ILTA
Since 1950

JILTA

Journal of Indian Leather Technologists' Association

Rgtn. No. KOL RMS/074/2022-24
Regd. No. ISSN 0019-5758
RNI No. 2839/57
Date of Publication: 6th
₹ 50.00

VOLUME : LXXIV No. 06 JUNE' 2024

ILTA PUBLICATIONS

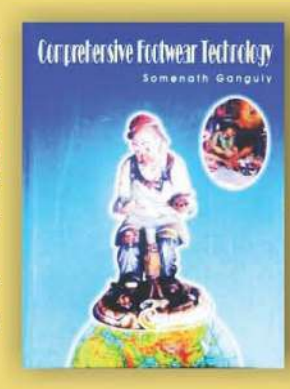
Title of the Book
Treatise on Fatliquors and Fatliquoring of Leather

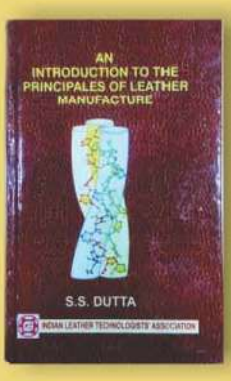
Author
Dr. Samir Dasgupta

Price per copy*
₹ 1500.00 / $ 60.00

Title of the Book
Comprehensive Footwear Technology
(Presently out of stock)
Author
Mr. Somenath Ganguly

Price per copy*
₹ 500.00 / $ 50.00





Title of the Book
An Introduce to the Principles of Leather Manufacture

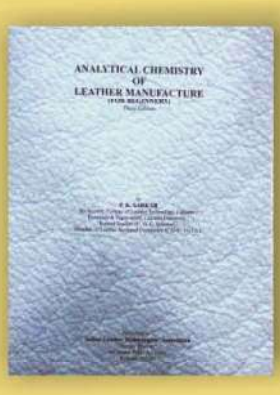
Author
Prof. S. S. Dutta

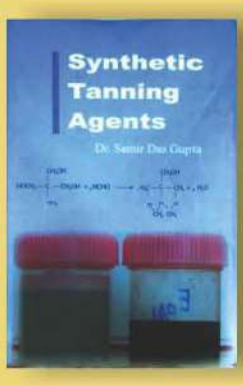
Price per copy*
₹ 800.00 / $ 50.00

Title of the Book
Analytical Chemistry of Leather Manufacture

Author
Mr. P. K. Sarkar

Price per copy*
₹ 300.00 / $ 10.00





Title of the Book
Synthetic Tanning Agents

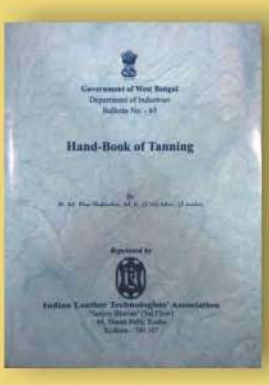
Author
Dr. Samir Dasgupta

Price per copy*
₹ 900.00 / $ 30.00

Title of the Book
Hand- Book of Tanning

Author
Prof. B. M. Das

Price per copy*
₹ 750.00 / $ 25.00



*Packing and forwarding charges extra

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Indian Leather Technologists' Association

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

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

JUNE, 2024 VOL.: LXXIV NO.: 06 RNI NO.: 2839/57 REGD.NO.: ISSN 0019-5758

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Hony. Editor : Dr. Goutam Mukherjee

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admin@iltaonleather.org; jiltaeditor@gmail.com

Cover Designed & Printed by :

M/s TAS Associate

11, Priya Nath Dey Lane, Kolkata - 700 036

Published & Printed by :

S. D. Set, on behalf of Indian Leather Technologists' Association

Published from :

Regd. Office : 'Sanjoy Bhavan', 3rd Floor,

44, Shanti Pally, Kasba, Kolkata - 700 107

Printed at :

M/s TAS Associate

11, Priya Nath Dey Lane, Kolkata - 700 036

Subscription :

Annual	Rs.(INR)	400.00
Foreign	$ (USD)	45.00
Single Copy	Rs.(INR)	50.00
Foreign	$ (USD)	4.00

All other business communications should be sent to :

Indian Leather Technologists' Association

'Sanjoy Bhavan', 3rd floor, 44, Shanti Pally

Kasba, Kolkata - 700 107, WB, India

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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.

Advertisement Tariff

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Black & White	Rs. 5,000.00/-
Colour (full page)	Rs. 10,000.00/-
Colour Insert (One side) (Provided by the Advertisers)	Rs. 5,000.00/-

Full Page / per anum

Front inside (2nd Cover)	Rs. 96,000/-
3rd Cover	Rs. 84,000/-
Back Cover	Rs. 1,20,000/-

Mechanical Specification

Overall size	:	27 cm X 21 cm
Print area	:	25 cm X17 cm

Payment should be made by A/c. Payee Cheque to be drawn in favour of :

Indian Leather Technologists' Association
and Payable at **Kolkata**

Send your enquiries to :

Indian Leather Technologists' Association
'SANJOY BHAVAN'
3rd floor, 44, Shanti Pally, Kasba, Kolkata – 700 107
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(Member Society of International Union of Leather Technologists and Chemists Societies)

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

EDITORIAL BOARD OF JILTA

A Look at the Global Economic Leaders

The world economy has been in consistent flux in later decades and the following ten a long time guarantee to be no distinctive for the following decade.

Underneath is a rundown of what to anticipate:

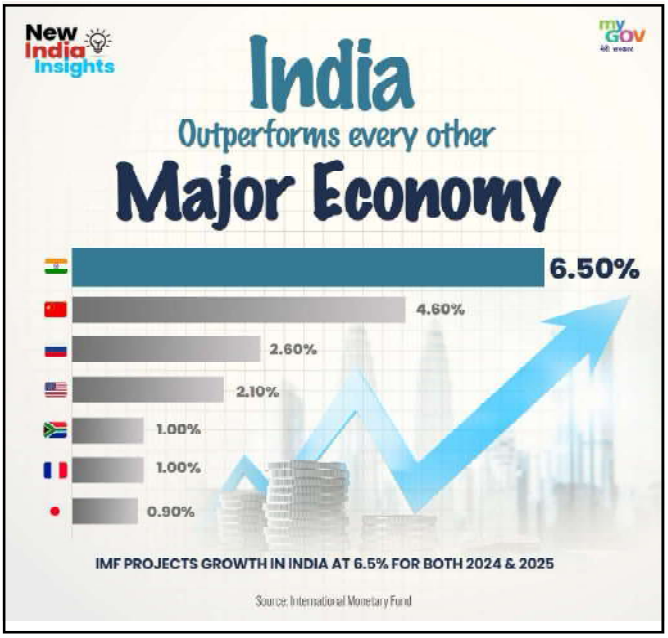
U.S. and Europe will proceed to diverge

Long-term Assessment estimates anticipate U.S. genuine GDP development to outpace Euro range genuine GDP development by a normal of 0.6 rate focuses per year over the following decade. As a result, the U.S. economy ought to be over 16 trillion dollars bigger than the Euro region economy by 2034, compared to 12 trillion dollars nowadays. More grounded socio economics, a laxer administrative environment, a more adaptable labor advertise a more bound together capital showcase and authority in rising advances will all be vital variables making difference the U.S. economy produce ahead of the European economy in the coming years.

China's financial development will moderate strongly. China's yearly GDP development is to slip underneath 3% inside a decade's time, concurring to long-term Forecasts—above the rates of created markets but a distant cry from the development seen in China in later decades. A number of components will be behind this lull. The scope for moderately simple catch-up development is lessening as the physical capital stock and urbanization rate rise. The populace will decay at an ever-sharper pace in the coming a long time, weighing on private utilization and the property segment and power exchange and tech limitations from the West will obstruct the send out segment and speculation.

India is being incubated and will emerge as the world's third-largest economy

Long term assessment Figures extend that India will end up as the world's third-largest economy in ostensible GDP terms some time recently the conclusion of this decade, with financial development anticipated to normal over 5% per year. This amazing financial execution will be supported by different drivers, mainly a populace anticipated to develop in overabundance of 10 million individuals per year, business-friendly changes, political soundness beneath most able Indian leadership, and the country's allure as a base for firms looking to strip from China. That said, China was developing at over 8% per year when it had a comparable GDP per capita to India; as such, India is still not maximizing its full financial potential.



Insight from Economic panelists

Goldman Sachs analysts commented on India's demographics:

"Millennials and GenZ will account for more than 50% of India's population by 2030./ This abundant labor force can help India achieve its near-term domestic growth goals while capitalizing on global supply-chain diversification opportunities. We expect India's demographic dividend to not only unlock

opportunities in services and manufacturing sectors but also unleash the spending power of the country's young population./ We expect consumption stories related to Millennials—especially in e-commerce, food delivery, and the fintech space—to be a driving force in India's growth."

On China's economic outlook, Nomura analysts said:

"We do not think China's economy has truly stabilized, as the property sector remains in decline, the risk of another fiscal cliff is on the rise, geopolitical challenges are likely to sustain, and growth might face downward pressure again over the next few months. We believe now is not the time for Beijing to be complacent, and more stimulus measures are needed to meet its economic targets."

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Goutam Mukherjee

Dr. Goutam Mukherjee
Hony. Editor, JILTA

Stahl Leather solutions

Stahl is proud to launch the renewed Stahl Neo® range: a future-proof portfolio of low-impact solutions covering the entire wet-end and finishing stages of leather production.

With growing awareness of environmental and health and safety impacts, the Stahl Neo® portfolio has been extensively reviewed and tested to help customers meet today's fast-evolving certification and compliance landscape for leather chemicals. This includes the recently updated Zero Discharge of Hazardous Chemicals (ZDHC) Manufacturing Restricted Substance List (MRSL) 3.1.

Following a rigorous internal review and testing programme, all products in the Stahl Neo® portfolio are in compliance with the following three criteria:

1. ZDHC: All Stahl Neo® products are compliant with Version 3.1 of the ZDHC MRSL for leather manufacture.

2. EU CMR: Stahl Neo® products are certified free from carcinogenic, mutagenic or reprotoxic (CMR) substances as per EU criteria.

3. EU REACH SVHC: Stahl Neo® products meet EU REACH criteria for substances of very high concern (SVHC) (less than 0.1% concentration).

As a result, Stahl is now able to offer tanners the most comprehensive range of future-proof solutions on the market – providing peace of mind for stakeholders across the leather article value chain.

Scan the QR code to download the Stahl Neo® brochures and discover the specific benefits of each product in our portfolio.

www.stahl.com

Stahl is a world leader in speciality coatings and treatments for flexible materials. Around the world, nearly 2,000 Stahl colleagues are driven by a clear purpose:
Touching lives, for a better world.

Our diverse teams work on creative and innovative surface solutions that enable our customers to make fantastic products. Our coatings are found on everyday materials in the automotive, luxury goods, packaging, apparel and home furniture market, among others. When consumers touch everyday products, we touch their lives.

Being a world leader means we are dedicated to contributing to a better world together with our value chain partners. At Stahl, we aim to impact the market through innovation and sharing knowledge and by reducing our own operational footprint. Our approach is underpinned by our robust ESG strategy and our strong sense of social responsibility, a characteristic shared by leading global companies.

We promote:

- Teamwork
- Initiative
- Personal development
- Innovation
- Creativity

Working at Stahl, means being part of a versatile, ambitious team that is committed to working on innovative, high-quality coating solutions for our customers while making the world a better place. You will also be joining a diverse global community: headquartered in Waalwijk, the Netherlands, Stahl operates a network of 16 production sites and 37 application laboratories, supported by sales offices in 22 countries.

stahl.com

Stahl

THIERRY VANLANCKER JOINS STAHL BOARD

Stahl, the leading provider of speciality coatings and treatments for flexible substrates, has appointed former AkzoNobel CEO Thierry Vanlancker as a Non-Executive Director to its Board.

As a Non-Executive Board Director, Mr Vanlancker will provide valuable oversight, advice and strategic guidance to Stahl's leadership, supporting the company's position as leader in speciality coatings and treatments for flexible substrates.

From 2017 to 2022 Mr Vanlancker served as CEO and Chairman of the Management Board of AkzoNobel NV. Prior to his tenure at Akzo he held several senior positions in Europe and the US at Dupont. Mr Vanlancker also serves as Chairman of the Board at Sika and as Non-Executive Board Director at Aliaxis and Etex. He brings over 30 years of experience in the speciality coatings and chemicals industries and holds a Master's degree in chemical engineering from Ghent University.

Maarten Heijbroek, Stahl CEO, says: "We look forward to working with Thierry and harness his extensive experience in the coatings industry to support Stahl's own transformation into a specialty coatings company and realise Stahl's ambitious ESG targets." Thierry Vanlancker says: "I'm delighted to be joining Stahl at this exciting point in its history. I have gotten to know Stahl as a high-quali ty company with a clear strategy and a true sustainability leader in its field."

About the Stahl Board

The Stahl Board of Directors consists of Stahl's CEO and CFO and seven Non-Executive Directors, including representatives from Stahl's main shareholders Wendel and BASF, two independent members, and a former executive member. The Stahl Board is responsible for the general affairs and strategy of Stahl, and the formation and implementation of the corporate governance organisation of the Stahl Group, including its management and reporting structure under the articles of associations of the relevant group companies.

(Stahl News – 06/05/2024)

SEVERE FLOODING IN RIO GRANDE DO SUL, BRAZIL

On behalf of the global Stahl community including our Brazil-based colleagues, we would like to express our sympathy and solidarity with the people and families affected by the recent severe flooding in Rio Grande do Sul, Brazil.

As it stands, Stahl's facilities in Portão, Rio Grande do Sul, have not been affected by the flooding, though we continue to monitor the situation closely. Stahl has taken every precaution to safeguard our wastewater treatment plans to prevent uncontrolled emissions from our lower-lying facilities. Stahl will provide further updates on the situation as necessary.

(Stahl News – 05/05/2024)

STAHL JOINS GO!PHA ALLIANCE TO ADVANCE THE USE OF NATURALLY OCCURRING PHAS IN FORMULATED COATINGS

Stahl, a leading provider of speciality coatings and treatments for flexible substrates, has joined the Global Organization for PHA (GO!PHA), a non-profit platform that advocates and advances the use of polyhydroxyalkanoates (PHAs), a naturally occurring polymer that offers a lower-impact, bio-based alternative to traditional fossil-based plastic feedstocks.

GO!PHA is a coalition of over 60 stakeholders ranging from producers and formulators to users as well as universities and research institutes. The members, all early adopters of PHAs, work together to increase understanding of this relatively new PHA technology and advance the science behind these renewable, compostable and biodegradable materials.

As a member of the network, Stahl will have the opportunity to join forces with the wider PHA value chain to help move PHAs beyond the testing phase and accelerate the potential application of the technology in the coatings market.

Paolo Bavaj (Chief Innovation and Development Officer at Stahl): 'We see significant potential in PHAs, and we look forward to collaborating with like-minded stakeholders through the GO!PHA alliance to bring this important technology to life. We are currently testing potential PHA-based applications across our entire portfolio; by pioneering and embracing new, sustainable technologies, we are truly living our purpose, Touching lives, for a better world.'

Anindya Mukherjee (Executive Board Member at GO!PHA) : "We warmly welcome Stahl as a new member to GO!PHA. Stahl's expertise in speciality coatings and treatments for flexible substrates will undoubtedly enrich our coalition's efforts to promote the use of PHAs, fostering innovation and sustainability within the coatings industry. Together, we look forward to advancing the adoption of PHAs and other renewable, compostable, and biodegradable materials!"

WHAT ARE PHAS ?

PHAs are polymers produced in nature, mainly as a result of bacterial fermentation. They can be sourced from organic waste streams, biogas, sugars and fat-rich, plant-based feedstock. The chemical composition of PHAs can be adjusted to a soft and elastic form, making them ideal for flexible substrates.

PHAs are a bio-based alternative to fossil-based 'persistent plastics', offering reduced carbon emissions and no harm to people or the planet through contamination or additives. They are also circular by nature, as they can be reused, recycled or composted: taking as little as days to break down compared to centuries for fossil-based plastics.

(Stahl News – 02/05/2024)

STAHL ADDS STAYDRY WATERPROOF PERFORMANCE COATING TO INTEGRA® PORTFOLIO

Stahl, a leading provider of speciality coatings and treatments for flexible substrates, has launched the protective coating Stahl Integra® Dry 725, meeting the increasing demand for water-repellant technical fabrics.

Part of the Stahl Integra® toolbox, Stahl Integra® Dry 725 is a fluorine-free coating for water-repellent technical textiles that harnesses Stahl's proven polymer technology. Stahl has introduced Stahl Integra® Dry 725 in response to the growing market demand for fluorine-free, water-repellent technical textiles, which is projected to reach USD 605.1 million by 2029.

Jan Terras, Global Market Manager within Stahl's Performance Coatings division, says: "With Stahl Integra® Dry 725, we have added a new solution for technical fabric producers within our range of performance coatings, which offer superior performance without compromising on sustainability. Together with our partners, we are creating solutions to new and existing challenges and identifying areas where our advanced, polymer-driven technologies can truly add value, in support of our purpose – Touching lives, for a better world".

Stahl Integra® Dry 725 offers a balanced performance between repellency, durability and adhesion. Stahl's durable water-repellent (DWR) technology, StayDry, repels water from fabric by modifying the surface tension of fibres. The solution can be combined with other top or back coatings and is specifically designed for technical textile applications such as camping equipment or luggage. As a fluorine-free, waterborne coating that is cured at low temperatures, Stahl Integra® Dry 725 can help reduce environmental impact without compromising on quality.

About Stahl Integra®

Stahl Integra® is a modular 'toolbox' of tailor-made, customer-orientated protective coating solutions that simultaneously ensure product quality and superior fabric integrity. This means that specific mechanical functionalities – from flame-retardant and breathable coatings to stay-clean technologies – can be introduced at different stages of the production process to meet specific end-market requirements as needed. These solutions help fabric producers to not only comply with regulatory and environmental demands, but also to achieve the highest standards in mechanical properties, fabric integrity, and other market requirements.

(Stahl News – 22/04/2024)

STAHL'S 2023 ESG REPORT CHARTS FURTHER PROGRESS IN MEETING ENVIRONMENTAL, SOCIAL AND GOVERNANCE GOALS

Stahl, a leading provider of speciality coatings and treatments for flexible substrates, has published its 2023 Environmental, Social and Governance (ESG) Report. The report outlines Stahl's recent progress on its ESG Roadmap to 2030 and the steps the company is taking to live its purpose of Touching lives, for a better world. The report is available now as a/ fully digital version.

Maarten Heijbroek, CEO of Stahl: "Stahl's 2023 ESG Report looks back on an important year for Stahl and its people. We delivered on our interim ESG Roadmap milestones and defined our new interim goals for 2026, that support our ambition to be an ESG leader in our space. In April 2023, we launched our new purpose: Touching lives, for a better world. I believe this sent a clear message about the kind of company we aspire to be and the impact we want to have on society. I look forward to collaborating with our value chain partners to make even more impact in 2024."

Exceeding interim environmental targets

Stahl's ESG Roadmap to 2030 includes interim targets for 2023, making this a year in which Stahl reached several important milestones. For example, the company reduced its scope 1 and 2 greenhouse gas (GHG) emissions by 22% versus 2022. Furthermore, in 2023 the Science Based Targets initiative (SBTi) validated Stahl's scope 1, 2 and 3 targets, making it one of the first coatings companies on the SBTi-approved list.

To reduce its GHG emissions, Stahl is actively increasing its use of clean energy. At the end of 2023, renewable energy generation, such as solar panels, had been installed at four Stahl sites, compared to its target of three.

Measuring – and reducing – the impact of products is an important step in the company's scope 3 emissions. As such, 353 Stahl products now have either life cycle assessment (LCA) or product carbon footprint (PCF) data, far exceeding the 2023 target of 50.

New ratings and certifications

In 2023, 2,161 of Stahl's products were certified by Zero Discharge of Hazardous Chemicals (ZDHC), in line with ZDHC MRSL V3.1. These products represented 70% of the company's sales revenue, demonstrating increased demand for coatings with a lower risk to health and the environment. Stahl was also proud to achieve a Platinum rating from EcoVadis for the second year in a row, which places it in the top 1% of companies evaluated. Stahl also exceeded its 2023 target of an average EcoVadis rating of at least 60/100 for their top ten suppliers, with an average rating of 68/100 reported in December 2023.

Fostering a safe and welcoming work environment

A core pillar of Stahl's ESG approach is how it supports its employees' physical and mental well-being. The 2023 ESG Report outlines several examples of this commitment, such as improvement in its key safety KPIs for the third year in a row.

Besides keeping people safe, Stahl continues to make progress in fostering an open and inclusive workplace. For example, in support of diversity, equity and inclusion (DEI), Stahl appointed its first female leadership team member, trained 98% of its staff in DEI and established DEI committees at all Stahl sites. In addition, to strengthen communication, engagement and collaboration across the workforce, Stahl also established an internal workplace hub, MyStahl.

(Stahl News – 17/04/2024)

From the desk of General Secretary

ELECTION SCHEDULE FOR RECONSTITUTION OF EXECUTIVE COMMITTEE OF ILTA AND THE REGIONAL COMMITTEES FOR THE TERM 2024 - 2026

The Executive Committee of ILTA at an Emergency Meeting held on 09/04/2024 approved the following schedule for Election of Executive Committee of ILTA and the Regional Committees for the term 2024-2026.

