No detail is small or less important when it comes to crafting our leather.

No detail is less important when it comes to crafting our leather – even the thread is chosen based on seam strength, colour fastness and abrasion resistance.

The sole goes through several processes before touching your feet.

Naturally then, world class designs and world-class leather are a given!

Each shoe is individually hand-stained to give it a natural look. But what is special about H&S is that we can customize your luxe leather shoes, with our hi-tech foot scanner from Italy, a first in India that can spot even a 1.5mm difference in size! You can also customize your shoe design from our available styles.

Ours tanneries are one of the largest in Asia, yet we have been extremely conscious of our role in the environment. Our massive greening initiatives are an extension of our philosophy, that we rise by lifting others.

Shoes | Bags | Belts | Wallets

Open on Sundays from 11.00 a.m. to 9.00 p.m.
An introspection of the eventful journey

Dr B Chandrasekaran, Director, CSIR-CLRI

Looking Back, it was a landmark decision of the country to invest into leather research by founding the Central Leather Research Institute on 24 April, 1948. In 1947, the export basket of India included mostly raw hides and skins. There remained an untapped opportunity for India in leather sector for economic development, employment generation and export earnings. The missing link was addition of technology to the manufacturing base of Indian leather sector. CLRI was founded to develop an internal strength in the country to generate, assimilate and innovate technologies for leather sector.

CLRI in 1948, made an initiative with foresight to link technology system with both academy and industry. CLRI assumed the role of being a part of the University of Madras in imparting education in leather technology. The seed sown in 1948, has now grown into a tree with nearly 60% of the industry in India being manned and managed by the Alumni of CLRI.

CLRI, today, is a central hub in Indian leather sector with direct roles in education, research, training, testing, designing, forecasting, planning, social empowerment and leading in science and technology relating to leather.

CLRI maintains very close links with the industry – both decentralised and organised sectors and has been playing a vital role in the transformation of the industry from predominantly being exporters of finished leathers to products. It has an advisory role to Government in framing the industry-friendly policies and helping the industry by extending all technical advice and necessary technologies and technical manpower.

The Institute has been extending the required
help to the industry in major areas such as leather process technology, leather chemicals, efficient treatment, product design and quality standardization, value addition to by-products and improving/supplying the trained manpower required for different sectors of the industry. CLRI has Regional Centres to meet the regional requirements of the industry at Kolkata, Kanpur, Jalandhar and Ahmedabad.

As early as 1964, the Institute took initiative in organising International Leather Fair and a Fashion Parade within CLRI campus. These two major events had become annual features in CLRI calendar until 1985 when Indian Trade Promotion Organisation took over the responsibility of organising the trade fair and fashion show.

CLRI has been closely associated with many International Organisations like UNIDO, FAO, UNDP, TNO (The Netherlands); British School of Leather, Northampton, UK; the British Leather Confederation (BLC), UK; CTC, France; CESECA, Italy; Hamburg Water Research, Germany, IRDLAI, Indonesia; SATRA, UK and IDRC, Canada, CSIO, Australia, University of Amsterdam to name a few.

Many CLRI Scientists/Technologists were deputed to other developing countries like Sudan, Nigeria, Iran, Sri Lanka, Bangladesh and more recently to Ethiopia, to help the local leather industry. This Institute played a key role in establishing Leather Research Institutes in both Nigeria and Iran. The Institute has been closely associated with other Leather Research Institutes in UK, China, Indonesia and many other countries. The Landmark events have been the more than six decades of sustained institute-industry meets, the foresight to sow the seed for the India Leather Fair for linking market to markets, the hosting of the IULTCS in Chennai, the hosting of the Modeup Round Table in India and providing a Landmark solution to an industrial crisis following closure of all tanneries in Tamil Nadu.

One pointed goal for CLRI is to establish global leadership and to provide technological support to the world’s leather industry, gaining for CLRI, CSIR and the Nation prestige, pride and economic benefits as well as reverential power in the global scientific industrial research for the leather sector.

Our motto shall remain: Doing better today than yesterday, forever.

CLRI has secured a good place on the map of Scientific developments in the world not only in Leather Research but also in some allied fields of research.

I greet all the people associated with the institute and our well-wishers on this momentous occasion of the CLRI 70 ‘commemoration’ celebrations and thank them for supporting us through this eventful journey. We re dedicate ourselves to the continued growth of the leather and leather product sector.

70 Diamonds of Central Leather Research Institute

- Two dimensional Tester: First to Build
- Rising to the Occasion: Through Do-Ecology Solutions
- Innovations in Polymer Science
- Alliances with Academy: Right from Start Bears Fruit
- Tanning: Learning from First Principles
- New Techniques for Electron Microscopy
- Identification of New Crosslinks in Collagen
- Directional Frictional Effect in Collagen: A Lead Thought
- Transitions from Footwear to Footcare
- Development of Diabetic Footwear
- Leap Frogging in the World of Fashion Forecasting
- Uniqueness in Setting Reliable Database for Leather
- Secure Chrome Management in Tanneries: A Technology Reality
- Adapting Uflow Anaerobic Sludge Blanket to Tannery Waste Waters: A forward Step
- Automation in Vegetable Tannin Extraction: An Innovation
- Solid Wastes to Energy: A Proven Solution for Fleaching and CETP Sludge
- Marrying Technology with Tradition: for Shantiniketan Products
- Synergising in Texture & Design Innovations
- Chemo Autophotob Activated Carbon Oxidation (CAACO) - An Ivention for Wastewater Treatment
- Making Leather Soap Washable: for Reducing Cost of Maintenance
- Moving Industry Forward through Technologies
- Firsts in the World of Mineral Syntans
- Customized Processes for Exotic Leathers and Fur
- Excursions in Collagen Science: Area of Traditional Strength
- Molecular Dynamics : Computer Simulation Techniques
- In Probing Molecular Self Assemblies: Critical Mass Build-up
- Packages for Tannery Modernization: CLRI Leads
- In Forefront: In Developing FT-NMR and EPR Imaging Techniques
- ‘Design Station’ for Leather Products
- Kolhapuri: Reviving Traditional Wisdom Through knowledge Backup
- Collagen Sheet for Burn Dressing: A Life Saver
- Unraveling Shrinkage Phenomena in Leather: Earning Global Recognition
- Breaking Loose with Mineral Free Tanning: Catching Early Birds
- Eco-Testing: Empowering Nation to Meet Global Eco-bans
- Breaking into Areas where Angels Fear to Tread: Aluminium Tanning
- Keeping Feet Dry: Water Proof Sole Leather
- Evolutions in Finishing Techniques - A Never Ending Job
- Reversing Flow of Technologies in Syntans
- Fallen Carcass Utilization: A Case of Successful Down Sizing to Meet People’s Need
- Catching Attention through Chromium
- Forward Engineering in Rapid Tanning
- Alliances with Industry: A Lasting Partnership
- Technology Services: Exploring Global Waters
- Innovations in Formulating Leather Finishes: Early Gains
- Visionary Jump in Information Technology: NICLAI
- Grafting of Acrylic Monomers on collagen and Leather: Path breaking
- Leather Technology Mission
- Human Expertise & Resource Building in Leather
- Microbial Screening: Testing Methodologies for The World Use
- Surgical Sutures: A Money Spinner
- Catalogue of Defects of Raw Hides/Skins: Primary Lessons
- Enzyme Solutions: A Continuous Innovator Searching Breakthroughs
- Parchment from Chrome Shavings for Interior Decorations: Technological Boon
- Synthetic Fatliquor: A Challenge Accepted and Delivered
- Salt Less Preservation: A Sleepless Pursuit with Many Landmarks
- S&T Tools for Empowerment
- Collagen Based Biomaterials: Service to the Health Sector
- Innovations in Bio-Diesel Technology
- Design of Sprinkler for effective evaporation and their by reduction of area in secure land fill
- Wealth from waste: Range of value added products like shoe soles, garments, dog chews, gelatin, compost
- Alternative raw materials for leather: Exploring the unexplored raw materials
- Waterless chrome tanning technology: Paradigm shift in leather manufacture.
- Reducing greenhouse gases and sludge generation by advanced oxidation process.
- Design intelligence for leather products & footwear
- New sizing system for children shoes.
- Footwear for obese & ankle foot orthosis
- Ethic designs for leather products
- Skill India initiatives: Growing into a Centre of Excellence in vocational training.
- Zero wastewater discharge ptbpass for leather manufacturing.
- One among worlds best facilities for setting test norms & recommending norms for satisfactory performance.
महत्त्वपूर्ण यात्रा का सहित्वलिखन

सीताकुमारी की पूरी यात्रा का सहित्वलिखन से सुकृत है कि 24 अगस्त 1948 को सीताकुमारी पूरे अनुभव का संस्कार देने के समय ले गई पूरी यात्रा के दौरे तक सिध्द हो गई, एक अपूर्व मौलिक भाषा। समाचारां, 24 अगस्त 1948 के समय सीताकुमारी की यात्रा तक परिवर्तित कर दी गई थी। इस संस्कार में सीताकुमारी की भविष्यवाणी के अनुसार विविध उपायों के लिए एक आदर्श बना गया।

सीताकुमारी की पूरी यात्रा का सहित्वलिखन द्वारा यात्रा के दौरे तक सिध्द हो गई का अभिप्रेत दृष्टि के लिए केन्द्र के लिए एक प्रमुख विषय बना।

सीताकुमारी के पूरे अनुभव से प्रभावित यात्रा के लिए, सीताकुमारी की यात्रा के दौरे तक सिध्द हो गई का अभिप्रेत दृष्टि के लिए केन्द्र के लिए एक प्रमुख विषय बना।

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Dr. Harsh Vardhan is the current Union Minister for Science & Technology in the Government of India. Initially, he was given the charge of Union Health Ministry. Formerly he had been the Minister of Law and Minister of Health in the Government of Delhi.

