



JILTA

Journal of Indian Leather Technologists' Association

JILTA 2022
2023

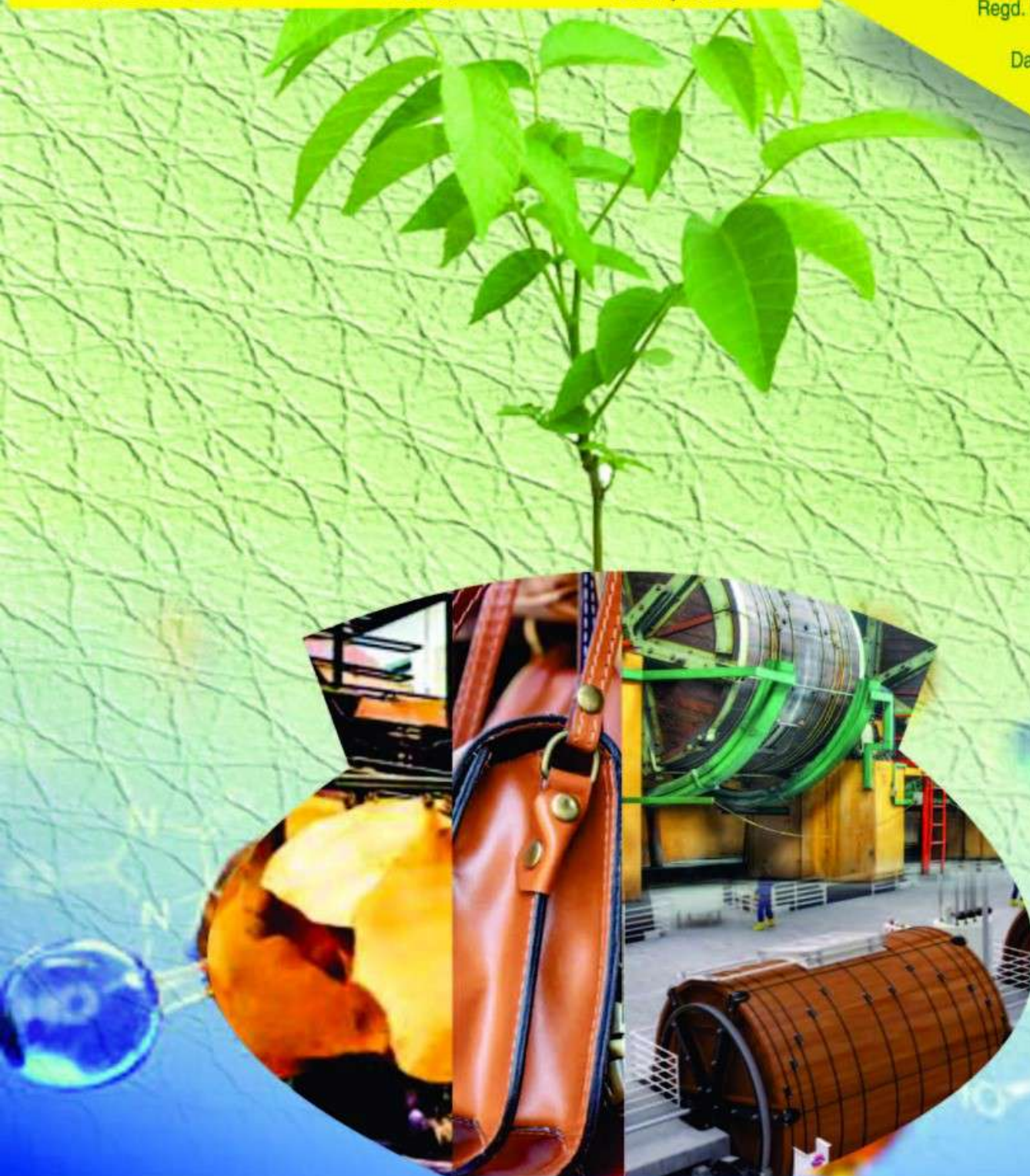
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Our Activities

- An Association with over 600 members from India and abroad working since last 68 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 60 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 (IULTCS)]

'Sanjoy Bhavan', 3rd Floor, 44, Shanti Pally, Kolkata- 700 107, WB, India

Phone : 91-33-2441-3429 / 3459 • WhatsApp +91 94325 53949

E-mail : admin@iltaonleather.org; mailtoilta@rediffmail.com

Website : www.iltaonleather.org

JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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Hony. Editor : Dr. Goutam Mukherjee

Communications to Editor through E-mail :

admin@iltaonleather.org; jiltaeditor@gmail.com

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Indian Leather Technologists' Association

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

Kasba, Kolkata - 700 107, WB, India

Phone : 91-33-2441-3429

91-33-2441-3459

E-mail : admin@iltaonleather.org;
mailto:ilta@rediffmail.com

Web site : www.iltaonleather.org

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

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

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

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3rd floor, 44, Shanti Pally, Kasba, Kolkata – 700 107
Phone : 91-33-24413429 / 91-33-24413459
E-mail : admin@iltaonleather.org / mailtoilta@rediffmail.com
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Silver Lining In The Cloud Of Global Economic Crisis



The majority of economic news has been decidedly gloomy in recent months, with the war in Ukraine, surging inflation, tightening monetary policy and a slowdown in China all putting a dampener on the global mood. The declines in expectations have been particularly large in the Euro area and Eastern Europe. But there is one region which has seen its forecasts revised upwards: the Middle East and North Africa (MENA). Since February, economic analysts have upgraded their 2022 growth forecasts for MENA by a full percentage point to 5.3%, and have also revised up their projections for 2023.

Surging energy prices as a result of the war in Ukraine have been the main driver behind the re-rating, given MENA's (Middle East / North America) position as a key exporter of oil and gas. The unexpected windfall to public finances should enable governments to step up spending—or, at the very least, to refrain from adopting austerity measures. The introduction of a VAT in Kuwait and Qatar, for instance, is likely to be delayed to 2024. The windfall is also encouraging greater fiscal generosity towards the region's more vulnerable oil importers: In April, the Gulf states pledged USD 22 billion to Egypt to cover the country's current account deficit, while Saudi Arabia sent Jordan USD 50 million to prop up its budget.

The Abu Dhabi Developmental Holding, a sovereign wealth fund based in the capital of the United Arab Emirates (UAE), announced March 23 its intention to invest \$2 billion in Egypt through the purchase of stakes in a number of state-owned companies, Asharq Business reported. Approximately half of this amount, the news site noted, will be used to acquire about 18% of Commercial International Bank, while the remainder will be invested in companies in sectors such as fertilizers and port services. Just a week later, on March 29, Qatar announced an agreement to place another \$5 billion "in the coming period" in a series of investments and partnerships in Egypt, according to a statement from the Egyptian government. To implement the agreement, the two parties agreed to establish a joint higher committee led by their foreign ministers. And as Egypt's Minister of Planning Hala Elsaid told Bloomberg, the Qatar Investment

Authority, the country's sovereign wealth fund, will hold the proposed investments. One day later, it was the turn of Saudi Arabia. On March 30, Riyadh announced that it had deposited \$5 billion in the Central Bank of Egypt, the Saudi Press Agency reported. And on the same day, Egyptian Prime Minister Mustafa Madbouly announced that in the coming period Egypt expects to attract up to \$10 billion in investments from Saudi Arabia after witnessing the signing of an agreement to facilitate the Saudi Public Investment Fund activities in Egypt, according to a Cabinet statement.

The pledge of some \$22 billion from Gulf states announced in a matter of days comes at a time when Egypt is experiencing a deep financial crisis that the Russian invasion of Ukraine and the ongoing global economic uncertainty has only helped to accelerate. In this context, the assistance from the Gulf is expected to at least neutralize for now some of its more urgent imbalances and vulnerabilities, albeit at a considerable price. "The new announcements of support are [substantial] in the context of Egypt's external financing needs, Central Bank of Egypt reserves and past support," Krisjanis Krustins, director of Sovereigns at Fitch Ratings, told Al-Monitor. "Besides shoring up investor confidence, [Gulf] support will directly inject foreign exchange into Egypt's economy and financial system, reducing the need for borrowing on the international markets."

The Gulf countries have for decades played an important role in Egypt's economy. But it was above all after the seizure of power by the current President Abdel Fattah al-Sisi in 2013 that its financial assistance — consisting of billions of dollars primarily aimed at shoring up an allied government — entered a new dimension. The weight of this support diminished following the 2016 agreement between Egypt and the International Monetary Fund (IMF), which included a \$12 billion loan subject to a program of reforms, and the entry of bond investors. In 2020, after the outbreak of the coronavirus pandemic, Cairo also had to turn to the IMF to deal with the economic shock, securing two more loans. Yet despite all this assistance, Egypt has not been able to fully turn its economy

around and it remains deeply vulnerable to external shocks. Even before the Russian invasion of Ukraine, Egypt was suffering from a worrying capital flight widely attributed to a volatile global economic situation. According to a recent report by Fitch Ratings, between September and December 2021, \$5 billion left the country. Since the onset of the war, hundreds of millions of dollars more have left its treasury markets as investors flee for safer markets, Reuters has reported. And the early maturity of a substantial portion of its debt adds to Egypt's imminent funding needs, Fitch Ratings has noted.

The conflict in Eastern Europe has also dealt a severe blow to Egypt's tourism sector, which represents another of its key sources of foreign currency, and it has further driven up prices of basic commodities, such as wheat and oil, on whose imports the country is heavily dependent. Egypt's deficit is also set to remain high this year. And the central bank stated April 7 that its net international reserves dropped to \$37 billion in March compared to almost \$41 billion by the end of February, the lowest point registered since mid-2020.

"Egypt has one of the highest debt burdens in the world, one of the highest shares of government revenues going on [debt] interests and one of the highest shares of government interest payments as percentage of the gross domestic product [GDP]," said Charles Robertson, global chief economist at the frontier investment bank Renaissance Capital. He told Al-Monitor, "This \$22 billion support from Qatar, the UAE and Saudi Arabia is a very big deal. It's 4% of the GDP and it covers the current account deficit of Egypt."

The announcements of financial support came after Sisi's tour of several Gulf states in the first months of the year. The Egyptian president first visited the UAE, where he met the country's ruler Mohammed bin Zayed Al Nahyan and King of Bahrain Hamad bin Isa Al Khalifa. In February, Sisi went to Kuwait. And in March, he traveled to Saudi Arabia and hosted Al Nahyan in the Egyptian city of Sharm el-Sheikh. According to the independent Egyptian online publication Mada Masr, citing official sources, the tour's goal was to secure direct financial cooperation agreements, particularly from Riyadh.

"[Gulf] states have provided significant support to Egypt in the past, including \$15 billion remaining in deposits at the Central Bank of Egypt before the Ukraine war. Further support was always a possibility, especially at a time when the oil price windfall significantly eases budget strains in the [Gulf] itself,"

Krustins noted. Yet the assistance offered now by the Gulf is different from that provided between 2013 and 2016. "The 2013-2016 aid was a mix of grants, in the form of fuel, and deposits, roughly \$15 billion each. This time, so far, we have \$5 billion in deposits and \$17 billion in investment pledges," David Butter, an analyst who has recently published a study on the relations between Egypt and the Gulf, told Al-Monitor.

"It feels there has been a shift. Now [the support] is more toward investment. So, it's quite long-term thinking. It's [more about] how to support the private sector. It's not just supporting a government. That's quite an important change," Robertson noted. Cairo's ability to secure financial assistance from its allies in the Gulf is also regarded as a possible IMF condition for agreeing to a new loan to Egypt. At the end of March, the financial institution announced in a short statement that the Egyptian authorities have officially requested its support to implement a comprehensive economic program.

"Egypt relied 100% on the Gulf from 2013 to 2015. They gave all their support to Sisi. From 2016 to 2020, it was the IMF and my clients — bond investors in America and Europe — that helped Egypt. Today it seems to be a mix of both," Robertson noted. The veiled bailout from the Gulf and a potential new IMF loan, however, has also given rise to criticism among those who consider that Cairo has not made the necessary economic reforms in recent years so as not to rely on further assistance.

"Egypt's government has attempted to suggest that the reason it finds itself once again in economic difficulty is strictly due to external shocks beyond its control. While these external shocks undoubtedly increased Egypt's challenges, there is no denying that poor governance and economic mismanagement contributed significantly to Egypt's economic vulnerability," Timothy Kaldas, policy fellow at the Tahrir Institute for Middle East Policy, said. He told Al-Monitor, "There's no denying that the pandemic and war made things harder for Egypt, but poor decision-making by Egypt's government made the country far more vulnerable to these external shocks." Despite such criticism, Egypt has received consistent praise from the IMF for its "resilience" and commitment to macroeconomic stability, structural reforms and new safety protections during the coronavirus pandemic. Egypt was one for the few economies in the world that sustained positive GDP growth — of 2.8% — during the pandemic.

The Gulf pledges have also generated unease due to the economic and political implications they may entail.

Economically, Cairo has taken significant steps in recent weeks to pave the way for the arrival of this assistance. In addition to the various bilateral agreements signed with the Gulf countries, the central bank raised interest rates in early March and devalued the pound. This last measure was especially applauded by the IMF, which also hinted in its statement that any further assistance would be conditional on its usual austerity recipe. Kaldas also noted that Egypt will have to pay a considerable price for Gulf assistance. "Most funds from the Gulf this time around are coming in the form of investments. This means the Gulf backers of the Egyptian government are pledging money in exchange for Egyptian state assets. They aren't just handing out cash assistance and low interest loans like before. They expect to profit from their aid to Egypt this time," he added.

On March 30, for instance, Abu Dhabi Ports Group, one of the region's largest logistics and transportation companies, announced the signing of an initial agreement with Egypt to manage the operations of the Red Sea port of Ain Sokhna and to manage and operate a river port in Minya governorate, it said in a statement.

On April 4, Egypt's sovereign wealth fund CEO Ayman Soliman told Al Arabiya TV that the firms targeted by the Saudi Public Investment Fund may include the state-owned Wataniya Petroleum and three power plants built by Siemens.

Politically, assistance from the Gulf has also been widely interpreted as trying to prevent Egypt's economic challenges from turning into political pressure. But more critically, aid from the UAE and Saudi Arabia could also be subject to greater support from Cairo for a new regional security scheme primarily designed to confront Iran. At the end of March, Mada Masr reported that Cairo remains quite skeptical to further tie its foreign policy to its powerful Gulf allies, but that the country remains under strong economic dependence.

That said, turning these ephemeral economic gains into something more durable will require a doubling-down on diversification efforts. MENA is still the most dependent region on fossil fuels by far. Oil rents account for 12% of GDP according to the latest data. Positively, virtually all MENA oil exporters now have comprehensive diversification plans in place; Saudi Arabia's Vision 2030 is the prime example. Plus, the last year has seen a series of economic reforms to make the region a better place to do business, with the UAE leading the

way with a barrage of measures tackling everything from the structure of the working week to unemployment insurance. Finally, inter-regional trade ties are strengthening: The embargo on Qatar was lifted in early 2021, while Israel has signed a host of deals with its Arab neighbors in recent years, most recently with the UAE.


Recent developments are therefore encouraging. However, many more structural economic reforms are still required if the Middle East and North Africa is to enjoy a prolonged period of high economic growth.

On economic prospects in the Gulf, Daniel Richards, senior MENA economist at Emirates NBD, said:

"The outlook for the GCC economies is constructive. Growth will be driven by increased investment and production in the hydrocarbon sectors, while the non-oil sectors will continue to recover from the pandemic contraction as restrictions have been eased, Covid-19 vaccination rates are high and international travel rebounds. However, higher inflation, slower global growth and rising interest rates are likely to prove headwinds to growth in the non-oil sectors. Improved fiscal dynamics for GCC oil exporters will allow governments to cushion some of the impact of higher global energy and food prices on their consumers, if they choose to do so."

Farouk Soussa, economist at Goldman Sachs, commented on Egypt :

"Egypt has received close to USD 13 billion in financial support so far from the Gulf, staving off the need for a sharper economic adjustment to the balance of payments shock it experienced in the wake of Russia's invasion of Ukraine. This has provided breathing space to negotiate a new programme with the IMF. [...] Policy makers appear focused on structural reforms, namely promoting private and foreign direct investment in the manufacturing/tradable sector. A range of initiatives are being launched to achieve these aims, including announced privatizations and a new traffic-light system indicating the state's degree of involvement in various sectors of the economy."


Dr. Goutam Mukherjee
Hony. Editor, JILTA



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.



Seize the opportunities of renewable chemistry



Today's leather tanneries not only have to deliver high-quality durable products – they must also deliver them with minimal environmental impact and without compromising on the health and safety of people. At Stahl, we see this as an opportunity to support our customers and the wider leather industry in driving responsible products and sustainable living in close

cooperation with our partners, we recently launched Stahl Impact®, a family of leather chemical solutions made with renewable feedstocks. Stahl Impact® will help tanneries to reduce their environmental footprint without compromising on the quality and performance of their products, since these ZDHC-compliant solutions deliver the same or improved

function performance to conventional alternatives. After the introduction of 7 product solutions of renewable carbon polyurethanes for tannery and topcoats in leather finishing, we've now also introduced 13 specific solutions of renewable carbon wet-end products for leather processing.

If you would like more information about Stahl Impact® or how we can support you to embrace the opportunities of an exciting leather industry, visit [stahl.com](mailto:communications@stahl.com) or get in touch with us at communications@stahl.com.

If it can be imagined, it can be created.



STAHL PICKLE-FREE LEATHER TANNING SOLUTIONS



“Our innovative pickle-free tanning agent adds an innovative solution to Stahl’s leather chemicals portfolio of process chemicals for responsible, high-quality leather production. 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 eco-friendly premium leathers.”

Mr. Prasanna Maduri, Stahl Campus Manager India, explains the added value of sustainable technologies like the pickle-free tanning process:

“The key benefits of the pickle-free technology are that it reduces the effluent load and eliminates the use of salt, acid and the basification process, depending on the type of substrate. This way we can reduce water consumption by about 40% and work towards a more efficient tanning process.

Advantages of pickle-free tanning

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:

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

Features of Salt-free tanning

- ❖ No usage of Sulphuric acid and salt
- ❖ Reduction in tanning time - depending on substrate
- ❖ Reduced discharge of hazardous chemicals in effluent load
- ❖ Hydrogen gas formation is completely eliminated as compared to conventional pickling system
- ❖ Pickle free tanning – carried in Low float with complete elimination of Sodium chloride and Sulphuric acid
- ❖ No additional infrastructure is required
- ❖ Reduction in the offer of chrome dosage
- ❖ High uptake and exhaustion of Chrome - higher fixation of chrome in the leather as a result low residual chrome in the discharge
- ❖ Average Cr content > 4.0%



STAHL POLYMERS LAUNCHES RELCA® PD-805 MATTING RESIN TO TACKLE ENVIRONMENTAL AND SUPPLY-SIDE CHALLENGES

Stahl, has introduced a new, water-based, and additive-free matting resin, Relca®PD-805, to its Relca®Matt_Binders portfolio. The 100% clean, VOC-free solution is targeted at paint and coating and printing and packaging markets, providing a safe, affordable, and high-quality matting performance for wood, metal, plastic, and glass. In this way, Relca®PD-805 helps customers to achieve regulatory and environmental compliance while also ensuring a superior matte finish.

In contrast to traditional matting solutions, which use additives to lower the gloss level for paints, coatings or inks, Relca® PD-805 is a water-based resin, meaning it can achieve a quality matte finish without the use of added matting agents. This, and the fact that Stahl's solution is free from other additives, including formaldehyde, amines, solvents, and heavy metals, makes the product less sensitive to current supply-chain volatility and steep rises in the price of raw materials.



In addition to its superior matting efficiency, Relca®PD-805 delivers a high level of thermal and chemical resistance, superior anti-blocking, anti-fingerprint, wetting abilities and improved abrasion resistance compared with current market alternatives. For end-users, this means tougher, more durable coatings that last longer, with no compromise on finish. Moreover, the formulation of Relca®PD-805 is also more stable than standard matting agents, meaning it has a longer shelf life and experiences fewer separation and sedimentation issues during transport and storage.

A future-focused approach to better coatings solutions

Stahl believes in the power of innovation to respond to customer demand and changes in the paints and coatings marketplace. With increasingly stringent legislation around the use of solvents in the paints and coatings industry, as well as growing supply chain uncertainty, new solutions are needed to ensure coatings are both environmentally friendly and affordable.