Sl. No.	Events	Election Schedule for 2024-2026	Day
01	Mailing of Nomination papers & Voters' List on or before	02.05.2024	Thursday
02	Last date for receipt of Nomination Papers	24.05.2024	Friday
03	Last date for receipt of Consent	13.06.2024	Thursday
04	Last date for withdrawal of candidature	17.06.2024	Monday
05	Mailing of ballot papers on or before	06.07.2024	Saturday
06	Last date for receipt of ballot papers from voters residing outside KMDA area & 24-Pgs (N & S)	03.08.2024	Saturday
07	Casting of votes by voters residing in KMDA & 24-Pgs (N & S) Area at ILTA Administrative Office 10-00 to 17-00 hrs. LUNCH BREAK : 01-30 to 02-30 PM	02.08.2024 & 03.08.2024	Friday & Saturday
08	Counting of votes at ILTA Administrative Office from 11-00 hrs. onwards	05.08.2024	Monday

HEALTH CARE BENEFIT FOR ILTA MEMBERS

As per decision taken in the 562nd Meeting of the Executive Committee, ILTA is going to launch Health Care Benefits for all the Members of our Association in collaboration with M/s Narayana Health w.e.f. 1st April, 2024. Initially the scheme is going to be launched for the members of Eastern Region as the Pilot Project.

For benefits and other details of this project may kindly follow the HRD Corner (Page No. -).

DIGITALIZATION OF ILTA PUBLICATIONS

As per decision taken in the 562nd Meeting of the Executive Committee, ILTA is going to launch a digital platform for availing all its publications including Leather Text Books, JILTA and different articles from renowned authors of Leather Fraternity online.

Work on this project is under process. The details of the same will be published very soon.

(Susanta Mallick)
General Secretary

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.

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.

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

2022-2023

PROJECT PARTNERS IN ASIA

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CONSENT TO CONCRETE : "TRANSFORMING TANNERY SLUDGE INTO SUSTAINABLE PAVEMENT BLOCKS"

Abstract :

The Indian Leather, Leather Products, and Footwear Industry occupies a significant position in the Indian economy, renowned for its consistent high export earnings, ranking among the top ten foreign exchange earners for the country. This sector is a major source of employment and export revenue, deriving its raw materials from the by-products of the meat industry. However, the process of converting skins/hides into leather generates a substantial amount of sludge in the form of PTP and CETP sludge. Disposing of this sludge is not only costly but also contributes to land and air pollution, without realizing its potential for economic value. The accumulation of solid waste in landfills poses a serious threat to the surrounding ecosystem by contaminating groundwater. To address these conventional practices, Solidaridad, as the implementing partner of the EU-funded Switchasia Grant Programme, "Effective Waste Management and Sustainable Development of the MSME Tanning Companies in Kolkata Leather Cluster (Bantala)," has intervened to transform this waste into valuable products such as pavement blocks and tiles. By repurposing the waste into paver blocks, Solidaridad aims to reduce the burden on landfill sites and mitigate environmental risks.

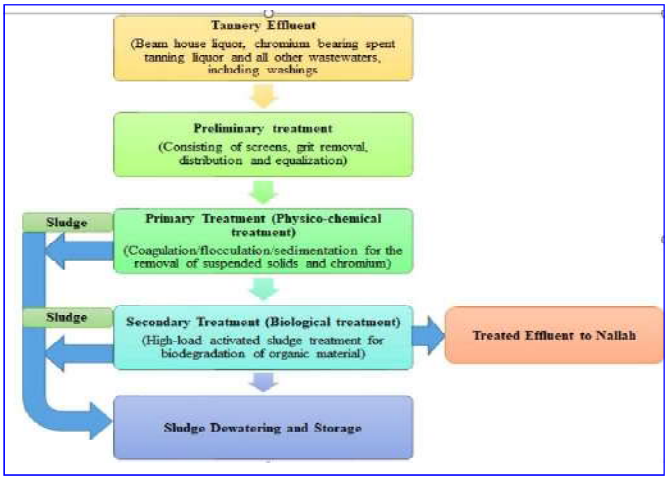
Introduction :

The leather industry stands as a prominent sector within India's industrial landscape, with key production hubs located in states such as Tamil Nadu, Uttar Pradesh, and West Bengal. Among these, Kolkata, the capital of West Bengal, emerges as a pivotal center for tanning activities. The Kolkata Leather Complex, situated in Bantala, hosts over 300 tanneries, highlighting its significance in the nation's leather trade. Central to the operations of the Kolkata Leather Complex is its Common Effluent Treatment Plant (CETP), a facility crucial for treating the effluent discharged by tanneries to align with the stringent standards set by the State Pollution Control Board (SPCB). Notably, the CETP handles a substantial volume of 10 tons per day of sludge, comprising both primary and secondary residues from the treatment process. Currently, this sludge is disposed of via secure landfilling, incurring a significant cost of INR 2500 per ton. The disposal of this sludge poses a significant challenge for stakeholders in the Kolkata Leather Complex, necessitating a technologically and economically viable solution for its safe and sustainable management. The tanning process inherently generates wastewater with high suspended solids content, leading to the formation of sludge in the effluent treatment process. On average, 100-150 kg of dry solid matter is produced per ton of hides or skins processed. In conventional treatment systems combining physio-chemical and biological methods, the majority of sludge, around 70-80 per cent, is generated in the primary treatment phase, with the remaining 20-30 per cent formed during the secondary biological treatment. The quantity of solids in the effluent is influenced by various factors, including the type of raw materials used, the tanning process employed, the chemicals utilized, and internal control measures within the tannery. Key stages such as first soaking and liming are identified as primary sources of suspended solids generation in the effluent.

Picture 1.0: Tannery Beamhouse Yard (Post Liming)

Conceptualization of idea into ground :

The preliminary treatment system comprises a fine screen, grit removal unit, distribution well, and an equalization tank. Wastewater from the collection network flows into a channel, where a screen chamber removes floating matter, and then into a grit chamber, which separates settleable solids.

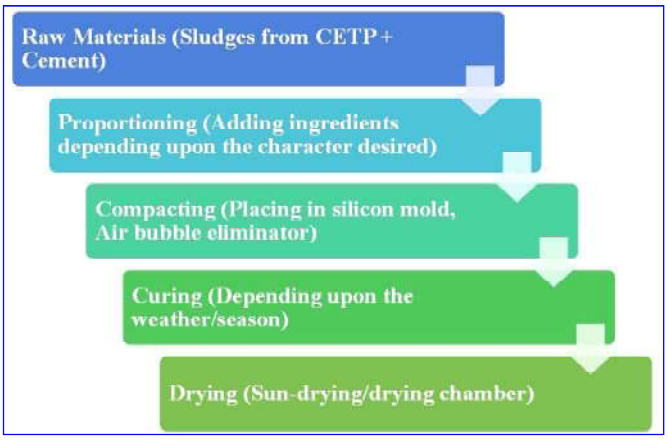


The sludge from the primary sedimentation tank is pumped into a sludge collection tank, then transferred to a mechanical sludge dewatering system. The dewatered sludge was originally sent to a designated secure landfill, as its reuse was not feasible. However, Solidaridad reformed the entire approach by making methodical adjustments to the chemical composition. This effort resulted in the successful creation of paver blocks that are not only safe but also environmentally friendly in every aspect.

The initial step in utilizing this sludge involved analyzing its current composition using test reports from NABL-accredited laboratories.

S. No.	Test Parameters	Results
1.	pH (10% of aqueous solution)	8.5
2.	Volatile Solids, %	27.91
3.	Non-volatile Solids, %	72.09
4.	Total Chromium mg/kg	5.784
5.	Calcium Oxide as CaO, %	21.14

The most intriguing and crucial aspect revealed by the test reports is the remarkably high calcium oxide content. This is primarily due to the use of lime in the liming process, which is employed to soften the pelt, enabling better absorption of chemicals and other ingredients without any obstruction.



Given the significant calcium content found in the sludge, Solidaridad ingeniously repurposed it for the manufacturing of paver blocks. These blocks, solid items crafted from CETP primary sludge and other essential components, come in various sizes and shapes, including rectangular and hexagonal forms, designed for interlocking with adjacent blocks. The manufacturing process requires raw materials such as Portland cement, coarse and fine aggregates, readily available in Kolkata. Paver blocks find wide application in sidewalks, gardens, parking lots, bus stops, industries, and other public spaces. There is a substantial demand for these products in the CLC, especially in parking areas and raw sections where transport vehicles are parked for loading and unloading. The blocks can be tailored to achieve desired compressive strengths, ranging from M25 to M40, making them suitable for diverse applications based on strength requirements.

Picture 2.0: Laid Pavement Blocks at CLC Gate-03

Characteristics of Paver Block (M-35), 60 mm thickness :-

S. No.	Parameters	Test Method	Results	Standards (IS: 15658 - 2021)
1.	**Compressive Strength** (N/mm^2)	IS: 15658-2021 Annex-D	40.5	32.0 min.
2.	**Water Absorption** %	IS: 15658-2021 Annex-C	4.7	7 max.
3.	**Dry Abrasion Resistance,** mm^3/mm^2	IS: 15658-2021 Annex-E	12000	20000 $mm^3/5000\ mm^2$ Max.
4.	**Wet Abrasion Resistance,** mm^3/mm^2	IS: 15658-2021 Annex-E	20000	22000 $mm^3/5000\ mm^2$ Max.
5.	**Flexural Strength** Mpa	IS: 15658-2021 Annex-G	6.2	3.5 min.
6.	**Tensil Strength** Mpa	IS: 15658-2021 Annex-F	3.6	2.8 min.

1. **Environmental Sustainability** : Utilizing CETP sludge in paver block manufacturing reduces the environmental impact by repurposing waste material that would otherwise be sent to landfills.

2. **Resource Efficiency** : By incorporating CETP sludge into paver blocks, Solidaridad conserves natural resources that would have been used in traditional block manufacturing, such as aggregates.

3. **Cost-Effectiveness** : Using CETP sludge as a raw material reduces production costs, making the paver blocks a more affordable option.

4. **Improved Waste Management** : Repurposing CETP sludge helps in managing waste effectively, contributing to a cleaner and healthier environment.

5. **Versatility** : Paver blocks made from CETP sludge can be manufactured to meet various strength requirements, making them suitable for a wide range of applications.

6. **Local Availability** : The raw materials required for manufacturing, including CETP sludge, Portland cement, and aggregates, are locally available, reducing transportation costs and carbon footprint.

7. **Durability** : When manufactured properly, paver blocks made from CETP sludge exhibit durability and can withstand heavy loads and varying weather conditions.

8. **Aesthetic Appeal** : These paver blocks come in various sizes, shapes, and designs, enhancing the aesthetic value of sidewalks, gardens, parking lots, and other public spaces.

Solidaridad

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

IULTCS FOCUSED ON THE 38TH CONGRESS TO BE HELD IN LYON, FRANCE IN 2025

IULTCS, the 126-year-old International Union of Leather Technologists and Chemists Societies, holds a world congress every 2 years. It set targets for the steps to be followed by the tanning industry in the 2024-2025 period and for the 38th Congress to be held in Lyon, France in September 2025.

Founded in London in 1897, IULTCS, the International Union of Leather Technologists and Chemists Societies, currently represents approximately 3000 individual members and 19 member associations worldwide. It is a scientific institution formed by leather engineering in the academy that determines strategies and produces solutions for the global leather industry. The union organization, which organizes international congresses in various countries every two years and enables the production of modern technologies and the development of chemical methods in leather production, has determined its strategies for the 2024-2025 period.

Its unique structure consisting of collagen fibers made by nature and providing extraordinary properties, which has ensured its compatibility with the high demands of leather quality requirements and within the framework of sustainable and environmentally friendly processes, is an inimitable science. Focusing on the congress it will organize in 2025, IULTCS has set principles for its sustainability goals for this unique craft since the existence of humanity :

Empowering the role of the IULTCS Commissions: to boost the effectiveness of our existing commissions and to explore the establishment of a new commission for sustainability to address the emerging challenges and to drive positive change within the industry :

- Communicating leather as an irreplaceable material:flpushing back against the falsehoods widely shared on social media, with facts and scientific arguments.
- Global collaboration for Research and Innovationflbetween international research institutions and industry partners to promote continuous innovation in leather technology and measurable impact in processing.
- Education and skill developmentflwithin the leather sector. Support programs that enhance the knowledge and capabilities of professionals, ensuring a skilled workforce for the future.

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

- Youth Engagement and Mentorship: cultivating the next generation of leather scientists and professionals by promoting youth engagement initiatives such as the YLSG. Collaboration between our experienced members and the emerging talent to ensure as seamless a transfer of knowledge as possible.
- Environmental stewardship and responsible practicesflalong the leather value chain.

(magazineleather.com – 06/04/2024)

JUNE 12TH AND 13TH FILK FREIBERG LEATHER DAYS – SALTZBURG, AUSTRIA

THE MEETING POINT OF THE EUROPEAN TANNING AND LEATHER INDUSTRY

The Freiberg Leather Days has been the meeting place for the European tanning and leather industry since 2012. Every two years in Freiberg and the other year out of town, the VGCT and FILK Freiberg as co-organizers, experts, researchers and specialists invite to exchange ideas and actively participate in the professional contents.

For details : ***https://www.filkfreiberg.de/en/conferences-training/meetings-conferences/freiberg-leather-days***

NEW IULTCS ISO-EN LEATHER TEST METHODS APRIL 2024

IULTCS methods of analysis for leather, including equivalent ISO and EN Standards

The IULTCS, through the IULTCS Testing Commissions (IUC, IUF and IUP), provides help and protection for the leather tanning industry worldwide by developing and publishing test methods that are explicitly relevant to leather manufacture and leather usage. Without the work of the IU Commissions, which develop these test methods, the leather industry could be open to having to meet performance standards of other materials that bear no relationship to the reality of working with leather.

For details : ***https://iultcs.org/iultcs-iso-en_leather_test_methods_2024-april/***

INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES

Carbon Audit - A Discussion

(Part - 1)

Dr. Goutam Mukherjee

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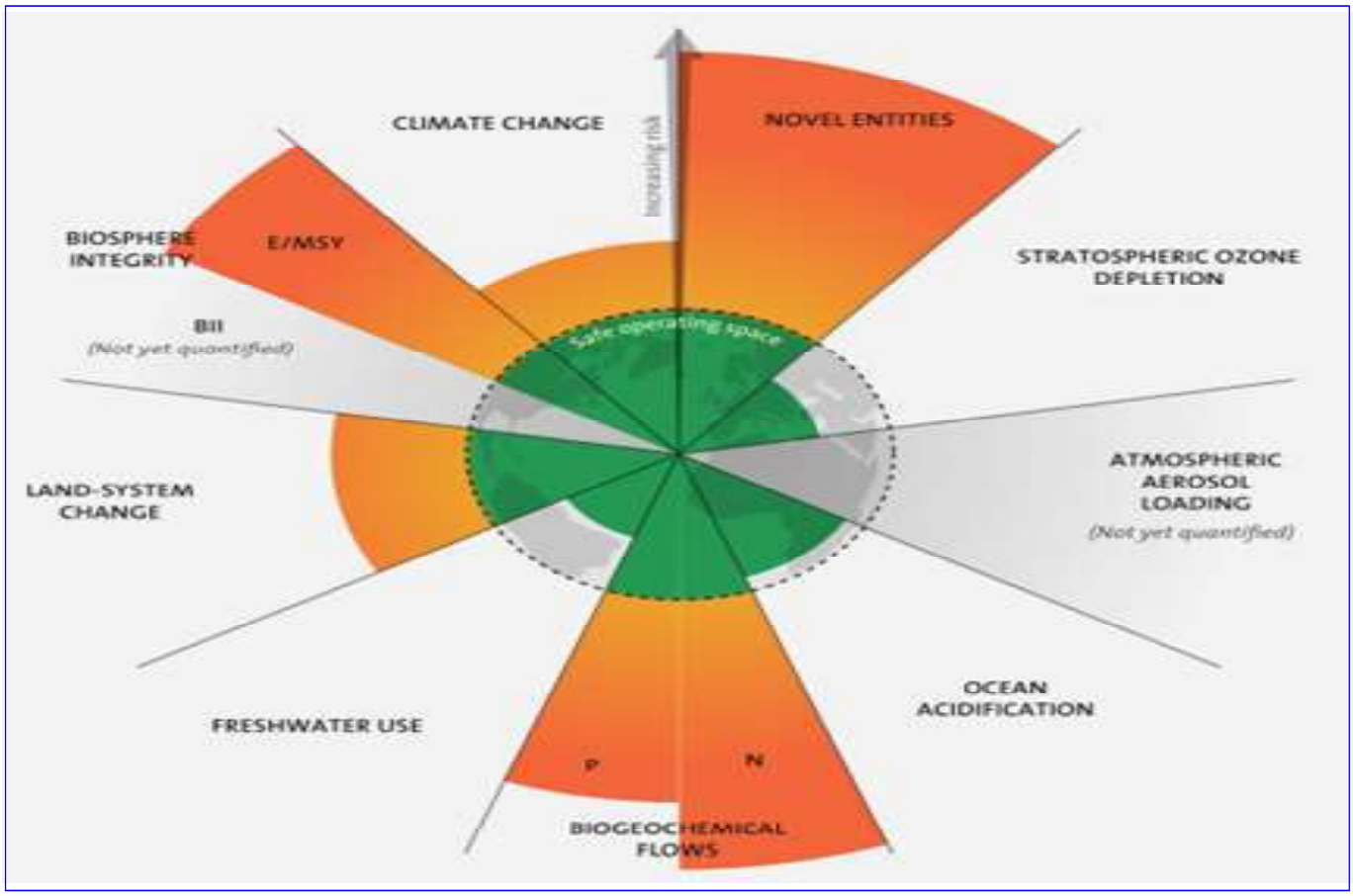
Introduction

Global surface temperatures have warmed 1.1°C since pre-industrial times, due to greenhouse gas emissions (GHG). Climate change is already leading to water scarcity, food shortages, price spikes, severe impacts on farming and fishing and mass species extinctions. The UNEP Emissions Gap Report 2022 states that there is "no credible pathway to 1.5°C in place" and "current pledges for action by 2030, if delivered in full, would mean a rise in global heating of about 2.5°C and catastrophic extreme weather worldwide." In other words, companies need to accelerate efforts to reduce GHG emissions, primarily their carbon (CO_2) emissions in a massive scale.

Discussion

Greenhouse gas emissions from human activities are an undeniable source of climate change, as stated in the 2021 IPCC report. To ensure the resilience and stability of earth's systems, we need to operate within our planetary boundaries. Only by doing so can we avoid irreversible damage. The next few years are critical, with emissions needing to be reduced by 45-50% by 2030 and net zero being achieved - globally - in the early 2050s. Only when net zero has been achieved can global temperatures stabilize which means continuing with 'business as usual' is not an option.



Corresponding author E-mail : gmclt@hotmail.com / gmgcelt@gmail.com

Carbon Accounting

Carbon accounting, or greenhouse gas accounting, is the process of quantifying the amount of greenhouse gases (GHGs) produced directly and indirectly from a business's or organization's activities within a set of boundaries. Carbon dioxide (CO_2) is the most common greenhouse gas emitted by human activities. As a result, all other major GHGs are given a "carbon dioxide equivalent," or CO_2e. This is determined by multiplying the amount of a GHG by its global warming potential (GWP). A gas's GWP is a measure of how much energy the emissions of 1 ton of that gas will absorb over a given period of time relative to the emissions of 1 ton of carbon dioxide. The higher the GWP, the more that GHG will contribute to global warming.

The demand for robust greenhouse gas (GHG) accounting is rapidly growing as investors and businesses seek to demonstrate their commitment to decarbonization—as of February 2023, 92% of global GDP (link resides outside ibm.com) has made an intended or actual commitment to reaching net zero by 2050. The most commonly used approach to calculate GHG emissions is the Greenhouse Gas Protocol (link resides outside ibm.com). As defined by the GHG Protocol Corporate Standard (link resides outside ibm.com), emissions are classified into three scopes :

Direct (Scope 1) Emissions

Also called "direct emissions," Scope 1 emissions are released directly from sources that are owned or controlled by an organization. Examples include emissions produced from manufacturing processes, fugitive emissions (e.g., methane emissions from coal mining) or the onsite production of electricity by burning coal.

Indirect (Scope 2) Emissions

"Indirect emissions," or Scope 2 emissions, are released from the electricity, steam, heating and cooling purchased by an organization. In 2015, GHG Protocol guidance was revised to recommend that both location-based (grid-based) and market-based methodologies be used when calculating Scope 2 emissions.

Supply Chain (Scope 3) Emissions

Often referred to as "supply chain emissions," Scope 3 emissions are indirect greenhouse gas emissions that occur as consequence of the activities of a facility, but from sources not owned or controlled by that facility's business. Accounting for 5.5 times more emissions on average than a company's direct emissions, Scope 3 emissions present a significant opportunity for organizations to engage their suppliers to accelerate decarbonization globally.

Carbon Accounting

Access to accurate, granular GHG emissions data is essential for organizations looking to identify where to focus emissions reduction efforts, develop a strategy and track the impact of emissions reduction initiatives. Organizations often follow an emissions reduction journey that aims to improve efficiency, introduce renewables and purchase offsets to achieve their Net Zero targets. Granular data on where emissions are coming from helps direct the organization's emissions reduction efforts. In addition, ongoing tracking of GHG emissions provides a quantified feedback loop to track if initiatives are achieving the desired outcome.

Net Zero

Net zero means the point at which global net human-caused greenhouse gas (GHG) emissions, including carbon dioxide and methane have been cut to as close to zero as possible with any residual emissions permanently removed from the atmosphere. Balancing the equation to achieve net zero greenhouse gas emissions will be extremely challenging since it will require eliminating all residual emissions—particularly those in hard-to-abate sectors like agriculture and steel, cement and chemical production. There is some conjecture over the validity of certain carbon removal techniques, but regardless, the quantities removed to balance what is emitted must be permanent. Permanence means it must not return into the atmosphere over time, such as through the destruction of forests or improper carbon capture and storage.

