulus to considering process changes. Thirdly, there is great concern to maintain or improve the standard of the environment and effluent legislation is greatly to the fore in this trend. The conversion of raw hides and skins into leather involves the use of toxic, polluting chemicals at certain stages and, as uptake of such materials is generally well below 100 per cent, considerable quantities of effluent are produced. Thus the final reason for considering economies in chemical consumption is the improvement of effluent, as it is obvious that a reduction of chemical usage should be reflected in decreased loading of tannery discharges.

Any means of reducing chemical or water consumption must not adversely affect the properties of subsequently produced leather but, with this condition in mind, the following alternatives are possible :

(1) Develop means to increase the uptake of chemicals during each process, thereby reducing wastage and allowing smaller quantities to be offered initially.

(2) Investigate ways of reusing the residual liquors of each process after suitable replenishment to the original concentration of reagents rather than discarding them.

The second of these methods is discussed in this review, since it appears more easy to introduce and to have a wider field of application than the concept of process modification.

Possible means for recycling, together with the savings resulting from such methods, are discussed for each of the major processes of leather manufacture. Details of the extra handling, analyses and equipment in practical implementation are included, in order that potential users may decide for them-

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selves weather recycling methods are worth while in their own situation.

Preservation of raw material

Salting.

When salt is sprinkled on to a freshly flayed hide or skin, osmotic pressure is generated which withdraws water from the interior of the fibre structure. Brine is also taken up into the skins and the two effects combine to give the required stability during storage. Salt of high purity is needed as difficulties in subsequent processing can arise from the presence of even small amounts of impurities.

Naturally there is some wastage of salt during the application and the excess salt then becomes contaminated with blood and water drained from the skins. Extraneous dirt and dung will also be present and will become included with the unused salt on the floor of the curing room. In time, salt-tolerant (halophilic) strains of bacteria may develop in the residual salt, adding a further source of contamination.

In regions where salt is scarce or expensive, it is likely that contaminated salt will be reused for subsequent batches of hides and skins but, as described above, this could be a risky practice. Smaller skins in particular are sensitive to the damage that can result from using impure salt.

A method for the purification of used salt has recently been published (Krishnamurthi and Padmini, 1976). A saturated brine of used salt was allowed to sediment for 48 hours to remove insoluble matter. The supernatant liquor was then solar-evaporated to dryness, giving a salt of greater purity than that of the commercial salt used initially.

It may be possible to extend such a method to recover salt from the soaking liquors (see 'Soaking'). The essential steps would then be:

(1) Dissolve used salt in used soak liquor to obtain a saturated brine.

(2) Follow sedimentation and solar evaporation steps as described above.

Naturally, such methods will only be applicable to those countries having a climate suitable for solar evaporation, as the energy requirements for other forms of evaporation would be too great to make the system economically viable.

Short-term Preservation

There are several methods available for short-term preservation of hides and skins, suitable for those situations where only limited delays between flaying and processing are to be expected. The methods have been described in detail (Barlow, 1976) giving the requirements for recycling preservative liquors where appropriate.

Soaking

This process is used to restore the dried or salted hides or skins to a condition similar to that found immediately after flaying. Rehydration can take a considerable time, particularly for material that has been sun-dried.

The usual features of soaking are:

(1) Large volumes of water, relative to the quantity of hides or skins, are used. This is necessary as the process is normally carried out in either pits or paddles.

(2) A low level of pollution of the liquor results, the main impurities being blood, dung, dirt, non-fibrous protein and salt.

(3) Due to the neutral pH and the availability of food supplies, bacterial multiplication can proceed rapidly, particularly under the warm ambient conditions likely to be found in many developing countries. Therefore it is common practice to add a bactericide, such as zinc chloride, a chlorinated phenol or sodium hypochlorite. In this case, recycling would be aimed solely at reducing the volume of water used in processing rather than to improve the quality of effluent or to reduce chemical consumption. Precautions would be needed to prevent the growth of bacteria and some form of coarse screening would also be necessary to remove particulate matter from the liquor.

Leather manufacture—description of processes and terms used

A schematic outline of the processing steps is shown in Figure 1 on next page.

If liquor has been used for the soaking of salted material, it should not be reused for further batches of hides and skins unless it is treated. Residual salt concentration in the soaked goods would increase with every cycle and subsequent processes would be adversely affected. Without incurring the need for expensive desalination or evaporation steps, a dilute brine liquor could be used in the liming, pickling or tanning processes. In liming, a salt content of over 3 per cent (w/v) is sometimes used to repress alkaline swelling, while in the pickling and tanning processes it is present in higher concentrations to prevent acid swelling.

In conclusion, the following points may be applicable to the recycling of soak liquors:

(1) In areas where water is rea-

Schematic Outline
Leather processing

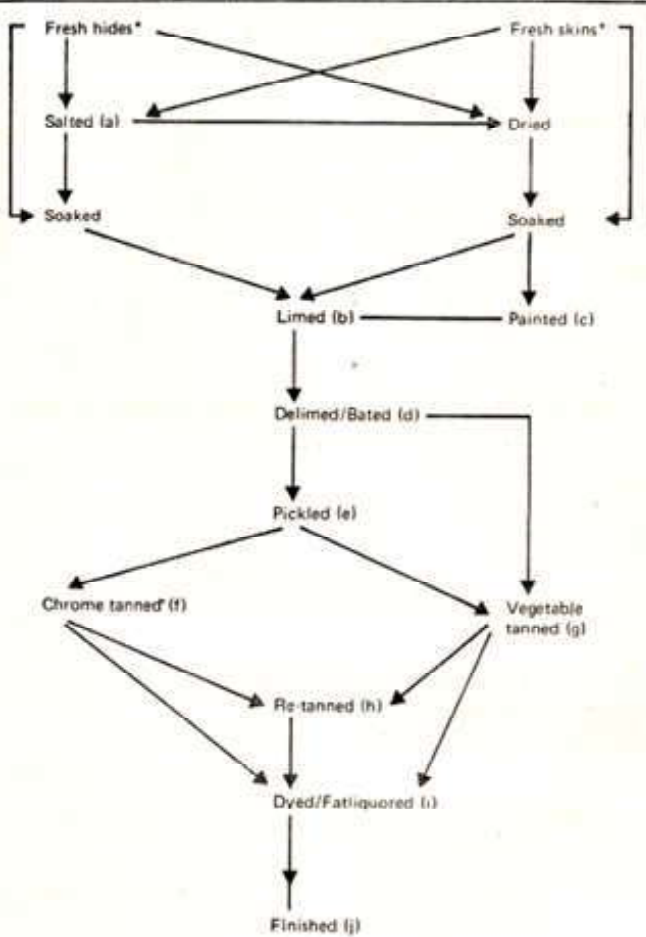


Fig. 1

Key to Figure 1

* 'Hide' is from a large animal such as a cow, camel or buffalo; 'skin' is from a smaller animal, e.g. sheep, goat or calf.

(a) Salting is a form of preservation to prevent degradation between flaying and processing.

(b) Lime and sodium sulphide are usually present. Hair is removed, the protein swells and non-fibrous material is degraded.