“In line with our commitment to sustainable development and responsible chemistry, we are helping to advance the transition to water-based coating technologies,” says Raymond Bakker, Global Business Director of Stahl Polymers. “Based on rigorous performance testing, our Relca®PD-805 resin shows clear advantages in a number of key areas compared with conventional matting agents like silica. The fact it is free from additives also means it is less harmful to health and the environment, and more resistant to rising raw material costs. With this new technology, we can help our customers to make cost-effective decisions that also help protect our planet. For us, water-based resins are the future of coatings solutions.”

(Stahl Website – 01/06/2022)





From the desk of General Secretary

ELECTION SCHEDULE FOR RECONSTITUTION OF EXECUTIVE COMMITTEE OF ILTA AND THE REGIONAL COMMITTEES FOR THE TERM 2022 - 2024

The Executive Committee of ILTA at its 548th Meeting held on 24/02/2022 approved the following schedule for Election of Executive Committee of ILTA and the Regional Committees for the term 2022-2024.

Sl. No.	Events	Election Schedule for 2019-2021	Day
1	Mailing of Nomination papers & Voters' List on or before	02.05.2022	Monday
2	Last date for receipt of Nomination Papers	24.05.2022	Tuesday
3	Last date for receipt of Consent	13.06.2022	Monday
4	Last date for withdrawal of candidature	17.06.2022	Friday
5	Mailing of ballot papers on or before	06.07.2022	Wednesday
6	Last date for receipt of Ballot Papers from the voters residing outside Kolkata PIN Code areas	03.08.2022	Wednesday
7	Casting of votes by voters residing in Kolkata PIN Code Areas at ILTA Administrative Office 10-00 to 17-00 hrs. (LUNCH BREAK: 1-30 to 2-30 PM)	02.08.2022 & 03.08.2022	Tuesday & Wednesday
8	Counting of votes at ILTA Administrative Office from 11-00 hrs. onwards	05.08.2022	Friday

Mr. Dhiman Chakraborty, Controller of Finance, The Asiatic Society (Under Ministry of Culture, Govt. of India), Kolkata has been acting as the Returning Officer for the Election.

72ND FOUNDATION DAY CELEBRATION OF ILTA

The acting Executive Committee in its Meeting held on Thursday the 16th June' 2022, after a detailed discussion has decided to

celebrate the Foundation Day at The Science City Auditorium on Sunday, the 14th August 2022 as per following program :-

03.00 PM to 06.00 PM : B. M. Das Memorial Lecture & Felicitation of Award Winners

06.00 PM to 06.30 PM : Tea Break

06.30 PM to 08.30 PM : Cultural Program

08.30 PM to 09.30 PM : Dinner

Detailed programme when finalized will be notified to individual members in due course including publishing the same in the August, 2022 issue of JILTA.

41ST LEXPO AT KOLKATA

The acting Executive Committee in its Meeting held on Thursday the 16th June' 2022, after a detailed discussion has decided to organize the 41st edition of Kolkata LEXPO at Kolkata Ice Skating Rink.

We have proposed to the KISR authority for some alternative schedules between Mid-December to Mid-January, as per their advice and till date the matter is yet to be finalized.

However, we will notify the status and details of the program to every member through individual communication as well as through JILTA nearer the program.



(Susanta Mallick)
General Secretary

YOUTUBE CHANNEL & FACEBOOK PAGE OF ILTA

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

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

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

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

2022-2023



PROJECT PARTNERS IN ASIA



Pradipta Konar, Programme Manager-Leather(Kolkata): pradipta.konar@solidaridadnetwork.org

Solidaridad Regional Expertise Centre

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

The Effects of Leather Processing on the Environment and Alternatives to Chrome Tanning

Dr. Dibyendu Bikas Datta

National Institute of Fashion Technology, Ministry of Textiles, Govt. of India, Kolkata



ABSTRACT

Leather production involves several processes. Tanning is one of the processes. A higher concentration of chromium is commonly used in the tanning process. At the same time, chromium is considered a toxic heavy metal. The discharge of these chromium effluents into bodies of water is known to have a variety of negative consequences. Vegetable tanning can be used as a substitute because it is simple and environmentally friendly. In this review, we discussed various leather processing procedures, particularly chrome tanning, as well as the health risks associated with chromium. A note on using tannins from vegetables instead of chrome tanning to help the environment is also included.

KEYWORDS: tanning; chromium; tannins, leather, eco-friendly

INTRODUCTION

Human beings have been using leather since Palaeolithic times. Skins which protected animals have been used down through the centuries to provide humans with protection from the weather in the form of a second skin. It is hard to imagine how we could have survived freezing winter conditions without the protection of animal hides. As human civilization became more sophisticated so did the techniques for the preparation of leather and more and more uses were found for this incredibly versatile material. Today, less than 1% of leather production comes from animals reared exclusively for their hides. Leather production is a by-product of the meat industry and is centered on the hides from four species of animal: cows 65%, sheep 15%, pigs 11% and goats 9%. Without the processing of animal hides into leather there would be serious environmental consequences resulting from the disposal of animal hide [1].

The global leather goods market size was valued at USD 394.12 billion in 2020 and is expected to grow at a Compound Annual Growth Rate of 5.9% from 2021 to 2028. The market is mainly driven by rising consumer disposable income, improved living standards, changing fashion trends, and growing domestic and international tourism. The rising demand for comfortable, trendy, and fancy leather apparel, footwear, and accessories, along with growing brand awareness, is expected to have a positive impact on the market. Attractive and luxurious leather products are often viewed as a style statement and status symbol. The rising demand for contemporary designs offered by prominent international brands is driving the demand for various leather goods, including apparel, footwear, and accessories [2].

The COVID-19 pandemic has had a negative impact on the overall leather industry, including the footwear, apparel, and accessories categories. Retailers faced severe losses during the first two quarters of 2020. Many manufacturers in the market have historically relied on China for finished products as well as raw materials used in the manufacturing of various leather goods. The pandemic has, however, disrupted the supply chain, causing severe losses in terms of product shipment and on-time delivery [3].

The leather industry has been a key player in the global commerce market for millennia, some even claiming that it may be the second oldest profession in the world. Today it is indisputably a major industry of huge economic importance on an international scale; in just one year alone, 23 billion square feet of leather is produced, at an estimated cost of USD 45 billion. The majority of developing countries, including India, produce 60 % of the world's leather requirements. Leather is the primary product of the tanning industry, and it is used to

Corresponding author E-mail : dbdatta@yahoo.com

make footwear, furniture, and bags, among other things [4]. However, the industry has not been unaffected since its genesis, but rather has experienced many significant and consequential changes, particularly in the last 20 to 30 years.

Tanning is a primary process for producing leather that involves more chemical reactions and mechanical operations. During the process, more chemicals, such as chromium and acid solvents, are used. These processes emit 30 L/kg of processed skin [5], whereas Indian tanneries emit more than 100 L/kg of processed skin.

Chromium is a primary heavy metal exploited in the leather industry. In India, it was found to release 30 billion of wastewater with 3000-5000mg/L of total solids and chromium of between 100-200mg/L on processing 700,000 tons of skins in about 3000 tanneries. More than 170,000 tons of 0.04 Mt Cr (III) waste per year are released worldwide. The world industry is desirous of taking cleaner and greener approaches to leather processing as environmental awareness grows and manufacturing patterns change [6].

Global leather has been in existence during which technologists were concerned about inflicting stability on raw skins and hides. Until the advent of chrome tanning, there were very few options available for tanners, such as aluminium tawing, smoke tanning, oil tanning, and vegetable tanning. The term tannin was first used in 1796 by Seguin to specify the specific components of vegetable extracts having a potential to bind with collagen-making insoluble complexes by blocking the action of other proteolytic enzymes that affect the physical condition of the skin [7].

This extraction includes non-tannins and other materials having no tanning strength, which contributes to determining the functional properties of leather. Oils of animal leather are also smoked, where the oil in an animal's brain is used as a tanning agent, which gives highly durable leather. Today, chrome tanning is the most commonly used method, which accounts for the world's leather production. Although chrome tanning has many advantages like high speed, low cost, good hide storage, 40% of the chromium remains in the effluent, resulting in sludge. One of the most serious issues facing the leather industry is chromium disposal, resulting in chromium-contaminated sludge [8]. Due to these disadvantages of chrome tanning, tanners are encouraged to use eco-friendly tanning processes like vegetable tanning.

HISTORY OF LEATHER TANNING

Tanning is one of the ancient trades of humanity, judging by the use of leather in archeological sites and cave paintings. Tanning had a random nature, which evolved slowly into a craft in the Middle Ages. The scientific studies on tanning started in the 19th century and derived into present-day leather technology with the development of machinery and the industrial revolution. The Egyptians made durable leather, which is a 3000-year-old specimen but still in good condition, which made the evidence for oil tanning. The rudimental processing of leather is mentioned in Assyrian texts and Homer's Iliad [9]. At first, the skins obtained from hunting and livestock breeding were used for clothing and tents. Still, they stiffened at low temperatures and rotted with heat, which was overcome after many attempts by a process called smoking, where the animal fats were rubbed to get more flexible. This process became the origin of leather processing by accident [10]. There was no change in skin processing from the Middle Ages till 17th century. With the rise of industrialization at the end of the 18th century, there was a demand for various types of leather for machine belting, leather for textiles, footwear, and other applications.

Similarly, at the end of the 19th century, the tanning industry was developed with the discovery of various leather processing, its effects on the environment, and alternatives to chrome. Tanning chemicals as tanning agents, and finally, with the discovery of major tanning agents like chromium and alum, the beginning of industrial-scale tanning. According to references, it was in the Neolithic period when man started using plant materials such as bark, pods, and leaves to prevent skins from putrefaction, forming the most stable and durable material. The term "skin" is used to determine the outer part of mature animals of smaller types, such as pigs, goats, reptiles, fish, etc. The term "skin" refers to the outer part of large animals such as buffalo and cattle [11].

LEATHER PROCESSING STEPS

(i) SOAKING

Soaking is the first step involved in tanning, where the preserved raw skins or salted skins are treated with water to make the skin dirt free and soft. The primary purpose of soaking is to remove salt, rehydrate the dry skin, and also remove unwanted materials like blood, soil, dung, etc. The soaking time depends on the condition of skins or hides [12].

(ii) LIMING

The second operation is liming, which involves the removal of hair and unwanted materials that are not transferred to leather. It also loosens the epidermis and removes soluble skin proteins. It uses lime and sodium sulphide as liquor. The hair gets loosened due to an increase in pH. The higher pH also causes fiber bundles to split and swell [13]. Dehairing and fleshing are also done to remove extra flesh and allow tannins to penetrate easily.

(iii) DELIMING

Deliming is the process of adjusting pH between 8-9, which enhances the enzyme activity and converts proteins into soluble forms. It uses ammonium sulphate and results in the de-swelling of pelts [14]. Deliming decreases the plumpness of the skin or hide.

(iv) BATING

Bating makes the grain surface soft and flexible. It prepares the skin for tanning. It is an enzymatic operation that removes unwanted proteins and increases the degree of stretch [15]. It imparts flexibility and softness to the leather.

(v) DEGREASING

Degreasing is a process used to remove extra fat and oils, which allows the tannin to penetrate easily through the skin. This step can be carried out by emulsifying fats using detergents or surfactants.

(vi) TANNING

Tanning is the main operation that converts skin or hides into a stable material called leather. In this step, tannins are allowed to interact with the prepared skin, which acts on collagen and makes it more durable.

(vii) FIXING

Formic acid is primarily used to ensure the homogenous tanning of hides in leather processing [16].

(i) MINERAL TANNING

Mineral tanning is a process that uses basic chromium sulphate as a tanning agent after the process of pickling. Once the desired penetration level is reached, the pH increases to facilitate the process termed basification, and the obtained product is called wet blue [16].

(ii) TAWING

Tawing is another practice that uses aluminum salts, alum, and other materials such as flour, egg yolk, and other salts. It is an age-old traditional process that gives a wet white product. In this method, the skin is tawed in an alum and salt solution, which increases flexibility, stretchability, etc., whereas egg yolk and flour enhance the handling properties. Tawing was conventionally used on goatskins and pigskins [17].

(iii) CHROME TANNING

Chrome tanning is the most commonly used tanning process. It uses Chromium (III) sulfate, considered the most effective and efficient tanning agent. It forms polychromium compounds by ololation, which act as active tanning compounds that crosslink the collagen subunits. The leather obtained by chromium contains 4-5 % of chromium, and its efficiency is determined by enhanced hydrothermal stability and resistance to shrinkage at high temperatures. Although chrome is an effective tanning agent, it has some hazards for humans [18].

EFFECTS OF CHROME TANNING ON HUMAN

The health risks and skin irritations from chrome tanned leather go beyond the leatherworker, all the way to you, the consumer. Between 1 and 3% of the adult population worldwide is allergic to chromium III, which is present in all chrome tanned leather products, and will react to chrome tanned leather with serious skin irritation. Someone using a pair of chrome tanned leather gloves or sandals, for example, can develop rashes and sores. The European Union has researched the chrome tanned leather industry, and regulates its use for products that come in frequent contact with the skin, such as automobile interiors, furniture upholstery, and more. But the risk of skin irritation and rashes from chromium III are seemingly inconsequential when considering the risks to consumers and leatherworkers exposed to chromium VI.

LEATHER TANNING METHODS

Chromium has two forms with an important distinction. Trivalent chromium, or chromium III, which we've been discussing, is benign to humans at low levels, but hazardous to leatherworkers who are exposed daily. Hexavalent chromium, or chromium VI, is a proven carcinogen that causes cancer, respiratory problems, and damage to internal organs.

While hexavalent chromium is not used in leather tanning, chromium III is the main ingredient in chrome tanning, and can transform into chromium VI in several different ways. Chromium III becomes the dangerous chromium VI during the leather finishing process, when oils or waxes are applied. Once the leather is finished, this transformation can also occur during the manufacturing process if leather is heated or treated with friction when applying wax. The chromium III present in finished chrome tanned leather products turns into chromium VI with exposure to heat, sunlight, and oxygen. So if chromium VI is not formed in leather during the finishing or the manufacturing process, it is highly likely that it will form in your finished product through normal use. The European Union's research into the chrome tanned leather market found a considerable influence on the formation of chromium (VI) in leather could be attributed to ageing and UV irradiation. When German regulators tested finished leather products for chromium VI between 2000 and 2006, chromium (VI) was detected in more than half of 850 samples. Several studies are available backing up this research, for example, in 2011; a small scale Danish study found that almost half of imported leather shoes and sandals contained chromium VI. It is possible as a consumer to avoid risking exposure to hexavalent chromium, but it requires a shift from the leather industry, and a commitment from consumers to vote with their dollars, and buy vegetable tanned leather products. Every purchase of a cheap, chrome tanned leather product reinforces the paradigm that consumers value low cost, over the effect their purchase has on the environment, the health of those who made it, and their own health.

VEGETABLE TANNING

Vegetable tanning is the most eco-friendly process, which results in the release of fewer pollutants into the environment. Vegetable tanning involves the use of tannins extracted from various parts of a plant. It mainly depends on the number of tannins in the extract that can be determined by various methods such as the Folins Denis method, mass spectrophotometer, UV detection, Reverse-phase High-pressure Liquid Chromato-

graphy, mass spectrophotometer, nuclear magnetic resonance, and circular dichroism. Vegetable tanning is a two-stage tanning that includes fixing and penetration. Penetration involves diffusion of tannins into the skin, whereas fixing makes the penetrated tannins bind with collagen, forming a stable material. It is mainly affected by several factors, such as temperature, pH, mechanical actions, and particle size. pH is the most important factor that affects the penetration and fixing of tannins. The reduction of pH in tanning liquor increases the potential of collagen fibers to swell and increases the tendency of tannins to bind with collagen. Temperature is another important parameter which affects vegetable tanning. An increase in temperature results in high diffusion of tannins and gives a high degree of tannage. The amount of acid and salt content in tannin liquor greatly influences the physical condition of leather [9]. Control of these parameters produces the most durable and flexible leather, which results in the release of fewer contaminants and thereby protects the environment. Hence, the current study is an eco-friendly approach that reduces toxic waste generation compared to the chrome tanning process and thereby reduces environmental impacts by contributing to the greener or cleaner development of leather processing.

(I) TYPES OF TANNINS

Tannins are water-soluble phenolic compounds capable of turning animal skins or hides into leather [19]. Structurally, tannins possess 12–16 phenolic groups and 5–7 aromatic rings per 1,000 units of relative molecular mass. They are mainly grouped into two types, condensable and hydrolyzable tannins, based on their structural properties (Figure 1).

(a) HYDROLYZABLE TANNINS

Hydrolysable tannins represent esters of phenolic acids (generally gallic acid as in gallotannins or other phenolic acids derived from the oxidation of galloyl residues as in ellagitannins) and a polyol, usually glucose. The galloyl groups can be further esterified or oxidatively crosslinked to yield more complex hydrolysable tannins. The molecular masses range from 300–5,000 Da. Many studies have proved that small flavonoids are more beneficial to health when compared to large ones and the research goals to obtain highly active biological small molecules from large tannins have been conducted. These tannins are found only in dicotyledonous plants. They are sub grouped into gallotannins and ellagitannins [20]. These tannins have

D-glucose at the center where hydroxyl groups of carbohydrates are partially or wholly esterified with a phenolic group, i.e., ellagic acid in the case of ellagitannins and gallic acid in the case of gallotannins. Gallotannins are polymers of galloyl units that are bound to many polyol units derived from D-Glucose, where the hydroxyl functions of polyol may be substituted by galloyl units. Ellagitannins contain galloyl units and hexahydroxydiphenol units formed by oxidation of galloyl groups [19].

(b) CONDENSED TANNINS

The most important studied group of polyphenols is that of the condensed tannins also termed proanthocyanidins (Figure 1), which are among the most abundant polyphenols in the plant kingdom. A typical property of proanthocyanidins is that they yield anthocyanidins upon heating in acidic media. The latter class of flavonoids is responsible for the pigments that give the dark red, blue, and purple colors [21]. The most common

members of the proanthocyanidins are the procyanidins, composed of the monomeric flavan-3-ols (+)-catechin and/or (-)-epicatechin (Figure 1). These elementary units are usually linked by C-C and occasionally by C-O-C bonds. Condensed tannins are non-branched polymers of flavonoids with a molecular weight of 1000–20,000 Da. The monomers of condensable tannins include catechin and epicatechin. Condensable tannins are the most common tannin found in almost all families of plants [22].