The concept of net zero GHG emissions was first popularized by the Paris Agreement, a landmark deal negotiated at the 2015 United Nations Climate Change Conference (COP21) to limit the impact of greenhouse gas emissions. The goal of the Paris Agreement is for the world to reach net zero GHG emissions in the second half of this century.

Net Zero Matters

To avert the worst impacts of climate change, global temperature increase needs to be capped at 1.5°C (2.7°F) above pre-industrial

levels. Today the Earth is already 1.1°C (2°F) warmer than it was in the late 1800s. Meanwhile, global emissions continue to rise and the Earth's temperature is on track to increase 2.7°C (4.7°F) by the end of this century, according to the UNDP's Emissions Gap Report 2021. International scientific consensus is that to keep global warming from breaching the 1.5°C threshold, near-term carbon emissions from human activities like the burning of fossil fuels must be reduced on the level of 45–50% by 2030 and at least 90% by 2050.

Until net zero GHG emissions are achieved, the temperature of the planet will continue to rise with increasingly dire consequences. In a special report (link resides outside ibm.com) by the Intergovernmental Panel on Climate Change (IPCC), a collection of the world's leading climate scientists highlighted the severity of climate impacts with a 1.5°C increase and how much worse things will get if the global temperature increase hits 2°C (3.6°F). Some of the effects highlighted in the IPCC special report include heat waves, species loss and rising sea levels.

Net Zero emissions targets

Various governmental and non-governmental organizations have launched voluntary initiatives, networks or pledge platforms that public and private sector organizations can use to help publicly validate their ambitions and gauge performance to targets.

Below is an overview of some of these platforms :

Race to Zero

- Race to Zero is a United Nations global campaign to rally leadership and support from businesses, cities, regions and investors.
- As of September 2022, 8,307 companies, 595 financial institutions, 1,136 cities, 52 states and regions, 1,125 educational institutions and 65 healthcare institutions have joined the Race to Zero.
- It aggregates net zero commitments from numerous networks and initiatives across the climate action community and sets out substantive criteria that industry participants must meet.
- Participants pledge to reach net zero carbon emissions by 2050 at the latest.
- Participants commit to report progress against targets annually.

Building-level targets

- The World Green Building Council (GBC) (link resides outside ibm.com) defines a net zero carbon building as a structure that is both highly energy efficient and fully powered by on-site or off-site renewable energy.
- Its Net Zero Carbon Buildings Commitment challenges businesses, organizations, cities, states and regions to have all buildings within their direct control operating at net zero carbon by 2030, and all buildings by 2050.
- Delivering a net zero carbon building requires a mix of improved energy system efficiencies, including behavioral changes, upgrades to plant and equipment (such as retrofitting with LED lighting), green energy purchases and, if necessary, carbon offsets.
- As of November 2022, World GBC's Advancing Net Zero (ANZ) project has been embraced by 34 Green Building Councils, including in Australia, the US, Canada and the UK.
- In 2022 alone, 4.3 million square meters of green building space was cumulatively certified by Green Building Councils.
- As of February 2023, over 170 businesses, cities and states or regions have committed to net zero buildings, and the numbers continue to grow.
- Performance against targets is measured using existing ratings tools such as NABERS in Australia.

SBTi Net Zero initiative

The Science Based Target initiative (SBTi) is more than a net zero pledge platform. It offers fee-based services to help organizations set their GHG emissions reduction targets and validate the targets against SBTi's criteria. In 2021, the SBTi introduced its Net-Zero Standard, which they claim to be "the world's first framework for corporate net zero target setting in line with climate science."

To achieve net zero GHG emissions, organizations need to measure their carbon emissions, identify opportunities for reduction, develop a plan, take action against it, measure and report on milestones for more on approaches to achieving emissions reduction targets.

Net Zero Issues and Challenges

While achieving net zero GHG emissions has gained considerable momentum, the concept is not without its challenges. In an assessment of climate pledges from various countries and corporations, the Net Zero Stock take 2022 (link resides outside ibm.com) states, "In contrast to the near-universal coverage of country-level net zero targets, the volume and robustness of targets set by non-state actors is alarmingly weak and bound to face increasing scrutiny as UN, national and NGO-led accountability initiatives ramp up."

While net zero GHG emissions pledges have been made by a large number of organizations, many of those had only pledged their intention with little to no follow through on how they would achieve their net zero targets. This situation has also brought scrutiny on greenwashing. Green washing is the term used when an organization presents an inaccurate or incomplete impression of their climate action to inflate their claims of environmental practices and performance results.

One method used by organizations to track their emissions and support their reduction claims is GHG accounting. The calculation of greenhouse gas emissions is a complex process. The GHG Protocol Corporate Accounting and Reporting Standard establishes methodologies for accounting and reporting of emissions and helps organizations create a greenhouse gas inventory. The inventory is a list of emissions sources and the associated emissions calculated using standardized methods, primarily based on using average emissions factors to convert different types of energy and fuel use into equivalent CO_2 emissions.

Net Zero opportunity

While net zero is not without its issues and challenges, including those noted above, the movement has undoubtedly spurred climate action where it did not previously exist. Collective climate action from organizations and jurisdictions around the world has given rise to climate policy, benchmarking and emissions transparency. Some investors are including net zero initiatives in their evaluation of organizational performance. In turn, organizations are making public commitments to deliver on these outcomes.

Disclosure for ESG reporting

GHG emissions data is essential for organizations wishing to track and disclose their performance against net zero goals. Carbon accounting informs the "E" in environmental, social and governance (ESG) reporting, which has surged in prominence amid a growing realization among investors and financial institutions that sustainability risk is investment risk, as BlackRock CEO Larry Fink highlighted in his 2020 letter to CEOs.

ESG reporting frameworks require quantitative or qualitative information to be provided to receive a score or other peer-comparison benchmark. This information is utilized by investors, shareholders and boards primarily. Reporting frameworks indicate how a company's operations are likely to impact the environment as well as the likely impact of climate change on the company's ability to generate value—financial or otherwise. This information is relevant to financial stakeholders, namely investors, insurers and creditors, but may also be relevant to the general public. Without exception, ESG reporting frameworks call for the disclosure of an organization's environmental impact, which most often includes GHG emissions. Given the rise of investor interest in ESG performance, the way an organization accounts for its emissions must have the same level of rigor as financial accounting.

Carbon Cost

Carbon pricing continues to hold a recurring spot in public political discourse around the world, with debates surrounding these climate policies increasing in the years since the Paris Agreement. Not only did the treaty outline a global framework for nations to follow, but importantly it offered nations the opportunity to cooperate beyond geographical boundaries, by encouraging the transfer of emissions reductions across borders. The Paris Agreement, international frameworks such as CDP and SASB, and green initiatives introduced by countries together have sent a strong signal of the international willingness to turn the tide with climate change. The most widely adopted of these initiatives spanning almost all industrialized countries today is government-mandated carbon pricing, a model which some organizations have also adopted internally within their sustainability plans as an additional lever to achieve their pledges.

At the vanguard of corporate sustainability strategy is the sustainability manager, and staying informed on international and private sector initiatives is now more important than ever as companies experience a growing urgency to create and deliver on outcomes.

In this article, we explore traditional forms of external carbon pricing models in some international markets, and look at internal carbon pricing as a company-led initiative in the private sector's push to decarbonize.

External carbon pricing

In an effort to reduce greenhouse gas (GHG) emissions from producers and financially incentivize them to emit less, governments ("external") place a fee on emissions in the form of carbon pricing. This "polluter pays" principle removes the burden from the public in bearing the responsibility of paying for the results of climate change (such as property and livestock loss), and shifts it to the producer of the emissions.

The producer can then determine whether they continue to pay the hefty premiums associated with GHG emissions or reduce emissions to avoid the additional cost. Given the financial weight that carbon pricing models bear on already resource-intensive industries, the '"polluter pays" principle also has a rippling influence throughout corporate strategy, as it provides a solid case for directing investments into more efficient and greener technologies as opposed to those with higher emissions.

The way carbon pricing is applied can lead to common challenges such as :

- Major producers may pass on the cost of the carbon tax directly to the end consumer, leading to increases in the cost of living.
- Companies may continue to pay carbon tax with little to no change in corporate behavior (although this has led to significant revenue for the government, which has allowed them to subsidize cleaner forms of energy).
- Governments may struggle to set an adequate pricing level that incentivizes behavior change without impacting profitability (however, as we later explore in the case of Sweden, the model has proved successful).
- Producers may have an uneven influence on public discourse around carbon pricing.

Despite these challenges, carbon pricing continues to be a viable market-based solution to reducing GHG emissions. As of 2021, over 60 carbon pricing initiatives have been implemented around the world, and in 2020 more than 2,000 companies reported using an internal price on carbon as another mechanism to support decarbonization pledges.

Carbon pricing is the broad model which covers two approaches: a carbon tax and a cap-and-trade system. Both systems share the goal of reducing carbon emissions—through different means.

Carbon tax

Under a carbon tax, the government establishes a price that producers pay for each unit of carbon pollution they emit. This system is intended to encourage businesses and the wider industry to fuel-switch, reduce their emissions or explore innovative technologies to avoid the tax imposed.

Also referred to as emissions trading, a cap-and-trade system limits the amount of emissions that a producer can release. The government places this limit and reduces the limit over time to reach an emissions reduction target. Under the cap-and-trade system, producers who exceed the limit are taxed, while the producers who reduce their emissions output can trade (emissions trading) and sell the credits they did not use. The European Union's Emissions Trading System (EU ETS), which is the world's largest carbon market, is an exemplary model of this, having reduced CO_2 emissions by 1 billion tons between 2008 and 2016.

Corporate use of internal carbon pricing

With markets moving toward a low-carbon economy and mandatory external carbon pricing initiatives expected to grow, companies are increasingly reporting the current or planned adoption of internal carbon pricing in corporate strategy.

By placing an internal fee on GHG emissions, companies can not only make strategic decisions on investment and business operations, but also gain a competitive advantage over others that prepares them for future regulatory requirements. Microsoft, for example, has implemented internal carbon pricing to fund green projects, research and employee climate education. Novartis has adopted an internal carbon price of USD 100/ tCO_2e to assess the financial impact of emissions from significant investments, as has ASDA (Walmart affiliate) to guide their investment decisions. Much like external carbon pricing models, there are also various approaches under internal carbon pricing. These typically include one of three types :

Internal carbon fee

Comparable to a carbon tax set by governments, an internal carbon fee places a value on each ton of carbon emissions, creating revenue to fund the company's decarbonization efforts.

Shadow pricing

Placing a hypothetical price on activities and investments that produce carbon emissions, shadow pricing helps with long-term business planning and forecasting by prioritizing less carbon-intensive activities while also preparing the business for future external carbon pricing.

Implicit pricing

Calculated retroactively after a company has reached its emissions reduction targets, implicit pricing is based on how much a company has spent to reduce its GHG emissions and adhere to government regulations where applicable.

Internal carbon pricing is yet another lever companies can use in their decarbonization strategy to reach targets, differentiate themselves from others in the market and ease the transition toward a low-carbon economy. Sustainability managers should refer to the jointly developed How-to Guide to Corporate Internal Carbon Pricing for guidance on engagement, design, implementation and evaluation of internal carbon pricing.

Carbon pricing policies around the world

Canada

Earlier this year, we reported on Canada's ambitious action plan for tackling climate change. The country's carbon pricing model is built around a federal carbon pricing system and is now written into law. For the past couple of years, carbon pricing has been applied within every jurisdiction in Canada and has ensured that if a jurisdiction does not appropriately price pollution, the federal system is enacted in that region. This federal system is comprised of two parts: a regulatory fuel charge and a performance-based charge (OBPS: Output-Based Pricing System). The latter is a cap-and-trade system designed for industries, which applies a financial incentive for producers to reduce their emissions and prevents facilities from relocating to other regions to avoid paying the charges.

United States

The United States has also placed climate action at the center of federal policies, following four years of stifled progress under the previous administration. The US has experienced years of gridlock on climate discussions and policy, and as a result does not have a nationwide carbon pricing policy. The new administration is being heralded as a significant game-changer in the nation's efforts to implement federally-backed green initiatives to combat its emissions output, and there are jurisdictions that have already led the way in modeling this change. Washington State's governor signed a historic climate policy bill in May 2021 that packages a number of innovative and progressive initiatives for the state, including legislation to reduce GHG emissions from the transportation sector and to enforce a limit on the state's emissions.

Still in its early days, the bill provides a blueprint for state-backed ambitious climate policy and joins California, Oregon and other states that have led on climate action in the absence of a federally-backed plan.

Australia

Not immune from the public and political discourse on climate change, Australia has also been locked in discussions in recent years on the state of a federally backed climate policy.

In 2011, a bill was introduced to price carbon emissions from the country's largest carbon emitters, which covered a broad range of industries. Three years later, the carbon pricing mechanism was repealed following a change in government and was replaced with a different, voluntary mechanism whereby both organizations and individuals can participate in emissions reduction initiatives such as carbon sequestration.

Sweden

Touted as having the highest carbon pricing in the world at USD 137/tCO_2, Sweden's system comprises a carbon tax and an energy tax. This "decoupling" system has so far demonstrated that carbon pricing and economic growth can exist harmoniously, with the Swedish economy growing by 60% and carbon emissions decreasing by 25% since the system's introduction in 1991.

China

Based on a cap-and-trade system, China's ETS officially began trading online in July 2021, following several pilot schemes in its main cities as early as 2013. For the time being, the model applies to coal and gas-fired energy plants, with an expansion into the construction and oil industries set to be introduced in the next few years. China's ETS scheme is based on reducing the intensity of emissions generation, as opposed to absolute emissions as seen in other countries including Canada and the EU.

The evidence suggests that carbon pricing is an important lever in the fight against climate change, and it must be urgently expanded globally to deliver the swiftest outcomes on climate action. The most effective schemes are the comprehensive, mandated programs set up at a federal level. However, the private sector also has a responsibility to initiate internal programs where government mandate is limited or nonexistent to keep momentum advancing toward a net zero future.

Carbon accounting challenges

Carbon accounting is a complex process that requires access to accurate, real-time and historical energy data and factor sets. Energy data must reflect the complexity and hierarchy of the organization so that emissions can be traced back to their source for reporting and compliance. Data must be regularly updated to allow comparisons across reporting periods so that organizations can benchmark their performance against targets. In addition, the approach to data collection and emission calculations should be rooted in internationally accepted standards.

Many organizations run their annual carbon accounting and ESG ratings calculation process using manual data collection and spreadsheets. This leads to enhanced risk and productivity loss—especially for complex, global organizations that report to multiple frameworks. These organizations often face the following challenges :

- Data stranded in silos or kept in spreadsheets. Metrics for carbon, energy, waste, water and social indicators are captured from different sources across the business, making them difficult to access in a consolidated way for reporting and decision making.
- Data quality is inconsistent and unreliable. Data captured manually increases the likelihood of inaccurate or incomplete data due to errors. Producing finance-grade reports requires confidence in the data and auditability at every step in the process—from collection at the source data through to the production of reports.
- Time and cost to report on sustainability is high. The process to capture the activity data and manage and allocate the factors required for calculating emissions is time and labor intensive when managed manually with spreadsheets.
- Ongoing sustainability performance is poorly understood. Without access to consolidated, accurate data, it can be difficult to monitor and manage sustainability performance on an ongoing basis, while tracking the effectiveness of sustainability projects.

Organizations that use dedicated ESG reporting software can address many of the challenges associated with data capture, storage and analysis. It allows them to automate collection of their data for reporting on the organization's performance and consolidate it into a single system of record. Additionally, it aids in generating important insights and delivering more impactful results.

- **Streamline data capture :** ESG reporting software can help automate the collection of a broad range of data types throughout the year. This includes pre-defining data allocation and reporting rules, as well as providing a rich suite of tools to verify data completeness and quality ahead of reporting season.
- **Report with confidence :** ESG reporting software can help produce finance-grade reports by ensuring confidence in the data and auditability at every step in the process—from collection at the source data through to the production of reports.
- **Drive enterprise-wide engagement :** With access to a shared, trusted source of information, ESG reporting software helps make sustainability relevant across diverse stakeholder groups by providing targeted insights and empowering people to deliver sustainability results in their business area.
- **Focus on strategy :** ESG reporting software gives organizations access to a library of compliance and management reporting templates, freeing up time to focus efforts on delivering strategic outcomes.

- **Simplify audit and assurance :** ESG reporting software can enable an organization's data to be easily shared with auditors via a single system that contains all supporting data, documentation and audit trails in one place.
- **Manage and track KPIs :** ESG reporting software allows organizations to measure and track sustainability performance over time against predetermined benchmarks or KPIs.

Establishing finance-grade carbon accounting data

Investors are increasingly scrutinizing sustainability performance alongside financial performance to inform investment decisions. In the same way that standard processes are used to capture and disclose financial data, sustainability reporting requires establishing a system and approach that delivers finance-grade GHG emissions data.

Review data accessibility and seek automation

The data required to calculate GHG emissions is often scattered across various internal systems throughout the organization, many of which may be incompatible. In addition, the data may be held by suppliers that do not have systems and processes in place to share data. To ensure a complete and accurate data foundation, It is key to determine how data will be sourced on an ongoing basis.

DATA usage

- Consider outsourcing the data capture process to a specialist service provider.
- Get as close to the original data source as possible.
- Aim for automated data transfer wherever possible. Files touched by people prior to data collection are more prone to failure to load, precision loss and metric confusion.
- Consider how you will store and manage data on an ongoing basis. A cloud-based enterprise software platform is infinitely superior to spreadsheets for this task.

Energy consumption data informs decarbonization strategies, so sourcing this data from utility providers through utility meters is the gold standard. This seems straightforward until you consider that there are thousands of utility providers with different rules and processes for data provision. The resulting variability in each utility's willingness and ability to provide data creates difficulties, particularly for organizations with multiple facilities in different geographic locations.

Utilities

- Contact your utility provider and explore data-sharing options—ideally automated data provision through either an online portal or application programming interface (API) that allows data exchange.
- Consider working with a specialist partner to automate the data capture process.
- Include a data-provision clause in all new energy procurement contracts.

Data must be organized in a structured way that best supports the identified decarbonization target. It is important to consider which types of data need to be captured and how the data should be tagged and aggregated to support reporting requirements. ESG reporting software should support tagging of data at the account or meter level, which can be aggregated to both locations and reporting groups.

Once a target is in place, the first challenge is to determine how the high-level organizational target translates down to individual assets. Targets can be broken down by many dimensions, including reporting group structure, asset type, geography and emissions source. Whichever approach is used, the data structure must be configured to match.

Each asset can have absolute targets applied that roll up to the high-level organizational target. An organization might also consider intensity targets for some assets, as these can help with benchmarking emissions reductions across the organization.

- **Meters and accounts :** The most granular data point in a data structure is usually an account or meter. Account data is utility cost data delivered on a monthly or quarterly basis. Meter data is consumption data delivered daily, typically in 15-to-30-minute intervals.
- **Locations :** Locations are where account and meter data can both be tracked and reported for electricity, water and gas. Locations may have multiple accounts or meters of the same utility type.

- **Organization :** Data reported at the whole-of-organization level is an aggregate of all locations and underlying data.
- **Reporting groups :** Groups are used to aggregate data from multiple locations to assist with setting boundaries for sustainability reporting.

It is important to ensure a good data foundation in a flexible format to meet reporting requirements now and in the future. Central to this principle is that the data collection and storage process is auditable with traceability back to the data source.

Equally important is that it allows for flexible boundary setting globally. Specifically, easily configuring and changing reporting groups and the locations, accounts and meters that underlie them. Baseline emissions need to be recalculated when structural changes occur in the organization that change the inventory boundary (such as acquisitions or divestments). Structuring data into a flexible organization hierarchy can simplify the process of recalculating baselines to enable more agility in ESG reporting.

Also important is that the data required for implementing decarbonization strategies is often scattered across various internal systems throughout an organization—many of which may be incompatible. It is also possible that the data may be held by suppliers who don't have systems and processes in place to share it.

Utilities

- Review the detailed reporting requirements of pledges or commitments you've made and ensure your team understands what data is needed to support them.
- Regularly check and maintain metadata (tags, labels, opening/closing dates, etc.).
- Set minimum KPIs for the data management process to define thresholds such as "data completeness" and be sure to document these decisions.

Data-driven decision making is only valuable if the data is accurate, complete and up to date. Effective data management requires dedicated attention to detail, ownership and diligence.

Utilities

- Create an accountability matrix for data management and assign responsibilities to staff. This matrix should set out a regular schedule to review data completeness to catch errors with enough time to address them.
- Keep a close eye on data flowing in. Set up inactivity alerts against each data source to identify data gaps early on.
- Institute a process to reconfigure formatting updates from utility supplier updates. A small change such as the column containing data within a bill can prevent your data from loading properly.
- Follow up promptly with parties that have not fulfilled data provision commitments.

Data is an increasingly valuable resource for guiding business decisions, so it should be made accessible to both internal and external stakeholders. If the process is outsourced, remember that sharing finance-grade sustainability data poses as much of a business risk as financial data. Therefore, the governance structure to protect it must be similar.

Utilities

- Use cloud-based storage to provide password-protected access for all stakeholders.
- Use appropriate wording in supplier contracts to ensure that data ownership rests with your organization.
- Align your data capture and management plan with audit requirements.

The audit process is a critical step to validating reported decarbonization progress. The outcome is important to the organization's governance, but the steps to achieve audit-ready, traceable data can be challenging.

