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Our Activities

- An Association with over 600 members from India and abroad working since last 70 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 benet 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 benet 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.

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 Telefax : 91-33-2441-7320
E-mail : admin@iltaonleather.org; mailtoilta@redimail.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; mailtoilta@rediffmail.com

Web site : www.iltaonleather.org

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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Phone : 91-33-24413429 / 91-33-24413459
E-mail : admin@iltaonleather.org / mailtoilta@rediffmail.com
Website : www.iltaonleather.org

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

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If you would like to know more about Stahl BeTan®, and what we can do for your business, visit **stahl.com** or contact **david.sabate@stahl.com**

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Natural Leather - Our Pride

The leather industry is creating a product that is both natural and long lasting - leather is unique in its ability to combine beauty, comfort and practicality. Given the extensive range of raw materials with different properties, and the many processes developed over time leather making is highly versatile and leather manufacturers can produce qualities with widely varied properties and looks.

Modern leather manufacturing recycles over 270 million cow hides each year. These are a by-product of the food industry and without the ability of the leather industry to transform them into leather, over 7 million tonnes would go to landfill with huge environmental and biological impact. Leather makes a sustainable contribution to a society that needs to consume less, reuse more and a recycle everything. Well made leather lasts a long time and unlike most man-made, or synthetic materials it gets better with age, acquiring a depth of patina and wear pattern pattern that is individual to the user - much like a favourite pair of jeans. As we mindfully look for ways to lower consumption, leather very much fits with the ethos of 'buy less, buy better'. Investing in quality leather products, is investing for the future.

The journey towards sustainability starts with products that can be repaired for longevity of use. Leather needs very little in the way of life-time maintenance and it easy to do at home, it does not draw heavily on resources for laundering and drying for example and we increasingly see the revival of artisan skills/ offering repair services for treasured leather goods. Leather trimmings from the manufacturing process can be repurposed as stuffing, (into boxing punch bags for example) or combined with other materials to make composite products such as leatherboard, which is used for insoles and heel inserts in footwear. Leather at end of life can be ground down to use in this way too. At the very end of its life leather will biodegrade, depending on type in between 10 & 50 years. We see leather trims being creatively incorporated into wall coverings, plus more and more companies are recycling the leather component from footwear and leathergoods into something new. The skills of the leather makers take the same basic raw material and turn it into a many different 'fabrics' with different qualities and benefits. Leather can be engineered to be durable enough for furniture yet soft enough for comfort footwear. It will make the finest dress gloves or protective, abrasion resistant motorcycling gloves. Leather makes the most supple of jackets or the firmest of walking boots.

Leather has a 'breathability' that more easily allows body temperature to be regulated, it will naturally absorb and hold moisture away from the skin until it can evaporate to the outside. It will also mould to the wearer - whether it's a glove, a shoe, leather jacket or wallet that's been carried in a back pocket for years, leather conforms to its wearer for a very individual comfort and fit.

Leather has a natural beauty that, unlike many materials, improves with age. Although every hide or skin is different, leather manufacturers work to bring out its best qualities, whether that's a completely aniline or 'naked' appearance to one that is expertly finished to combine durability and easy care. For more information on the different types of leather, check out our fact sheet.

Leather has long been a component of luxury goods, from covetable handbags to footwear and clothing. It has a distinctive touch and wear quality that cannot be replicated and for that reason it is often combined with hardedged technology to provide a more luxurious and personal feel to an item that is otherwise anonymous. As with all natural materials it creates a user experience that is more emotional, less functional. The leather industry understands this and responsible manufacturing commits to certified standards and working with initiatives such as ZDHC in order to develop a better product.

Tanneries are regulated under governments for compliance to all environmental standards as well as to international

regulations via 3rd parties and customer audits. Most tanneries are very transparent about their compliance data and openly share that information with their customers. Multiple 3rd party programs provide transparency on whether a tannery has environmental compliance with government and 3rd party regulations. Third party governance programs include the Leather Working Group (LWG), Brazil has Sustainability Certification to tanneries and the Institute of Quality Certification for the Leather Sector (I.CE.C) operates in Italy.

Most tanneries either run their own wastewater treatment plant or send their wastewater to an industrial or municipal run wastewater treatment plant. To learn more about the leather industry's wastewater treatment plants see the UNIDO article on the treatment of tannery effluents together with the IULTCS-IUE recommendations. All modern tanneries run or discharge to wastewater treatment systems to treat their liquid waste. Solids waste is managed according to government protocols and best in class tanneries are working towards creating circular waste streams that provide new materials or energy sources from their solid waste. ZDHC stands for Zero Discharge of Hazardous Chemicals. ZDHC is a non-governmental program which established rules to eliminate hazardous chemicals in textile and leather processing. Over 100 global brands and many suppliers to the leather industry have become contributors to the ZDHC program and are enforcing ZDHC regulations with their supply chains. Today major leather producers must comply with all major chemical legal regulations with regard to the use of restricted chemical substances. Regulations such as the EU-REACH directives and the ZDHC manufacturing restricted substance list, called MRSL. A MRSL is a list of chemical substances established by ZDHC which are not allowed to be used in chemical products for leather manufacture. ZDHC is a global NGO run by stakeholders coming from global brands, universities, manufacturers and testing institutes trying to reduce the discharge of hazardous chemicals.

The use of solvents in tanneries is very low. While solvents were commonly used in the past for degreasing and finishing (coating) of leather these processes have all been switched to water-based technologies. The few amounts of solvents still in use are not considered hazardous as all solvent containing air from coating operations is run through a scrubber where it is captured and is not emitted to the environment. Legislators, eco labels, brands and NGO run organizations establish lists of chemical substances which are restricted for intentional use in leather manufacturing or the final leather product. These substances are called restricted substances due to their hazardous properties. These are lists of chemicals substances which should not be intentionally used in chemical products during leather manufacture. For example, ZDHC has a MRSL list which is the most commonly recognized MRSL list in the leather industry. Compared to the leather industry, the textile industry is dealing with a higher number of restricted substances. The leather industry is more advanced in phasing out ZDHC listed restricted substances from its manufacturing.

Chemical products are generally not recycled but many chemical formulations in tanneries are reused during the process to limit their discharge and reduce cost. Chemical products that have not been completely used up during leather manufacture will remain in the final wastewater which is specially treated in wastewater treatment plants. Ideally chemical products used in leather manufacture should biodegrade. Since tanneries in the past often did not ensure proper working conditions these issues become a focus of legislators and environmental NGO's. This led to significant improvements and it is safe to say that responsible tanneries nowadays practice a very high level of operational safety. Workers are trained in handling chemicals and operating machines in a safe way. Regular audits done by various organizations (i.e. LWG, CCIB, etc.) ensure high standards are maintained. Modern tannery machines are equipped with state-of-the-art safety devices, and employees are required to wear personal protective equipment (safety gloves and shoes, goggles, breathing masks) when handling chemicals.

UNIDO has also launched an online safety awareness training program, which includes video demonstrations of how to employ safe practices for specific chemicals used in tanneries. Leather manufacture is known for its craftsmanship, and historically significant manual work was involved. However, this has changed a lot over the past 20 years. Many mechanical operations and the handling and dosing of chemicals has become automated. The larger tanneries around the world have become automated in the last 10 years and are now running state-of-the-art operations with highly efficient use of resources and levels of environmental compliance that go beyond many regulations.

Tanneries are places where chemicals are processed into leather; most of them have a high level of safety and occupational health programs in place. Employees are constantly being trained to perform safe activities. Tanneries also need to comply with local, state and federal regulations. If those risks are properly managed and safety efforts undertaken, then a tannery is no riskier than other chemical manufacturing facility. The process of calculating leather's carbon footprint has been controversial due to the hides connection with the meat industry. Currently, there is no single methodology on an internationally agreed standard for leather's product footprint. In 2018 the EU's Environmental Footprint Steering Committee published rules about how to calculate the impact of leather manufacturing using LifeCycle Assessment methodology. This allows tanners to calculate their footprint using harmonized established rules, taking into account the fact that leather is a by-product of the meat and dairy industries. Water is essential for leather production. Manufacturing leather currently involves a system of water-based processes, utilizing water as the transport medium and diluent for the chemicals required. The water consumption of leather manufacturers is an important topic audited in protocols from the Leather Working Group and the like.

The Leather Working Group (LWG) runs a traceability audit on all LWG audited tanners to assess a supplier's ability to be able to trace their raw material back to the slaughterhouse. This information is not only available to customers of the tannery but also to end consumers on the LWG website. The Institute of Quality Certification for the Leather Sector in Italy runs a comprehensive certification programme and more information can be found on its website, www.icec.it. CSCB is the Brazilian Leather Certification for Sustainability, more details can be found on www.cicb.org.br together with background on the Brazilian leather industry. Leather from cattle, sheep, goat and pig are a by-product of the meat industry. 98% of the leathers are made from these four animals. Farmers do not raise cattle for their hides to turn into leather as the value of a steer/cow hide is generally only approximately 4% of the total animal's value. Farmers raise cattle for their meat or milk with the hide as a by-product that must be turned into another value-added product or eaten. Leather is currently the best way to up-cycle hides and skins from the meat industry; every year it not only saves around 7.3 million tonnes from global landfill, but is versatile enough to be used in a range of products from soft gloves to comfortable footwear, to hard wearing furniture and contemporary clothing.

Assessing bodies for leather industry are :

Leather Working Group

The objective of this multi-stakeholder group is to develop and maintain a protocol that assesses the environmental compliance and performance capabilities of leather manufacturers and promotes sustainable and appropriate environmental business practices within the leather industry.

ICEC - Institute of Quality Certification for the Leather Sector

The Code of Conduct and Social Accountability, a tool provided by UNIC Italy, is a basic instrument to widespread the principles regulating business activity. In this document the principles of conduct and social accountability characterizing the leather manufacturers are officially defined.

Brazilian Leather Certification of Sustainability (CSCB)

Brazilian Sustainability certification standard that applies the tripod of sustainability concept in which a tanning industry's results are considered in economic, environmental, and social terms.

ZDHC

By managing chemical inputs, ZDHC wants to ensure safer products, cleaner water and fresher air. The initiative focuses on leather and other materials and maintains a Manufacturing Restricted Substance List (MRSL) and Waste Water Guidelines. Chemicals can be approved according to different conformance and are published on the ZHDC Chemical Gateway.

Goutam Mukherjee

Dr. Goutam Mukherjee
Hony. Editor, JILTA


Leather Fraternity 70 years of service to the International

Solidaridad
ASIA

Solidaridad Network is a global civil society organization providing efficient, scalable and economically effective and innovative sustainability solutions in various agricultural and industrial commodities such as:

Tea · Sugarcane · Soy · Leather · Livestock · Gold · Textile · Fruits & Vegitable · Dairy · Cotton · Aquaculture · Castor · Palm oil

Solidaridad Asia has more than 320 sustainability experts operating from 26 offices in 9 countries and has also pioneered development and implementation of national sustainability standards in the region.

Solidaridad initiated its efforts in the leather cluster in late 2017 with the Kanpur-Unnao leather cluster. WIthin 2 years of inception, we have started our efforts in Kolkata and Bangladesh Leather clusters. Through tailor-made programs, Solidaridad has tried to address the following components:

KEY COMPONENTS


Efficient water consumption practices


Introduce technologies to address effluent pollution (TDS,TSS, Heavy metals etc.)


Effective solid waste management


Productivity enhancement through shop floor management


Trainings on occupational health and safety


Digitalised training platform

SUSTAINABLE WAY FORWARD IN THE LEATHER CLUSTERS ACROSS INDIA


Unique public private partnership model


Indo-Dutch technical expertise


Scalable technological interventions


Pilot demonstration of proven eco-friendly and commercially viable technologies

Significant contribution to the larger vision of "National Mission for Clean Ganga"

Solidaridad
ASIA

Solidaridad celebrating its 50th year anniversary in The Netherlands


Capacity building workshops of tannery personnels


Tannery workers using desalting machine to remove salt from hides


OHS workshop conducted by experts for awareness creation and risk mitigation of toxic H2S gases

Ministry of The Netherlands acknowledged Solidaridad's contribution to leather sector in India at Indo-Dutch forum

Launch Meeting of Solidaridad's project for pollution prevention in tanneries in Kanpur

Tatheer Raza Zaidi, Senior Program Manager- Leather: tatheer.zaidi@solidaridadnetwork.org
Solidaridad Network Asia Limited
A-5, 1st Floor, Shankar Garden, Main Najafgarh Road, Vikas Puri, New Delhi – 110018
Contact: 011-45134500, +91-9818311450

From the desk of General Secretary

SEMINAR ON 'DIABETES' ORGANIZED BY ILTA

A Seminar on the topic "Diabetes – The Silent Killer" was organized by our association as an initiative of ILTA Welfare Committee on 17th October' 2020, at 7.00 pm on digital platform.

The programme resumed with the introductory speech delivered by Mr. Susanta Mallick, General Secretary, ILTA. He requested Mr. Arnab Jha, President ILTA to deliver the Welcome Address for the audience.

In his address Mr. Jha expressed his anxiousness about present storming tendency of spreading Diabetes Worldwide. He mentioned that as per a recent research around 6% of the World population is diabetic and 16 lakhs are losing their lives every year due to diabetes. Quoting the research report he also mentioned that Diabetes is going to take a major role in the mortality rate of World population within next 10 years. Standing on this crucial situation he welcomed Dr. Debmalya Sanyal, the hon'ble Speaker of the day for highlighting the subject.

Thereafter Mr. Mallick called on Mr. Samrat Paul, an official from R. N. Tegore Hospital, Narayana Health to give an introduction of Dr. Sanyal.

Dr. Sanyal then delivered the highly informative and suggestive lecture on the topic "Diabetes – The Silent Killer". In his lecture he explained in details about the latest status of diabetes among Indian populations and different reasons that's of. He suggested a nice routine life style for everybody, especially the industry peoples who are under heavy stress due to their daily business.

He also explained with some data the remedial measures could be followed to avoid diabetes by maintaining some routine health checkup.

After conclusion of his lecture Dr. Sanyal responded a lot of queries of the participants with a proper clinical advise that of.

The programme came to an end with offering Vote of Thanks by Mr. Kaushik Bhuiyan, Coordinator, Welfare Committee of ILTA. He offered his heartfelt thanks to the Speaker of the day, President & General Secretary of our association, Members of our association and all the participants.

There were about 55 – 60 participants over Zoom platform and around 100 viewers on the ILTA HR Face Book Live.

This lecture is also available on ILTA's official Youtube Channel **'ILTA Online'** and wbsite **www.iltaonleather.org.**

NEW YOUTUBE CHANNEL OF ILTA

A new official YouTube Channel of our Association **(ILTA Online)** has been launched from 1st November' 2020. You may follow and view all the video recording of different Seminar & Symposiums on this channel by opening it time to time.

You are requested to kindly do 'Like' the channel and 'Subscribe' it by pressing the Bell Icon.

62nd ANNUAL GENERAL MEETING

The 62nd Annual General Meeting has been proposed to be organized by 24th December' 2020, on digital platform.

Details of the Progress will be informed in due course.

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

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

You are requested to :-

a) Kindly inform us your 'E-Mail ID', 'Mobile No', 'Land Line No', through E-Mail ID: admin@iltaonleather.org or over Telephone Nos. : 24413429 / 3459. This will help us to communicate you directly without help of any outsiders like Postal Department / Courier etc.

b) Kindly mention your Membership No. (If any) against your each and every communication, so that we can locate you easily in our record.

(Susanta Mallick)

General Secretary and the Members of the Executive Committee are available to interact with members at 19.30 hrs, over Phone/Conference call on every Thursday

News Release from the IULTCS

INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES

YOUNG LEATHER SCIENTIST GRANT PROGRAMME 2021 OPEN NOW FOR APPLICATION SUBMISSION - ERRETRE AND LEATHER NATURALLY TO SUPPORT AGAIN THE IULTCS YLSG PROGRAMME IN 2021

Due to the impact of COVID-19 the application submission for the 2021 YLSG programme has been extended until 30th November, 2020. Luis Zugno, President of IULTCS, asks young research talents of the industry to submit courageous and innovative project ideas for research projects in the categories: Leather Research, Machinery / Equipment and Sustainability to be conducted at a recognized institution in 2021.

Details of the eligibility requirements are available on the IULTCS website :

https://iultcs.org/commissions/iur-research-commission/

Italy based leather technology provider and machinery manufacturer, ERRETRE S.p.a., confirmed support of the 2021 YLSG programme of IULTCS in the category Machinery/ Equipment. The grant is to encourage young leather students and scientists to run a leather research project in the areas of developmentof machines for leather processing, automation, chemical/physical analysis and environmental equipment. Mr Adriano Peruzzi from Erretre remarks: “Our company supports leather education and we strongly believe our sector needs young motivated people to implement innovation and face the challenges the industry is face during the coming years. Erretre is again proud to award one young scientist for the work on a remarkable research project on Machinery/Equipment and for the contribution to the leather industry.”