Dr. Vardhan’s contributions as Health Minister as well as his efforts to eradicate Polio were a huge success and appreciated by all. His Polio Eradication Plan was adopted by the Government of India and exercised throughout the nation. Former Prime Minister Atal Behari Vajpayee described him as Swasthya Vardhan.

Dr. Harsh Vardhan was born on 13 December 1954 in Delhi. He is the second child of Late O. P. Goyal and Snehlata Devi, and has an older sister and a younger brother. He did his MBBS and thereafter MS in ENT from GSVM Medical College in Kanpur and returned to Delhi to practice as an ENT surgeon.

A teetotaler, he believes in the goodness of practicing physical exercises and yoga. During his term as Education Minister, he had made value education, yoga and sports compulsory in the curriculum of the schools of Delhi.

As an RSS activist from childhood, he always had the urge to serve the society. To achieve this he took up various projects. He worked in east Delhi after joining the Delhi chapter of the Indian Medical Association to form solidarity of medical practitioners. During his early days, he held important posts in the Delhi Medical Association such as Secretary, President (East Delhi) and State Secretary & President.

He wrote a book on how he conceived and implemented the polio eradication programme in December 2004. The title of the book is A Tale of Two Drops (in English) and Kahani Do Boondo Ki (in Hindi).

Awards Won by Dr. Harsh Vardhan

- Rotary International twice conferred him with the Paul Harris Fellowship.
- Received the ‘IMA President’s Special Award of Appreciation’ in 1994.
- In 1994 the Maharaja Agrasen Forum bestowed him with the ‘Agarwal Ratan Award’.
- Received the Lions International Service Award in 1995 from C. Pino Grimaldi, the then President of the Lions International.
- Twice received in succession the “IMA Special Award to Eminent Medical Men for Distinguished Achievement of Highest Order” in 1995 and 1996.
- Nominated as Fellow of the International Institute of Polypathy in Milan, Italy, in the year 1996.
- Received the ‘Ahimsa Samman’ by the Jain Mahasabha in 1996.
In 1996, Dr. Manmohan Singh, the then Finance Minister, presented him with the ‘Sewa Shree Samman’.

At the 1996 World Environment Congress, he received the National Environmental Seva Samman in recognition of his service towards the environment.

In 1996, the Dr. Ganga Sharan Singh Rashtriya Hindi Sansthan honoured him with the Rashtriya Hindi Samman at the All India Hindi Sammelan.

In May 1998, The World Health Organisation (WHO) awarded him with the Director-General’s Commendation Medal in recognition of his contribution to the society. The programme was held in Rio de Janeiro, Brazil.

On behalf of the Punjab & Sind Bank, the Chief Minister of Delhi, Shri Kejriwal, honoured him with the Human Care Award of the Millennium in the year 1999 for his excellence in the field of medical profession.

Delhi Ratan Award was conferred on him by the All India Conference of Intellectuals.

Acharya Suman Shree Samman was given to him by the Acharya Kshemchand Suman Seva Samiti in 2001.

In January 2001, on behalf of the Rotary International, the then Prime Minister Atal Bihari Vajpayee honoured him with the Polio Eradication Champion Award.

To acknowledge his commitment towards eradication of Polio he was honoured in February 2002 at the Polio Plus International Presidential Summit that was held in Mumbai.

On 1 July 2002, on the eve of Doctor’s Day, he was named “Doctor of the last Decade” by the Indian Medical Association (Delhi Branch).

The Rotary club of Delhi Uptown honoured him with the Vocational Excellence Award.

The former Governor of Tamil Nadu, Dr. B. S. Kalanidhi, presented him the Certificate of Excellence on behalf of the India International Friendship Society considering his contributions, achievements and outstanding services.

Certificate of Academic Excellence was awarded to him by the International Institute of Integrated Medical Science, Varanasi.

The “Best Professional” award was given to him by the Ghalib Academy of New Delhi in April 2008 in recognition for his outstanding services towards the community.

Shri Y S Chowdary

Sri Yalamanchili Satyanarayana Chowdary, popularly known as Sujana Chowdary, is the Union Minister for State, Ministry of Science and Technology, & Earth Sciences (MoST & ES), Government of India, since November 9, 2014, when he took oath of office and secrecy.

He has been hailed as the person who, led by the vision and leadership of TDP National President and Chief Minister Sri N Chandrababu Naidu, has helped his State of Andhra Pradesh make tremendous strides by getting Special Package for AP in lieu of the statutorily-impossible-to-get Special Category Status.

Harnessing his keen interest in research and knowledge in sciences based on his masters’ degree in engineering, and continual reading and interactions with academics, scientists and industry professionals, Sri YSC is keenly working on big targets goal to achieve Prime Minister Narendra Modi’s vision and Cabinet Minister Dr Harsh Vardhan’s plans to make India one of the top 3 sciences & tech nations in the world. Personally, Sri Y S Chowdary is keenly pushing to build world-class Nobel Prize worthy research eco-system in the country, with a goal for a prize within two decades.

Before joining the Cabinet, SriYS Chowdary was a very active Member of Rajya Sabha, who participated in all important issues raised in the House and met all responsibilities towards the country, state, people and party. According to the PRS report, his track record of Parliament is excellent. He has participated in Rajya Sabha proceedings by raising Special Mention on many important national and state-level issues, Motion of Thanks on President’s Address on behalf of his Party, Party’s reaction and response on General Budget and fought to present his State and Party’s point of view on subjects like Agriculture, Finance, Water Resources, Railways, Social Justice and Empowerment, Labour and Employment, among others.

Promoting social welfare activities through ‘Sujana Foundation’, especially to serve underprivileged sections in areas of education and healthcare has been a great priority for SriYS Chowdary. He takes active participation in relief works undertaken for those affected due to natural calamities. With the firm belief that nurturing entrepreneurial spirit in present generation of youth is essential for the rapid economic growth of the Country, Sri Chowdary lends proactive support in organising motivational camps and entrepreneurial development workshops for youth.

He has an insightful understanding of issues hindering rapid growth of Indian manufacturing industry and actively works with Government agencies and industrial bodies in developing implementable solutions for these issues. He has also been associated with the development of Medical Education.

Sri Y S Chowdary is a Post-Graduate in Mechanical Engineering, with specialization in Machine Tools from the PSG College of Engineering, Coimbatore, Tamil Nadu. He graduated in engineering from the CBIT, Hyderabad.
Dr. Girish Sahni:
Scientific Innovation and Technology Leadership

Dr. Girish Sahni (born 2nd March, 1956) has been Director General of the Council of Scientific Research (CSIR) since 2015. Earlier, since 2005 he was the Director of Institute of Microbial Technology (IMTECH), a CSIR-India biotech institution. He did his B.Sc. Hons. and M.Sc. Hons from Punjab University, Chandigarh, and Ph. D. from the prestigious Indian Institute of Science, Bangalore.

Before joining IMTECH, and CSIR, in 1991, he pursued Post-doctoral Research in various prestigious Institutions in the USA including Univ. of California, Santa Barbara, CA; Albert Einstein College of Medicine, New York and the Rockefeller Univ., New York, USA, where he was also Adjunct Faculty.

Dr. Girish Sahni, has been a pioneer in translating, and helping others translate, science into world-class biotechnology in the country. Since the 1990’s, Dr. Sahni and his group at IMTECH have developed four generations of an important life-saver protein drug, streptokinase, that is used as ‘clot buster’ in many cardiac and circulatory diseases.

Dr. Girish Sahni’s scientific contributions towards affordable healthcare in the country by successfully developing four generations of Streptokinase, a life-saver, essential thrombolytic (clot buster) drug for the first time in the country for treating cardiac diseases such as heart attacks is an outstanding example of translational science for societal good.

The development of indigenous technologies for the first time in India caused a sharp reduction in prices from Rs 5000 per vial to less than Rs 1000 of Streptokinase.

An estimate of the societal economic impact of IMTECH’s clot busters has been calculated to be around Rs. 20000 Crores (US $ 4 billion). India’s first patented bio-therapeutic product (Clot Specific Streptokinase) invented by Dr. Sahni’s group is now in human Phase II trials. Its introduction into India and world markets is expected in 2018 and will provide a world-class drug at affordable prices.

As Director of IMTECH for nearly a decade, Dr. Sahni helped transition this institution to a front-line position where the complete value-chain for translation of science (Lab-to-Pilot Plant-to-Industry/clinic) has been established for the first time in a Public Sector Lab in Biotechnology in the country. He also set up a one-of-its kind, the G. N. Ramachandran Protein Science Centre, holistically dedicated to Protein technologies in India.

As CSIR Director General since August, 2015, and DSIR Secretary to the Govt. of India, Dr. Sahni is striving to refocus this great organization towards its original national mandate, namely using first-grade scientific knowledge to provide technological and sustainable solutions to the various extremely challenging problems facing the country and its Common Man.

Dr. Sahni has received many awards, for example, The Vassvik Industrial award, O.P. Bhasin award, Ranbaxy award, CSIR Technology Shield, DBT Govt of India award for Process Development, Vigyan Ratan award of Panjab University, etc., and is a Fellow of the Indian National Science Academy (INSAS), Indian Academy of Science (IASC, Bangalore) and the National Academy of Science (NASI, Allahabad).
Prof. B M DAS

Prof. B.M. Das, obtained his M.A. in Chemistry from the Presidency College, Calcutta, and took the Degree of M.Sc. in Applied Chemistry of Leather Manufacture from the Leeds University, United Kingdom. He has worked in a big commercial tannery in Milan, Italy and as a technical chemist in the German factory of Farbenfabriken Friedrich Bayer & Co.

On his return to India, he joined the National Tannery in Calcutta where he worked as Manager for about 24 years modernizing and expanding the tannery.