(c) A depilatory paint is applied to the flesh side. It penetrates into the skin, the hair roots are

attacked and the wool may then be pulled out. The most commonly used materials in such paints are sodium sulphide and lime.

(d) Alkalinity is reduced by acid salts such as ammonium chloride. 'Bating' is the term used to describe the action of proteolytic enzymes, usually derived from pancreatic sources, to remove protein degraded in liming and to induce 'stretch'.

(e) Pickling is a form of preservation using salt and sulphuric acid. It is a necessary preliminary

dily available, there is little incentive to consider recycling.

(2) Liquors for recycling would need filtration and settling, as well as storage in suitable vessels before further use. Handling would be difficult owing to the large volumes involved.

(3) Where salted skins have been soaked, the liquor could be reused in a subsequent step of the process, e.g. liming or pickling. A check of salt content would be needed in order that addition of correct amounts of salt could be made to give the concentration required for the subsequent process.

(4) Bactericides would be needed to avoid the multiplication of bacteria in the soak liquor between cycles.

(See next page)

to chrome tanning but may be omitted for vegetable tanning.

(f) Chrome tanning is carried out in solutions of basic chromium sulphate. The process imparts a blue or blue/green colour to the hides or skins.

(g) Vegetable tanning involves the use of extracts from nuts, fruit or bark of certain plants and trees to give a brown leather.

(h) Retanning may be carried out to impart desired characteristics to the leather.

(i) Dyeing gives the required colour; fatliquoring is the introduction of fats and oils into the leather to give suppleness after drying.

(j) 'Finishing' is a general term used to cover a large number of chemical and physical processes applied to make the leather ready for sale. Drying, flexing, glazing and spraying with polymers would be included.

(5) Recycling of soak liquors would be greatly simplified if fresh hides or skins were being treated, since the absence of salt would allow the liquors to be reused for soaking rather than for other stages of the process. (A similar argument applies to the reuse of soak liquors from skins which have been sundried.) To ensure uniformity, it would be preferable to reject a constant proportion of the soak liquor (e.g. 30 per cent) containing the majority of the particulate matter. The required volume could then be made up by the addition of fresh water.

In practical terms a system operating on this principle would require one vessel extra to requirements of throughput, into which liquors for reuse could be pumped. The soaking process could then be as shown in Figure 2.

Liming

The liming operation creates the largest quantity of pollution, in terms of suspended solids, protein,

sulphide and alkalinity, of any leather-making process (see Table 1). The chemicals that are used are quite cheap, and hence the major incentive to recycling lies in the reduction of effluent loading that would result.

In the liming process, as applied to the majority of hides, lime and sodium sulphide are present. Under the highly alkaline condition, non-fibrous proteins are broken down and go into solution. Fat is

released and the hide structure swells. Hydrosulphide ions, formed from the hydrolysis of sodium sulphide, attack the hair and form a number of organic, sulphur-containing breakdown products. It is clear then that the chemical composition of a used lime liquor differs from that of a freshly-prepared liquor. Indeed, it has long been a practice to include a proportion of 'mellow' (used) lime liquor to reduce plumping and to avoid excessive swell-

TABLE 1
Contributions of different steps of processing to effluent loading
(Folachier, 1975)

| Process | BOD (%) (a) | COD (%) (b) | Salinity (%) | Toxicity (%) |
|-----------------------------|-------------|-------------|--------------|--------------|
| Soaking | 10 | 15 | 60 | 0 |
| Liming | 70 | 45 | 0 | 80 (c) |
| Deliming | 3 | 5 | 9 | 0 |
| Pickling and chrome tanning | 1 | 2 | 25-30 | 5 (d) |

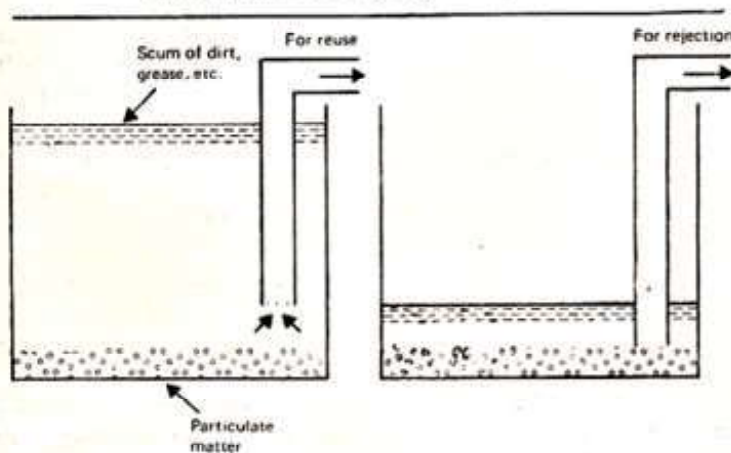
(a) Biological Oxygen Demand—measure of the amount of oxygen that the liquor extracts from the environment.

(b) Chemical Oxygen Demand—as (a).

(c) Principally sulphide.

(d) Principally chromium.

Possible methods for recycling soak liquors



1. Used soak liquor allowed to settle. Water pumped out, via filtered pipe, for reuse.

2. Remaining portion, containing the majority of dirt etc., rejected. Pumped out by unfiltered pipe.

Fig. 2

ing of the hide. Dissolved proteins act as buffering agents to limit the alkalinity of the liquor and hence to give the required action on the goods being processed. However, such methods have usually been applied on an empirical basis and have involved the rejection of a proportion of the used liquor followed by the addition of fresh lime.

More recently, there have been several studies on the recycling of lime liquors involving the replenishment of chemicals at the end of each cycle to give the required concentrations for the next batch (Simoncini *et al.*, 1972; Frendrup, 1973;

Money and Adminis, 1974 : Fola-chier 1975). The basis of the methods reported in these studies have been similar in every case, namely that the replenishment of water, lime and sodium sulphide to the used liquor was based on analytical results. In all cases, the properties of leathers from a recycling system were not significantly different from those of leathers produced by a standard method. Money and Adminis (1974) noted that reduced swelling took place in the used-lime liquors, although equilibrium was established after five or six cycles and from then on no process differences could be seen. Some workers found that filtration of the liquor was needed between each cycle to remove hair debris and some grease, while others maintained that it was possible to directly recycle the liquor without filtration.

Table 2 shows the likely savings in chemicals resulting from the use of a recycling system.

A further possibility to reduce the chemical consumption, and to virtually eliminate lime and sulphide from the effluent, is to recycle the liquors used to wash the hides after liming. These liquors will contain some sulphide, carried over in the liquors held within the hide structure, and could be used to make up the required volume for the liming liquor. Thus the full recycling method would be as shown in Figure 3.