“Leather Naturally is proud to sponsor the Professor Mike Redwood Sustainability/Environment grant for another two years” said Egbert Dikkers, Chairperson. “With Leather Naturally’s focus on providing education to designers, brands and consumers, it was a logical step to sponsor this award and honour our founder Professor Mike Redwood.” Who is quoted as saying: “I wrote my first sustainability report in 1993 and those companies who have embraced the subject positively since then have all benefited from the solid science-based foundation it establishes when fighting competitive materials on environmental grounds. To pursue sustainability as an ongoing objective stimulates the leather industry to be dynamic and innovative. I am immensely honoured to be named in this grant and hope that it will allow candidates to feel free to challenge the industry with creative and unexpected ideas”.

2021 will be the seventh year of the grant, and IULTCS will provide the monetary sponsorship for a single sum of €1,500 grant to Basic Research; ERRETRE will sponsor the €1,000 grant for Machinery/Equipment and Leather Naturally the €1,000 sponsorship for the Professor Mike Redwood grant on Sustainability/Environmental.

Michael Meyer, Chairman of the International Union of Research Commission (IUR) of IULTCS and Research Director at Freiberg (Germany) based FILK Leather Institute expressing his appreciation of the engagement: “We much value the contribution of ERRETRE and Leather Naturally to our YLSG programme. It is a vital instrument to encourage young leather scientists to acquire awareness and become more connected to the established research community of our industry. We have seen the programme growing stronger over the past years. Last year´s edition brought up numerous, ambitious applications to step forward with innovative ideas and sustainable technologies.”

The IULTCS requests that readers of this announcement forward the information to those institutions and individuals who could benefit from the award.

Dr Christine Powley-Williams, Chairman, IUL Commission

(Source : Email dated 09/10/2020)

A Healthy Manufacturing Plant and Its Driving Mechanisms

Prof. Goutam Mukherjee

Govt. College of Engineering & Leather Technology, Kolkata

(Contd. from October' 20 issue) -

Managerial Communication :

Communication forms the basis of any organizational structure. A manager cannot get the work done through the employees unless he is sure of some basic facts, viz., that the workers are to be communicated of what he wants to be done. He has to decide how it is to be communicated, and what results can be expected from the communication.

The relationship between these issues and the managerial communication are given below :

Managerial Communication and Its consequences

1. What to communicate? : Factual Information, Information about Opinions and Attitudes.
2. How to communicate? : Verbally (oral or written), Non-verbally.
3. What to expect? : Compliance Behaviour, Changed Behaviour.

Communication is the base for any management

Communication forms a basis for management by objectives, long-range strategic goal setting and policy formulation, strategic planning, organization development and organization effectiveness, control, decision-making and allied managerial activities aimed at effective achievement of organizational goals.

Communication refers to the sharing of ideas, facts, opinions, information and understanding. Prof. Das Gupta is of the view that

"To communicate is to inform, to tell, to show or to spread information. Whatever its etymological meaning, from the managerial point of view, communication is the means by which a management gets its job done. It can affect both the morale and efficiency of employees. Communication is a skill of management."

Dr. McFarland views communication as

"a process of meaningful interaction among human beings. More specially, it is the process by which meanings are perceived and understandings are reached among human being."

Basic Elements of Communication

The key elements of communication are :

1. It is a process, which exists as a flow through a sequence or series of steps. These steps include the generation of an idea putting it into some logical sequence, transmitting it through some media; and its reception by someone at the other end; his understanding of the message sent and his acting upon the message received.
2. Communication involves that information not only be transmitted but also understood. If information has been transmitted and not received or received but not accurately interpreted, then miscommunication occurs.
3. The third element is that information senders (encoders) and receivers (decoders) are either human (animate) or non-human (inanimate) objects. It should, however, be remembered that communication is a broad field of human interchange of facts and opinions and not the technologies of the telephone, the radio and the like."
4. There must be some channel or medium through which information or understanding could be transmitted: Transmission may be done by word of mouth, by written material, pictures, body language, etc.

Corresponding author E-mail : gmgcelt@gmail.com

5. Communication may consist of three interlocking circuits transmitting information: It may be upward in regard to knowing the effectiveness of orders, ideas, comments, actions, reactions, attitudes, reports, complaints, and grievances from the lowest level; downward may flow instructions, directions, clarifications, interpretations, of rules, regulations, orders, policies and procedures; and intra-scalar or cross contact, where information may be exchanged between two departmental heads or two or more persons who are of equal status.

Process of Rational decision making

Management is essentially a process of decision-making, and managers at various levels are mainly concerned with decision-making. Without decisions, the functions of management could not take place and the entire process of management could not exist.

Decision-making is an important aspect of planning. Without making decision nothing can be done. For performing vat1ous aspects of management functions like planning, organizing, control, etc., decisions should be made because it helps to set objectives, prepare plans of action, introduce innovations, determine organizational structure of the concern and so on.

Phases in decision making process or rational decision making

Decision-making involves the following phases :

1. Identifying the Problem: The first step in the decision-making process is to identify the actual cause of a problem. It involves defining and formulating the problem clearly and completely. In practice, defining the problem is not an easy task. What seems to be a problem may actually be the symptoms of it. So the manager should dig further to identify the real problem.

   Defining the problem involves identifying the critical factors so that such factors can be restricted by the manager and finding out whether there are any limiting factors to solve the problem. For this purpose, manager should refer to the objectives, rules, policies, etc., of business.

2. Analyzing the Problem: After the problem is defined, the next step in the process of decision-making is, analyzing the problem. it involves the collection and classification of as many facts as possible. The assembled information should be classified on the basis of futurity of the decision and the impact of the decision. Collection of relevant and accurate data is essential because the quality of decision will depend upon the quality of data used.

3. Developing Alternative Solution for the Problem: Majority course of action will have alternatives. A course of action does not become the best merely because it has been in use for a long time. Hence, the sound decision necessitates the consideration of all alternatives. This step involves the identification of limiting factors because it will enable the manager to search for those alternatives which will overcome the limiting factors.

4. Evaluating the Alternatives: After having developed the appropriate alternatives, the next step is evaluating them so as to choose the best one. While comparing the alternatives, various factors that are given here under are to be considered.

   a) Quantitative Factors – factors which can be measured e.g., fixed and operation costs.
   b) Qualitative Factors or intangible Factors — factors which cannot be measured i.e., unmeasurable factors, e.g., labour relations, change in technology. While evaluating the qualitative factors, the planner should see whether these factors can be quantitatively measured. If they are found not to be quantitatively measurable, then he should assess the importance and influence and then come to a conclusion.

5. Deciding the Best Course of Action: After the evaluation of various alternatives, the next step is deciding the best alternative. The manager should take into account the economy, risk factors, the limitation of resources, feasibility of its implementations, etc., at the time of deciding the best course of action. Koontz and O'Donnell have suggested three bases for deciding the best one from the alternatives viz.

   a) Past Experience,
   b) Experimentation, and
   c) Research and Analysis.

6. Conversion of Decision into Action: If the decisions taken remain in the paper, there is no meaning in taking decisions.

Once a decision is made, it should be converted into action i.e., implemented. Implementation involves the following steps.

a) Communicating the decision to all the employees concerned.
b) Assigning the responsibility of carrying out the decision to certain employees.
c) Developing the procedure for the purpose of executing the decision.
d) Developing feedback mechanisms to check on the progress of the implementation.

7. Control: Once the decision is implemented, the next step is controlling. The term controlling involves the following steps :

a) Comparing the actual with the expected result.
b) Finding out the deviation.

Need for coordination in management

Co-ordination is an abstract of management. The purpose of coordination is to synchronize the functions of various sections for achieving organizational goals with minimum effort. It is an orderly management of group effort to provide unity of action in the pursuit of common purpose.

In this context, Ordway Tead says "co-ordination is the effort to assume a smooth inter-play of the functions and forces of all the different component parts of an organization to the end that its purpose will be realized with a minimum of friction and a maximum of collaboration effectiveness".

The need for co-ordination arises due to the following :

1. In every organization, the nature of work is such that it requires to be divided into homogeneous and specialized sub-tasks and then without Integration and co-ordination the output of the organization will be nil.

2. **Co-ordination applies to group effort** rather than to individual effort. It gives importance to unity of effort and united action. The outcome of coordinated group efforts will be much better than the sum results of various individuals.

3. **Coordination motivates the employees** to consider their work from the point of view of business and so the employees will willingly contribute towards the success of the concern. Therefore, **coordination is heartbeat of organization** which brings integration of efforts and action among employees in the organization.

3. **Coordination ensures commitment** on the part of divisions, groups, individuals toward organizational goals.

4. **Coordination ensures efficiency and economy** in the organization, enterprise to ensure smooth working. It also helps in saving of time by bringing efficiency and economy to the enterprise.

5. There may arise certain circumstances that may demand sacrifice of objective of one department in the welfare of the enterprise as a whole. In such situation, the need for co-ordination arises.

6. Coordination is directed towards channelizing the efforts, skills, energies of work groups along organizationally established lines. If the co-ordination is absent, group members may be pulled in different directions and work at cross purposes.

Good Leadership

"**Leading**" is another important tool of directing. It is an activity on the part of the managers to get works done by various means. **Leadership** is the process of influencing subordinates in the organization for the achievement of organizational objectives. It is the manager's ability to induce his employees to perform their job confidently and enthusiastically.

Meaning of Leadership

Leadership, in the business context, is one of the means of direction and represents that part of manager's activities by which he guides and influences the behaviour of his subordinates and the group towards the accomplishment of some specified goals. Leadership is a great quality that can create and convert anything.

Characteristics of Good Leadership

Following are the chief characteristics of good leadership :

1. A leader should have followers. The reason is, there cannot be leadership without followers. A leader must receive habitual

obedience from his followers i.e., there must be acceptance of his leadership.

2. **Leadership considers deeply inter-personal influence**. It is rooted in feelings and attitudes that have grown out of reactions of individual personalities to each other.

3. A manager must lead continuously because **leadership is a dynamic and ever evolving process**.

4. **Leadership involves directing, guiding and influencing the behavior of individuals** and groups so that future activities and behaviors can be modified in the appropriate direction.

5. There must be working relationship between the leader and his followers. That means, the **leader himself must be an active participant**. Otherwise, he will not have any effect.

6. The **leader must set an ideal before his subordinates**. His behavior must stimulate the followers for hard and honest work.

7. **Leadership involves motivating subordinates** to strive willingly for mutual objectives. There should be community of interests between the leader and his team of work. If the objectives of the two are different and both move in different directions, there is no leadership.

Leadership Style

The term **leadership style** refers to behavioral pattern employed by a leader to integrate organizational and personal interests in the pursuit of some goal or objective. The type of leadership style available in an organization has a great deal to do with the implementation of strategies.

In management literature, different researchers have identified different styles. For instance

there are three distinct types of leadership styles — authoritarian, democratic and laissez-faire.

Consideration and initiating structure, accomplishment and personal relationship are important dimensions of leadership style which emphasis on employee-oriented supervision. The essence of leadership style lies in task behavior, relationship behavior and effectiveness.

The extensive research in the relationship between management style, the nature of environment and effectiveness reveals that there are basically seven styles of leaderships whose characteristics can be explained in the following five dimensions.

Characteristics of Leadership Styles

1. **Risk Taking**: Willingness to make high — risk, high-return decisions.

2. **Technology**: Degree of commitment to planning, employment of technically qualified persons, and practice of management science techniques.

3. **Organicity**: Degree of loose and flexible organizational structuring; low organicity is mechanistic in tightly structured organizations.

4. **Participation**: High participation implies extensive participation of those other than the top management in key positions.

5. **Coercion**: High coercion means extensive use of fear and domination by top managers as a management technique.

The environment along the following dimensions shall be characterized as follows :

1. **Degree of Turbulence of Volatility**: Fast changeability and unpredictability.

2. **Degree of Hostility**: Hostile environments are highly risky and overwhelming.

3. **Degree of Heterogeneity**: This refers to diversity of markets and types of consumers.

4. **Degree of Restrictiveness**: Restrictiveness means many economic legal, social and political constraints.

5. **Degree of Technological Sophistication**: With complex technologies, R & D is necessary for survival.

When the management style matches the strategic choice (firm's environment), firms tend to be more effective.

However, the leadership style that an individual selects should depend on the situation in which he finds himself, the type of strategy to be managed, and the general environmental variables.

Different methods of Training employees

On-the-job Training

On-the-job training is considered as the most effective and widely used method of training. Under this method, the worker is assigned to a specific job. He is generally instructed by his immediate supervisor or an experienced employee of the same department. The nature of the job, the method of handling the machine and using the tools, and the method of performing the tasks are all explained in On-the-job training. Then he is asked to operate the machine in the course of actual production process. Thus, training and output go hand-in-hand.

Forms of On-the-job Training

On-the-job training may take any one of the following forms.

1. Coaching

Under this method, the superior teaches job knowledge and skills to a subordinate. The emphasis in this method is learning by doing.

2. Under Study

Under this method, the superior gives training to a subordinate under his duty. The subordinate acts as the student of the superior. He is also called as the heir apparent or successor to fill the vacancy caused by the promotion or retirement of his superior.

3. Position Flotation

Under this method, the trainee is periodically rotated from job to job instead of sticking in one particular job. He can acquire a general background of different jobs.

Limitations of On-the-job training method

The following are some of the limitations of On-the-job training method.

1. In practice, it takes longer time to train the employee.

2. If the supervisor is unable to devote more time, much of the work will be spoiled.

3. Expert guidance is possible only when the superior himself is an expert.

4. Trainees are often subjected to distractions of a noisy shop or office

Vestibule Training

This method is contrast to the on-the-job method. Under this method, new workers are trained for specific jobs on special machines or equipment in a separate room located in the plant or workshop itself. An experienced workman is entrusted with the task of training. He should actually demonstrate the machine. Besides, other devices such as lecture, conference, group discussion, role playing, etc, are also used to impart training. This method is suitable only when a large number of new recruit are to be trained simultaneously.

Merits of Vestibule Training

The following are some of the advantages of Vestibule Training method.

1. The trainer is a specialist and an experienced teacher as well.

2. Since the training is given off-the-job, the trainer has no other work other than teaching Hence, he can concentrate on teaching.

3. It does not interfere with the regular work.

4 It avoids the inconvenience of on-the-job method. Hence, the trainee can learn the job within a shorter period.

Limitations of Vestibule Training

The following are some of the limitations of Vestibule Training method.

1. Training a conducted in artificial conditions.

2. It is an expensive affair. Hence small firms cannot resort to this type of training.

3. This method is not suitable to train one or two employees.

4. Splitting of responsibility may lead to organizational problems.

Apprenticeship Training

Apprenticeship training is one of the earliest methods of training. This method originated in the age of hand craftsman, when the individual craftsman taught the practical skills to the apprentice Under this method, the new

employees are required to work as an apprentice to the expert This method Is widely used in those trades in which longer period is required for gaining all round proficiency.

Merits of Apprenticeship Training

The following are some of the advantages of Apprenticeship Training method.

1. A skilled work force is maintained.
2. Trainees receive some stipend during the training period.
3. The workmanship is high and good. Therefore, the trainees have a good demand in the labour market.
4. It is comparatively cheap because only nominal amount is paid to the trainees as stipend.
5. It reduces the labour cost, production cost and the labour turnover.

Limitations of Apprenticeship Training

The following are some of the disadvantages of Apprenticeship training method.

1. It is a time consuming process. The trainees have to undergo training for many years.
2. Rigid standards are insisted. Hence this method is not flexible.
3. If the worker fails to learn sufficiently, he shall not be appointed in the firm.
4. There is also no guarantee that the trainee after the training shall continue in the same firm.
5. This type of training tend to stress time instead of achievements.

Internship Training

Under this method, the students get practical training while they study Thus. this method is based on the cooperation between the employers and the vocational or technical institutions A few large undertakings have their own training institutes Under this method a balance between theory and practice is maintained.

This method is highly suitable to train skilled and technical personnel and not for others Besides, it is also a time consuming process.

Learner training

Learners are employees selected for semi skilled jobs and those who do not even have basic knowledge of Industrial Engineering. The learners are first given formal education in vocational schools for some time. Then they are trained in the operation of machines. After the completion of the training course, they are put on regular lob in the factory.

Besides, there are also a number of off the job methods worth mentioning. Lectures, group discussions, conference are all devised to supplement the knowledge of the trainees depending on the circumstances and requirements, one or two methods or a combination of two or more methods can be followed.

Adoption of proper strategy

The concept of manufacturing strategy is a natural extension of the concept of corporate strategy, although the latter need not be as rational and explicit as management theorists usually require.[2] As we use the term, a corporate strategy simply implies a consistency, over time, in the company's preferences for and biases against certain management choices as shown in Exhibit I. We use the term company to refer to a business unit that has a relatively homogeneous product line, considerable autonomy, and enough of a history to establish the kind of track record we refer to here. Such a "company" could, of course, be a relatively independent division within a larger enterprise. The following four "attitudes" shape those aspects of a company's corporate strategy that are relevant to manufacturing.

