



ILTA
Since 1950

JILTA

Journal of Indian Leather Technologists' Association

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Synopsis of Objectives

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



Indian Leather Technologists' Association

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

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*Wish You a
Happy & Prosperous
New Year - 2024*



*Executive Committee of
ILTA*



JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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**Opinions expressed by the authors of contributions published in the
Journal are not necessarily those of the Association**

JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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

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

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

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Indian Economy Demonstrates Resilience



The year 2023 marked a year of resilience for the Indian economy and markets in spite of headwinds due to the monetary tightening by global central banks, led by the US Federal Reserve and high inflation. US Fed hiked interest rates by 5.5%, this along with “quantitative tightening program” of reduction in balance sheet, resulted in multi-decade high interest rates in the US and around the world. As a result, the foreign portfolio investor (FPI) flows turned negative on emerging markets like India, leading to significant outflows and putting downward pressure on Indian equities at the start of the year. The year started with the persistence of inflation at elevated levels across economies, continuing geo-political uncertainties and tightening financial conditions. The banking turmoil in US (Silicon Valley Bank) and Europe (Credit Suisse) increased risk aversion with the expectations of an early reversal of the monetary tightening cycle leading to Equity markets to correct and softening of bond yields.

During the latter part of the year the concerns of a significant growth slowdown has softened, globally inflation has started to moderate, most of the central banks have taken a pause on interest rate hike boosted the positive sentiments among investors. With the brightening prospects of a “soft landing”, FPIs & DIIs have been a net buyer so far during the year led to market rally and most of the tracked domestic indices trading at their all-time highs.



Source: - NSDL, Axis Capital

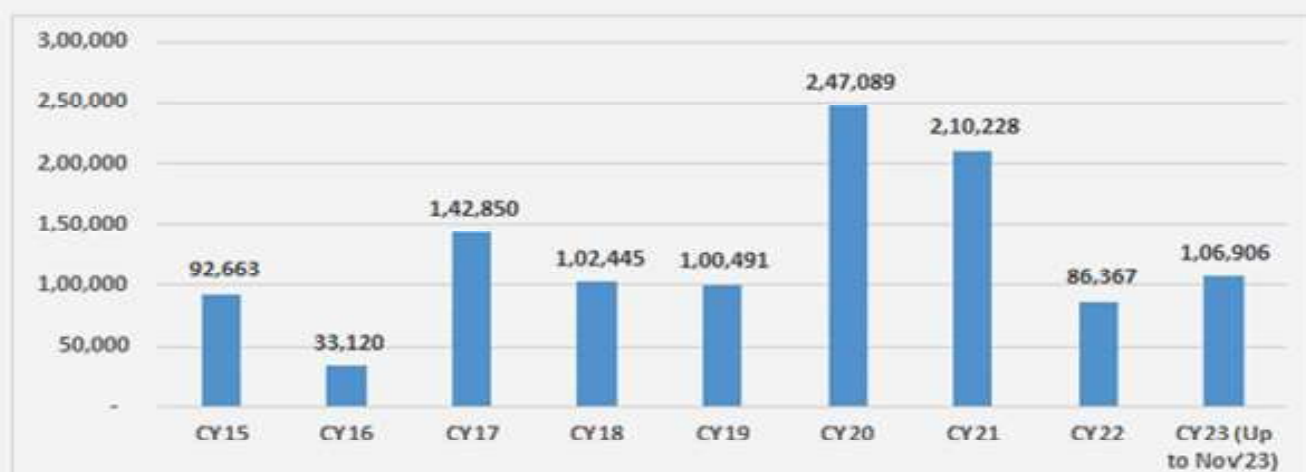
The year 2023 has been a good year for Indian Equity markets with the Nifty50 on track to deliver around 20% gains. The Midcap & Small cap indices are on track to deliver substantially higher returns of around 50% for the year. The gains during the year have been fairly broad-based with most sectors participating in the rally. Amongst the large sectors, only Oil & Gas has seen some underperformance while PSUs, Autos and IT stood out in terms of outperformance.

Nifty earnings growth for FY23 stood at 12%, and there is an optimistic outlook with expectations of around 13% growth in both FY24 and FY25. As such the earnings growth trajectory of India Inc remains strong in the post COVID era thereby supporting

market performance. Indian equity valuations remain at a premium compared to emerging and developed markets, this reflects that investors have continued confidence in the long-term growth story. However, sustained focus on delivering robust earnings growth remains crucial to maintain these valuations. We expect Indian equity markets are expected to deliver positive returns in 2024, although potential volatility remains due to global uncertainties. Continued earnings growth and supportive global liquidity conditions are likely to drive market performance.

Besides the secondary market performance, India emerged as the global leader in terms of number of IPOs in 2023. Activity in the primary markets have been buoyant through 2023 with a number of companies accessing the capital market for either an IPO or to raise money through the QIP route.

Chart 2: Equity issuances (IPO, QIP, Rights Issues, OFS and FPO)



Source: Prime Database, Bloomberg, Kotak Institutional Equities

As the year progressed the liquidity support extended by western central banks were successful in stabilizing the financial markets – with no further incidents of bank collapses. US economy continued to be robust with good GDP growth (Q1CY23 2.2%, Q2CY23 2.1% and Q3CY23 5.2%), low unemployment rate along with robust job gains. US CPI inflation too showed signs of moderation (6.5% in Jan'23 to 3.1% in Nov'23).

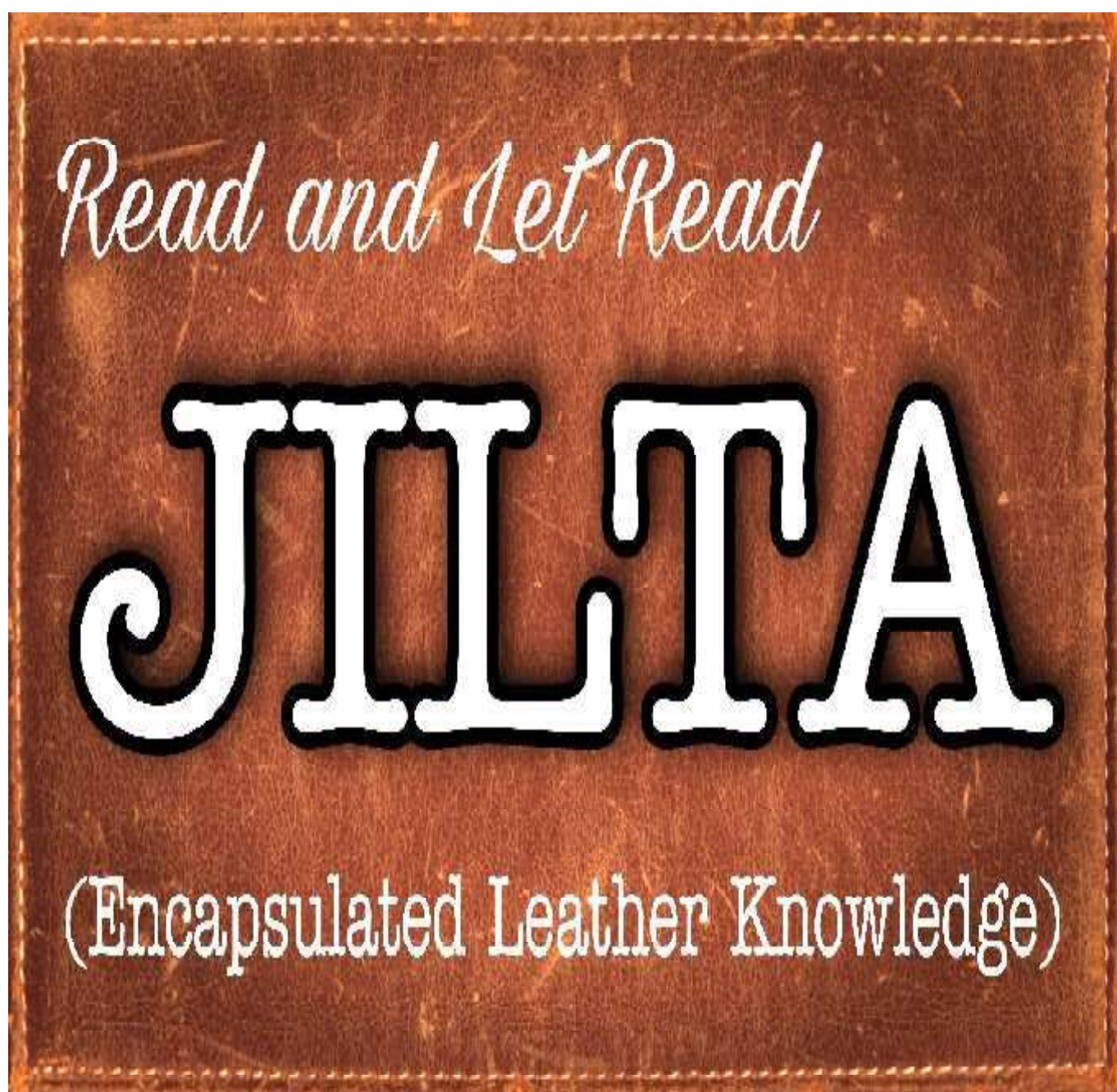
Chart 3: US CPI y-o-y % trend



Source – Bloomberg

So, India is on the proper rail cutting through the icebergs of the world economy and is poised to surge ahead. Even, the toughest military without a national robust economy, bureaucratic stronghold, converting the nation inter-dependable within galaxy of super powers and making it undeniable can win a war.

Goutam Mukherjee
Dr. Goutam Mukherjee
Hony. Editor, JILTA





Indian Leather Technologists' Association

(A Member Society of IULTCS)

22nd Sanjoy Sen Memorial Lecture



The Executive Committee requests the pleasure of your company at
22nd Sanjoy Sen Memorial Lecture
at the Seminar Hall 19A of Science City,
Kolkata, on Monday, the 15th January,
2024 at 15.00 Hrs. (Registration from
14.15 Hrs.)



Mr. Sivakumar T.D., *Vice President*, NaBFID, Mumbai
has kindly consented to deliver the **Sanjoy Sen Memorial
Lecture** titled "India in International Trade: Recent
Trends and Possible Solutions."

Arnab Jha
President

Susanta Mallick
General Secretary

22nd Sanjoy Sen Memorial Lecture

Monday,
15th January,
2024
15.00 Hrs.

P R O G R A M M E

■ Registration	:	14.15 Hrs
■ Introductory Speech	:	15.00 Hrs
■ Welcome Address	:	15.05 Hrs
■ Announcement of the names of the Awardees	:	15.10 Hrs
■ Sanjoy Sen Memorial Medal from ILTA		
■ Sanjoy Sen Memorial Gold Medal from GCELT		
■ Announcement of the name of		
■ P. K. Basu Memorial Scholarship holders		
■ Presentation by award winner	:	15.20 Hrs
■ Delivering of Sanjoy Sen Memorial Lecture	:	15.30 Hrs
■ Vote of Thanks	:	16.15 Hrs
■ High Tea	:	16.20 Hrs

Tell me and I forget, teach
me and I may remember,
involve me and I learn

Stahl Campus[®]



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

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

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

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

If it can be imagined, it can be created.





Stahl

We imagine sustainable pickle-free leather tanning

If it can be imagined,
it can be created.

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

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

- Reduction of water consumption by up to 40%
- Shorter process time on cow, sheep and goat
- Cleaner effluent, TDS reduction by up to 60%

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

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



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

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

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

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

About ISCC PLUS

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

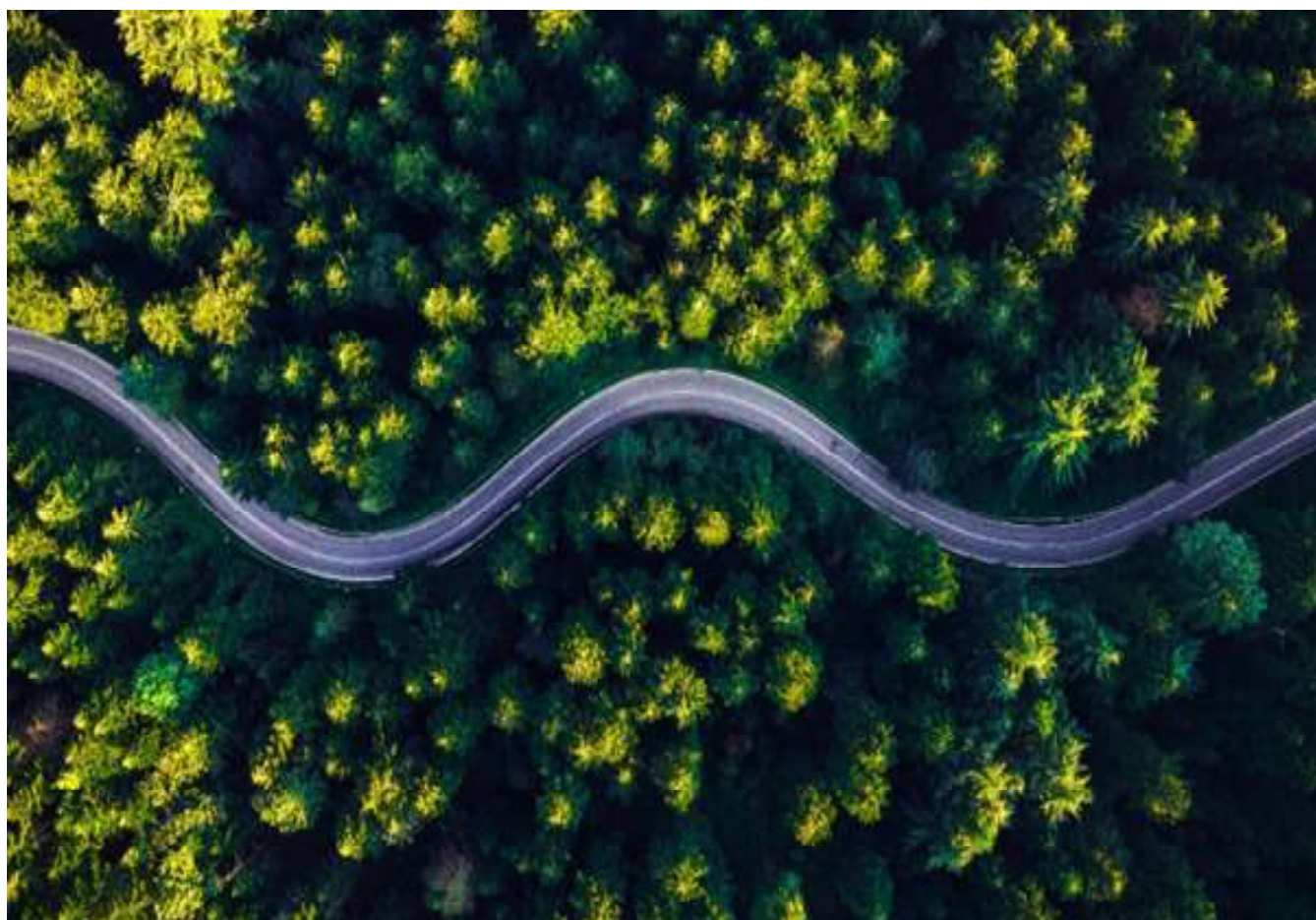
based and circular materials. These include biomass waste and residues, non-biological renewables and recycled carbon materials. Independent third-party certification ensures compliance with high standards of ecological and social sustainability, as well as traceability, throughout the supply chain.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