TABLE 2
Percentage of chemicals per batch, based on raw hide weight
(Money and Adminis, 1974)

| Chemical | Recycling process | |
|---------------------|-------------------|-------------------|
| | Standard process | No removal solids |
| Sodium sulphide (%) | 4.0 | 2.2 |
| Lime (%) | 2.0 | 1.5 |
| Water (%) | 200.0 | 40.0 |

Recycling of liming and wash liquors

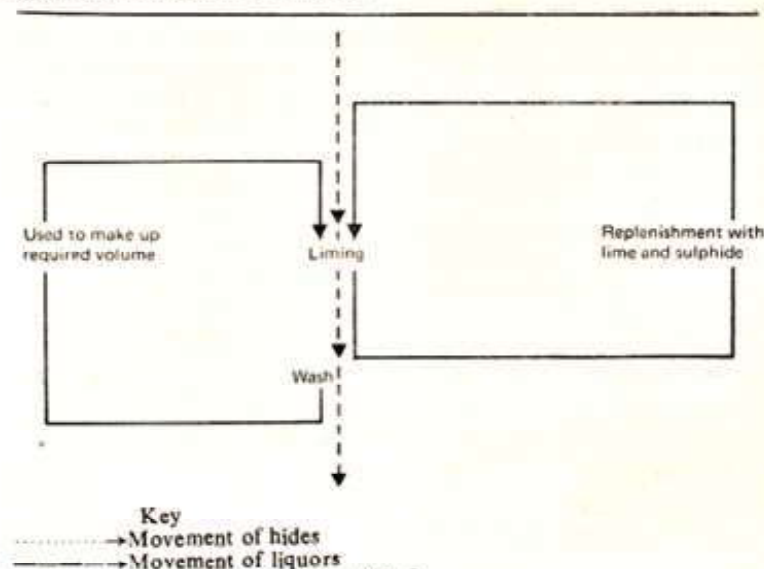


Fig. 3

Using such a system, and completely replacing the lime liquor after 20 cycles, Money and Adminis (1974) claimed 20-fold reductions in the consumption of water and in the concentration of sulphide in the effluent. In addition, there would be a seven-fold reduction in effluent lime and protein concentrations.

Methods for recycling lime liquors would involve the following steps :

1. Calculation of replenishment needs

The swelling of hides and rate of attack on hair are influenced by the concentration of sulphide in the

lime liquor. Hence an analysis of sulphide in the residual liquor is needed in order that the correct amount of sulphide is added for the next batch of goods to be processed.

Lime acts as a source of alkali when sodium hydroxide, a hydrolysis product of sodium sulphide, has all been absorbed by the hide protein. However, it has a very limited solubility in water (approximately 0.2 per cent w/v at 20°C) which effectively restricts its concentration in solution. Therefore, an analysis is not needed, provided that sufficient lime is present to maintain saturation at all stages of the process.

Required measurements are therefore :

(a) Concentration of sulphide in residual liquor (= c g per litre).

(b) Volume of residual liquor (= v litres).

Weight of residual sulphide = $c \times v$ g (as sulphide ion).

= $c \times v \times \frac{78}{32}$ g as pure sodium sulphide.

Flake sulphide, the form most commonly used, contains approximately 62 per cent (w/w) as sodium sulphide. Residual sulphide is therefore equivalent to

$$e \times v \times \frac{78}{32} \times \frac{100}{62} \text{ g}$$

of sulphide flake.

$$= 3.9cv \text{ g.}$$

If the weight of the next batch is W kg, and sulphide (as flake) is required at 'a' percent, the required weight of sulphide flake

$$= W \times \frac{a}{100} \text{ kg}$$

$$= \frac{W \times a \times 1000}{100} \text{ g}$$

$$= 10Wa \text{ g}$$

hence replenishment

$$= (10Wa - 3.9cv) \text{ grams of flake.}$$

Water would also be needed to increase the residual volume to that required for the next batch. Lime would be added, probably at the rate of 1 to 2 per cent based on raw hide weight to maintain alkalinity.

2. Practical implementation

Recycling is well suited to pit systems, as are found in the traditional leather processing industries of many developing countries, since there is no need for the removal of liquor from the vassels. Hides are removed on completion of liming, a note is made of the residual volume of liquor (using a calibrated dipstick, for example) and a sulphide analysis is carried out. Appropriate replenishments of lime, sodium sulphide and water are then given and the next batch of hides can be processed. This method is also applicable to paddle liming where the goods can again be removed from the processing liquor. A periodic removal of grease would be advantageous in handling the limed goods and to ensure an adequate penetration of chemicals in subsequent processing.

For drum liming, it would be necessary to collect the processing liquor before the goods are removed. The facilities required have been described (Money and Adminis, 1974) and include:

(a) Rapid and efficient drainage of the processing vessel, by using a perforated, false bottom covering a drainage valve.

(b) Storage tank, large enough to hold the daily output of lime liquors and washings.

(c) Ancillary pumping and pipework with the probable inclusion of filtering for occasional removal of debris.

In conclusion, recycling of lime liquors offers great benefit to the leather producer, not only from reduction of chemical consumption but also, of more importance, by greatly improving the quality of the tannery effluent.

Washing after liming

It is customary to give hides and skins a short wash in water on completion of liming, to assist in cleaning off hair debris, epidermis and adhering particles of lime. The liquor at the end of washing will be strongly alkaline since it will contain sodium hydroxide, lime and hydrosulphide ions, all from the carried-over lime liquor. As stated above, this residual wash water may be recycled to give some of the liquor for liming, thereby greatly reducing the loading of effluent. Pumping facilities and storage vessels will be needed for such a process.

Deliming liquors

As the object of deliming is to reduce the alkalinity of the limed goods, the liquors used are either mildly acidic, neutral or slightly alkaline. At the pH range encoun-

tered, usually 5.0 to 9.0, bacteria are able to flourish and hence some form of preservation would be needed to keep recycled liquors free from contamination.

The quantities of deliming materials used are normally adjusted so that they are practically consumed by the carried-over alkalinity of the limed goods. There is little benefit to be achieved, therefore, from recycling deliming liquors from a drum process, apart from minimal reductions in water consumption, chemical consumption and effluent production. No aspects of the savings are probably sufficient to justify either capital expenditure or extra handling involved in a recycling step. (Naturally, in those regions suffering from severe shortages of water, any form of economy may be worthwhile and therefore suitable for putting into practice).

Recycling is more attractive for a pit system, where larger volumes of liquor are needed with a consequent increase in the quantity of wasted chemicals if the residual solution is discarded. A method has been published dealing with the recycling of deliming liquors used in vegetable tanning (Hodgson Tanning Products, 1971). For the initial run, a solution of 2 to 3 per cent (w/v) deliming agent is prepared and acidified to pH 3.5 with dilute sulphuric acid. The goods are placed in this solution, gently agitated by rocking and the pH readjusted to 3.5 after 4 to 6 hours. After an overnight treatment, the hides are removed, 10 per cent of the liquor is drawn off and replaced by water and 0.1 per cent (based on limed weight) of deliming agent is added. Acidification to pH 3.5 is then carried out and the next batch of hides can be delimed. (It is stated that complete renewal of the deli-



ming liquor is necessary at intervals.)