Dominant orientation - Some companies are clearly market oriented. They consider their primary expertise to be the ability to understand and respond effectively to the needs of a particular market or consumer group. In exploiting this market knowledge, they use a variety of products, materials, and technologies. Gillette and Head Ski are examples of such companies. Other companies are clearly oriented to materials or products; they are so-called steel companies, rubber companies, or oil companies (or, more recently, energy companies). They develop multiple uses for their product or material and follow these uses into a variety of markets. Corning Glass, Firestone, DuPont, and Conoco come to mind. Still other companies are technology-oriented—most electronics companies fall into this class—and they follow the lead of their technology into various materials and markets.

A common characteristic of a company with such a dominant orientation is that it seldom ventures outside that orientation, is uncomfortable when doing so, often does not appreciate the differences and complexities associated with operating the new business, and then often fails because it hesitates to commit the resources necessary to succeed. A recent example of a company that ventured, with considerable trauma, outside its dominant orientation was Texas Instruments' entry into consumer marketing of electronic calculators and digital watches.

Pattern of diversification - Diversification can be accomplished in several ways: (1) product diversification within a given market, (2) market diversification (geographic or consumer group) using a given product line, (3) process or vertical diversification (increasing the span of the process so as to gain more control over vendors and/or customers) with a given mix of products and markets, and (4) unrelated (horizontal) diversification, as exemplified by conglomerates. Decisions about diversification are closely interrelated with a company's dominant orientation, of course, but they also reflect its preference for concentrating on a relatively narrow set of activities or, alternatively, its willingness to enter into a wide variety of activities, products, and/or markets—and which ones it will enter.

Corporate attitude toward growth - Does growth represent an input to or an output of the company's planning process? Every company continually confronts a variety of growth opportunities. Its decisions about which to accept and which to reject signal, in a profound way, the kind of company it prefers to be. Some companies, in their concentration on a particular market, geographic area, or material, essentially accept the growth permitted by that market or area or material consumption. A company's acceptance of a low rate of growth reflects a decision, conscious or unconscious, to retain a set of priorities in which a given orientation and pattern of diversification are more highly valued than growth.

Other companies, however, are so structured and managed that a certain rate of growth is required in order for the organization to function properly. If its current set of products and markets will not permit this desired rate of growth, it will seek new ones to "fill the gap." Again, this decision will closely reflect its attitudes regarding dominant orientation and diversification. One obvious indication of a company's relative emphasis on growth is how growth is treated in its planning, budgeting, and performance evaluation cycle, and particularly the importance that is placed on annual growth rate, compared with such other measures as return on sales or return on assets. It is necessary to differentiate between a company's stated goals-words on paper-and what actually moves it to action.

Choice of competitive priorities - In its simplest form this choice is between seeking high profit margins or high output volumes. Some companies consistently prefer high margin products, even when this limits them to relatively low market shares. Others feel more comfortable with a high-volume business, despite the fact that this commits them to severe cost-reduction pressure and often implies low margins. An interesting article describes David Packard's attempts to redirect Hewlett-Packard away from the latter approach, where it was nose-to-nose with Texas Instruments, and back toward the former approach.[3]

This concept can be expanded and enriched, however, since companies can compete in ways other than simply through the prices of their products. Some compete on the basis of superior quality-either by providing higher quality in a standard product (for example, Mercedes-Benz) or by providing a product that has features or performance characteristics unavailable in competing products. We intend here to differentiate between an actual quality differential and a perceived difference, which is much more a function of selling and advertising strategy.

Other companies compete by promising utter dependability; their product may be priced higher and may not have some of the competitive products' features or workmanship. It will, however, work as specified, is delivered on time, and any failures are immediately corrected. IBM has been cited as an example of a company that competes on this basis; in a sense, so do AT&T and Sears, Roebuck.

Still others compete on the basis of product flexibility, their ability to handle difficult, nonstandard orders and to lead in new product introduction. This is a competitive strategy that smaller companies in many industries often adopt. And, finally, others compete through volume flexibility, being able to accelerate or decelerate production quickly. Successful companies in cyclical industries like housing or furniture often exhibit this trait.

In summary, within most industries different companies emphasize one of these five competitive dimensions-price, quality, dependability, product flexibility, and volume flexibility.

It is both difficult and potentially dangerous for a company to try to compete by offering superior performance along several competitive dimensions. Instead, a company must attach definite priorities to each that describe how it chooses to position itself relative to its competitors.

Practically every decision a senior manager makes will have a different impact on each of these dimensions, and the organization will thus have to make trade-offs between them. Unless these trade-offs are made consistently over time, the company will slowly lose its competitive distinctiveness.

Without such consistency, it does not matter how much effort a company puts into formulating and expounding on its "strategy"-it essentially does not have one. One test of whether dimension being brought into line by some function's self-interest.

Falling into such a trap can be devastating, however, because a manufacturing mission that is inconsistent with corporate strategy is just as dangerous as not having any manufacturing mission at all. The more top management delegates key manufacturing decisions to "manufacturing specialists" (usually engineers), the more likely it is that manufacturing's priorities will be different from corporate priorities. They will reflect engineering priorities, or operating simplicity (often the goal of someone who has worked his way up from the bottom of the organization)-not the needs of the business.

Translating a set of manufacturing priorities into an appropriate collection of plant, people, and policies requires resources, time, and management perseverance. As we mentioned earlier, the great bulk of most companies' assets (capital, human, and managerial) is found in manufacturing. Moreover, these assets tend to be massive, highly interrelated, and long lived-in comparison with marketing and most financial assets. As a result, it is difficult to redirect them, and "fine-tuning" is almost impossible. Once a change is made, its impact is felt throughout the system and cannot be undone easily.

Such manufacturing inertia is made worse by many manufacturing managers' reluctance to change. And it is further compounded by many top managers' lack of understanding of the kind of changes that are needed, as well as by their unwillingness to commit the resources to effect such changes.

Conclusive view on good and healthy management :

Synergy is cooperative interaction that results in an enhanced effect, and good management is a key element of synergy. A good manager acts as a catalyst to mobilize employees, strengthen their skills and channel those skills to meet workplace goals.

Stephen Covey, author of "The 7 Habits of Highly Effective People," encourages the use of synergy in working relationships. Synergy is cooperative interaction that results in an enhanced effect, and good management is a key element of synergy. For instance, if you want your small business to succeed, you need not only skilled or trainable employees, but also a good manager. A good manager acts as a catalyst to mobilize employees, strengthen their skills and channel those skills to meet workplace goals.

Employees need to know what is expected of them; having clear expectations helps employees do their job well. A good manager will convey his expectations and make sure employees understand them. He also will make himself available to employees, so they can have the opportunity to clarify any confusion they may have.

Employees can always benefit from a manager's guidance and leadership. For instance, if you own a restaurant, it's doubtful the workday will run smoothly without a manager's intervention. A good manager will monitor her employees as they work and offer suggestions to accomplish tasks in the most efficient and effective manner. This, in turn, can result in more skilled and confident employees. Also, a good manager will work side-by-side with employees during an unexpected surge in business or an employee absence.

A good manager knows that employees need motivation to keep repeating desired behaviors and encouragement to achieve their goals. Managers can offer incentives for exceptional performance as a way to motivate employees. They can hold weekly meetings to encourage employees to strive for their goals. When employees know that their manager cares how they do their jobs and whether or not they are successful, it can make a difference in their daily effort.

A good manager will observe his employees, gather relevant data and evaluate employees objectively, regardless if a personal relationship exists. His job is not to play favourites or become friends with everyone. He is not a peer to his employees; he is a leader. He is there to identify employees' strengths and help them build upon them. He is skilled at identifying areas that need improvement and is able to offer helpful solutions to employees while supporting them as needed. By being fair and objective, the manager will keep employee morale intact and also gain respect and trust.

An effective manager will extend an open-door policy to employees, making herself available to listen to and empathize with her employees in regards to disputes with other employees. She can offer solutions and help employees implement them, and she can discipline employees as needed. Her authority and guidance can keep employees functioning as a team.

A good manager will strive to help his employees reach their full potential. He will encourage employees to engage in training or educational opportunities. He will be open to his employees' ideas and opinions relating to work. He will consider their suggestions that may help improve the workplace or job functions. In response, employees may feel more valued and invested in their roles.

A healthy plant consisting of state of the art equipment, healthy work force and cooperative / guiding management do result in actual plant layout.

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- Organises the ILPA SHOW : Leather on the Ramp , one of the most prestigious and sought after Fashion event in Eastern India.
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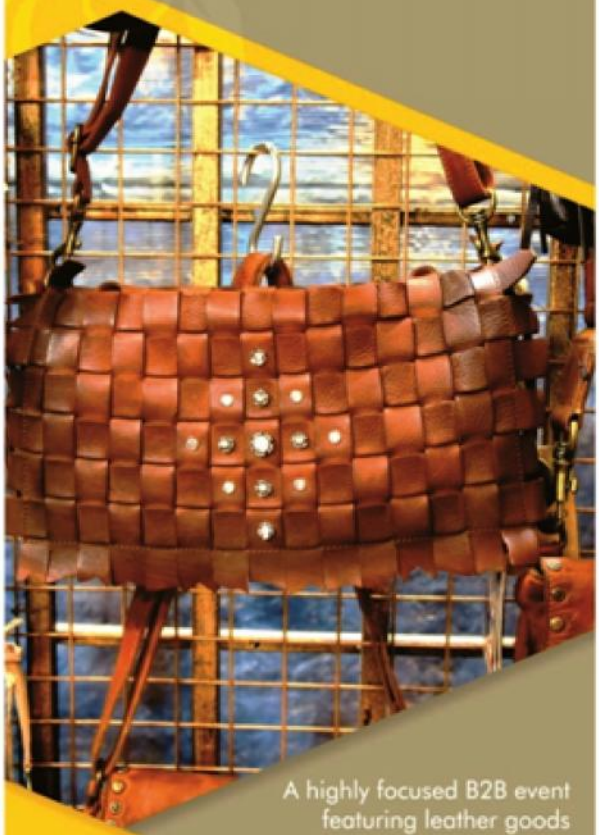

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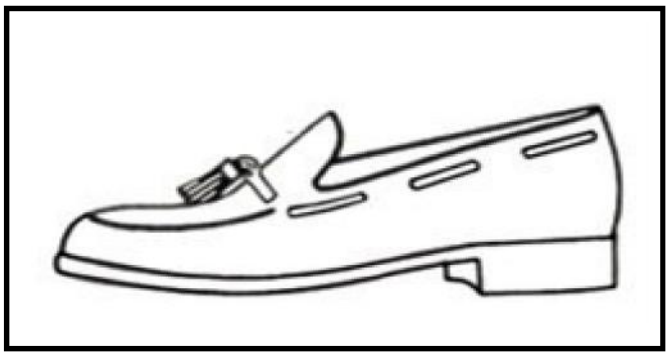
KNOW YOUR SHOE
Part - 6

Mr. Shome Nath Ganguly
Former Principal, Karnataka Institute of Leather Technology

SLIP-ON SHOES

The shoe in which you can easily put (slip) on your shoe without lacing or buckling the same. There are no lacings or fastenings system. The popular loafers are part of this category as well as less popular styles, such as elastic- sided shoes. Men's shoes can also be decorated in various ways.



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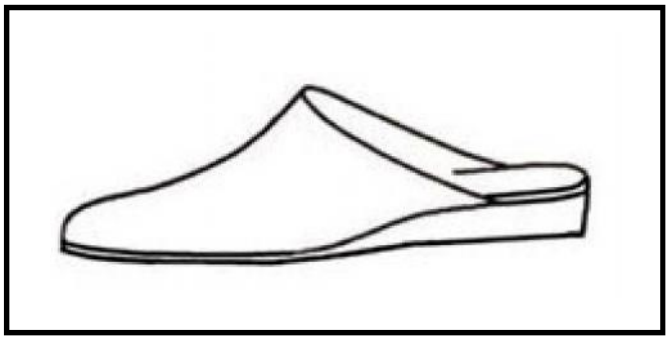

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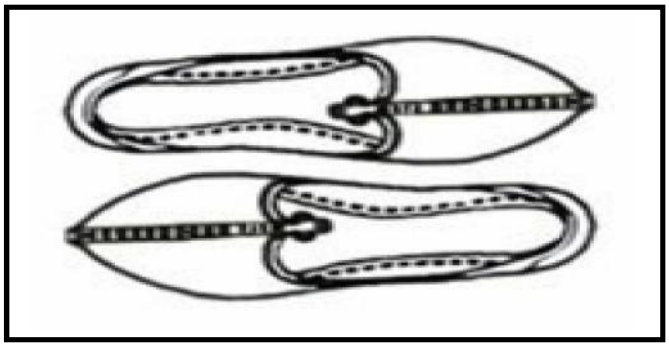


Jalsa Juti

Slip-ons are typically low cut lace-less shoe. The style which is most commonly known as a **loafer** or **slippers.** One of the first designs was introduced in London by Mr. Wildsmith was called then as **"Wildsmith Loafer".** This began as a casual shoe but have increased in popularity many fold because this shoe was being worn by American youths in cities that time.

L**oafer Shoe :** This is a men's casual / slip-on type shoe very popular among young Americans. The name implies 'smart and semi formal' .Typically there is a saddle or a trim on the vamp which has an extension up the instep. This basically made with true mock construction to provide more comfort.

Venetian-style shoes (venetian-style loafers) are mid-heel slippers with an upper or top part that is slightly open to the kick of the foot and the ankle bone. The venetian-style shoe and its lack of ornamentation contrasts with the loafer which may have slotted straps, vamps and even tassels. The term came from Great Britain.

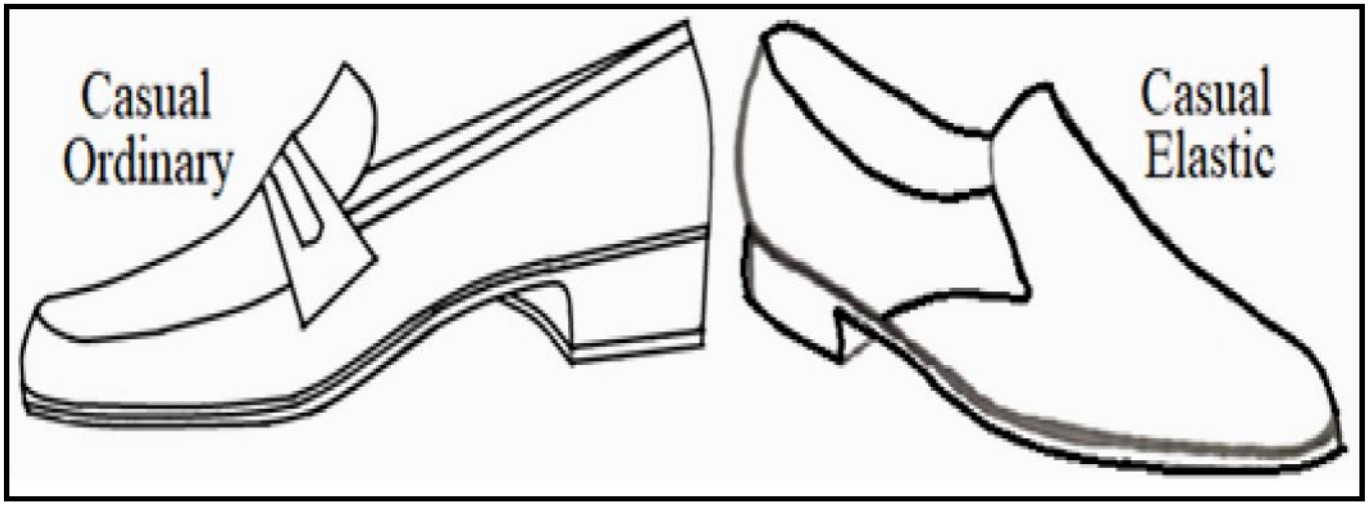
Loafers are "slip-on shoes with a moccasin toe construction and slotted straps stitched across vamps". A loafer may even be "decorated with metal chains or tassels". A penny-loafer has a "tongue and strap"

By the 20th century, the slip-on loafers were common male footwear. During this period other popular shoes included lowcut, laced oxfords in various leathers, ankle boots, and specialized sport shoes. During the 1950s, the loafer became fashionable.

Slip-ons are typically low, lace-less shoes. The style most commonly seen, known as a loafer or slippers in American culture, has a moccasin construction. First appearing in the mid-1930s from Norway, Aurlandskoen, they began as casual shoes, but have increased in popularity to the point of being worn in America with city lounge suits. They are worn in many situations in a wide variety of colours and designs, often featuring tassels on the front, or metal decorations. A less casual, earlier type of slip-on is made with side gussets. Made in the same shape as lace-up Oxfords, only lacking the laces, elasticated inserts on the side allow the shoe to be easily removed, but remain snug when worn. This cut has its greatest popularity in Britain.