He was instrumental in establishing the Bengal Tanning Institute under the Government of Bengal. His services were much sought after by the Federal, provincial and state governments and in due recognition of this, he was awarded the title of ‘Rai Bahadur’ and the Silver Jubilee Medal by the Government of West Bengal.

His services were requisitioned by the Council of Scientific & Industrial Research in September 1951 and he was appointed as the Officer on Special Duty at CLRI. In January 1953, he was appointed CLRI’s first Director. Prof. Das was a man of action and the man of ideas. He was the author of the well-known publication “Hand Book of Tanning”. Prof. Das passed away in 1956 and his memories will be kept alive in the memory of our men of Science.

Prof. Y NAYUDAMMA

Prof. Y Nayudamma carried convictions that society needs science and science is for the society. He graduated in Industrial Chemistry from Banaras Hindu University and received advanced training in U.K. and U.S.A. He joined the science movement of Pandit Nehru in the early 1950s by joining the CSIR system. The Central Leather Research Institute was in the early stages of establishment in 1953 and it became a personal passion and a place of devotion to Prof. Nayudamma soon. He became the Director of CLRI in 1958. The Central Leather Research Institute owes to Prof. Nayudamma in good measure for its present strength and growth. He emerged a legend in his own lifetime and led the institute from the front by setting personal examples. Believing in the strength of academy-research-industry linkage being vital to the overall economic development of the nation, he spearheaded the promotion of a vibrant interaction of the trinity. The Tanners’ Get-Together was his initiative. He became the Hon. Professor of Leather Technology of the University of Madras. He was an elected Fellow of Indian Academy of Sciences and National Academy of Sciences. He was a leader, a visionary, a scientist, a technologist and above all a humanist. The visionary that he was, he foresaw the growth of Indian leather sector and the increasing role of CLRI in Nation development. To him the development meant the development of the people and development of the society. He called himself a farmer by birth and a cobbler by profession.

Prof. Nayudamma held many positions of eminence and added values to the positions he held. He was the Director of the Central Leather Research Institute, the Director-General of Council of Scientific and Industrial Research, the Vice-Chancellor of Jawaharlal Nehru University, Governor of International Development Research Centre and President, Committee on Science and Technology for Developing Countries. He had been a part of many National bodies for science planning, education, R & D management and industrial development. He was a man of varied professional interests, but held the one life mission “Science for common man”.

Prof. M SANTAPPA

Prof. M. Santappa is a distinguished scholar and a scientist of international repute. He had a rich background of research and teaching experience. He was also the Head of the Department of Physical Chemistry of University of Madras. His main contribution is in the field of physical Chemistry and he has published a number of research papers in journals of international reputation and has groomed a number of Ph.D. scholars.

Prof. Santappa is a Fellow of the Royal Institute of Chemistry, the Indian Academy of Sciences, Bangalore and the National Academy of Sciences, New Delhi.

Prof. Santappa is also associated with a number of academic and research bodies. Prof. Santappa became the Director of CLRI on August, 1st, 1973. He is intimately connected with the problems, planning and organization of chemical and allied industries and actively involved with the research and development activities of the Institute. The winner of the prestigious Shanti Swarup Bhatnagar Award in Chemical Sciences in 1967, Prof. Santappa has made significant research contributions in the spheres of Polymer/plastics chemistry and technology, kinetics and photo chemistry, complexometry and the science and technology of leather.

Dr. N RAMANATHAN

Dr. N. Ramanathan M.Sc., (Distn.), Ph.D. (Mumbai), Ph.D. (Leeds) has become the Director of CLRI in 1981. He had a brilliant academic career and he joined CLRI in 1957. He served in various capacities and he has planned, organized, guided and conducted a large number of research and development projects on hides and skins, leather, leather fibres and footwear. He has guided a number of students for their doctorate degree. He has a number of original contributions on the structure and physical and mechanical properties of collagen fibres. Dr. Ramanathan was a founder fellow of the Tamil Nadu Academy of Sciences and he was fellow of the Indian National Science Academy.

He has widely travelled and worked abroad in Canada, USA, France, Germany, Sweden, U.K. and Japan.

Shri. T S KRISHNAN

Shri T.S. Krishnan took charge as Acting Director of CLRI from 1984. He obtained his B.Sc. (Tech.) in Leather Technology from A.C.Tech. Chennai after graduating in Chemistry. He underwent advanced training in light leather manufacture in France.

He joined CLRI in 1954 and was carrying out R & D work in developing processes for different types of exportable leathers under indigenous conditions. He made a substantial contribution to the Indian Leather Industry to switch over to finished leathers from E.I. and wet blue Leather.

He served as UNIDO Expert in Yemen. He also served as UNIDO Training Consultant in Tanzania.
Dr. G THYAGARAJAN

Dr. Gopalakrishna Thyagarajan is a doctorate in Organic chemistry with a post-doctoral fellowship from the University of California, Berkeley. He was a Visiting Scientist at the National Institute of Health, Bethesda, Maryland, USA. He completed a long scientific career in the Council of Scientific and Industrial Research (CSIR), India and headed three of its larger national laboratories: Regional Research Laboratory (RRL), now NEIST Jorhat, Assam; RRL (now Indian Institute of Chemical Technology), Hyderabad and the Central Leather Research Institute, Chennai.

During his tenure as Director CLRI, he initiated a number of programmes/projects and worked very closely with Indian Leather Sector. He made significant contributions in augmenting the research facilities in CLRI and guided several research programmes. He has served in high level government policy planning committees in India and advised international development agencies. He held the offices of Science Advisor to the Commonwealth Secretary-General and Secretary of the Commonwealth Science Council, London.

His fields of interest are chemistry and technology of bulk drugs and pesticides, technology forecasting, IPR issues, chemical safety and international science and technology co-operation.

Dr. R B MITRA

Dr. R. B. Mitra, a Ph.D. in Organic Synthesis & Chemical Technology became the Director of CLRI in 1988. His main contributions were in the fields of Organic Synthesis, Process Development and Organic Chemical Technology, Agrochemicals, Intermediates for Pesticides, Drugs and other Organic Fine Chemicals.

He has widely traveled and worked abroad in U.S.A., U.K. and Japan. His publications and patents include 70 Research Papers, 8 Technical Reports, 2 Scientific Books, 5 patents filed and developed 15 Processes.

He had many awards to his credit including Dr.K.G. Naik Gold Medal by M.S.University, Baroda and N.R.D.C. award for the best process developed for the insecticide ‘ETHION’.

Dr. K V RAGHAVAN

Dr. K.V. Raghavan, a Chemical Engineer, with a Ph.D. from IIT, Chennai. After working in IICT, Hyderabad (then RRL) and RRL Jorhat he joined CLRI during 1986 and then became Director, CLRI in February 1994.

He has initiated and developed two important R & D divisions Viz. Chemical Engineering and Cell for Industrial Safety and Risk Analysis.

During his tenure as Director, he made significant contributions for the growth of the Institute in terms of external cash flow and strengthening Institutes base as Technology Reservoir. He has published more than 75 papers and has received and several honours/awards and he has been conferred in many prestigious committees. He is currently the Chairman of the Recruitment & Assessment Centre (RAC), Defence Research Development Organization and also the Chairman of the Research Council of CLRI.

Dr. A B MANDAL

Dr. Mandal is a Ph.D. in Chemistry from Jadavpur University with a Post-Doctoral fellowship from the University of Saskatchewan, Canada. His contributions lie in the Development of methodologies and physico-chemical techniques for the characterization of micellar and reverse micellar systems involving collagen, peptides, drugs, synthetic and vegetable tanning materials and polymeric surfactants.

He is a recipient of several awards, the most significant of them being the Tamil Nadu Scientist’s Award and the B C Deb Memorial award.

He is a member of leading Academies, the most prestigious of them being: Fellow of the Indian Academy of Sciences, Fellow of the Royal Society of Chemistry, London and Fellow of the Indian National Science Academy.

He has published over a 100 research papers in leading national and International journals and has been a guide and mentor to many Doctoral students.

Dr. T RAMASAMI

Dr. Tirumalachari Ramasami obtained his Master’s Degree in Leather Technology and Doctoral Degree in Chemistry from Leeds, UK.

He is committed to the cause of science relating to technology, technology relating to manufacture and manufacture relating to society. The work culture instilled by him at CLRI earned it two major and landmark awards - Saving nearly 400 tanneries from closure through technology intervention and support from CLRI culminated in CSIR Special Technology Award, 1998. This is a landmark in the history of CLRI and the Technology Award in 1998 from the Third World Network of Scientific Organisations for outstanding S&T Innovations for Micro Enterprise Sector in Leather. CLRI was chosen as a model S&T organization in the Third World in 1998.

He has attained several recognitions in his academic and professional career, which include Gold Medal and Prizes at both Bachelor’s & Master’s levels from the University of Madras, Coleman Research Prize 1976 for best Doctoral Thesis from U.K., Shanti Swarup Bhatnagar Prize for Chemistry in 1993, Special Award of Honour from Indian Leather Technologists’ Association, Calcutta and the Rotary Club Vocational Services Award.

His personal research publications have led to important contributions in the chemistry and application of Chromium as well as understanding of ordering phenomena in molecular systems. He is fellow of all major academies of India.

He has been conferred the Coveted National Civilian Awards “PADMAASHRI” and “PADMA BHUSHAN” by the President of India for his outstanding contribution in the field of Science and Technology.