Utilities

- Consult with your auditor up front to understand their requirements and confirm that your policies for data retention and tagging are compatible.
- Use a cloud-based, single system of record that includes change tracking and document storage and can easily be configured to provide access to external parties as required.
- Ensure your data management system has the capability to store reference documents and meets core audit requirements such as change tracking, time stamping and trace-to-source capability.

The responsibility for energy and sustainability data management cannot fall solely on the sustainability team. There is much to be learned from organizations that have successfully tackled this challenge. These organizations have embedded policies and procedures to drive companywide engagement in data capture and management.

Utilities

- Elevate the importance of GHG data capture and storage within the organization to senior-level management to encourage participation and support.
- Consider internal reporting tools to provide transparency and drive accountability for data capture and storage.

.....To be continued in next issue

ANNOUNCEMENT

ILTA LAUNCHED HEALTH CARE BENEFIT FOR ITS MEMBERS

Indian Leather Technologists' Association (ILTA), a member society of IULTCS and a pioneer organization in the field of leather industry, has now tied up itself with the hospital the Narayana group for Eastern India with a view to giving Indoor, Outdoor and Medical testing services to all of its registered (both life and ordinary) members at concessional rates.

Offer & Discount :

1. **OPD Service:** 10% discount on Doctor's Consultation, Prevailing Health Check-ups available at hospital, day care procedures, Investigations except outsourced tests.
2. **IPD:** 5% on total IPD billing as per prevailing hospital tariff excluding medicine / consumable / implant / outsource & blood bank services. (Not applicable on insurance cases/ Govt scheme / ESIC and any other schemes & promotional package or offers & discounts).
3. **Ambulance:** As per Availability & as per Narayana Health ambulance policy & charges.
4. **Payment Terms:** Payment should be only in Cash Mode, Debit Card, Credit Card, NEFT/RTGS/ IMPS. No cheques shall be accepted.

These facilities will be extended to its existing members (both Life & Ordinary) only. Six family members including spouse, two children (below 25 years) and dependent parents will be entitled to avail these facilities. The persons concerned may contact Mr. Bibhas Chandra Paul, OSD, ILTA (Mob. No. 9432553949) and / or Mr. Subha Paul, Assistant Manager - Payor Relation, Narayana Health (Mob. No. 8334847000) for further details.

ILTA will issue a Health Card in favour of each Member. Thus, Members are requested to collect the prescribed application format to avail this facility either from ILTA Office or through email.

UPCOMING HEALTH CARE PROGRAMS

- Health Camp on 28th June, 2024 (speciality : Cardiac, Pulmo, BMD)

***Note : Date of the above program is subject to be changed under special circumstances.*

ILTA IS NOW ON DIGITAL PLATFORM

Indian Leather Technologists' Association is now set for digitalization of its all publications. The members and non-members alike are eligible for this facility. The association has been publishing number of books on leather & footwear technology since inception. Also, the Association has a great collection of number of articles from renowned personalities & scientists of leather fraternity worldwide which has been publishing in our only technical journal namely "Journal of Indian Leather Technologists' Association (JILTA)".

All the above facilities will be available to all the interested peoples on digital platform through the official website of the Association very soon.

Sustainability of Leathers against Vegan Leather

Mr. Gualtieri Gualberto

CEO, M/s C & E Ltd., Chennai

This article is transcripted form of the lecture delivered by Mr. Gualtieri Gualberto, CEO, M/s C & E Ltd. in the webinar organized by ILTA on 24th February, 2024

Introduction :

Leather industry now a days facing a great challenge to Synthetic leather. As a consequence of it, synthetic leather has captured the leather industry in a large extent, as synthetic leather is much cheaper than natural leather. Mr. Gualtieri Gualberto delivered a lecture on webinar, organized by the Indian Leather Technologists' Association, on 24th February, 2024, titled **"Vegan is Leather ??? Leather vis a vis Artificial Leather – A Technical Study"**.

Mr. Gualberto, an eminent leather technologist, spoke exhaustively on various aspects of leather – starting from natural leather, synthetic leather, vegan leather. He spoke of deforestation, economic aspect, labour welfare of the leather industry. Mr. Gualberto, currently CEO of C & E Ltd., Chennai, spoke at length on utilization of natural leather from pre-historic era to the present day and evolution of natural leather industry to synthetic leather to vegan leather.

But he keeps faith in natural leather though the natural leather is costlier than synthetic leather. He concluded his deliberation emphasizing on investment by the industry on R & D, labour welfare and the government incentives & subsidies to the industry for its survival. The excerpts of his deliberation are as follows :

From its historic significance to its modern-day environmental impact, as we navigate to complexity of the leather industry and its alternative. The main feature of this article will touch upon each of those following distinctive points. Let's start analyzing the contribution of leather in the human history that can't be forgotten.

Let's address the misconceptions on leather and veganism, explaining origin of leather and why it is not considered vegan. We're going to touch the point of ow leather production can be considered a form of vast recycling as is utilized animal by products that would otherwise go too vast. Let's start discussing the environmental and ethical impact of natural leather production, including deforestation, water and animal welfare concern.

Here we will analyze the contrast, the environmental synthetic leather production with the dose of natural leather, discussing issues such as chemical pollution and resource depletion. We compare the carbon footprints of synthetic leather and natural leather production process, highlighting the difference in energy consumption and greenhouse gas emission. Let us try to explore the role of synthetic and natural leathers in fashion industries, its trends, consumer preferences and environmental consequence of fashion choices.

We underlined the challenge faced by the startup promoting vegan leather alternatives including technological limitations, market demands and consumer participation. Let's discuss the challenge and opportunities for the future of the leather industry, putting emphasize on the importance of innovation, sustainability and customer education. The use of leather has a long history in the human civilization, dating back thousands of year.

Ancient civilization like Egyptians, Greeks, Romans and various indigenous cultures used leather extensively for clothing and footwear. The practice of tanning hides to make leather like began during this time, using methods such as brain or vegetable tanning.

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Leather has been used to make tools, containers and equipment from the time of immemorial. Ancient civilization crafted leather into push bags, begs and straps for carrying items. Leather was also used to make harness, saddles and reins for domestic animals, facilitating transportation and agriculture.

In fact, every age has the importance and center of the leather. The industrial revolution brought about great changes to the leather industry with the development of mechanized tanning process and the use of leather in machinery belts, gaskets and other industrial applications.

In modern times, leather remain a widely used material in our contemporary society. Ultra-synthetic alternatives have become increasingly popular due to our concern on animal welfare and environmental impact.

Anyway, still leather is being used for its durability, versatility and aesthetic quality with application ranging from fashion to furniture and automotive upholstery. Throughout ages, the use of leather has been intertwined with the human culture, technology and commerce, making it a significant material in our civilizations' development. Overall, leather has been a versatile and valuable material, serving essential functions in clothing, tools, furniture and many other aspects of our daily needs.

Veganism is a lifestyle and philosophy that seeks to avoid the animal products for ethical , environmental and often health related issues. Vegans abstained from consuming animal-derivative foods such as meat, dairy products, eggs, honey as well as avoiding other animal derivative products like leather, wool, silk and other household products that contain animal ingredients.

The motivation behind veganism varies among individuals but commonly includes concerns about animal welfare, environmental sustainability and personal health.

Many vegans plead for a cruelty-free lifestyle that minimizes harm to animals and planet. Leather, by definition, obtained from animal hides typically produced from cows of the big worldwide production, sheep and other domestic animals. Thus, by strict definition of veganism is to avoid the use of animal products for ethical or environmental pursuit.

So, while traditional leather can't by itself be vegan, this is one of the reasons not the only one for the development of vegan friendly product-alternative to leather. The alternatives to traditional leather are often called vegan leather or faux leather. These materials are sourced from polyurethane or natural materials like cork, pineapple leaves or mushroom, or now cannabis derivatives.

This alternative offer cruelty-free option for those who want to look and feel leather without animal products. But can we consider leather generally an example of vast recycle ? The leather thus obtained from cow and any other animal sources can be considered one of the first example of vast recycling.

For example, in the dairy industries cows are primarily raised for milk production, rather than their hides. When dairy cows reach to the optimum level of productive lives or if they perish due to natural causes or disasters, their hides are normally be used for leather, which are by products of the dairy industries. This process involves transforming raw hides into durable leathers which are used in various industries including obviously for fashion to furniture, automotive and other accessories. By transforming dairy cow hides into leathers, the leather industry effectively recycles what would otherwise be considered waste.

This practically minimizes vast disposal and maximizes resource utilization. This is one of the first recycling in the world. This practice aligns the practice of sustainability and circular economy by extending life span materials obtained from diary produced hides. The leather industries thrive on the vest of leather.

Instead of disposing of the hides or vests, leather industry by converting them into leather adds value on it, thereby using them into leather articles such as shoes, bags, clothing and upholstery etc. By repurposing the hides, the leather industry effectively recycles what would otherwise be a waste product extending the useful life of the material and reducing the environmental pollution.

Now, let's discuss the impact of natural leather production in the world. The production of natural leather like any industrial activity has several environmental, social and economic implications.

1. Environmental implications :

Livestock farming for leather industry requires vast land, resources for cattle grazing and their feed production. In some regions, this has led to deforestation and habitat loss and particularly in areas where there are forests and cleared to create pasture land for cattle.

For example, in South America, like Argentina or Brazil, leather industry consumes huge water. It is a water intensive industry involving animal husbandry, hide processing and tanning. Water usage can lead to local water depletion impairing upon water resources and pollution in west border is not properly treated before discharge. Greenhouse gas emission happens while farming livestock particularly cattle rearing in a significant source of methane and carbon-di-oxide emission which contribute to climate change.

Additionally, energy consumption during leather processing and transportation adds to the carbon footprint of natural leather production. One example for all it is what happens today in the Lombardia, in the North Italy where we have lot of farm and its contribution to the pollution in Lombardia is a menacing one.

It is not really farm but vast production of farm. Chemical pollution along with tanning process involving raw hides into leathers often involves discharge of toxic chemicals into environment.

2. Labour :

In some areas labour condition in the leather industry is dismally poor, with issues such as low wages, long working hours and lack of health & safety protection to them. Fair and ethical labour practices through the supply chain is essential for addressing these concerns.

3. Animal Welfare :

The use of animal in leather production raises ethical considerations regarding animal welfare, particularly regarding factory farming practices, transportation and slaughter method. Advocates for ethical treatment of animals often highlight the concern and call for providing standards and practices.

4. Economy :

Leather industry generates income and employment opportunities in both rural and urban areas, particularly in developing countries the industry where it is the sources of export earnings. The leather supply chain is complex and involves multiple stakeholders including farmers, traders, processors, manufacturers and retailers. Market dynamic consumer preference and global trade policy influence the economic viability of the leather industry. Regarding the market competition, the industry faces competition from synthetic material and alternative materials, such as plant based or recycled alternatives. Economic factors such as production costs, market demand and trade regulations affect the competitiveness of natural leather products.

5. Regulatory Compliances :

Compliance with environmental regulations and standards such as water discharge limits, chemical management requirements and forest conservation laws is essential for minimizing the environmental impact of leather production and ensuring suitable practices. Certifications of voluntary standards such as LWG Certification aim to promote a responsible sourcing production and traceability in the leather industries.

6. Cultural and Traditional Practices

Leather production has a cultural and traditional significance in many societies where it is value for its craftmanship, heritage and utility. These cultural practices often play a role in shaping local economies and communities as well as preserving traditional knowledge the skill related to leather working.

Overall while natural leather production contributes to the economic development heritage, it also poses environmental and social challenges that need to be addressed through suitable practices, regulation and stakeholder engagement. Efforts to mitigate the negative impact of leather production include animal welfare standards promoting sustainable land management practice, reducing chemical use and pollution engaging workers. Safety and labour rights and promoting transparency and accountability through the

supply chain. Now, what is regarding synthetic leather impact ? The production of synthetic leather or faux leather or vegan leather because there are a lot of confusion regarding the story of synthetic, vegan or other things.

As a significant growth in recent years due to increasing demand for animal friendly sustainable alternatives in various industries, including fashion automotive, furniture and consumer goods. While specific production data for synthetic leather may vary depending on resources and regions, regarding its production, environmental impact. Synthetic leather production requires raw materials like petroleum based polymer, polyurethane, PVC or aerosols.

We are derived from no renewable fossil fuel. The extraction and processing of these material contribute to resource depletion. Regarding the energy consumption, manufacturing synthetic leather involves an energy intensive process, including polymer synthesis extraction coating and carrying.

These reliance or fossil fuel-based energy sources can lead to greenhouse gas emissions and air pollution. Regarding the chemical use, the production of synthetic leather often involves use of toxic chemicals, solvents and additives which can have adverse effects on human health and environment if not properly managed. Improper disposal of these chemicals can lead to soil and water pollution.

On VEST, synthetic leather production generates vest at various stages, including offcuts, trimmings and manufacturing residues. Disposal of VEST can pose a challenge particularly if it is not recycled or treated properly.

Workers involved in synthetic leather production can contribute to job creation and economic growth where production facilities are located, providing employment opportunities to workers. Regarding market competition, synthetic leather industry competes with natural leather industry and other alternative materials in the global market.

Regarding the investment and innovation in this field, the continued investment in R & D of synthetic material manufacturing technologies and suitable production practice, can derive innovation and improve the economic validity of synthetic leather industries. Regarding market and consumer trends, demand of suitable alternatives, the growing awareness of environment and ethical issues have led to increased demand for sustainable and eco-friendly materials, including synthetic leather alternatives. This trend is driving innovation and prompting manufacturers to adopt sustainable production practices.

Compliance with environmental regulations and standards such as restriction n hazardous substances and emissions can impact the production process end cost structure of synthetic leather producers. On the whole, while synthetic leather production offers benefits such as versatility, afford ability and a growth-free option, it also presents environment and social challenges that need to be solved through sustainability practices, innovation and regulatory measures. Efforts to minimize negative impact of synthetic leather production include reducing resource consumption, optimizing the manufacturing process, improving chemical management practices, promoting workers' safety and labour rights and fostering transparency and accountability in the supply chain.

Regarding the carbon footprint of synthetic vs natural leather because this is another point that everywhere the people discuss at home, well, determining the exact carbon footprint of synthetic leather vs natural leather involves considering various factors across their respective life cycles, including raw material extraction, processing, manufacturing, transportation, use and end of life disposal. Now, regarding natural leather carbon intensive process, the production of natural leather involves several carbon-intensive processes, including livestock farming, which produces methane and potent greenhouse gases. Land use charge, such as deforestation for grazing land and energy intensive tanning process.

Transportation is another point, because natural leather may be transported over long distances from the source of production to the tanneries and then to produces and retailers contributing to its carbon footprint. High quality leather products may last for several years, potentially reducing the need for frequent replacement and associated carbon emission from production and transportation.

Today, thanks to some chemicals products care, we can have a real maintenance and renovation with the benefit to extending the durability of the leather products. Now, regarding synthetic leather and the synthetic leather is typically made from petroleum-based such as polyurethane or polyol chloride or

other products that until today, at 70-80% are solvent based. The extraction and processing of petroleum can be energy-intensive and contribute to carbon emission.

And that is not all, indeed. It is also important to underline that the substrates and used is normally fabric-based. Now, we need to consider that the impact for the production of fabric in the last 10 years has been at the level of both emission and water consumption absolutely relevant.

Manufacturing Process

The production of synthetic leather involves a chemical process obviously, including polymerization and coating, which require energy and may emit greenhouse gases.

Regarding end of life disposal, while some synthetic material can be recycled or re-purposed, orders may end in landfills, where they can release greenhouse gas and the degradation.

Overall, the carbon footprint of synthetic leather vs natural leather can vary depending on factors such as specific material and process used, energy efficiencies measurement, transportation, distance and end of life disposal practice. However, suffice it to say, that both synthetic as well as natural leather production have environmental impact beyond carbon emission, including water uses pollution and habitat destruction. To mitigate the environmental impact for both synthetic and natural leather, efforts are on to develop more suitable materials, improve the manufacturing process and promote resourcing and production practice across the fashion industry.

Additionally, customers can make an informal choice by considering factors such as the durability, resource efficiency and end of life disposal while selecting leather products. Now, synthetic leather against natural leather has become an issue for discussion, because today it is being discussed everywhere in leather industry. Now, synthetic leather is man-made material designed to mimic look and the feel of real leather without using animal product.

On the other hand, natural leather is derived from animal hides or skins, typical of cattle, goats, sheeps and other animals. So, the key difference between synthetic and natural leather are source of raw materials. Natural leather is made from animal hides or skins while synthetic leather is typically made from petroleum derivatives.

Some synthetic leather is produced from plat-based material like cork, pineapple, fibre, canopa, vest etc. The production of natural leather involves raising livestock population requires land, water and grazing field.

Durability

Every one of us knows that natural leather is well recognized durables with proper care and maintenance of high-quality leather products can last for on any years, developing rich patina overtime.

Synthetic leather can vary in quality, but it tends to be less durable, which definitely has a plastic effect and terraforms unnaturally than natural leather and may signs of wear and tear more quickly. Natural leather is breathable material that adapts to body temperatures, making it comfortable to wear in various climates.

Synthetic leather may lack the same level of breathability and sometimes feel less comfortable, especially in warm and humid conditions. Natural leather is prized for its luxurious appearance, unique grain patterns and rich textures.

Synthetic leather can be manufactured to mimic look and feel of real leather, but definitely it lack authenticity and character of natural leather. Natural leather is often more affordable than natural leather, making it popular for budget conscious consumers.

Natural leather tends to be more expensive due to the cost of animal tanning processes and craftsmanship. Ultimately, we can say that the choice between synthetic leather and natural leather depends today on a lot from a social media pressure on consumers, where the message that makes them feel some priorities value has ethical consideration, environmental concerns and budget constraints. Definitely, some people that are not easily influenced prefer natural leather for its durability, luxury, and traditional appeal, while others, fashion and social believers, opt for synthetic leather influenced by advertising campaigns that can well emphasize its correctly free vegan and deco-friendly characteristics.

The impact of synthetic leather against natura leather in fashion. The rise of synthetic leather spreading a strong social message, has had a notable impact on the fashion industry vs natural leather. The message has a several implications and impacts including environmental, ethical and economic considerations.

Regarding ethical considerations, synthetic leather is liked as providing a currently free alternative to the natural leather, appealing to consumers who are concerned about animal welfare. This has led to growing demand for vegan and sustainable fashion options. Regarding the environmental concerns, the fashion industry is increasingly aware of the environmental impact.

Fast fashion and superfast fashion well know that in the last 10 years they have barred the production of six generations with an unbelievable impact in terms of carbon footprint balance. They well know about their guilty conscience and build around synthetic leather are mirage of a more suitable choice compared to natural leather in some aspects. While traditional natural leather production can involve deforestation, water pollution and greenhouse gas emissions, they say that synthetic leather can be made from recycled material or produced using more eco-friendly manufacturing process.

Please keep in mind that a giant like Inditex prepare to have collections in a year that is something that it is really impacted. Additionally, synthetic leather can minimize the look and feel of the natural leather or other material providing versatility in design and affordability.

Synthetic leather is often more affordable than natural leather, making fashion items such as hand bags, shoes and jackets more acceptable to wider range of consumers. This affordability contributes to the popularity of synthetic leather in the fast fashion, superfast fashion and mass market segment and consumer preference.

As awareness of environment and ethical issue grows, many consumers are actively seeking out sustainable and currently free fashion alternatives. The social media round around synthetic leather provide a viable option for individuals who wish to align their fashion choice with their values. Overall choice between synthetic leather and natural leather in the fashion industry involves a complex interplay of factors including environmental consideration, ethical concern, quality and consumer preference.

As sustainability becomes increasingly important in the fashion world, there is a growing interest in developing innovative material and production methods that minimize the negative impact of both synthetic and natural leather. Now, there is another point to be discussed and it is regarding what to say about the several notices regarding the failure of startups, like any business failure can be attributed to various factors, including market dynamics, product quality, competition, funding issues and management challenges.

Regarding the quality and performance issues, vegan leather products may face a challenge in achieving the same quality, durability, performance and traditional leather. If vegan leather doesn't fulfill consumer expectations in terms of aesthetics, comfort and longevity. It can lead to low customer satisfaction and negative reviews, impacting sales and brand reputations. The production of high quality vegan leather materials can be costly especially if using sustainable and innovative manufacturing processes and materials.

If the production costs are high, vegan leather products can be priced at a premium, making them less competitive in the market compared to the traditional and synthetic alternatives. Regarding the product quality of vegan leather products including durability, texture, appearance and repeat purchases. If the quality of vegan leather is inferior to the natural leather of other synthetic alternatives, customers may be distracted and choose not to repurchase leading to poor sales and brand reputations.

Another problem is the supply chain, because vegan leather startups are encountering challenges related to sourcing raw materials, manufacturing processes and supply chain logistics, delay, quality control issues and production bottlenecks can disrupt operations, product availability and consistency. The compliance with the regulations and standards related to product safety, environmental sustainability and labelling requirements in critical leather startups.

Now, what challenge to answer a future of leather industries, even against the synthetic products require addressing key challenges. So, regarding that point, decreasing the products water consumption and implementation of water recycle. It is one of the key points which means investment in technologies and process that reduce the water in the leather production, such as water efficiency in tanning meters and the vast water treatment system.

Governments, world around can play a grand role providing financial aid or incentives to support collaborative project and improving environmental practice and reducing the industry's ecological footprint. Decreasing energy consumption, the other key point, means adoption of energy efficient technologies and practice through production processes, such as using renewable energy sources, optimizing machinery, equipment and implementing energy management systems.

Investment is required in R & D to explore new methods for reducing energy consumption in leather manufacturing. Decreasing the chemical consumption, considering safer and more suitable chemicals in the tanning process can help reduce environmental impact and improve worker safety. R & D efforts focused on developing eco-friendly alternatives to traditional tanning chemicals are essential for long term sustainability.