A less casual, earlier type of slip-on is made with side goring (sometimes called a dress loafer). Made in the same shape as lace- up Oxfords but without laces. These shoes have elasticated inserts on the side which allow the shoe to be easily removed but remain snug when worn. This type of shoe has its greatest popularity in Britain.

By the 20th century, the slip-on loafers were common male footwear. During this period other popular shoes were low cut laced oxfords in various leathers, ankle boots, and specialized sport shoes. During the 1950s, the loafer became fashionable.



Casual Shoe : A shoe intended for 'casual wear' not for a formal occasion. The shoe is not having any fastening or having an elastic gusset for fastening it with the feet. The shoe is designed in such a way that men can easily put his feet in the shoe and start moving. The comb area of the last and the basic pattern of the shoe is responsible for better gripping with the feet.

Jalsa Juti : A low cut wide open casual shoe giving more open space in frontal area. It is generally made with single piece unlined (1.6-1.8mm) upper components join at the back but sometime it joins at instep. Bottom of the shoe is made with a thin piece of neolite sheet or with vegetable tanned leather sole. It is a traditional Indian shoe for men.

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Physico - Chemical changes in Composite Tannery Effluents at the Common Effluent Treatment Plants of Calcutta Leather Complex : Amelioration potential in removal of total suspended solids

[1]Sreeparna Das, [2]Shuvadip Adhikari, [3]Sudin Pal,

[4]Arkajyoti Mukherjee, [5]Ivy Kanungo, [6]Prof.(Dr.) Sanjoy Chakraborty,

[7]Subhra Kumar Mukhopadhyay

Ecotoxicology Project Laboratory, GCELT, Kolkata

Abstract

West Bengal has been associated with the leather industry from the pre-independence era. It began with the establishment of Bengal Tanning Industries at Kolkata by Mr. B. M. Das in 1910 which marked the beginning of exporting finished leather from Kolkata. Till 2004, about 550 tanneries operating in eastern outskirts of Kolkata used to process around 850 tons of raw hides and skin per day. The wastewater made up of tannery effluent and the wastewater coming from city Kolkata used to carried 40 km through the web of canals spread over the East Kolkata Wetlands ecosystem and discharge into Kultigongriver, that carry it into the Bay of Bengal. On its way the composite wastewater facilitated the age-old practice of agriculture and pisciculture reviving the poor livelihood here daily.However, in the context of environmental safety, eventually in 2004,tanneries were shifted away from the city towards the south-east in Calcutta leather complex equipped with a Common effluent treatment plant as the existing cluster surrounded by densely populated residential areas at the eastern part of Kolkata was unfavorable for installation, expansion and modernization of any pollution control system. Different physical, chemical and biological treatments conducted at the CETP results in the total suspended solids (TSS) to reduce periodically from 2.52 ± 0.33 g/L to a significant level of 0.84 ± 0.18 g/L at the time of discharge. The least TSS is observed in the filtrate 0.75 ± 0.12 g/L.

Introduction

The shallow water bodies at the eastern fringe of Kolkata city, known as East Kolkata Wetlands (EKW; lat. 22^0 33' - 22^0 40' N; long. 88^0 25' - 88^0 33'E), a Ramsar site (number 1208), has been playing a crucial role in ameliorating different chemical compounds present in the huge solid and liquid waste coming frommunicipality, different industrial and medical sources (Kunduet al., 2005; Feyenet al., 2008)of Kolkata city since past 100 years. Though, EKW received waste from different types of industries like tanneries, rubber industries, electroplating, pigment manufacturing units, potteries, and battery manufacturing plants (Mukhopadhyayet al., 2007), however, the risk imposed by the tanning sector is considered high. Because at the time of leather processing of raw hides and skins to prepare finish leather different kinds of chemicals and salts are used.(Pal et al., 2015; Syed et al., 2010) and about 30% - 50% of the washed chemical leaches out to the effluent. However, after discharge into the EKW, the wastewater traverse through a web of canals for around 40 km and during this long course the TSS along with other anions and cations are settled down at the bottom of the canal and taken up by macrophytes, planktons etc. (Pal et al., 2014; 2016). Further the wastewater is also used in pond for culturing fish, where natural amelioration occurred (Das et al., 2019) and agriculture practices for more than past eighty years (Aichet al., 2012).

Corresponding author E-mail :

However, an Honorable Supreme Court verdict, due to pollution related issues, make the tanneries of the eastern boundary (Tangra, Tiljala, Topsia agglomerate) of Kolkata to shift phase wise to a separate tannery cluster by setting up common effluent treatment plant. This tannery cluster has been named Calcutta Leather Complex (CLC), set up on 1,100 acres of land spread over Karaidanga, Gangapur and Bhatipotta areas of South 24 Parganas district and about 22 km away from Kolkata. With the advent of tannery relocation, a Common effluent treatment plant (CETP) is also installed to treat the effluent for more than 300 tanneries of the region and the treated water will eventually be discharged into one of Kolkata's storm water flow canals (SWF) in Karaidanga, which mixed with the Kultigangriver. Total effluent generated from the Calcutta Leather Complex area is 19.99 MLD. Thus, to make an understanding regarding the discharged water condition from CETP, the present work was initiated. In the present study the basic physico-chemical factors of the incoming tannery wastewaterhave been monitored in phase-wise in each treatment tanks of CETP and the water finally discharged from the CETP to the canal of EKW ecosystem.The study will also give a glimpse about the relationship of different physico-chemical factors of processed tannery effluent and the efficiency of different treatment units of CETP.

Materials and methods

Study area and site description

To deal with the heavy load of tannery wastewater and prevent the contamination to residential areas, a site of 8.7 ha had been identified in the eastern part of CLC to install a Common Effluent Treatment Plant (lat. 22□ 29'N; long. 88□ 31'E) along with an area of about 20.2 ha dedicated for solid waste and sludge disposal directly to the south of the CLC. The proposed CETP is equipped with six modules of 5,000 m^3/d capacity each, of which four modules are in working condition presently (Fig. 1). Sample water is collected from treatment tanks of the CETP. Site 1: Detritor (DTR): In this site the wastewater of different tanneries is came to CETP. From there the water is distributed module wise to equalization tank; Site 2: Equalization tank (ET): Equalization tank possess blowers that create movement into the water and separate larger clumps to small portions; Site 3: Coagulation tank (CT): From equalization tank the wastewater come in coagulation tank for chemical treatments. Here the small portions again clump together to create large flocks; Site 4: Primary Clarifier (PC): In primary clarifier the flocks are separated by rotating platforms; Site 5: Filtrate from filter press (FIL): The sludge, collected at the bottom of the primary clarifier come to filter press. Filter press thickens the sludge to make sludge cakes; Site 6: Aeration tank (AT):The overflow of primary clarifier is transferred to aeration tank for bacterial treatment. Also, Filtrate from the filter press is transferred to aeration tank. Aeration tank use bacterial culture and airflow to treat the wastewater; Site 7: Secondary Clarifier (SC): Secondary clarifier take the water from aeration tank and mechanically separate bacterial sludge from the water; Site 8: Final Discharge (FD): The overflow of the secondary clarifier is channeled towards the outlet of the CETP and discharged into the EKW.

Sampling and analysis

Monthly sampling has been carried out from the month of June, 2018 to May, 2019 within 11 AM to 2 PM. The water is collected by immersing 1L plastic bottles completely into the water. The bottle rinsed with the respective water twice before final collection. Physical parameters like pH, temperature, conductivity, total dissolved solids (TDS) and salinity were measured potentiometrically using Eutech 5 in 1 Multiparameter PCS Tester 35 in the site. Total suspended solids (TSS) were analyzed gravimetrically following the standard methods of Eaton et al., 1995.50 ml raw wastewater is agitated and filtered through Whatman grade 40 (pore size is 8 micron) filter paper.Mean concentrations of number of samples collected (n) are measured and standard deviation (SD) evaluated, which are depicted in the result sections. The graphs are prepared by Origin Pro 9.5.

Results

The continuous characteristics of water at CETP is checked from entry point of tannery effluent, Site 1 till exit point, Site 8 of the treated water. Through the treatment process the initial turbid and stinking wastewater become clear water with absolute absence of any stench. Significant amelioration at the CETP-level is recorded for indicating physical factors of wastewater quality assessment (Fig. 2). pH is thoroughly alkaline through all of the treatment processes except for Site 6 (6.88±0.31) and gradually comes at a neutral pH starting from relatively more alkaline pH.Spatial variation of pH in descending order is like

DTR>FIL>PC>ET>CT>FD>SC>AT. The effluent comes at the Detritor (Site 1) is of pH 7.35 ± 0.85and left CETP with a pH of 6.99 ± 0.32. Though the effluent enters CETP with the highest pH but after that it decreased at equalization tank and coagulation tank consecutively. At the filtrate coming from the filter press it increased to 7.19 ± 0.33, which after entering the aeration tank reduced to 6.88 ± 0.31. Water temperature ranges between 31.29 ± 2 □ C (Site 6) and 29.05 ± 1.71 □ C (Site 5), in order of AT>SC>ET>CT>PC>DTR>FD>FIL. However, total dissolved solids (TDS) shows an 8.13 % (Fig. 3) increase in the finaleffluent exitingthe CETP.Though it starts with the least value of 5.34 ± 0.68 ppt at the Site 1 and gradually increased to mark the highest TDS observed in the filtrate of 7.53 ± 1.01 ppt. By then it took a downfall and settled with 5.77 ± 0.53ppt at the outlet. With TDS the conductivity changes simultaneously. Least value of 7.61 ± 0.71mSat the Site 1 that periodically goes highest at filtrate with11.19 ± 0.84 mS and then reduced to 8.43 ± 0.44 mS at the outgoing water. In primary and secondary clarifier, the respective TDS and conductivity are 6.84 ± 0.49 ppt, 9.77 ± 0.52 mS and 5.63 ± 0.67 ppt, 8.2 ± 0.74 mS (Fig. 2). Conductivity of different sites in descending order would look like FIL>PC>CT>ET>FD>SC>AT>DTR. There is a similar pattern of variation of TDS and salinity found in different sites of CETP i.e. FIL>PC>CT>ET>FD>AT>SC>DTR. Different physical, chemical and biological treatments conducted at the CETP results in the total suspended solids (TSS) to reduce periodically from 2.52 ± 0.33 g/L to a significant level of 0.84 ± 0.18 g/L at the time of discharge. TheTSS is gradually decreased (DTR>ET>CT>PC>AT>FD>SC>FIL) to the least TSS observed in the filtrate of 0.75 ± 0.12 g/L (Fig. 2).

Discussion

Around 30-40 L of water is requiredfor per kg of raw skin to process, out of which 35% is consumed by the washing (Rao et al., 2003) and the steps of tanning and re-tanning consumes 57%.Different chemicals mixed tannery effluent is treated in the CETP. The initial tannery effluent with a pH of 7.35±0.85 (Site 1) and after all chemical, mechanical and biological treatment processesit is reduced at6.99±0.32 at the final outlet from CETP (Site 8) making a 4.93% reduction.

TDS content in effluent originated from all chemicals like chrome salts, common salts, aluminium nitrate, sodium nitrate, lead nitrate, sodium carbonate, sodium bicarbonate, potassium chloride etc. (Pal et al., 2016), which is used in leather processing. Along with the chemicalsinter-fibrillary proteins of hides and skins, common lime etc also increase the TDS and TSS load in tannery effluent.Increase of TDS 8.13% in outgoing water with respect to the initial effluent in CETP is because of the presence of different chemicals that ionized into the water more at the later stage, which in turn increase the conductivity by 10.78%.

Removing TSS is a good way to curb heavy metals like chromium from raw and supernatant wastewater altogether (Adhikariet al., 2019). High TSS in composite effluent comes from insoluble calcium carbonate ($CaCO_3$), hairs, and hair-root-like insoluble organic matter (Dutta, 1999). TSS in all the cases decreased considerably except for Site 6 (1.39±1.37 g/L) due to high load of bacterial biomass. Within CLC set up CETP reduces TSS by 66.56% at the time of exit compared to the initial effluent (Fig: 3). Fromdetritor to filtrate TSS is gradually decreasing. Different mechanical and chemical processes make flocks of solid particles that eventually settled at the bottom. On the other hand TDS, conductivity and salinity increases for this time. As the TSS is separated, the water become progressively clear. It facilitates free movement of ions that contribute to increase the TDS and conductivity itself. Maximum salinity is observed in the filtrate (Fig. 2). As the sludge is compressed, the aqueous solution is pressed out of the sludge. Due to the pressure the chemical constituents involved in the hypersalinity comes from the sludge to the filtrate. After that the TSS is again shoot up in the aeration tank before becoming flat at the exit point. TDS and salinity on the other hand decreased in the aeration tank and maintain a steady level thereafter.

Conclusion

Total suspended solids (TSS) anchor most of the pollutants and contaminants. By removing TSS to a significant grade by the organized mechanical, biological and chemical treatment processes carried in the common effluent treatment plant, the pollutants, contaminants and heavy metals present in tannery effluentcan be successfully removed that deliver clear water suitable for discharging into the EKW canals. Along with that, the data obtained from the CLC, CETPs clearly depict absolute clean image of the rehabilitated tanneries. Widespread changes

in land-use pattern within the EKW areas surely have changed the wastewater characteristics. Further identification of the unknown sources other than tannery operating in the post CETP belt (Roy et al., 2013) causing contamination should be done at the earliest.

Acknowledgement

The work is supported by Department of Science & Technology and Biotechnology, Government of West Bengal for Fellowship and contingency grants (193 (sanc)/ST/P/S&T/2G-02/2017). SKM is thankful to the UGC for awarding Emeritus Fellowship (F.6-6/2016-17/EMERITUS-2015-17-GEN-5244/SA-II).

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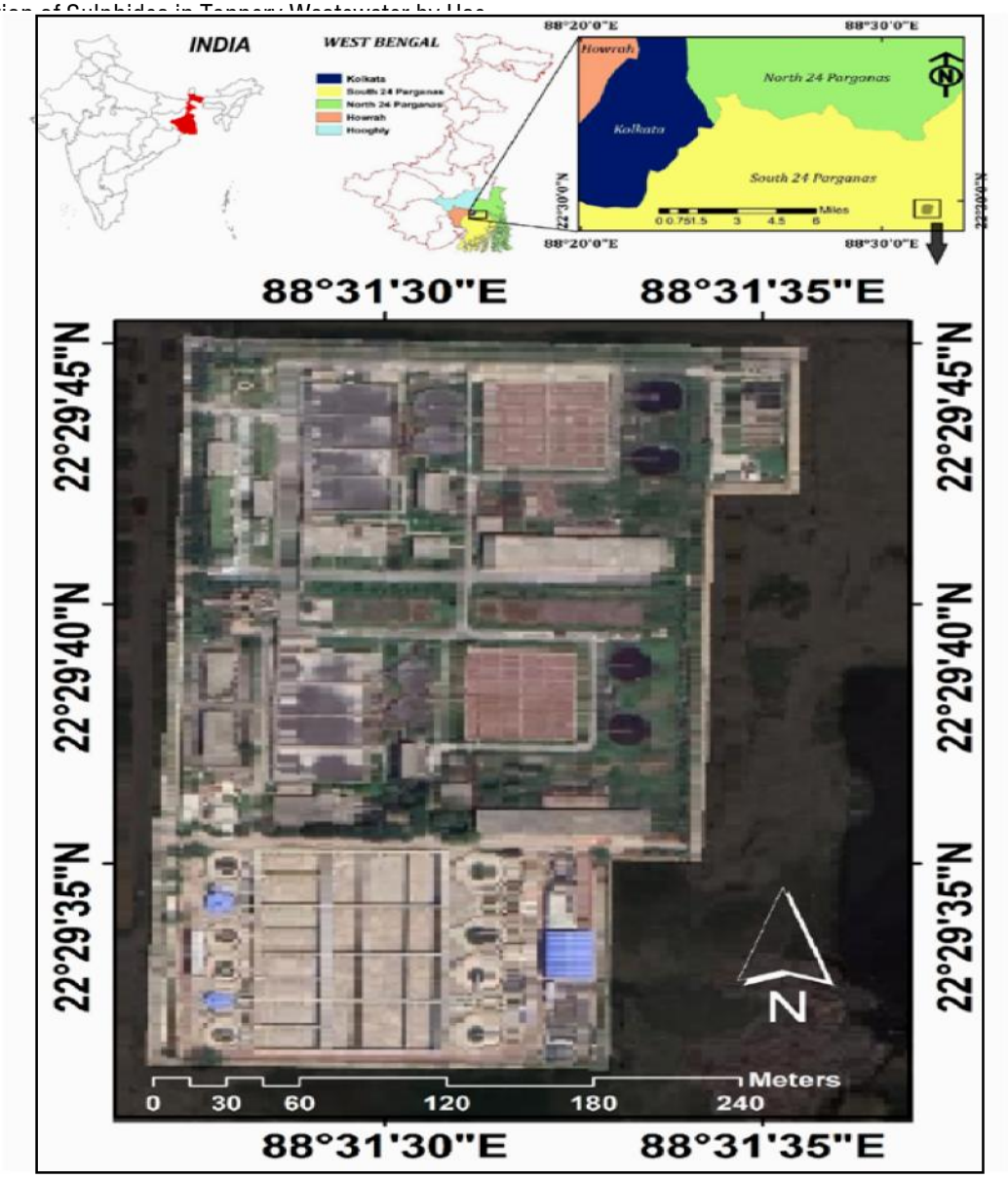