About TÜV NORD

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

(Stahl News – 18/07/2023)

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



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

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

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

Progress in the Labour & Human Rights category

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

Stahl moves forward with 2030 ESG ambitions

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

(Stahl News – 19/09/2023)



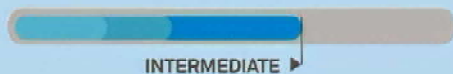


Only the top 1% of companies worldwide are **platinum-rated**

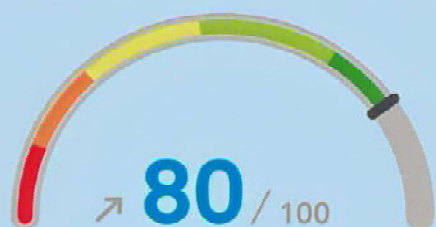
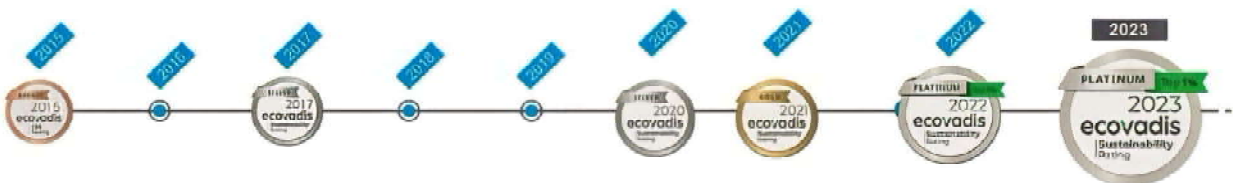
For the second consecutive year, Stahl has been awarded an EcoVadis Platinum rating. This follows an improved result in the 2023 assessment, led by higher scores in the Labour & Human Rights category.

ecovadis
Business Sustainability Ratings

Carbon Management Level



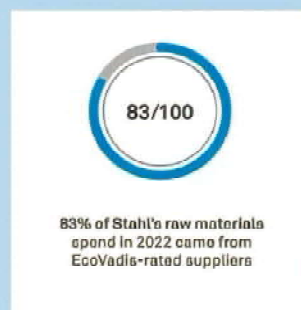
OUR JOURNEY BEGAN IN 2015



2022 OVERALL SCORE



2022 INDIVIDUAL SCORES





From the desk of General Secretary

22nd SANJOY SEN MEMORIAL LECTURE

The 22nd Sanjoy Sen Memorial Lecture would be organized by our Association on Monday, the 15th January, 2024 (being 14th January, 2024 is a Sunday) at 3.00 PM (Registration from 2.15 pm) at Seminar Hall - 19A, Science City, Kolkata.

Mr. Shivakumar T.D., Vice President, NaBFID, Mumbai has kindly consented to deliver the Sanjoy Sen Memorial Lecture titled *India in International Trade : Recent Trends and Possible Solutions*. Also the Toppers from different institutes would be felicitated with Sanjoy Sen Memorial Medals on this occasion.

Formal Invitation card through email has been forwarded to all concerned on 29/12/2023 and hard copy of the same has been posted on 30/12/2023.

MOTIVATIONAL LECTURE AT GCELT

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

Accordingly the 1st Lecture of the series was scheduled to be organized on 10th January' 2024 by Mr. Aloke Sengupta, Director, M/s ASG Leather Private Limited, Kolkata on the topic "Entrepreneurship Development".

But, due to some unavoidable circumstances the said lecture has been proposed to be rescheduled on 19th January' 2023.

5TH PROF. S. S. DUTTA MEMORIAL LECTURE AT CHENNAI

The 5th Prof. S. S. Dutta Memorial Lecture will be organized by the Southern Regional Committee of ILTA on 1st February, 2024 at Chennai Trade Centre, during India International Leather Fair'2024.

Update on progress will be shared in due course.

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

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

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

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



(**Susanta Maallick**)
General Secretary



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

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

PUBLISH YOUR TECHNICAL ARTICLE

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

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

Members are requested to :-

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

YOUTUBE CHANNEL & FACEBOOK PAGE OF ILTA

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

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

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

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



ILTA
Since 1950

Solidaridad

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



Castor



Tea



Sugarcane



Leather



Textile



Palm Oil



Aquaculture



Dairy



Fruits &
Vegetables



Gold



Soy



Cocoa



Coffee



Livestock



Medicinal Plant

Solidaridad

switchasia
GRANTS PROGRAMME

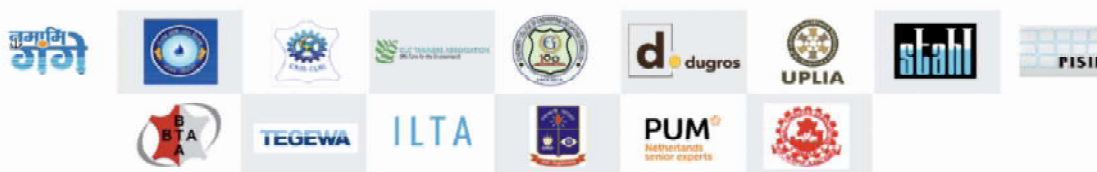


**EFFECTIVE WASTE MANAGEMENT AND SUSTAINABLE
DEVELOPMENT OF MSME TANNING COMPANIES IN KOLKATA
LEATHER CLUSTER (BANTALA)**

2022-2023



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Solidaridad Regional Expertise Centre

158/5, Prince Anwar Shah Road, Kolkata-700045 | Contact: 033-40602211, +91-9830279866

SOLIDARIDAD REGIONAL EXPERTISE CENTRE AND COUNCIL FOR LEATHER EXPORTS SIGN MOU FOR UPSKILLING INDIAN LEATHER SECTOR



Solidaridad Regional Expertise Centre (SREC) and the Council for Leather Exports (CLE) have forged a strategic partnership to further strengthen the performance of the Indian leather industry in domestic and international markets.

The Memorandum of Understanding (MoU), which was signed in Delhi today, will be effective from 1 January 2024 till 31 December 2028. “The MoU initiates a pivotal five-year partnership between SREC, a prominent not-for-profit organization established in the year 2008, and CLE, operating under the Ministry of Commerce and Industry, Government of India,” a media release stated.

“Through joint efforts, Solidaridad and CLE aim to introduce comprehensive training programmes, facilitate access to cleaner technology, and promote certifications that enrich the skill set and knowledge base of those involved in the leather industry,” said Solidaridad.

It added: “The MoU outlines the collaboration’s commitment to train 150,000 workers over five years, conduct capacity-building programmes, and build partnerships with leading leather institutions and leather

businesses in the country. CLE will support trainings, workshops, engagement with stakeholders, and contribute towards the development and promotion of a Leather Portal for green and circular leather practices.”

Sanjay Leekha, Chairman, CLE said: “The Council for Leather Exports has set an ambitious target of US\$ 47-billion business by 2030 for the Indian leather industry. This opens up avenues for leather professionals to innovate. I am happy to share that the MoU between CLE and Solidaridad is an alliance to represent a commitment to steering the Indian leather and footwear industry towards a more sustainable future. We are embarking on the journey of partnership, innovation and commitment to sustainability that will bring about transformative changes in the industry. Being responsible organizations, our endeavour would be to shape a sustainable future for this ever-evolving, labour-intensive manufacturing and exporting sector of India. Such an initiative also aligns very well with the ‘Make in India’ motto of the Government of India.”

Monika Khanna, Country Manager, SREC said, “Together, we’re not just aiming for efficiency and growth, but for a complete transformation – a transformation that prioritizes responsible production, empowers our workforce, and propels India’s leather sector to a leadership position in global markets. Over the next five years, we will train 150,000 workers, build capacities, and foster partnerships that drive innovation and sustainability. This is more than just a collaboration; it’s a catalyst for a greener, more equitable, and thriving future for Indian leather.” R. Selvam (IAS), Executive Director, CLE highlighted the significance of this collaboration and said, “This collaboration will provide impetus to our joint vision of unlocking pathways to prosperity in the leather sector through the 7S strategy – sustainability, scale, skill, speed, supply chain, sales, and style.” Tatheer Zaidi, Asia Head of Pollution Management in MSMEs at Solidaridad said, “The signing of the MoU signifies a dedicated commitment towards the holistic development and advancement of the leather sector, particularly focusing on empowering the tannery workforce through training and capacity-building initiatives.”

This strategic partnership comes on the back of SREC’s work in promoting sustainable practices in the Indian leather sector. The organization embarked on this journey in 2017 as an implementing partner for the ‘Pollution Prevention and Efficient Water Use in Kanpur-Unnao Leather Cluster’ project, funded by the Government of the Netherlands. SREC’s groundbreaking efforts led to the introduction of cutting-edge technologies like water flow meters, solenoid valves, and Smart Water Saving System, effectively reducing water usage in tanneries.

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Solidaridad

Exploring Leather Dyeing and Colouring Techniques: Tradition, Innovation, and Sustainability in the Leather Manufacturing Industry

(PART-1)

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Abstract

The durability, versatility, and aesthetic appeal of leather make it an enduring material with a rich history spanning millennia. The dyeing and colouring processes transform raw hides into visually appealing and functional leather goods. At this crucial stage, leather's quality and durability are greatly affected. We emphasize the importance of using high-quality dyes and adhering to best practices for environmental sustainability, reducing waste, hazardous chemicals, and energy consumption. Emerging eco-friendly methods like digital printing and laser engraving are promising avenues for customizable leather design. The paper aims to explore traditional and contemporary dyeing techniques, sustainable practices, and regulatory considerations in the context of infusing vibrant colours into leather.

Keywords: Leather, dyeing innovation, sustainability, eco-friendly

1. Introduction

The durability, versatility, and aesthetic appeal of leather have made it an integral part of human culture for thousands of years. Colouration transforms raw hides into aesthetically pleasing, functional leather products. It enhances leather's appearance and influences its quality and durability. Different dyeing and colouring techniques have evolved throughout the leather industry, each with unique characteristics. Modern methods leverage advanced technology and innovation in addition to traditional methods that have stood the test of time. Choosing a technique depends on the intended final product and leather

type. Achieving consistent results requires premium dyes and pigments. Low-quality materials affect leather's appearance and durability. Moreover, dyeing and colouring processes must follow safety protocols and best practices to minimize environmental impact.

In recent decades, the leather industry has adopted eco-friendly dyeing and colouring techniques. Manufacturing companies are exploring ways to reduce waste, limit toxic chemicals, and save energy. Leather products can now be designed in novel and customized methods using innovative approaches such as digital printing and laser engraving.

The leather industry is dynamic and ever-evolving. Technology advancements and sustainability are driving the development of new dyeing techniques and colours. Keeping up with emerging trends and adopting modern techniques are essential to remaining competitive and producing high-quality, innovative leather goods. The following sections discuss traditional and contemporary methods, sustainable practices, and regulatory concerns. The exploration focuses on the art of adding vibrant colours to leather.

2. Leather Dyeing Methods

Leather dyeing methods include the following types.

2.1. Drum Dyeing is a popular method of dyeing large quantities of leather at once. Leather interiors and upholstery that require consistent colours can benefit from drum dyeing. The process begins by soaking the leather in water to prepare it for dyeing. A dye bath solution is prepared depending on the

type of leather to be dyed. The dye solution was poured into a large drum to accommodate the number of leather to be dyed. The leather is kept in the drum and rotated for a set amount of time to ensure the dye is absorbed evenly. Dye penetrates leather, resulting in uniform colour. The leather is removed from the drum and rinsed to remove excess colour. After dyeing, the leather is removed from the drum and dried. [1].

- **Advantages of Drum Dyeing:** This method saves time and money by dyeing large quantities of leather uniformly. It can produce leather for many products due to its wide range of colours. while saving time and money. The method allows for a wide range of colours, making it ideal for producing leather for a variety of products.
- **Suitable leather types for drum dyeing:** The method is suitable for a wide range of leather types, including full-grain, top-grain, and corrected-grain leather. The method does not work well with suede or nubuck leather as they are more delicate and may get damaged.
- **Precautions for Drum Dyeing:** This method of dyeing leather is highly efficient. Precautions must be taken to ensure safety and effectiveness. It is essential to use the right type and amount of dye for dyeing leather since any wrong type or too much dye can damage it. The pH and temperature of dye bath solutions must remain within prescribed limits.
- **Environmental Concerns:** Leather dyeing using drums is efficient but has environmental consequences. Chemicals and water are required for the process, which leads to wastewater pollution if not managed properly. Various leather manufacturers have implemented wastewater treatment systems to address this issue.

2.2. Hand Dyeing is a more precise method of dyeing leather that provides more control over colour and shading. Often, craftspeople and artisans who use small quantities of leather use this technique. Hand dyeing involves applying dye to leather by hand, using a brush or sponge. Dyes are applied in thin layers and allowed to dry before adding the next layer. Hand dyeing is creative and customizable despite its time-consuming nature. Leather can be dyed to match a specific colour scheme or create unique shading and texture effects. Leather items

that have faded or lost their colour can be repaired by hand dyeing [2]. These key points highlight the benefits and process of hand-dyeing leather:

- **Artistic Expression:** Hand dyeing allows artisans and craftsmen to showcase their creativity and artistic skills. It offers a wide range of colour possibilities, shades, and effects, allowing for unique and customized leather products. Artisans can create intricate patterns, gradients, blends, and other artistic designs, making each piece of dyed leather truly one-of-a-kind.
- **Customization and Personalization:** Manufacturers can offer personalized leather products tailored to customers' preferences through hand dyeing. Customers can select specific colours, combinations, and designs, creating a sense of exclusivity. The personal touch of hand-dyed leather is often lacking in machine-dyed items.
- **Enhancing Natural Characteristics:** Hand dyeing can enhance the natural characteristics of the leather, such as grain patterns, texture, and depth. It allows the dye to penetrate the leather surface, highlighting its natural beauty and uniqueness. Hand-dyed leather products often exhibit variations and nuances in colour, giving them a rich and organic appearance.
- **Colour Variations and Effects:** Hand dyeing offers a wide range of colour variations and effects through different techniques and dye application methods. Artisans can create solid colours, gradients, ombre effects, two-tone effects, antique finishes, and other unique colour blends. This versatility allows for endless leather design possibilities.
- **Ageing and Patina Development:** Hand-dyed leather develops natural ageing and patina over time, which adds character and charm to the product. As the leather ages, the dye may fade, blend, or develop a vintage appearance, giving it a distinctive and lived-in look. This natural ageing process can enhance the overall appeal and value of hand-dyed leather products.
- **Sustainability:** Hand dyeing can be a more sustainable alternative to industrial dyeing processes. In contrast to

chemical-intensive dyeing methods, hand dyeing can save the environment through careful consideration of dye materials and application techniques. The artist can use natural dyes or eco-friendly dyes and manage waste responsibly.