The optimizing of production, adopting manufacturing principles and investment in technology and automation can help optimize production process, improve efficiency and reduce waste. This includes implementation digital process and data analytics to better manage inventory, streamline operation and identify areas of improvement. Workforce and labour condition, ensuring fair labour practice and safe working condition are essential for the long term sustainability and reputation of the leather industry.

Prioritize the health, safety and well-being of the workforce providing them proper training, protective equipment and support service. Implement fair labour practice and ensure compliance with labour regulation and standards. By addressing this challenge and implementing sustainable practice, the leather industry can enhance its competitiveness, minimizing its environmental footprint and ensure its future in the face of synthetic alternatives.

Collaboration, innovation and a commitment to sustainable will be key to overcoming challenge and ensuring the long term viability of the leather industries. Well, these are the points and I don't think that there are points that are very important in the challenges for the future.

And the renovation of the leather industries is absolutely necessary to face the issues regarding future of these industries. I can't be really worried about synthetic leather because from one side, we have to think that, for example, if a big international brand like Nike, they wanted to make all their production using leather, we can assist at one growing of the price of the leather can be not affordable.

(Scripted By – Mr. Tarak Ch. Saha, Sr. Member, ILTA)

LEATHER EXPORTERS ASK GOVERNMENT TO FORMULATE NEW POLICY FOR INVESTMENT, JOB CREATION

The Council for Leather Exports, the apex body for leather and footwear exporters, has asked the government to formulate a national policy for the sector with a view to attract investments, boost India's shipments and create jobs.

In a letter to Niti Aayog Chief Executive Officer, BVR Subrahmanyam, CLE said that though there are schemes and support measures at central and state levels, there is a need for holistic development of the entire sector through a national policy. The elements of the proposed policy, it said, can include incentives for setting up manufacturing units, training workers, supporting measures for adoption of sustainable technologies and innovative products.

"This policy should cover the entire supply chain of the sector, starting from raw materials to finished products, including processing, product development, marketing, supply chain management, and backward integration," the council said. Explaining the importance of the policy, CLE Executive Director R Selvam said that the sector needs a national policy as it is a labour-intensive sector, which employs about 4.4 million workers, with over 85% women.

"The sector has a huge socio-economic benefit. The policy would help the industry in boosting exports and creating huge number of jobs," Selvam told PTI. The council asked the government to implement the Production-Linked Incentive scheme for the entire supply chain of the footwear and leather industry and also the machinery segment.

It added that there is a need to fine-tune the Special Economic Zone policy, with a focus on increasing productivity through flexible labour laws, lowering the tax burden for the sale of goods in the domestic market. Further, the CLE suggested that the policy should include a blueprint for infrastructure development in all leather and footwear clusters to make them smart clusters, measures for logistics management, and monetary policy, credit facilities and insurance coverage.

"I would request to frame the policy to facilitate growth and development and provide additional employment opportunities to at least two million youth in the next seven years," CLE Chairman R K Jalan said. He also called for organising a meeting of global CEOs of major leather products and footwear brands with industry secretaries of states.

"Such a meeting will be helpful in attracting more investments from brands," he said, adding that there is a demand for setting up plug-and-play models of factories wherein ready-to-use factory sheds with all required infrastructure and support services are provided by the government. The industry is projected to grow at a CAGR of 18-20% in the next six years. Its turnover is projected to reach $47 billion by 2030 from $16.7 billion in 2023-24. The sector's exports dipped by about 10% to $4.3 billion in 2023-24.

(Source : ndtvprofit.com – 23/05/2024)

LEATHER EXPORTS DROP 10% ON WEAK DEMAND

Leather exports from India, including sports goods, declined nearly 10 per cent to $4.28 billion for the fiscal ending March 31, 2024 as against $4.75 billion previous fiscal. The drop was primarily due to poor demand from major markets, the US and Europe.

Tamil Nadu, the largest exporter of leather products, was the worst effected; export of leather products declined by 18 per

cent to $1.66 billion in FY24 as against $2.04 billion in FY23, Central Government data showed. Tamil Nadu's contribution in total leather exports dropped to 37.77 per cent in FY24 as against 43.20 per cent in the previous year. Uttar Pradesh, the second largest exporter of leather products, marginally increased its share to 27.77 per cent in FY24, as against 25.80 per cent, in the previous year.

The decline in exports from Tamil Nadu, follows a trend witnessed across India. The decline was due to poor demand from major markets like the US and Europe, said Israr Ahmed, Vice President, FIEO.

WINDS OF CHANGE

That said, many believe, in the next couple of years, things will change in the State — some of the major Taiwanese companies have already commenced construction of large manufacturing facilities. Exports from Kanpur in Uttar Pradesh, which primarily manufactures safety leather products, were stable as demand was stable, Ahmed said.

The Executive Director of Council for Leather Exports, R Selvam told business line that in the next couple of years, the trend will transform in Tamil Nadu with major Taiwanese companies like Pau Chen group, Honk Fu, Feng Tae, Shoetown and Dean shoes that signed MoUs with the State commencing production.

Recession in the US, UK and the Russia-Ukraine war, having greatly affected the Eurozone are the primary reasons for the decline. The US alone has seen a 35 per cent decline in exports, said M Abdul Wahab, Regional Chairman, Council for Leather Exports, Southern Region.

"However, in the current fiscal, we are witnessing positive trends. Along with newer investments in the Southern Region, especially sports footwear, we are confident to bounce back strongly," he said. A senior official in the Tamil Nadu Government too, was optimistic that the Taiwanese company would help the State bounce back in the next two years.

TAIWAN RULES IN TN

Pou Chen Group signed an MoU in April, 2023 to invest Rs. 2,302 crore to manufacture nonleather footwear over a span of 12 years, mainly for youth and women, in and around Kallakurichi, with a prospect of 20,000 jobs. Long Yin Investment plans to set up a greenfield unit in Tamil Nadu to manufacture nonleather footwear investing Rs.1,500 crore, generating 22,000 jobs.

TKG Taekwang plans to set up a greenfield unit to manufacture non-leather footwear with a proposed invesment of Rs. 1,250 crore, meantime creating 9,000 jobs. In April, 2022, Hong Fu had inked a pact with the State Government to set up a footwear manufacturing facility spending Rs. 1,000 crore, in a three to five-year period. Land has already been allotted at Ranipet.

Feng Tay has two factories in Bargur and Cheyyar and the third one in Tindivanam is under construction. The first factory at the Perambalur footwear park to make Crocs brand of footwear went on stream in November, 2023, set up by JR One Footwear Pvt. Ltd., a joint venture company between Phoenix Kothari Footwear Ltd. and Shoetown at SIPCOT Industrial Park in Perambalur district.

(pressreader.com/ - 15/05/2024)

MAJOR FIRE BREAKS OUT AT LEATHER FACTORY IN KANPUR, NO CASUALTY REPORTED

Picture : ND TV

A massive fire broke out at a leather factory in Uttar Pradesh's Kanpur on Tuesday evening leading to a major chaos inside the factory. The incident took place at Kanpur's Allahdad Tannery in Jajmau, where the fire broke out under suspicious circumstances. During the incident, major plumes of smoke started igniting in the sky, which was noticed from a far distance. On information, the several fire tenders along with a crane fire tender were rushed to the spot and efforts to douse the fire were initiated. According to the sources, the efforts to control the fire were underway at the spot.

Police are probing the incident The fire department officials stated that due to the presence of huge amounts of leather and

leather made items inside the factory, the fire spread rapidly and gripped the entire factory. It is being alleged that due to the negligence of the workers present in the tannery, the fire spread rapidly and engulfed the factory. The people present inside the tannery were also rescued and shifted to a safe place.

No casualties were reported during the incident so far. It is being said that the Allahabad Tannery is involved in Tanning and dressing of leather, manufacture of luggage handbags, saddlery and harness.

(Source : republicworld.com – 14/05/2024)

MORAL COMPLEXITIES IN THE GLOBAL LEATHER TRADE - MIKE REDWOOD

In the mid-1980s, I travelled to western China's Gansu Province looking for hairsheep skins. China was not yet very open to foreigners and a minder was sent from Beijing to monitor our activities. Our local guide had been denied school by the Mao era, so learned English listening to the BBC World Service. We soon discovered that the experts in sheepskins lay in the Muslim communities found in villages in the hills and were met with a wonderful welcome and purchased our skins among these groups.

Two weeks ago, I heard the name Rahile Dawut and discovered she is a world renowned 57-year-old anthropologist who studied these Muslim areas. Her international fame in scholarly circles comes from her academic studies of Uyghur life and hopes to preserve some of the cultural diversity in the wider Xinjiang region. In 2017, she disappeared and, in 2023, the Dui Hua Foundation reported that she had been sentenced to life in prison for endangering national security.

During my trip, the reverse side of the National Geographic map I had with me showed ethnic minorities in China and, although the scale was unhelpful, the places we found our best tanneries (some truly old school) were marked with purple dots for Muslim. Today, I could not buy those skins, even if they are still available, due to international human rights concerns. Generally speaking, the leather trade has always managed to find ways to continue trading during periods of difficult politics. I was working with an Argentinian tanner during the Falklands War in the early 1980s and we were long-standing friends. We held our council on the conflict but continued working, and I am pleased that I do not think I have lost touch with any of my Argentine friends over the years.

Geopolitics and leather

Current geopolitics feel different. There is an element of everyone travelling on the same "moral railway line" on an issue but choosing to get off at different stations. I will fight for climate change, but not glue myself to doorways or damage property, nor disrupt people going about their daily business. To me such things are wrong – a station too far. But should we buy Chinese made automobiles? Or other products which carry similar technologies that have led China to ban Tesla vehicles from a growing number of government affiliates, local authority agencies, highway operators and even cultural and exhibition centres, on top of a longer standing ban from military bases?

In the bigger picture, North America has worked hard since the Financial Crisis to damage the image of a dollar led rules-based system. Initially, China looked as though it would play by the rules of the liberal international order but was soon duplicitous and, now, President Xi clearly wants to see a multipolar world and write new rules.

The Chinese leadership's dislike of the Western-centric world order is matched only by Putin in Russia, who has chosen to use an anti-Western policy to stay in power for life. It is also gaining considerable support from the Global South, where America's increasing nationalist self-interest has created uncertainty. The Belt and Road Initiative, although poorly managed, has generally helped China build support, as has Russia's use of deniable forces to keep African regimes in power.

Amid all this, Russia has traditionally been a big client for the Turkish leather industry and some Indian companies are now selling leather to Russia while pretending not to. China is of

course hugely important to every aspect of the global leather supply chain, from buying U.S. and Brazilian hides to making the majority of almost every finished leather product. Meanwhile, the fast-rising population in Africa should see big local growth in both leather production and consumer purchasing as the century develops. President Xi's visit to Europe last week did not reassure. There was no real search for compromise in either Europe's acceptance of imports from China or on China's support for Ukraine, although France got a deal on cognac.

Choices to be made

In my view, this all-spells turmoil for the world of leather and will be decided as each company chooses where it will get off on the moral railway line. For many, the brand Patagonia forms the benchmark to follow. After two decades and excellent relationships built up with its Chinese suppliers of organic cotton, in 2020 the company announced it would be actively exiting the Xinjiang region. It had mapped the source of products to the farm level as part of this and instructed all its suppliers that both fibre and manufacturing in Xinjiang was prohibited.

The current global situation stretches far beyond this region but is no less complex. Leather has always been an international business and has never been totally localised. It will struggle with a big curtailment. We must be open and clear as we decide at which station of the moral railway line we will alight.

(internationalleathermaker.com – 14/05/2024)

INDIAN LEATHER EXPORTS DOWN FOR THE YEAR

According to *The Hindu Business Line*, exports of leather and leather goods, including sports goods, declined by nearly 10% to 4.28 billion US dollars in the fiscal year ending on the 31st of March from 4.75 billion US dollars in the previous fiscal year. This result was attributed to weak demand from major markets such as the US and Europe. The US alone has seen a 35% drop in exports, pointed out M Abdul Wahab, Regional Chairman, Council for Leather Exports, Southern Region, and the economic impact of the war in Ukraine cannot be ignored when considering the Eurozone. The state of Tamil Nadu, the largest exporter of leather products, recorded a decline of 18% year-over-year to 1.66 billion US dollars in fiscal year 2024 from 2.04 billion US dollars in the previous year, reducing its contribution to total leather exports to 33.77% from 43.20%. Uttar Pradesh, the second-largest exporter of leather products, marginally increased its share to 27.77% from 25.80% in the previous year.

"However, in the current financial year, we are witnessing good positive trends in exports, which are picking up. Along with recent investments in the southern region, especially in sports footwear, we are confident of a strong recovery", Wahab added, alluding to the fact that major Taiwanese companies (including Pou Chen Group, Honk Fu, Feng Tae, Shoetown and Dean Shoes) have signed a Memorandum of Understanding with Tamil Nadu to start production in the region.

(www.worldfootwear.com – 23/05/2024)

INDIA'S LEATHER EXPORTS FALL BY 10%

Indian leather exports fell by nearly 10% for the fiscal year 2023-24, from $4.75bn in 2022-23 to $4.28bn, according to reports in the Indian press. The drop was due largely to poor demand from major markets such as the US and Europe, with recessions in both the US and UK plus the Russia/ Ukraine war cited as reasons for the decline in The Hindu Business Line. The southern state of Tamil Nadu, India's largest exporter of leather products, was the worst region hit, with export of leather products down by 18% to $1.66bn compared with $2.04bn previously.

However, M Abdul Wahab, regional chairman of India's Council for Leather Exports, Southern Region, was reported as seeing "good positive trends in exports picking up", and was confident they would "bounce back strongly", particularly with Taiwanese investment taking place in Tamil Nadu.

(Leather International - 15/05/2024)

Valorisation of Invasive Species - For Leather, Fur, Bristle, Meat and By-Products (Part -17)

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Common Brushtail Possum

The umbrella term "possum" refers to a group of nocturnal, arboreal, omnivorous marsupials. Of the seventy species known till date, approximately twenty-seven of the small to midsized furry animals are endemic to Australia - the biggest repository of possums of different colours, builds and sizes. They inhabit the forests of the country and its neighbouring islands, such as New Guinea, Celebes, Solomon Islands and Tasmania.

A colony of possums is called a "passel" by Aussies. Males are known as "Jacks", females, "Jills" and baby possums, "Joeys".

A prerequisite for their habitation is adequate canopy cover of large trees, which the clawed climbers use for food and shelter. Although a major part of their diet consists of foliage-fruit, seed, stem, flower and shoots, berries and nectar, ornamental plants, shrubs, sedges, vines, ferns, fungi, buds, leaves, barks, grasses, horticultural produce and vegetable crops, possums have evolved as omnivores. Their feeding habit adversely affects the growth, development and life-cycle of plants and trees-particularly of rata and kamahi varieties, towards which they gravitate for their gustatory requirement.

These pouched predators have been observed eating various invertebrates, snails, mice, rats, insects, bird eggs and small birds and fledglings, leading scientists to classify them as "reluctant folivores". The opportunistic and adaptable animal periodically subsists if required, on leftover food of humans and animals.

The marsupials are indigenous to various regions of Australia – Kangaroo Island, Tasmania, the southern and Northern reaches of North Territory, the northern and south-western regions of West Australia, Northern Queensland, South Australia, Victoria and NSW.

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Several arboreal mammals, trapped from the Perth Metropolitan Area, were liberated without success in Julimar forest of West Australia, as recently as in 1993-94.

In the 1970s-80s, the nocturnal tree-dwellers were satisfactorily liberated, in appreciable numbers, in Murray Bridge, Humbug Scrub, Katarapko Islands, Quorn and Wilmington and Arkaroola (South Australia). They were reintroduced with unsatisfactory outcome, in Sandilands, Ernabella, Mambray Creek and Flinders Ranges National Park, South Australia in the decade between 1961-71.

Several islands off the coast of Australia were the recipients of brush tailed possums, among which are, Prince Seal, Maria and East Sister (Tasmania), Rabbit, Newry, Outer Newry and Dent (Queensland). These "floating zoos" are the repositories of stable possum populations.

The nineteenth century heralded the biggest evolutionary transformation in New Zealand's history. Flora and fauna from all over the globe, carried by indefatigable members of Acclimatization Societies ,voyaged freely across distant oceans and seas, to surmount all geographical barriers, and enter the frontiers of the far-flung island-nation. European settlers desirous of establishing a free ranging, inexpensive, countrywide inventory for food, fibre and fur pelts, with no associated husbandry cost, introduced the common brushtail possum from Victoria and Tasmania to New Zealand.

One Mr C. Basstian is believed to have been the bellwether of the first successful introduction and liberation of opossums, in the "Land of The Long White Cloud", in a forest behind south Riverton in 1858. Other sources assert that it was much earlier, prior to 1840, that the first marsupials were set free in the area of Riverton.

The main phase of release of New Zealand bred possum by Acclimatization Societies, was between 1890 -98, constituting the peak introductory period. This portion of time is also regarded as the first coordinated action towards establishment of a viable fur industry in New Zealand, although a number of animals are alleged to have been brought over from mainland Australia and Tasmania to be kept in residences as pets.

Notwithstanding the fact that private enterprise was at the helm of the novel venture, government participation commenced in 1898, much after breeding passels of the arboreal mammals were well established on both North and South Islands.

Archival entries indicate that the Government played an active part in the acclimatization of the possum, between 1895-1906. The vast majority of Tasmanian blacks were released in 1898, in the Westland, within and near the constituency of Rt. Hon. R. J. Seddon (NZ PM 1890-1906), who evinced personal interest in the establishment of the arboreal denizens.

Between their maiden introductions into New Zealand, until 1924, serial releases followed at periodic intervals, with stock drawn from the progeny of the Australian animals, born on New Zealand soil. Thrust and focus of all stakeholders were directed towards acclimatizing the species with the long-term objective of establishing a burgeoning fur industry. The lucrative financial return enjoyed by hunters and furriers was on governmental radar – it desired to partake of the benefits through the levying of royalties.

After the first introductory phase, possum import was approved, authorized and gazetted by legislation under the Protection of Certain Animals Act 1861, and by the Animals Protection Act 1880 and their respective amendments.

Between 1915 to 1924, possum arrivals were limited to incidental pets. However, during the-period 1915-1940, further importations were strongly advocated by non-governmental bodies and private individuals, with the objective of diversifying the gene pool.

The secondary stimuli for the liberation and artificial dispersion of the nocturnal mammals are generally considered to have been garden ornamentation, recreational viewing, financial gain or pet keeping. These were expected to extend additional impetus on the overall population stabilization and dispersal, as possums imported as novelty pets, could also cater to a limited and niche market, thereby improving both viability and profitability of the exercise.

From 1900 to 1910 there was a waning and slackening in the number of releases by both private and governmental agencies, except that effected by the Department of Tourist and Health Resorts in the Rotorua district.

Since there was no academic, scientific or academic data or consensus, on the prudence of fostering the marsupials, from I9I7 (except for a brief change in I92I) the Government of PM Rt. Hon. William Massey (NZ PM 1912-25), held out against pressure to permit more liberations. It was however helpless in preventing unauthorized releases.

In New Zealand, free-living possums of black to reddish-black pelage from Tasmania began to be sighted in larger numbers than their Victorian congeners. The ascendency of Tasmanian blacks was due to the fact that they were coveted by trappers and other fur industry stakeholders, on account of their larger size and denser fur.

Commercial values and fur qualities largely determined the location and habitation range in Australia, from where the marsupials were brought to New Zealand. The Victorian species, except those inhabiting colder or hilly areas, contributed fur of lesser economic value.

Summary of possum releases in NZ :

From 1837 to 1875, in the introductory phase - fifteen documented releases - in the districts of Auckland and Southland, with individual releases on Kawau Island and in Wairarapa (Canterbury).

From 1875 to 1890, in the dormant phase – two recorded releases - by the Auckland Acclimatization Society in Auckland district (1876-1877) with an ensuing release in the Waikato district by a certain Mr Thornton (1883). From 1890 -1900, in the acclimatization society phase – ninety known releases – nationwide.

From 1910-20, in the mainly illegal liberation phase – thirty-four identified cases carried out by some acclimatization societies, despite declined requests. These societies subsequently forwarded serial requests through the Department of Internal Affairs for permission to liberate more marsupials. In 1919, as a result of the representations made by the pro- and anti- possum factions, the Government, requested that professor emeritus of biology, Victoria University College, Wellington, New Zealand, Professor H. B. Kirk, to undertake a comprehensive investigation of the possums answering specifically to the two following queries.

1. Whether the adverse impact on forests could be overlooked considering advantages accruing from trapping revenue and royalty.

2. Suggestions on ideal possum release locations, to ensure adequate safeguard against their dispersal into and damage of State forest wealth.

In his reply, Professor H. B. Kirk elucidated (1920) :

1. The harm to New Zealand forests would be insignificant and greatly superseded by the advantages which would be reaped by the community. While the detrimental effect on gardens and orchards was indisputable with concomitant losses to crop and produce, the volume of ongoing trade in skins was already in the thousands of dollars. Therefore, profits accruing from trade in possum skin to trappers and tanners would offset the losses suffered by farmers and orchardists.

2. Possums could be freed in all forest districts except those fringed by agricultural lands, orchards and plantations.

By permitting licensed trapping in winter (May–July), issued against a fee plus royalty of one shilling per skin payable to the Crown, the possum-fur trade would reach a value of £200,000 per annum.

This recommendation was a most important one, as it strongly determined subsequent legislation and influenced New Zealand government policy.

From 1920 -22, eight releases were allowed.

Sheltering and lodging or release of possums without the written permission of the Department of Internal Affairs, were prohibited on 5 May 1921.