(II) VEGETABLE TANNING AND THE MECHANISM OF TANNING

Vegetable tanning refers to the tanning of skins or hides using the tannins obtained from barks and leaves. Tannins are astringent, water-soluble polyphenolic compounds with a molecular weight of 500–20,000 and can precipitate proteins. Tannins can be found in different plant parts like fruits, seeds, pods, stems, leaves, tubers. There are mainly two types of

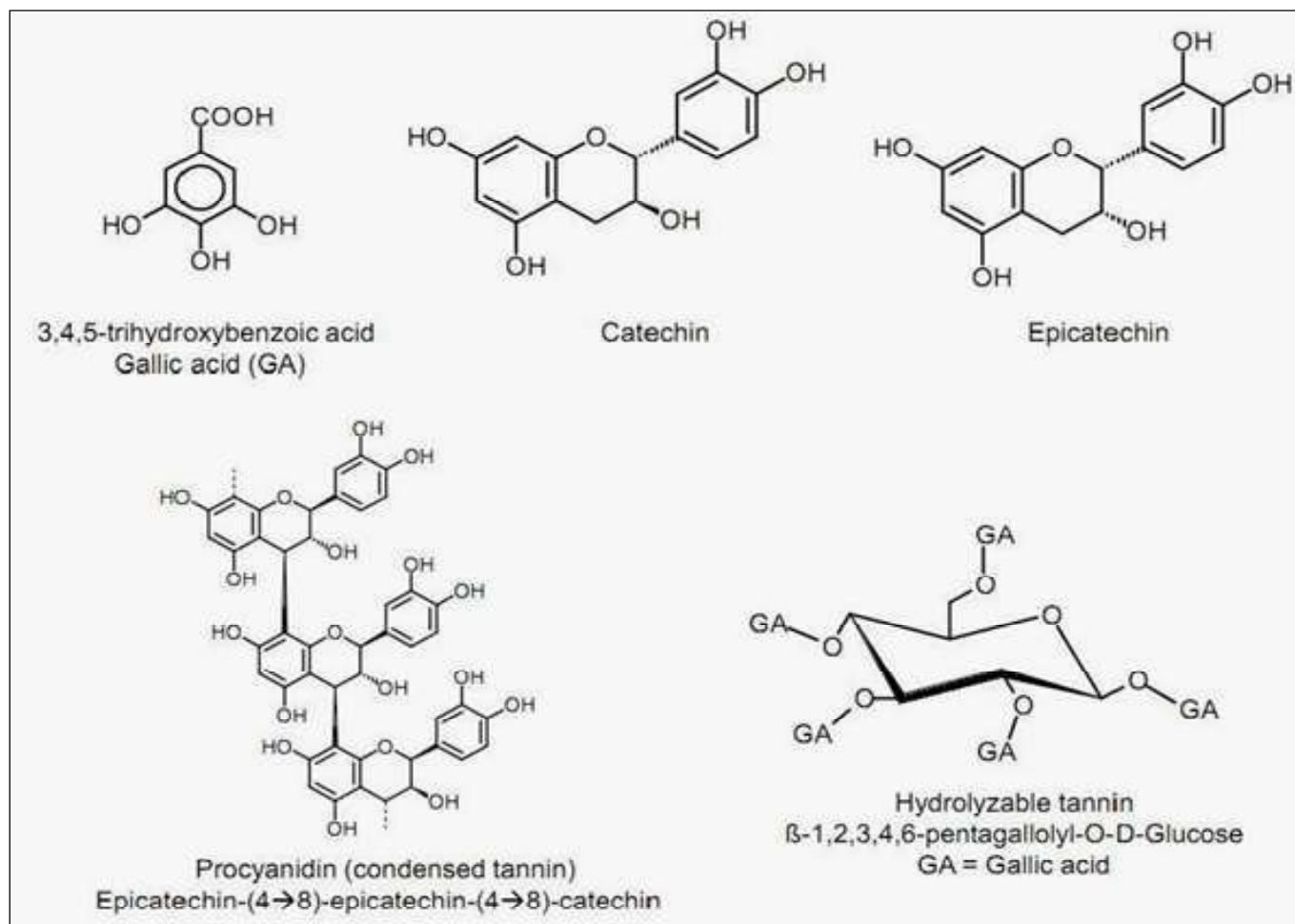


Figure 1. Typical Structures of hydrolyzable and condensed tannins.

tannins based on their properties and structure. Both hydrolysable and condensed tannins are used in the tanning process. The quality of leather differs based on the source of tanning materials. The tanning materials also affect the physical characteristics of the leather, which are taken from the exact origin. Vegetable-tanned leathers have high wear resistance, molding properties, solidness, and flexible endurance [23]. Vegetable-tanned leather is widely used in making upper shoe leather, furniture leather, and garment leather.

The mechanism of vegetable tanning involves the interaction

of the primary group's collagen protein with the acidic group of tannins by polyfunctional crosslinking. The interaction between protein and tannin is mainly hydrophobic and hydrogen bonding, as shown in Figure 2. They form hydrogen bonds between the peptide oxygen of collagen and polyphenolic-OH groups or between oxygen atoms of phenolic-OH groups and protonated amino groups. The factors responsible for the tanning mechanism are pH, temperature, tannin concentration, salt content, and the condition of the hide [24].

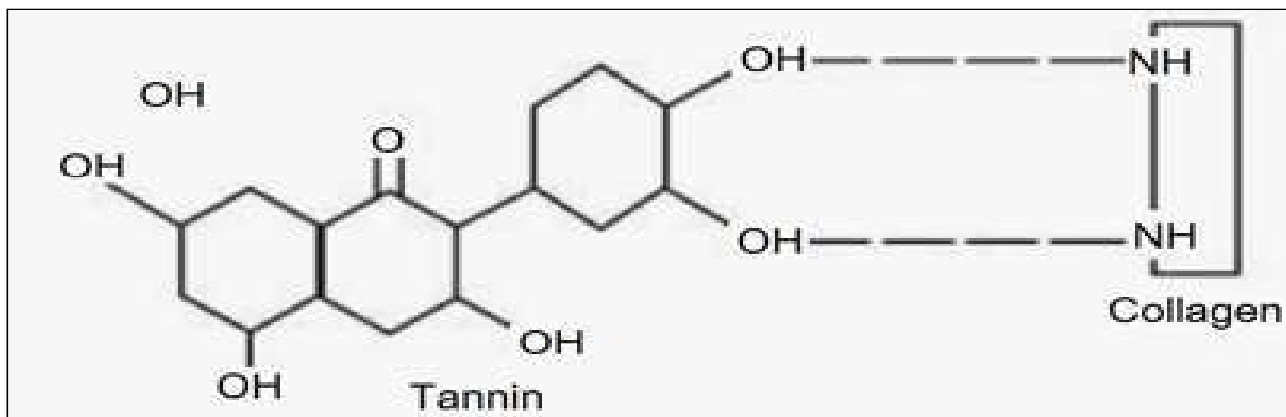


Figure 2: Mechanism of tanning

(iii) ADVANTAGES OF VEGETABLE TANNING

- Vegetable tanning is environmentally friendly; meaning any leather products that have been vegetable tanned can be recycled
- Vegetable tanning is an age-old tradition, so most tanneries have very skilled craftsmen producing and dyeing the leather
- Due to the natural tannins used, vegetable tanned products are unique and have their own life, they are not the same for their entire life, but they change, continuously, for the better
- The colours produced by vegetable tanning are rich and warm tones that appear completely natural.
- Vegetable tanned leathers are more valuable and thus sold at a higher average price compared to chrome tanned leathers

(iv) DISADVANTAGES OF VEGETABLE TANNING

- The average process time of vegetable tanning is quite similar to chrome tanned leather but it can take up to 60 days to produce sole leather

- It can stain easily in the presence of iron
- Products that have been vegetable tanned are more expensive. They require much more skill to tan the hides, this means they are of better quality
- The colors you can produce from vegetable tanning are limited
- Direct heat can cause vegetable tanned products to shrink or crack

(v) COMMONLY USED VEGETABLE TANNINS

Many plants rich in tannins had been used over time. Table 1 lists the most important sources of tannins used in European tanneries until development of mineral tanning since before the 18th century the autochthonous plants were the main raw vegetable tanning materials. However, with the growing need for leather and the increase in trading between Europe and other continents such as Africa, Australia and South America, other exotic sources arrived at Europeans tanneries in large amounts and low cost [25].

Table 1 : Post-medieval and traditional vegetable tanning materials used in Europe

Botanical Name	Common Name	Part Used	Main Tannins	Origin and Distribution
<i>Acacia mearnsii</i>	Mimosa, wattle	Barks	Condensed	Australia, cultivated in South Africa since 1864 and South America. Imported since 2nd decade of 19th century, commercial extracts
<i>Betula</i> spp.	Birch	Barks	Condensed	Northern Europe, Russia. Used to produce Russia leather
<i>Caesalpinia coriaria</i>	Divi-divi	Pods	Hydrolysable: gallotannins	Central and South America. Imported since late 18th century
<i>Castanea sativa</i>	Chestnut, sweet chestnut	Wood	Hydrolysable: ellagitannins	Mediterranean region. Since 19th century, commercial extracts. Used mixed with other vegetable materials to produce firm leather
<i>Coriaria myrtifolia</i>	Mediterranean coriaria (emborrachacabras, redoul, roldor, rodor)	Leaves (redoul)	Hydrolysable	Southern France and Mediterranean coastal Spain
<i>Cotinus coggygria</i> (syn <i>Rhus cotinus</i>)	Smoke tree	Leaves (Venetian or Turkish sumac)	Hydrolysable: gallotannins	Southern Europe, Mediterranean region
<i>Larix</i>	Larch	Bark	Condensed	Northern Europe
<i>Mirtus communis</i>	Myrtle	Leaves	Hydrolysable: ellagitannins	Southern Europe, Italic Peninsula
<i>Picea abies</i>	Norway spruce	Barks	Condensed	Alps, Pyrenees, Germany, Scandinavia, northern and central Europe
<i>Pinus halepensis</i>	Aleppo pine	Barks	Condensed	Coastal areas of the western Mediterranean region, northern Europe, yields reddish leather
<i>Quercus aegilops</i>	Valonea oak, Turkish oak	Acorn cups	Hydrolysable: ellagitannins	Eastern Mediterranean region Middle Ages in Turkey, Greece, Italy
<i>Quercus coccifera</i>	Garouille	Husk of root (rusque)	Hydrolysable	Mediterranean region, south of France
<i>Quercus infectoria</i>	Aleppo oak	Galls (Aleppo galls)	Hydrolysable: gallotannins	Eastern Mediterranean region , Europe
<i>Quercus ilex</i>	Holm oak	Barks	Condensed, hydrolysable	Central-western part of the Mediterranean, Iberian Peninsula
<i>Quercus</i> spp. (<i>Q. ilex</i> , <i>Q. robur</i> , <i>Q. petraea</i> , <i>Q. pyrenaica</i>)	Oak	Barks, wood	Condensed, hydrolysable: ellagitannins	Europe

Botanical Name	Common Name	Part Used	Main Tannins	Origin and Distribution
<i>Quercus suber</i>	Cork oak	Inner bark	Condensed, hydrolysable: ellagitannins	Iberian Peninsula
<i>Rhus coriaria</i>	Sumac	Leaves (Sicilian sumac)	Hydrolysable: gallotannins	Mediterranean region, Southern Europe, yields light colored, soft and supple leathers. Used to produce basil and cordovan leather.
<i>Salix</i> spp.	Willow	Barks	Condensed	Northern Europe, Russia, yields light colored yellowish-brown leather, soft and flexible
<i>Schinopsis balansae</i> , <i>S. lorentzii</i>	Quebracho	Wood	Condensed	South America, imported and used in Europe since last decades of 19th century
<i>Terminalia chebula</i>	Myrabolans	Fruits	Hydrolysable	India, British Islands, Used in mixed tannages for sole leather

Various vegetable tanning materials are used in leather processing worldwide based on tannin concentration and their availability in plants. Some of the plants used for tanning are quebracho (20%), chest nut (10.7%), behra nuts, etc. Most acacia species are used for tanning due to their high tannin concentrations.

NANOMATERIALS AND ECO-FRIENDLY LEATHER PROCESSING

With nano-oxides, polymers, and metals, it is feasible to reduce the amount of chemical products and also improve the properties of leather. Thus, it is possible to reach a more eco-friendly and effective process with the use of nanomaterials to turn hide/skins into finished leather. Because of their small size and their ability to combine with polymers, nanoparticles show their potential for application in tanning. The introduction of nanoparticles into tanning agents enhances leather's physical and mechanical properties. To do this, silver nanoparticles, due to their properties against bio-activities, can even impart some functional properties such as anti-microbial, UV-resistance, and fungal resistance of leather [26]. Raji et al. (2019) used various tannins mediated silver nanoparticles for the tanning process and were able to produce durable leather [4].

LEATHER AND ENVIRONMENT

Though we may consider ourselves intellectually and technologically superior to our cave-dwelling ancestors, we

still adorn our bodies, transports, and homes with the skin of conquered animals. But unlike the wholly organic methods used by our forebears, the modern leather industry is simultaneously killing the local environment and the people that work there with a toxic slurry of chemicals.

The current worldwide market for leather is booming: The 23 billion square feet produced annually is worth more than USD 77 billion, according to recent estimates published in the Scribes Guild Journal. Leather footwear is far and away the largest outlet for the stuff, valued at USD 47 billion—over 60 % of the world total trade in the 2020-21 period—while the next largest outlet, leather goods and products (including gloves) were worth about USD 12.3 billion and constituted 15.9 % of the total world trade. Leather clothing, auto upholstery, home furnishings, and miscellaneous other uses rounded out the remaining outlets with between 8 and 14 % shares.

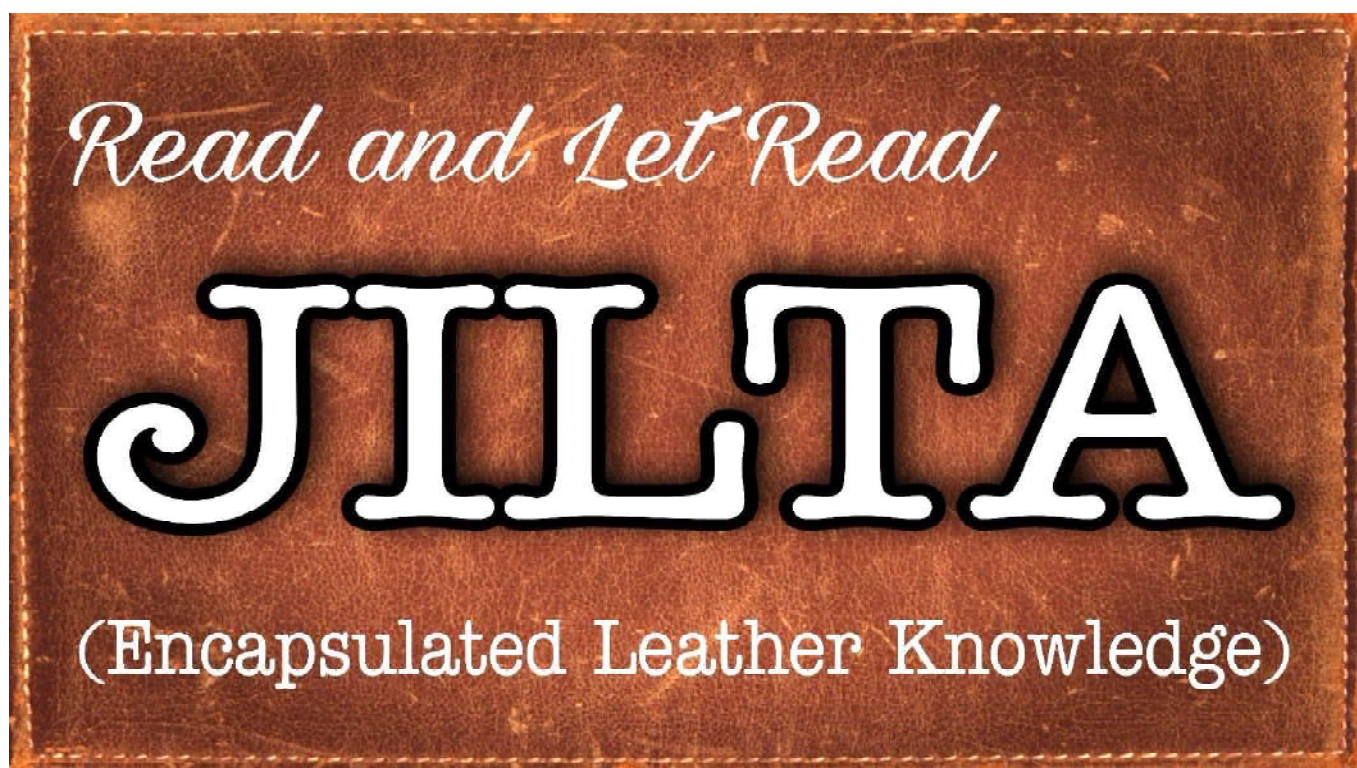
The global environment is continuously deteriorating due to the many socio-economic activities of humans [27]. Processing industries are causing much damage to the environment. Leather processing is one such industry that takes skins from the meat industry and processes them to produce leather through the tanning process. It has had a negative impact on society because of its pollution. Leather processing involves various operations, including many chemicals expelled in processing [28]. For example, 40 liters of water is required for processing 1 kg of skin, which results in the generation of a large amount of effluent, leading to an increase in biological oxygen demand,

chemical oxygen demand, dissolved oxygen, etc. [27]. It also results in the emission of chromium and sulfate ions [29]. The leather industry also emits an obnoxious smell due to protein degradation of the skin, resulting in the generation of toxic gases such as ammonia, Hydrogen sulfide, etc. According to the research data, only 20% of the rawhide is used to produce leather, while the remaining is generated as waste. Hence, the leather industry is considered one of the major polluting industries, producing a considerable amount of solid and liquid waste. The most critical approach to preventing environmental pollution is realizing that prevention is better than reuse, which is better than the disposal of waste. There are various recycling methods to make generated leather waste into valuable eco-friendly bi-products, such as the production of fatliquoring oils and bio-diesel from pre-fleshing wastes, production of activated carbon, gelatin, retanning agents, etc., from shavings and trimmings, production of grease, methane gas, fertilizers, etc., [30] from fleshing waste. Hence, cleaner production and recycling are the best options to control environmental pollution.

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Queenstown sits on the shores of the South Island's Lake Wakatipu, set against the dramatic Southern Alps. Renowned for adventure sports, it's also a base for exploring the region's vineyards and historic mining towns. There's bungee jumping off Kawarau Gorge Suspension Bridge and jet-boating on the Shotover and Dart rivers. There is also the possibility of skiing on the slopes of The Remarkables and Coronet Peak.

The three-day programme promises excellence in science, along with practical examples of science impact and the drive to sustainable leather production. We seek to foster strong and lasting bonds between leather scientists across the international community with companies engaged in leather production and chemical companies who deliver the products used to manufacture leather.

Main Topic Areas:

- ❖ Advances in Basic Science of leather
- ❖ Benign chemical developments
- ❖ Cleaner leather production and closed-loop processing
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- ❖ Intelligent leather technologies – Industry 4.0
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AIM FOR NET-ZERO CARBON FOOTPRINT IN LEATHER PROCESSING : JITENDRA SINGH



Union Minister of State for Science, Technology and Earth Sciences Jitendra Singh on Thursday stressed on the need to bring the carbon footprint of leather processing activity to zero. Speaking at the platinum jubilee celebrations of the Central Leather Research Institute (CLRI) here, Singh said, "The Indian leather industry must seek net-zero carbon footprint to meet the environmental norms."

He added that the carrying capacity requirement of the leather sector in locations like Tamil Nadu demands the implementation of zero liquid discharge. Singh released a coffee table book containing 75 success stories related to CLRI to commemorate the 75th year of the institute and Azadi Ka Amrit Mahotsav. A special stamp and envelope brought out by the Postal Department to mark the occasion were also released by the minister on the occasion.

(The New Indian Express – 20/05/2022)

SMES REMAIN UPBEAT ON DEMAND REVIVAL, SAYS SURVEY



Confidence amongst India's small businesses remains high with a majority of SME executives expecting improvement in the second quarter of 2022 on most of the parameters including sales, capacity utilisation and hiring, according to the ASSOCHAM-Dun & Bradstreet Small Business Confidence Index (SBCI).

The index, which measures the level of optimism of small and medium businesses on key business parameters such as sales, employment, prices, inventory and investment, stood at 87 in Q2 2022. An index value above 50 signals an improvement or increase in the forthcoming quarter compared to the same quarter in the previous year. All indicators suggest a likely expansion in economic growth during Q2 2022.

One of the primary findings of the ASSOCHAM-D&B SBCI survey is that export demand is projected to increase. The percentage of the SMEs expecting an increase in their net sales and new export orders stood at 77 and 86, respectively, suggesting export-led demand growth in Q2 2022. On the other hand, 75% of SMEs expect an increase in their domestic orders, it pointed out.

"The high level of optimism on export orders could be a result of the Comprehensive Economic Partnership Agreement that India signed with the United Arab Emirates and the Economic Cooperation and Trade Agreement with Australia, as well as the prospects of similar agreements with the UK and Canada in 2022 and 2023. These agreements are expected to boost India's export of agricultural products, footwear, gem & jewellery, leather, and textiles.

Supply chain disruptions caused by the Russia-Ukraine crisis has improved India's export prospects of iron ore, iron & steel products, and wheat. In addition, businesses are increasingly looking for alternate suppliers to de-risk their operations since the outbreak of COVID-19. Cost competitiveness makes India an attractive destination for sourcing. These factors will lend to India's export momentum in Q2 2022" said Avinash Gupta, Managing Director, Dun & Bradstreet India, in a statement.

On improved prospects for sales, businesses see an increase in their average capacity utilization rate to 63 percentage in Q2 2022, up from 57 percentage in Q1 2022. An overwhelming 77% of SMEs expect an increase in their new fixed capital investment, which is indicative of optimism for future demand.

As many as 76% of SMEs expect an increase in their workforce, even as they have to deal with the price pressure. 80% of the

SMEs expect raw material prices to increase, whereas 75% see upward revision in their selling prices. Consequently, the percentage of SMEs expecting an increase in their net profits stood a tad below other indicator at 77.

“Energy prices have reached their highest level since 2008 as a result of the Russia-Ukraine crisis, while base metals prices have reached a record high. The combination of rising input costs and increasing freight expenses is a key source of concern for businesses. Given that the majority of newly ordered tonnage is not planned for delivery until 2023, global container freight rates will continue to remain elevated in the coming months. As the survey indicates, not all producers will be able to pass on the increased costs to their customers, eroding profit margins” said Arun Singh, Global Chief Economist, Dun & Bradstreet, in a statement.