- **Flexibility and Adaptability:** Hand dyeing offers flexibility in dye application and customization. Artists can control dye intensity, layer colours, blend shades, and adjust the dyeing process to achieve the desired result. The adaptability of leather allows artisans to create products that are both visually appealing and unique.
- **Craftsmanship and Heritage:** Traditionally, leather dyes are processed by hand to preserve traditional craftsmanship. It reflects the artisans' skill, attention to detail, and dedication to producing high-quality leather goods. A sense of authenticity and craftsmanship makes hand-dyed leather products appealing to consumers seeking unique and artisanal products.

2.3. Spray Dyeing is a quick and efficient way to dye large areas of leather, like furniture upholstery or clothing. Using a spray gun, dye is applied to the leather surface. Spray dyeing is often used on leather treated with a protective finish since the dye won't damage the finish. To spray dye leather, the dye is mixed with a solvent to create a thin, even consistency. A spray gun is used to apply thin, even layers of the mixture to the leather surface. Multiple layers may be applied to achieve the desired colour depth [3].

- **Even Colour Application:** Spray dyeing ensures uniform colour application across the entire surface of the leather. The fine mist of dye particles allows for better dispersion and penetration into the leather fibres, resulting in a smooth and even colour distribution. This helps eliminate blotches or uneven patches that can occur with other dyeing methods.
- **Efficient and Time-saving:** Spray dyeing is a highly efficient process, particularly for large-scale leather production. Spray guns or airbrushes allow quick and precise dye application, reducing production time compared to manual dyeing methods. The controlled spray pattern ensures that the dye is applied only to the intended areas, minimizing wastage.
- **Versatility in Colour and Effects:** Spray dyeing offers a

wide range of colour options and effects. Manufacturers can achieve solid colours, gradients, ombre effects, and other artistic designs by adjusting the concentration of the dye solution. They can adjust spray pressure or the distance between the spray gun and the leather surface. This versatility allows for creativity and customization in leather product design.

- **Consistency and Reproducibility:** Spray dyeing enables consistent colour reproduction, making it ideal for large-scale production where colour matching and consistency are primary. Manufacturers can establish standard operating procedures for spray dyeing to ensure that the same colour shade and intensity can be achieved repeatedly. This consistency enhances product quality and customer satisfaction.

2.4. Dip Dyeing involves immersing leather in a dye solution. Small leather items, such as wallets and key chains, can be made with it. In dip dyeing, the colour gradually fades from one end of the leather to the other, creating a gradient effect. Dip dyeing leather requires soaking it in water first. After the dye solution is prepared, the leather is immersed in it. The leather is fully immersed in the solution for several minutes, ensuring the dye reaches all areas evenly and penetrates the fibres. Leather is rinsed with water to remove excess dyes. The duration of immersion determines the colour intensity. [4].

- **Uniform Colour Saturation:** Dip dyeing offers excellent colour saturation throughout the leather. As the material is fully submerged, the dye permeates the fibres, resulting in uniform colour intensity. This method is particularly effective for deep and rich colours.
- **Penetration and Absorption:** One of the advantages of dip dyeing is that the dye penetrates the leather deeply, ensuring that the colour is absorbed throughout the material. This allows for long-lasting colour retention and resistance to fading or rubbing off.
- **Colour Blending and Gradient Effects:** Dip dyeing allows for colour blending and gradient effects. By gradually immersing the leather at different depths or by dipping it multiple times in different dye solutions, manufacturers can create unique colour transitions and ombre effects. This versatility adds aesthetic appeal to leather products.

2.5. Airbrushing is a more advanced method of dyeing leather that allows precise colour application. This method involves spraying the dye onto the leather surface using an airbrush. Airbrushing allows for intricate designs and patterns, making it popular for leather art and fashion. The dye is mixed with a solvent to airbrush leather to create a thin, even consistency. The mixture is then loaded onto an airbrush and applied to the leather surface in thin, even layers. Multiple layers may be applied to achieve the desired colour depth and shading [5].

- **Airbrushing Equipment**: Airbrushing requires specialized equipment, including an airbrush gun, an air compressor, and a compressed air source. An airbrush gun controls the flow of paint or dye, while an air compressor provides the necessary pressure to atomize the liquid.
- **Control and Precision**: Airbrushing allows precise control over the colour application. The airbrush gun typically features adjustable settings for controlling airflow and paint flow. This enables artists and craftsmen to achieve detailed and intricate designs on leather surfaces. The fine mist created by the airbrush provides smooth and even colour application.
- **Customization and Personalization**: Airbrushing enables customization and personalization of leather products. It offers the flexibility to create unique designs, logos, names, or other personalized elements, making each piece of leather distinct and tailored to individual preferences. This customization adds value and uniqueness to leather goods.
- **Colour Options**: Airbrushing provides a wide range of colour options. Artists can mix and blend different paints or dyes to achieve custom colours or create subtle colour transitions. The ability to layer colours allows for complex and vibrant designs on leather surfaces.

3. Leather Tanning Processes

Leather tanning is an important process in the production of leather, which involves treating raw animal hides or skins to transform them into durable and usable leather materials. Tanning prevents the decomposition of animal hides, making them suitable for various applications. There are two primary methods of tanning: vegetable tanning and mineral tanning, each with its unique characteristics and uses.

3.1. Traditional Vegetable Tanning

Leather tanning is the process of transforming raw animal hides into durable, long-lasting leather. Traditionally, tanning used tannin, an acidic chemical compound from which the tanning process draws its name [6]. Here is an overview of the traditional tanning process:

- **Soaking**: The first step in the vegetable tanning process is soaking the animal's hides in water to remove any dirt or debris. This process can take several hours or even days, depending on the size and thickness of the hides. During the soaking process, the hides begin to absorb water and expand, making them more pliable and easier to work with. This step is essential for preparing the hides for the tanning process.
- **Liming**: Lime is applied after soaking to remove any hairs or flesh remaining on the hides. Natural substances such as lime help break down proteins in the hide, making it easier to remove unwanted materials. The hides are soaked in a lime solution for several days during the liming process. The solution is then drained off, and the hides are washed and rinsed to remove any remaining lime. There are two main types of liming used in vegetable tanning: traditional liming and modern liming. Traditional liming involves the use of natural materials such as lime and wood ash to create an alkaline solution. Modern liming involves the use of chemicals such as sodium sulfide and sodium hydroxide.
- **Deliming and Bating**: After the liming process, the hides are treated with a deliming agent to neutralize the lime and restore the natural pH balance of the hides. This step is essential for preparing the hides for the tanning process. After deliming, the hides are then treated with a bating agent, which helps soften and condition the hides. This step is essential for creating soft, supple leather that is comfortable to wear or use.
- **Purpose of Deliming**: Deliming is a process of removing limed hair and excess lime from hides. Deliming brings the hide pH down to an optimal range for the bating process. Deliming is accomplished by soaking hides in a solution of water and an acid such as sulfuric acid, formic acid, or lactic acid. The acid neutralizes lime and removes it from the hides.

- **Bating Process** : Bating is the process of removing the remaining flesh and connective tissue from the hides. This process is necessary to prepare the hides for tanning. Bating helps to open up the fibres of the hide so that they can absorb the tanning agents more effectively. There are two methods of bating: enzymatic bating and chemical bating.
- **Enzymatic Bating** : Enzymatic bating is a natural process that uses enzymes to break down the remaining flesh and connective tissue on the hides. This process is slower than chemical bating, but it is gentler on the hides and produces more natural-looking leather. The enzyme used for bating is usually derived from a fungal source.
- **Chemical Bating** : Chemical bating is a faster process that uses chemicals to break down the remaining flesh and connective tissue on the hides. The chemicals used for bating are usually a mixture of sodium sulfide, sodium hydrosulfide, and other reducing agents. This process is faster and more efficient than enzymatic bating, but it can be harsher on the hides and can produce more processed-looking leather.
- **Importance of Deliming and Bating** : Deliming and bating are crucial steps in the traditional vegetable tanning process. These processes help to prepare the hides for tanning by removing the hair, flesh, and excess lime. This makes the hides more receptive to the tanning agents and helps to produce a more even and consistent leather. The deliming and bating process can affect the final quality of the leather, so it is important to get these steps right.
- **Tanning** : The tanning process is the most critical step in vegetable tanning and involves soaking hides in a solution of tree bark, leaves, and other plant materials. The tannins bind to the collagen fibres in the hides, creating a durable and long-lasting material resistant to water, heat, and other environmental factors. The tanning process can take several weeks or even months, depending on the desired quality and properties of the leather.
- **Drying and Conditioning** : After the tanning process, the hides are then dried and conditioned. The drying process can take several days, during which the hides are hung in a cool, dry place to prevent any cracking or damage. Once

the hides are dry, they are then conditioned with natural oils and fats to restore their suppleness and softness. This step is essential for creating high-quality leather that is comfortable to wear or use.

- **Finishing** : After conditioning, the leather is then finished with natural dyes and finishes to enhance its appearance and durability. Natural dyes are derived from plant materials, such as roots, berries, and leaves, and can create a wide range of colours and hues. Natural finishes, such as beeswax or carnauba wax, are applied to the leather to create a protective barrier that helps prevent damage from water, dirt, and other environmental factors.

3.2. Mineral Tanning for Leather Colouring

Mineral tanning is a process used to produce durable and water-resistant leather. Unlike vegetable tanning, which relies on natural substances, mineral tanning uses chemicals to transform animal hides into leather.

3.2.1. Chromium Tanning is the most common mineral tanning process used today. During this process, the hides are treated with chromium salts, which help bind the collagen fibres in the hides and create a durable and water-resistant material. Chromium tanning is a relatively quick and efficient process that produces leather with a uniform colour and texture. However, some people have concerns about the environmental impact of chromium tanning and the potential health risks associated with exposure to chromium.

- **Process** : Chromium tanning is a mineral tanning process that involves the use of chromium salts as the tanning agent. The process usually begins by soaking the raw hides or skins in a salt solution that contains chromium salts. The chromium ions then penetrate the hides and bind with the collagen fibres, resulting in a stable and durable leather product.
- **Benefits** : Chromium tanning is preferred by many leather manufacturers because it is a relatively fast process that results in a soft and uniform leather product. The leather produced using chromium tanning is resistant to water, heat, and other environmental factors, making it ideal for a wide range of applications, including shoes, bags, and furniture.

- **Environmental Concerns:** Despite its popularity, chromium tanning is known to be an environmentally hazardous process. The chromium salts used in the tanning process can cause pollution and are classified as hazardous waste material. This has led to regulations and restrictions on the use of chromium tanning in many countries around the world.

3.2.2. Alum Tanning is an ancient method of mineral tanning that has been used for centuries. During this process, the hides are treated with a solution of alum, which is a naturally occurring mineral. Alum Tanning produces soft and flexible leather with a pale yellow colour. However, it is not as durable or water-resistant as chromium-tanned leather.

- **Advantages of Alum Tanning :** Alum-tanned leather is known for its light colour, softness, and flexibility. It is water resistant, making it ideal for use in humid climates or wet environments. In addition, alum-tanned leather is less likely to crack or shrink, which makes it ideal for use in clothing and accessories.
- **Disadvantages of Alum Tanning :** One of the main disadvantages of alum tanning is that it can be time-consuming and labour-intensive. The process of soaking the hides in the alum solution can take several weeks and requires constant monitoring to ensure that the hides are properly tanned. In addition, alum-tanned leather is not as durable as leather that has been tanned using other methods, which makes it less suitable for use in high-impact applications.

3.2.3. Zirconium Tanning is a relatively new method of mineral tanning that is gaining popularity in the leather industry. During this process, hides are treated with zirconium salts. These salts help bind the collagen fibres in the hides and create a durable and water-resistant material. Zirconium tanning is considered a more environmentally friendly alternative to chromium tanning, as it produces fewer harmful byproducts. The process is relatively new, and its long-term effects on human health and the environment are not fully understood [7].

- **Benefits of Zirconium Tanning :** Zirconium tanning offers several benefits over traditional tanning methods. It is a relatively quick process that takes only a few hours

compared to the several days required for other tanning methods. Using fewer chemicals makes it more environmentally friendly. It features a soft, supple feel and is lightweight.

3.2.4. Titanium Tanning is another alternative to chromium tanning that is gaining popularity in the leather industry. During this process, the hides are treated with titanium salts, which help bind the collagen fibres in the hides and create a durable and water-resistant material. Titanium tanning produces soft, supple leather and uniform colour. It is considered more eco-friendly than chromium tanning, as it produces fewer harmful byproducts [8].

Benefits of Titanium Tanning : Titanium tanning has several benefits over other tanning methods. When compared to traditional chrome tanning, titanium tanning produces no hazardous waste. This makes it an environmentally friendly option. Secondly, titanium tanning produces softer and more pliable leather than chrome-tanned leather. This is because the tanning process does not shrink collagen fibres.

3.2.5. Iron Tanning is an ancient method of mineral tanning that has been used for centuries. During this process, the hides are treated with a solution of iron salts, which help bind the collagen fibres in the hides and create a durable and water-resistant material. Iron tanning produces soft and flexible leather with a reddish-brown colour. However, it is not as durable or water-resistant as chromium-tanned leather [9].

- **Advantages of Iron Tanning :** Iron tanning is a relatively inexpensive method of tanning leather compared to other methods, such as chrome tanning. It is a more environmentally friendly process as it does not produce toxic waste products. Iron-tanned leather is more durable and resistant to water than vegetable-tanned leather.
- **Disadvantages of Iron Tanning :** Iron-tanned leather is not as supple or soft as other leather tanning methods, which makes it less suitable for certain applications like clothing. It may be more difficult to dye iron-tanned leather as iron salts can interfere with dye absorption.

- **Applications of Iron Tanning :** Shoe leather, belt leather, and other leather goods that require durability and water

resistance are commonly made with iron-tanned leather. Conveyor belts and bookbinding leather are made from this material.