Fig. 1: Common Effluent Treatment Plant (CETP)

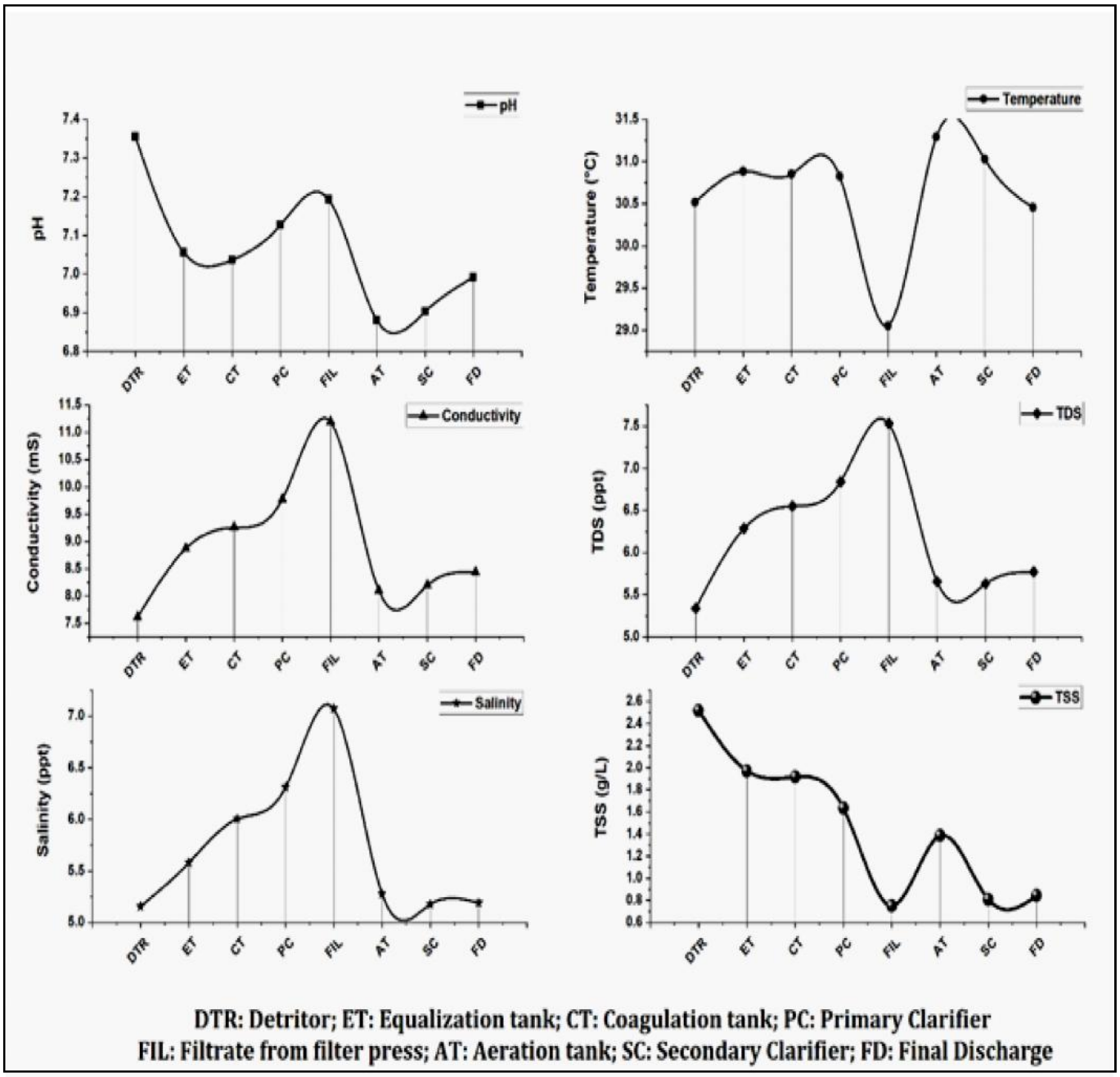

Fig. 2: Change of physical factors at different treatment tanks of CETP of CLC

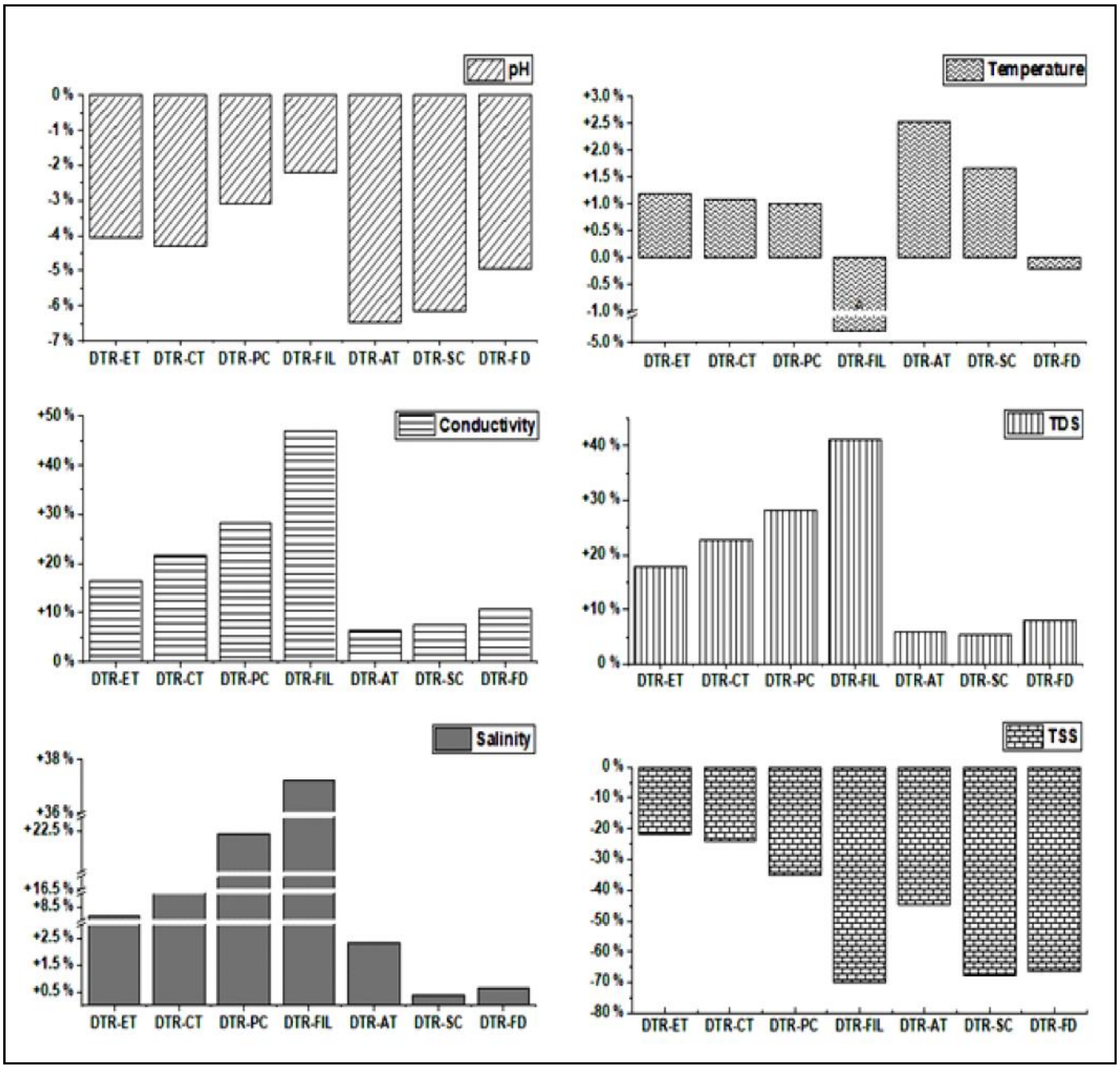

Fig. 3: Change of physical factors (in percentage) in each treatment tank with respect to initial tannery effluent

LOCKDOWN TEARS INTO LEATHER/APPAREL, EXPORTS

Shortage of labour, disruption in logistics delay shipments to major markets. The lockdown has crippled leather, apparel and handloom exports due to shortage of labour and disruption in logistics, delaying shipments to major markets like Europe and US.

The leather industry had suffered nearly $1-billion export order losses due to the Covid-19-induced lockdown. Shipments for Christmas and New Year and crucial samples for the Spring (new) collection in Europe are being delayed, said industry sources.

April to August are crucial months during when shipments for the festival season, and for the new Spring collections are dispatched. However, this has not yet happened, said Jay Kumar Singh, Managing Director of Chennai-based Shivam Apparels.

“Any further lockdown will be a disaster for the industry,” he said. In Chennai, there are 75-100 units manufacturing leather products like garments, bags, and wallets, said Singh.

Echoing a similar view, Sanjay M Lulla, Managing Partner at SM Lulla Industries Worldwide, a Chennai-based exporter of leather garments, said orders have come from European clients but there is a shortage of labour. Several of them have left for their native places with no indication of when they will return. The lockdown restrictions have made it difficult for local employees to come to factories.

The government has allowed units to function, but the staff need to stay at the factory or nearby. This is not possible, given that over 85 per cent of employees are women, he said. Many orders have been cancelled due to lockdown in Europe, followed by lockdown in India. Global clients work on dual sourcing policy. If Indian companies cannot supply, they will source from China or Taiwan, he said.

High freight cost

The lockdown restriction has also affected movement of goods by sea. “We are planning to ship goods by air to save time. However, this is going to escalate the operations cost significantly due to high freight cost, which has increased by three to four times,” he said.

The lockdown has created so much uncertainty even as clients are demanding supply on time, said M Israr Ahmed, Regional Chairman (South), Council for Leather Exports, and Director of India Shoes Exports Pvt. Ltd. Any further extension of the lockdown will cripple the industry, he added.

Major markets of Europe and the US (to which 70 per cent of leather exports are sent), have now opened up and buyers have placed export orders. However, exporters need to ensure that the products are shipped per commitments. Else, further orders will be lost to China or Vietnam, he added.

Cancellation of orders

Prabhu Damodaran, convenor of Indian Texpreneurs Federation (ITF), that represents the textile industry of Tamil Nadu, told a news channel that a complete lockdown should be avoided at a time when exports are recovering. It will affect the economy badly. After two months, many factories are now working with half the employee strength, he said.

Nishanth Jain, Secretary, Apparel & Handloom Exporters Association, the industry body for over 400 MSME apparel exporters from Tamil Nadu, said during the lockdown from March till mid-May, the industry suffered huge losses on account of order cancellations by many international clients.

The current lockdown in Chennai, Kanchipuram, Chengalpattu and Thiruvallur districts has caused immense delays with the international clients not being able to get the deliveries of goods they were supposed to get by the end of June. This will now have a cascading effect on the deliveries of goods in July, August and September.

The goods being manufactured have to be exported between June and September so that they can be put up in the overseas shops overseas from August to November in time for the holiday season and Christmas, he said.

Any further lockdowns in Chennai and its surrounding districts will result in a very huge number of large-scale order cancellations (about $150 million) for exporters. Buyers will move to the competing countries to source their goods, said Jain.

(Source : Business Line – 29/09/2020)

YOUNG LEATHER SCIENTIST GRANT 2021 OPEN FOR APPLICATION SUBMISSION

Supported by Erretre and Leather Naturally, application submissions for the 2021.

Young Leather Scientist Grant (YLSG) programme of the International Union of Leather Technologists and Chemists Societies (IULTCS) has been extended until November 30, 2020.

Luis Zugno, President, IULTCS, is inviting young research talent across the leather industry to submit courageous and innovative project ideas for projects in the categories of Leather Research, Machinery/Equipment, and Sustainability to be conducted at a recognized institution in 2021.

In its seventh year, IULTCS will provide the monetary sponsorship for a single sum of € 1,500 grant to Basic Research; Italian technology provider and machinery maker Erretre will sponsor the € 1,000 grant for the Machinery/Equipment category, and Leather Naturally the € 1,000 sponsorship for the Professor Mike Redwood grant on Sustainability/ Environmental.

Details of the eligibility requirements are available on the IULTCS website. For further information, please click on https:// iultcs.org/commissions/iur-research-commission/

(Source : LeatherBiz – 15/10/2020)

INTERNATIONAL CAMPAIGN LAUNCHED TO PROMOTE SUSTAINABLE LEATHER

- Leather has a rich history as a natural, sustainable and durable material
- Collaboration between U.S. leather and Chinese fashion industries showcases leather's sustainability in Shanghai video shoot
- Social campaign to roll out across channels including WeChat, Weibo, Instagram and Facebook

The Leather and Hide Council of America (LHCA), the representative body for the U.S. leather industry, today unveiled the first in a series of videos as part of a new international campaign communicating the natural, sustainable and durable nature of leather.

Launched under the banner of "Real Leather. Stay Different.," the campaign will feature three videos and social shorts looking at nature and sustainability, the importance of sourcing quality leather and leather in fashion. With a focus on the next generation of consumers, the campaign will be promoted entirely through social channels, including WeChat and Weibo in China and Instagram and Facebook around the world.

As one of the leading markets for U.S. leather, China was chosen as the location for the video shoot. U.S. leather is preferred by the Chinese fashion and design industry for its consistency and impeccable quality, for its sourcing guarantees and for the U.S. industry's exceptional standards in environmental management and material production.

From its opening featuring stunning vistas of the American landscape to the studios of a bespoke shoemaker in Shanghai to leather fashion on the streets, the first video in the campaign takes the viewer on a spectacular visual journey. It showcases

leather as the material of choice for artisans and craftsmen, and positions leather products as the sign of the individual who values enduring style over fast fashion.

The campaign comes as the fashion world considers the social and environmental impacts of fast fashion and the use of low-cost, disposable materials. LHCA President Stephen Sothmann commented:

"We have been using leather for thousands of years, dating back to our time as hunter gatherers when waste was unacceptable. The issue of waste remains a concern, rightly so, to this day as consumers take a careful look at fast fashion, production processes and the volume of materials that end up in landfill.

With leather, we create beautiful and durable items from by-products that would otherwise be destined for landfills, items that will last for many, many years. This campaign reminds us of that long history, the qualities that make leather desirable and its contribution to a more sustainable society. Leather products may be costlier, but there are good reasons why they represent real value for all."

(Source : ILM – 13/10/2020)

LEATHER CAN DO GOOD AFTER COVID - MIKE REDWOOD

After the 1990s, the world supercharged globalization and pulled hundreds of millions of people out of poverty, led by China. Things had been improving since the 1950s, but the rise in the digital economy appears to have so improved communications that there was a huge acceleration.

The leather industry played its part. A piece of leather provides a large number of jobs in light industry making footwear, garments, bags, gloves and other items. These pull largely unskilled people into the workforce, teach them skills, provide steady incomes and create identifiable tax revenues for governments. In a number of tanneries and glove factories I have seen the changes from start-up, when staff was bussed to work, then needed provision for bicycles and scooter storage, and finally sizeable car parks. The leather industry was early in this cycle, starting in places like Korea and Taiwan in the 1960s where the outcomes for progress have been outstanding.

SUSTAINABILITY INVOLVES USING INDUSTRIAL DEVELOPMENT TO END POVERTY

If one reads the Brundtland Report on the basis that sustainability involves the requirement to use technological and industrial development wisely to end poverty without doing harm to the environment for future generations, then the leather industry has certainly played its part. With few exceptions, the new tanneries built to replace redundant capacity elsewhere had better layouts, equipment and came with proper provision for waste treatment. They were better environments for workforce safety and wellbeing, and for the planet. Most of the locations about which the leather industry worries today are older legacy situations where attitudes still require change and laws enforcing.

But the pandemic has reversed this progress, putting some 90 million back into poverty and with changes to free trade thinking, the return ticket appears to have been discarded. Developing countries appear to have lost the historic route of export-led growth to grow employment and income.

The global leather industry should still be able to play its part, as it has done in the past. It is no longer in the top three of the world's manufacturing industries, where it sat for centuries, but it is still important. And many of the countries who need to reduce poverty have high volumes of good quality raw material. Think of Ethiopia and much of the rest of Sub-Saharan Africa. Think of Bangladesh and other Asian countries. The influential Professor of Economics at Ashoka University in India, Arvind Subramanian, argued recently that looking at the proportion of unskilled workers in China and its proportion of exports in certain areas, China "over-exports low-skilled goods such as textiles, clothing, leather and footwear". Given that China's raw material supplies are limited, we need to help move that production to the raw material source where it can be of greater benefit.

But such moves must be done properly. Dare we shift more to Bangladesh where merely moving tanneries a few miles down the road from Hazaribagh to Savar because they were polluting the River Buriganga appears to have been a huge failure.