“As is clear from the latest IMF World Economic Outlook, the Indian economy is projected to be the fastest growing amongst the leading economies of the world. Our survey amongst the SMEs’ executives clearly points towards significant contributions from the small businesses” commented Deepak Sood, ASSOCHAM Secretary General. He added that an important highlight of the survey is that the small businesses have gathered enough confidence to add to their workforce.

(Economic Times – 24/05/2022)

LEATHER, SPORTS GOODS, TEXTILES TO GAIN FROM FTA WITH EU: PIYUSH GOYAL



Head of the next round of negotiations between India and the European Union on the proposed free trade agreement (FTA) at the end of this month, commerce and industry minister Piyush Goyal said on Monday that the pact will give greater market

access for several domestic sectors such as textiles, leather and sports goods in the EU.

The two sides revived the talks on June 17 after a gap of more than eight years for agreements on trade, investments and geographical indications (GI). A GI is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin.

The next round of negotiations will take place from June 27-July 1 in New Delhi. “It will open the doors, we believe, to our textiles, leather, pharma, sports goods, some agri products, handicrafts, handlooms. All this will get a bigger market. Our exports will increase,” said Goyal.

India had started negotiations for a trade and investment pact, called the Bilateral Trade and Investment Agreement (BTIA), with the 27-country economic bloc in 2007 but the talks were stalled in 2013 as both sides failed to reach an agreement on key issues, including customs duties on automobiles and spirits, and the movement of professionals.

Goyal said that the EU has strength in modern technologies, high-end precision equipment and “we will get the benefit of their modern technologies”.

(Economic Times – 21/06/2022)

SUSTAINABLE LEATHER FORUM RETURNS TO PARIS



Organised by the Conseil National du Cuir (CNC), the event will host professionals from the leather industry alongside the fashion and luxury sectors to discuss the cutting edge of leather sustainability.

In a statement, CNC said: “These days, the need for sustainable development is a given. However, a broad spectrum of approaches, from the most extreme calling for a change in society through to those who only pay lip service with “greenwashing” has emerged in recent years, occupying the media stage and monopolising consumer attention.

“That is why the SLF organising committee has chosen to take a realistic, middle-ground approach with ambitious commitments that are still compatible with business development. To this end, our choice of speakers is crucial if we are to present exemplary achievements in the field of CSR.”

Topics addressed during the fourth edition of SLF will include: the role, approaches and innovation of chemistry companies, the market for leather for automobiles, CSR approaches of other soft materials and the traceability of skins, materials and finished goods.

(ILM – 16/06/2022)

WHY ARE ALTERNATIVE BIOMATERIALS TARGETING GENUINE LEATHER ? : ILM DEPUTY EDITOR TOM HOGARTH



Many in the leather industry are annoyed that companies and brands producing and championing new biomaterials are choosing to target genuine leather over other competitor materials and for good reason; it makes very little sense.

Leather is a natural, premium material prized by brands, retailers and OEMs in the fashion, automotive and furniture industries for its unique range of attributes. Although many are accepting a responsibility to take action over leather's links to issues such as deforestation or animal welfare, leather is first and foremost an upcycled by-product from the food industry.

In 2022, the leather industry is more focused on sustainability than ever before and is taking the already circular nature of a natural, collagen-based biomaterial to new heights with more responsible chemistry, ethical sourcing, biodegradability, waste treatment and so much more.

No wonder then that so many are confused that sustainability-focused products like “lab-grown (or cultivated) leather” and so-called “vegan leather” are choosing to target leather in the market instead of obvious targets like synthetic materials, which are easy to criticise for the danger they pose to the environment and their fossil-derived origins. Surely, it's these materials that should be targeted as they are the worst offenders.

British leatherworker Yusuf Osman, interviewed in the May/June issue of ILM, said: “I think people are being hugely misled because, actually, the vegan alternatives are not an alternative to leather, they're an alternative to polyurethane (PU). They're an alternative to 100% PU because they are, maybe, 50% PU. And that's great but don't come for the leather industry, go after the PU industry.”

Materials that reduce the amount of plastic needed in footwear and upholstery are a move in the right direction, and non-leather materials which use no fossil fuel derived ingredients are even better. It's unsurprising that these materials are stealing headlines and catching fire on social media as they are developed and picked up by brands, but the choice to use that leverage over public perception to attack leather is confusing.

One reason could be found in leather's competition with synthetic materials. From a purely business perspective, synthetics have won out and secured market share for the same reason that production moved to China, India and other countries with low manufacturing and labour costs; spend less money and make more money.

Leather is a premium material which finds itself front and centre of the most expensive and exclusive brands and products in the world. With materials such as “cactus leather” (the majority of which is synthetic), mushroom biomaterial or other lab-grown biomaterials, development and scale-up production are costly, particularly at a time when those companies are only beginning to build up commercial production and refine manufacturing processes. Perhaps this has led these companies to naturally compete with leather for a share of the markets and brands that are willing to invest and have the margins to do so.

It's certainly not because these materials offer substantial benefits over leather from a performance standpoint. The oft-referenced FILK study set the record straight on this front and no sooner would someone advise a motorcyclist to choose synthetic protection than they would advise no protection at all.

And let's not forget one important fact. If any material replaces genuine leather, it will not stop a single farmed animal from being culled for the food industry and, instead of being turned into leather, those hides and skins would most likely end up in landfills and emit CO₂ as they decompose. Whereas, if the new generation of biomaterials were to replace synthetics, they could have a positive impact on the environment as society moves away from fossil-derived products.

MONEY TALKS IN A POST-PANDEMIC WORLD

It's also likely not because of the ethical or environmental benefits. Although these aspects are vital and will be at the centre of marketing for any material which can boast them, after years of pandemic-related financial insecurity and a post-Covid world which is proving more perilous than ever, there is little that will trump the bottom line in terms of priorities.

Covid-19's repercussions on the global economy, continuing issues in countries such as China with zero-tolerance policy lockdowns and now the seeds of large-scale geopolitical unrest with the Russian invasion of Ukraine are all finding their way into financial results of the largest companies in the world as they justify their subsequently weakened revenues and profits.

So perhaps it has nothing at all to do with the environment, veganism or plastics. It's simply, as many things are, about money. And the leather industry cannot do much about that. If that's the case, then it will not come down to sustainability or ethical choices, it will simply come down to bang for your buck. Thankfully, leather has plenty of its own, and it's going to be hard to dethrone a material which provides unbeatable performance in every category with a relatively low price to boot.

(ILM – 09/05/2022)

GLOBAL CHALLENGES REQUIRE NEW APPROACHES : DR. MIKE REDWOOD

Dr. Redwood examines some of the current challenges facing the leather industry across the globe, from geopolitical conflict to trade shows.



I have always interrogated the context before adopting or suggesting a strategy. Looking back notes from 2012 it was longer lives, technology, a more connected world, urbanisation and rising affluence in Asia and Africa that were driving change. 10 years and a pandemic, a war and some big political switches they have totally transformed.

What if China and the U.S. continue their decoupling? How will the world be able to pull the hundred million or more who slipped back into poverty during the pandemic, and avoid even larger numbers joining them in abject poverty if inflation and food issues remain?

Bill Clinton's 1992 campaign slogan "It's the economy, stupid" soon became a global mantra. In reality today politics drive many leaders and they are willing to take actions, often bizarre, that weaken economic growth to stay in power. So, the framework in which tanners work has totally changed.

Over and above carbon emissions and biodiversity companies must consider Russia, gender rights, inflation, worried consumers, fragile supply chains while governments focus on energy security, poverty reduction and food security and the risk of opportunistic wars while Russia's invasion of Ukraine is creating a distraction.

QUEEN'S JUBILEE

The UK has spent four days celebrating a Queen who has reigned for 70 years, and I added a picture from her Silver Jubilee in 1977, showing us decorating the British Club in El Salvador where we had a memorable event.

By 1978 all expats had left as the Civil War kicked off, and even the owner of our shoe company and tannery moved to

Costa Rica to run the company remotely. Yet El Salvador remains a great place to live despite the current well-publicised problems. We would still be there had the fighting not got too close with a close neighbour kidnapped and killed, our dentist shot and the substation at the tannery blown up.

A LOOK INTO THE FUTURE

Perhaps the war in El Salvador was showing us the future. Rich democratic countries found it too easy to tell others what to do and often got it wrong. That sudden shifts in western policy as when Jimmy Carter took over from Gerald Ford in the U.S. sends unsettling messages that we do not always recognise.

In September 2021 El Salvador became the first country to make Bitcoin legal tender. Economists tell us this is a foolish move; a point emphasised by Bitcoin's big fall in value in the recent weeks. Yet some commentators ask us to view this from another level. Many countries are becoming less than happy about being linked to the dollar and to the rich democracies, down to the ordinary citizens who object to the big cut taken by banks when remittances are sent from overseas family members – a huge income for most developing countries.

The Economist tells us countries who clearly oppose Russia over the Ukrainian invasion hold two thirds of the World GDP but those who support Russia or are staying silent hold two thirds of the World Population. These include China, India, much of Africa and large parts of Latin America.

This reflects an increasing concern about rich democracies, their governments and their capitalistic approach to business. China continues to expand its influence and it is doing so with greater wealth and military power than it has had for many centuries.

WHATEVER THE OUTCOME TANNERS WILL BE TRADING IN A NEW WORLD

Russia appears to claim a right to recreate a self-defined "sphere of influence" by force. China's use of trade and aid, along with its Belt and Road programme has been quietly creating strong links into many countries with an economy and military stronger than it has ever had. Even Russia with its fossil fuel programme and sale of weapons has many strong relationships. Whatever the outcome of the war, the likely famine, the energy crisis tanners will be trading in a new world.

The APLF will return in 2023 to Dubai and hold an October event in Thailand. These reflect the reality. We will see new centres of activity, new hubs. The luxury trade, which has been clever at surviving the recent disruptions sees Dubai as a potentially important future centre and Thailand is a perfect centre of the ten ASEAN countries where according to the APLF their "leather community accounts for over US\$2.5 billion imports of raw hides, skins and leather, a number closely equivalent to China".

These two events do not replace Hong Kong, but this wonderful location looks unlikely to fully recover from the problems created by its approach to covid and the reality of the new politics. And it is the reality we must live with. APLF is demonstrating the resilience we all need.

On that point those involved in the leather industry need to remind themselves of some key points, all based on taking a responsible approach to business:

- Jobs provided in tanneries and in the use of leather to make products offer useful careers in all countries and play a major role in reducing poverty
- Modern tanneries alone or in groups should be producing energy from their wastes and making a major contribution to global energy security, as well as climate change
- Leather has always been a sustainable material mixing utility with beauty in our lives. Today its major utility is its sustainability from its origins through its longevity, helping society reduce its use of fossil-based materials such as plastics
- And generally speaking, leather makes people feel better.

While tanneries will have to work harder to ensure their individual security, we need to remind ourselves of the fact that our own resilience, properly secured will be a major help to saving society and the planet.

(ILM – 08/05/2022)

LE MARCHE : A SPECIAL CASE

The war in Ukraine has, understandably, dominated the headlines for months. One of the consequences that has largely gone unnoticed is its effect on the footwear sector in the Italian region of Le Marche.

The whole of Europe and, indeed, the entire world, has been horrified and dismayed that war could break out there again in

2022. Human suffering outweighs any other concern and the most urgent priority is to establish peace and allow families to rebuild their lives and their communities. Nevertheless, the business world, still in the early stages of recovery from the shut-shops-shock of the covid-19 pandemic, has had to try to keep up its own rebuilding efforts, in spite of the war and its consequences.



In the sphere of the global economy, these consequences have been widely discussed and are well documented. Energy prices, which were already on the rise, have soared. Supplies of grain from Ukraine are disrupted, pushing food prices up. Global agriculture is suffering because fertiliser is now in short supply and more expensive.

In normal times, trade goes the other way too and an inability to sell in Ukraine and the surrounding region (because of the war) and in Russia (because of sanctions) is affecting manufacturers of products including high-end shoes and leathers. In the important footwear-producing region of Le Marche, there are fears that the fall-out from this presents an existential threat to many producers there, especially small- and medium-sized business. There are fears, too, that the artisan skills and craftsmanship in using leather to make some of the most beautiful and coveted shoes in the world could die out.

DISCUSSION AT MICAM

Soon after the war began, senior government officials and representatives of the footwear industry in Le Marche took part in a hastily arranged discussion event on the first day of the Micam exhibition in Milan. The industry and its supporters in Le Marche wanted to present a series of arguments for treating the region as a special case and to secure as much assistance as possible to help its manufacturers stay in business.

The speakers left no one in any doubt that they regarded the human suffering in Ukraine as more important than business. From an industry point of view, though, they said Le Marche's shoe manufacturers would be harder hit than their counterparts in other regions of Italy.

The president of national trade promotion organisation ICE, Carlo Ferro, told the audience that, for Italy's wider fashion industry, Russia, Belarus and Ukraine represented 2.7% of overall export business. For footwear exports, he said the share of the countries involved in the war was 3%. For the footwear industry in Le Marche, however, he said the figure was between 9% and 10% of all exports.

Italy's junior minister for economic development, Gilberto Pichetto Fratin, took part in the discussion. He suggested that something the national government might be able to put in place for concerned companies was an extension of a moratorium on paying back loans they received during the covid-19 pandemic.

One senior representative of Le Marche's shoe industry, Annarita Pilotti, a former president of national industry body Assocalzaturifici, said this measure should come into place right away. "We are already paying back some of the loans we received," she said. "With interest."

DOMINANT POSITION

This region on Italy's Adriatic coast comprises five provinces: Macerata, Fermo, Ancona, Ascoli-Piceno and Pesaro-Urbino. For decades, it has held a dominant position in the country's footwear manufacturing landscape. In 2010, there were 4,400 footwear companies in Le Marche but this figure had fallen to around 3,800 by the start of 2017 and has continued to drop. Of 72,000 employees that footwear manufacturers across Italy had in 2020, around 25,000 of them were in Le Marche. The industry is important enough for regional president, Francesco Acquaroli, to have travelled to Milan to take part in the Micam talk, which, incidentally, took place on a Sunday morning.

Mr Acquaroli described the situation in Ukraine as a crisis in the international arena because of its effect on the cost of energy and of a number of important raw materials. "For our region's economy, however, it's also a market problem," he said. "In Le Marche, a great part of our manufacturing capacity, and this is especially true of the footwear sector, has been focused on the markets in Ukraine, Russia and the surrounding region."

This means our companies are facing a liquidity problem. And all this on top of having been weakened already by the crises of these years of the pandemic.”

He said cash flow was his immediate concern and one that needed addressing right away to avoid creating “structural problems for the companies affected”. He added that the region itself has “a limited capacity for offering financial help” and called on Italy’s central government to step in. “It’s a difficult and fragile situation,” he said.

In a follow-up comment, an economic advisor to the regional government, Guido Castelli, asked that the central government lower the rates of value-added tax in Italy because, he pointed out, high sales taxes were preventing Italian consumers from buying Italian shoes. He said Le Marche was not asking for handouts. “What we want,” he insisted “is help in setting up a system, a way of working, that will allow us to preserve what I would call, without descending into romanticism, our artisan traditions.”

OPEN DOORS

Annarita Pilotti, who runs Fermo-based brand Loriblu, seemed more upset than optimistic after listening to the politicians’ interventions. She said she has been appalled by the outbreak of war, adding: “Customers of mine, people I know well, have bombs falling on them now.” She pointed out that hers is one of the thousands of families across Europe to have opened its doors to Ukrainian refugees. In Ms Pilotti’s case, a buyer she has a commercial relationship with has sent his wife and children to Italy to take shelter with her; he has stayed behind to join Ukraine’s war effort.

But she is afraid for the footwear business in Le Marche too. Her contention is that one of the reasons for the fall in the number of shoe producers in Le Marche over the past decade is that an earlier round of sanctions against Russia, after its invasion and annexation of the Crimean Peninsula from Ukraine in 2014, took companies by surprise.

“We know why the sanctions were imposed,” Ms Pilotti says, “but for us it was devastating. Many of Le Marche’s shoe companies closed, and many of our suppliers closed, too. The difficulties this situation presented were too much for small- and medium-sized companies to cope with and we lost them.” She says it’s a pity that sanctions have been necessary again and is fearful that the consequences could be equally

devastating. “Sanctions seem to be the only response we have to try to prevent or bring an end to war,” she adds. “It’s a shame, and it’s a shame that diplomacy, in spite of all the talking, seems to be of so little use.”

(Leatherbiz.com – 14/06/2022)

A PROJECT TO TRANSITION TO SUSTAINABLE FUTURE FOR TAMIL NADU LEATHER INDUSTRY LAUNCHED



Initiative supports clusters to adopt cleaner and sustainable production practices

A project to promote circularity in Tamil Nadu’s leather clusters for solid waste management was launched on 22nd June. International NGOs, leather industry organisations, and funded by the EU have partnered to launch a solid waste management project in Tamil Nadu.

The NGOs, Solidaridad Regional Expertise Centre along with Politecnico Internazionale per lo Sviluppo Industriale ed Economico (PISIE), Indian Finished Leather Manufacturers and Exporters Association, Council for Leather Exports, Tata International Limited and the European Union have launched the project. This project has already been implemented at Kanpur and Kolkata leather clusters.

The project will be a 42-month initiative funded by the European Union under its SWITCH-Asia Programme, which promotes sustainable consumption and production across the Asia-Pacific region. The project was launched by State Environment Minister Siva V Meyyanathan and Ugo Astuto, Ambassador of the European Union to India.

Leather clusters

Information provided by the organisers said that project at Pallavaram, Ambur, Ranipet and Vaniyambadi leather clusters in Tamil Nadu aims at promoting circular market-based models by establishing pilot demonstrations on environmentally sustainable leather processing practices and creating capacities among SME tanneries and their industry partners for the wide scale adoption of circular practices that creates value from waste.

In line with Tamil Nadu's effort to transition to a resource-efficient and circular economy model, this initiative supports clusters to adopt cleaner and sustainable production practices. This initiative entails pilot demonstration of sustainable technologies at the tanneries, the organisers said. With many tanneries located in Tamil Nadu, it is the key centre for the leather industry in India. The industry mainly processes semi-finished leather into finished and value-added products for export.

Waste-to-value

Solidaridad will work with its partners and technical experts to demonstrate a series of circular tanning and waste to value technologies at cluster level; tannery workforce will be trained in on better tanning practices, solid waste management and occupational health and safety through training-of-trainers programme. Sectoral cooperation and market linkages for 'waste to value' products will be facilitated by engaging with potential national and international off-takers. A public-private partnership platform will be established that represents the interests of key stakeholders. These stakeholders will come together to create a roadmap for improving waste management at the cluster level, says a release.

Ugo Astuto said, "We are very pleased to collaborate with Tamil Nadu on this project as sustainability, circular economy and resource efficiency are key pillars of the EU-India partnership. This project will not only help to reduce the environmental footprint of the tanneries but also improve health and safety conditions of the workers and taking India a step closer to fulfilling SDGs."

European Union has made Sustainable Consumption and Production a priority, thus this project is relevant. Leather Industry is one of the highest forex earners and generates high employment. He said that that the project will be very beneficial to the leather stakeholders in Tamil Nadu.

Minister Meyannathan said that the project is targeting waste management and its focus on promoting circularity has come at an opportune time, this will complement with the ongoing initiatives of the State government.

(The Hindu Business Line – 22/06/2022)

ASSOMAC AND UITIC PARTNER FOR 2023 CONGRESS



UITIC has announced that it will partner with Assomac for its 21st International Footwear Technology Congress in 2023.

The event, UITIC's (The International Union of Shoe Industry Technicians) first since the 20th edition in Portugal in 2019, will take place in September 2023 in Milan and Vigevano in Italy. Yves Morin, President of UITIC, said: "We could not have wished for a better destination than this to mark the restart of our UITIC congresses which, in its next edition, will give life to an extraordinary event as it will take place simultaneously with Simac Tanning Tech." He added that the event will also coincide with the organisation's celebration of its 50th anniversary.

Sergio Dulio, member of the Executive Committee of UITIC, said: "In 2023, we want to expose the world of footwear with all its most important evolutions and those technological trends that can influence the way in which shoes are designed and manufactured. "We have prepared a conference program covering all relevant topics – from sustainability to digital transformation, from logistics to supply chains – with a particular focus on the human capital of tomorrow. The program will then be further enriched by the contribution of selected keynote speakers and anticipated by a pre-conference calendar of visits to companies and immersive experiences in innovation. It will be an unmissable opportunity to reconnect and update."