3.3. Synthetic Tanning Agents and Their Effects on Leather

In modern tanning processes, synthetic tanning agents replace natural tanning agents such as plant extracts and minerals. Synthetic tanning agents are chemical compounds derived from petroleum or other sources and are more efficient and cost-effective than traditional tanning methods [10]. Some common synthetic tanning agents include:

- **Acrylic Tanning Agents** are the most widely used synthetic tanning agents in the leather industry. The agents provide excellent colour, softness, and water resistance to leather. They are resistant to heat and light, making them ideal for high-performance leather.
- **Melamine-formaldehyde Tanning Agents** are used for the production of high-quality leather. They offer superior light-fastness, water resistance, and excellent heat stability. Commonly used for the production of shoe uppers, garments, and upholstery leathers.
- **Phenol-formaldehyde Tanning Agents** are used to produce soft, flexible, and durable leathers. They are resistant to water and abrasion, making them suitable for use in a variety of applications. Commonly used for shoe uppers, garments, and upholstery leathers.
- **Sulfone Tanning Agents** are used to produce leathers that are resistant to heat, light, water, and abrasion. They offer excellent colour and softness, making them ideal for high-end leather. The agents are usually used in shoe uppers, garments, and upholstery leathers.
- **Polyurethane Tanning Agents** are used to produce soft, flexible, and durable leathers. They offer excellent water resistance and are resistant to abrasion and light. These agents are commonly used in the production of shoe uppers, garments, and upholstery leathers.

3.3.1. Effects of Synthetic Tanning Agents on Leather

While synthetic tanning agents can produce high-quality leather, they can have negative effects on leather's properties. Some of

the potential effects of synthetic tanning agents are:

- **Reduced Breathability** : Synthetic tanning agents can reduce the leather's breathability, which can make it less comfortable to wear.
- **Reduced Flexibility** : Some synthetic tanning agents can make the leather stiffer and less flexible, which can affect its overall durability and wearability.
- **Reduced Water Resistance** : Synthetic tanning agents may not provide the same water resistance as natural tanning methods, which can affect the leather's durability and lifespan.
- **Reduced Colour Fastness** : Synthetic tanning agents can affect the leather's ability to retain its colour over time, which can lead to fading or discolouration.

3.3.2. Advantages of Synthetic Tanning Agents

Synthetic tanning agents have gained popularity due to several advantages they offer over traditional tanning agents like vegetable tannins or chrome. Here are some of the advantages of using synthetic tanning agents in leather production:

- **Consistency in Quality** : A synthetic tanning agent ensures consistent quality regardless of source or extraction method. It is important to maintain quality consistency when it comes to high-end leather goods.
- **Increased Speed of Tanning** : A synthetic tanning agent has the advantage of being able to tan leather faster than traditional methods, which usually take weeks or months. When time is of the essence, this speed is essential in large-scale leather production.
- **Reduced Environmental Impact** : The environmental impact of synthetic tanning agents is lower than that of traditional tanning methods. Compared to natural tanning agents, synthetic tanning agents emit fewer pollutants into the environment. It is particularly relevant in today's world, where environmental concerns are at an all-time high.

- **Improved Control Over Tanning Process** : Synthetic tanning agents allow enhanced control over the tanning process. Traditional leather tanning methods vary in quality, colour,

and texture, but synthetic tanning agents can improve these characteristics. Leather manufacturers can create leather that meets precise specifications and requirements.

- **Increased Durability of Leather**: Another advantage of synthetic tanning agents is their ability to increase leather durability. Leather tanned using a synthetic tanning agent has a higher resistance to water, heat, and wear and tear. This increased durability makes it ideal for leather products used in harsh environments, such as outdoor gear and footwear.

3.4. Choosing the Right Tanning Agent

When it comes to choosing a tanning agent for leather, there is no one-size-fits-all solution. The choice of tanning agent depends on a variety of factors, including the desired leather properties, the intended use of the finished product, and the environmental impact of the tanning process [1,9]. Here are some key factors to consider when selecting a tanning agent:

- **Leather Properties**: Different tanning agents yield leather with distinct characteristics. Chrome tanning, for example, produces soft and supple leather ideal for applications like shoes and handbags, while vegetable tanning creates firmer and more rigid leather suitable for belts and saddles. Determine the properties of the leather that needs to be produced.
- **Intended Use**: Consider what the finished leather product will be used for. Upholstery, clothing, and accessories require different leather properties. Leather upholstery requires durability and wear resistance, while leather clothing should be soft and flexible.
- **Environmental Impact**: Be mindful of the environmental impact of the tanning process. Some tanning agents, such as chrome, are more efficient and less time-consuming but can have environmental concerns due to the toxic nature of chromium. Vegetable tanning is considered more environmentally friendly, but it requires more time and resources.
- **Cost**: The choice of tanning agent can affect the production cost. Chrome tanning is generally cheaper and faster than

vegetable tanning, but the latter might be preferred for high-end or eco-conscious products.

- **Regulations and Standards**: Ensure that the tanning agent you choose complies with local regulations and international standards for leather production. Different regions may have specific rules regarding tanning agents and their permissible levels.
- **Availability**: Consider the availability of tanning agents in your region. Some agents may be more accessible than others, which can impact your production process and costs.
- **Expertise and Equipment**: The level of expertise and equipment available may influence choice. Some tanning methods require specialized knowledge and machinery.

4. Role of pH in Leather Dyeing

Leather dyeing is a chemical process that depends critically on pH levels [3,11].

pH Basics: pH measures the acidity or alkalinity of a solution. pH scale ranges from 0 to 14, with 0 as the most acidic, 14 as the most alkaline and 7 being neutral. When dyeing leather, the pH level of the dye solution can significantly affect the leather's colour and quality.

pH and Dye Colour: The pH level of a dye solution can affect the colour of leather in several ways. Here are a few examples:

- **Acidic Dyes**: Acidic dyes are most effective in acidic environments, typically with a pH between 4 and 5. Acidic dyes may not bond well with the leather at higher pH levels, leading to uneven or muted colours.
- **Basic Dyes**: Basic dyes are most effective in alkaline environments, typically with a pH between 8 and 9. Basic dyes may not bond well with the leather at lower pH levels, leading to uneven or muted colours.
- **Neutral Dyes**: Neutral dyes can work in a range of pH levels, typically between 6 and 7. These dyes are used in combination with other dyes to achieve specific shades and hues.

pH and Leather Quality : In addition to affecting the colour of the leather, the pH level of the dye solution can impact the quality of the leather. Here are a few examples:

- **pH and Tannins** : Tannins are natural substances found in many plants that are used in leather tanning. Tannins are most effective in acidic environments, typically with a pH between 4 and 5. Tannins may not bond well with the leather at higher pH levels, leading to weaker and less durable leather.
- **pH and Protein Structure** : Leather is made up of protein fibres that can be affected by changes in pH. Excessive exposure to alkaline solutions can weaken the protein fibres in the leather, leading to weaker and less durable leather.

Achieving the Right pH Level : The pH level must be maintained throughout the leather dyeing process for optimal results. Here are a few tips for achieving the right pH level:

- **Test the pH** : Before dyeing leather, test the pH level of the dye solution to ensure that it is within the appropriate range for the dye being used.
- **Adjust the pH** : If the pH level is too high or too low, adjust it using an appropriate acid or base. Common acids used for adjusting pH in leather dyeing include acetic acid and formic acid, while common bases include sodium carbonate and sodium hydroxide.
- **Monitor the pH** : Throughout the dyeing process, monitor the pH level of the dye solution to ensure that it remains within the appropriate range. Small adjustments may be necessary to maintain the correct pH level.

5. Techniques for Achieving Different Leather Colours

5.1. Vegetable Tanning is a traditional way of colouring leather and making it more durable by using natural tannins. This method produces brown shades ranging from light tan to dark brown. The vegetable-tanned leather will have a different colour depending on the type, quality, and duration of the tanning process [10].

- **Natural Tannins** : Vegetable tanning relies on the natural tannins found in various plant materials, such as tree bark,

leaves, and fruits. Common sources of tannins include oak, chestnut, mimosa, quebracho, and tara.

- **Tannin Extraction** : Tannins are extracted from plant materials by soaking them in water or extracting them through various extraction methods. The extracted tannins are processed into a liquid form that is used for tanning.
- **Colour Development** : Tannins react with collagen in the hide during tanning, resulting in a rich, natural colour. The colour can range from light beige to various shades of brown, depending on the type of tannin used and the duration of the tanning process.
- **Patina and Aging** : One of the unique characteristics of vegetable-tanned leather is its ability to develop a beautiful patina over time. As the leather ages and is exposed to light, air, and natural oils, it darkens and acquires a unique sheen and character.

5.2. Mineral Tanning is another traditional method of leather tanning that uses mineral salts, such as chromium, to colour and preserve the leather. Unlike vegetable tanning, mineral tanning produces a wide range of colours, including black, brown, and many others. The colour of leather can be controlled by adjusting the pH level of the tanning solution [10].

- **Chromium Salts** : Mineral tanning primarily relies on the use of chromium salts, particularly chromium sulfate, chromium chloride, or a combination of both. These salts contain trivalent chromium, which is essential for the tanning process.
- **Tanning Process** : In mineral tanning, the raw hides or skins are soaked in a tanning solution containing chromium salts. The tanning solution is typically acidic to facilitate the penetration of the chromium ions into the collagen fibres of the hide.
- **Crosslinking** : The chromium ions form strong crosslinks with the collagen fibres in the hide, stabilizing the structure and preventing it from deteriorating. This process is known as cross-linking, and it imparts durability, strength, and stability to the leather.

5.3. Synthetic Dyes are popular for colouring leather due to their versatility and ease of use. These dyes can produce a wide range of colours, from classic browns and blacks to bold and bright hues. Synthetic dyes can be applied to leather using a variety of methods, including immersion dyeing, spray dyeing, and hand painting [12].

- **Colour Consistency:** Synthetic dyes offer excellent colour consistency, allowing manufacturers to achieve precise and predictable shades in leather colouring. They provide a broader spectrum of colours compared to natural dyes, including vibrant and intense hues.
- **Colourfastness:** Synthetic dyes are more colourfast than natural dyes, which means their colour will remain stable and will not fade or bleed with time. Despite exposure to light, heat, and other external factors, leather dyed with synthetic dyes retains its colour integrity.
- **Wide Range of Colours:** With synthetic dyes, leather manufacturers can create a wide variety of unique and customized products. From bold and vivid shades to subtle and pastel tones, synthetic dyes allow for versatile and creative leather colouring.
- **Cost-effective:** Synthetic dyes are generally cheaper than natural dyes. They are often produced in large quantities, making them readily available and affordable for manufacturers. In the leather industry, synthetic dyes are widely used due to their lower cost.

5.4. Pigment Dyes are another popular choice for colouring leather, particularly for achieving bold and vibrant colours. Pigment dyes are typically applied as a coating on top of the leather rather than penetrating the fibres like traditional dyes. This allows for more control over the colour and opacity of the finished product [3].

- **Colour Variety:** Pigment dyes provide a wide range of colours, including vibrant shades and deep tones. Manufacturers can easily achieve intense and bold colours with pigments, allowing for diverse design options and customization in leather products.
- **Colourfastness:** Pigment dyes are known for their exceptional colourfastness. Once applied and properly fixed the pigments exhibit excellent resistance to fading or bleeding, even when exposed to sunlight, heat, or other environmental factors. This ensures that the colour remains vibrant and stable over time.
- **Versatility:** Pigment dyes are versatile and can be used on a variety of leather types, including full-grain, top-grain, and corrected-grain leather. They can be applied to leather with different finishes, such as aniline, semi-aniline, or pigmented finishes.
- **Surface Effect:** Pigment dyes provide a smooth, consistent appearance to leather. They can help hide natural variations in leather, such as scars, blemishes, or grain inconsistencies. This results in a more uniform and aesthetically pleasing final product.

.....(to be continued in the next issue)





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

News Release from the IULTCS

Geoff Holmes elected as IULTCS Vice President



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

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

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

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

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

(Part-12)

Subrata Das, M.Tech (Leather Technology)

Freelance Leather Technologist & Consultant, Chennai



Asian Carp



Ten different varieties of carp - Grass carp, Common carp, Amur carp, Silver carp, Largescale silver carp, Bighead carp, Black carp, Goldfish, Crucian carp and Mud carp - are collectively known as Asian carp.(1)

In November 1963, with increased consumer awareness and elevated concern and anxiety on the use of harmful weedicides and pesticides, poultry, animal husbandry, agriculture, pisciculture, olericulture, viticulture and fruticulture, there was increasing demand from the American public for gentler and “greener” methodology to countering invasive and unwanted flora and fauna. With microbiology and biotechnology, and their wider applicability still in their infancy, the scientific fraternity was hard-pressed to rise to the challenge.

Expecting their fresh, novel and hitherto untried experiment to be a bio-friendly precursor of the Gen-next aquatic weed killer, multi-disciplinary, systems-oriented researchers at the U.S. Department of Interior’s Fish Farming Experimental Laboratory, located in the heart of Arkansas catfish country, released a few dozens of sub-adult grass carp, imported from Malaysia, into the Illinois River, optimistic of defending the waterway and the Great Lakes from invasive surface and benthic vegetation.

This three- crate consignment was the first documented import of Asian carp into the United States.

The sole apprehension of the scientists pioneering the procedure was, whether or not the conditions in the Chicago

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River were conducive for the piscine patrols to spawn and proliferate. Hitherto pisciculture, in fish farms and hatcheries involved painstaking control of water conditions – temperature, circulation, oxygen and micronutrient content, light levels and choice of submerged plants – in addition to injections to initiate or sustain reproduction, since fish do not spawn naturally in the static waters of tanks and ponds.

The scientists crossed the Rubicon in 1970, when an Arkansas farmer received an accidental shipment of silver and bighead carp, in place of the silver carp he had ordered. Finding no use for them, he unburdened the unwanted fish on the Arkansas Game and Fish Commission, who, delighted with unexpected bounty, set about creating the ambience to get the school to multiply.

There was no such expected increase in numbers, and no major breakthrough in sight, leading to an upsurge in carp numbers, until the UN aquaculture expert and consultant; Dr. S.Y. Lin, who was an authority on carp biology and culture, was inducted into the team. He successfully obtained in excess of a million-silver carp fry from two specimens weighing 5.5 kg each. Concomitantly a female bighead was cajoled to produce around fifteen thousand fingerlings, which were stored in grow out ponds.

Primed with the armada of indefatigable weed warriors, the Arkansas Game and Fish Commission reached an agreement with the U.S. Environmental Protection Agency to utilize the carp corps in sewage treatment experiments. Plan A involved releasing the silvers and bigheads into unsanitary waterways to function as sanitary workers and Plan B was to harvest them when physically bigger in size and weight, after gaining desirable body mass. The economic benefits from the sale of fish would more than offset the sewage treatment costs of small communities which did not enjoy the facility, as well as cover the costs of maintenance. The services of Baylor University, Texas, was sought out to evaluate and certify the fish as worthy of consumption.

By 1973, three more carp species - Bighead, silver and black had been imported and released into the river. Each species of carp possessed a unique trait. Black carps had a marked fondness for molluscs. Grass carps were partial to fibrous

aquatic vegetation. Silver and bighead carp were known to have appetency for free floating plankton. Each of the four varieties was expected to complement the others in unburdening the river's payload, thereby significantly contributing in keep it clean and pristine.