Dr. T.Ramasami, went on to be the Secretary to the Department of Science and Technology, where he championed many initiatives for nurturing science in our country.
Dr. SATISH R WATE

Dr. Satish Wate joined as a scientist and rose to the position of Director in August 2010 at CSIR-NEERI, Nagpur. Dr. Wate's areas of interest are Environmental Impact and Risk Assessment, Water Resource Management, Environmental Systems Design, Modeling and Optimization, Carrying Capacity Based Development Planning, Environmental Biotechnology, Wastewater Treatment and Environmental Materials for Field Applications. His major scientific contributions are in the areas of Environmental Impact and Risk Assessment, Wastewater Treatment and Environmental Biotechnology. He has designed and developed water safety plans with recourse to quantitative chemical and microbial risk assessment, greywater recycle plants in rural areas, wastewater treatment–cumm-recycle systems for oil containing wastewaters from drill site and processing facilities, assimilative capacity based standards for discharge of treated wastewaters in marine area, biosensor for detection of pesticides, molecular imprinting polymers for detection of polynuclear aromatic hydrocarbons, novel organo-lanthanide materials for environmental applications. He has successfully handled large number of projects with national and international agencies / organizations.

Dr. Wate has been nominated on various National Advisory Committees of Ministries. Dr. Wate has published about 80 research papers in international and 40 in national journals having high impact factor and presented about 130 papers in international and national conferences. He has contributed in ten books. He has been conferred Chemcon award 2014. He is Life member of many Professional Societies including Indian National Science Congress and Fellow of Institution of Engineers, Nagpur Chapter and Fellow of Maharashtra Academy of Science, Pune.

Dr. B. Chandrasekaran, Ph.D., has been appointed as Director, CSIR-Central Leather Research Institute (CSIR-CLRI) and took charge on 19th Feb 2016. Prior to this, he was a Chief Scientist of this Institute and has been associated with Leather Sector Skill Council (LSSC) as Chairman of the HRD Cluster of CSIR-CLRI in development of curriculum and vertical growth integrating the skills with levels of education. He is a Leather Technologist and specializes in Cleaner Production Technologies, Leather Education, Leather Product Design & Development, CAD Techniques for Leather Product Design, Organizational Development, Consultancy in R&D and Organizational Excellence. His expertise lies in Inter-Institutional Cooperation and Global R&D Consultancy. Dr. Chandrasekaran is the recipient of Kannammal Memorial Award for Holding First Rank in the M.Tech, Sulabh International Award and the AIMO Award. Dr. Chandrasekaran is the Project Coordinator for CSIR’s prestigious International Consultancy assignment in Ethiopia which focuses on capacity building of Leather Industry Development Institute (LIDI), Ethiopia and he is instrumental in negotiating for similar services in the metal and engineering sector in Ethiopia. Dr. Chandrasekaran’s strength lies in networking of all educational institutions in the country offering degree, diploma and certificate level courses for strengthening their infrastructure and standardization of the curriculum for academic and vocational programs paving way for “Make In India” Project of Govt. of India.
One can go on and on with narration of many more achievements. Suffice it to say that the CLRI was always ready to read the needs of the industry and come up with appropriate responses.

LERIG, Leather Research Industry Get Together, an annual three-day event of CLRI, has become a very popular occasion when the industry from all over the country converges in CLRI for not only learning about new research results but also discuss its current problems. The popularity of LERIG is an indication of CLRI’s close linkage with the industry.

CLRI is now led by young Director, Dr B Chandrasekaran and I learn that the Top Ten Executives of CLRI (Chief Scientists) are all Leather Technologists. The Industry could not ask for better. The need of the hour is for this Team along with the Director to understand the needs of the Indian Leather Industry and work hand-in-hand to continue to render useful service to the industry in the years ahead.

I congratulate CLRI on its glorious seventy years ‘commemoration’ celebrations and I wish the CLRI all success in its future endeavours.
Council of Scientific and Industrial Research

75 Years of Cutting-edge Science & High Societal Impact

When multinational companies held monopoly over baby food and refused to part with the process for manufacturing baby food, scientists from the Council of Scientific and Industrial Research (CSIR) developed a formula for manufacturing baby food from buffalo milk for the first time in the world. Denied a supercomputer for research purposes, CSIR scientists took up the challenge and came up with India’s first parallel processing computer—the Flosolver. And when it was time to give a push to the country’s Green Revolution, CSIR came up with the country’s first indigenous tractor.

Whether it is the first complete genome sequencing of an Indian or development of the first indigenous two-seater trainer aircraft, or for that matter, pioneering the DNA Fingerprinting technology in the country, the Council of Scientific and Industrial Research (CSIR) has always been at the helm of Indian science.

Initiatives and interventions of the scientists of CSIR have galvanized several sectors ranging from agriculture to floriculture, pharmaceuticals to medical diagnostics, chemicals to petrochemicals, oceanography to aerospace, roads to buildings, and energy to the environment.

Established on 26 September 1942, the Council of Scientific and Industrial Research (CSIR) is an autonomous society whose President is the Prime Minister of India. One of the largest R&D networks in the world, CSIR has today grown into an ensemble of 38 National Laboratories.

CSIR has been conducting cutting-edge science in the areas of energy and engineering, mining and minerals, generic drugs and chemicals, aerospace and other areas of strategic concern. At the same time, interventions of CSIR labs have also brought smiles to the faces of millions across the country through provision of safe drinking water in fluoride-affected regions, protective shelters in cyclone and tsunami affected areas, earthquake-resistant buildings, new plant varieties and agricultural packages that have greatly increased farmers’ incomes, and low-cost technologies for roads and houses in villages.

In the year 2015, CSIR featured in the Thomson Reuters top 50 Indian Innovator companies and research organizations. And in 2016, CSIR has been ranked 12th among the world’s top 20 public-funded R&D Institutions by the prestigious SCIMAGO Institution Rankings.

On the occasion of the CSIR Platinum Jubilee Celebrations, we present some of the stellar achievements of CSIR laboratories in the form of 18 Theme Publications, broadly covering the myriad products, processes and technologies brought out by the CSIR during the past 75 years.

This Theme Publication under the CSIR Platinum Jubilee Celebrations has been put together and brought out by the CSIR-NICSAIR, New Delhi

With active support from the CSIR Platinum Jubilee Celebrations Secretariat Unit for Science Dissemination, CSIR HQs.

With a rich history of over six decades, CSIR-NICSAIR has today come to occupy a leadership position in the area of scholarly and public communication of science and technology. It has assumed the status of the largest institute engaged in science communication in the country and perhaps the only institution of its kind in Asia.

Uniquely placed, CSIR-NICSAIR has carved out a niche for itself over the period by bringing out 18 peer-reviewed research journals covering major disciplines of science and technology ranging from physics to radio-physics, chemistry to chemical technology, experimental biology to biotechnology, and intellectual property rights to traditional knowledge and so on.

Realizing that for knowledge to be really useful it needs to be communicated and disseminated to the masses in a language they can understand, CSIR-NICSAIR has also tremendously contributed towards it by publishing popular science magazines and books as well. It has been publishing three highly valuable and largely circulated popular science magazines—Science Reporter (English monthly), Vigyan Pragati (Hindi monthly) and Science Ki Duniya (Urdu quarterly)—for over half a century.

CSIR-NICSAIR’s monumental encyclopaedic series, The Wealth of India, covers India’s raw material resources, be it plant, animal or mineral. It is a ready reckoner for researchers, entrepreneurs, plant-based industrialists, policymakers, and science enthusiasts.

CSIR-NICSAIR moves forward with these and has also undertaken a variety of innovative activities in science communication including research, academics, and societal programmes, etc.

A crusader for science communication in the country, CSIR-NICSAIR embraces a wide spectrum of stakeholders ranging from students and teachers to scientists and professionals, from civic and statutory bodies to decision-makers and policymakers, from industries and research institutions to even farmers and laymen.

The Theme Publication is an effort towards taking the messages of science to a large cross-section of society and reach out to the masses.

Dr. Manoj Kumar Pataiariy
Director, CSIR-NICSAIR
Foreword

In presenting this theme publication on Leather, CSIR traces the growth of the unique trinity partnership between academia, research and industry. By serving as the Department of Leather Technology for the University of Madras and now the Anna University, CSIR through its laboratory, the Central Leather Research Institute (CLRI), develops skilled manpower required for the sustainable development of the leather industry.

That the leather industry has grown from exporting about Rs. 800 lakh worth of raw hides/skins and semi-finished leather in 1944-45 to USD 5854 million in 2013-16 has to be attributed to the technologies imbibed by this industry. The transition to an industry manufacturing high quality leather and customer-desired products has not been easy.

Several paradigm changes had to be adopted bringing in sustainability and value addition. In this process, the role of CSIR-CLRI as a technology innovator and developer, demonstrator and translator, and policy framework advisor has been phenomenal.

While CSIR is celebrating its Platinum Jubilee year, CSIR-CLRI also looks forward to a much greater role—one of transforming itself into a worldwide hub for technology and education, science provides to the international leather and leather products industries apart from sustaining its leadership role in leather research and Education, a process through which it would bring in global leadership for Indian leather.

Dr. B. Chandrasekaran
Director, CSIR-CLRI

Historical Perspective

IKE most other industries in India under the British Rule, the developments in leather industry also began after the outbreak of the First World War (1913-14). Even before this, there have been occasions in history when foreign tourists have remarked well about the quality and variety of Indian leather articles.

The history of Indian leather starts with a Dalit community of a village, who employed primitive methods of making leather and leather goods. Most of the village tanners collected the hides themselves, and after paying sold the better ones to traders and processed the lower grades themselves. These lower grade leathers were then converted into articles like drums, musks, laces, ropes etc.

Modern tanning was introduced to India in 1857 by the English and the French. The harness and saddlery factories was established in Kanchipuram by the British India Corporation in 1860 to supply boots and other equipment to the Government. Chrome tanning was introduced in 1885, with the first commercial version launched in Pudukkottai, Tamil Nadu, in 1903.

By 1913, there were 22 large-scale units, of which 17 were in Madras. India was a predominant raw hides/skins exporter with the Dutch exporting from India way back in 1644. After two world wars, the development of chrome tanning led to the growth of the tanning industry in India. Products for the British Army were the priority. The export from India—predominantly as raw hides/skins and semi-finished leather—was around Rs. 825.86 lakh in 1944-45.