Very roughly speaking, it has taken the best part of 20 years and US$100m, yet the new central effluent treatment plant appears to be missing essential elements and to be only half the required size. According to a scathing article in New Age, the Dhaka-based English language daily newspaper, "the park (Savar) releases both liquid and solid wastes into the adjacent River Dhaleshwari, undoing the very objective of the tannery relocation".

THE LEATHER INDUSTRY DESTROYS ITS OWN REPUTATION

I never cease to wonder at how bright executives around the world continue to allow the leather industry to destroy its own reputation by letting these things happen. There are some good tanners in Bangladesh, and all the work forces should be able to have decent jobs, with proper work-wear and conditions. Even the Bangladesh textile industry seems to have improved more since the 2013 Rana Plaza, while the leather industry has spent a fortune on self-harm.

Globalization might in part be reversing, but it does not mean we can hide from some basic consequences. Leather is a complex material on which millions of livelihoods depend, and for the future benefit of the biodiversity and climate needs of the planet has to be used to the full. Any damage to its reputation risks this, and we cannot ignore it and pretend it is nothing to do with us.

Second, after the financial crash we began to see that globalization was leaving certain groups behind, including those left unemployed in the developed world as their ageing factories shut. If we have learned anything in the last decade, it is that all such groups of the ignored and left behind need to be helped or problems will arise.

Amazingly, the leather industry can take a lead in both the developing and developed world in providing these employment opportunities at different levels. The workers in Bangladesh, Ethiopia and elsewhere deserve the opportunity to find employment, adding value to their own raw material. And as companies in the luxury and automotive sector, for example, have shown, there is valid work for leather makers and artisans in the leather networks of the developed world, too.

(Source : ILM – 28/10/ 2020)

WORLD'S TANNERY

The Leather industry in India accounts for around 12.9% of the world's leather production of hides/skins and handles a robust annual production of about 3 bn sq. ft. of leather. The country accounts for 9% of the world's footwear production. The industry is known for its consistency in high export earnings and it is among the top ten foreign exchange earners for the country.

India has an abundance of raw materials with access to 20% of world's cattle and buffalo and 11% of the world's goat and sheep population.

The Leather industry is an employment intensive industry providing job to more than 4 mn people, mostly from the weaker sections of the society. Women employment is predominant in Leather products industry with about 30% share. The Leather industry in India has one of the youngest workforces with 55% of the workforce below 35 years of age.

The major markets for Indian Leather & Leather Products are USA with a share of 17.22%, Germany 11.98%, U.K 10.43%, Italy 6.33%, France 5.94%, Spain 5.01%, Netherlands 3.52%, U.A.E 3.35%, China 2.61%, Hong Kong 2.15%, Belgium 2.21% and Poland 2.11%.

The Leather industry has the tendency to generate 250 jobs for every $0.2 mn investment.

(Source : Invest India. Gov.In – 25/10/2020)

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SCIENCE AND TECHNOLOGY

A Critical Review And Prospects Of Titanium As A Potential Mineral Tanning Agent

By U MANIVEL, S BANGARUSWAMY, J B RAO and M SANTAPPA, of the Central Leather Research Institute, Madras.

This article attempts to analyse the chemistry of titanium and its salts and the uses of the metal in general. Comparison is made of the co-ordination chemistry of titanium with that of chromium, zirconium, etc., elements already in use in the leather industry. The experiments conducted wiih titanium is protein chemistry are also reviewed. Possible areas of work to fill the gaps in the knowledge on the industrial application of titanium in the field of leather processing are identified.

Titanium is present in the abundantly available sands on the west coast of our country. Travancore Titanium Products Ltd produces titanium products. Besides, India is also importing Tio_2[1] at a cost of about Rs 8 a kg, which is much lower than the price of alumina (Rs. 40/Kg.) and chrome extract (1000 gms. Cr_2O_3—Rs. 23).

Titanium is found to have tanning property for use in the leather industry besides being used as pigments. Titanium tannage produces white leathers with anti-corrosion properties, a special property of titanium that can be profitably utilized in the production of leathers for use in protective gloves and other outfits required to be used in corrosive atmospheres. The white leathers obtained with titanium will also lend themselves for dyeing and finishing into pastel shades. It may be that in due course titanium will find increasing use in the leather industry in view of its lower cost and other special properties specific to titanium,

Uses of Titanium and I s Products in General

The principal properties of titanium that are of interest to metallurgists and engineers are its low density, better strength and greater resistance to corrosion. Because of its resistance to corrosion it is finding increasing uses in aircraft construction. Some of its alloys with Cr and Fe and Mo and Fe have desirable mechanical properties. In addition, ferro-titanium is used as a scavenger in the steel industry. The oxide is also used as an opacifier in the paper and vitreous enamel industries. $TiCl_4$ is used in warfare for producing smoke-screens since it gives off highly opaque particles of the tetrahydrate ($TiCl_4 . 4H_2O$) and the hydroxide ($Ti(OH)_4$) in the presence of moist air. Titanium carbide is very hard and used as an abrasive. TiO_2 after mixing with $BaSo_4$ is used as a white pigment (titan white) in the paint industry. Compounds of titanium are also used in the dyeing industry for obtaining discharge

effects producing patterns on dyed fabrics. Organo titanium compounds in conjunction with silicone are found to produce water-resistant properties on acetate and nylon fabrics.

Titanium in Leather Industry

The uses of titanium alone aswell as in combination with other tanning agents have been reported as far back as 1902. In that year, Lamb[2] took a British patent using basic sulphate, chloride or oxalate containing 0.3—0.5 mole of H_2SO_4/mole of TiO_2 in the tanning of the skins. He was successful in obtaining white leathers with shrinkage temperatures up to 85°C.

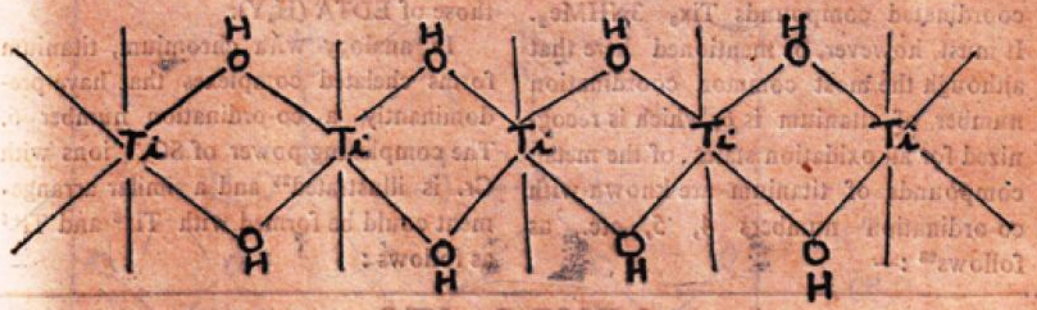
Motov et al[3,4] have shown the tanning potency of titanium using diammonium titanyl sulphate monohydrate ($(NH_4)_2$ TiO $(SO_4)_2H_2O$) and used titanium in this form for the tanning of hides as well as furskins. Nekhamkin et al[5] have prepared combination tanning systems containing Zr, Al and Cr. with titanium. Roman et al[6] found that citric acid, tartaric acid and maleic acid when added to ammonium titanyl sulphate prevent the precipitation of the latter during tanning by increasing the acidity ; they have also reported that citric acid is the most effective among the three acids taken up for their studies. Krasnohlyk et al[7] have reported that the titanium tanliquor stabilized with citric acid led to a lower degree of crosslinking than the normal liquor indicative of the masked nature of the citrate-added liquor. Roman et al[6] have further investigated the reaction of ammonium titanyl sulphate with –OH and =NH groups of collagen, using polyvinyl alcohol (–OH) and the nylon 6 (=NH) for their experiments ; ion exchang studies of ammonium titanyl sulphate indicated predominantly anionic complexes although cationic complexes were also found. Arbuzov et al[8] have studied the phenomenon of interaction between Ti, Cr. and Zr., etc., with gelatin gels and found that the maximum melting points of gels treated with sulphates of Cr., Al., and Ti are found nearer the shrinkage temperatures of leathers tanned with those mineral salts, although the melting point of Zr-treated gels is about 10° lower than the shrinkage temperature of Zr-tanned leather. They have obtained leathers tanned with titanium at 85% basicity which are stable at cold temperatures. Roman et al[6] have also done some amount of work on the properties of leathers obtained with Cr-Ti tanning salts using mole ratios of Cr Ti 3.3 – 5.0. During these combination tannages, titanium has been found to be replaced by Cr, although the tensile strength was the same as that of straight Cr. tanned leathers. Magomedov et al[9] reported an increase of elastic modulus with the increase of Zr. or Ti. salts in the tanning of leathers. Kucherenko[10] has reported that the adhesion of finish coat (casein-HCHO) to the titanium tanned leathers is lower as compared to the Cr. tanned leathers. Lawrence[11] noticed that titanium tanned leathers are found to have good scuff resistance when used in the children's shoes. Metelkin et al[12] have reported a 5 : 2 combination of ZrO_2 and TiO_2 which has been found to produce sole leathers with good strength, wear resistance and dimensional stability. Andrianov et al[13, 14, 15] have shown that leathers are made water-proof by treating them with cross-linking agents such as those obtained by reacting $HO.CH_2.CH_2.NH_2$ with Ti $(OBu)_4$ and

compounds of the type $Ti(OR)_4$ where R is an aliphatic hydrocarbon ($>C_{12}$) or hydroxylated aliphatic hydrocarbon of less than four hydroxy groups. They also found the hydrophobic properties of ethers of Si and Ti on the tanned skins. The covering power of titanium based pigments[16, 17, 18] in the finishing of white leathers is well-known.

Co-ordination Chemistry of Titanium vis-a-vis Chromium, Zirconium, etc.

Titanium occupies the IV B position in the Periodic Table[19] and is the first member of the 3 d Transition series, having four valence electrons. Its electronic configuration is $3d^2\ 4S^2$. The most stable and most common oxidation state of four involves the loss of $3d^2 4S^2$ electrons signifying Ti^{+4}. However, the element may also exist in a variety of lower oxidation states viz., Ti^{+3}, +2, 0, −1 and −2. The last two of these, known only in the compounds such as $\{Ti(bipy)_3\}^{n-}$, may not be genuine oxidation states of the metal, but may involve the reduction of the ligands. The lower valency compounds of titanium are more powerful reducing agents and they get easily oxidized to tetravalent compounds. The ionization potentials of the element are 6.82 EV, 13.52 EV, 27.47 EV and 43.24 EV and its ionic M^{+4} and covalent radii are 0.68 and 1.36. The halides of both titanium (IV) and zinconium (IV) are very readily hydrolysed and it is reported that the work in these compounds should be carried out under moisture-free conditions.

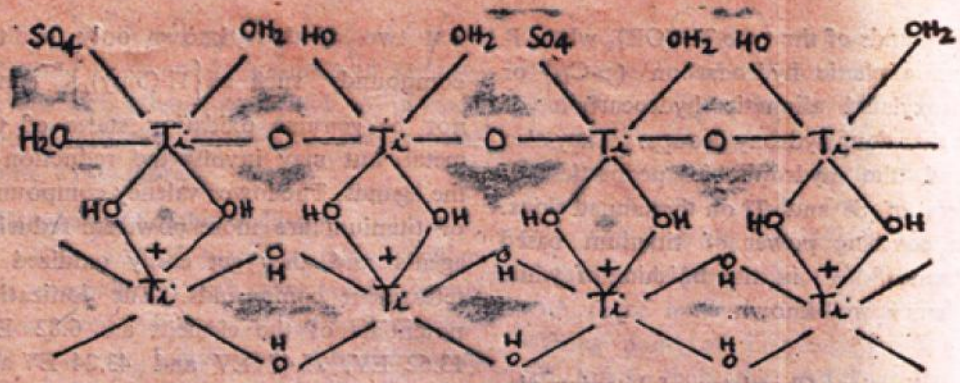
In the majority of the cases, titanium exhibits a co-ordination number of 6, and polycationic as well as polyanionic complexes of the following types[49] are known :



$$\left\{ TiO_2(OH)_2 \left[Ti(OH)_2SO_4 \right]_3 \cdot 4H_2O \right\}^{2-} + 4H_2O = = = =$$

$$\left\{ TiO_2(OH)_2 \left[Ti(OH)_2H_2O \right]_3 \cdot 5H_2O \right\}^{+4} + 3SO_4 =$$

Tde hydrolysis of such titanium complexes is accompanied by the condensation of hydroxo groups and formation of oxobridges thus—

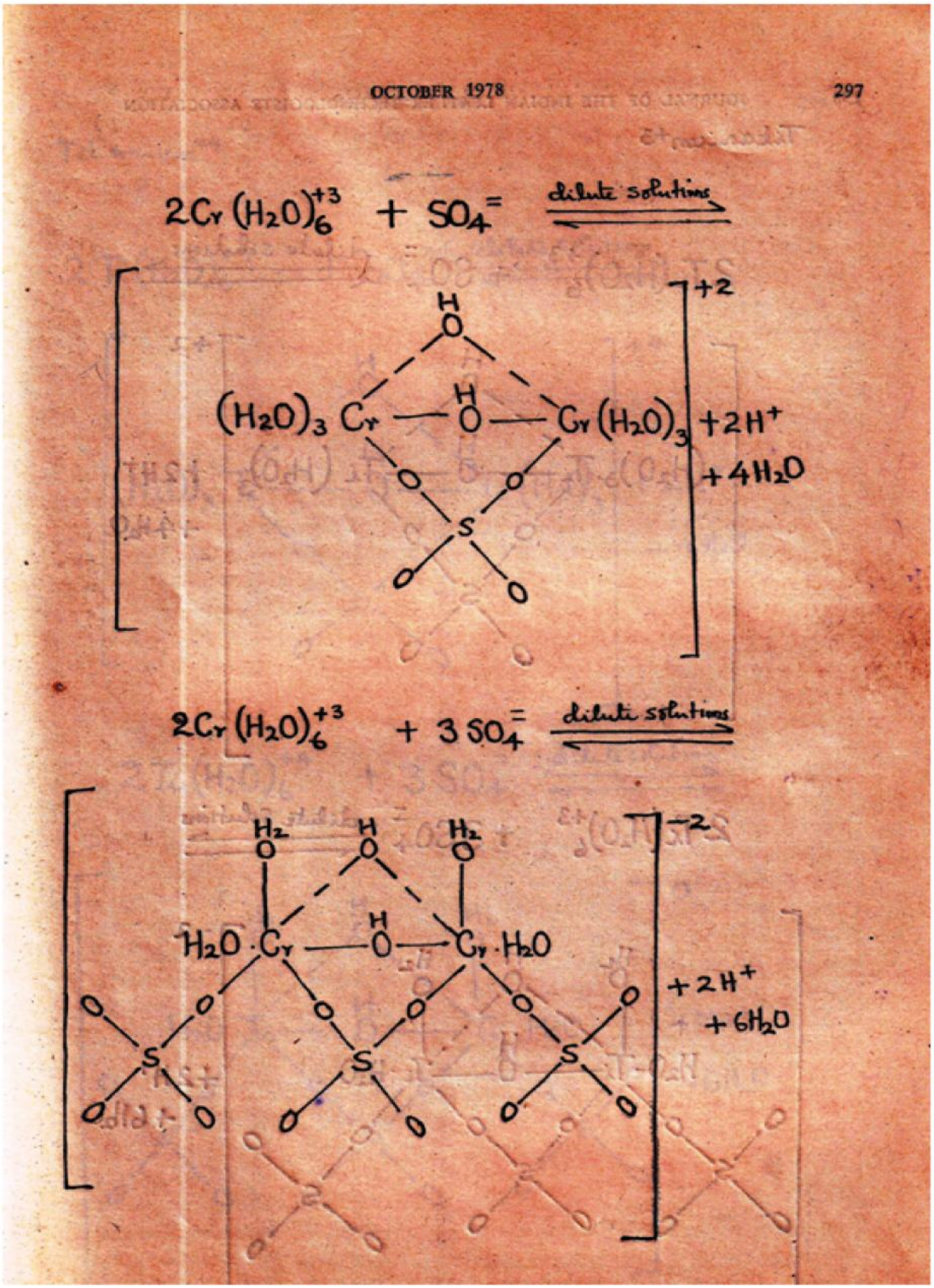


It has also been found that at the higher concentration of Ti (IV) and H_2SO_4, the degree of polymerization is greater. Disubstituted products[21] were obtained from the reactions of Ti (IV) chloride with oxalic and succimic acids. I.R. studies indicate a Ti-centred octahedral co-ordination compound with titanium having a co-ordination number 6. Unlike in zirconium, the trivalent state of titanium is also fairly stable as the quadrivalent state. Ti (III) halides[22] react with dimethylamine to give six-coordinated compounds Tix_3 $3NHMe_2$. It must, however, be mentioned here that although the most common coordination number of titanium is 6, which is recognized for all oxidation states of the metal, compounds of titanium are known with co-ordination numbers 4, 5, etc., as follows[23] :—