Imported quad squads of the four species of carp began to be extensively corralled into aqua farms to control parasitic growth, algae, and weed, undesired vegetation in irrigation ditches and canal systems, and perform rudimentary sewage treatment.

The grandiose plans were shot down by federal Food and Drug Administration, who had an established rule which made it both impermissible and illegal to harvest fish from sewage ponds for human consumption.

Under the hindrance of the caveat, federal funding for the project became no longer available. Some of the fish died naturally, some were destroyed and many drained from hatchery ponds into waterways and streams to find their way into the Chicago Sanitary and Ship Canal and from there into the Chicago, Des Plaines and Mississippi Rivers.

The fish flotilla flowed down the 24-feet-deep, 160-foot-wide, man-made waterway of the Chicago Sanitary and Ship Canal into the Mississippi. Unfortunately, the canal which had been constructed to unnaturally and artificially connect the Great Lakes with the Mississippi River basin became a hydrological highway for the invasive species to spread all over the place, beyond the point of no return.

The brainwave boomeranged. The growing fish, in the absence of predators in the new ecosystem, assumed the role of an invasive species. They assailed the food chain at its very foundation, depleting the plankton which - directly or indirectly - sustains all other fish species. (3)

Since its opening in 1959, unsolicited and unwelcome species have often been introduced into the Great Lakes via the St. Lawrence Seaway - a complex system of canals, locks, and channels in the United States and Canada- which permits maritime vessels access to all the ports in all five of the Great Lakes of North America, from the North Atlantic Ocean, as far inshore as Duluth, Minnesota, situated at the western end of

Lake Superior. The shipping lane is named after the St. Lawrence River, which flows into the Atlantic from Lake Ontario.(4)

No other freshwater ecosystem on Earth has faced such severe and incessant assault by invasive species, as the Great Lakes basin. One new foreign species has been discovered established in the Great Lakes every 6-7 months, between 1959 -2015.

Till date, approximately 190 non-indigenous species of fish, microbes, aquafauna, molluscs,, plants, plankton and various other invertebrates have been accidentally transported into, entered and thrived and established populations in the great lakes. As many as 65% of invasive flora and fauna recorded since the inauguration of the St Lawrence Seaway in 1959 were dragged into the Great Lakes by the ballasts, anchors and chains of ships from foreign ports. These include notorious stowaways such as the zebra mussel (Black Sea), the quagga mussel (Caspian Sea), the spiny water flea (Mediterranean Sea), the round goby (Sea of Marmara /Sea of Azov), red swamp crayfish (Northern Mexico) and sea lamprey (northern and western Atlantic Ocean) – each among the most ecologically and economically damaging invaders in the basin. As many as thirty-nine of the foreign species, have metastasized from the Great Lakes, via the Mississippi River, through the Chicago canal, to as far away to Nevada and California (5)

In spite of proactive steps, such as installation of the U.S. Army Corps of Engineers' barrier located on the Mississippi, just 35 miles downstream from Lake Michigan, designed to deliver 4 volts per inch, supported by weaker adjacent backup electric barrier supported by a \$13 million concrete and chain - link barrier holding back floodwaters of the Des Plaines River from accessing the Chicago canal, the tenacious Asian carp breached all defence lines and entered the Great Lakes.

Two last ditch attempts were made to restrain the marauding shoals, by poisoning stretches of the Chicago Sanitary and Ship Canal, first on 3 December, 2009 and the second on In late May 2010, just six miles from the Lake Michigan shoreline, but to no avail.(6)

Though there are no accurate projections of Asian carp numbers in U.S. waters, but the armada is believed to be run into several million, at times contributing to 90% of the piscine in the Mississippi and its backwaters. In 2019 alone, commercial

fishermen dredged 6 million pounds of Asian carp from two Kentucky reservoirs.(7)

Today, grass, silver, and bighead carp are confirmed entrenched, in significantly high densities in the Mississippi River basin and the major tributaries - the Ohio, Allegheny, Tennessee, Missouri Arkansas, Illinois, Wabash and Red rivers Grass, bighead, and silver carp have been caught in the catchment basin from Louisiana to South Dakota, Minnesota, and Ohio. In other watershed, in Texas, grass carp have been found to be firmly entrenched.

Except Lake Superior, Common Carp have been captured in all of the Great Lakes, while common carp exists in large numbers throughout the 244,106 square km of the five lakes. Interestingly, no black or silver carp has been caught.

A number of grass and bighead carp have been netted in Canada's part of the Great Lakes. Other than common carp, no species of Asian carp has been confirmed as presently established in Canada. Anxieties among the scientific community exist that the silver carp may proliferate and diffuse into Cypress Hills in Alberta and Saskatchewan through Battle Creek (Milk River), the Frenchman River, and the catchment basins of other rivers and the Milk River.

In Mexico, the common and grass carp are found in all the river systems, and are considered invasive.(8)

Converting fish skin into leather was once upon a time, a regular practise in fishing communities. Anthropological literature and ethnographic museums carry information, pictures and exhibits on conventional fish skin leather and accessory making techniques. In the quest for more sustainable and biodegradable raw material for leather making, designers and artisans, the world over, are giving new vitality, energy and hope to the ancient craft - the traditional practice is no longer being talked about in the past tense - as more and more millennial designers are stepping forward to make good use of the opportunities to utilize all the fish skin hitherto discarded, and learn how to turn it into leather fashion boots, corsets, mittens, jewellery, handbags, containers, and parkas, in both classical and contemporary designs. With the cultural practice being revitalized, skin of the invasive Asian carp is also being commercially harnessed for leather making.

Since 1994, tanning facilities for fish skins have been established in Canada, England, France, India, the Republic of Korea, Mexico, Iceland, Norway, Scotland, South Africa, Brazil, the Netherlands, Kenya, Finland, Australia and Taiwan. There is a growing acceptance of fish-leather for the production of novel articles or items such as vases, cup holders, centrepieces, wallets, belts, boots, etc., of which these products are manufactured in countries like Peru and Costa Rica, Colombia, Mexico and Ecuador in the Americas, and China and Vietnam in Asia.(9)

In India, Mayura Davda Shah of Solapur Maharashtra, who founded Mayu in 2018, operate at a zero-waste-certified facility in Chennai, which is also a certified 'white' category factory by the Pollution Control Board of India – making various kinds of fish skin products, while Fish Leather India, a Kolkata based company manufactures bi-fold card cases from fish skin.(10)(11)

Researchers at Ege University, Turkey have observed skin of grass carp to have high fat content, but lower nitrogen, hide substance and ash content compared to the skins of other fish such as sturgeon and conger.

The physical parameters of grass carp are as follows- Thickness (0.65 mm) tensile strength (18.33 N/sq. mm), elongation at break (78.4%), lastometer ball burst extension (13.18mm), Lastometer ball burst force (13 kgf), Lastometer measurement of Distension (14.69mm), Lastometer measurement of distension (17Kgf), Shore Hardness A (76) and Shore Hardness D (23) and shrinkage temperature (90 degrees celcius). It has comparatively low tear strength of 46.8 N/mm and stitch tear strength 63.75 N/mm somewhat limits its application in footwear.(12)

Founded in 2005, Sea Leather Wear, Calgary Canada, began marketing fish leather, including those made from carp skin, as a unique and exotic leather, offered in soft suede and firm glazed finishes. The fish leather tanning process has retained the natural scale patterns of the fish. The glazed leather is scratch and stain resistant, water repellent and never needs polishing. (13)

Other major players in the manufacture of fish leather are :

- i. NYVIDD Fish Leather, Eindhoven, Netherlands (14)
- ii. Nyanza Perch Company , Jinja ,Uganda (15)

- iii. Alisam Products Development and Design and Newton Fish Leather, Kisumu, Kenya (16)
- iv. Osklen,Rio de Janeiro, Brazil (17)
- v. Ocean Hide, Mossel Bay, RSA (18)
- vi. Sjávarleur (Atlantic Leather), Sauárkrókur, Iceland (19)
- vii. Salmo Leather GmbH , Tittling, Germany (20)
- viii. Kalaparkki - Mikkeli, Finland (21)
- ix. Ictyos, Saint Fons, France (22)
- x. Felsie Fish Leather, East Essex, UK (23)

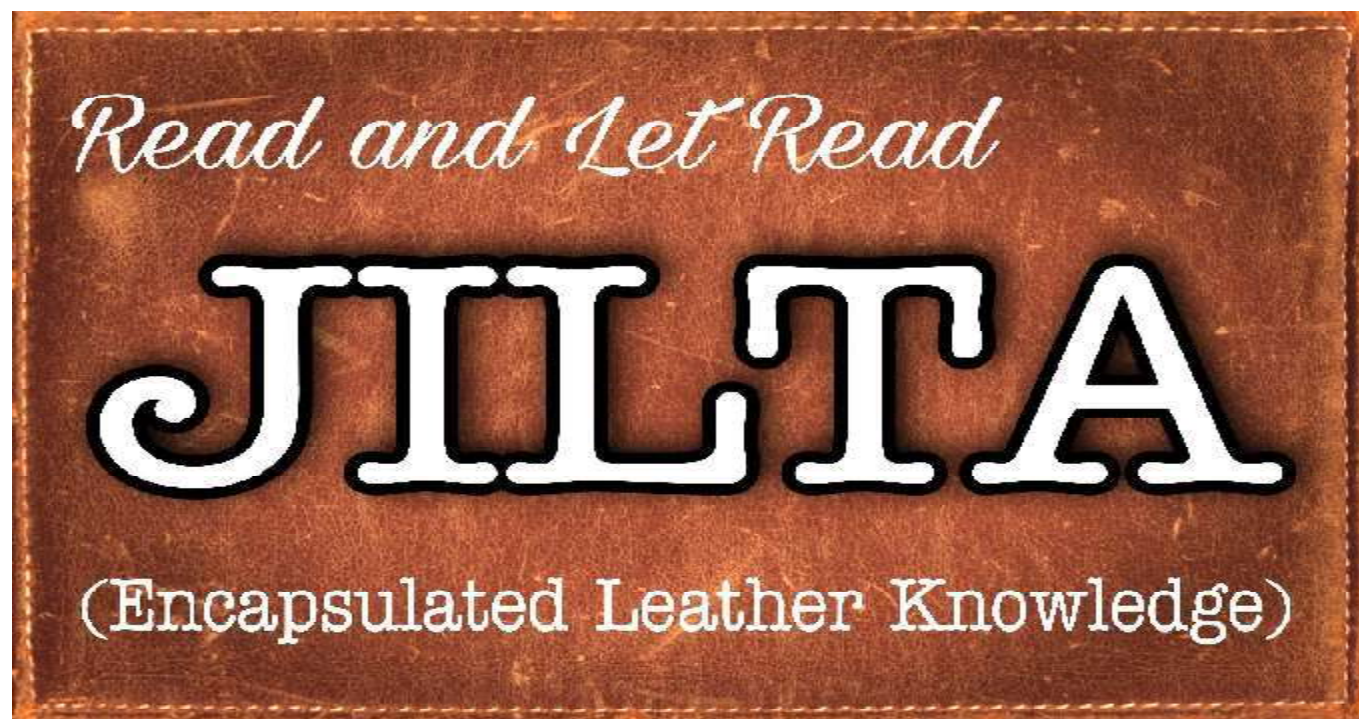
Most fish leathers, including that of Asian carp have adequate physical strength and performance properties. They are thin, strong and tough due to their surface patterns and structures as compared to other skin types from livestock, and thereby eminently suitable for the production of value-added luxury leather goods. Since they possess different characteristics compared to terrestrial animals, the manufacture of fish leather necessitates specific application technology and process recipes, including intricate and dexterous mechanical treatment, to be applied manually.

With the skin of Asian carp, as with skin sourced from other species of fish, fostering a soft and elastic texture, strong air-vapour and fluid-permeability, excellent durability, fold, crease, wrinkle and scratch resistance, outstanding tensile strength, long service life, impressive waterproofing effect, superior drag resistance and braking properties-the invasive species have great potential of yielding leather not only of high performance attributes, but also of unique beauty and natural decorative pattern, which is difficult to imitate.(24)

With concerted effort and ingenious marketing, accessory and apparel designs can be made unique and customized – in myriad textures and colour ranges emphasizing or muting limitless optics and scale patterns - comparable in quality and competitive in price to most reptile and exotic skins available in the global marketplace. Inspired and talented exploration of hitherto untried applications such as, interior decoration, jewellery, board games, craft material, fibre art and baby shoes offer endless possibilities of harnessing leather of this invasive species to achieve creative goals in turning concepts into reality, thereby establishing a stable market for leather from the Asian Carp.

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SILVER JUBILEE REUNION 95 BATCH LEATHER TECHNOLOGISTS ANNA UNIVERSITY – CHENNAI

The alumni of the 1995 batch conducted their silver jubilee Reunion in Raman Auditorium of ACTECH CAMPUS Guindy. Forty faculties More than 80 Chemical, textile and leather students participated in the event. The event's main objective was to felicitate the faculties were felicitated.

Eminent faculties of our times Padmabushan Dr. T. Ramasmy, Dr. Sadulla, Dr.K. J.Sreeram, Dr. B. Chandrasekar, Dr. Rajamani, Dr. Chandramouli, Dr. Balasubramaniam, Dr. Swarna V. Kanth and More than forty faculty members participated.

Alumni from different parts of the world travelled exclusively to attend this event and many came to the campus after 25 years. Alumni working and settled in countries like the US, Canada, Bahrain, Qatar, UAE, and Singapore attended the programme.

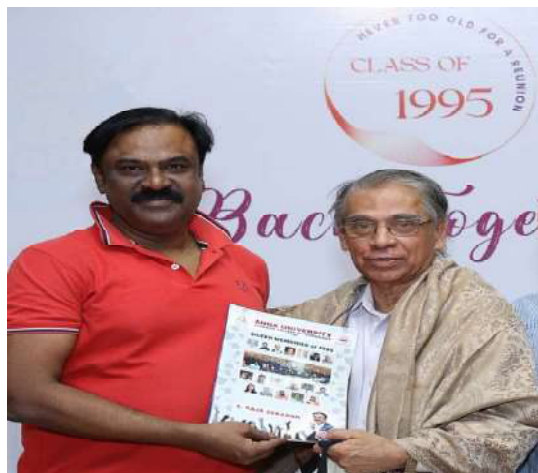
Shri M.C. Balasubramaniam IOFS, GM of Indian Ordinance Parachute factory, Kanpur a proud B. Tech leather technologist of the batch Thanked the alma mater CLRI for

their continuous support even after the completion of their degree in various aspects

A souvenir on the memories of 1991-95 titled "SILVER MEMORIES" Authored by S. Rajasekaran of Leather was released by Padmabushan Dr. T. Ramamsamy and Former vice chancellor Dr. D. Viswanathan. The souvenir has the best wishes from all faculties, Alumni profile, their views of the Reunion, articles on Hostel memories and vintage photos.