In 1922, after all previous notifications were cancelled; the Department of Internal Affairs took a firm stand and, declined further repeated requests for permission by State Departments and local-government representatives, non-governmental bodies and private individuals to release more animals.

From 1922-40 - period of illegal liberations, marked particularly by the number of unauthorized releases by trappers and private individuals .The period is also highlighted by the applications (in many cases, re-applications) to the Department of Internal Affairs for permission to liberate, by elected local bodies, other organizations, acclimatization societies, State Departments, and private individuals.

In 1936, imports of two new possum s species – The grey possum and the short eared possum were strongly recommended by the North Island Acclimatization Council, driven by the falling values of red, red-brown and black pelts, and elevated demand by the fur industry for grey possum skins.

The sequence of events indisputably establishes that possums were well established in New Zealand by private enterprises prior to government action. Therefore, the governments of the past were not specifically accountable for the introduction of possums into the country.

The importation, liberation and artificial dispersion of New Zealand bred possum progeny, both authorized and illegal, by private individuals and acclimatization societies had by far the greatest impact on the overall distribution and consequent spread of opossums and their development into an invasive alien species.

The possum has established its domain across the expanse of New Zealand's primary islands, metastasizing onto Stewart Island, Codfish Island, and even the remote reaches of the Chatham and Cook Strait islands. Today the invasive alien species has colonized no less than 19 islands, to maintain a stable presence on 13 or 14 of them, as testimony to their resilience and adaptability in new environment..

Possums are essentially nocturnal and can reside in any place offering shelter and a varied food supply. They are now widespread across most of New Zealand, particularly in coniferous tree or shrub forests. Pasture and meadow-forest margins are also seen to carry dense populations. These animals have a great impact on a number of New Zealand's natural ecosystems. They occur in high numbers. Cats - both domestic and feral - their only predator in New Zealand, are ineffective in controlling the burgeoning numbers.

Possums, once introduced, unleashed unforeseen havoc upon New Zealand's flora. Their relentless and gluttonous consumption pattern wreaks havoc on trees, morphing them into stunted, misshapen versions of their genus and species. Economic ramifications are astronomical, as the arboreal marsupials girdle leading shoots in timber forests, diminishing the commercial importance valuable wood.

In gardens, orchards, and fields alike, possums leave a trail of destruction, targeting fruits, vegetables, and flowers with equal voracity. They disrupt power lines, mar forest regeneration efforts, and invade homes, disturbing both peace and hygiene.

Despite efforts to cull their numbers, possums persist, their insatiable appetite reshaping landscapes and fuelling concerns of disease transmission. This ecological imbalance, unique to New Zealand, underscores the urgent need for sustainable mitigation strategies.

Possums were filmed, in 1993, eating the eggs and chicks of the native endangered bird kokako. The sad visual spectacle served to harden the New Zealanders' animosity towards the marsupials. Additional evidence of their invasiveness began coming to the fore. The tree dwellers were seen to occupy tree hollows and crevices, denying nesting sites to indigenous avian species such as saddlebacks and kakariki. They were also found to be rapacious predators of New Zealand land snails and invertebrates.

Further evidence confirmed possums preying on the Kea - New Zealand's native parrot. Researchers relying on nest-cameras have for the first time filmed the macabre reality inside kea nests attacked by possums in South Westland. The graphic and grisly nature of almost fully fledged Kea chicks being mauled and devoured by a possum shook the conscience of the nation. It was also observed, when male kea was guarding the nest, in the event of a possum assault and the ensuing skirmish, eggs were invariably damaged. Today, possums, rats and stoats are together estimated to kill some 26 million native birds every year in New Zealand.

Since 1960 possums were observed to have become vectors of bovine tuberculosis, with the bacillus having jumped from bovine to marsupial hosts. Therefore, the invasive alien species which reside in areas adjacent to cattle and deer farms have been causing particular concern and distress to dairy and deer farmers. TB carrying possum passels are estimated to be approximately 38% of their total population.

Although scientists are familiar with various species of TB bacillus carrying wild animals, such as ferrets, fallow- and red-deer, possums are considered to be the sole self-sustain TB repositories. The tree dwellers now carry the dubious distinction of being the fundamental TB vector for most infected deer and cattle herds in the last four decades.

Bovine TB continues to be the most critical disease for both deer and cattle farming in New Zealand. It is a debilitating affliction in both cattle and deer, leading to wasting and fatality. Milk production by diseased cows becomes substantially lower.

With the ability to move from livestock to humans with potentially fatal consequences, bovine TB is similar to human TB, whereby possums are creatures of particular concern.

New Zealand covers an area of 268,000 sq km, and has a population of 5.13 million, as per the 2021 census.

In the 1980s, the number of these hob clawed marsupials was similar to the number of sheep in New Zealand, with the national flock peaking at 70.3 million in 1982, eating 21,000 tonnes of vegetation every night .

Presently the estimated number of possums in New Zealand in the absence of control (i.e., if possums were at carrying capacity) is 47.6 million. Non- podocarp indigenous forests are home to 60% (28.5 million) of the marsupial population, with the remaining numbers distributed in scrublands and southern beech forests. Presently, after the implementation of stringent manual and chemical control methods, there is an overall reduction of 36% and the common brushtail possum number in New Zealand is assumed to have stabilized around the 30 million mark.

This implies a staggering half a dozen marsupials for each New Zealand citizen – man, woman and child. Possum extermination is usually done by head – abdomen – or leg gripping traps or 1080 poison. The latter is based on sodium monofluoroacetate. Poisonous chunks of carrot or cereal, and at times rabbit meat, used to entice stoats, smeared with the poison are placed in bait stations or airdropped over target areas. Sodium monofluoroacetate is biodegradable, inexpensive and vigorously effective against all mammals, including possum.

For those soliciting methods conforming to their moral standards, to put down the pestiferous climbers, a captive bolt stunning gun powered by a carbon dioxide piston, similar to those employed in abattoirs, is available.

Several other approaches for possum management have been explored in New Zealand. These include the use of cyanide poison, combining Aspirin with Cholecalciferol (Vitamin D3), use of kill traps and live capture, predator – proff "exclusion" fences and aerial toxin broadcast from aircraft. Both aerial and ground control operations have been effective in keeping possum numbers in check for the time being.
Another interesting option being researched is the "customization" of "Trojan Jills" – genetically manipulated female possums – which would produce infertile male joeys.

It is amply evident to the scientific community that the employment of such advanced genetic tools in New Zealand, for possum control, would necessitate further development of the technique after prolonged field trials, legislative amendments and changes with concomitant nationwide acceptance ,across all sections of society. Gene editing for pest control is a contentious issue in many countries and ongoing regulatory protocol is both stringent and restrictive.

The New Zealand government has established a company ambitious goal of eradicating possums, stoats and rats by 2050.The enterprise is overseeing predator control of seventeen eradication projects over 757,000 hectares, investing $75.6 million towards total costs.

The lead agency of the "Predator Free 2050 " programme is the NZ Department of Conservation, which is strategizing the battle to free the "Land of the Long White Cloud" from the devastation being wrecked by introduced alien species, such as possums, rats and mustelids (weasels, stoats and ferrets)

Since possums have been present in the island–nation for the last 186 years (1837-2023), the Kiwis have been proactive and innovative in harnessing the commercial and economic potential of possum fur and pelt for many years now.

Possum harvest and recovery of possum skins and fur has been long established practice in New Zealand, with the possum down, highly coveted for blending with other materials, for the manufacture of thermal wear and winter clothing.

Low specific weight, insulating attributes and comfort indices, serve to make possum fur 1.14 times lighter and 1.0 8% times warmer than wool. These reassuring characteristics have led to an upswing in the sale of Possum fur products in recent years.

Since possum fur has the same thermal qualities as polar bear fur, a path breaking innovative application has been the development of possum abdominal brace belts, invented by Wanganui deer farming stalwart Colin Cox.

The belt, positions a band of possum fur against the wearer's body. While with wool and other fibres moisture sat on the tips of the fibres and leaving the wearer hot, cold or clammy depending on the exertion, possum fur slowly arrives at blood heat and then turns off like a thermostat. The material that binds the possum pad around the lower body is made of the same proprietary fabric used in mountaineering clothing.

Till it closed its doors in 2020, after twenty-five years in business, Possumdown Knitwear Limited, in East Tamaki, manufactured sweaters, gloves, socks, vests, beanies, jacket, scarves and big

shawls made of possum fur, with the tagline–"By wearing "Possumdown" you'll be helping to protect New Zealand's natural plant and wildlife from being desecrated by the Brushtail Possum - an introduced species that feeds on our native trees and birds' eggs."

Possumdown Knitwear also produced ''possum merino clothing'' such as jumpers, cardigans, tweed coats, ponchos and ultra-elastometric fingerless gloves in a variety of colours, from a blend of merino wool and brushtail possum fibre. Unable to counter declining business due to the Covid-19 pandemic, another iconic museum–shop hybrid in Napier –Opossum world, closed down in 2022, after 50 years in business.

However, many other stores continue to popularize the signature NZ winterwear from possum. They include, Kiwi Country Clothing, Untouched World (the first New Zealand fashion company to gain UN recognition for sustainability), Snowy Peak and Pearly's

NZ possum products under names such as merinomink, eco-possum, possumdown, eco fur and possum wool, are not only found in the country but all over Europe and USA.

Country -wide stores of "Mohair and Possum", have an extensive range of possum- merino clothing, all made with 40% possum, 50% merino and 10% nylon. Their range includes accessory sets, beanies & hats, gloves, ponchos & wraps, scarves, socks, blankets and throws.

Environmental Products New Zealand is yet another possum fur manufacturer, situated in Stratford, Taranaki. The company which has been in business for two decades manufactures its product range in-store - fur throws, mittens, pillows, hats and boots. The owners, Laurie and Pennie sands offer guided tours to clients in their premises and familiarize visitors with product development intricacies of goods made with possum down.

Other innovative ways New Zealand uses the invasive species are - as the 'Possyum' brand of dog-food, in which meat from more than 350,000 possums have been used since 2010. The peak daily production target of 3,000 rolls of 'Possyum', was achieved by Pest Pro NZ, the owner of the brand, in 2021.

The popularizing of pet protein possum is an intrinsic segment of New Zealand's gallant plan to be free of the pest by 2050.

Possum protein, which contains large proportions of Omega 3 and 6 is more nutritional, beneficial to physical and muscle health of canines. Apart from assisting in imparting beautiful luster to their skins, possum feed has been found to significantly improve the skeletal strength and ease of digestion in dogs. Pet protein made from possums has been found to have marked benefit for dogs than dog feed derived from other species.

The leading player in this segment continues to be Pest Pro New Zealand, which apart from catering to its anchor client, Superior Pet Food Co.,is now supplying to twenty-nine other customers

Numerous other lines of possum meat-based dog food have hit the shelves in New Zealand, with Pest Pro NZ going from selling to only Superior Pet Food Co., to supplying more than 29 other producers, 2022.

Keeping in view the usefulness of possums to the local economy, Possums are being treated as a "resource" with a financial incentive to entice hunters to help contain numbers of the pest.

More than 50% of fur from the 1.8 million furry arboreal creatures, caught, trapped and killed by hunters for commercial use in New Zealand, was purchased by "Basically Bush", a renowned trading company. The company estimates, if the number could be augmented by a further 1.2 million animals, to total 3 million annually - comprising 10% of the present population, the population of the pestiferous species would be reined in substantially. It hastens to add, that their endeavour to exterminate as many possums as possible, was only able to complement governmental efforts directed towards possum trapping and poisoning, which could not be replaced in any other way.

New Zealand companies have also commenced processing, canning and exporting possum meat to Taiwan, Hong Kong and Malaysia where it is regarded as a delicacy–euphemistically known as ''Kiwi Bear''.

Additionally, citizens, tourists and foodies can buy possum pate and possum pies in many supermarkets, all over the country.

Possums are a protected species in Australia, where it is illegal to hunt them without a permit, but in New Zealand, where they are an invasive species, the marsupials are free for harvesting without bag limit.

Possum meat contains Niacin, Vitamin B6, Iron, Phosphorus and Selenium, and provides a high amount of Vitamin B12.Like other animals, the flavour and texture of the meat depends on the age and sex of the animal. For fattier meat try a breeding female possum with a distended pouch. Adult males tend to be leaner, have more muscle bulk and have a stronger possum smell to their meat. If you're keen to try an authentic gamey flavour go for a large male. For the most tender meat, a juvenile or pre-breeding possum is best. However, a discouraging factor is that, possum meat is tough and chewy, especially from more mature specimens.

Recommended recipes include possum slow-cooked in an herb casserole with lemon juice, possum roasted with sugar and orange, or possum braised in garlic and spices, stewed possum, possum butter "chicken" and possum curry. Slow cooking, roasting or hot smoking the meat with barbecue sauce are other suggested options.

However, since there are significant safety risks associated with eating road killed or hunted possum, due to their being vectors of tuberculosis, human consumption of possum meat has not really taken off.

The pelts have always been used in a range of garments for cooler climates, but more recently the fur has been blended with silk and merino wool to manufacture a lightweight, low-density, ultra-soft winter wear that has excited and pleased shoppers and top fashion outlets, in equal measure.

Supple and smooth possum skins by golfers and rugby players. Fila has included golf gloves made from possum skins in its range. These have gained wide popularity in golfing communities across US, Singapore and Korea.

With fur and leather from the invasive alien species establishing a niche market, trappers and hunters are enthusiastically plying their trade once again in "The Land of the Long White Cloud", not only earning a good living, but also simultaneously ensuring that the possum numbers remain within manageable and reasonable limits.

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This article was originaly published in Vol.- 46 No.- 05 May & June' 1996 issue of JILTA.

ELEMENTARY KNOWLEDGE ON FOOTWEAR MANUFACTURE

PRINCIPLES OF FOOTWEAR* Part—II

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Changes in the Foot Shape :

The changing of the foot shape takes place as early as ninth week of the foetus and it continues until it reaches eighteenth year after birth. The changes in the foot shape takes place due to the following reason.

a) Growth from infancy
b) weight bearing
c) Movement

Changes due to growth :

Bones are made up of animal and mineral substances. Children are having bones in the composition of (a) Animal matter (90%) and (b) Mineral matter 10%. As the child grows the deposition of calcium started in the bone as calcium phosphate and the same continues till 18th year of age. In some cases it varies upto 20 years. The composition of bones then changed to a animal matter 75% and mineral matter 25%. When the development of bones starts from it's tender age uptil the end of the teen ages the Gristle like cartilage turns into a hard bone. The skeleton of the foot is of cartilages before birth and this slowly turns into bones. The process is called OSCIFICATION, which means the changes of bones from a week soft things at birth to the strong, hard material in adult hood.

The short bones, each have a primary centre that starts turning to bone. When oscification is completed the short bones consist of a hard outer surface of compact bone and a spongy fibrous interior containing marrow. The long bones of the foot develop form two separate pieces of cartilage each. The primary centre consists of the shaft and one end. The secondary centre consists of the other end which is similar to the spongy short bones and the two fuse together towards the end of the oscification process. The secondary centres of the phalanges and 1st metatarsal are the bases but the heads are separate on the other four metatarsals.

As the bones of the foot of a child are extremely pliable and soft there lies always a chance of deformation due to the wearing of incorrect footwear. The joints are also at this stage very weak and liable to be distorted which results the misalignment of the bones. As time passes the shape and substances of the bones keep changing. Long bones increases in length more than in girth thus become more suseptible to fracture. Joints become more prominent in the adult's hood. The bones becomes more brittle and therefore there is a tendency to fracture more at the old age. The process oscification though very slowly, but continues throughout the life of a man.

At birth the foot is plump

* Continued from April 1996 Issue (p 109 to p 127).

and comparatively shapeless (fig. 28) and it is covered with proportionally large amount of fat and fatty tissues to the "forming bone structure". The longitudinal arches though masked by fatty tissues are not visible but surely present there. The toes at early ages are rounded like peas in a pod,


FIG-28

where as in adults, toes are long with a definite shape. The outer and inner metatarsal-phalangal joints are almost opposite in the infant's foot. The heel is rather pointed in the infant but it becomes rounded and broadens in the adult.

Changes due to weight bearing :-

As infant grows, it gradually starts from crawling to walking. What happens when the body moves forward on walking ? The entire body weight has to be borne by the feet. The body weight is distributed from the astragalus to the oscalsis at heel, the heads of the metatarsal in the forepart and along the outer longitudinal arch. The longitudinal arches are depressed and metatarsal arches disappear. Due to this changes an increase in the length of the foot upto a full size (1 size= 1/3") and a slight broadening of the foot across the metatarsal-phalangal joint. The seat also becomes wider and toes lengthen as the great toe assists in providing balance. These changes varies form people of people depending upon (1) the strength of the ligaments and muscles (2) the fleshiness of the foot and (3) the weight of the body.

The weight bearing points of the foot :

There are three weight bearing points of our foot. (fig. 29) (1) The heel bone (ii) the head of the first metatarsal (iii) the head of the fifth metatarsal. These


FIG-29

three tri-podal bearing points provide the foot the strongest support and co-ordinated balance in walking upon uneven surfaces. They help to stabilize the many angulation of our different foot action.

The Function of Our Foot :

The basic function of our feet can be divided in three (3) category.

a) Weight bearing
b) Propulsion
c) Shock absorbing.

To carry out the above function efficiently our foot arches contribute in the following manner.

Function of Arches	They Provide
Weight bearing	Strength
Propulsion	Flexibility
Shock-absorbing	Elasticity

Propulsion :

When a man walks the entire body weight is taken by each foot in turn. The weight is transferred from heel to toe as the centre of gravity of the body moves forward in relation to the foot on the ground. (fig 30). When the foot of the concerned man is lifted at the ankle joint as it leaves the ground and swing forward to stage 1, it prevents the toes from touching the ground. The calf muscles later force the foot down in relation to the leg, lifting the body on to the forepart at stage 4.

In addition to this movement at the ankle joint the metatarso phalangeal joint allows the toes to bend up as the heel is raised to the stage No. 4 and then flexes them down as the foot leave the ground at stage 5.

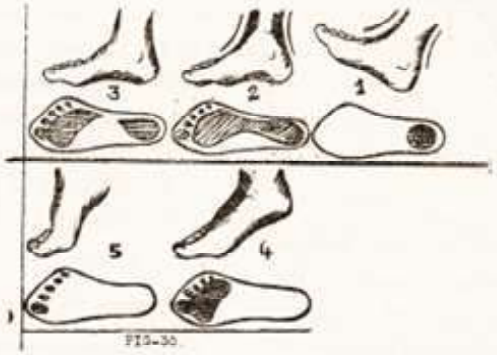


FIG-30

Changes due to Movement :

The shape of our foot keeps changing continuously while we are walking, running or performing other activities. The following movements take place in approximately within 2/3rd of a second. (fig. 31)

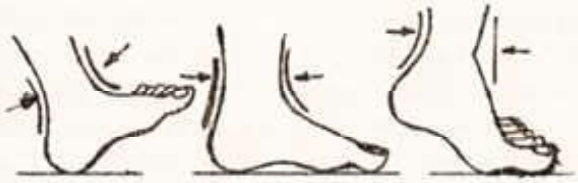


FIG-31

a) while moving forward man always lift his foot touched the ground on the heel. It lifts the forepart to avoid striking the ground. Thus the curvature is increased at the front of the ankle and reduced at the rear.

b) Now he puts his foot on the ground which distributes the body weight of the man between heel and metatarsals. The metatarsal arch disappears and the longitudinal arches are depressed, resulting the increase in width and length of the foot.

c) The muscles of the leg then lifted the body to move it forward. As soon as the heel of the foot is raised from the ground the entire body weight is then transferred to the heads of the metatarsals. The curvature on both the side of the ankle changes. The curvature on the front of the ankle decreases considerably while the curvature at the back increases. While normal walking the angles of raising up and bending down (fig. 32) of the feet is between 30° to 50°. When a man swing the foot forward to take up position (1) it's body propelled forward by means of a thrust of the toes-the big toe in particular-against the ground.

INFANT FEET :

As we all know that the infant's feet is very soft, pliable and gristle one should take special care while choosing a shoe for a baby. The skeleton of foot at this stage is in the primary level and damage may take place at any time due to negligence. Without causing any pain to the wearer (infant), the tender feet can be damaged. Total freedom of movement to the feet should be allowed at all times.

First footwear should be simple for protection both in crawling and when the child begins to walk. Immature feet must be kept warm. "Light in weight" and "well flexibility" are essential for a children footwear. A shoe cannot assist or promote the natural development of feet but can protect it from various aspects. The foot must always dictate to the shoe but not the shoe to the foot.

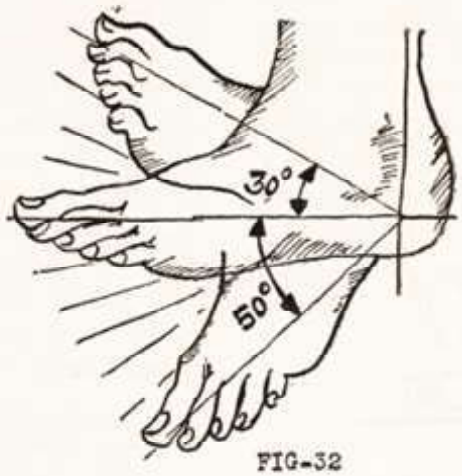


FIG-32

A laced shoe is always recommended for a child wear. A broad toe and high cut shoe ensures that the foot is held firmly at the back leaving plenty of space in the front portion for the growing toes. Minimum allowance of 13 m/m is kept as a growing space in the frontal area of the foot. It should always be kept in mind that the hose of the child also fit correctly. As the foot grows rapidly during this period parents should keep in changing the shoes minimum twice in a year.