Bating

As with deliming liquors, the pH conditions of bating mixtures are suitable for bacterial growth and hence any recycling scheme would need the inclusion of a suitable preservative. The effects of specific bactericides on the proteolytic enzymes of the bate would need investigation and could make recycling methods impracticable. A further drawback is the need to carry out checks of the enzyme activity for each liquor to be recycled, which requires time and skill. With the bating step of processing, simple analytical techniques do not indicate the likely activity of the enzymes on the hides and skins. Temperature and duration of storage between cycles, pH and concentration of salts are all likely to influence the enzymes present and hence affect the amount of material needed for replenishment. An additional disadvantage is that bating is carried out at elevated temperatures (30 to 37°C), which are necessary for optimum enzyme activity. If a liquor were to be stored prior to its replenishment and reuse, it would be necessary to supply heat before its addition to the next batch of hides and skins. Any reheating would need to be applied with care since localised formation of temperatures above 50°C would probably destroy enzyme activity and make the recycling step worthless. Therefore, recycling of bate liquors offers limited advantages and is likely to be difficult in practice.

Pickle liquors

In the processing of sheepskins, where pickling is generally a separate process, it is customary to

recycle the liquors when the process is carried out in pits or in paddles. Determination of acidity (by titration against standard alkali to a defined pH) and salt concentration (by measurement of the specific gravity of the liquor) may be carried out to enable the replenishments to be calculated. This is a straightforward and obvious means of economising in process chemicals.

However, when the pickling process is carried out in drums, extra equipment would be needed to contain the liquors, and modifications to the drum, to allow for the required rapid drainage, would also be essential.

In the processing of cattle hides, recycling of pickle liquors is more difficult since additional chemicals, such as formic acid or calcium formate, are often added to modify (mask*) the subsequent chrome tanning. Therefore and extra analysis would be needed to enable the replenishment to be calculated, since it is important to keep a constant ratio of masking agent to chrome tanning salt. Pickling and tanning may be carried out in the same bath, without removal of either the hides or liquor. In such cases the chrome tanning salts are added directly to the pickle liquor and hence simple recycling would not be possible. The alternative approach would then be to collect the residual liquor after tanning, replenish with acid and salt, and reuse it for the pickling step of the next batch. The appropriate amount of chrome tanning salt could then be added on completion of pickling. Such a method is described under 'Chrome tanning.'

Chrome tanning

The rate of chromium consump-

*For an explanation of masking see 'Chrome tanning'.

tion during conventional commercial methods of tanning is usually 70 to 80 per cent (Davis and Scroggie, 1973a). Therefore, 20 to 30 per cent of chromium is wasted, since residual liquors are usually discarded on completion of the tanning process.

In developed countries there has been a recent trend to minimise the wastage of chromium, either by modification of the tanning process or by reuse of residual liquors, with the principal objective of reducing the concentration of chromium in effluent. In developing countries, on the other hand, the major incentive to reduce the consumption of chrome tanning salts may lie in the resultant savings in the cost of the chemicals. Chrome tanning salts (as a powder containing 25 per cent Cr_2O_3) cost approximately £410 per tonne in the UK (February 1981) but are likely to be far more costly in those developing countries that have to import such compounds. Any ways of economising in their use, without having adverse effects on the leather produced, are therefore of considerable importance.

Some reduction in the rate of wastage can be gained by using smaller volumes of liquor in the processing vessels and hence effectively increasing the concentration of chemicals present. The use of more basic complexes will also increase the fixation of chromium, but a compromise is needed between reduction of wastage and retention of the desirable properties of the leather. Recent papers have described methods for increasing chrome uptake to almost 100 per cent (Gaughofer, 1975) but such processes include the use of specialised tanning techniques and require considerable expertise.

An alternative approach is the

recycling of chrome tanning liquors. Before discussing possible methods for recycling chrome tanning liquors, it is necessary to appreciate some of the chemical changes and their effects on the reaction between tanning salt and hide protein that can take place during and between processing cycles. Three terms that will be used in subsequent discussions are basicity, masking and neutral salts. For the sake of those unfamiliar with tanning terms, these are described below.

Basicity: Basicity, expressed as a percentage, indicate the proportion of total bonding from the chromium atom that is satisfied by hydroxyl groups. Thus chromic chloride, CrCl_3 , is 0 per cent basic, $\text{Cr}(\text{OH})\text{Cl}_2$ is 33 per cent basic. In practical terms, the reactivity of chromium salts towards hide protein increases as basicity increases. It is normal practice to use a tanning salt of 33 per cent basicity in the initial stages of tanning. For at this level the chromium salts are only moderately reactive and therefore penetrate the full thickness of the skin. Once penetration is complete, dilute alkali is slowly added to increase the basicity of the tanning salts and thereby induce stronger bonding to the hide. Thus the residual liquor, after basification, will have different tanning properties compared to those of the initial solution.

Masking: Masking is the introduction of substances into the chromium complex to lower the reactivity of the latter and hence to modify both the tanning process and the properties of subsequently produced leather. Organic acids, such as lactic, forming or acetic, are most commonly used and may be added to the prior pickle

liquor. The properties they impart include:

Tannage

- (a) Reduced astringency.
- (b) Increased resistance to precipitation by alkali.
- (c) Increased penetration rate of tanning salt.

Leather

- (a) More uniform distribution of chromium.
- (b) Improved smoothness.
- (c) Greater thickness.

It is clear that the ratio of masking agent to chromium salt should be kept constant, in order that consistent results are obtained.

Neutral salts: During the manufacture of most chrome tanning salts used commercially, sodium sulphate is formed and remains in the liquor or solid as applied. It has long been known that the uptake of chrome tanning salts by hide protein is adversely affected by the presence of such neutral salts (Wilson, 1941). Hence a constant concentration is needed to ensure regularity in tanning on a batch-to-batch basis. In normal processing, it is easy to control the neutral salt content of the tanning liquor as it will be the sum of that used in the pickle liquor (if carried over) and that introduced from the tanning salt. With a recycling system, however, it is necessary to measure the salt content for each run and to make the necessary corrections to maintain a constant concentration.

Possible methods for recycling chrome tanning liquors are shown in Figure 4. Details of these methods are described below.

Direct methods

Method 1. (Davis and Scroggie, 1973b, c; Folachier, 1975).

The residual tanning liquor was replenished with an appropriate

amount of chromium salts and reused for the next batch of hides or skins. It was therefore necessary to carry out separate pickling and tanning steps, with the liquor from the former being discarded. In both laboratory and commercial-scale trials, recycling was seen to be feasible and to produce leathers of a quality comparable to that of leathers from a standard process. The residual liquor from each tanning batch was analysed for chromium and the appropriate amount of tanning salt added for the next cycle. For basification, sodium carbonate was used, with the weight being in proportion to the weight of added chrome tanning salt. No additional neutral salt was used and it was found that the concentration of sodium chloride (from carried over pickle liquor contained in the interfibrillary spaces of the hides) and sodium sulphate soon reached equilibrium. Approximately 25 per cent less of chrome tanning salt was needed to produce leathers having satisfactory chemical and physical properties, with the added benefit of considerable reductions in the chromium and neutral salt content of the effluent.

Method 2. (Davis and Scroggie, 1973 d, e; Barlow, 1977).