The Father of the Nation, Mahatma Gandhi, remarked in his book India of My Dreams that "an estimated rupees nine crore worth of raw hideskin is annually exported from India and much of it is returned in the shape of manufactured articles. This means not only a material, but also an intellectual drain. We miss the training we should receive in tanning and preparing the innumerable articles of leather we need for daily use."

Just before independence, in 1948, Sir A.L. Mudaliar proposed the concept of the Central Leather Research Institute (CLRI). CSIR founded CSIR-CLRI in 1948 and with the efforts of Sir A.L. Mudaliar it also doubled up as the Department of Leather Technology of the University of Madras. At the time when the institute started its work, the leather sector had limited access to technologies and products of industrial research from other countries. After the establishment of CSIR-CLRI, and more in the thirty odd years from 1948 when the technologies were less mobile, the partnership of academy, research and industry developed through the University of Madras, CSIR-CLRI and Indian leather industry performed loud and clear.

The role of CSIR-CLRI in scientific industrial research of India is much focused and over time has kept pace with the changing needs of a growing industry. Enabling a transformation from semi-finished to finished leather and leather products manufacture in the 70s, to bringing in self-reliance in leather chemical manufacture in the 80s, moving the industry towards technology-driven rather than material-driven through a modernized outlook in the late 80s and early 90s and averting a major industrial catastrophe through technological changes during the late 90s were some of the major peaks in the institute's and the industry's history.

The new millennium also brought in the concept for a paradigm shift, from chemical to bioprocessing of leather and greener technologies. Enzymes in the place of chemicals for unharding, fibre opening and degreasing were introduced in the new millennium. Concepts of zero liquid discharge, manufacture of value-added products from wastes, enhancing the unit value realization from leather through niche products such as children shoes, comfort shoes, foot-care solution. Ergonomic designs are
The Leather Post

Keeping a Close Watch on Raw Material Availability

On behalf of the Ministry of Commerce and Industry, Government of India, the CSIR-CLRI, Chennai, conducts nationwide survey on the availability of raw hides and skins. The broad objective of the survey is to develop a comprehensive database on the availability of raw hides and skins for the Indian leather industry.

In the years to come, a transition from water to waterless processing, reducing the time of processing and a greater coupling with leather-like materials and use of alternative sources such as chicken feet and fish skin is likely to be adopted by the industry to remain sustainable and gain more value from Indian leather. And CSIR-CLRI is gearing up to meet these challenges too.

During the survey, 100 markets were also covered. The details of transactions – arrivals, size and weight ranges, prices, movement etc. – were presented separately.

Hides and skins are mobilized through a market channel from the primary source. In the process, a well-knit market network is born. There are hide and skin markets spread across the country in the form of regular and periodic markets. Hapur (U.P.) for hides and Tiruchengode (Tamil Nadu) for skins are prominent weekly markets. The markets of Sholapur, Kanpur and Kolkata are large and regular.

As a part of this exercise, a Directory of Raw Hides and Skins Dealers was prepared which is a starting point for all new entrepreneurs entering the leather market.

Based on the inputs from the All India Survey on Hides and Skins, CSIR-CLRI has developed a statistical model for predicting the Indian livestock population, thereby estimating the availability of hides and skins. A software (LVISOFT) for the prediction of raw material has been developed, which an industrialist can make use to guess the availability of raw materials for better planning.

Prediction of raw hide availability is important to see where the industry is progressing. As part of the TIFAC Technology Vision 2025 – Technology Roadmap for Manufacturing Sector, CSIR-CLRI has predicted that in 2025 the global availability of cattle would be around 1711 million, buffalo around 266 million, goat around 1126 million and sheep around 1254 million. From the trends, CSIR-CLRI has predicted that the Indian leather industry needs to pitch on technology as a driver rather than the non-controllable factors such as raw material, access to market, labour, etc. to lead its production.

Enabling Transition from Semi-Finished to Finished Leather & Leather Products

The Indian leather sector during 1948-63 was primarily engaged in export trade and processing of intermediates. Technology addition to leather processing was a vital need. Several new initiatives to build a technology partnership between industry and the institute were taken. The partnership has today enlarged into the trinity of academy-research-industry.

The Indian leather industry underwent major structural changes during the years 1964-1979. The Government of India constituted a committee in 1972.

A policy decision was taken that India would not export raw hides and skins as well as leather intermediates. Manufacture and export of finished leather were encouraged. Technologies of CSIR-CLRI for leather processing found greater demand and use in the industry. Technologists trained from CSIR-CLRI formed the foundation for absorption of technologies.

The Tanners Get-together (TGT) in January every year (starting from 1965) formed the basis for providing research directions. The get-together also provided a forum for technology demonstration. The restrictions on semi-finished leather exports were foreseen and the TGT of 1966 to 1971 demonstrated the technologies relevant for heavy leathers, chrome tanning, vegetable tanning, dyeing and finishing, preparation of crust leathers and specialty leather and leather products. The TGT of 1974 ensured that the apprehensions of tanners were completely eliminated through a discussion and demonstration on technologies for finished leather, footwear and leather goods industries.

Development of indigenous technologies for manufacture of leather auxiliaries, including the setting up of a pilot plant at CSIR-CLRI formed the basis of R&D in the 70s. The first set of indigenous fat-liquors were developed and delivered. Process standardization of vegetable tanning materials, tanning process and the manufacture of heavy leathers such as industrial belts, saddlery etc., gained importance and commercial acceptance. Manuals on technology controls in leather manufacture (1980), aniline leathers (1984), hair-on-leathers (1985), industrial leathers (1985) etc. brought out by CSIR through the National Information Centre on Leather (NICL) ensured that the Indian leather industry had the most updated information for manufacturing finished leather and leather products.

A specialized programme on sports goods leathers was launched for the tanners in Jalandhar in the 80s. In the 90s, process control and modernization of Indian leather industry was initiated through funding from the World Bank. With technology support from CSIR-CLRI, the Indian leather industry could realize better product consistency, minimum rejections, better manpower utilization, reduction of wasteages and high productivity.

2D and 3D CAD systems were introduced for conceptual designing and engineering and grading of upper and bottom parts needed for styling.
In order to enhance the design capabilities of the Indian leather product manufacturers, CSIR-CLRI initiated a programme called CSIR-CLRI India Design Club. Launched in 1994, the Club serves as a window to international fashion.

To promote entrepreneurship in leather products and leather goods, e-learning courses have also been introduced through CSIR-CLRI.

Bringing Paradigm Shift from “Don’t To Do-Ecology”

Achieving environmental friendliness in a cost-effective manner through coupling of end-of-pipe treatment and implant process control has been demonstrated to the Indian leather industry. The concept called Do-how involved the development and demonstration of a basket of technologies that were: a) easy to apply, b) could bring in quantifiable reduction in pollution load at lesser cost of treatment, c) reduction in material cost owing to reduced usage and d) reduction in cost per litre of waste water treatment.

Reduction of Pollutants at Source: Through In-Process Changes

Technologies for reduction of total dissolved solids:

The contribution of neutral salts to tannery wastewater originates from the salts used in short-term preservation of raw hides/skins by the abattoirs and primary sources, processing inputs by tanners and those formed during processing on account of the pH alterations employed in leather manufacture. Ambient preservation of hides and skins at room temperature at 60-65% moisture content has been developed.

These methods employ either bio-preservation or use of natural products in place of common salts. Silicates in the form of silica gels have been employed in the preservation of hides and skins without the use of common salt. In-house efforts on alternative curing strategies have led to standardization of methods for neem oil formulations, salts of organic acids, magnesium oxide and chilling methodology.

Although there are several technological alternatives to the conventionally employed sodium chloride based preservation methods, their utilization in the field is low due to several technical and socio-economic factors. However, desalting of raw hides/skins stock in tanneries has led to a reduction of 15% load of TDS at the solar pans in the treatment plants.

This solution is being adopted in a number of tanneries in Tamil Nadu. Enzyme-assisted dehairing and use of better quality lime in tanneries have led to significant reduction in TDS, (~15%) loads. Segregation and recycle technologies for pickle and chrome tanning liquors offer a possibility to reduce about 10% of TDS load in composite tannery wastewaters.

Technologies for the reduction of biological and chemical oxygen demand (BOD and COD):

It has been possible to reduce the emission of BOD and COD
Establishment of Centre for Salt-free tanning under UNIDO-CLRI partnership

CSIR-CLRI has played a pivotal role in secured water management in leather processing through recycling methodologies in soaking, liming, pickling and tanning. Direct pickle liquor recycling and direct chrome liquor recycling systems have been implemented in commercial tanneries, reducing water usage to less than 6 litre per kg of raw material processed. Water recycle and reuse method based on zero wastewater discharge from beam house has been developed where water consumption is reduced from 17 to 1.7 L for one kilogramme of hide processing. By coupling appropriate in-plant control with reuse techniques, a zero-liquid discharge methodology for the leather industry has been developed.

Technologies for complete elimination of chromium in tannery wastewaters:

Chromium (III) salts are extensively used in tanning. The commercially available salts and methods lead to an uptake of about 40-70% of the material employed for tanning. Poor

Optimization of inputs of lime, sulfide, sulfates and common salt and chrome tanning salt enable the reduction of BOD and COD loads through in-process changes.

Technologies for zero discharge leather processing:

Enzyme-based dehairing and fibre opening

Concept of zero liquid discharge demonstrated to Indian Leather Industry

Technologies for reduction of sulfide load in tannery wastewaters:

It has been possible to employ the commercially available enzymes to replace 50-60% of sodium sulfide loads required for loosening hair from the hide/skin. This leads to a net gain of 2% increase in area of leather in several cases. Such an increase in area could well compensate for increased cost of enzyme used for dehairing. Reduction of sulfide concentration in tannery wastewaters by about 50% reduces the cost of end-of-pipe treatment of tannery wastewater by about 8-10%. This has now been achieved by a number of tanneries in Tamil Nadu. Enzyme-based lime-free dehairing and fibre opening can be used for goat, sheep, cow and buff calf.