TEENAGE :

The feet of the teenagers also keep on increasing its size in length in particular and a little in width. Care should be taken while choosing the shoes for this ages. It is true that at this juncture the style and fashion trend attracts more to the teenager but still a correct fittings should be maintained. The shoe must be light in weight and flexible on the upper part, gay and colouful but correct fittings for allowing the nature growth of the feet. It is recommended that a teenage shoe should be reasonable light in weight, not the low cut shoe. Semi-ankle high with cushioning effect like sports shoe, with some sorts of adjustment at the instep. A growth space of 16 m/m is advisable in the front of the shoe.

VARIOUS TROUBLES OF FOOT :

There are various types of foot troubles found among the people. It is true that most of the babies are born with perfect or near perfect feet. There may be various reason for foot troubles but one of the main reason for foot trouble is caused by ill-fitting or incorrect fitting of footwear or socks. It is also noticed that major problems of these troubles can be avoided if one uses the right shoe for his feet. Three main types of foot troubles are being observed in the process.

1. Damage to skin
2. Troubles of the toe
3. Troubles of the arches.

1. Damage to Skin :

when a man wears a shoe which fits tightly to him, the skin of the feet in certain portion is under pressure or mechanical stress. The continuous wearing of tight shoe put the skin under friction which ultimately develops **BLISTER.** A shearing movement in the deeper cells of the epidermice causes break down and fluid build up in the space.

A callous is the hard outer layer of skin caused due to intermittent pressure around the edges of the insole at the seat.

A **corn** is formed by friction caused by localised pressure, over toe joints and again causing extra layer of skin to build-up. The extra

skin increases the pressure of thefootwear causing pain as it presses nerve endings in the skin under the corn. The cause of pressure should be removed and also the extra skin. One of the main reason for soft corn on the toes is the use of narrow shoe.

A **Bursa** is a fluid containing sac that develops over bony prominence to protect the area. Bursa generally occur in between achilles tendon and oscalcis. But when the Bursa occur due to the ill fitting of a footwear it is over the big toe joint or the little toe, they are called **Bunions.**

Bunion is an inflammation of the tissues over a joint caused by pressure and/or friction. It is most commonly developed over the protruberant metatarso-phalangeal joint of the big toe in cases of hallux valgus.

Troubles of the Toe :

The shape of the foot changes due to various reason like natural growth, heavy pressure of the body and body movements. Sufficient space should be kept, inside a shoe so that the natural expansion of the feet may not be restricted. The troubles of the toe which we will discuss now is mainly due to the ill fittings (insufficient space) of the shoe which restricts the normal extension of feet.

1) **Hallus Valgus :** (fig.33)

A side way deviation of the big toe towards the other toes. It is associated with the development of a prominence on the inner side of the joint which then develops a protective **bursa**.The **bursa** may become inflammed resulting

FIG-33

in a bunion. The first metatarsal head or joint to which the fitter takes the heel to ball measure, is much more prominent than in normal and the forefoot is wider because of the larger than average angle between the first and second metatarsal shafts. The condition is often found in a foot with a larger than average angle between the first and second metatarsal shaft, which is an inherited characteristic. The cause of hallux valgus is not clear. It may be pointed-toe shoes, shoes fitted too short or too narrow, or a combination of any of this with a foot structure that has a predisposition, possibly hereditary, towards the abnormal.

ii) Hallus Rigidus :

A pain full affliction of the big toe with restriction of movements. Practically there is no movement of the great toe at the metatarsal phalangeal joint. If it continues for some time the toe is fixed down permanently. This is due to the continuous wearing of a short or narrow toe shoe. To allow more normal gait shoes may have a metatarsal bar fitted beneath the metatarsal heads under the sole.

iii) Hammer Toe :

A deformity which consists of extension at the metatarsal phalangeal joint and permanent downward flexion of the second phalanx. Pain may result from a corn over the prominent inter phangeal joint and a bursa may develop. (fig. 34)

FIG-34

iv) Clawed Toe :

Same type of toe defects as in case of hammer toe but

here the third phalanx is also flexed. (fig. 35)

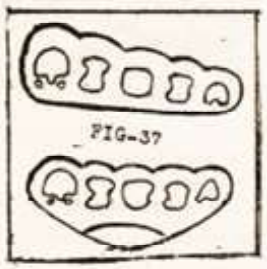
v) Mallet Toe :

This is also only type of toe deformity. One second joint is affected and the distal phalanx is flexed. (fig. 36)

Trouble of the Arches :

1) Metatarsal gia : (fig. 37)

An extremely painful condition of the forefoot, starting with a burning sensation in the fourth metatarsal head region. This is caused due to the overloading on the forepart by wearing higher heel



than the usual heels one wears or operating a machine with a foot pedal badly positioned or wearing narrow shoes cramping the toe portion. This also develops severe piercing pain extending to the tips of the fourth and fifth toes. The cause is pressure on the nerves near the metatarsal heads when walking, arising from some degree of displacement of the metatarsal heads. A callous may form beneath the central metatarsal heads, thus increasing the pressure.

ii) PES PLANUS

(FLAT FOOT) : (fig. 38)

Clinical features of this condition are a tilting inwardly of the oscalcis and displacement of the head of

the astragalus downwards. The result is an inward tilting of the heel, observable from the rear when the sufferer is standing. Another feature is abduction of the foot, that is displacement of the forefoot outwardly. The inner longitudinal arch flattens as the oscalcis and astragalus tip forward and the forepart turns out due to the stretching of the lagaments and muscles some times caused by the foot having to bear extra weight e.g., after a long illness or due to pregnancy, but usually this is congenital.

iii) PES CAVUS (humped foot) (fig. 39)

A foot deformity characterised by a greater than normal degree of arching of the foot. In the normal foot the degree of arching varies greatly. The longitudinal arches, are high with the arch visible on the outside of the foot increasing the weight borne by the forepart. In

minor cases of Pes Cavus it is recommended to, fit metatarsal pads to raise the interior metatarsal region, use shoes with a high waist and generous instep girth.

FOOT COMFORT & THEIR RELATIONSHIP TO THE FOOTWEAR

The best comfort for an individual foot is bare foot, but people now-a-days cann't even think for going out a step without footwear. A foot protection is always needed. Shoes are worn for the protection of foot but it cannot assist or promole for the natural growth, development and function of the foot. As such footwear is being used for protection of feet and also for the fashion. To maintain the fashion trend we should not compromise with foot comfort as well as deformation of feet during wear. A footwear must be made considering the essential anatomical requirements and bio-mechanical manner of walking. It must also fulfil the conditions of hygiene.

1) Correct fitting of a shoe indicates (a) to have a right inner dimensions and the shape must support physiological function of foot.
2) To assure right wearing condition of a footwear the material to be used for the concerned shoe must assure the correct thermal condition inside the shoes during different wearing condition. Find below some required conditions.
   a) temperature inside of a shoe max 33°c-higher temperature will cause bad thermoregulation and higher perspiration.
   b) relative humidity inside the shoe max 60%-if it is higher than this bad thermoregulation will occur.
   c) the closed upper should be of porous material so that permanent air exchange between inside and outside of a shoe can take place. This ensures effective moisture and heat exchange.

Sweat evaporation per square centimetre of the skin of a human foot per hour is

i) During the rest 4-9 mg
ii) During the normal march—about 7.2 mg
iii) During heavy work —upto— 15 mg

3) water and heat protection for a shoe is very essential that is why water proofness and low thermal conductivity of the material is desired.
4) Fullness and flexibility of the leather must be maintained.
5) The tensile strength and abrasion resistance must be upto the mark to resist wear and tear.

FITTING OF A SHOE

Foot comfort and fitting of a shoe are inter connected. Without correct filtting of a shoe one cannot imagine about foot comfort. Now we will discuss about fitting of a shoe.

a) Sufficient space in length as well as in width must be kept in a shoe so that the toes can move freely inside a shoe. A space from 1/4" to 1/2" is absolutely necessary in order to eliminate the possibilities of a closed shoe being too short. In case of a open toe shoe (peep toe), sufficient width at the tip and the length of the insole to be kept so that the big toe of the foot should not extend beyond the insole.
b) we can define the well fitted shoe as "when a shoe hug the foot firmly and snugly throughout the arch and the heel but it allows sufficient

space for free movement of toe and ball of the foot and also to stretch out comfortably". This will help the free movement of bones and muscles when we walk.

c) It is also one of the main thing of good fitting that the weight of the body should be distributed equally from heel to toe of a feet. The main objective in shoe fitting is to secure shoes that allows muscles to act freely and keep the bones in their places rightly. A complete freedom of the foot in their movement without any pinching, binding or restricting at any point. Four main points to the fitting of a shoe is given below.

1) HEEL PORTION OF FEET MUST FIT ACCURATELY ON THE HEEL SEAT AREA OF A SHOE

The heel acts as a rudder of the feet and one of the three weight bearing point lies on it. The heel first received the weight of the body (when a man stands) and transmits it equally to the other two weight bearing points. As the heel strikes first when man start to move, it absorbs the shocks of the pavement pounding This is a most important part of the foot and care must be taken so that the heel portion of the foot is well placed in the shoe and makes the shoes fit snugly to the foot at the waist and instep. There should not be any unusual gaps and wrinkles at the top line of the quarter.

2. BALL GIRTH PORTION OF FOOT MUST BE IN THE BALL OF THE SHOE

Girth is one of the fundamental area of a foot which plays vital role in fitting of a shoe. The point close proximity to the head of the first metatarsal and big toe joint. One of the three weight bearing points is also situated on ball line. We make shoe on the last which resembles to the foot though not exactly. It is important the ball of a foot must be placed at the ball portion of the shoe. If it is differed, at this point wrinkle will appear on the upper in the shank area of the shoe just above the sole. The upper of the shoe should adhere smoothly to the foot at this point without pressure and also without any gap or wrinkles behind or in front of the ball of the shoe.

3) WIDTH SHOULD BE ENOUGH TO ACCOMMODATE NORMAL EXPANSION OF FOOT WITHOUT PRESSURE

we know that the expansion in width takes place on foot when we stand or walk. A sufficient width in the metatarsal area must be kept because the third weight bearing point is on the head of the fifth metatarsal. If we do not allow sufficient space for this area the metatarsal bones will be cramped, nerves and tissues will be pinched, the circulation of blood will be retarded. As a result the shoe will provide incorrect balance while standing or walking. Too much width at this point is also not desirable because it will allow the foot slide and slip within the shoe making the tissue friction which ultimately causes corns, callouses and bunions.

4) SUFFICIENT ROOM FOR FREE MOVEMENTS OF TOES

The height, width and lenght in the toe portion of the last should be kept in such a level that the toes can move easily during walking or standing, inside the shoe. Insufficient space will make the toes crowded into other which ultimately causes

various foot ailments like hammer toe, in-grown nails, corns etc. etc. It is very important to select right kind of lasts while making shoes specially for infants, teenager and women.

FOOTCARE FOR THE INDIVIDUAL

Wearing of a shoe is no doubt a foot care measurement. But with this care there are several other cares should be taken from the very beginning, even at the crawling stage of an infant. As we know bones of the child's feet is very soft and damage may occur even without causing any pain to a child, so special precaution should also be taken for a child. With a little care and attention, feet may be kept efficient, healthy and trouble free. Here are some guidance.

1)* As the child's/teenager's feet grows rapidly from every four weeks to 6 months, the growing foot should be watched very carefully so that right shoes can be replaced at right time.

2)* Children should be taught to walk straight and prevent them from toeing out objects, this ultimately weaken the ankles and arches and ruins a graceful stride.

3)* Wash your feet daily with soap and brush the nail every day. 2-3 min. soaking in water is a very good refreshment for the feet.

4)* Cut the nails straight across as soon as it grows, not shorter than the flesh at the end of the toe.

5)* Never cut the corns, callouses with unsterilised instrument. It is advisable to use corn cure cap to remove corns.

6)* Try to wear shoes with min. heel or wedge heel. Straight heel is always preferred. More heel height weaks the ankle and cause strain to the feet.

7)* Do not buy the shoe only by style, try to select it for comfort also. Flexable upper and bottom material to be selected. Do not go for tight shoe. Porous upper material (leather) helps to evaporate perspiration during your walk.

8)* Change your shoes in case it damages your skin, like corns, blister and callous etc.

9)* Do not run or walk more which your health does not permit. Do not make any extra pressure on feet during physical exercise or during convalescence from an illness.

10)* It is often observed that one side of the heel rubbed heavily due to the abrasion for some people. It is due to the uneven pressure of the feet on the heel protion. This worn heels may cause weak ankle and strain to the feet. It is suggested to level the heel and if possible to change the shoe.

(To be continued in the next issue)

ELEMENTARY KNOWLEDGE ON FOOTWEAR MANUFACTURE

PRINCIPLES OF FOOTWEAR• Part—III

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SHOE SIZE AND SIZE SYSTEM :

Practically it is not clear to a common people what does actually mean by a shoe size. Some one thinks it is the length of the shoe and some one thinks it is the length of the foot of the concerned man. But actually both are not correct. It is the length of the insole (size of the last) of the last on which the shoe is being made. The length of the last is always more than the foot length and the shoe length is always more than the length of the last.

The feet of individual people have quite different dimensions. To fit these feet, shoes of quite different dimensions have to be produced. To create a situation in which the greatest part of the population can be supplied with shoes of the right fit using ready made shoes, a system of sizing is necessary. A sizing system consists of a range of shoe sizes with a given difference in dimension (length and width) between sizes as well as a code to identify the size of the shoe. Several sizing system have been developed so far to cope up with the increasing demand of the various types of feet and also for good and comfortable fittings. We will discuss about some important sizing systems which are being used now-a-days by the shoe industry.

PRINCIPLES OF SIZE AND FIT :

The main features of good and comfortable fitting is the shape of the shoe which is similar to that of the foot. Shoes are being made on several dimension in length and width. Beside these other dimensions such as ball girth, instep girth, instep girth, heel girth etc. are also directly related to the concerned last on which shoes are generally made. There are measurements for each and every places of a last and are defined as measurement of last (dimension of last). There is a close relation exists between the dimension of the foot and those of the insole of the shoe. The picture (fig. 50) below illustrated the things in details.

Now we can make this relation into a formula.

Insole length = Foot length + Fitting allowance.

The fitting allowance is nec-

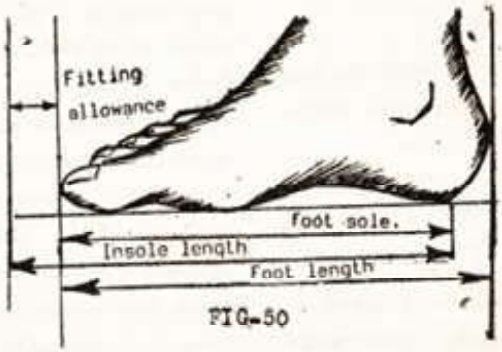


FIG-50

(Continued from Page 183 to 91 of previous issue)

ded to prevent the toes of the foot from touching inside of the shoe during walking and also enables the shoe for a some what greater length of foot without any fitting problem.

The magnitude depends on the type of the shoe as well as the size of the shoe. For closed shoe the fitting allowance are given in the following manner.

1) For adults (size 5-11) = 15 m/m

2) For Boys/girls/children (7-10, 11-1, 2-5) = 10 m/m.

For other types of footwear, the fitting allowance can be smaller as for example the shoes with open toes, sandals and sports shoes etc

The heel correction is needed because the curved shape of the heel makes the insole shorter at the rear of the foot. For adults, this correction is 4 m/m for small children it may be some what shorter . 3 m/m.

EXAMPLES :

For a foot of length 260 m.m the length of the insole will be 260 + 15 – 4 = 271 m/m.

An insole length of 260 m.m is intended for a foot with length 260 – 15 + 4 = 249 m/m.

For a child with feet of 150 m/m the length of insole would be 150 + 10 – 3 = 157 m m.

There is an important relation between foot and insole lies in its width. This dimension is measured at the joint or ball of the foot. The ball line exists at 2/3rd of the foot length from the rear. The width of the insole and width of the foot is directly related to the joint or ball girth. It is observed from applying various "trial and error" method that the insole width is 37% of the joint girth and the foot width is 40% of the joint girth. The reason behind this is the "curvature" of the foot. (fig. 51)

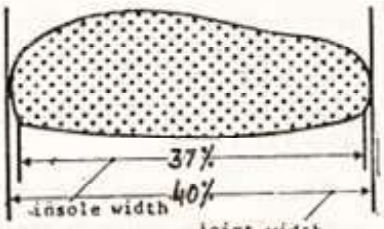


FIG-51

SIZES :

In India we generally follow English size system though for manufacturing export oriented closed upper and shoes we also follow Parish Point system of sizing. American size system which is fundamentally the same with English size with a slight difference (1/12th inch shorter) in length is not followed. Mondo Point Size System which is the latest developments from Europe is yet to gain its popularities.

There are five types of size systems are being followed by the foot-wear world (fig. 52, 53, 54, 55).

1) *British or English size*
2) *American size—*
   a) Boston size
   b) American Standard Size
   c) American Custom Size
3) *French or Continental size* (Paris Point)
4) *Japanees size*
5) *Mondo Point size*
6) *Euro point system*

WHAT IS SIZE SYSTEM :

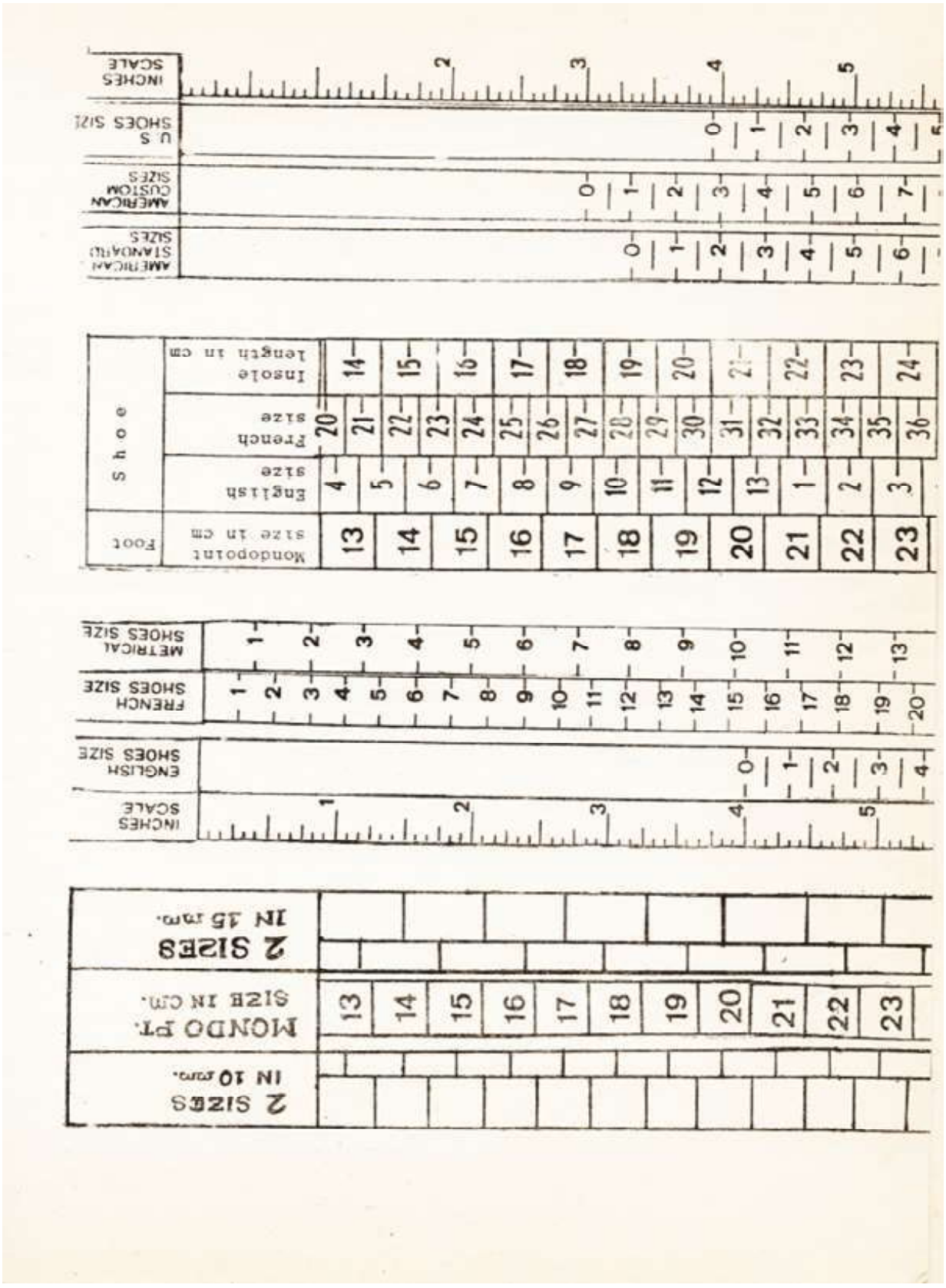
A size system can be defined as a method of (a) Measuring (b) Recording and (c) Marking the various length of (a) Foot (b) the Last and (c) the Shoe.

—Different countries employs different systems

a) Using a special size unit as well as
b) a method of marking OR notation.

BRITISH SIZE SYSTEM :

England appear to have the oldest known system of sizing foot and footwear which is reported to have originated from NORWICH, centuries ago. As this was developed by the British the same is being known as a British size. This is based on F.P.S. System. The unit of size


INCHES SCALE
U.S. SHOES SIZE
AMERICAN CUSTOM SIZES
AMERICAN STANDARD SIZES
Shoe
Insole length in cm
French size
English size
Foot
Mondopoint size in cm
METRICAL SHOES SIZE
FRENCH SHOES SIZE
ENGLISH SHOES SIZE
INCHES SCALE
2 SIZES IN 15 mm.
MONDO PT. SIZE IN CM.
2 SIZES IN 10 mm.