The residual liquor from chrome tanning was replenished with acid and (possibly) salt and used as the pickle liquor for the next batch of hides or skins. At the end of the pickle step, the appropriate amount of chromium salt was added to the same liquor and tanning proceeded. As with method 1, the amount of alkali used for basification was proportional to the added weight of chromium salt. The amount of sulphuric acid added after each cycle was the same as that of a standard process, but the amount

Possible methods for recycling chrome tanning liquors

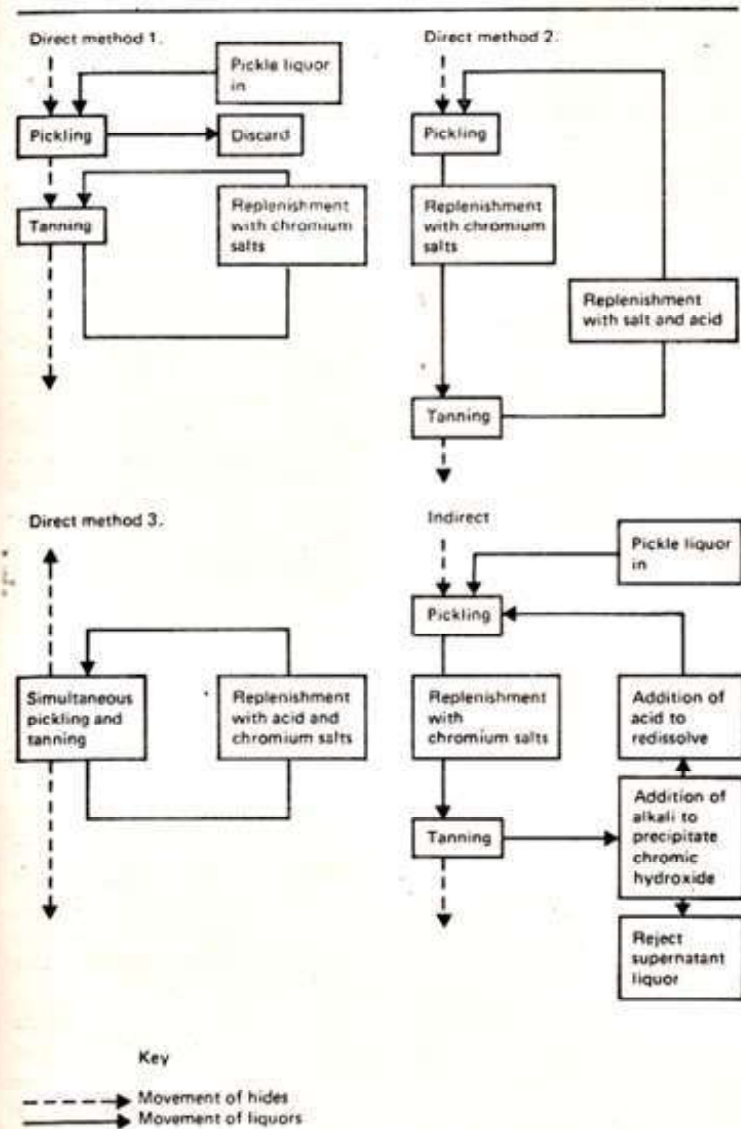


Fig. 4

of formic acid was reduced by 20 per cent, in order to give standard masking for each cycle. It was found that the equilibrium salt content, brought about by the introduction of sodium sulphate from the tanning salt, was sufficient to prevent acid swelling during pick-

ling. Leather properties were not adversely affected by the recycling process, consumption of tanning salt was reduced by 22 per cent and further economies were seen in the lower quantities of neutral salts required for pickling. Wet blues thus produced had storage

stability equal to that of leathers from a conventional (non-recycling) process, and batch-to-batch colour differences were minimal (Barlow, 1977).

Method 3. (France, 1976).

Simultaneous pickling and tanning have been described, using a mixture of organic acids for the former part of the combined process. Such compounds, marketed as a proprietary product specifically designed for pickling hides and skins, serve the two following purposes. They penetrate the hide or skin structure rapidly, thereby reducing the tendency for the chromium salts to precipitate on the surface of a mildly alkaline delimed hide or skin. They mask the chromium salts, further reducing the tendency for deposition and giving rapid, uniform penetration of tanning agent.

The method used was as follows (starting from washed; bated stock):

- (1) Drum for 5 minutes with salt (2 per cent on weight of bated goods).
- (2) Add replenished pickle/tanning liquor while drum turning.
- (3) No basification required.
- (4) Remove goods, collect residual liquor.
- (5) Analyse acid and chromium contents of spent liquor, replenish for next batch and store liquor for 24 hours before reuse.

Table 3 summarises the different aspects of the three direct recycling methods.

Indirect methods

Chromium was precipitated from the residual liquor, in the form of chromic hydroxide, by the addition of alkali and was then removed by

TABLE 3
Comparison of different methods for the direct recycling of chrome tanning liquors

| Property | Method 1 Reuse as separate tanning liquor | Method 2 Reuse as pickle liquor for next batch | Method 3 Reuse in simultaneous pickling (tanning) |
|--|--|---|--|
| Utilisation of chromium salts | ← Similar → | | |
| Neutral salt content of tanning liquor | ← Similar → (lower quantities possible) | | |
| Control of pickling | Standard process | ← Analysis to determine replenishment needs → | |
| Wastage of pickle acid | Wasted, unless separate recycling system used | ← Recycled → | |
| Handling of goods | Separate pickling and tanning processes not generally favoured for hides | ← More acceptable on commercial scale → | |
| Others | ← Occasional filtration suggested → | | Publish method only describes use of proprietary pickling compound |

filtration. The solid was then redissolved in sulphuric acid to give a chrome tanning liquor ready for reuse. This method was used in the USA during the Second World War but has been further developed more recently (Langerwerf *et al.*, 1975). The method found to give the best precipitation characteristics was as follows:

(1) Collect and mix residual liquors from tanning, neutralisation, retanning and washing processes, measure volume and determine concentration of chromium.

(2) Add calculated amount of magnesium oxide. Calculated to give a pH of 8.0 to 9.0; approximately 440 g per kg of Cr_2O_3 (assuming that basicity of chromium in waste liquors equals 50 per cent).

(3) Drum liquor and magnesium oxide for 1 hour, allow to settle overnight.

(4) Syphon off supernatant liquor and discard.

(5) Dissolve precipitate in calculated amount of concentrated sulphuric acid* to give reusable liquor of known concentration and basicity.

(6) Replenish with chrome tanning salt ready for use on next batch of goods.

The main purpose of the reported trials was the reduction of chro-

*Calculated to give standard pH of solution and known basicity of complex. (Approximately 1.3 kg of concentrated sulphuric acid needed per kg of Cr_2O_3 for reduction of basicity from 100 per cent to 33 per cent.

mium in effluent, although the corresponding reduction in chemical consumption would also be financially attractive. For example, for a tannery processing 2.5 tonnes of hides per day, the reduction in the consumption of chrome tanning salt would be approximately 12.5 tonnes per annum.

However, considerable apparatus would be needed, together with extra handling, analyses and chemical additions. Thus the direct recycling of chrome tanning liquors, rather than the more complicated procedures involved with precipitation and redissolving methods, appears more attractive and less likely to create problems in practice.