Mr Rajasekaran Former students Leather Technologists Association Secretary said, *"In this same Raman Auditorium our journey started in 1991. It is unbelievable that thirty-two years have passed. We came from different parts of Tamilnadu and Madras itself was new to many of us. The confidence given by our seniors and teachers is the main reason for our success. Teachers not only guided us on subjects but also helped to a greater extent in placing us in jobs even before the completion of our degrees. The magnanimity of the support in placing each one in companies, looking back is very large"*.

Mr A.K. Venkatesh Alumni & founder of the colour shoppe thanked the faculties for their participation and guidance.



MORE THAN 60 INDIAN FIRMS TO SHOW-CASE LEATHER PRODUCTS AT DUBAI EVENT TO BOOST EXPORTS

More than 60 top Indian footwear and leather goods manufacturers will participate in the Middle East and North Africa (MENA) region's largest exhibition of such products here from December 11-13. Dubai International Footwear and Leather Exhibition (DIFLEX 2023) is being held in the backdrop of the demand upswing for footwear and leather goods in the Middle East and N Africa (MENA) estimated to be growing at a compound



annual growth rate of over 7 per cent and poised to touch upwards of \$20 billion by next year.

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

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

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

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

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

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

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

(economictimes.indiatimes.com – 01/12/2023)

MAKE IN INDIA 2.0 : DPIIT WORKING CLOSELY WITH 24 SUB-SECTORS TO PROMOTE MANUFACTURING, EXPORTS, CUT IMPORTS



The department for promotion of industry and internal trade (DPIIT) is working with 24 sub-sectors, including furniture, aluminium, agrochemicals and textiles, to promote domestic manufacturing, boost exports and reduce imports, according to an official statement. The commerce and industry ministry on Tuesday said that since its launch, ‘Make in India’ has made “significant” achievements and is now focusing on 27 sectors under ‘Make in India 2.0’.

While the DPIIT is coordinating action plans for 15 manufacturing sectors, the Department of Commerce is coordinating for 12 service sectors. “Now, DPIIT is working closely with 24 sub-sectors which have been chosen keeping in mind the Indian industries strengths and competitive edge, need for import substitution, potential for export and increased employability,” the ministry said. It added that these sub-sectors are — furniture, air-conditioners, leather and footwear, ready to eat, fisheries, agri produce, auto components, aluminium, electronics, agrochemicals, steel, textiles, EV components and integrated circuits, ethanol, ceramics, set top boxes, robotics, televisions, close circuit cameras, toys, drones, medical devices, sporting goods, gym equipment.

“Efforts are on to boost the growth of the sub-sectors in a holistic and coordinated manner,” it said.

It also said that investment outreach is being done through ministries, state governments and Indian missions abroad; investment identification of potential investors, handholding and investment facilitation is done through Invest India.

(economictimes.indiatimes.com – 26/12/2023)

BIHAR BUSINESS CONNECT 2023 : MOUS WORTH RS. 554.40 CR SIGNED IN LEATHER, TEXTILE SECTORS



Bihar wants to be among top 10 states with respect to industrial investment in the next three years and among the top five destinations in next five years’.

In a boost to industrialisation in Bihar, eight companies signed memorandums of understanding (MoU) with the state government for proposed investments of Rs.554.40 crore in textile and leather sectors on Wednesday, the first day of the two-day Bihar Business Connect 2023-Global investors meet.

Speaking at the inaugural session of the summit, industries minister Samir Kumar Mahaseth said Bihar wants to be among top 10 states with respect to industrial investment in the next three years and among the top five destinations in next five years.

“For this, we have revised our industrial policy to make land available in 7-10 days. The government is committed to creating job avenues and we are ready to extend all possible help for business ventures,” the minister said and reiterated the demand for the creation of Special Economic Zones (SEZs) in the state by the Centre.

“With new policies, Bihar has changed. Join the new Bihar and enrich it. If industries grow in the state, the country will progress too. I once again request the Centre to create at least four SEZs in the state that will pave the way for fresh investment opportunities,” he said.

(hindustantimes.com – 13/12/2023)

LVMH HOLDS LIFE 360 SUMMIT AND LAUNCHES SUPPLIER INITIATIVE



LIFE (LVMH Initiatives For the Environment) 360 launched in 2021 with a deadline of 2023 for a series of environmental actions and further deadlines of 2026 and 2030 for others.

The 2023 achievements include establishing a repair-and-care task force at several of its brands. For example, Louis Vuitton repairs 600,000 products per year, while 79% of Berluti’s leather products are repairable. The company has also created LVMH Circularity, to bring together reuse and recycling efforts across the group and its partners.

Meanwhile, after having helped regenerate 1.37 million hectares by the end of 2022, LVMH has a target of regenerating five million hectares by the end of 2030. Additionally, the group reduced Scope 1 and 2 greenhouse gas (GHG) emissions by 11% in absolute terms per unit of added value between 2019 and 2022, plus a 15% drop for Scope 3 emissions.

Additionally, LVMH has a target of pinpointing the countries of origin of its strategic raw materials by 2023, which is ongoing but reportedly on track to being achieved. The company now knows more than 95% of the countries of origin for its diamonds, wool and leather. “Complete traceability” is the target for 2026.

LVMH is now confident in reaching its 2026 and 2030 LIFE 360 targets, with the possible exception of its 2026 target of zero virgin fossil-based plastics.

The group has also launched LIFE 360 Business Partners, an initiative to support emissions reductions and other impacts

across its suppliers. Several brands under the LVMH umbrella have initiated transition plans for their suppliers and, from 2024, the group will organise Sustainability Business Partners Days to work with suppliers on these targets.

Hélène Valade, Environment Development Director at LVMH, said: “Scope 3 emissions account for more than 90% of our environmental footprint and arise mainly from the impact of raw materials and transport. This encompasses emissions from the upstream and downstream of our value chain, not assets that we own or control.

“This is why these emissions are the most challenging to reduce. To achieve our ambitious Scope 3 targets, both in terms of carbon emissions and impact on water and biodiversity, the mobilization of suppliers is essential. LVMH is committed to supporting them with the LIFE 360 Business Partners program.”

For more information on the LIFE 360 Summit, visit the LVMH website.

(internationalleathermaker.com – 15/12/2023)

HOW WOODLAND, PUMA, ADIDAS AND OTHER INTERNATIONAL SHOE BRANDS MAY FACE ‘SMARTPHONE INDUSTRY KIND’ IMPORT ISSUES



The premium footwear industry in India may reportedly face issues similar to smartphone and PC makers in the country. Wondering how? According to a report in Economic Times, the

footwear industry is facing similar sourcing issues as the Bureau of Indian Standards (BIS) has not certified their factories in China and Vietnam, a requirement for allowing imports from them.

Earlier this year, the footwear as a category came under BIS Quality Control Orders (QCO) for leather shoes. While for sports shoes, sandals and slippers it's effective from January 2024. As per QCO norms, all factories manufacturing these and some specified key components, such as rubber, PVC or polyurethane soles and heels, need to be certified by BIS to be able to import and sell such products.

BIS has reportedly not yet certified sourcing factories in China and Vietnam from where the bulk of imported shoes are sourced for India, according to the chief executives of five leading brands who didn't want to be named.

These executives told ET that BIS officials have told them they are not keen on certifying the factories in these markets and will be selective about manufacturing units in Southeast Asia such as Thailand, Indonesia and Malaysia also, as some of those might be owned by the Chinese like in Vietnam.

Nike reportedly had written to the government, asking it to certify supplier factories in Indonesia and Vietnam so that it can continue to import from them. Some of the premium and luxury brands import almost their entire footwear lineup, whereas others like Woodland, Puma and Adidas get their high-end and technical shoes from overseas. Vietnam, China and a few Southeast Asian nations are the main sources for such imports.

A senior government official said that the idea is to promote domestic manufacturing, considering that a large amount of low-quality footwear was being imported from China. He said the QCO for 24 footwear and related products were notified in October 2020 and the industry, especially the large and medium-scale players, had already sought multiple extensions.

(timesofindia.indiatimes.com – 19/12/2023)



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FOOTWEAR

Role of Last In A Quality Footwear

By S. N. GANGULY*

LASTS play a vital role in the manufacture of good quality shoes, chappals, sandals as the fittings of these footwear articles depend solely upon the last. Even in the 80's decade in our country most of the chappals and sandals (more than 80%) are being manufactured without the help of lasts. The general practice is to get the fittings by hand measured fittings only. These hand fittings vary from worker to worker depending upon their skill and conception. As such the fittings of these chappals/sandals are not accurate. The comfort of a shoe lies in its true fittings only. So a shoe with all its good quality raw material and grinders can become painful to a customer if the fittings of the shoe, chappal, sandal are not correct.

We can get better result in fitting of chappals, sandals if we can introduce last. It is true that it will take time to convince the worker to ensure the fittings with the help of lasts because they generally are not agreeable to accept a change from their traditional system. For this necessary arrangements may be made in the institutions concerned so that while training the artisans, they are made to understand that the use of last is imperative and without last quality footwears can not be made. The use of last will save production time and at the

same time provide accurate fittings to the sandals, chappals produced

A closed shoe cannot be made without a last. But, still we get various complaints from our customers regarding the fittings of a shoe. What is the reason behind it? The answer is accurate last has not been used. In our country more than 90% of the lasts required by our manufacturers are procured from hand made last factories. The lasts are manufactured in these factories with their traditional system only. To make a pair of shoe last the measurements in the following portions have to be maintained strictly.

1. Ball girth
2. Instep girth
3. Heel to instep girth
4. Toe depth
5. Toe spring
6. Heel height

But it is very much difficult to maintain these measurements accurately by hand made system and as a result we often find some differences in measurements even in a pair of last in their two odds. The shoe made with such type of last will be painful to a customer.

Another reason for ill-fitting of a hand made last is the lack of seasoning. The hand made lasts are cheaper than machine made ones because these hand made last manufacturers do not season their wooden blocks properly. This is why these lasts shrink after 2-3 months of use. In conclusion we can see that our 90% shoes are being manufactured by hand made shoe industries and this hand-made sector gets the lasts from hand made manufacturers and the handmade last manufacturers are not in a position to produce accurate lasts. As a result more than 90% of our shoes made by hand made sector are without proper fitting and comforts. It is true that our craftsmen are good enough to produce a shoe by hand which can get lucrative international market provided we can arrange to supply to them good quality shoe lasts which play a vital role in a good quality shoe.

My suggestion in this context is that State Leather Development Corporations should take initiative to provide necessary help to the hand made last making units for getting their blocks seasoned at a very lower price and at the same time scientific technical guidance should be provided so that ultimately their end product becomes accurate. Training programme can be arranged for the second

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generation of workmen engaged in the last industry so that they can get a thorough knowledge and conception for making quality shoe lasts. Moreover, emphasis should be given by the authorities concerned to ensure that the quality shoes are produced only on the lasts made in a mechanised factory.

LAST

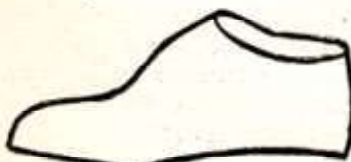
Last is the base of a shoe. It is the mould of either wood or plastic or metal, on which footwears are made. It is not exact replicas of feet but resemble them in outline. It provides the shape and fitting of a shoe made on it. The designing and making of shoe is mainly based on shoe lasts. Before modelling a shoe-last the following two points are considered primarily :

1. The Anatomy of the foot.
2. The Trend of the fashion.

Types of Shoe Lasts :

1. SOLID BLOCK LAST :—

Chiefly used for making chap-pals and sandals. This is the simplest type of last to bring accuracy of dimension and shape of footwear.



Solid Block Last

2. SCOOP BLOCK LAST :—Used by the handmade footwear industry with cat wedge.



Scoop Last

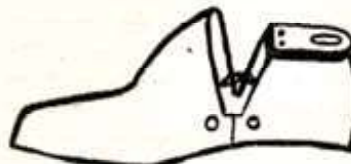
3. HINGED LAST :—Exclusively used by machine-made footwear industry.

The shoe lasts are mainly classified under two groups considering the process of Footwear manufacturing.

- (i) Making Last
- (ii) Finishing Last.

Depending upon the heel height the last can again be sub-divided into the following groups :

- (i) Without Heel — Flat bottom
- (ii) Low Heel — 10-25mm
- (iii) Medium Heel — 26-40mm
- (iv) High Heel — 40mm and above



Hinge Last

Important Requirement of Last

1. Moisture content of finished last should not be more than 12%.
2. The sap of the wood be included in the soles of the last.
3. The wood must be free from the following defects :
 - (a) dirt of any sort,
 - (b) decay and rot,
 - (c) fungal attack,
 - (d) worm holes and insects damage,
 - (e) cross grain.
 - (f) pith or the central weak portion of the wood,

(g) split or honey combing.



Telescopic Hinge

Material for Shoe Last

The following basic kind of raw materials are mainly used for the making of shoe lasts.

A. Wood —The best woods of foreign origin—Maple, Beech & horn beam,

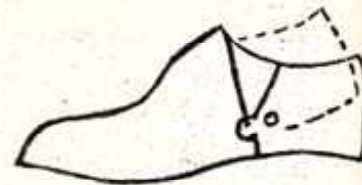
—The usable woods of indigenous origin and recommended by I. S. I. are —

Sissoo, Black Siris, Haldu, Mango, Amaria, Chickrassy, Bola.

B. Metal—Usually an aluminium alloy.

C. Plastic—High density poly ethylene

D. Iron—Cast iron.



Conventional Hinge

Desired Characteristics of Last Timber :—

The quality of the timber to be used for last making has important role as the following points mostly depend on them.

1. The life of the last
2. The workability and behaviour of last during use.

The quality of timber implies the following properties —

1. It should cut or turn on machine without tendency to fray.
2. It should be reasonably free from knots.
3. It should not be liable to split when nails and screws and thimbles are driven in.
4. The texture should be firm enough so as to dent from blows and should be able to retain its definite edges.
5. The grain should be close enough to take the high polish.
6. It should neither shrink nor absorb moisture.

Timber for Shoe lasts :

The following indigenous timbers are recommended for making shoe lasts :

a) Lasting Lasts—

Himalayan maple
Pitraj
Kala-siris
Amari
Sissoo
Benteak

b) Finishing lasts—

Chikrassy
Gamari
Bola

Out of the above mentioned timbers sissoo is most widely used for making lasting lasts. Sissoo is available in Northern and Central India. It is noted for its beauty

and rapid growth in every soil. This is largely needed for avenues along roads and canals. The wood is hard dark brown in colour, with well-marked coarse grains. The wood weighs approximately 780 kg/m³ at 12% moisture content.

The logs for the preparation of blocks for shoe lasts shall be free from the following defects :

1. Flutes
2. Spiral or wavy grain
3. Knots
4. Shakes
5. Cracks
6. Decay or rot
7. Insect attack

The logs are converted into blocks of triangular section in various sizes to cover the size range of footwear.