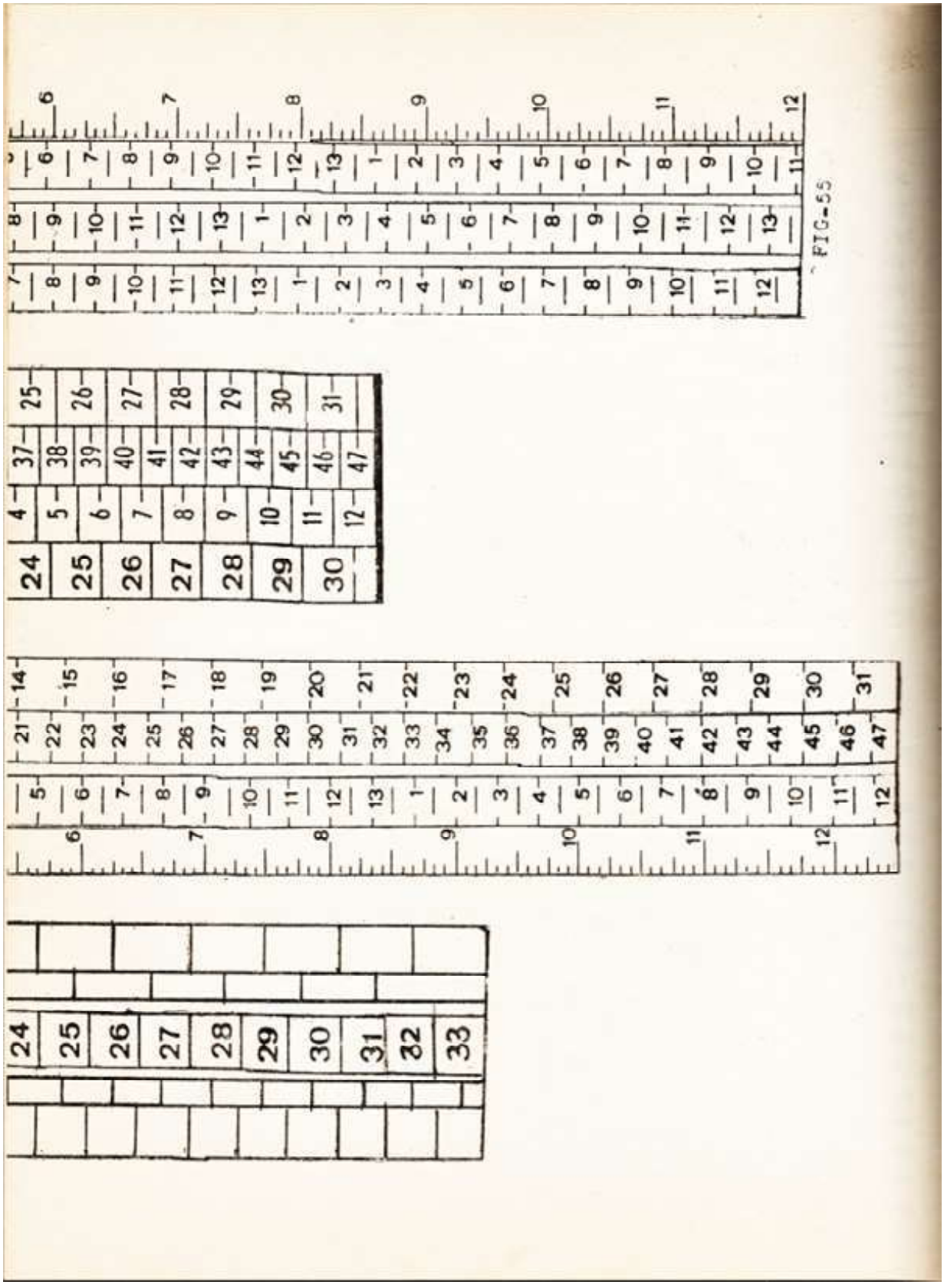


FIG-55

is in inch. The size 'O' in this system starts at 4″ length. From size O their consecutive sizes number 1 to 13 and then again it starts from 1 to 11 or on wards. The difference between two sizes is 1/3rd inch (8.4 m/m) and for half sizes it is 1/6th inch (4.2 m.m). Three full sizes or six half sizrs in this system covers one inch (2.54 cm).

It is very easy to calculate the length of size in this system. Suppose you will have to find out the length of size of 13.

Size number $13 \times 1/3''$ (difference between two sizes)

$+ 4''$ ('O' size starts at 4″)

∴ The length is $4\frac{1}{3} + 4''$

$= 8\ 1/3$ inch

The method of notation according to this system are.

Size	Length
Children 'O' (Infant)	4″
Children 13	8 1/3″
Youth 1	8 2/3″
Adult 12	12 1/3″

The sizes are categorically divided in the following groups.

Sizes	Groups
0-6	Infant
7-9	Children
10-12	Children
1-5	Youth Boys/Girls
3-8	Ladies
5-12	Gents

AMERICAN SIZE SYSTEM :

The salient features of an American scale is same as it is in the English scale keeping only the difference while starting its 'O' size. The 'O' size in an American scale starts at a length $3''/12''$ which is $1/12''$ (2 m/m) shorter than the 'O' size length of a English scale. The differences in length and width between two sizes are same with English scale. As per their suitability in work the Americans again sub-divided their size scale as follow.

"Type"	'O' Size Starts at
i) Boston size	3 11/12 inch
ii) American Standard size	3 1/3 inch
iii) American Custom size	3 inch

FRENCH OR CONTINENTAL SIZE (PARIS POINT)

This scale is based on C.G.S. system. It is widely used throughout Western Europe. The unit in the scale is c.m. The 'O' size in this scale starts at 'O' m.m. and consecutive sizes upto 50. The difference between two sizes is 6.6 m.m. which is approx. $1/4''$. Thus three Parish Point sizes covers approx. 2 c.m. Roughly 4 British (English) sizes covers the length of 5 Parish Point sizes. There are no half sizes in this scale.

Sizes	Groups
18-22	Small children (Infant)
23-26	Tall children
26-35	Girls/Boys
36-40	Youths
35 41	Women
38-48	Men

JAPANEES SIZE SYSTEM

This scale is based on F.P.S. system and its unit is being in inch. Each size has a length of 1″ (one inch) starting 'O' size at 'O' inch. The sizes continues without a break. Each size again sub divided into four quarters i.e., the sizes are 1, $1\frac{1}{4}$, $1\frac{1}{2}$, $1\frac{3}{4}$ 2 and so on.

MONDO POINT SIZE/ METRIC SIZE SYSTEM

This system is completely based on C.G.S. system. This scale developed by International Standards Organisation. Mondo Point, a name which suggests a world system of footwear sizing. The size marked is the length in millimetres of the average foot which fits the foot-wear, the foot measurement being taken with weight on and wearing hose.

There are two types of size increment suggested in this scale 5 m.m and 7.5 m.m. The width of a shoe is the joint width of the average foot which fits the shoes. In multi fitting ranges the width interval between fittings should be either 3 m.m. or 5 m.m.

The Mondo Point size marking consists of two number such as 240/95. The first number represents the size or the length of the foot measured in m m.

The second number is the width index, the indication of the joint girth measurement of the foot, expressed as a percentage of the length.

Example	*Shoe Marking*	*Foot Measurement*
240/95	Length—240 m/m Girth—228 m/m	

Since 228 is 95% of 240, therefore *the shoe 240/95*, indicates the size of a foot having a length 240 m/m and girth 228 m/m.

THE EUROPOINT SYSTEM

This system is based on the metric measure and the unit sizes are taken to be as :

i) 4 m.m for women's size

ii) 6 m.m for men's size

It is calculated from the actual length of the foot measurement when standing. This System, however, hasn't yet become wide spread. According to this system shoe lasts should be marked to correspond to the actual foot length measured in m.m. So you can say the size marked on the last and the shoe will be the same as the foot measurement.

Europoint so far deals only with length and not with width and fittings. It is simple to use since it is nothing more than just the conversation of English size system into the metric measure.

CONVERSION OF SIZES

British size to American size

British size 7 = American size 7 + 1/12 inch

and

American size 7 = British size 7 – 1/12 inch

British size to French size

Suppose we will have to determine "What will be the British size (gents) 8 in French size system ? At first we will have to convert the British size into inches, i.e., Gent size 8 = 13 + 8 = 21 size or size $8 = 21 \times \frac{1}{3}$ inch = 7 inch

The total length of British size 8 = 7 inch + 4 inch (as 'O'size starts at 4″) = 11 inches.

Now 11 inch = 11 × 2.54 cm = 27.94 cm.

One French size = 6.667 m.m.

Therefore Britis size 8 i.e., 27.94 cm or 279.4 m/m is equal to French size $\frac{279.4}{6.667} = 41.907$

The nearest French size for British size 8 (gents) is 42.

French Size to British Size

What will be the nearest British for the French size 38. ?

At first we will have to convert the French size 38 into m.m.

French size 38 = 38 × 6.667 m.m.

or, 253.346 m.m.

Now 253..346 m.m. $= \frac{253.346}{25.4}$

= 9.97 inch

We can say 10 inch

Therefore 10″ is equal to 4″ + 6″

or, 4″ + 18 sizes $\left(6 \times \frac{1}{3} = \frac{6 \times 3}{1}\right)$

or, 18 sizes (As 'O' size starts at 4″)

or, 13 + 5 (0 – 13 sizes for children and again size started fsom 1)

or, 5 size for gents.

Therefore the nearest British size for French size 38 is British Gents' size 5.

FITTING OF A SHOE

The difference in length between two English size is 8.5 m/m. (8.466) With the increment in length, a last has also some more increments in various girth measurement of a shoe

matically i.e., in ball girth ... 6 m.m., in heel girth also ... and in short heel it is 7.5 ... Thus if size 7 has a ball ... G) 239 m.m., size 8 will ... a ball girth of 245 m.m., A ... made from heavy material ... have a greater girth than one ... from light material. Since ... is necessary in order to com... for the loss of flezibility ... the greater thickness of the ... The actual measurement ... very according to the type ... to be made.

Lasts are made not only with ... girth measurements for ... length but also with ... girth for same length. ... enables us to get several ... of last covering the same ... scale but with different ... measurrments, which ulti... helps efficient fitting of a ... to the consumer.

The difference between the ... girth meafurement of two ... last is not fixed, but ... most widely used grade is 6 ... for ball girth. This is ... distributed with 2 m/m ... width of the last and the rest ... on the circumference of ... girth, the widest part of the ...

As indicated, the number of ... will vary according to the ... of shoe being made. Each ... is indentified either by a ... or by a letter. The ... fittings are categorised by letters while the French fittings are defined by numbers. The fittings are categorised in the following way.

Description	Symbol (letter) for English size	Symbol (number) for French size
Very small	E	5
Small	F	6
Medium	G	7
Large	H	8
Extra large	XH	9

Table below shows the ball girth measurements for a limited fittings range. Though in India we follow fittings from E to XH but actually it starts from A. A to D fittings are generally followed by Western countries.

Fitting	Ball Girth for Sizes m.m.				
	6	7	8	9	10
E	221	227	233	239	245
F	227	233	239	245	251
G	233	239	245	251	257
H	239	245	251	257	263
XH	245	251	257	263	269

MULTI FITTINGS

This method is developed by the footwear trade associate, who manufacture shoes, as per their suitability and comfort to a customer. There may be as many as ten to eleven different fittings ranging from 4A (AAAA) to 4E (EEEE). The orthodox grade of 6 m.m. is not satisfactory for such a wide range and it is general practice for this to be reduced to 6 m.m. between the larger and smaller fittings. The increase 6 m/m makes the larger fittings too large and the smaller fittings becomes too small. Alternatively the girth interval 6 m/m may be retained but the tread grade reduced to 1.5 m/m thus avoiding too wide a last in the larger fittings and too slim a last in the small fitting. A further complication is introduced by the practice of lengthening the last by 1 m/m between each of the larger fittings and making a similar reduction between each of the smaller fittings.

LENGTH AND GIRTH FOR MULTIFITTING SIZE 7

Fitting	Length (m.m.)	Ball Girth (m.m)
AAAA	266	202
AAA	267	205
AA	2'8	208
A	269	211 3 m/m
B	270	214
C	271	217
D	271	222 5 m.m
E	271	227
EE	272	230
EEE	273	233
EEEE	274	236

TABLE—I

STANDARD TABLE FOR MEASUREMENT

CHILDREN SIZES BRITISH SCALE

All dimensions in millimetres

SIZES		8	9	10	11	12	13	1
LENGTH		169	177.5	186	194.5	203	211.5	220
BALL GIRTH	E	161	166	171	176	181	186	191
	F	166	171	176	181	186	191	196
	G	171	176	181	186	191	196	201
	H	176	181	186	191	196	201	206
INSTEP GIRTH	E	166	171	176	181	186	191	196
	F	171	176	181	186	191	196	201
	G	176	181	186	191	196	201²	206
	H	181	186	191	196	201	206	211
SHORT HEEL	E	218.5	226.9	235.3	243.7	252.1	260.5	268.9
	F	225	233.4	241.8	250.2	258.6	267	275.4
	G	231.5	239.9	248.3	256.7	265.1	273.5	281.9
	H	238	246.4	254.8	263.2	271.6	280	288.4
	XH							

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	E	156	161	166	171	176	181	186
	F	161	166	171	176	181	186	191
ANKLE	G	166	171	176	181	186	191	196
	H	171	176	181	186	191	196	201
	E	60.8	62.4	64	65.6	67.2	68.8	70.4
	F	62.4	64	65.6	67.2	68.8	70.4	72
INSOLE	G	64	65.6	67.2	68.8	70.4	72	73.6
WIDTH	H	65.6	67.2	68.8	70.4	72	73.6	75.2
AT BALL								
	E	41	42	43	44	45	46	47
INSOLE	F	42	43	44	45	46	47	47
WIDTH	G	43	44	45	46	47	48	49
AT HEEL	H	44	45	46	47	48	49	50
	E	262.3	270.7	279.1	287.5	295.9	304.3	321.7
	F	268.8	277.2	285.6	294.0	302.4	310.8	319.2
LONG	G	275.3	283.7	292.1	300.5	308.9	317.3	325.7
HEEL	H	281.8	290.2	298.6	307.0	315.4	323.8	312.7

TABLE—2

STANDARD TABLE FOR MEASUREMENT

ADULT SIZE BRITISH SCALE

"All dimensions in millimetres"

SIZES		4	5	6	7	8	9	10
LENGTH		245.5	254	262.5	271	279.5	288	296.5
	E	209	215	221	227	233	239	245
	F	215	221	227	233	239	245	251
BALL	G	221	227	233	239	245	251	257
GIRTH	H	227	233	239	245	251	257	263
	XH	233	239	245	251	257	263	269
	E	215	221	227	233	239	245	251
	F	221	227	233	239	245	251	257
INSTEP	G	227	233	239	245	251	257	263
GIRTH	H	233	239	245	251	257	263	269
	XH	239	245	251	257	263	269	275
	E	299.1	307.5	315.9	324.3	332.7	341.1	349.5
	F	305.6	314.0	322.4	330.8	339.2	347.6	356.0
SHORT	G	312.1	320.5	328.9	337.3	345.7	354.1	362.5
HEEL	H	318.6	327.0	335.4	343.8	352.2	360.6	369.0
	XH	325.1	333.5	341.9	350.3	358.7	367.1	375.5

	E	197	203	209	215	221	227	233
	F	203	209	215	221	227	233	239
ANKLE	G	209	215	221	227	233	239	245
	H	215	221	227	233	239	245	251
	XH	221	227	233	239	245	251	257
	E	80	82	84	86	88	90	92
INSOLE	F	82	84	86	88	90	92	94
WIDTH AT	G	84	86	88	90	92	94	96
BALL	H	86	88	90	92	94	96	98
	XH	88	90	92	94	96	98	100
	E	54	55.4	56.8	58.2	59.6	61.0	62.4
INSOLE WIDTH	F	55.4	56.8	58.2	69.6	61.0	62.4	63.8
AT HEEL	G	56.8	58.2	59.6	61.0	62.4	63.8	65.2
	H	58.2	59.6	61.0	62.4	63.8	65.2	66.6
	XH	59.6	61.0	62.4	63.8	65.2	66.6	68.0
	E	337.9	346.3	354.7	363.1	371.5	379.9	388.3
LONG	F	344.4	352.8	361.2	369.6	378.0	386.4	394.8
HEEL	G	350.9	359.3	367.7	376.1	384.5	392.9	401.3
	H	357.4	365.8	374.2	382.6	391.0	399.4	407.8
	XH	363.9	372.3	380.7	389.1	397.5	405.9	414.3

TABLE—3

COMPARATIVE SHOE SIZES
COMPARATIVE SIZE

LENGTH, MM (1)	ENGLISH SIZE (2)	AMERICAN SIZE (3)	PARIS POINT (4)
220	1 Adults	2½ Adults	33
224.5	1½ Adults	3 Adults	—
228.5	2 adults	3½ adults	34
233.0	2½ adults	4 adults	35
237.0	3 adults	4½ adults	36
241.5	3½ adluts	5 adults	—
245.5	4 adults	5½ adults	37
250.0	4½ adults	6 adults	—
254.0	5 adults	6½ adults	38
258.5	5½ adults	7 adults	—
262.5	6 adults	7½ adults	39
267.0	6½ odults	8 adults	40
271.0	7 adults	8½ adults	—
275.5	7½ adults	9 adults	41

LENGTH, MM (1)	ENGLISH SIZE (2)	AMERICAN SIZE (3)	PARTS POINT (4)
279.5	8 adults	9½ adults	42
284.0	8½ adults	10 adults	—
288.0	9 adults	10½ adults	43
292.5	9½ adults	11 adults	44
296.5	10 adults	11½ adults	—
301.0	10½ adults	12 adults	45
305.0	11 adults	12½ adults	—
309.5	11½ adults	13 adults	46
313.5	12 adults	13½ adults	47
109.5	1 children	1 children	—
118.0	2 adults	2 adults	18
126.5	3 adults	3 adults	19
135.0	4 adults	4 adults	20
143.5	5 adults	5 adults	—
148.0	5½ children	5½ children	22
152.0	6 children	6 children	23
156.5	6½ children	6½ children	—
160.5	7 children	7 children	24
165.0	7½ children	7½ children	—
169.0	8 children	8 children	25
173.5	8½ children	8½ children	26
177.5	9 children	9 children	—
182.0	9½ children	9½ children	27
186.0	10 children	10 children	28
190.5	10½ children	10½ children	—
194.5	11 children	11 children	29
199.0	11½ children	11½ children	30
203.0	12 children	12 children	—
207.5	12½ children	12½ children	31
211.5	13 children	13 children	32
216.0	13½ children	13½ children	33

I) Text book of footwear Manufacture—J. B. THORNTON
II) Manual of shoe making-Clarks Limited
III) Lecture notes on Footwear-Jerzy Malenczak, Technology
IV) Bata Footwear Design and manufacture-Bata India Limited
V) ISI Specifications Book-IS : 1638-1969
VI) T.N.O. Report-1989-T.N.O. Leather and shoe research Institute Netherland
VII) All the diagrams in this articles ahve been drawn by Sri Budhadev Sinha.

(to be continued)

-: JILTA : -

***Owner**: Indian Leather Technologists' Association, **Publisher & Printer**: Mr. S. D. Set, **Published From**: 'Sanjoy Bhavan', (3rd floor), 44, Shanti Pally, Kasba, Kolkata - 700107, West Bengal, INDIA and **Printed From**: M/s TAS Associate, 11, Priya Nath Dey Lane, Kolkata- 700036, West Bengal, INDIA*

History and Activities of Indian Leather Technologists' Association #1

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Das-Stiasny theory and father of Indian Leather Science on 14th August' 1950. ILTA is the Member Society of IULTCS (International Union of Leather Technologists & Chemists Societies) representing India.

The primary objectives of the oldest Leather Technologists' Association which celebrated its Diamond Jubilee year in 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 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 14th August, Sanjoy Sen Memorial Lecture on 14th January, the birthday of our late President for several decades, Prof. Moni Banerjee Memorial Lecture on 15th March, the birthday of our late Founder-General Secretary of our Association and Prof. S. S. Dutta Memorial Lecture on 2nd February every year during IILF at Chennai. 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, Prof. J. M. Dey Memorial, Prof. Moni Banerjee Memorial and Prof. S. S. Dutta Memorial Medals to the top rankers at the University Graduate and post graduate levels. Prof. 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 (JILTA). 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 in Leather Technology who is meritorious but financially crippled.

contd.

History and Activities of Indian Leather Technologists' Association #2

Registration No. KOL RMS/074/2022-24

The International Congress of IULTCS used to held in different locations of the world once in two years. In its 125 years long 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 organized LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi. It commensurate with the time, demand and new perspective of the modern-day 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 celebrated its Golden Jubilee with a year long programme from 14th August' 2000 to 13th August' 2011 along with the first conference of South East Asian Countries at Netaji Indoor Stadium, Kolkata.

The Association's present (as on 31.03.2024) 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 & Leather Technology, Kolkata, Anna University, Chennai, Scientists from Central Leather Research Institute (CLRI), Harcourt Butler Technical University, Kanpur, Govt. Institute of Leather Technology, Jalandhar, Central Footwear Training Institute, Agra, Central Footwear Training Centre, Budge Budge, Footwear Design & Development Institute, Kolkata, National Institute of Fashion Technology, Kolkata etc.

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

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

ILTA
Since 1950

Indian Leather Technologists' Association
[A Member Society of International Union of Leather Technologists and Chemists Societies] (IULTCS)]
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