Conclusions

Simple methods of reducing the consumption of both chemicals and of water, with corresponding decreases in the loading and volume of effluent, are of interest to leather manufacturers in all parts of the world.

Considerable effort has been expended on developing methods for recycling processing liquors, after suitable replenishment, to give the results summarised in this article. In developing countries it is imperative that potential methods should not involve large amounts of capital expenditure, whilst the skills needed for sophisticated apparatus or methods of operation may also be in short supply. However, in general the recycling processes discussed do not need expensive plant or high orders of skill for their successful use, yet they could give appreciable savings in the cost of converting hides and skins into leather.

In the future it is likely that effluent legislation will become more



comprehensive and will necessitate the reduction of wastage from many of the leather-making processes. It is usually far more economical to redesign a process to make more efficient use of the chemicals present, rather than to build treatment facilities for reducing the loading of effluent produced.

Naturally, certain processes and processing vessels lend themselves to recycling more than others, good examples being the 'concrete mixer' type of hide processing equipment. Rapid drainage and pumping facilities are such that the liquors can readily be separated from the goods and transported to a collection vessel for analysis and replenishment. With drums, on the other hand, it would be necessary to fit perforated false bottoms or sides for drainage, with some form of collection pit, sump, pump and collection tank for handling the residual liquors. However, with the resultant savings in expensive chemicals and effluent loading, it is likely that the moderate investment needed for such facilities would be regained within a short period.

Pits or paddles are suitable for recycling methods, provided that excess capacity is available to accommodate the liquors between cycles.

Recycling of lime liquors offers the greatest potential savings in effluent loading but is of less interest in terms of chemical savings. Recycling of chrome tanning liquors results in a considerable reduction of chemical consumption and, as such chemicals are particularly expensive in developing countries that do not have local sources, well worth investigating. Furthermore, the stringent effluent restrictions on heavy metal contents, now being implemented in many developed

countries, are likely to become more widely accepted and hence to enforce all possible means for economy of tanning salts. Sufficient data are already available to enable commercial scale recycling of chromium liquors to be carried out with little extra handling or analyses compared to those required in a conventional process.

It will be to the benefit of all developing countries to practise methods for reducing chemical consumption and effluent production, both for the short-term improvement of profitability and in longer-term aims to control environmental pollution.

References

- BARLOW, J. R. (1976) Preservation of partially-processed hides and skins: a review. Part I. Raw stock. *Trop. Sci.*, 18 (2), 63-92.
- BARLOW, J. R. (1977) Some properties of wet blue leathers produced from recycled chrome tanning liquors. *J. Soc. Leath. Technol. Chem.*, 61, 29.
- DAVIS M. H. and SCROGGIE, J. G. (1973a) Investigation of commercial chrome-tanning systems. Part I. Separation of the complexes present by gel filtration and the effects of ageing and basification. *J. Soc. Leath. Technol. Chem.*, 57 13-18.
- DAVIS M. H. and SCROGGIE, J. G. (1973b) Investigation of commercial chrome-tanning systems. Part II. The rate of uptake by hide of the different chromium complexes from solution. *J. Soc. Leath. Technol. Chem.*, 57, 35-38.
- DAVIS, M. H. and SCROGGIE, J. G. (1973c) Investigation of commercial chrome-tanning systems Part III. Recycling of used chrome liquors. *J. Soc. Leath. Technol. Chem.*, 57, 53-58.
- DAVIS, M. H. and SCROGGIE, J. G. (1973d) Investigation of commercial chrome-tanning systems Part IV. Recycling of chrome liquors and their use as a basis for picking. *J. Soc., Leath. Technol. Chem.*, 57. 81-84.
- DAVIS, M. H. and SCROGGIE, J. G. (1973e) Investigation of commercial chrome-tanning systems Part V. Re-cycling of chrome liquors in commercial practice. *J. Soc. Leath. Technol. Chem.*, 57, 173-176.
- FOLACHIER A. (1975) Recyclage direct des bains de pelange et de tannage au chrome en fabrication. *Proc. XIV Congr. Int. Union Leath. Chem. Tech. Soc.* Vol. IV, pp, 17-24. Barcelona; Assoc. Quim. Esp. Ind. Cuero, 284 pp.
- FRANCE, H. G. (1975) Recycling tan liquors from organic acid pickle/tan process. *J. Am. Leath. Chem. Assoc.*, 70, 206.
- FRENDRUP, W. (1973) Section 4 of report of 4th meeting of the IULCS Effluent Commission, Lyon. *J. Soc. Leath. Technol. Chem.*, 57, 63-68.
- GAUGLHOFER, I. (1975) Ein neues verfahren zur maximalen Chromfixierung im Leder. *Proc. XIV Congr. Int. Union Leath. Chem. Tech. Soc.*, Vol. III, p. 35. Barcelona; Assoc. Quim. Esp. Ind. Cuero, 284 pp.
- HODGSON TANNING PRODUCTS (1971) Preparation of pelt for rapid tanning. In: *Tanning materials*. Beverley, England: Hodgson Tanning Products Ltd.
- KRISHNAMURTHI, V.S. and PADMINI, K. (1976) Purification and used salt for curing. *J. Am. Leath. Chem. Assoc.*, 71, 36-39.
- LANGERWERF, J. S. A., DE WIJS, J. C. PELCKMANS, H. H. A. and KOOPMAN, R. C. (1975) Precipitation and reuse of trivalent chromium. *Proc. XIV Congr. Int. Union Leath. Chem. Tech. Soc.*, Vol. IV pp. 27-38. Barcelona; Assoc. Quim. Esp. Ind. Cuero, 284 pp.
- MONEY C. A. and ADMINIS, U. (1974) Recycling of lime-sulphide unhairing liquor. 1. Smallscale trials. *J. Soc. Leath. Technol. Chem.*, 58, 35-40.
- SIMONCINI, A., DEL PAZZO, L. and MANZO, G. (1972) Investigations on the re-use of unhairing limes for bovine hides. *Cuoio. Pell. Mat. Conclanti*, 48, 337-344.
- WILSON, J. A. (1941) *Modern practice in leather manufacture*, p. 399. New York Reinhold, 744 pp.

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INDIAN ECONOMY TO GROW AT 6.5% IN FY24: CHIEF ECONOMIC ADVISOR NAGESWARAN



The Indian economy will grow at 6.5 per cent in the current fiscal ending March 31, 2024, Chief Economic Advisor Mr. V. Anantha Nageswaran said recently. This decade is going to be the decade of uncertainty. If the corporate sector delays its investment, then the virtuous cycle of employment generation and economic growth will not materialise, Nageswaran added.

“When it comes to the finance ministry, our emphasis has been to plan conservatively, both with respect to nominal GDP growth assumptions, buoyancy assumptions for revenue growth, etc.

“And I think, when I talk about being able to achieve six and a half per cent in real GDP growth on average, I am giving myself enough room to surprise on the upside,” he said while addressing an event organised by industry body CII.

The Indian economy grew 7.2 per cent in 2022-23. The Reserve Bank also expects growth to be 6.5 per cent in the current fiscal.

India’s economy grew 7.6 per cent in the September quarter of this fiscal and remained the fastest-growing large economy, mainly due to better performance by manufacturing, mining and services sectors.