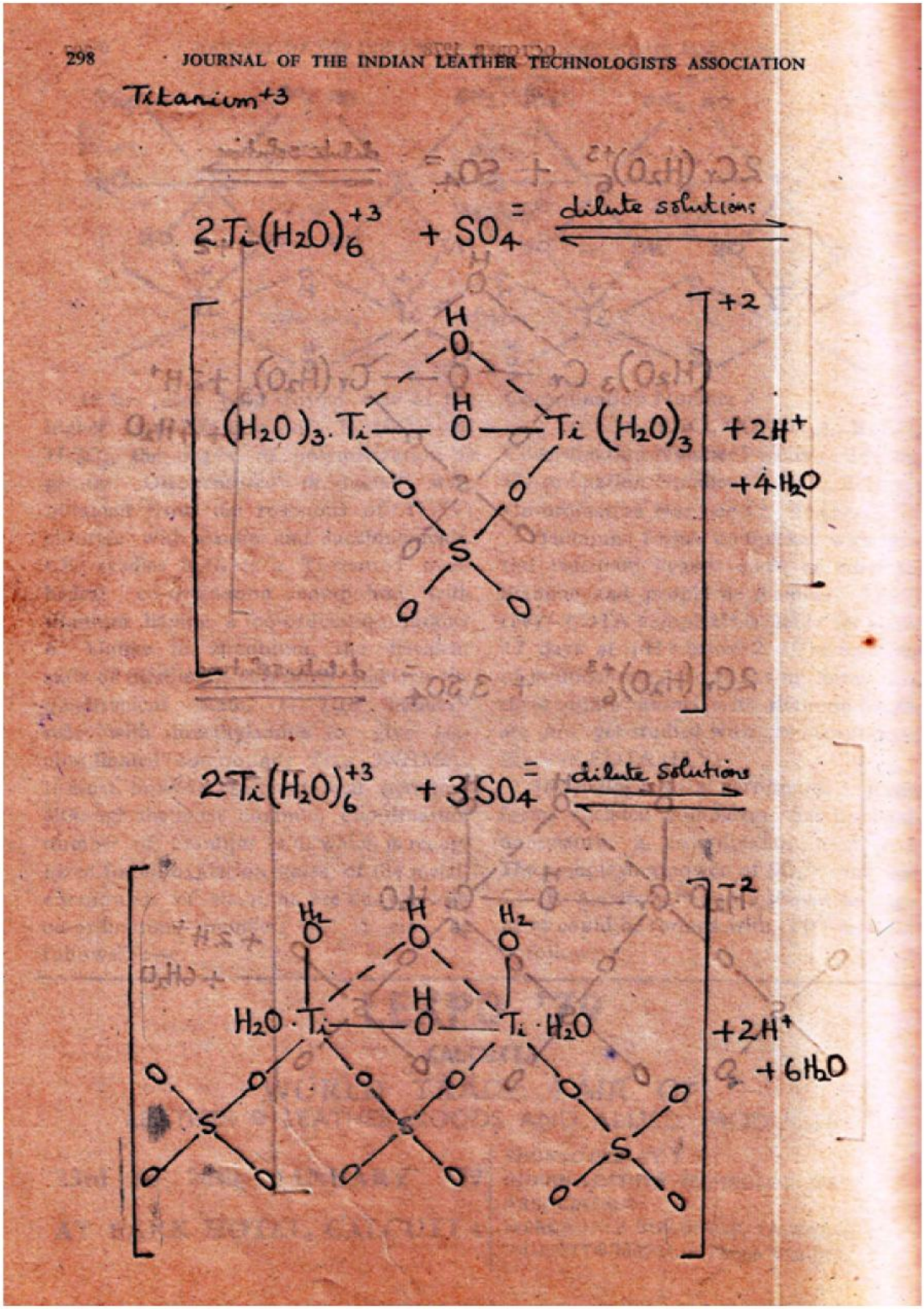
Co-ordination Number 4 :
$(TiCl_4,CO)TiH_3))_4$, $BaTiO_3$
Co-ordination Number 5 : $TiBr_3$. 2 NMe_3
Co-ordination Number 7 : $TiCl_4$, Triarsine
Co-ordination Number 8 : Ti $(No_2)_4$.

Titanium forms complexes with neutral bidentate ligands such as ethylenediamine and propylene diamine. The Ti (IV)—EDTA complex[24] is stable for about 17 days at pH's below 2. The reactions of multidentate ligands having more than three donor atoms with titanium halides are not yet studied with the exception of those of EDTA (H_4Y).

In analogy with chromium, titanium forms chelated complexes that have predominantly a co-ordination number 6. The complexing power of $SO_4^{=}$ ions with Cr. is illustrated[25] and a similar arrangement could be formed with Ti^{+3} and Ti^{+4} as follows :

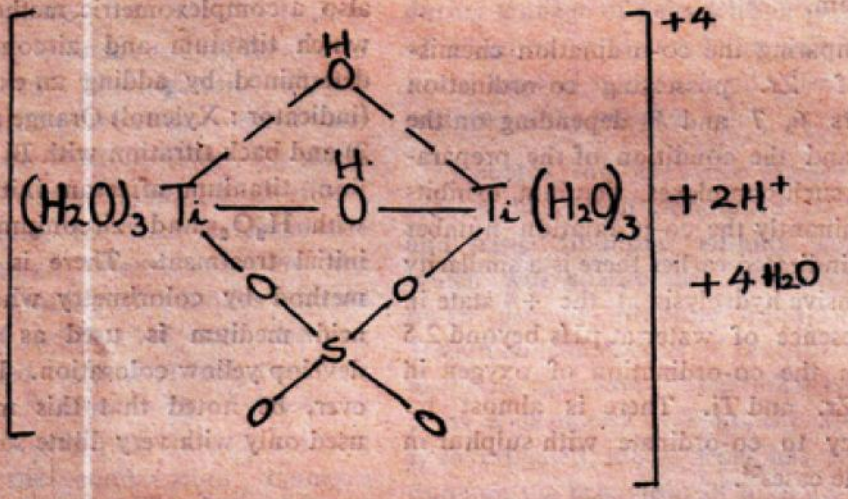

OCTOBER 1978
297
$2Cr(H_2O)_6^{+3} + SO_4^{=}$
dilute solutions
+2
$(H_2O)_3 Cr$ — O — $Cr(H_2O)_3$
$+2H^+$
$+4H_2O$
$2Cr(H_2O)_6^{+3} + 3SO_4^{=}$
dilute solutions
−2
$H_2O \cdot Cr$ — O — $Cr \cdot H_2O$
$+2H^+$
$+6H_2O$

Titanium+3

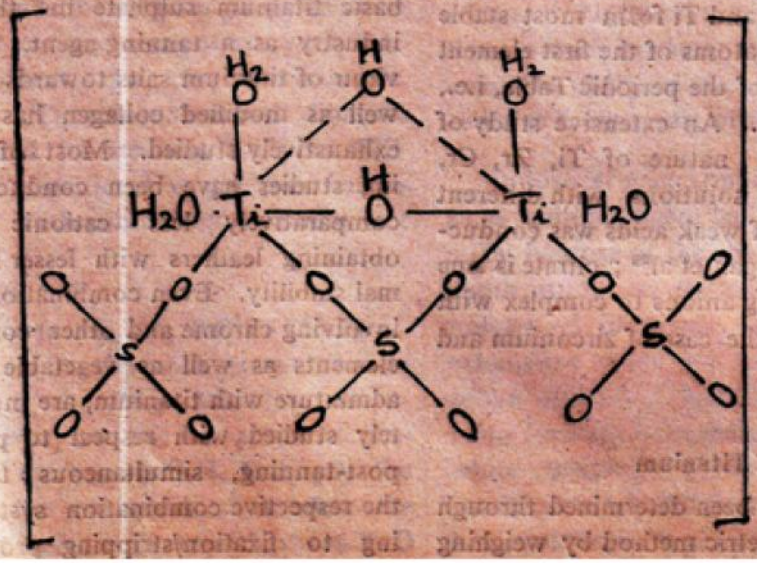

2Ti(H2O)6+3 + SO4= dilute solutions
(H2O)3·Ti — O — Ti(H2O)3
+2
+2H+
+4H2O
2Ti(H2O)6+3 + 3SO4= dilute solutions
H2O·Ti — O — Ti·H2O
-2
+2H+
+6H2O

Titanium^{+4}

$$2Ti(H_2O)_6^{+4} + SO_4^{=} \rightleftharpoons \text{dilute solutions}$$



$$2Ti(H_2O)_6^{+4} + 3SO_4^{=} \rightleftharpoons \text{dilute solutions}$$



Chelated complexes having nil charge are thus possible when the higher oxidation state of titanium—that is to say, Ti^{+4} is involved in the reaction. It can also be expected that the mononuclear species can be converted into polynuclear ones by boiling the solution as in the case of chromium.

Comparing the co-ordination chemistry of Zr. possessing co-ordination numbers 6, 7 and 8 depending on the ligand and the condition of the preparation of such complexes, titanium exhibits predominantly the co-ordination number 6. As indicated earlier there is a similarity of extensive hydrolysis at the +4 state in the presence of water at pHs beyond 2.5 through the co-ordination of oxygen in both Zr. and Ti. There is almost no tendency to co-ordinate with sulphur in both the cases[26].

By virtue of Zr displaying a greater co-ordination number of 8, it can form neutral chelates[27] $M(acac)_4$ unlike titanium.

In general, it can be said that elements like Cr, Al, Zr, and Ti form most stable complexes[28]with atoms of the first element of each group of the periodic Table, i.e., with O, N and F. An extensive study of the complexing nature of Ti, Zr, Cr, Al, Fe and Zn solutions with different anions of salts of weak acids was conducted by Selvarangan et al[29] ; citrate is one of the promising anions to complex with titanium as in the case of zirconium and aluminium.

Determination of Titanium

Titanium has been determined through the usual gravimetric method by weighing as oxides and through the cupferron method[30] when other elements such as Zr are also precipitated. Advantage is also taken of the reducing power of titanous salts for the determination of titanium through permanganometry, provided no other reducing agent is present. There is also a complexometric method[31] through which titanium and zirconium can be determined by adding an excess Trilon B (indicator : Xylenol) Orange ; buffer pH : 2) and back titration with $Bi(NO_3)_3$ solution, titanium after an initial treatment with H_2O_2 and zirconium without this initial treatment. There is yet another method by colorimetry when H_2O_2 in acid medium is used as a reagent to develop yellow coloration. It must. however, be noted that this method can be used only with very dilute solutions.

Identification of Problems for further Studies

As can be seen through the survey of literature, there are many aspects to be studied from the point of view of using basic titanium sulphate in the leather industry as a tanning agent. The behaviour of titanium salts towards native as well as modified collagen has not been exhaustively studied. Most of the tanning studies have been conducted using comparatively less cationic titanium, obtaining leathers with lesser hydrothermal stability. Even combination tannages involving chrome and other conventional elements as well as vegetable tannins in admixture with titanium, are not elaborately studied with respect to pretanning, post-tanning, simultaneous tanning of the respective combination systems leading to fixation/stripping properties of

either of the components of the systems taken up for such tannages. The studies in these directions will show the reaction sites of collagen with titanium at various pHs to have a thorough knowledge about the tanning chemistry of titanium salts and combination tanning systems. Complexometric studies of basic titanium solutions using different anions have also not been studied. Investigations of such nature using titanium at convenient basicities will throw more light on the exact behaviour of titanium tanning solutions, during masking, for their eventual use during tanning. Information on the comparative studies of complex nature and thermal stability of such tanning agents chelated with promising anions is also lacking. Studies in these directions will help in choosing the correct tanning system for the combination tannages involving titanium as one of the tanning agents.

Organometallic compounds[32] are formed through direct metal-carbon bonds and compounds containing titanium-carbon bonds have been prepared using both alkyl and aryl compounds with THF as the solvent. To cite an example, stable bis Ti-cyclopentadionyl dihalides are prepared by treating $TiCl_4$ in THF with cyclopentadienyl magnesium halides or with cyclopentadienyl sodium or lithium.

$$TiCl_4 + 2\,NaC_5H_5 = (\pi\text{—}C_5H_5)_2\,TiCl_2 + 2NaCl$$

deep-red crystalline solid (M.pt 289°C).

It is also possible to prepare compounds of the type $(\pi C_5H_5\,TiCl_2)_2O$, the X-ray studies of which show that the Ti-O-Ti bridging is linear with short Ti-O bond lengths of 1.74A implying the presence of double bonding in the bridge. The triand di-valut states of titanium also exhibit organometallic compounds, but they are unstable and oxidise rapidly in air. Studies in these directions to investigate the functions of such Ti-C linkages during tannage of pelts with a wide range of titanium compounds in suitable solvents may also provide additional information on the subject.

Detailed ion exchange studies do not seem to have been conducted on normal and basic titanium tanning solutions, which will enable the technologist to make use of titanium liquors at the desired concentrations of cationic/anionic/nonionic titanium. Since the basic aspects of chemistry of Ti are not thoroughly investigated, much work has not been done on the behaviour of titanium tanned leathers towards fatliquoring with different types of fatliquors and dyeing with different types of dyes as well as on the properties of leathers tanned with systems containing titanium alone and in combinations. Production of basic Ti tan liquors and extracts with commercially available TiO_2 as the starting material can also form a part of the studies.

Industrial scale application of titanium as a tanning agent has not been possible so far because of the absence of such in-depth study on the chemistry and technology of titanium. It is hoped that an exhaustive study on the above lines will prove successful and the industry will come forward to make use of yet another white tanning agent—titanium—in the production of different types of leathers having different types of properties.

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JOBS: OCTOBER HAS SOME BAD NEWS

Keeping the employment rate from slipping is challenging.

To merely keep the employment rate unchanged, the economy has to generate additional jobs. It needs to run to stay where it is points out Mahesh Vyas (MD and CEO, CMIE P Ltd.)

Labour market statistics derived from CMIE's Consumer Pyramids Household Survey have been indicating a stagnation of India's economic recovery process from its April 2020 shock. The recovery was smart in May and spectacular in June. It continued well into July. Then, it stalled in August and September. Now, it appears that the stagnation could extend or worsen in October.

We measure labour market conditions by the most apt summary measure for a developing country like India — the employment rate. This is the proportion of working age population that is employed. Fiscal 2019-2020 ended with an employment rate of 39.4 per cent. It fell to 27.2 per cent in April 2020 but, it recovered 300 basis points to reach 30.2 per cent in May. In June, the recovery was of a very impressive 600 basis points to 36.2 per cent. In July, the employment rate climbed up another 140 basis points to 37.6 per cent.

The fatigue set in in August when the rate fell to 37.5 per cent. Then, there was a small recovery to 38 per cent in September. Note that the fatigue set in well before recovering to the 2019-20 average employment rate. October shows signs of continued stress. All the first three weeks ending in the month penciled employment rates lower than the 38 per cent recorded in September. The rates, in sequence, were 37.6 per cent, 37.5 per cent and 37.9 per cent.

Keeping the employment rate from slipping is challenging. To merely keep the employment rate unchanged, the economy has to generate additional jobs. It needs to run to stay where it is. This is because the denominator — the working age population — keeps rising naturally. Employment has to rise in tandem to ensure that the ratio, the employment rate, remains constant. In the past four years, the employment rate has fallen steadily in each year. This is because employment has been stagnant. Fall of the employment rate revealed in the first three weeks of October 2020 is entirely because of a fall in the employment rate in rural India. The employment rate in rural India was 39.8 per cent in September. This was its highest level since the lockdown and was not too far from the 40.7 per cent clocked in 2019-2020.

However, it appears that rural India is not able to sustain an employment rate of 40 per cent or more. The weekly employment rate had touched 39.9 per cent in the week ended September 6. But it has slid since then.

In the week ended October 4, the rate was down to 39 per cent and then it slipped further to 38.8 per cent in the week ended October 11. It recovered to 39.5 per cent in the week ended October 18. But, it was still lower than the September average. The average of the first three weeks of October was 39.1 per cent.

The fall in the rural employment rate in October is somewhat surprising because this is the peak season for harvesting the kharif crop. While sowing is spread over four months, most of the crop is harvested in October. Different crops have different gestation periods but save for cotton and sugarcane, most of the kharif crop is harvested in October. It is possible that employment under the MGNREGS has declined significantly in October.

Till October 19 this year, the scheme had provided 58.5 million person-days of employment compared to 138 million person-days of employment provided during the entire month of October 2019. These numbers do get revised very substantially and therefore, it may be hazardous to draw inferences at this stage. Yet, the fall evident so far is quite large.