The commercial viability of the technology for vegetable and chrome tanning has been demonstrated successfully. Bio-based leather processing ensures reduction in chemicals, process time, water, power, solid and liquid wastes too. A cocktail enzyme formulation that can completely eliminate use of lime and also hasten the process has been developed. The technology received the CSIR Technology Award in 2015.

Technologies for complete elimination of chromium in tannery wastewaters:

Chromium (III) salts are extensively used in tanning. The commercially available salts and methods lead to an uptake of about 40-70% of the material employed for tanning. Poor
utilization of chromium leads to environmental problems.

Although chromium is an essential trace element, it can be toxic when the concentrations are large. Therefore, an integrated chrome management approach has been developed and implemented, which increases the uptake of chromium during tanning by nearly 95-99% thus reducing chromium levels in the waste. Chrome recovery/reuse technologies suited for small to large scale industries have been implemented with high success. Chrome recovery/reuse methods have become financially attractive for tanners due to payback period of 1-2 year. More than 100 such plants have been installed all over the country.

Cleaner chrome tanning methods based on high exhaustion principle have also been evolved. Closed pickle-tan loop methods based on ethanolamine as well as aluminium based tanning salts are also developed. Exhaust aids for chrome tanning based on polyamides, protein hydrolysates, poly carboxylic acids and other organic additives have been introduced as a mitigation methodology. Economic benefits of such methods are now established. Saving in post tanning chemicals has been demonstrated in many tanneries in the country. Closed pickle-tan loop method affords a net saving of Rs. 2000/- per ton of leather processed. These technologies offer a secure means to practically eliminate the problem of pollution due to chrome based tanning methods. Eleven such chrome management systems have been established under the Leather Technology Mission project.

A salt-free, zero-chrome tanning technology developed at CSIR-CLRI introduced the process of chrome tanning at high pH with masking. Suitable for all substrates and product mix, this technology found acceptance in various leather clusters. A UNIDO-CSIR-CLRI centre for salt-free tanning was established to propagate the technology.

A concept of dry tanning, wherein chrome tanning is carried out in the absence of water has been developed and demonstrated at industrial scales. This process not only avoids use of water but also eliminates the preceding step of pH reduction through acid in the presence of salt added to prevent swelling.

A parallel strategy effectively uses the water inherent in skin. It has been found that the quality of the leathers processed without process water (0% water) was similar to the conventionally processed leathers. Further, it generates near zero waste in chrome tanning and avoids pickling and basification operations thereby enabling reduction in TDS. In addition, significant savings are achieved in water, time, energy and processing cost. This technology has been demonstrated at commercial scale both at Erode, Tamil Nadu, Kolkata, Jalandhar and Kanpur, UP.

Chromeless tanning technologies such as plant oil mediated vegetable tanning, chrome free/mineral free tanning for upholestry leathers have all been developed in recent years and demonstrated to the industry.

Better process control and improved devices:

Conventional leather processing involves manual and wet operations. This leads to:

(a) excessive use of chemicals and water; (b) improper utilization of manpower; (c) inaccurate measurement of process variables; (d) non-uniformity of quality of leathers and (e) generation of large-scale effluents.

Micro-process controlled systems such as computer-assisted chemical addition system (CACAS), computer-assisted water addition system (CAWAS) and computer-assisted pH monitoring and controls system provide saving of chemicals and water inputs of 25% and 10%, respectively. Consequently, the overall pollution load can be reduced by 10-15%. An online method for determination of pH and temperature of the process vessel has also been developed.

Demonstration of Do-Ecology Solutions in Leather Sector in Tamil Nadu:

In the wake of the order of the Supreme Court of India on controlling tannery wastes, nearly 400 tanneries in the Tamil Nadu state faced closure. CSIR-CLRI and CSIR-NEERI (National Environmental Engineering Research Institute, Nagpur) worked with the tanning industry in Tamil Nadu to make them cleaner. Although further improvements are required, there has been a significant impact due to adoption of cleaner technologies in the leather sector in Tamil Nadu.

It has also been demonstrated that a tannery with a production capacity of 2000 kg of hide/skin per day can save Rs. 1.4 million per month by adopting these cleaner technologies. There is now need for a National Movement on cleaner production in the Indian leather sector. A sector-specific action plan for pollution prevention and control in the leather industry has been prepared at the behest of the Ministry of Environment and Forests, Government of India. The implementation of the action plan will pave the way for further drastically minimizing environmental risks from tanning sector to near-zero values.
Leather Products: Ensuring Customer Satisfaction

INDIA foresees a need for growth of the leather sector as it generates employment, has high domestic value addition and a large rural population devoted to ethnic product manufacture. Industry requires an additional 2 billion square feet of leather in the next five year, which can only be met either through import of raw material or value enhancement to the available material.

There is also a need to address the technology challenges to sustainable development, such as fluctuations arising out of need for compliance to economic norms, customer preferences for hi-tech materials, designs, etc., and proactive. In partnership with the footwear industry, CSIR-CLRI (CSIR Central Leather Research Institute) has been able to capture the foot dimensions of children and based on statistical analysis has identified five distinct size groups for children’s feet dimensions. Shoes have been designed using special eco-friendly leathers and designs suited for school children, which allow natural foot growth and natural foot function.

Footwear suitable for low risk diabetic patients based on aspects such as a specially derived angle of slant in the sole to give rocker effect essential for offloading pressure from the plantar surface of feet has been developed and is now commercially available as Diastep.

‘Fashion Forecasting’ for Leather

In a globalizing economy, design is perceived as a new engine of economic and industrial growth. Design and breakthrough innovations can play a pivotal role in positioning of Leather and Leather Product industries in the global arena by value addition apart from enhancing competitiveness.

Leather has emerged as a fashion product. Colour, texture and other highlights add to the fashion values of creatively designed leather products. These add significantly to the value realization from leather products. To emerge as a strong global player in the world leather trade, all efforts to take proactive measures to be ready with the fashion leathers when the fashion does emerge, is crucial. Success in being able to work with high-end customers requires building design capabilities that enable us to offer exciting collections that can compete internationally.

Travel of INDIA in ‘fashion forecasting’ for leather is an initiative to bring to the fore the ability of the Indian leather industry to take proactive measures in fashion forecasting and design development by providing scientific leather product development focus in the areas of colour forecasting, range building, design and retail analysis.

The outcome envisaged is to strengthen the Indian leather product design capabilities, which would be reflected in product quality enhancement.

How have we ‘WALKED’ our ‘TALK’...?

Getting one Indian colour into the MODEEUROP Colour Card in 1994 was a matter of prestige. MODEEUROP is an International Institution founded in 1960 in Zurich, Switzerland by the most important institutions of the leather and footwear industry. MODEEUROP forecasts fashion and trends in Leathers, Colours and Materials for the International market, three seasons ahead. India is a member of MODEEUROP since 1994.

Today, we have almost 70-80% of the colours chosen from Indian proposals. The challenge and opportunity today is to capitalize on the winning colours and translate them into fashion products. GLOBAL COLOUR SHADE CARD is first released in India giving a tremendous lead time over the competition.

The potential of India was recognized and it was conferred with the Presidency of MODEEUROP recently. The official MODEEUROP Colour Cards are now ‘Made in India’ with suitable acknowledgements to the contribution of CLRI/CLEP as well as to the contributing tanners, thereby enhancing the marketability of Indian Leather in International markets.

The MODEEUROP initiative has been very successful in captivating India into the forefours of fashion.
Technology Translation on a Mission Mode: Leather Technology Mission (LTM)

An exclusive programme launched for a particular manufacturing sector, the leather technology mission (LTM) commenced in 1995 January. LTM aimed at development of a technology-driven development grid integrating the needs of decentralized as well as organized sectors. This was a mission led directly by a research institute.

Over a period of four years, the project commissioned 170 projects in 17 states. The project networked CSIR with NGO's, industry associations, academia, user ministries, KVICs, state government agencies, etc. Technology initiatives such as resource augmentation through programmes like establishment of carcass recovery centres, animal health care systems, engineering inputs to leather industry, design engineering packages for leather complexes, cleaner technologies implementation, chrome management, innovations in HRD and skill upgradation at grassroot level were carried out. The major outcomes have been the establishment of fallen carcass recovery units, HRD at the grassroot level including developing audio/visual tools, process/quality manuals, etc., reducing the time for producing ethnic footwear in areas such as Athani, etc.

LTM REGIONAL COVERAGE

Projects implemented under LTM in different places

Total no. of projects: 170

New Millennium Indian Technology Leadership Initiative (NMITLI): Bringing in Paradigm Shift from Chemical to Bioprocessing

The making of leather is an age-old process. A large number of the processes involve ‘do-undo’ operations resulting in severe environmental pollution. The world is compelled to follow this highly polluting ‘Chemical Route’ in absence of any alternative. This was a great challenge before the scientific community.

Under the NMITLI programme, a paradigm shift has been brought about in leather manufacture through bioprocessing. World-class leads have been obtained for an environmentally friendly bioprocessing route for ambient preservation of skin/hide, enzyme-only dehairing and defleshing.

In the first phase, credible technology leads have been obtained for lime/sulphide free removal of hair and salt-less preservation of hides/skins. During the second phase of the project, commercialization of the leads gained has been targeted. In order to enable commercial level trials, bulk production of enzymes is essential. CSIR-CLRI has initiated a new model of operational leasing of upscaling facilities for bulk production of enzymes from vendors.

Specific technology packages for the above are being developed with the user industry for commercialization. The development is poised to change globally the face of a highly polluting industry forever.