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SCIENCE AND TECHNOLOGY

Basis for Instrumental Colour Measurement and Matching

By

BUDDHADEB CHATTOPADHYAY

College of Leather Technology, Calcutta

and

RANA LAL MUKHERJEE

I. C. I. India Ltd. Rishra, Hooghly.

ABSTRACTS

The colour sensation is easy to experience and appreciate but equally difficult to express in any language. This very classic and subjective concept has been converted into an objective one. Colour thus becomes measurable and predictable, with the rapid progress in computerization it is thus possible to achieve accurate and reproducible measurement and matching of any colour in minutes.

Recently the authors had the opportunity to work together and go through the details of instrumental colour measurement and matching both qualitatively and quantitatively.

When our other industries namely paints, textiles, yarn, pigments etc. are utilizing this techniques, the days are not far off when leather industries will have to venture into this field particularly for surviving in the high fashion oriented export business, where fashion changes in days and very faster response from the producers becomes a challenging target. When we talk about "Just in time", concept, we cannot afford to spend time on manual colour matching, where precision and accuracy is limited.

However, it is almost a precondition to understand what, why and how any system or an assembly of instruments works before we install it, so that, the interpretation of results are properly inferred and the adjustments in programming depending on one's need becomes possible and conducive.

As the authors seemed to be overwhelmed to find collaboration of at least sixteen branches of science to accomplish this novel and mammoth tasks, they took enormous trouble to bring them in one arena. They felt it necessary to express that it is nothing of their discovery but it should be treated as a review paper, particularly aimed for the benefit of the students of Leather Technology of our country.

We hope that our readers will be provided with the necessary and adequate informations to cope with. Because of the limitation of space this paper will be published in two parts. The readers are requested to bear with us the inconvenience. This article contains 15 sections with 34 figures, 16 tables 3 appendixes apart from references.

1. INTRODUCTION

"A THING of beauty is the joy for ever"—said Keats. Nature is beautiful as it is colourful. Man needs colour as he is physically and mentally healthy in a pleasant colourful environment. We become over-whelmed to see the multi colour projections from the dancing peacock or the vernal sky during the rising sun over the peak of Kanchenjanga or a colour composition in an art gallery. Colour is the joy of life. A form of translating emotions by the employment and meaningful manipulation of colours is an age old art exercised by the primitive men even in the prehistoric era at the dawn of civilization. We experience different colour sensations from our childhood. There exists a vast scientific background calling for appreciation of scientific principles in multi directional branches of science in order to understand the colour. Colour sensation is easy to appreciate difficult to standardise, most difficult to understand and yet impossible to accurately express in any language. Measurement, matching and quality control of colour for any consumer goods (be it leathers, footwears or paints, cars or clothing or capsules) is the headache of the producer as well as the consumer. Most often it is extremely difficult to come to an agreement between both the parties when the question of colour matching comes. We find each one talking in subjective aspect in some arbitrary language to site logics for disagreement. This has been



so far a very subjective concept. Probably this is the root for the development of a proverb "Colour matching is more an art than a science". We shall make an endeavour to disprove this and set counter logic in support of the opposite statement i.e., colour matching is scientific and it needs appreciation in photophysics, photochemistry, ophthalmology, optics, spectroscopy, photometry, quantum mechanics, numerical analysis, statistics, organic-inorganic, coordination chemistry, geometry, mathematics and computer—to mention a few.

Colour concept has been broken down into very simpler elementary blocks and then analysed and integrated in a way to get the 3-D representation of any colour, mathematical values associated with it. This forms now-a-days a basis for computation of formulation and deriving informations such as :—

1. Values of any colour.
2. Forecasts of formulation to get a match.
3. Prediction of how close the match would be as compared to a standard both qualitatively and quantitatively.
4. What steps has to be adopted in order to reduce the differences?
5. How the match will be under an average day light or a noon sun light or horizontal light or under an artificial light?
6. To what extent any colour is pure or in other words how much is its impurity?

7. What is the dominating wave length present in it?
8. Compared to a standard whether the match is darker or lighter, redder or greener, yellower or bluish and to what extent?
9. What is the spectral reflectance of that colour against each wave lengths present in visible portion of the electromagnetic radiation?
10. Graphical representation of the % reflectance vs. wave length of standard and that of the sample.
11. An instant costing per unit area.
12. Opacity or hiding power.

And all these information can be achieved if we can measure the colour and express numerically, means from a pure perception to a physical and numerical representation of any colour. A computer takes only 3 minutes to display and record all these informations. We shall slowly try to bring out all these aspects but at this juncture the authors feel it worthwhile to express to the readers their limitations with regard to the total knowledge and still poorer communication skill. A caution is to be noted very carefully here-in such system the human eye has been eliminated by a spectrophotometer but no matter how much efficient it may be the foremost and final prerogative for approval or disapproval have been deligated to

the human. It requires the skillful colourist to suggest the combination of the pigments with which the colour has to be matched, and as has been said his final reaction on the match of the trial lot. Simply because the colour conception as experienced by a human being is not merely a selective absorption and complementary reflection phenomenon but how the impulse is sensed by the human. The human being senses everything not merely by physical look or touch or test but by the sensation and recaptulation of it from his stored memory through central nervous system. That means both physiology and psychology plays a part in sensing. Therefore radiation factor multiplied by the sensitivity of brain has to be taken into account. A computer has no brain and hence if this vital factor is withdrawn the concept of colour sensation through computer becomes most unscientific and unrealistic. It therefore can not substitute the need of the skilled colourist but it adds much more efficiency to the colourist and he can do possibly one month's job in one day with accuracy and precision; in a relaxed brain. (During the off time the computer may be utilized for other computation purposes). Day to day, batch to batch colour matching becomes efficient and accurate, result oriented and meaningful. The capital investment is eventually paid back by the reduction in inventory, reduction in slow-moving or non moving seasons, reduction in

rejects due to non-matching of colours, increment in productivity, quality assurance, keeping production schedule and costing in line, keeping supply commitment in schedule.

Since the name of the tropic precludes itself the detailed incorporation of the discussion related to the origin of colour present in complex organic, inorganic molecules we shall broadly divide the present tropic basically and broadly in two parts one is fundamental the other is applied. The first one deals with the concept of standardization the later one is instrumental colour matching (I.C.M.).

2. THE SOURCE

Light is the source of all colours. In dark we see no colour. The colour sensation becomes perceptible only in presence of light, whether a sun light or any artificial light. We often experience that, sensation of any given colour in presence of a fluorescent tube light or a yellow sodium vapour lamp is not the same as we experience the same in sun light. Now why is it? Physics considers light as an energy. As any coloured body loses its colour effect in absence of light, therefore there must be an energy factor associated with colour formation. Law of conservation of energy permits the exchange, transformation of energy and prohibits any loss of energy. We therefore will have to recognise apart from the vast physical-world, which can be sensed by us with sensory organs—eye, ear, nose, tongue and skin,

there lies a vast radiation world with a great range of energy, defined in one word, electro magnetic radiation. Quantum mechanics accepts the dual wave particle properties; and basically from that concept we define electro magnetic radiation (E.M. radiation) is an emission of energy in wave motion where electrical component and magnetic component acts at perpendicular plane (in three dimension) simultaneously in space or in matter at certain speed; in a direction perpendicular to the plane of these two fields (vide figure 1). Having introducing both speed and direction we can now define velocity. The velocity of all E.M. radiation in vacuum is same and uniform (i.e., no rate of change of velocity). This velocity is constant 2.9979×10^8 m per second which is denoted by c —the velocity of light in vacuum. Though all the E.M. radiation has same velocity in vacuum yet they vary to a great extent in energy. (Light itself is electro magnetic radiation only a certain part can give us visual sensation called visible light). Light is considered as the emission of packets of discrete units called photon, whose energy is quantized¹.

The energy content of a photon is calculated by Einstein's formulation $E = h\nu$ (where h = Planck's constant $= 6.624 \times 10^{-34}$ Js and ν = frequency of the wave). If λ be the wave length of the E.M. radiation in question then by definition we get $c = \nu\lambda$ or $\nu = c/\lambda$. Hence by substituting ν we get $E = hc/\lambda$ as h and c are the constants we can write $E \propto \frac{1}{\lambda}$. Qualitatively the expression in language turns as—higher the wave length lower is the energy associated with it and vice versa².

From the classical chemistry concepts we get that, there exist different energy levels with the protons, electrons present in an atom/molecule. Quantum mechanics designates and quantifies these energies at different levels and thereby the differences of energies between two different levels is the subtractive function of them. Spectroscopy considers that, if the differences of energy is supplied and absorbed by the electrons or protons from external sources (here E.M. radiation) the transition of electron or proton can take place from low energy state to higher energy state. In terms of quantum

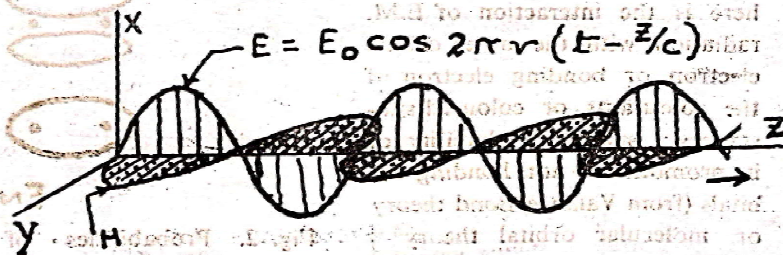


Fig. 1: The Electrical Component and magnetic Component in the electromagnetic wave.

TABLE-I
Visible Portion of E. M. Radiation:

Colour	Wave length in 10^{-9}m (λ)	Frequency in 10^{14}Hz (ν)	Photon's Energy (energy in 10^{-20}J) $E = hc/\lambda = h\nu$
Violet	400.0—424.0	7.495—7.115	49.66 —47.14
Blue	424.0—491.2	7.115—6.104	47.14 —40.44
Green	491.2—575.0	6.104—5.215	40.44 —34.55
Yellow	575.0—585.0	5.215—5.125	34.55 —33.956
Orange	585.0—647.0	5.125—4.634	33.956 —30.703
Red	647.0—700.0	4.634—4.284	30.703—25.375

mechanics we can call a promotion from ground state of excited state³. Probabilities of such transitions are permitted or prohibited by the selection rule.

From the famous Grother's Drapper's Law, known as first law of photochemistry we get—only that part electromagnetic radiation that is absorbed by a molecule can cause certain chemical changes; the transmitted or reflected radiation can not be accounted for it⁴. Colour can be seen only when the visible part of the E.M. radiation interacts with the molecule the obvious result being absorption of certain portion of wave length from the visible spectrum and the effect being the production of colour. Now the decisive factor here is the interaction of E.M. radiation with the outer orbital electron or bonding electron of the colourants or coloured substances; and the probability of its promotion to anti bonding orbitals (from Valance Bond theory or molecular orbital theory^{5,6} and electron in box theory⁷) or a

split in the degenerated 3d orbital in a crystal field in presence of legends associated (crystal field theory⁸) or a partial charge transfer between metal as Lewis acid and legand as Lewis base (charge transfer spectra⁹) or because of the trapped counter ions in a solid matrix (ions trapped in solid state⁹). Figure 2 and figure 3 (on

next page) illustrates two such transition. So here we can see that, the structure of the molecules and the type of bonds and their arrangements and relationship with neighbourhoods and geometry all becomes very decisive factor for accounting selective absorption of certain wave lengths in the visible spectrum. Such selective absorption of a fraction of wave length from the visible spectrum and the reflection and or transmission of rest of the spectrum is, the origin of colour. Hence, in mathematical language qualitatively we can say absorption is complementary to visible colour. The colour that we see thus is the electro magnetic radiation which was left behind after absorption by the outer orbital electrons present in a coloured body or colour ants from the visible spectrum

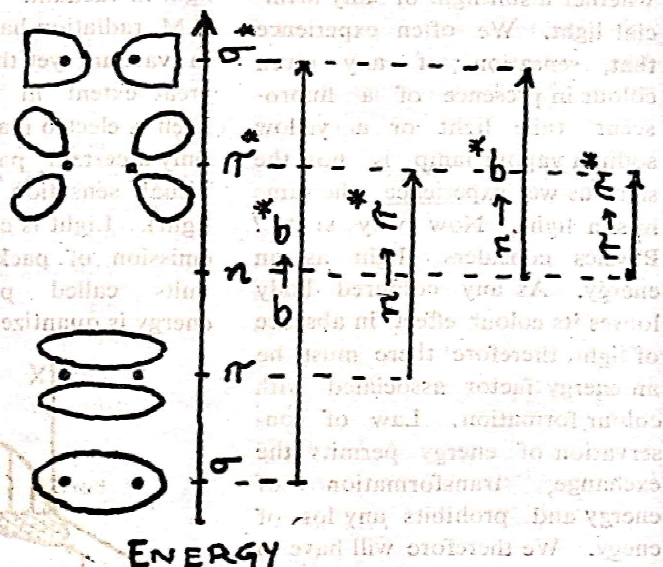


Fig. 2. Probabilities of transition of bonding electron to antibonding orbital namely $\sigma \rightarrow \sigma^*$, $n \rightarrow n^*$ and $\pi \rightarrow \pi^*$.

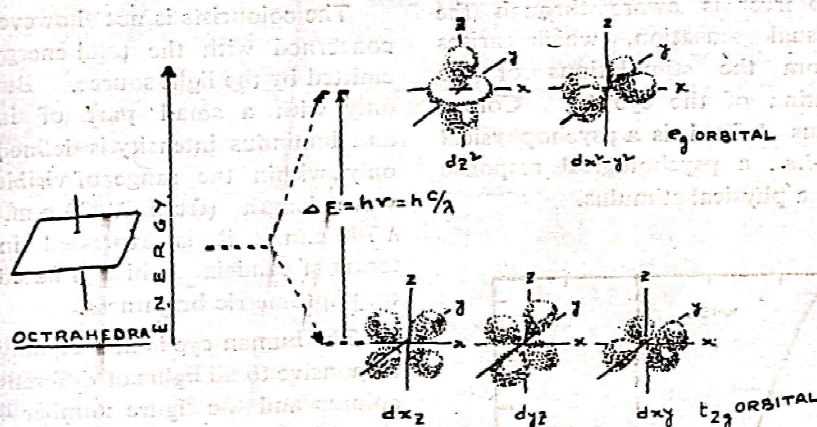


Fig. 3. Splitting of 3-d orbitals in crystal field considering octahedral geometry dz^2 and dx^2-y^2 being splitted to higher eg orbital than the dxy , dyz and dxz orbitals.

ranging between 400 n.m. and 700 n.m. of wave length. As this difference of energy between ground state and excited state is different for different colorants so the region of absorption is also different and hence the colour is also of many kinds. And this absorption property is the intrinsic property of the molecule in question. As

only the matching energy from the E.M. radiation in the visible range can be absorbed to cause this effect (as per 1st law of photochemistry), in absence of visible light this absorption becomes impossible and hence transition also becomes impaired as a result we see no colour in dark.

TABLE-II

Relationship Between Selective Absorption And Colour Effect

Wave length in n.m.	Colour absorbed	Colour visible Complimentary colour
400—435	Violet	Yellowish green
435—480	Blue	Yellow
480—490	Greenish blue	Orange
490—500	Bluish green	Red
500—560	Green	Purple
560—580	Yellowish green	Violet
580—595	Yellow	Blue
595—650	Orange	Greenish blue
650—780	Red	Bluish green

Hence logically the matching intensities of both the colour pair would bring an visual effect similar to white as the absorbed wave length got subtracted from white light.

Example : Due to photochemical degradation of cellulose the colour of white cloths get yellowish. The common practice is therefore to add tint of blue (Robin blue or Tinopal) or blue fluorescent dyes mixed in detergent (as in Rin and some other) to make clothes whiter after washing since blue—yellow is a complimentary pair.

Because of the complexities of the molecular structure, chromophores, fluorochrome, auxochromes, fluorophore and polarity and other factors absorption does not take place at single wave length but mostly over 10-60 wave lengths the disproportionate absorption takes place. Hence if we plot a graph showing % reflectance or % transmittance vs wave length we will get different pattern for different pure spectral colours. There will be ofcourse a wave length corresponding to which absorption becomes maximum or reflectance becomes minimum for each spectral colour (white light falling through a prism divides into 7 spectral colours). This wave length is designated as λ_{max} . So if the same reflectance vs wave length graph of a standard gets superimposed with that of match we can say that a 100% spectral Colour match has been accomplished.

The committee of the colorimetry of the Optical Society of America has defined colour as, "consisting of the characteristics of light other than spatial and temporal inhomogeneities, light being that aspect of radiant energy of which a human

observer is aware through the visual sensation, which arises from the stimulations of the retina of the eye"¹⁰. Colour thus defined is a psychophysical —i.e., a psychological response to a physical stimulus.

The colourists is not, however concerned with the total energy emitted by the light source. But only with a small part of it, and luminous intensity is defined only within the range of visible wave length (from λ 400 n.m.- λ 700 n.m.) it is expressed in terms of candela, which is based on photometric brightness.

The human eye is not equally responsive to all lights of different colours and the figure number 4 shows how the relative luminance of spectral colour varies with wave length (λ). (See Appendix-3)

At this juncture certain scientific terms got to be defined and abbreviated with respect to both electromagnetic radiation and visible light. Table 3 reflect this.

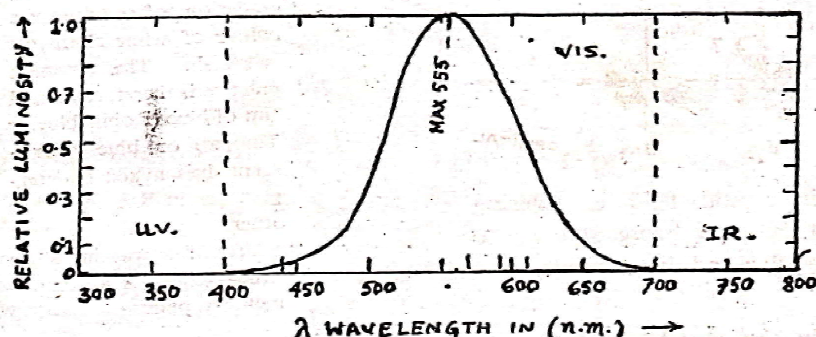


Fig. 4. Photopic luminous efficacy function. The sensitivity of human eye to the light of different wavelength.

T A B L E—III
Comparison Of Radiometric And Photometric Quantities

ELECTROMAGNETIC RADIATION		LIGHT	
Name & defination	S. I. Units	Name & defination	S. I. Units
1. Radiant Energy Q_e	Jule J	Luminous Energy Q_v	Lumen-Second lms
2. Radiant Density $\frac{dQ_e}{dv}$	Jule/m ³ Jm ⁻³	Luminous Density dQ_v/dv	Lumen Second meter ⁻³ lms-m ⁻³
3. Radiant Flux ϕ_e $\phi_e = \frac{dQ_e}{dt}$	Watt (W) Js ⁻¹	Luminous Flux ϕ_v $dQ_v/dt = \phi_v$	Lumen lm
4. Radiant Excitance M_e	—	Luminous Excitance M_v	—
5. Irradiance E_e $E_e = \frac{d\phi_e}{dA}$	Watt/sq. meter Wm ⁻²	Illumiannce $E_v = \frac{d\phi_v}{dA}$	Lux (lx) lm m ⁻²
6. Radiant Intensity $d\phi_e/d\omega$	Watt/Steradian W Sr ⁻¹	Candle power I_v $I_v = d\phi_v/d\omega$	Candela (cd) lm Sr ⁻¹
7. Radiance L_e $L_e = \frac{dL_e}{dA \cos \theta}$	Watt/Setradian sq. meter W Sr ⁻¹ m ⁻²	Luminance $I_v =$ $dI_v/dA \cos \theta$	Candela/sq. meter cd m ⁻²
		Luminous Efficacy $K = \phi_v/\phi_e$	Lumen/Watt lm W ⁻¹
		Luminous Efficiency $v = \frac{K}{K_{max}}$	—

3. THE MUNSELL SYSTEM

If one is engaged in arranging beads of identical dimension, texture and uniformity but of many different colours into a logical array where adjacent beads very systematically in colour a three dimensional array results. Firstly they can be defined and arranged as per "hue" *i.e.*, some are green, some red, yellow, purple etc. Then secondly, in each hue each colour can be arranged in terms of lightness to darkness—*viz.* pink—red to cherry red etc. Thirdly, after doing this it may be seen that some contain more 'pure' spectral colours than others, *i.e.*, the colours or hues in different saturation or purity. After arranging these beads in all these three direction with same logical manner, *i.e.*, arranging the beads systematically according to the increasing difference it may be found that any colour can

be placed in space almost completely. Figure 5, 6 designs the Munsell's colour space.