Seasoning of shoe last blocks

The dimensional accuracy is of prime importance in shoe lasts. The wooden blocks for manufacture of shoe lasts, therefore, should be perfectly seasoned, so that the shrinkage, warping, distortion and splitting do not occur in the finished lasts.

The blocks for shoe lasts may be fully air seasoned, partly air and partly kiln seasoned or completely kiln seasoned to the moisture content between 8-12%.

The drying or seasoning of green wood is a critical step in the conversion of logs into finished woods because it is a potential source of degrade. For perfect seasoning it is necessary to follow the particular kiln schedule depending on the thickness of the blocks and species of the timber. The higher the thickness of the timber the slower will be the drying schedule. The seasoned timber should be free from the defects like checks, case-hardening, honey combing and collapse.

Characteristics of Different Lasts

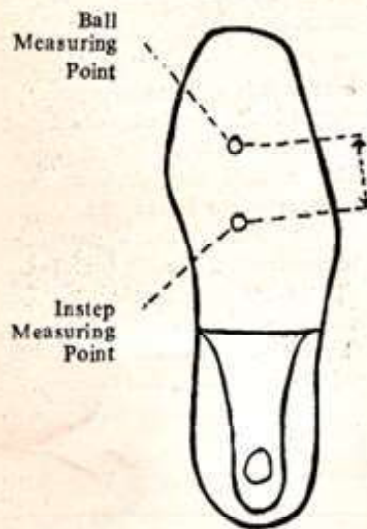
Characteristics	Women's	Men's	Boots	Children's
Toe	Variable	Variable	Wide & but wider round	Rounded
Toe spring	Little	Moderate	Large	Depend on sole flexing
Waist	Narrow	Wide	Still more wider	Wide
Heel curve	Great	Moderate	Very little	Very little
Cross-section of heel brash	Almost triangular	Less triangular	Still less tapered	Almost rectangular



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Category of Last	Model Size	Distance in mm.
(1)	(2)	(3)
Men's	7	60
Ladies/Youth	4	55
Children	10	45
Boys	13	50
Infant	7	40
Babies	4	35



Pitch of the last

The pitch is the vertical distance or height from the ground at the seat point. Lasts are always elevated at the heel by various amount according to the height of the heel which is to be attached to the shoe.

Toe Spring of the Last

The toe of the last is also elevated which is known as spring. This elevation assists the foot to

avoid the toe scraping the ground and roll forward during walking.



H = Height of the Heel or Pitch
T = Tread Line Contact

Important Check Points

Whether the shape, dimension and profiles of a last are correct or not are ascertained by taking physical measurement at the following check points and by comparing with appropriate templates.

1. Overall length (OVE FALL)
2. Accuracy of bottom shape
3. Accuracy of joint measurement
4. Accuracy of instep measurement
5. Accuracy of bottom and back profiles
6. Accuracy of toe profile
7. Accuracy of location point for counter, vamp and instep as well these marked for taking measurements.



S = Toe Spring

The standard amount of toe-spring in relation to pitch (height

of the heel) shall be as follows according to the nature of the shoe which is measured in mm :

Heel Height in mm	
Normal Men's shoe	12-14
Popular shoe on low heel	10
Ladies' shoes on medium heel	8
Ladies' shoes on high heel	6

Where other heights of heels are employed the toe spring shall be as follows :—

Height of heel mm	Toe-spring mm
10	13
20	12
30	11
40	10
50	9
60	8
70	7

The ratio between the spring and height of heel during the increase and decrease for size to size shall be as follows :

Height of heel	Toe-spring
10 to 30	0.5
30 to 60	1.0
over 60	1.5

Height of Quarter :—

In order to have a uniform and accurate quarter height in finished footwear, and to minimize the effort in the footwear manufacturing



processes, a demarcation along the centre line of the heel curve, from the seat edge position shall be made as to conform to the requirement given in quarter height.

Category	Quarter height
Men's (7)	58.0 mm
Ladies (4)	54.00 mm
Boys' (13)	47.5 mm
Children (10)	42.5 mm
Infants (7)	30.0 mm
Babies' (4)	33.5 mm

Height of the last excluding the thickness of the top plate shall be as follows :

		mm
Men's	7	68
Ladies	4	63
Children	13	55
Boys	10	50
Infant	7	45
Babies	4	40

The difference of height for the sizes is ± 1

The length and width grades for insole of last shall be as follows :

Grades	Adults & Youth	Children
(English Scale)		
Length grade	8.4	8.4
Width grade	2.0	1.6

Each fitting shall be identified as given below :

Fittings	Letter of Identification
Extra narrow	A
Narrow	B
Very slender	C
Slender	D
Very small	E
Medium	G
Large	H
Extra Large	XH

Approximate dimension for Economic Conversion of Logs

Size of last	Measurement of Block			Required dia of log	Volume/ pair mm.	Used for
	Length cm.	Breadth cm.	Height cm.			
8½—12	34.00	11.5	13.0	40.0	0.0102	Men's.
5½—8	30.5	11.0	13.0	36.5	0.0086	Men's/Ladies
11½—5	28.0	10.0	11.5	34.0	0.0064	Boys/girls
11½—1	25.0	9.5	10.0	32.0	0.0048	Children
6½—11	21.5	9.0	9.0	28.5	0.0034	Children
1—6	18.5	8.5	9.0	25.0	0.0028	Infants.

In the production of last for Oxford shoe (cow shoes) instep girth shall be reduced by 3 mm. and the upper heel part must be thinner than that of last for boots.

Instep girth shall be increased

- in the production of lasts for marsh and fishing boots by 20 mm
- in the production of last sandals by 10 mm
- in the production of chrome (box calf) boots by 7 mm.

MEASUREMENT FOR BOY'S LAST

Place of Measurement	(all dimensions in mm)			
	Size of Last			
	35	36	37	38
Length of the foot	—	223.3	230.0	236.6
Length of the last	—	233.3	240.0	246.6
<i>Fitting 5</i>				
a) Width of the insole at the joint.	—	75.5	77.0	78.5
b) Width of the insole at heel	—	53.0	54.0	55.0
c) Joint girth	—	207.0	211.0	215.0
d) Instep girth	—	217.0	221.0	225.0

The above mentioned measurements will be increased in the following way for higher fittings.

Place of Measurement	Increase/decrease of fitting-mm	Increase/decrease in each size.
a) Width ..Joint	2 m.m.	1.5 mm
b) Width ..at heel	1.00 mm	1.0 mm
c) Joint girth	5.0 mm	4.0 mm
d) Instep girth	5.0 mm	4.0 mm

(In the production of last for boots and sandals, the widths of the insoles shall be increased in the joint by 2.5 mm and at the heel by 2 mm.

Instep girth shall be increased by 10 mm in the production of last for sandals).

Measurements for Ladies' Last with Low Heel

(all dimensions in mm.)

Place of Measurement	Sizes of Last									
	33	34	35	36	37	38	39	40	41	42
Length of the foot	210	216.6	223.3	230	236.6	243.3	250	256.6	263.3	270
Length of the last	220	226.6	233.3	240	246.6	253.3	260	266.6	273.3	280
<i>Fitting 5</i>										
Width of inside at the joint	70.5	72.0	73.0	75.0	76.5	78.0	79.5	81.0	82.5	84.0
Width of inside at the heel	49.0	50.0	51.0	52.0	53.0	54.0	55.0	56.0	57.0	58.0
Joint girth	199.0	203.0	207.0	211.0	215	219	223	227	231	235
Instep girth	209.0	213.0	217.0	221.0	225	229	233	237	241	245

The above mentioned measurements will be increased/decreased in case of higher/lower fittings in the following way.

Place of Measurement	(1) increase/decrease in fittings	(2) increase/decrease in each size
1. Width .. joint	2.0 mm	1.5 mm
2. Width....heel	1.0 mm	1.0 mm
3. Joint girth	5.0 mm	4.0 mm
4. Instep girth	5.0 mm	4.0 mm

In the production of last for footwear with.

(a) Heel Height

(b) Width of the insole shall be increased/decreased at

			Joints	Heels
	1. 30 mm	decreased	2 mm	1 mm
	2. 35-40 mm	decreased	4 mm	2 mm
	3. 45-60 mm	decreased	6 mm	3 mm
In the production of last for	Sandal	increased	3 mm	4 mm
In the production of last for	Boot of rubber	increased	2.5 mm	1 mm

In the production of lasts instep girth shall be increased for sandal by 10 mm and for boots and high shoes on elastics by 5.0 mm.

Measurement of Children Last

Place of measurement	Size of Last			
	27	28	29	30
Length of the foot	170.0	176.0	183.3	190.0
Length of the last	180.0	186.6	198.3	200.0
<i>Fittings-6</i>				
Width of insole at the joint	65.5	67.0	68.5	70.0
Width of insole at heel	46.0	47.0	48.0	49.0
Joint girth	180.0	184.0	188.0	192.0
Instep girth	190.0	194.0	198.0	202.0

The above mentioned measurement will be increased/decreased in case of higher/lower fittings in the following way :

	(i) Increase/decrease in fitting	(ii) Increase/decrease in sizes
A. Width.....joint	2 mm	1.5 mm
B. Width.....heel	1.0 mm	1.0 mm
C. Joint girth	5.0 mm	4.0 mm
D. Instep girth	5.0 mm	4.0 mm

1. In the production of last for shoes of rubber or sandal width of insole shall be increased in the joint by 2.5 mm and in the heel by 2 mm.

2. In the production of last instep girth shall be increased for sandals by 10 mm and for boots and shoes of rubber by 5 mm.

Measurement for Gents Last (all dimensions in millimetre)

Placement of Measurement	Size of Last									
	38	39	40	41	42	43	44	45	46	47
Length of foot	243.3	250	256.6	263.3	270.0	276.6	283.3	290.0	296.6	303.3
Length of last	253.3	260	266.6	273.3	280.0	286.6	293.3	300.0	306.6	313.3

Fitting-7

a) Width of insole at the joint	87.5	89.0	90.5	92	93.5	95.0	96.5	98.0	99.5	101.0
b) Width of insole at the heel	58.0	59.0	60.0	61	62.0	63.0	64.0	65.0	66.0	66.0
c) Joint girth	229.0	233	237.0	241	245	249	253	257	261	265
d) Instep girth	239.0	245	247	251	255	259	263	267	271	275

Fitting 8

a)	89.5	91.0	92.5	95.5	94.0	97.0	98.5	100.0	101.5	103.0
b)	59.0	60.0	61.0	62.0	63.0	64.0	65.0	66.0	67.0	68.0
c)	234.0	238.0	242.0	246.0	250.0	254.0	258.0	262.0	266.0	270.0
d)	244.0	248.0	252.0	256.0	261.0	264.0	268.0	272.0	276.0	280.0

Every fitting has an increase and decrease in the following manner in measurement.

	m.m.	Increase/decrease in each size
A) Width of Insole at joint	2.0	A) 1.5 mm
B) Width of Insole at Heel	1.0	B) 1.0 mm
C) Joint Girth	5.0	C) 4.0 mm
D) Instep Girth	5.0	D) 4.0 mm

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Acknowledgement

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STARTUP STORY SET FOR BETTER SCRIPT IN 2024 AFTER A BLEAK '23



Funding winter and corporate governance woes separated the men from the boys in the country's startup space in 2023 that saw funds into the segment tapering to just around \$8 billion.

All said, investors are hopeful of strong growth of the maturing startup ecosystem in the new year. Edtech and health tech segments that grew exponentially during the pandemic plunged into an abyss of financial uncertainties, with several firms shuttering their business, and valuation of prominent players like BYJU'S and PharmEasy plummeting 85-90 per cent.

Indian startups are estimated to have laid off over 15,000 employees in 2023. Startups with sustainable business models as well as the well-capitalised ones are expected to weather the current turmoil. And the horizon in 2024 is expected to be "exciting" as well as "challenging".

Venture capital firm Lightspeed, which has invested in firms like BYJU'S, Magicpin and OYO, said a high cycle or a low cycle of two years does not really impact the outcome of companies that get built over a period of 8-10 years. "As such, we think of the current phase as a part of the growing up of our ecosystem. "Yes, there will be consolidation, valuation correction and even some mortality of companies but all in all, the end result will still be progress," Lightspeed's Partner Rahul Taneja said.

Reflecting a challenging environment for the startup ecosystem, which has churned out numerous unicorns, the total funding tumbled this year compared to a staggering \$35 billion it attracted two years ago. Also, corporate governance issues came

to the fore at various promising unicorns making the investors' community jittery. BharatPe, GoMechanic, 4B and BYJU'S all had to grapple with multiple red flags in terms of corporate governance ways as well as funding.

Debt fund Stride Ventures' Managing Partner Apoorva Sharma said all lenders in general have been extremely cautious and the primary focus has been to ensure healthy asset quality. "The average ticket size is already in the range of say Rs 20 crore now, which in 2021 was close to Rs 45-50 crore. "If you look at venture capital investments, it was about \$35 billion in 2021, about \$25 billion in 2022 and in 2023, it will be roughly about \$8 billion. "It is declining every year," she said.

Further, Sharma said several unicorns have not gone for public valuation and those which are raising funds are doing so either by way of flat valuation or promising discounts in the next round of fund raise. According to venture capitalist firm Fundamentum Partnership, the number of unicorns dropped to 72 as of November this year from 110 in 2022.

"As of November 2023, India had 72 unicorns in comparison to 110 unicorns last year," Fundamentum Partnership's Principal Prateek Jain said. Consulting firm HexGn's CEO Jappreet Sethi estimates that health and medtech segments saw an 8 per cent valuation decline while in the case of e-tail, market places and portals, the fall is 9 per cent. The fintech sector saw a marginal decline of 2 per cent in 2023, he added.

IvyCap Ventures' Founder and Managing Partner Vikram Gupta said that approximately 30 unicorns saw changes in their status between 2021-2023. "When we look at specific sectors, the multiples in the consumer/ D2C sectors might have dropped from 5-7 times in 2021 (price to revenue) to around 2-3 times in 2022. "Now, they may be showing an increase of 2-4 times.

"Similarly, in SaaS, these multiples may have dropped from 10-30 times in 2021 to 3-5 times in 2022, and may currently be coming to 5-7 times in 2023," Gupta said. On the other hand, startups with sustainable business models and those innovating around artificial intelligence, Software-as-a-Service (SaaS), deep tech, fintech, electric vehicles and casual gaming, are anticipated to progress well. Softbank Group, which has invested \$15 billion in India in the last few years, sees emergence of global technology companies out of India and

maturity in the funding ecosystem with many venture capital players getting IPO (Initial Public Offering) exits.

“Our India portfolio has done quite well in terms of exits as well as operating performance of companies. “Even in 2023, we saw companies like Lenskart, Firstcry, Meesho and Ola Electric raise capital from external investors. “This has been possible due to strong operating performance of these companies. Several companies are maturing and growing well,” SoftBank Investment Advisers Investment director Narendra Rathi said.