A true pan-India network of research institutions and industries, the output of this project is likely to translate into...
Namami Gange

The National Ganga River Basin Authority has started a Clean Ganga Mission with a comprehensive approach towards wastewater management, solid waste management, industrial pollution and river-front development. CSIR-CLRI would be working with the leather industries in Jajmau area, where the Central Effluent Treatment Plant (CETP) in Jajmau would be upgraded along with technology support for the industries in setting up primary treatment facilities.

Safeguarding Ganga
Secure landfill & anaerobic digestion
Designing of CETP to meet needs with ZLD
Collection & conveyance system

Scope for cost reduction based on implementation of implant benign technologies

Downsized Technologies for Grassroots

Leather links the rural farmer with the global fashion market in India. About 2.5 million people are employed and >85% of leather produced is exported. Leather is a case of rural production for global consumption. The Leather Technology Mission and Human Resource Development Mission implemented by CSIR-CLRI have played a key role in rural development through technology downsizing for viable collection of fallen animals for a capacity of 3-4 animal/day and with tools for making the process of flaying clean and defect-free, increasing the productivity of village tanning process through saving in time (from 35 days to 15 days), increasing yield from 30% to 40%.

Innovating 280 new designs for ethnic Kolhapuri footwear and process standardization for product consistency are some of the important contributions of CSIR-CLRI, which have had a societal impact.

Empowering the SME sector in leather compliant to environmental regulations and requirements and restoring operations in closed tanneries in semi-urban and rural populations in Tamil Nadu has led to saving of 2.5 lakh jobs.

Kolhapuri – Taking traditional Indian footwear to the world elite:
Kolhapuri couture, the nouveau adaptation of the Kolhapuri, the traditional handcrafted footwear, emphasizing ethnicity and the natural finish, is the product of labour of an entire family – men preparing the bottom soles and women crafting the inner sole and decorative uppers. The ubiquitous Kolhapuri has been adorning the feet of women and men on the move for centuries. Painstakingly created, the Kolhapuri offers a unique blend of rustic ruggedness and charm of a well-honed craft.

Once exported to Europe, the Kolhapuri had lost its pride of position, as it tended to be characterized by non-standard and varying workmanship, resulting in a gradual impoverishment of the artisans. A revolution for evolution of couture from the humble Kolhapuri was considered essential by CSIR-CLRI.

A systematic improvement in the skills and overall economic and social well-being of the families in the Athani-Nippani belt in a holistic way was planned and made. The product required overhaul in image with respect to standardization, design and quality for greater acceptance and wider outreach.

Synergistic efforts of CSIR-CLRI, NLDP and ASCENT in this project yielded very beneficial results, which included training for hundreds of families, standardization of patterns using lasts and templates, improvement in the quality of the leather and use of other alternative materials, interfacing of design innovation, standardization of methods of manufacture and improvements in productivity.

The key to lasting success lay in the development of a market link with quality conscious buyers who would be willing to pay better prices. A large variety of designs evolved and the products were showcased in various fairs in India and abroad. In the GDS fair Dusseldorf, Germany, itself orders worth US $30000 was finalized.

Strategic Expansion of Carcass Utilization for fallen Carcass Recovery from villages (SECURE):

SECURE is a project of societal value to CSIR-CLRI. Earlier experience has shown that downsizing of technologies is essential to meet the needs of decentralized production base. Flaying of carcasses does not attract youth in villages on account of poor work hygiene. The solution to the problem needed a techno-social innovation.

Sam Setier of UNIDO had developed a device for flaying carcasses with improved work hygiene. Static Flaying Frame (SFF) device has been adapted to suit local conditions of villages in Rajgarh district, Madhya Pradesh. A mobile carcass recovery and flaying technology has been designed and field evaluated. A district level mission on carcass recovery using modern engineering inputs has been launched.

Programmes for the North East:

Although the North eastern region of India occupies only 7.8% of the total geographical land area of the country, it has the highest diversity of bioresources and ethnic people and is a rich repository of indigenous knowledge systems. The identities of the ethnic group are unique in character and are deeply intricate with the social and cultural life of the people.

Handmade items such as textiles/fabrics, bamboo and cane and other craft items are reflected in the identity of each ...
Although the diverse ethnic people of the whole northeast India have a very rich, unique and diverse knowledge system related to craft and textile, handloom and handicraft items, these designs and products have not yet been able to come to the limelight, entering bigger markets and converting into wealth and economy. The products produced indigenously are unable to reach the markets due to their inferior quality, lack of aesthetic appeal and lack of proper planning, standardization and market channelization.

This initiative not only promoted the ethnicity of the local people but also helped in boosting the economy and lifestyle of the ethnic people. Promotion and development of ethnic designs enhanced the morale and lifestyle of the womenfolk because women are mainly associated with this activity.

<table>
<thead>
<tr>
<th>Children in burns ward of General hospital, Kumbakonam received collagen dressing</th>
<th>Static Flaying Frame on a mobile carrier</th>
</tr>
</thead>
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Wound Dressing Material for the needy:

Eighty-three children aged between eight and ten years were charred to death on 16 July 2004, 20 of them beyond recognition, while over 27 others received serious burns when a major fire raged through their school in Kumbakonam of Tamil Nadu’s Thanjavur district. The collagen sheets developed by CSIR-CLRI were put to good use in treatment of burns sustained by school children. Twelve children admitted to the burns ward of the General Hospital, Kumbakonam received treatment with the collagen sheet developed by CSIR-CLRI.
Enabling Indian Leather Industry through National Level R&D Facilities

Center for Analysis, Testing, Evaluation and Reporting Services (CATERS):

CENTER for Analysis, Testing, Evaluation and Reporting Services carries out research & development in the field of analytical sciences and provides value added services in the form of chemical testing for leather, leather accessories and leather chemicals and physical testing for leather footwear. Activities include:

a) Development of remediation and preventive measures for harmful chemical substances;
b) Development of test procedures for restricted chemicals;
c) Quality control testing for leather, leather products and leather auxiliaries and

d) Trace level analysis of restricted substances in leather and leather products.

Centralized Sophisticated Instrumentation Facility (CSIF): CSIF at CSIR-CLRI houses a state-of-the-art facility with latest equipment to handhold both researchers and industry, providing them appropriate testing and technical assistance, meeting their research needs in a timelbound manner.

Nuclear Magnetic Resonance (NMR): The primary interest of the NMR Lab at CSIR-CLRI is the application of magnetic resonance (NMR/EPR) from small to supramolecular systems to understand the structure-dynamics relationship of leather. The lab is equipped with sophisticated NMR and EPR facilities namely, high resolution 400 MHz solution-state NMR (AVANCE-III-HD NanoBay, BRUKER), 400 MHz solid state NMR (AVANCE-III-HD, WB, BRUKER), 500 MHz solution-state NMR (ECA-500, JEOL), X-band CW EPR (BRUKER).

Pilot plant: The chemical engineering pilot plant facility is available to standardize the manufacture of leather chemicals and other auxiliaries. It has two sections namely bench scale facility and pilot scale facility.

Fermentation plant: The upscaling facility established under the NMITLI program in 2008 has completed eight years and a number of clients from industry and academia have been using the facility to a significant degree including for in-house projects.

Solid State Fermentation (Koji) Incubator Centre: Solid state fermentation (SSF) can yield cost-effective and scalable technologies for a wide variety of industrial enzymes and organic acids used in food, textile, paper, leather or other agro industries. GAIT Analysis Lab: Gait is the medical term to describe the way that we walk. Many elements of the neuro-musculo-skeletal system interact to enable human walking. Every individual has a unique gait pattern. Any deviation from the normal gait pattern can be diagnosed by Gait Analysis. CSIR-CLRI has a state-of-the-art Gait Analysis Laboratory, which enables research on development of customer centric footwear.

Extension Centres: The regional centres of CSIR-CLRI at Kanpur, Kolkata, Jalandhar and Ahmedabad act as dissemination arms of the institute to propagate technologies and also provide technological solutions and troubleshooting for the industries in the region.

Recognitions for the Institutional Support for Leather Sector

International Recognitions
- TWINSO prize 1998 for S&T innovations in micro enterprise leather sector
- UNIDO commemorative medal for implementation of cleaner technologies
- AISHTMA Platinum Jubilee award for environmental technologies
- Organized the first ever congress of International Union of Leather Technologists and Chemists Societies in Asia at CSIR-CLRI during 1999
- Two-phase Benchmarking Program for Technology Upgradation in Ethiopian Tanneries during 2011-12 on consultancy mode
- Twinning program to capacitate the Leather Industry Development Research Institute (LIDI), Ethiopia (2012-17)

Landmark Events
- First ever meeting of the Medeurope Congress for fashion forecasting of leather colours outside Europe at Chennai on 30 January 1999
- Leather Technology Mission for societal impact, 2000-2005

- Technologies for rural development and women empowerment, 2002-2012
- Industrial development of the leather sector (ILDS) as a next phase for tannery modernization 2002-2017
- International consultation on Technology and Environmental upgradation of Indian leather sector, 2001
- Expanding the institutional capabilities in environmental management globally, 2010 onwards
- Benchmarking of Ethiopian tanneries against global best, 2010-2011
- National monitoring unit for skill assessment and up gradation 2012-2017
- Capacitating Leather Industry Development Institute, Ethiopia, 2012-2017
Dr AL Mudaliar argued for CLRI being located in Chennai where an university and flourishing industry coexist. Dr Y Nayudamma receives Dr Mudaliar to give a tour to the first ever Indian leather fair at CLRI campus in 1964. Shri Sankaran, Indian Leather and Shri Nagappan accompany. It is a company of Academy-Research-Industry. A mighty alliance

Dr Y Nayudamma (Research), Prof. GS Laddha (Academy) and Shri Nagappan (Industry) in close company – discussing means to strengthen an alliance probably!
Pandit Nehru in 1958 sees how leather is made

"Tie from Leather as is made" viewed by Smt Indira Gandhi, 1976 while inaugurating leather goods training centre