A method of describing colour based on these three psychological dimension of hue, lightness and saturation or chroma was originated by an artist, Prof. Albert H. Munsell, who published the first description of his notation of these dimension in 1905. He has considered five basic hues red (R), yellow (Y), green (G), blue (B), and purple (P) and for the five intermediates which are combination of these basic hues, namely yellow-red (YR), green-yellow (GY), blue-green (BG), purple-blue (PB) and red-purple (RP).

At the hub of the hue-wheel is the 'gray pole' *i.e.*, the axis of the coloured sphere. The three dimensional array was arranged with respect to this Gray-Pole with black at the bottom of the axis (vertical axis) and white at

the top. Munsell designated this scale as value scale and gave a numerical notation which describes uniform differences in Munsell value.

Relating to Gray-Pole the colour increases in saturation as the colour approaches away from the vertical axis in the horizontal plane. Hence the most saturated (purest) colour lies in the periphery. This horizontal dimension is also called "chroma scale". Figure 6 (on next page) indicates these three dimensions :

4. TRISTIMULUS

It has been observed that human eye can not separate the component colour of a light source, it is possible to produce sensation of any colour in a number of ways.

Grassman¹¹ postulated in 1953, that, light of any colour can be matched by the combination of three suitable primary colours. As each colour makes certain stimulations on optical nerves hence the term tristimulus or trichromaticity (chroma in Greek means 'colour') has evoked. As per Grassman's hypothesis with these three primary stimulus any colour can be matched provided that none of these can be matched by any mixture of other two. He further stated that light that gives some visual effect separately produces same visual effect in mixture irrespective of their differences in spectral composition. As has been stated earlier spectral composition depends on the type of the chromophore, fluorophore

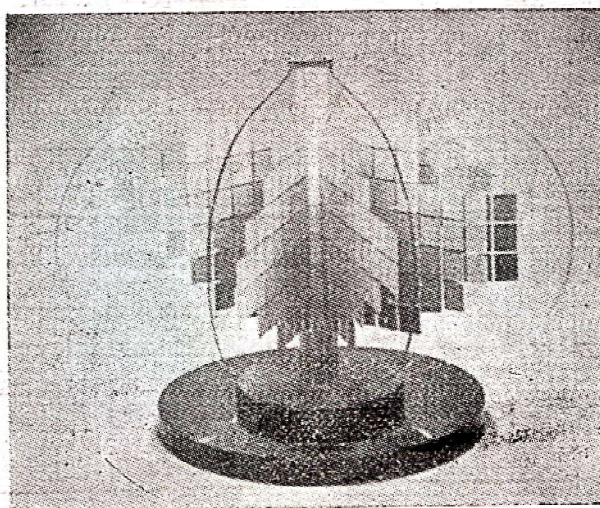


Fig. 5. Munsell's Colour space—a 3-D view.

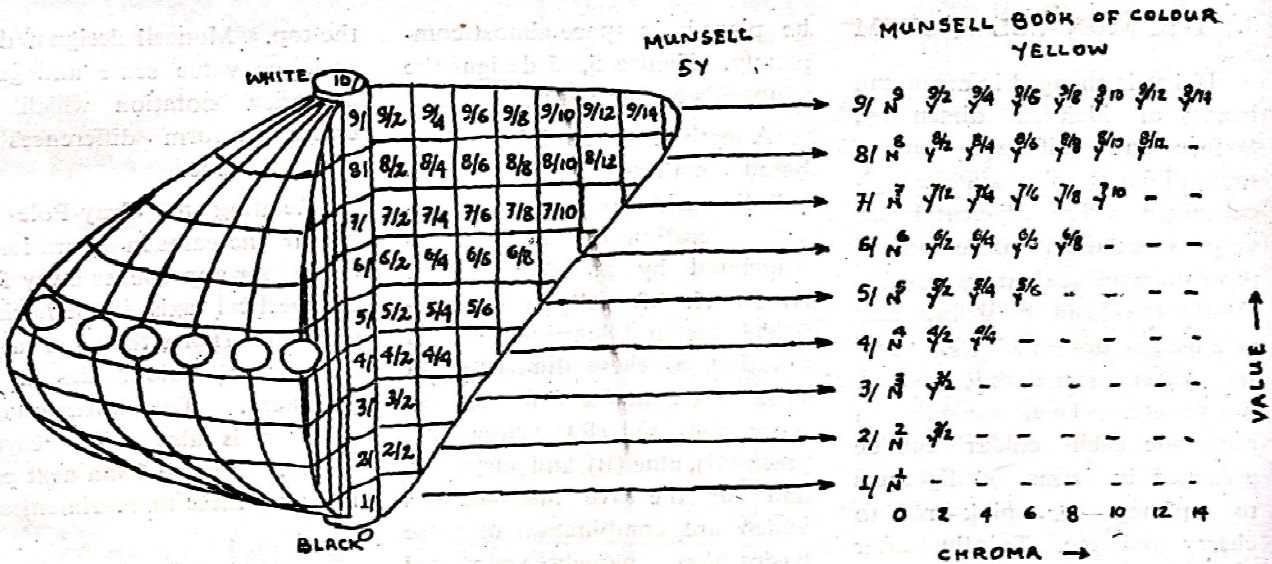


Fig. 6. Munsell's Colour space showing Chroma and Value scales.

or auxochromes etc. which results in selective absorption at certain wave length resulting in visual effect of colour

Guild at the National Physical Laboratory, Teddington and Wright Imperial College, London has shown that it is possible to match the spectral colours with suitable combination of three primaries namely, blue, green and red.

Figure no. 7 shows the results obtained by Wright the ordinate represents each of the three primaries red green and blue needed to match the colour of particular wave length which has been placed in abscissa. The amount of each primaries can be obtained from their respective curves. Because the colour is determined by the relative amount and not the absolute amount all the values has been adjusted by Wright such that the sum of

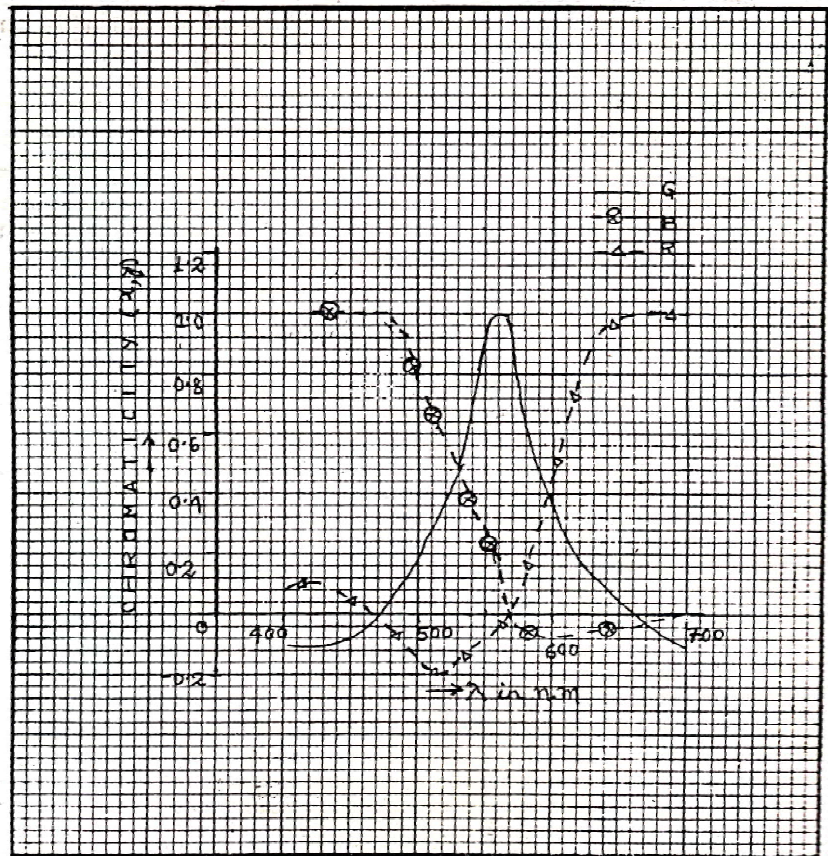


Fig 7. Relative amounts of Wright's primaries required to match a spectral colours.

these component primaries for any given colour would be unity (the basis for trichromaticity co-ordinates x, y and z)

The interesting feature to note is that, except at the wave length corresponding to three primaries one or other ordinate is always negative. This is because over most of the spectrum, it was necessary to desaturate the spectral colours with one of the primaries before it could be matched with other two. This is not in contradiction to Grassman's hypothesis but it is the consequence of the fact that the primaries chosen are not capable of matching the complete colour range with positive amount.

The mathematical representation of expression is :

$$C(C) \equiv R(R) + G(G) + B(B)$$

where C=amount of colour (C),
R=amount of primary (R),
G=amount of primary (G),
B=amount of primary (B),
means "matched by". If suitable units are chosen for R, G, B, then the amount C is given by $C = R + G + B$. Often it is convenient to ignore the intensity of the colour and consider it qualitatively. Then we can write $C = r(R) + g(G) + b(B)$ where r, g, b, are the relative amounts of the three primaries, R, G, B (Red, Green, Blue) respectively. As per Wright's convention from figure no. 8 we get,

$$r = \frac{R}{R+G+B}, \quad g = \frac{G}{R+G+B}$$

and $b = \frac{B}{R+G+B}$ or in other words $r + g + b = 1$

In the following figure no 8 Wright's results have been plotted in a different way. All the colours that, can be matched by the mixture of the three primaries lie within the equilateral $\triangle RGB$. Within this triangle the position of any point represents the composition of a mixture of three primaries. The distance from the base of the triangle to the apex G is proportional to the amount of Green primaries and so on. The height of the triangle is unity.

Since the sum of the vertical distance from a point in an equilateral triangle to the three sides is equal to the height of the triangle (i.e., unity). Hence the quality of any colour can be mathematically represented as :

$$C(C) \equiv r(R) + g(G) + b(B)$$

It can be seen, that, all the spectral colours lie outside the $\triangle RGB$ and the line joining three spectral colours is called the spectrum locus.

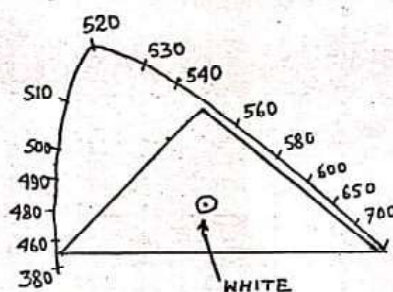


Fig. 8. Colour triangle based on Wright's primaries showing spectrum locus and distribution of wave lengths on it in nanometer (see figure 7 also)

If three lights are chosen as primaries for colour matching, it

is necessary to define a scale on which to express their amount to match. And before introducing any scale it is necessary to fix up a constant point with respect to which the scale can be calibrated.

Example: For setting up temperature scale we fix up melting point of H_2O as $0^\circ C$ and $32^\circ F$ respectively. For specific gravity scale, specific gravity of water is kept constant=1. For colour composition it was found convenient to choose a scale such that when equal amount of three lights are mixed they give a neutral white. Thus by definition and convention the centroid of the triangle RGB should be white. Since the $\triangle RGB$ is equilateral and $RG = GB = RB = 1$ the centroid should be equally disposed with respect to the apexes. If this point be O then from purely geometrical consideration $OR = OG = OB$ and by definition of equilateral triangle $OR + OG + OB = 1$ (since $RG = GB = RB = 1$). So the centroid will have three equal co-ordinate values (0.333, 0.333 and 0.333).

But it has been found out neither luminance (visual effect), nor radiant intensity dictates the size of unit quantity of the three primary colours with the wave length 700, 546.1 and 435.8 n.m. will combine to give an equal energy white when their luminance are in the proportion red : green : blue :: 16.6 : 76.4 : 1. The relative luminance in unitary scale at equal energy white are 0.004, 0.984 and 0.018.

5. C. I. E. System :

The Commission internationale d'Eclairage 1931 held in Paris consisted of the colourists throughout the world and formulated the internationally acceptable colour standards. This body is the parent organization from which any colour is evaluated three dimensionally with certain numerical values in each dimension. This is known as famous C. I. E. System of representing colours numerically. Because numbers express definite pin pointed language understood and interpreted exactly in the same way by any body in any parts of the world. Therefore talking about colours in terms of numbers will be equally understood by each one. By this we can eliminate the arbitrary languages which limits our expression of colours perception in any vocabulary language. Secondly the additive and subtractive principles of colour mixing and other laws of the optical properties can help to calculate the colour value. It was not at all an easy task.

The Commission Internationale d'Eclairage 1931 recognised that, any system for numerical representation of

colour must take into account the three basic parameter —what is the type of the light with respect to which we see the coloured object, what is the type of object (its colour bearing properties), psychological stimulation of the human and his colour perception. So C.I.E. has to take into account.

- The energy distribution of the source of light with respect to wave length.
- The varying sensitivity of the observer's eye with respect to wave length (refer to Fig. No. 4).
- The absorption of light of different wave lengths by the object (see Table No. 2).

From the results of Guild and Wright, the spectrum locus (figure no. 8) was defined in

terms of three spectral primaries (figure no. 7). From these results, the locus can be calculated for other sets of primaries. We have seen also that any set of primaries will need the use of negative amount of primaries in defining spectrum locus, then it can cause confusions in calculation.

It was therefore decided to use instead of spectral primaries (R), (G) and (B) three imaginary primaries (X), (Y) and (Z). In the figure no.8 some portion of spectrum locus was outside the triangle RGB now introduction of three imaginary primaries was done purposely to make the spectrum locus enclosed by the triangle $\triangle XYZ$. Thus $\triangle XYZ$ being equilateral triangle having $XY = YZ = ZX = 1$, any point within the spectrum locus could

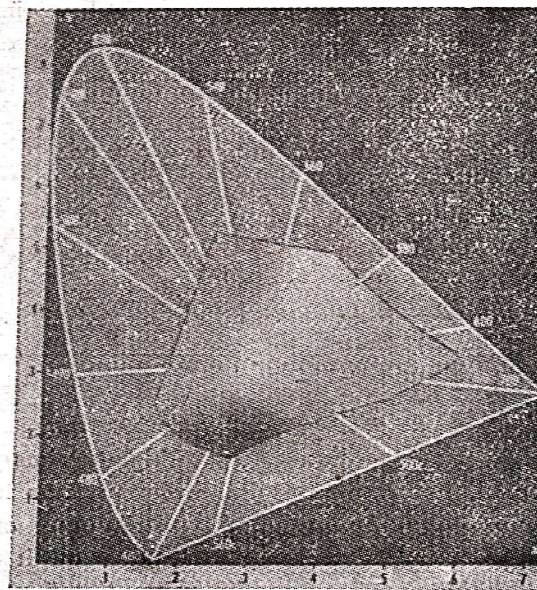
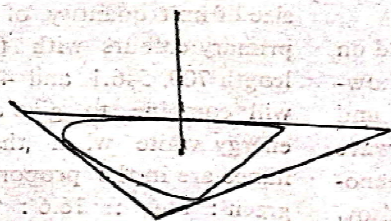


Fig. 9. Trichromaticity diagram showing trichromaticity co-ordinates X, Y and the spectrum locus enclosed inside the big equilateral triangle, whose each side equals to unity.

be represented by only the positive co-ordinates. In practice no matter what primaries are used in measuring the tristimulus values of a colour a calculation can be made to convert the C. I. E. tristimulus values X, Y and Z and these will always be positive.

In the above diagram 9, the rectangular co-ordinates were used instead of triangular co-ordinates (as in figure no. 8). The reason is any colour (as per Wright's experiment) can be represented by R, G and B that, these could be reduced to chromaticity unit scale r, g and b respectively as $r+g+b=1$ it means value of r and g is sufficient to define b since $b=1-(r+g)$. We still have to measure R, G and B otherwise we will not get the value of $R+G+B$ and we can not find the corresponding reduction of these values in unit scale.

Figure no. 8 thus could have been constructed on rectangular co-ordinates simply by plotting r against g in the same way the C.I.E tristimulus values X, Y, Z can be reduced to their respective co-efficients x, y and z by —

$$x = \frac{X}{X+Y+Z}; y = \frac{Y}{X+Y+Z}$$

$$\text{and } z = \frac{Z}{X+Y+Z}$$

It can be seen from figure no. 9 that the entire spectrum locus (designation due to Munsell) lies within the triangle formed by three points having co-ordinates as : indicated table no. 4.

Within this triangle for any point all values of x & y are positive since x & y is never greater than unity. So all values must be positive.

The C. I. E. was concerned to make colour calculations as simple as possible and the choice of (x), (y) and (z) was made with great care. It can be seen that the line joining (0.1) and (1.0) in Figure No. 9 coincides almost with the spectrum locus passing through that region (i.e., the locus points for which $z=0$) follows that the spectrum locus whose wave lengths lie in the region of 550 to 780 n.m. all has values of $z=0$ or near to zero.

Another convenience of the C.I.E. system is that the units in which the stimuli (x), (y) and (z) are expressed are such that the equal amount of each is required to match the equal energy white. Hence the position of white is at the centroid of the triangle having co-ordinate (x=0.333, y=0.333).

C. I. E. system considers that value of any colour i.e., the

relative lightness or darkness is proportional to whiteness and blackness and this dimensions have been placed in the vertical axis of the colour sphere with the same convention introduced by Munsell (reference to figure no. 6). The value of x, y designates the two dimensions in the horizontal plane whereas the concept of lightness/darkness provides third dimension in the vertical plane giving a complete 3-D representation and definition of any colour. C.I.E. system recognises brightness or luminance of a coloured sample is proportional to its corresponding Y value (Y tristimulus) regardless of the values of other two namely X and Z. This again needs to be explained why should Y value and not X and Z represent the luminance factor (extent of lightness or darkness).

We have already seen from the figure no. 4 that the photopic luminous efficacy as experienced by human eye in the wave lengths of visible spectrum is not the same. (The height being close to 546.1 n.m.). We have seen also the arguments basis on Wright's experiment that the spectral primaries (R) (700 n.m.), (G) (546.1 n.m.) and (B) (435.8 n.m.) gave a match for equal energy white only when they were mixed in equal amount and their relative luminances were matched in the proportion of 16.6 : 76.4 : 1.0 respectively.

Figure no. 10 shows a perspective of the spectrum locus lying in the horizontal plane of the Δ RGB at the corners of which are the columns, whose

T A B L E—4

C.I.E. Co-ordinates of The Apexes of The Tringle As Shown In Figure No. 9

Position of the Apexes	C.I.E. Co ordinate Value (Rectangular Co-ordinate)	
	x	y
Origin	0	
Extreme Right (Base)	1	
Top (Hight)		1

heights are proportional to the relative luminances of the respective primaries.

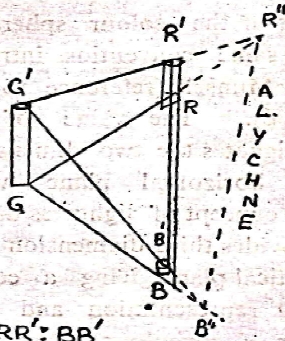


Fig. 10. Perspective 3-D view of the triangle $\triangle RGB$ and $\triangle R'G'B'$ with $RR' : GG'BB' :: 16.6 : 76.4 : 1.0$. The line $B'R'$ is the alychne.

So here we can see if the luminance factor represent the spatial orientation then while proceeding from G to B or G' to R' any point loses its luminance until they reach the alychne $B'R'$ where luminance gets zero. Thus if X represents the red, Y the green and Z the blue stimuli then all the luminance factor is due to Y since at the alychne $B'R'$ the C.I.E. X and Z stimuli are located.

In its 1931 proceedings C.I.E. established the mathematical spectral colour matching functions of a standard observer using three primaries transformed from Red, Green and Blue. These colour matching Functions are the transformed averages of a number of observers of normal colour vision when sub-standing at an angle 2° from the normal to the eye.

The three primaries were designated X for the red, Y for the green and Z for the blue. The colour matching functions were reduced further to co-efficients in an unitary scale and designated respectively x, y and z.