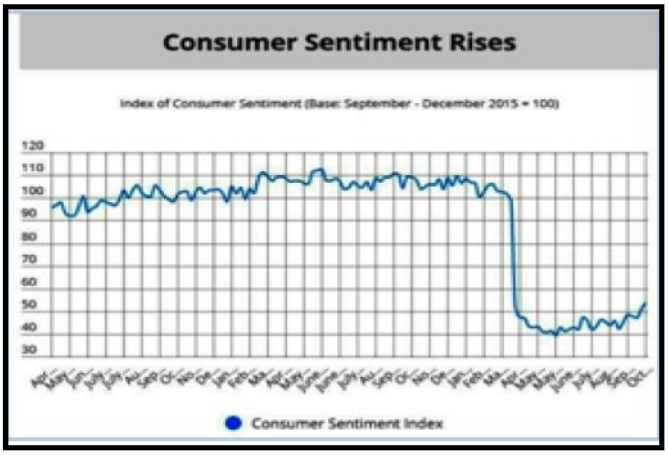
The average person-days of employment per day in October 2019 was 4.47 million. In the first 19 days of October 2020 it was 3.08 million, a fall of 31 per cent. Given that rural India has a much larger weight in all-India estimates, it is imperative that its employment rate stops falling any further.

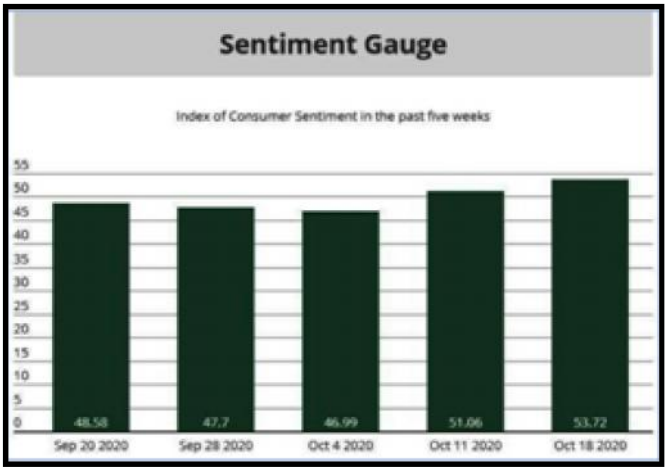
In contrast to the falling trend seen in rural India, urban India has shown an improvement in the employment rate in October 2020.

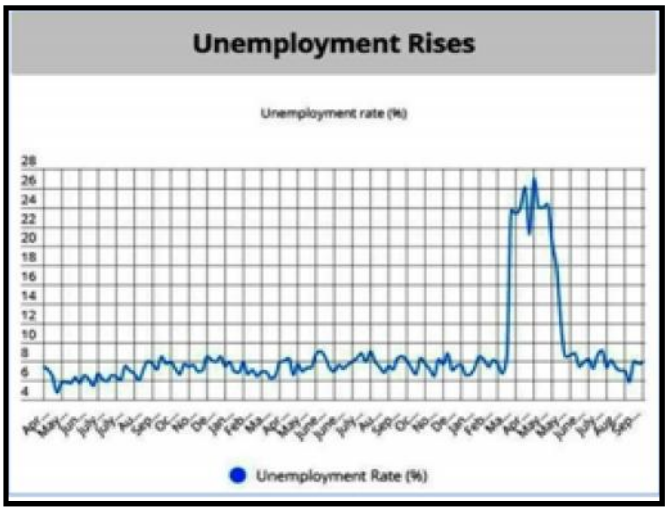
The employment rate in urban India in September was 34.4 per cent. The recovering trend in urban India in October is in contrast to the sharp fall in employment rate seen in September.

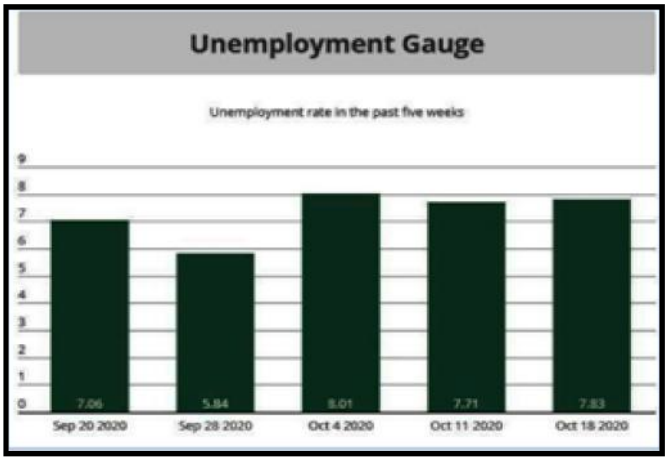
The urban employment rate at 34.4 per cent was a substantial 254 basis points lower than the average 36.9 per cent rate in 2019-20. The average employment rate in urban India in the first three weeks of October was 34.8 per cent. Even this was over 200 basis points lower than the 2019-2020 level.

The falling employment rate in rural India and the continued low employment rate in urban India are the weaknesses in India's labour market recovery process. The gap between the monthly employment rate in 2020-21 and the corresponding month of 2019-20 narrowed consistently till August 2020 when it was just 182 basis points. It then rose to 254 basis points in September. The gap could widen further in October.









(Source : Business Standard – 01/11/2020)

CONTROL COVID FOR ECONOMY TO RECOVER!

Unless we control the coronavirus, we are going to struggle to get our economy and country back on track. The specter of the virus haunts recovery, warns Naushad Forbes (Co-chairman, Forbes Marshall, past president CII, chairman of Centre for

Technology Innovation and Economic Research and Ananta Aspen Centre)

Unprecedented' is an over-used word — but it applies perfectly today. We are living through an unprecedented health crisis, with 30 million Covid infections and one million deaths. We are learning, but still do not definitively understand its spread, seriousness, and treatment.

India is now at the centre of this crisis — with more than seven million cases, and the fastest growth rate. Let me be blunt. With fresh daily infections of 100,000 and deaths at 1,200, and both rising, we are competing actively with the United States to be the worst-hit country in the world.

We face an unprecedented economic crisis - as governments shut down the economy to try to halt the spread of the virus. World gross domestic product is expected to fall between 5 and 10 per cent this year. India's GDP dropped by 24 per cent in the first quarter, the largest drop in our history and the biggest drop in the world.

Talk of a recovery is valid only relative to a shut-down economy of April and May, June, July, August and September performance have varied by sector: Pharmaceuticals, chemicals, food and beverage, tractors and two-wheelers are back at last year's level. Construction, real estate, travel and tourism, retail and fashion languish at levels below half of last year. Capital goods show their 20th successive monthly decline, reflecting a complete slump in investment.

The consensus now points to a GDP drop in 2020-2021 of 10 to 15 per cent. This will set our development back by three years - so the prime minister's $5-trillion-by-2024 goal will now have to be abandoned. All this adds up to the most painful and stressful period in memory. Unless we control the coronavirus, we are going to struggle to get our economy and country back on track. The spectre of the virus haunts recovery. Travel and tourism is most directly affected, both major employment sectors. But so is retail.

In Singapore, which now has the virus in control, shopping mall footfalls are back to 65 per cent of last year's level with sales at 75 per cent — the shortfall reflects an absence of tourists. Our shopping malls report footfalls at 25 per cent of last year's number in September, and sales at 35 per cent. People are understandably afraid to enter malls.

The Chinese economy has bounced back after controlling the virus and is now expected to show some modest growth this year. Most countries have had some success in controlling the spread of the virus, or seen the curve flatten. India's rise in infections has been inexorable. So our immediate challenge is health.

Here's our problem. In late March, with just 600 cases of Covid infections in the country, we initiated the world's most stringent lockdown. Strong communication then associated controlling the virus with a strict lockdown in everyone's mind. Today, we have over seven million cases and the fastest spread of infection in the world. We are simultaneously opening up and easing restrictions on movement and activities.

I agree with this opening up. With 20:20 hindsight, the lockdowns were too draconian for a country like ours with such a large informal sector and no social safety net. So we must ease the restrictions. But we must communicate that we are opening up to restore economic activity because we went too far, implemented the lockdown badly, and have no choice. And warn people that the virus is spreading faster and is as dangerous as before. Instead, we are hardly communicating anything.

So what must be done? I am in none of those professions — immunologists, virologists, epidemiologists, seriologists, mathematicians — that understand what's going on. I hope, instead, to kindle some debate on what we should be doing.

Let me offer five suggestions as a citizen deeply troubled by the long-term damage this crisis is doing to our national prospects.

First, take it seriously — this must be seen in what our leaders say — at the national, state and city level. When the health crisis is at a new peak each day, the silence is deafening. Let's start by acknowledging the problem. Let the data speak, using international metrics of seven-day rolling averages of fresh infections and mortality to tell us how we are doing, both in absolute terms and per million population.

Second, learn from the best experiences in controlling the virus internationally — Germany, Taiwan, Vietnam, Thailand, South Korea, Sri Lanka, Dharavi.

Avoid facile explanations - the best democrats (Taiwan, South Korea, Sri Lanka, Kerala) have done as well as the best authoritarians.

The best countries with high population densities have done as well as those with low. Taiwan (500 cases and just 7 deaths), Vietnam (1,100 cases, 35 deaths), South Korea (23,000 cases, 400 deaths) and Sri Lanka (3,300 cases, 13 deaths) have done an exceptional job of controlling the virus.

South Korea and Taiwan have twice the population density of India. Vietnam and Sri Lanka are not very different to India in population density and wealth.

Third, rely on science and expertise. Withdraw the Disaster Management Act — it has proved ineffective in delivering anything except harassment. Rely on our many good scientists and doctors, those practicing on the ground rather than in administration. Let them set policy direction, which politicians and bureaucrats implement, instead of the other way around.

In the three months to June, the Union government issued 270 separate Covid directives, roughly three each day. State governments between them issued another 370 directives.

Some of these directives were even well-meaning, but with what effect? Many were to undo the confusion a previous directive had caused. Let science and expertise coordinate what we do, not bureaucrats. And learn from what Taiwan, Sri Lanka and Kerala have done in using science and communication to control spread and mortality.

Fourth, work collaboratively between the Centre, state, and city. Can we suspend politics in matters relating to handling the virus? Covid reminds us how inter-connected we are — and therefore how important it is we design policy together. And then let's communicate, communicate, communicate. We must remind people constantly that this virus has to be controlled and dealt with.

Fifth, can we as citizens take the lead? We are not a particularly disciplined country (think of how we drive, think of our Parliament), but to halt Covid, we need self-discipline to keep ourselves and our families safe.

My own city, Pune, has the very dubious distinction of having the highest infection rate in the last two months of any city in the world, adding around 4,000 cases each day. Let's ensure that we and everyone around us, in our place of work, in our housing societies, follow strict principles of social distancing, wearing masks, and hand-washing.

Let's require that every shop we enter has social distancing being visibly, simply and rigorously followed. We should refuse to enter any enclosed space if even one person is not wearing a mask. People think a fatality ratio of 2 per cent is a small number, but that means we are seeing 70 to 90 extra deaths in Pune district each day over the last two months. That's around 30 per cent more than usual, an unacceptable number. We have to turn this around.

The key to a lower mortality rate is early identification of cases — so plentiful testing and tracing giving us a test positive ratio under 5 per cent is key. And then followed by close monitoring at home of progression, and ensuring that care levels, including hospitalization, are stepped up as needed.

This requires a coordinated effort between the city health authorities, doctors and hospitals. And the coordination must be among equals - devoid of the bullying and counterproductive edicts we have seen issued with such regularity. If we do all this, can we control the virus today given how rampant it is? I don't know. Perhaps it is already too late. But we need to hear from those who understand what it would take.

Communication is critical - with a single message to avoid confusion. We cannot have life-as-usual, business-as-usual, or a vibrant economy till Covid is in control. Let's get real.

(Source : Rediff.com – 15/10/2020)

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ILTA PUBLICATION

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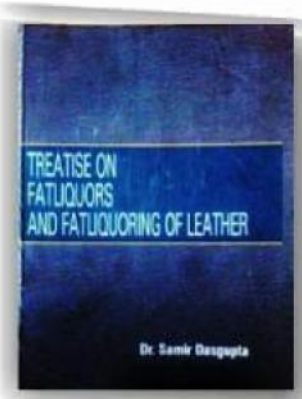

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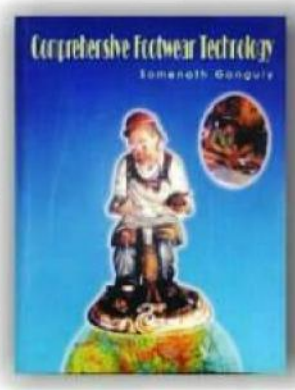

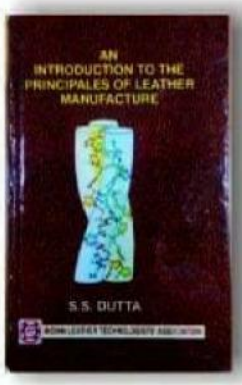

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Send your enquiries to :

Indian Leather Technologists' Association

'Sanjoy Bhavan', 3rd Floor, 44, Shanti Pally, Kolkata- 700 107, WB, India
Phone : 91-33-2441-3429 / 3459 Telefax : 91-33-2441-7320
E-mail : admin@iltaonleather.org; mailtoilta@redimail.com
Website : www.iltaonleather.org

Registration No. KOL RMS/074/2019-21

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-Sisanay 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 benet of all concerned. To oer 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 benet of students at various levels of study, for the researchers and industry.
- To have interface between urban and rural sector.
- To assist Planning Commission, various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies acceptable and adoptable to the industry.
- To organize practical training and to provide skilled manpower and to motivate good students for study.
- To conduct activities related to the growth of the export of leather and leather goods from India.
- As the part of many social activities ILTA has donated Rs. 1 lac to Consul General of Nepal towards relief of earthquake erected 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 rst 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 & Symposums on regular basis to share information, knowledge & latest development and interactions for the benet 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. Moni 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 :

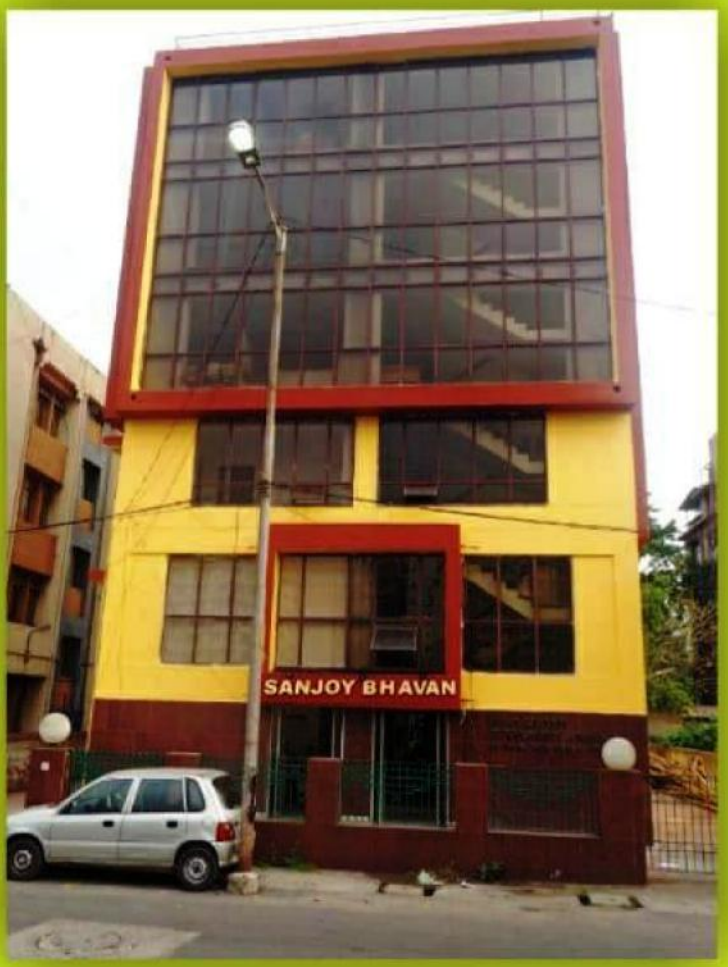
- Prof. Y. Nayudumma Memorial Lecture.
- Series of Lectures during "Programme on implementing Emerging & Sustainable Technologies (PrIEST)".
- Seminars in occasion of India International Leather Fair, 2014 and 2015 at Chennai etc. Many reputed scientists, industrialists and educationists have delivered 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. S. S. Dutta
- Practical Aspects of Manufacture of Upper Leather by J. M. Dey
- An Introduction to the Principles of Leather Manufacture by Prof. S. S. dutta
- Analytical Chemistry of Leather Manufacture by P. K. Sarkar
- Comprehensive Footwear Technology by Mr. Somnath Ganguly
- Treatise on Fatliquors and Fatliquoring 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 Moni Banerjee Memorial Medals to the top rankers at the University / Technical Institute graduate and post graduate levels to encourage the brilliants 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 (JILTA).

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 tiny, 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, Kasba, 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', 3rdFloor, 44, Shanti Pally, Kolkata- 700 107, WB, India
Phone : 91-33-2441-3429 / 3459 Telefax : 91-33-2441-7320
E-mail : admin@iltaonleather.org; mailtoilta@redimail.com
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