The IMF, World Bank, ADB, and Fitch expect India’s GDP to expand 6.3 per cent in the current fiscal. S&P Global Ratings expects India to record a 6.4 per cent growth this fiscal.

Nageswaran said rebalancing towards investments and manufacturing will happen if the investment cycle gets into high gear as it did in the first decade of the millennium.

“So, the rebalancing is something that we are waiting for, as all the enabling conditions are in place,” he added.

(Business Standard – 07/12/2023)

GST EVASION OF RS 1.51 LAKH- CRORE DETECTED TILL OCTOBER; 71 NOTICES TO ONLINE GAMING COMPANIES



About Rs 1.51 lakh crore of tax evasion was detected by the Goods and Services Tax (GST) authorities till October in the financial year 2023-24, with Maharashtra, Haryana and Gujarat among the states with the highest amount of evasion, data shared by the Finance Ministry in Parliament showed. As many as 71 show cause notices have been issued to online gaming companies for alleged GST evasion of over Rs 1.12 lakh crore during financial years 2022-23 and 2023-24, reply to another question by the ministry stated.

Meanwhile, under its special drive, GST authorities detected tax evasion of Rs 24,010 crore and 21,791 non-existent entities, another reply by Finance Minister Nirmala Sitharaman stated. Out of the total 21,791 entities whose GST registrations were discovered to be non-existent, 11,392 entities pertained to state tax jurisdictions and 10,399 entities pertained to CBIC jurisdiction. State authorities detected Rs 8,805 crore of tax evasion, while Central authorities detected evasion of Rs 15,205 crore during the special drive.

For the total GST evasion of Rs 1.51 lakh crore detected by central GST officers in the current fiscal (till October 2023), 154 persons were arrested. A recovery of Rs 18,541 crore has been made so far this fiscal, the ministry said. This compares with detection of over Rs 1.31 lakh crore as evasion in financial year 2022-23, with recovery of Rs 33,226 crore, Minister of State for Finance Pankaj Chaudhary.



To the other question in the Rajya Sabha by MP Sushil Kumar Modi on the amount of tax evasion and number of show cause notices issued to online gaming companies, Chaudhary said: “71 show cause notices involving GST to the tune of Rs 1,12,332 cr have been issued to online gaming companies during financial years 2022-23 and 2023-24 (up to October 2023). As these notices are pending adjudication, the respective GST demand is not yet determined under the provisions of CGST Act, 2017.”

The government has amended the GST law, making it mandatory for overseas online gaming companies to register in India from October 1. In August, the GST Council clarified that 28 per cent GST would be levied on the full value of bets placed on online gaming platforms. Since then, many gaming companies received either an intimation notice or a show cause notice for short payment of GST.

Amended legal provisions and rules for online gaming, horse racing and casinos came into effect from October 1, bringing into effect the 28 per cent GST at face value at entry level and mandatory registration for offshore online gaming companies in India. The online gaming companies claim they were paying taxes at the rate of 18 per cent as the games played on the platform were ‘games of skill’.

(The Indian Express – 06/12/2023)

MOODY’S GIVES NEGATIVE OUTLOOK FOR GLOBAL BANKS IN 2024



Moody’s Investors Service on Wednesday said the outlook for global banks for 2024 is negative as central banks’ tighter monetary policies have resulted in lower GDP growth.

It said Indian banks’ profitability will increase further on lower provisioning expenses and robust growth in higher-yielding retail segments. “Reduced liquidity and strained repayment capacity will squeeze loan quality, leading to greater asset risks,” Moody’s said in its global banking outlook report.

Profitability gains will likely subside on higher funding costs, lower loan growth and reserve buildups. Funding and liquidity will be more difficult. It said the operating environment will deteriorate under tight monetary policies. Major central banks will start to cut rates, but money will remain tight, resulting in lower GDP growth in 2024. Inflation is slowing, but geopolitical and climate risks remain.

China’s economic growth is set to slow on muted private spending, weak exports and an ongoing property market correction. “Asset risks for Chinese banks will increase from the country’s economic slowdown as well as the prolonged stress among property developers and local government financing vehicles,” Moody’s said.

(PTI – 06/12/2023)

UNEMPLOYMENT RATE ROSE TO TWO-YEAR HIGH OF 10.09% IN OCTOBER: REPORT



India’s unemployment rate rose to a two-year high of 10.09% in October, *Bloomberg* reported citing data from the Centre for Monitoring Indian Economy (CMIE). That figure represents a near-three percentage point increase from September, when it was 7.09%. *Bloomberg* added that rural unemployment jumped from 6.2% to 10.82% and that the urban employment rate “eased slightly” to 8.44%.

According to government figures, the unemployment rate for 2022-2023 stood at 3.2%. But economists have come to rely on CMIE data for a better assessment of the labour market as

its figures are based on monthly surveys as opposed to government data, which releases country-wide data less frequently, *Bloomberg's* report said.

India's economy was projected to rise by an impressive 6% to 6.5% this year. The population is also growing and India overtook China as the world's most populous country in April. But despite this growth, India's workforce has remained stagnant for the last five years, CMIE chief executive Mahesh Vyas told *The Wire*. Close to 10 million Indians entered the job market in October hoping to find work, *Bloomberg* cited CMIE data as saying.

A survey by the Centre for the Study of Developing Societies found earlier this year that 36% of Indians aged 15 to 34 thought that unemployment was the biggest problem facing the country. When compared to a similar survey conducted in 2016, the proportion of Indians who identified unemployment as the biggest problem increased by 18 percentage points, the *Indian Express* reported the survey as saying. As many as 40% of educated respondents (graduate and above) identified unemployment as the biggest challenge, as opposed to only 27% of non-literate individuals doing so.

(The Wire – 02/11/2023)

INDIA NEEDS TO INCREASE R&D SPENDING TO 3% OF GDP: KRIS GOPALAKRISHNAN



India must triple spending on research and development (R&D) to 3 per cent of its gross domestic product (GDP) from 0.7 per cent now, said Kris Gopalakrishnan, co-founder of Infosys, on Friday.

The private sector needs to contribute 1.5 per cent to the total R&D spending, he said during a keynote address at the Pan IIT World of Technology (PIWOT) event in Bengaluru. India doubled its R&D spending to about Rs 127,380 crore in 2020-21 from Rs 60,000 crore in 2010-11. However, spending as a percentage of GDP is only 0.7 per cent, said Gopalakrishnan. The number of patent applications in India grew 31.6 per cent in 2022, one of the highest in the world. India has seen a rise in global capability centres (GCCs) in recent times, Gopalakrishnan said. Several GCCs in the country are transforming themselves to R&D hubs. Additionally, many multinational companies have their second or third largest R&D centres in India.

Gopalakrishnan also stressed on the need for educational institutions to introduce courses in emerging technologies like artificial intelligence (AI) and data science, adding that India has one of the largest information technologies (IT) and science, technology, engineering, and mathematics (STEM) talent pools in the world.