The green or Y primary was established to correspond to the spectral luminosity or lightness response. The value of Y varies from 0% for standard black and 100% for standard white and within this range each colour can be arranged from darkest to lightest shade and thus provided the arithmetic dimension to "Grey scale".

The x, y trichromaticity co-ordinate represents the position of any colour in the horizontal

plane on or inside the spectrum locus (for better understanding we can call it as a sort of colour map and the positions of colour may be considered to be decided by x, y co-ordinate as we point the position of any city with its latitude and longitude values in the map). This provides information about what is the hue (whether it is red, green or purple etc.), what is the dominating wave length, what is the % saturation (chroma) of that colour in question and all these we get from the numerical values of x and y. Figure 11 represents the C.I.E. hue names and map as we may call it.

Based on its x and y value we can plot any point. The further

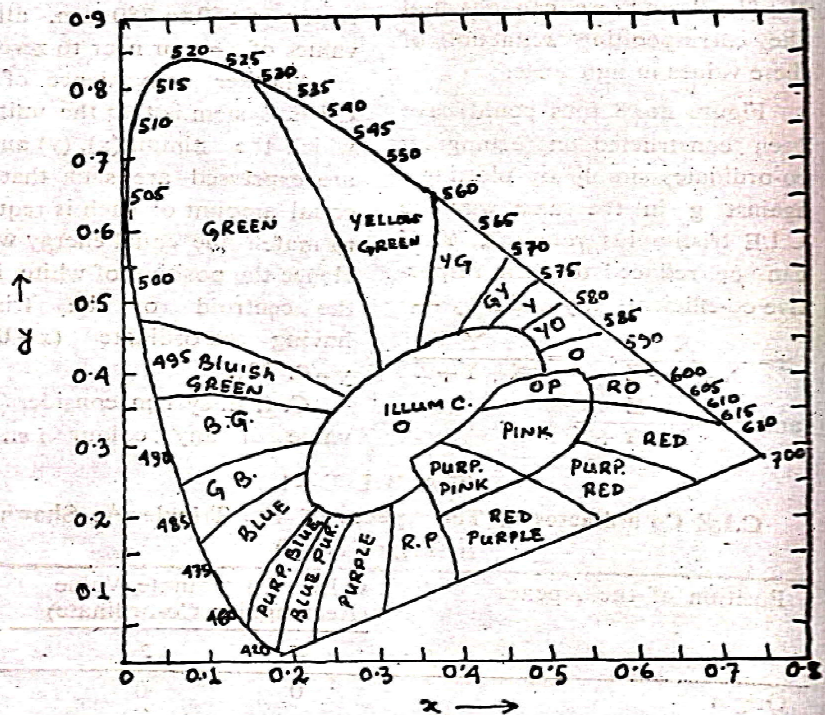


Fig. 11. Hue names associated with areas of the 1931 C.I.E. chromaticity diagram.

MSME CREDIT DEMAND FROM NON-METROS BACK TO PRE-COVID LEVELS: STUDY



Credit and Finance for MSMEs: In the second wave, MSMEs were well prepared and could adjust to the new business environment as only 30 per cent MSMEs had required support last year in comparison to the first wave in 2020, the study noted.

MSME credit demand from non-metro cities in March 2022 was back to pre-Covid levels vis-a-vis the marginal lag recorded in metro cities, according to a study launched by digital MSME lender NeoGrowth. In terms of segments, non-discretionary demand-oriented businesses such as petrol pumps, infrastructure, and auto had recovered faster than consumer-facing and discretionary demand-oriented businesses, the study noted assessing over 40,000 MSMEs from 25 cities for the period March 2020 to March 2022.

The study *Rising in The Face of Adversity* also highlighted the revival of MSMEs during the post-Covid period. In the second wave, MSMEs were well prepared and could adjust to the new business environment as only 30 per cent MSMEs had required support last year in comparison to the first wave in 2020, the report said.

“Many MSMEs were struggling in 2020-21 due to the burden of loan repayments because of the cessation of demand from consumers...The MSME ecosystem in India is a ‘Survival to Revival’ saga. The vital lessons learned from the pandemic have transformed the way businesses operated and fast-tracked their move to digital. The credit demand from MSMEs is back to a healthy level,” said Arun Nayyar, Whole Time Director & Chief Executive Officer, NeoGrowth.

According to the study, while MSMEs across segments were impacted due to the pandemic, it was only 46 per cent MSMEs

across India that needed financial support to mitigate the impact with higher demand from non-metros than metros. Moreover, financial support availed by non-discretionary MSMEs was lesser compared to other businesses.

MSMEs in 2020 were impacted during the lockdown due to restrictions on movement, inability to manage cash flows due to reduced consumer demand, and uncertainty around business recovery post resumption. To support MSMEs in their recovery, NeoGrowth had launched its Sanjivni initiative to extend financial and non-financial assistance through customized solutions for all types of customers irrespective of the severity of the impact. The company said it had registered a 30 per cent growth in its customer base from 16,087 during March 2020 to 20,868 as of March 2022.

(Financial Express – 14/06/2022)

AS US FED SNEEZES, WILL INDIA CATCH A COLD?



Those who are now in their late sixties or older would know that one of the chief features of the 1970s has come back. No, I am talking not of the return of disco dancing or bell-bottom trousers but inflation. As high single-digit inflation persists in the West and double-digit inflation rages elsewhere, it suddenly seems as though nations have lost control over accelerating price rise, which is the ultimate nightmare of economists, politicians, and investors everywhere.

Central banks are rushing to tighten money supply (reducing liquidity and raising interest rates) to control inflation and governments are simultaneously trying to tweak imports, exports, and taxes. They are facing two problems in doing so. One, after many years the world is simultaneously under a demand and supply shock, with no immediate solution in sight to either.

And two, and for the first time, inflationary expectations seem to be setting in, which is what policymakers dread the most. Inflation is as much a matter of perception as it is of facts. If businessmen and householders believe that prices will rise (something economists call inflationary expectations), their actions will further push up prices.

In mid-March, I had said in my column, 'Stock markets unconcerned about inflation'. The market indices went up after that, dropped sharply, and have risen to the same levels they were in mid-March. Key indices are vacillating, unable to find an answer to one crucial question: Can the central banks control inflation quickly by increasing interest rates and tightening liquidity? If yes, the markets will go up.

If not, they will remain weak. One reason why we won't get a clear answer to this question very soon is that monetary tightening is the only tool that can be deployed easily in the short term, but it is a blunt tool to control inflation. After all, to bring down prices, one has to increase supply, which seems impossible in the short term.

So policymakers have to dampen demand. It is possible to cool demand, or so central banks believe, with a tighter money supply. Unfortunately, monetary tightening cannot cut demand for products that are non-discretionary, such as fuel, fertilisers, edible oils, and foods, which are the main cause of inflation now.

Tightening can affect only speculative investment, the discretionary spending of the middle class, and some asset purchases. This is why among the first casualties of inflation have been highly speculative 'investments' such as cryptocurrencies and loss-making tech companies in need of a perpetual supply of cheap funds in order to survive.

If monetary tightening affects discretionary spending (of the middle class and the poor) and non-essential assets mainly, how will demand for the essential items shrink? In the US they recorded the highest increases last year: Natural gas (176 per cent), heating oil (100 per cent), gasoline (91 per cent), crude oil (70 per cent), cotton (66 per cent), nickel (55 per cent), wheat (54 per cent), and coffee (48 per cent). The prices of these commodities will cool when their supply increases, which is not in the hands of the central banks.

However, if inflation does not drop, central banks will keep tightening liquidity as long as that is the main tool available.

This will destroy demand across the board, just like antibiotics, which kill both good and bad bacteria. The danger is that these decisions have to be made on the fly, and, with hindsight knowledge, tightening can also go too far, especially if the economy is otherwise strong, as it is now. Indeed, in the US, the labour market is tight and dislocation in supply/demand in dozens of products — from energy to food to industrial raw materials — is so severe that it may require extraordinary tightening to bring down inflation, which will also shrink the economy.

Such action could take even the US to the edge of a recession. As top US investor Bill Ackman says: 'There is no economic precedent for 200 to 300 bps of Fed funds addressing 8 per cent inflation with unemployment at 3.6 per cent. 'Current Fed policy and guidance are setting us up for double-digit sustained inflation ... It ends when the Fed puts a line in the sand on inflation and says it will do 'whatever it takes'. 'And then demonstrates it is serious by immediately raising rates to neutral and committing to continue to raise rates until the inflation genie is back in the bottle.' All this is terrible news for stocks. As Ackman says, 'If the Fed doesn't do its job, the market will do the Fed's job, and that is what is happening now.' If the US sneezes, emerging markets like India will catch a cold.

THE GOOD NEWS...

The good news is that the markets do not react to past data; they are forward-looking. They will not wait for economic news to improve or for inflation to drop to 2 per cent again. They will watch the intent of central banks, and, if they are not satisfied, they will keep marking down the prices of stocks selectively (those with high valuations and low growth will fall sharply).

Then, at some point, with the first downward tick of inflation, or when the valuation of quality stocks becomes attractive again, the markets will rally. After all, the valuations of leading Indian stocks are already back to the long-term average and companies are enjoying strong underlying demand. There is no sign of an earnings recession as in the previous periods of high inflation. Also, the excesses of cheap money in India have been confined to the unlisted sector (which indirectly will affect consumption a bit) and a few outrageously priced public issues. In short, the probability that inflation will come down on its own is low. This means if the central banks act harshly now, the markets will crash and then rally. If they are hesitant, the pain will be prolonged.

(Business Standard – 15/06/2022)

NRI TAXPAYERS CANNOT SEEK MAP IF THEY OPT FOR VIVAD SE VISHWAS: CBDT



Authorities will allow the country's taxpayers to access the mutual agreement procedure (MAP) for cross-border disputes. This is even if they had settled the case under the direct tax dispute resolution scheme — Vivad se Vishwas — without deviating from the outcome of the scheme, said the Central Board of Direct Taxes (CBDT).

However, non-resident taxpayers, who opted for the resolution scheme, cannot go for MAP on the same issue, it clarified. MAP is an alternative dispute resolution mechanism under the tax treaties where competent authorities of two countries enter into discussions to resolve tax-related disputes. The CBDT has come out with a fresh guidance note on MAP that also specifies cases or situations in which India will provide access to MAP.

This is following the slew of queries it received from industry stakeholders on consequences of the resolution scheme on MAP. Tax disputes relating to transfer-pricing adjustments, determination of existence of a permanent establishment, attribution of profits to permanent establishments and characterisation or re-characterisation of an expense or receipt as a taxable expense or income would be covered under MAP. This is if they result in taxation not in accordance with the relevant Double Taxation Avoidance Agreements (DTAAs). The guidance notes also clarified that the authorities will fully abide by the ruling of the Income-tax Appellate Tribunal (ITAT) related to drawing curtains on corresponding cases pending under MAP, unless the ITAT has set aside the matter for fresh adjudication.

Accordingly, where an ITAT order has been passed on merits, corresponding MAP cases will be 'closed as resolved under domestic remedy.' In such cases, taxpayers may independently pursue the alternative remedy of urging their respective tax authorities to allow relief from double taxation based upon the merits of ITAT decision.

A non-resident taxpayer — who opted for Vivad se Vishwas settlement on the same issue would forfeit his right for MAP resolution. This is owing to voluntary surrender of such legal rights under Section 5(3) of the Vivad se Vishwas Act. The guidance notes also said that taxpayers pursuing MAP carry the inherent responsibility of making 'true-and-complete' disclosure. It should be based on the cardinal principle of 'good faith action' by keeping the authorities abreast of up-to-date information relevant to the case.

This includes disclosure of corresponding adjustments made in home countries on the same transaction, or in terms of sharing the same set of comparable data with the Indian authorities. "The tax authorities clarified that taxpayers should not hope to achieve a different outcome under MAP. "This is in cases where there exists overlap with prior settlement under Vivad se Vishwas or adjudication by the ITAT," said Chirag Nangia, partner, Nangia & Co LLP.

(Business Standard – 21/06/2022)

INFLATION: WAS RBI CAUGHT NAPPING?



The RBI's mistake may have been in interpreting its mandate to maintain retail inflation at 4%, with 2% leeway in either direction, as being a mandate that permitted it to do nothing even when inflation was at or near the upper bound of 6%.

A former governor of the Reserve Bank of India, reminiscing on his days at Mint Road in Mumbai, told your columnist once that one of his rules was never to surprise the market with negative news. He said it was ok to give the market a positive surprise, but if there was unpleasant action coming, the market should be given advance warning of what to expect.

Given the way in which the RBI's off-cycle jacking up of the policy rate for overnight money (and that by more than the usual 25 basis points) has been received, there can be little doubt that it has come as a negative surprise — even if most people knew already that a cycle of rate increases was in the offing.

Also noteworthy is the unanimity on the subject within the monetary policy committee, just as there was unanimity a month ago when no repo rate change was announced. This is an unusual two-way groupthink, even as it appears that the RBI is now trying to make up for lost time in tackling inflation.

The mistake by the RBI may have been in interpreting its mandate to maintain retail inflation at 4 per cent, with 2 per cent leeway in either direction, as being a mandate that permitted it to do nothing even when inflation was at or near the upper bound of 6 per cent. That's where it had been for many months before recently breaching that mark. Even when the breach occurred, the RBI's response was wishful thinking (forecasting, if you will), that the problem would be short-lived.

But such an approach leaves neither time nor space for corrective action to stay within the 2-6 per cent band when inflation pressures mount — and time is needed because, as everyone knows, monetary policy works only with a substantial time lag. A correct reading of the mandate should have been that the inflation target is 4 per cent, not 6 per cent. And action to raise interest rates should have begun last year.

WHY WOULD THE RBI MISREAD ITS MANDATE?

The reason could be that it gave primacy to its role as the government's banker, to facilitate North Block's huge borrowing programme at the lowest cost possible, and subordinated the RBI's role as the economy's monetary authority. Since North Block has aimed at keeping up government spending in order to boost growth, the RBI found itself giving primacy to the government's growth objective, whereas its legislated mandate makes this secondary to inflation control. Such a reversal of the mandated priorities resulted in negative real interest rates (i.e. nominal interest rates minus inflation) for savers, pushing them into the equity and other markets in a search for positive returns.

WHAT HAS RESULTED IS AN ASSET PRICE BUBBLE.

As often happens in such situations, foreign portfolio investors have used inflated prices as an opportunity to cut and run, even as more retail investors have come rushing in. There will be those who disagree with this admittedly reductionist deconstruction of the RBI's thought processes. For instance, it has been argued that the inflation spurt, especially in fuels and in food products like edible oils, could not have been foreseen since they are by-products of the war in Ukraine. But that war is now in its fourth month, and the monetary policy committee met during the build-up to the war, when oil prices had already surged, and met again more than a month after the war started.

WHAT EXPLAINS THE INACTION THEN, INDEED THE NEAR-UNANIMITY ON INACTION?

There is another possible temptation. The government's total debt has moved up sharply in recent years to nearly 90 per cent of GDP, against a stated ideal of 60 per cent. The cost of servicing this bloated debt through interest payments rises if interest rates get hiked, thereby constricting government expenditure on other items. So you kill the problem by allowing inflation to boost nominal GDP; the debt-GDP ratio automatically comes under control, as does the fiscal deficit ratio. This is a well-worn response to excessive public debt ('Inflate away debt'), except that the mandate to the RBI effectively forbids it.

(Rediff.com – 02/06/2022)

HOW THE WEAKENING RUPEE IS AFFECTING INDIA'S ECONOMY



The weakening Indian rupee has become a headache for Harsh Shah, who owns a company in India that imports and sells kitchenware. Mr Shah is watching the currency's movements closely because the exchange rate affects the price of goods he imports. "The depreciation of the rupee is a significant setback for us," says Mr Shah, founder of Rupa Steel Centre, which is based in the state of Gujarat. "Even a downfall of the rupee by a small amount makes a huge difference."

The rupee hit a record low of 77.85 against the US dollar on Thursday. So far this year, it has dropped almost 5 per cent. Foreign capital outflows from emerging markets amid Russia's war with Ukraine, the tightening of liquidity by central banks globally and high oil prices are putting pressure on the rupee. Analysts do not believe the currency's slide is over, with some forecasting that it could move towards 80 against the US dollar.

The rupee's slump is having far-reaching effects, from making imported goods and materials more expensive for businesses such as Mr Shah's to driving up inflation as higher prices are passed on to consumers. However, others are benefitting from the softer currency, as Indians working abroad can buy more rupees with their foreign money.

Property developers are reporting a spike in Indians overseas buying homes as they have more purchasing power because of the exchange rate. Indian exporters are also benefitting as their goods and services become more competitive in price and they can boost their earnings when they convert foreign exchange income to rupees. "A weaker rupee has multiple implications for the economy," says Sandeep Bagla, chief executive of Mumbai-based Trust Mutual Fund.

"It is expected that the Indian rupee could depreciate against the US dollar. If the pace is sharp, there could be concern as it could lead to inflation and general instability in markets." The rupee will depreciate to an all-time low of 78.20 in the near term and 78.50 in the medium term, according to Religare Broking.

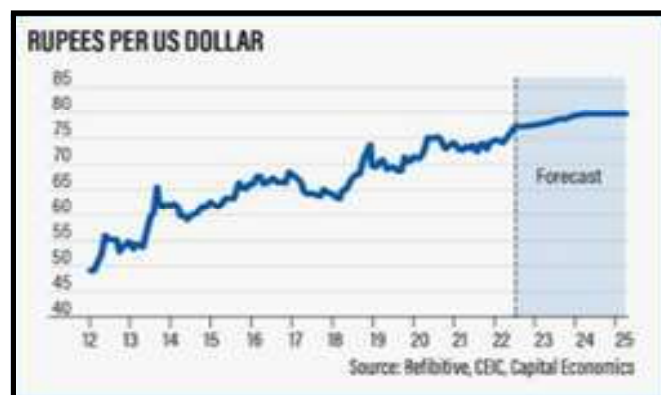
"The rise in crude prices owing to supply tightness is further accentuating inflation concerns and inflicting damage on the global economy, already strained by the monetary policy tightening path of the major central banks and the Russia-Ukraine crisis," says Sugandha Sachdeva, vice president of commodity and currency research at Religare Broking.

"These are the key headwinds playing out in the current scenario for the domestic currency and leading to a flight of foreign capital flows while increasing the demand for the safe-haven dollar." Capital Economics projects that the rupee could fall to 80 against the dollar next year. However, there is also some speculation in the market that it could hit that mark much sooner.

For the millions of Indians working abroad, any slump in the rupee creates a good opportunity to send money home. UAE-based money transfer company Al Fardan Exchange has noticed a surge in remittances to India as Indian residents take advantage of the exchange rate, which allows them to get more rupees for their dirhams. "The rupee has broken the psychological levels of 21 rupees against the UAE dirham, which is considered a favourable time to remit money back home," says Hasan Al Fardan, chief executive of Al Fardan Exchange.

"Flows to India in both the number of transactions and volume has increased substantially. We have seen more than 8 per cent growth in volumes quarter-on-quarter in the first half of 2022 and expect the volume to grow further as we expect the Indian rupee to depreciate even more." Many Indians are sending money home "to invest in various growth sectors, such as the property market, bank deposits, and shares", Mr Al Fardan says.

As expats look to capitalise on the weaker rupee, real estate companies say they are benefitting from the boost in property investments. "The weakening Indian rupee spurs investment into the country ... [as Indian expats] can definitely get more power to consume," says Shrey Aeren, managing director and country head at Berkshire Hathaway HomeServices Orenda India, a real estate agency. Over the past year, the company, which sells homes built by some of India's biggest developers, has received a "record number of inquiries, as well as closures from NRIs [non-resident Indians] from all over the world" and the softening rupee is "a significant factor in the opportunity", Mr Aeren says.



"Because of the weakening rupee, the inflation has really soared and real estate is actually a good hedge against inflation," he says. Axis Ecorp, which builds luxury homes in Goa, has seen "a marginal spike in the queries that we have been receiving", says Aditya Kushwaha, the company's chief executive and director. "Due to the current geopolitical situation, there is a sense of uncertainty," he says. "Therefore, homebuyers are resorting to a more cautious approach."

Last Wednesday, the Reserve Bank of India (RBI) raised interest rates for the second month in a row in an effort to rein in steep inflation, which will push up the cost of home loans. Nevertheless, "we feel that if the downwards spiral for rupee continues, it will result in a far greater number of NRIs showing interest in purchasing a holiday home in India", Mr Kushwaha says.