As founders continue to focus on operating performance, he said they are driving robust, sustainable growth with a clear path to cash flow break-even. “We continue to see investor interest in such high-quality companies. “Entrepreneurs and shareholders are now being more reasonable on valuation expectations,” Rathi said.

While investors like Berkshire Hathaway exited from prominent fintech player One97 Communications (Paytm) at a loss of around 31 per cent per share, Honasa Consumer, which sells products under Mamaearth brand, brought cheers to investors, including bollywood actor Shilpa Shetty Kundra, with a good IPO.

“India’s GDP per capita is at \$2,600. This is like 2005 in China, where discretionary spending and consumption economies take off when countries cross \$2,000 GDP per capita,” Fireside Ventures’ Partner and co-founder Vinay Singh said. According to Lightspeed’s Taneja, 2024 promises to be exciting and challenging in equal parts.

“We believe that this will also be the year when we will see a lot more IPOs coming through. “From a theme standpoint, we believe that core themes such as local consumption, fintech, enterprise SaaS and infrastructure - will continue to dominate deal flow,” he said. Fintech firm Mobikwik and e-commerce firm Meesho reported their first ever profits while India’s biggest fintech firm PhonePe raised \$850 million at a pre-money valuation of \$12 billion during the year.

The growth in the fintech sector is also being helped by the crackdown on Chinese loan apps that has created space for Indian firms.

(Source : PTI/Rediffmail.com – 28/12/2023)

INDIA LIKELY TO REMAIN FASTEST GROWING MAJOR ECONOMY IN 2024 : ASSOCHAM



India is likely to remain the fastest-growing major economy in the world in 2024 on the back of strong consumer demand leading to a pick-up in investment across sectors such as construction, hospitality and infrastructure including railways and aviation, ASSOCHAM said on Thursday.

India retained the tag of the world’s fastest-growing major economy, with its GDP expanding by a faster-than-expected rate of 7.6 per cent in the July-September quarter on booster shots from government spending and manufacturing. The country’s Gross domestic product (GDP) growth of 7.6 per cent beat most estimates, including 6.5 per cent projected by the Reserve Bank of India (RBI).

The growth compares to 6.2 per cent in the same quarter last year and 7.8 per cent expansion in the preceding quarter, official data released on Thursday showed. India’s GDP growth beat China’s 4.9 per cent rise in July-September, while the Western economies are getting crushed under high-interest rates and energy prices. “India’s macro picture looks quite convincing with the overall economy following a trend growth of seven per cent with critical building blocks combining to give it brighter prospects,’ ASSOCHAM Secretary General Deepak Sood said.

According to the industry body, India Inc led by financials, construction, hotels, aviation, automobile and other manufacturing areas like electronics are on a strong pitch to further improve performance in the coming year. The trajectory is being helped by the low crude oil prices, keeping inflation in check with a big positive on raw material cost.

“Sectors like construction have several related industries which too have gained momentum. These include steel, cement,

mining, electricity generation and consumer durables,' Assocham stated. The macroeconomic indicators including government balance sheet reflected in strong tax collections, record foreign exchange reserves, stability in the rupee against major currencies and signs of revival in merchandise exports are expected to further improve, it estimated.

(Business Standard – 28/12/2023)

INDIA TO SIGN CLEAN, FAIR ECONOMY DEAL UNDER INDO - PACIFIC ECONOMIC FRAMEWORK



India is expected to sign a much-awaited deal on two more pillars of the US-led Indo-Pacific Economic Framework—clean economy and fair economy—early next year, two officials aware of the matter said. India's law ministry is currently vetting proposals for IPEF's clean economy and fair economy pillars, following which the commerce ministry will move for cabinet approval, the officials said. "Both the pillars are very important for the country. The clean economy (Pillar-III of the IPEF) is aimed at cooperation on research, development and commercialisation of clean energy and climate-friendly technologies," one of them said.

Under the fair economy deal (Pillar-IV), India will strengthen implementation of effective anti-corruption and tax measures to boost trade and investment among IPEF economies, the official added. The ministries of finance and commerce did not reply to queries sent on Tuesday.

India in November signed a supply chain resilience agreement (Pillar II) with the US and 12 other members of the Indo-Pacific Economic Framework for Prosperity to reduce its dependence on China. It has so far stayed away from the trade pillar of the framework.

The agreement, which was signed by Union minister for commerce and industry Piyush Goyal and US trade secretary Gina Raimondo in San Francisco, also provides benefits such as a potential shifting of production centres in critical sectors. The development was seen as a major breakthrough for India and other participating countries. Once the deal is finalised, it will help reduce India's dependency on China and mitigate risks of economic disruptions from supply chain shocks.

India has not signed the trade pillar aimed at strengthening economic engagement among partner countries, excluding China, as it is seeking more clarity to assess if it will be in the interest of the country, said the second official mentioned earlier. "The legal scrubbing of Pillar-III (clean economy) and Pillar-IV (fair economy) has started. The process of legal vetting may get completed by February. Then it will be moved to the Cabinet for final approval," this official said.

Legal scrubbing is a process under which participating countries of the IPEF review proposals through a legal perspective and for language consistency. Once the deal is legally approved, the commerce ministry will move a cabinet note in consultation with other ministries involved in the process, such as the ministries of finance and power.

"The IPEF framework will enhance inclusiveness and competitiveness and promote economic growth through investment," said Abhash Kumar, assistant professor of economics at Delhi University. "It will benefit consumers also. Clean and fair economy will increase resilience in the economy, which is important for sustainable economic growth."

IPEF was launched in Tokyo by the US and other Indo-Pacific countries on 23 May 2022. The group includes Australia, Brunei Darussalam, Fiji, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, the Philippines, Singapore, Thailand and Vietnam.

(livemint.com - 28/12/2023)

ECONOMY AWAITS BIG POLICY PUSH: GROWTH ABOVE 6% SEEMS TO STOKE INFLATION

The year 2023 has been better on the economic front for India than envisaged at its dawn. The Reserve Bank of India (RBI) has recently raised its forecast of the real GDP expansion for FY24 to 7% from 6.5% (this implies the same rate of year-on-

year growth in calendar year 2023). It has also started to worry again about the demand-pull stoking inflation.



While there is near consensus about a prospective slowing of growth in 2024, two analytical formulations clash. One view, which has the official backing, is that there may be a plausible “underestimation of the economy’s underlying momentum and dynamism”. An “unprecedented tax buoyancy” (of nearly 2 for the Centre in the first half of this fiscal) is the main reason for the assumption. High level of capacity utilisation in a section of the industry is seen to trigger a long-awaited investment cycle.

Another section rues a draining of the economy’s capacity to expand faster, and expects a resultant trough in the medium term. It also highlights a sustained trend of rural consumption lagging urban’s, high indebtedness of the larger household sector, and the stagnation — real-term decline — in wages and income, across large sections of rural and urban people.

While the new year would see a Parliament election, midway through it, the new government at the Centre would inevitably be addressing the uncertainty about the course of the economy. The full Budget in July would have already laid the road map by then.

With globalisation taking a backseat, global demand sluggish and geopolitics unpredictable, the policy changes will have to be aimed at resolving the domestic household income crisis, and boosting the savings rate. They must also make public-private partnership work in infrastructure sectors, other than seaports and airports, where it is already up and running.

Making foreign trade a net positive contributor to the gross domestic product will require consolidating the early gains in export of tech-driven products like smart phones, by enhancing domestic value content, moving up the value chain in services, and resolving the crisis in labour-intensive industries.

An overhaul of the goods and services tax (GST) is necessary to make it capable of delivering the “output effect” expected of destination-based consumption taxes. Land, labour and capital must be put to more efficient use for higher value creation, while India integrates more seamlessly with the global value chains.

All this may well be on the agenda of any government taking office after the polls, since exigency would demand it. But growth impulses would also come from a reversal of the centralisation of policies and governance, for which the outcome of the elections will be a key determinant.

It is a safe bet for Prime Minister Narendra Modi to “guarantee” that his “third term” would make India the third-largest economy in the world in current dollar terms. This will likely happen latest by FY28 (and probably earlier), even with a further slowing of growth, and by then, India would have moved seven notches up in the global economic pecking order in less than one-and-a-half decades.

Such climb up the standings, however, is thanks to the unique period, when India found a number of economies in striking distance in the economic race, all growing at anaemic rates. However, to move further and become the second-largest economy, it would have to wait at least another half a century, even in the best-case scenario (with per capita income still much lower than most high-income countries).

To be sure, more than four years since the economy bore the brunt of the pandemic (and shrank by nearly a quarter in Q1FY21), statistical data is yet to be shorn of the distortion caused by the tragedy. Growth in the quarter ended September 2023 may well be less than the impressive headline figure of 7.6% by one percent point or more. If such an expansion rate is causing concerns of overheating, it signifies a considerable undermining of the growth capacity, which may have dropped to around 6%.

That is subdued growth for a country anxious to traverse the high-growth path in the coming decades. And even this is produced with a relentless overuse of fiscal firepower over the years. The mismatch between the economy’s capacity to churn out revenues for the government, and latter’s ability for pump-priming has widened.

To the government’s credit, it has made commendable strides in tax collections, aided by the drive to “formalise” the economy,

and a greater connect between the direct and indirect tax wings. But the statistical practice of a larger de facto weight being accorded to wholesale price index in the GDP deflator too is behind the instant high tax buoyancy (tax-GDP ratios in FY23 and H1FY24 were somewhat identical, but buoyancy jumped 2.4 times from the last fiscal). In 2024 and onward, support to the economy from government investments and consumption will inevitably wane. An effort to rein in “general government debt” to somewhere close to the recommended level of 60% will require economical spending.

Since Q2FY20, which represents the pre-pandemic phase, gross fixed capital formation has grown nearly twice as private final consumption expenditure. The fixed investment creation was predominantly due to public-sector capex. But the recent years’ large spikes in public capex are partly optical, as it masks a deliberate shift of public investment mandate to the Centre (Union Budget) from states and CPSEs, which had conventionally played bigger comparative roles. The limitations of the strategy of creating a virtuous cycle of investments by using government funds to crowd in the private sector are apparent.

For sure, many sectors of Corporate India are reportedly witnessing capacity utilisation of over 75%. If this doesn’t yet boost the confidence of companies to invest afresh, it is because they perceive the domestic consumption demand is weak and transient, and fear the external sector won’t see a quick turnaround.

Though sales of high-end consumer goods have been buoyant in the past year, the broader consumption market is rather sluggish, and the rural sector is languishing. The recent spurt in corporate profits has much to do with an incidental fall in input costs, rather than a broad-based uptick in demand. Such corporate profitability would easily vacillate, being excessively prone to global commodity market trends, capital flows and exchange rates.

Any monetary easing by RBI is unlikely at least before the third quarter of the next fiscal, given the persisting inflationary risks. RBI’s latest monthly bulletin rightly notes that, unless inflation is “brought back to the 4% target and tethered there, there is a strong likelihood that growth may falter”.

(Source : financialexpress.com – 28/12/2023)

INDIA’S FISCAL DEFICIT SURPASSES 50% OF FULL-YEAR BUDGET ESTIMATE IN NOVEMBER’ 2023



As of the end of November 2023, the Indian government’s fiscal deficit has surpassed 50% of the full-year budget estimate (BE), reaching Rs. 9.06 lakh crore, according to data released by the Controller General of Accounts (CGA) on Friday, December 29.

In absolute terms, the fiscal deficit, representing the difference between expenditure and revenue, amounted to Rs. 9,06,584 crore during the April-November period of 2023-24.

Comparatively, in the corresponding period last year, the deficit stood at 58.9% of the BE for 2022-23. The government’s projected fiscal deficit for 2023-24 is Rs. 17.86 lakh crore or 5.9% of the GDP.

Up to November 2023, the Indian government received Rs. 17.4 lakh crore, constituting 64.3% of the corresponding BE for 2023-24. This includes Rs. 14.35 lakh crore in tax revenue (net), Rs. 2.84 lakh crore of non-tax revenue, and Rs. 25,463 crore of non-debt capital receipts, which involve the recovery of loans and miscellaneous capital receipts.

According to CGA data, the central government’s total expenditure during April-November 2023 was Rs. 26.52 lakh crore, equivalent to 58.9% of the corresponding BE for 2023-24.

Out of this, Rs. 20.66 lakh crore was allocated to the revenue account, while Rs. 5.85 lakh crore was allocated to the capital account.

(cnbctv18.com – 29/12/2023)

CBIC EXTENDS GST DUES RECOVERY DATE



The Goods and Services Tax (GST) Council has extended the deadline for tax officials to demand and recover dues from businesses for 2018-19 and 2019-20, as the government looks to resolve backlogs and bolster revenues.

For FY19 dues, tax officials now have time until the end of April 2024, while for dues of FY20, the deadline has been extended to the end of August next year, Central Board of Indirect Taxes and Customs (CBIC) said in a recent note, announcing the GST Council's decision.

Under section 73 of the Central GST Act, the prescribed time limit for recovering dues is three years from the date of filing of GST annual returns. The extension is particularly beneficial for tax officials, enabling them to take appropriate action in instances of tax discrepancies, such as underpayment of taxes, improper use of tax credits, or incorrect tax refunds. It's important to note that this time limit does not extend to cases involving fraud, wilful misstatement, or suppression of facts.

Tax experts observed that the extension is a response to the accumulating cases with the adjudicating authority and concerns about businesses not having adequate time to provide requested information. "For FY19, the initial deadline of 31 March 2024 has now been extended to 30 April 2024. This extension aims to ensure that the department can provide sufficient time to taxable persons for submitting necessary information, facilitating a more thorough assessment process," said Saurabh Agarwal, tax partner, EY.

For FY20, the original deadline of 30 June 2024 has been extended to 31 August. Agarwal said this extension grants the department more time for issuing show cause notices.

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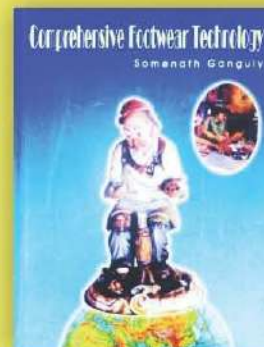
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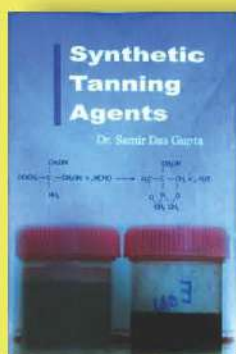
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Indian Leather Technologists' Association

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

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History and Activities of Indian Leather Technologists' Association

Registration No. KOL RMS/074/2022-24

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

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

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

ILTA have published the following books:

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

ILTA presents awards in the name of Prof. B. M. Das Memorial, Sanjoy Sen Memorial and J. M. Dey Memorial Medals to the top rankers at the University graduate and post graduate levels. J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly journal of the Indian Leather Technologists' Association (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 Leather Technology who is meritorious but financially crippled.

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

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

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

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

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

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



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