“The IT services industry must continue to grow as that is creating job opportunities and bringing foreign exchange to the country. We must grow the product space today as it contributes about \$13-\$14 billion and must take it to \$30 billion... We should also look at research in IT so that we can look at the next generation of AI, technologies that are going to be relevant to the industry 10 years from now. We should start working on those things now along with research institutions,” said Gopalakrishnan.

He said India has a huge role to play in the global ecosystem as it is home to almost 20 per cent of the world population. The world is looking towards India to hire from the talent pool. “Industry involvement in research and funding is a two-way street,” Gopalakrishnan said, adding that India needs to set clear goals in academic and basic research and make use of AI in R&D.

(Business Standard – 08/12/2023)

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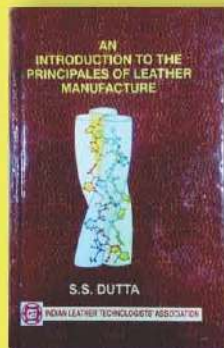
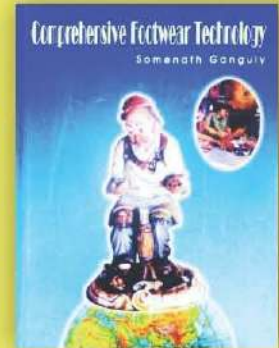
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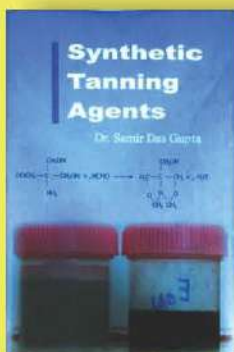
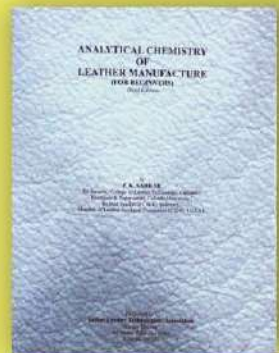
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History and Activities of Indian Leather Technologists' Association

Registration No. KOL RMS/074/2022-24

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Das-Stiasnay theory and father of Indian Leather Science on 14 th August' 1950. The primary objectives of the oldest Leather Technologists' Association which celebrated its Diamond Jubilee year in the 2010, are:

- To bring all concerned with the broad spectrum of the leather industry under one umbrella.
- To organize seminar, symposium, workshop in order to create information, knowledge and latest development for the benefit of all concerned. To offer a common platform for all to interact with each other in order to understand each other's problems and prospects.
- To publish monthly journal as a supplement to those above objectives. The monthly journal of ILTA is known as journal of Indian Leather Technologists' Association and is the most widely circulated technical journal concerning leather technology.
- To publish text books for the benefit of students at various levels of study, for the researchers and industry.
- To have interface between urban and rural sector.
- To assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies acceptable and adoptable to the industry.
- To organize practical training and to provide skilled manpower and to motivate good students for study.
- To conduct activities related to the growth of the export of leather and leather goods from India.

ILTA also organizes Prof. B. M. Das Memorial Lecture every year during the Foundation Day Celebrations on 14 th August and Sanjoy Sen Memorial Lecture on 14 th January, the birthday of our late President for several decades. Many reputed scientists, industrialists and educationists have delivered these prestigious lectures. Foreign dignitaries during their visits to India have addressed the members of ILTA at various times.

ILTA have published the following books:

1. An Introduction to the Principles of Physical Testing of Leather by Prof. S. S. Dutta
2. Practical Aspects of Manufacture of Upper Leathers by J. M. Dey
3. An Introduction to the Principles of Leather Manufacture by Prof. S. S. Dutta
4. Analytical Chemistry of Leather Manufacture by P. K. Sarkar
5. Comprehensive Footwear Technology by Mr. Somnath Ganguly
6. Treatise on Fatliquors and Fatliquoring of Leather by Dr. Samir Dasgupta
7. Synthetic Tanning Agents by Dr. Samir Dasgupta
8. Hand Book of Tanning by Prof. B. M. Das



ILTA presents awards in the name of Prof. B. M. Das Memorial, Sanjoy Sen Memorial and J. M. Dey Memorial Medals to the top rankers at the University graduate and post graduate levels. J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly journal of the Indian Leather Technologists' Association (ILTA). From the year 2023 ILTA has started to present a Scholarship namely Prof. Moni Banerjee Memorial Scholarship to a Student of B. Tech / M. Tech Leather Technology who is meritorious but financially crippled.

ILTA is the Member Society of IULTCS (International Union of Leather Technologists' and Chemists Societies) which is a 125 years old organization. The International Congress of this union is held in different locations of the world once in two years. In its 125 years history, for the first time the Congress was held in January 1999 outside the developed countries and that too in India at CLRI, Chennai. Indian Leather Technologists Association organized the Congress under the able leadership and guidance of Late Sanjoy Sen, the then President of ILTA and IULTCS and Dr. T. Ramasami, the then Vice-President of ILTA and Director, CLRI, Chennai. In 2017 IULTCS Congress was successfully held again at Chennai, India for the second time. In order to promote and provide marketing facilities, to keep pace with the latest design and technology, to have better interaction with the domestic buyers, ILTA has been organizing LEXPO fairs at Kolkata from 1977, Siliguri from 1992 and Durgapur from 2010. To help the tiny, cottage and small-scale sectors industries in marketing, LEXPO fairs give the exposure for their products. Apart from Kolkata & Siliguri and Durgapur, ILTA have held LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi. In commensurate with the time, demand and new perspective of the modern leather users, ILTA has started to organize LEXPO at Kolkata from 2022 in a new shape with the Manufacturers and Exporters of Leather Goods from all over India.

ILTA has celebrated its Golden Jubilee with a year-long programme from 14 th August' 2000 to 13 th August' 2011 along with the first conference of South East Asian Countries at Netaji Indoor Stadium, Kolkata.

ILTA has also celebrated its Diamond Jubilee with a year long programme from 14 th August' 2010 to 13 th August' 2011 which included National Seminars, B. M. Das Memorial Lecture, Sanjoy Sen Memorial Lecture, Moni Banerjee Memorial Lecture, Y. Nayudamma Memorial Lecture and 3 day's AICLST (Asia International Conference on Leather Science and Technology) at Hotel 'The Stadler' at Salt Lake City, Kolkata.

The Association's present (as on 31.03.2023) strength of members is around 550 from all over India and abroad. Primarily the members are leather technologists passed out from Govt. College of Engineering and Leather Technology – Kolkata, Anna University – Chennai, Harcourt Butler Technological Institute – Kanpur, B. R. Ambedkar National Institute of Technology – Jalandhar and Scientists and Research Scholars from Central Leather Research Institute (CLRI).

In order to strengthen its activities, ILTA have constructed its own six storied building at 44, Shanti Pally, Kasba, Kolkata – 700107, West Bengal, India and have named it as "Sanjoy Bhavan".

This Association is managed by an Executive Committee duly elected by the members of the Association. It is absolutely a non-profit making voluntary organization working for the betterment of the Leather Industry. None of the Executive Committee members draws any remuneration for their services rendered but they get the satisfaction of being a part of this esteemed organization.



ILTA
Since 1950

Indian Leather Technologists' Association

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