While Axis Ecorp sources most of its materials for construction from within India, many projects rely on materials from abroad, which are becoming more expensive as the rupee weakens. "The costs of the raw materials have been spiralling in the past six to eight months," says Vinit Dungarwal, director at AMs Project Consultants, a construction project management company. "The rupee hitting record lows will aggravate the situation even further. It will have a far more significant impact on the raw materials that are being imported from outside the country."

The rupee's movements will also have a significant effect on the country's investment climate. "A period of currency weakness is accompanied by withdrawal of funds from foreign institutional investors," Mr Bagla says. "For bonds, where a large part of the return is from currency movement, a weakening currency could result in exodus from debt foreign institutional investors," he says.

"Foreign companies expanding in India would have a multi-decade view and would not be affected so much by short-term currency movements." However, large companies will be able "to withstand a further 10 per cent to 15 per cent depreciation of the rupee", according to a report by Moody's Investors Service. "Most rated companies have protections to limit the effect of currency fluctuations," says Annalisa Di Chiara, a senior vice president at Moody's.

"These include natural hedges in the form of revenue and costs denominated in or linked to the US dollar, some US

dollar revenue, financial hedges, or a combination of these factors, which help limit the adverse effects on cash flow and leverage," Ms Di Chiara says.

However, there are heightened credit risks associated with currency volatility, the credit rating agency says. Given the effects the rupee can have on the economy, the RBI has been intervening in the foreign exchange market to prop up the currency in recent weeks.

"The RBI has been very actively intervening and curtailing the volatility for the rupee," says Gaurang Somaiya, a forex and bullion analyst at Mumbai-based Motilal Oswal Financial Services. Mr Somaiya expects the rupee to move towards 78.50 against the US dollar because of rallying oil prices, which are putting pressure on inflation and the trade deficit, and the US Federal Reserve's interest rate rises.

"The Indian rupee has moved in an orderly fashion and has depreciated by 2.5 per cent against the US dollar during the current financial year [beginning in April] so far — faring much better than many of its emerging market peers," Shaktikanta Das, governor of the RBI, said on Wednesday.

Meanwhile, Mr Shah is hurrying to mitigate the effects of the rupee's slide on his business and worries about a further weakening in the currency. "Currently, we are relying on domestic procurement due to prevailing fluctuations in the foreign exchange market," he says. "However, it is nearly impossible for us to source every input from the domestic market."

(The National News.com – 13/06/2022)

WORRYING SIGNS FOR INDIAN ECONOMY, AS Q4 FY22 GDP GROWTH DECLINES TO 4.1%



The slowdown seen in the fourth quarter to a four-quarter low of 4.1 per cent was inevitable, stemming from the adverse impact of the third wave on contact services, and of high commodity prices on margins, as well as the unfavourable base effect. India's gross domestic product (GDP) growth in FY22 expanded 8.7 per cent in FY22, slightly lower than the earlier estimated 8.8 per cent in the second advance estimates. In FY2020-21, Indian economy contracted 6.6 per cent. However, economic growth slowed for the third consecutive quarter in the January-March period at 4.1 per cent from 5.4 per cent growth in the previous quarter, as soaring prices slowed down consumer spending.

The provisional estimate (PE) pegs the FY22 GDP growth at 8.7 per cent, lower than the second advance estimate of 8.9 per cent. The major reason for the downward revision in GDP growth was due to a combination of factors, including the impact of third wave of Covid on economic activities and downward revision in first two quarters' growth rates. On the demand side private final consumption expenditure (PFCE) and gross fixed capital formation (GFCF) witnessed decent growth, though on a low base. Even government final consumption expenditure (GFCE) grew at 2.6 per cent compared to 3.6 per cent in FY21.

"The growth of 8.7 per cent in FY2022 as a whole is mildly higher than our estimate of 8.5 per cent, making India one of the fastest growing large economies in FY2022. Nevertheless, Indian GDP in FY2022 was a subdued 1.5 per cent higher than the level in FY2020. The growth embedded in the nominal GDP assumed by the Union Budget for FY2023 is only 9.0 per cent relative to the latest estimate for FY2022, suggesting a considerable upside to the revenue forecasts made in the Budget," said Aditi Nayar, chief economist ICRA.

FOUR QUARTERS OF GROWTH SLOWDOWN

The slowdown seen in the fourth quarter to a four-quarter low of 4.1 per cent was inevitable, stemming from the adverse impact of the third wave on contact services, and of high commodity prices on margins, as well as the unfavourable base effect. "Though 3rd wave of Covid did not hit the economy as hard as 1st and 2nd wave, but the headwinds emerging out of the Russia Ukraine conflict is looming large on the FY23 GDP growth. Ind-Ra believes both fiscal and monetary policy support not only will have to be recalibrated but also continued to steer the economy forward. India Ratings and Research expects GDP to grow at 7 per cent in FY23 with downward bias," India Ratings & Research said.

Services sector was the main driver of the 3.9 per cent GVA growth seen in the fourth quarter, driven by government spending. GVA growth of agriculture, forestry and fishing recorded a steady 3 per cent growth compared to 3.3 per cent last year, especially in the backdrop of the bleak wheat harvest portrayed by the third advance estimate of crop production. Construction displayed a better performance than expected in the fourth quarter, recording a growth of 11.5 per cent from a contraction 7.3 per cent last year.

INFLATIONARY PRESSURE AND INDIA'S PERFORMANCE

The agriculture sector remained the strongest pillar of growth. Experts say that growth in manufacturing was affected the most in the fourth quarter, which was expected as logistic and supply chain disruptions impacted industrial activities. "Services were not as badly hit thanks to improving mobility and remote working. In the fourth quarter, we were confident that investments and exports will bolster growth. Government spending also supported growth. However, uncertainties such as the Omicron wave, geopolitical crisis and high inflation weighed on consumer demand quite significantly offsetting growth in the other expenditure categories. Consequently, growth slowed to 4.1 per cent," Rumki Majumdar, Economist, Deloitte India.

Inflation has been a persistent problem in India and the economy has been fighting the challenge of rising prices for a long time now. Higher prices weighed on consumer wallets and production costs. Majumdar said that panic and the search for safer havens amongst global investors led to capital outflows from emerging countries, India being one, resulting in currency depreciation and higher import bills.

India's Chief Economic Adviser V Anantha Nageswaran said in a press conference that fourth quarter GDP growth at 4.1 per cent was better than what was estimated. "Govt capex on FY2021-22 fully met. Growth inflation challenges are universal. Inflation pressures elevated at 7 per cent to remain elevated, with imported inflation contributing over 2 per cent to the overall Consumer Price Inflation. And this may stay as crude oil prices are inching back up to \$120 a barrel, but the availability of Russian crude oil could help India is better placed than some other countries as far as inflation is concerned."

Nayar said that the data showed that global headwinds had not dented volume growth so far. "Nevertheless, business margins

are likely to be compressed, amidst an incomplete pass-through of input price pressures, while higher inflation would constrain demand growth, notwithstanding the recent excise duty cuts on petrol and diesel. Aided by a low base, ICRA expects GDP growth to print at an optically high 12-13 per cent in Q1 FY2023.”

(Outlookindia.com – 31/05/2022)

GOVT NOTIFIES PROCEDURAL CHANGES IN GST RULES



The changes were vetted by the Goods and Services Tax (GST) Council at its meeting last week. With the amendments notified by the Central Board of Indirect Taxes and Customs (CBIC), businesses have also been allowed to make tax payments on the GSTN portal by using IMPS and UPI payment modes.

Businesses with aggregate annual turnover of up to Rs 2 crore in the fiscal ended March 31, 2022, are exempt from filing annual returns for 2021-22, as per the amended rules. The amendment also clarified that interest on incorrect availment of input tax credit (ITC) would only apply in cases where such credit is utilised.

The Finance Act had brought in a provision related to levying of interest on ITC wrongly availed and utilised. The provision would come into effect from July 5 and would apply retrospectively from July 1, 2017, — the date of GST rollout. Deloitte India Partner, Leader – Indirect Tax, Mahesh Jaising said the notification issued for retrospective amendment to Section 50(3), clarifying that interest on incorrect availment of credit would only apply in cases where such credit is utilised, is a welcome one.

KPMG Tax Partner Abhishek Jain said the GST law has been suitably amended to say that interest shall be payable only in

respect of the ITC availed and utilised. “This change is much appreciated, and puts a final close to this issue.” The amendments also provide for automatic revocation of GST registrations cancelled once the return filing is regularised. “This will reduce the time and effort spent by taxpayers in getting registrations revoked even after regularisation of the return filings.

“It will reduce the interaction and improve the faceless compliances under GST,” Jaising said. Jain said these changes in rules would also help the small players in undertaking compliances, and will lighten the burden for taxpayers with less than Rs 2 crore turnover to the extent of filing of annual returns under GST. AMRG & Associates Senior Partner Rajat Mohan said other important changes include extension of time-limit specified under Section 73 (determination of tax) under the GST Act for issuance of an order for FY 2017-18 to September 30, 2023.

However, no extensions have been provided for any other financial year. “In relation to the delayed filing of refund applications during the COVID period (March 1, 2020 to February 28, 2022), suitable extension has been granted that will enable numerous exporters to encash the refunds stuck in litigation,” Mohan said. Jain said that considering the COVID scenario of the last two years for India, the government has extended the limitation period under GST for issuance of notice to taxpayers who have not paid/ short paid the tax due.

Similarly, relaxation in limitation is granted for filing refunds. “While the intention of the government is to curb revenue leakage, this change keeps the businesses exposed to departmental audits and assessments for some additional time. “This being said, this change also ensures that genuine taxpayers are not denied their refund claims,” Jain added.

According to Mohan, the manner of calculation of interest on delayed payment of tax has been notified and that would help taxpayers in making precise calculation of the tax dues. As per the amended rules, every invoice issued by an MSME supplier will have a standard declaration printed on invoice regarding non-applicability of e-invoice. Also, cash ledger balance can be transferred from one GST registered entity to another under the same PAN.

(PTI – 06/07/2022)

HOW SIDBI IS HELPING MSMEs GO 'GREEN' IN LINE WITH INDIA'S CLIMATE COMMITMENTS



Sustainability for MSMEs: India's 'Panchamrit' goal announced by Prime Minister Narendra Modi at the 26th session of the Conference Of Parties (COP26) conference in Glasgow in November last year has once again underscored the significance of encouraging sustainable or environment-friendly businesses practices. Enterprises in fact need to keep a close check on their carbon footprints to help India meet at least four of its five panchamrit targets by 2030, viz. increasing India's non-fossil energy capacity to 500 GW, meeting 50 per cent of the country's energy needs from renewable energy, reducing carbon emissions by 1 billion tonnes, and lowering the carbon intensity of the economy by less than 45 per cent.

Given the enormous size of the MSME sector with around 6.5 crore businesses, helping them go 'green' with affordable access to finance would help the country to be compliant with its climate change commitments. Here, the role of the Small Industries Development Bank of India (SIDBI), the principal financial institution for the promotion, financing, and development of the MSME sector assumes significance.

For the uninitiated, green businesses are ones that prioritize minimizing the environmental impact of the company instead of maximizing the profit. This may include the adoption of renewable energy. Towards this, SIDBI in February this year had set up a dedicated vertical with an objective to increase the resilience of the MSME sector to combat climate change and with a view to facilitating the greening of MSMEs in line with the COP26 goals.

Among other developmental efforts by SIDBI towards greening MSMEs have been the Srijan scheme to provide highly concessional loans up to Rs 2 crore per project at 3-5 per cent per annum interest rate for innovative technology projects that

have either reached the pre-commercialization stage or have tested the market and are ready for scale-up. SIDBI has also refreshed the corpus of its End-to-End Energy Efficiency (4E) scheme channelized in joint collaboration with the World Bank. The scheme intends to support energy efficiency and solar projects with a quicker dispensation of term loans up to Rs 3 crore at 4.90-7 per cent interest rates.

SIDBI has also launched a Green Finance Scheme in March this year to support green projects such as water management efficiency, wastewater treatment, carbon capture and storage, environment protection, green building, and more in the MSME sector with up to Rs 20 crore assistance.

However, MSMEs have been hesitant to invest in green financing projects due to a lack of access to funds. "To kindle energy investments, businesses need substantial investments and most green finance projects have higher transaction costs and longer gestation period, for example, the cost of capital and its availability is a challenge for MSMEs in low carbon technologies. Businesses require a factor of incentive or subsidy for green investment," said Ravindra Kumar Singh, CGM, SIDBI in his masterclass session at MSME Business Conclave organised by Financial Express Online last week.

Singh suggested providing MSMEs access to trusted advisory services for technology transfer and conducting energy audits along with providing credible business service providers to support MSMEs with green investments. Moreover, "Green financing requires non-financial support as well by creating awareness for it...Provision of soft infrastructure for the skilling and upskilling and hard infrastructure such common facilities such as lab testing centres must be made available for MSMEs," he added.

To further encourage green investments, Singh noted that a better rate of interest is required for such investments while brown investments or projects that are not climate-friendly should be taxed more. Also, bankers must prepare the Environment Social Governance (ESG) framework on their part for balancing their investments towards environmental responsiveness while MSMEs too should comply with requirements of their state pollution control board by using energy-efficient equipment along with social aspects such as the provision of a safe working environment and afforestation, according to Singh.

(Financial Express – 05/07/2022)

RUPEE PLUNGES BY 41 PAISE TO RECORD LOW OF 79.36/USD



The rupee fell by 41 paise to close at a fresh lifetime low of 79.36 (provisional) against the US dollar on Tuesday amid a strong greenback overseas and unrelenting foreign fund outflows. At the interbank forex market, the local unit opened at 79.04 against the greenback and witnessed an intra-day high of 79.02 and a low of 79.38. It finally settled at 79.36 (provisional), down 41 paise over its previous close. On Monday, the rupee had closed at 78.95 against the US dollar.

The Indian rupee hit a fresh record low against the US Dollar on Tuesday on the back of stronger dollar and weaker-than-expected domestic data, said Anuj Choudhary - Research

Analyst at Sharekhan by BNP Paribas. India's merchandise exports in June rose by 16.78 per cent year-on-year to \$37.94 billion while the trade deficit ballooned to a record \$25.63 billion on account of a steep increase in gold and crude oil imports, according to the government's preliminary data released on Monday.

"Rupee is expected to trade on a negative note on a firm tone in the US Dollar, elevated oil prices, and weak global market sentiments," Choudhary said. Dollar may strengthen on expectations of aggressive rate hikes by the Federal Reserve, Choudhary said, adding that the hike in import duty on gold may support rupee to some extent as it may dent import demand for gold. Rupee may trade in the range of 78.50-80 in the next couple of sessions. The dollar index, which measures the greenback's strength against a basket of six currencies, was up 0.89 per cent at 106.07.

Brent crude futures, the global oil benchmark, fell 1.10 per cent to \$112.25 per barrel. On the domestic equity market front, the BSE Sensex ended 100.42 points or 0.19 per cent lower at 53,134.35, while the broader NSE Nifty declined 24.50 points or 0.15 per cent to 15,810.85. Foreign institutional investors remained net sellers in the capital market on Monday as they offloaded shares worth Rs 2,149.56 crore, as per exchange data.

(PTI – 05/07/2021)

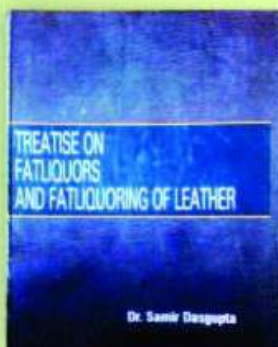
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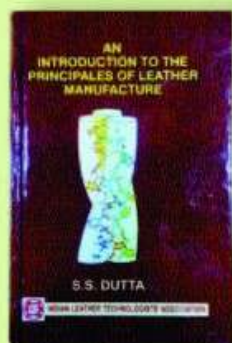
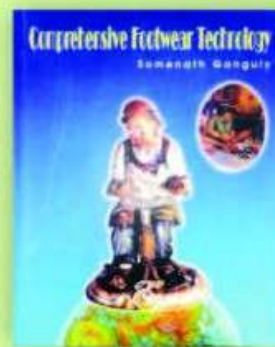
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Send your enquiries to :

Indian Leather Technologists' Association

'Sanjoy Bhavan', 3rd Floor, 44, Shanti Pally, Kolkata- 700 107, WB, India

Phone : 91-33-2441-3429 / 3459 • WhatsApp +91 94325 53949

E-mail : admin@iltaonleather.org; mailtoilta@rediffmail.com

Website : www.iltaonleather.org

History and Activities of Indian Leather Technologists' Association

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Das-Strauss 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 adaptable 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.
- ◆ As the part of many social activities ILTA has donated Rs. 1 lac to Consul General of Nepal towards relief of earthquake affected of Nepal on 15th Sept, 2015.

INTERNATIONAL & NATIONAL SEMINAR

- ◆ ILTA is the Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS), a 115 years old organization and for the first time the IULTCS Congress was organized in January 1999 outside the developed countries in India jointly by ILTA and CLRI.
- ◆ 2017 IULTCS Congress is scheduled to be held in India again.
- ◆ 8th Asian International Conference on Leather Science & Technology (AICLST) was organized by ILTA in 2010 during its Diamond Jubilee Celebration year.

SEMINAR & SYMPOSIUM

ILTA organizes Seminar & Symposiums on regular basis to share information, knowledge & latest development and interactions for the benefit of all concerned. Few are as under:

- ◆ Prof. B. M. Das Memorial Lecture every year during the Foundation Day Celebrations on 14th August every year.
- ◆ Sanjoy Sen Memorial Lecture on 14th January every year, the birthday of our late President for several decades.
- ◆ Prof. M. Banerjee Memorial Lecture on 15th March every year, the birthday of this iconic personality.
- ◆ Seminar on the occasion of India International Leather Fair (IILF) at Chennai in February every year.

It has also organized:

- ◆ Prof. Y. Nayadama Memorial Lecture.
- ◆ Series of Lectures during "Programme on Implementing Emerging & Sustainable Technologies (PRIEST)".
- ◆ Seminars in occasion of India International Leather Fair, 2014 and 2015 at Chennai etc. Many reputed scientists, technologists and educationists have delivered these prestigious lectures. Foreign dignitaries during their visits to India have addressed the members of ILTA at various times.

PUBLICATION

ILTA have published the following books:

- ◆ An Introduction to the Principles of Physical Testing of Leather by Prof. B. S. Dutta
- ◆ Practical Aspects of Manufacture of Upper Leather by J. M. Dey
- ◆ An Introduction to the Principles of Leather Manufacture by Prof. B. S. Dutta
- ◆ Analytical Chemistry of Leather Manufacture by P. K. Sarkar
- ◆ Comprehensive Footwear Technology by M. Somnath Ganguly
- ◆ Treatise on Fatliquors and Posttanning of Leather by Dr. Samir Dasgupta
- ◆ Synthetic Tanning Agents by Dr. Samir Dasgupta
- ◆ Hand Book of Tanning by Prof. B. M. Das

ILTA has a good Library & Archive enriched with a few important Books, Periodicals, Journals etc.



AWARDS OF EXCELLENCE

- ◆ ILTA awards Prof. B. M. Das Memorial, Sanjoy Sen Memorial, J. M. Dey Memorial and M. Banerjee Memorial Medals to the top rankers at the University / Technical Institute graduate and post graduate levels to encourage the brilliant to evolve with the industry.
- ◆ J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly journal of the Indian Leather Technologists' Association (ILTA).

LEXPOs

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 big, cottage and small-scale sectors industries in marketing, LEXPO fairs give the exposure for their products. Apart from Kolkata, Siliguri & Durgapur, ILTA has organized LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi.

MEMBERS

The Association's present (as on 31.03.2018) strength of members is more than 600 from all over India and abroad. Primarily the members are leather technologists passed out from Govt. College of Engineering & Leather Technology, Anna University, Chennai, Harcourt Butler Technological Institute, Kanpur, B. R. Ambedkar National Institute of Technology, Jalandhar and Scientists from Central Leather Research Institute.

ESTABLISHMENTS

In order to strengthen its activities, ILTA have constructed its own six storied building at 44, Shanti Pally, Kolkata – 700 107 and have named it "Sanjoy Bhavan".

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



ILTA
Since 1950

Indian Leather Technologists' Association

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

'Sanjoy Bhavan', 3rd Floor, 44, Shanti Pally, Kolkata- 700 107, WB, India

Phone : 91-33-2441-3429 / 3459 📞 WhatsApp +91 94325 53949

E-mail : admin@iltaonleather.org; mailtoilta@rediffmail.com

Website : www.iltaonleather.org