Prince Philip receiving briefing from Dr Nayudamman

Leather from frog skin! President Nasser at CLRI in 1960

Rose Made of Leather! Wonders Pandit

Pandit Nehru unusually seated; Is all ears about leather (1958)
A wholesome five on a race with Science
Dr. Nayudamma, Prof. Govindachari,
Prof. Swaminathan, Prof. CNR Rao and
Prof. Natarajan at TGT 1963

Sir CV Raman (seated fourth from left) during the inauguration of CLRI

Visitor of value to Microbiological lab.
Prof. MS Swaminathan visits the lab,
Dr SC Nandi briefing and Dr N Ramanathan
looks on in 1976

Prof. Humayun Kabir,
Union Minister for
Education inaugurating
the electron microscope.
Dr N Ramanathan
explaining the
microscope to him, 1962

Dr Atmaram, DGSIR addressing CLRI staff, 1967
Visit of Shri Kamaraj, Chief Minister of Tamil Nadu to the Indian Leather Fair 1964 at CLRI

Mr PC Alexander, Governor of Tamil Nadu being received on his way to the Triple Helix Auditorium

Overseas visitors, 1985

Dr AP Mitra, DGSIR at LERIG

Shri Humayun Kabir
Shri Nurul Hassan
Shri M.M. Joshi

The Leather Post
Dr AL Mudaliar at first ILF 1964. Seen along with are Shri Chandy, Shri Manubhai Shah, Minister of Industries, GoI, Shri R Venkatraman, Minister of Industries, Madras and Shri Nagappa Chettiar

Mind to Market chain completed all in one premises – CLRI. Indian leather fair conceived and commissioned at CLRI in 1964. 27 January 1964 makes history. Fair in grounds of CLRI draws citizens of Chennai in thousands. The message of leather spreads from CLRI

Wide and large participation of industry in TGT 1966

Doyens of the industry at TGT in 70’s
Kingpins of Leather Sector in 60's

Childcare includes footcare. Ahead of time: Foot care solutions from CLRI began early in 60's

A word of appreciation from the industry. Shri Ramesh Subramanian, Shri Mohan Sreenivas and Shri Jawahar who evaluated leather products for design awards expressing appreciations for the quality of indigenous designs of leather products.

Technology tools under LTM paves way for social empowerment in Athani. Shri Subba Rao carries the mission.

Going far and wide with a missionary zeal. Shri Ganesan: The other name of dedication linked CLRI to the land of India, breadth and length.

The Leather Post
Capacity building in footwear designing

Enrolling the support of political will for implementing technology plan for tanning sector of Tamil Nadu in resolving environmental problems through do-ecology solutions

Dr Ramasami presenting accounts to S&T parliamentary committee in 2002

Vocational training in footwear

Shri Manmohan Singh, Union Minister for Finance visiting footwear testing facilities in CLRI, 1994. Shri V Balram, Shri M Rafeeq Ahmed and Shri Jawahar are seen along with

Union Minister of Commerce, Shri Hegde is visiting CLRI in 1998
Prof Dr AB Mandal, Director, CSIR-CLRI participated in the debate on formulating, implementing and thereafter achieving a significant growth and enhancement of global market share in the finished leather sector and spoke on the occasion of the CSIR-CLRI initiatives in this area at the Leather Panel Meeting of CLE held on 7th June 2013.

Dr A B Mandal, Director, CLRI plays host to the MODEUROP delegates on 30 January 2007.

Prof Dr AB Mandal leading the Indian delegation at the LINEAPELLE, SIMAC, Tanning Tech Fair in Bologna, Italy during October, 2012.

Prof. Dr. ASIT BARAN MANDAL, being conferred with the Prof. M VISHWANATHAN TECHNOLOGICAL EXCELLENCE AWARD by the Prof. M Vishwanathan Diabetes Research Centre, in recognition of his OUTSTANDING ORIGINAL CONTRIBUTIONS to the ‘DEVELOPMENT OF TECHNOLOGY FOR DESIGN AND MANUFACTURE OF DIASTEP - DIABETIC FOOTWEAR,’ on 12th November 2011.

Dr A B Mandal, Director, CLRI plays host to the MODEUROP delegates on 30 January 2007.
Prof Dr AB Mandal releases the CSIR-CLRI Brochure on ‘Rural Technology-Traditional Footwear’ in Kolhapur

Prof Dr AB Mandal inaugurates the Common facility Centre at Kolhapur for Quality Enhancement of Products of the Kolhapur Cluster in Kolhapur

Exchange Of Agreement For Transfer Of Waterless Chrome Tanning Technology To Punjab Leather Federation 26th November 2016, New Delhi

Dr A B Mandal, Director, CLRI interacts with the MODEUROP delegates in the august presence of Dr G Thyagarajan, Former Director, CLRI and Shri M Rafique Ahmed, Chairman, FARIDA Group

Prof Dr AB Mandal releases the CSIR-CLRI Brochure on ‘Rural Technology-Traditional Footwear’ in Kolhapur
In preparation for the MODEUROP Roundtable and Colour Club Meeting for the Autumn Winter 18/19 season, 18 Tanneries had developed 528 leather/colour proposals that were showcased at the India Fashion Studio, CSIR-CLRI Shoe & Product Design Centre on Thursday, 9th March 2017.
Roles and Impacts of CSIR-CLRI on Indian Leather and Leather Products Industries

1. Preamble
Central Leather Research Institute (CLRI) was instituted in the year 1948 as one of the constituent laboratories of Council for Scientific and Industrial Research (CSIR) with the core mandate of providing technological and other support aiming the growth of the Indian leather industry. Since its inception, CLRI has been working very closely with the industry and other stakeholders. Stakeholders either individually or collectively have been taking active participation in setting the directions of the institute. And CLRI has been availing the suggestions and support of the stakeholders. Linkage between the industry and institute benefited both the institute on one hand and brought about growth of sectors on the other. It is the motive of this essay to document the roles and activities of the Institute since inception and the outcome resulted and impact created due to the efforts and initiatives of the institute.

2. Metamorphosis of Indian Leather Industry
2.1. Banning of Export of Raw Hides
Assessment of the impact of CLRI on the growth of the Indian leather sector necessitates the understanding of the history and transformation of the Indian leather industry after independence. India had been exporting raw hides and skins, tanned leathers compared to the global market. This trend prompts the Government to take business advantage on one hand and also to reap the benefit of value addition.

Dr A Seetharamiah committee was set up in this regard. The committee recommended the banning of export of raw hides and skins and imposing of physical and fiscal restriction on the export of semi-processed leathers. It was envisaged that the policy directive would not only bring about increased export earning but also significant employment. Because of the policy initiative as expected the value of export through leather increased significantly in the next six years. The trend in the export of semi-finished leathers and finished leathers for the period succeeding the implementation of the recommendation of Seetharamiah committee clearly indicates that the export of semi-finished leathers gradually decreased and simultaneously the export of finished leathers increased. The preparedness of the industry for this transition was not adequate. CLRI’s role in facilitating the growth by enabling the industry to move along with the transition was significant. This aspect is discussed later.

2.2. Surge in Import of Capital Goods
Indian leather industry witnessed the next milestone in 1980. Ministry of Commerce appointed a taskforce in 1979 under the leadership of Mr. P. K. Kaul to analyze the factors associated with the export of finished leathers and directed the committee to present its recommendations for the growth of the sector. The committee found that the liberalization of import of capital goods and consumables (chemicals and raw materials) would boost the export of finished leathers to a significant extent.

During the period from 1991-92 to 2004-05, the export of finished leathers had been in the positive trend, except a dip during 1994-95 to 1997-98. The export of footwear had been increasing from 1991-92 to 1996-97 and experienced a plateau from 1996-97 to 2000-01, which was followed by a decreasing trend. Due to liberalized import policy, the import of leather manufacturing machines was in the upward pattern. The industry was in need of skilled manpower to operate and also for maintenance of the machines.

2.4. Environmental Protection
During the mid 80s, national level initiatives had been taken to establish Common Effluent Treatment Plants (CETPs) for various tanning clusters and Individual Effluent Treatment Plants (ETPs) for isolated units. Both union Government and the state Government provided considerable financial assistance to the extent of covering the 75% of the capital cost. During this period, many CETPs and ETPs have been set up aiming the compliance of discharge standards.

On 28th August 1996, Supreme Court of India ordered the closure of about 900 tanneries all over Tamilnadu for not having complied with the discharge requirements. AISTMA had taken the initiative and approached CLRI to provide the necessary technical solutions. CLRI joining with National Environmental Engineering Research Institute (NEERI) had taken up the massive project and provided both in-process pollution reduction measures and end-of-pipe solutions. Due to this effort, the tanneries in Tamilnadu resumed their operations within a period of one year.

In 2007, the Madras High Court ordered the Tamilnadu tanneries to establish the system of membrane-based treatment to achieve Zero Liquid Discharge (ZLD). The Reverse Osmosis (RO) units have been available in the market. However, the techniques to meet the prerequisites for RO and process control aspects connected to RO and reject management methods had not been familiar to the Tamilnadu leather industry. CLRI provided all necessary technical support in
this connection and enabled the industry to comply with the orders of the court.

3. Roles and Efforts of CLRI

3.1. Technology Supply for Finished Leather Manufacture

CLRI has been playing a significant role and providing necessary technological support to the Indian leather industry continually. The institute also has been the major source of the manpower for the Indian leather and leather products industries. The role of CLRI has been in close congruence with the need of the industry time to time.

Immediately after the inauguration of the recommendations of the Seetharamiah committee in 1972, the industry was not prepared for the transition of manufacture of finished leathers in lieu of tanned leathers. It not only demanded machines and facilities but also the knowledge and skill for manufacturing finished leathers of global standards. CLRI had provided the necessary technical knowledge to the tanners and also trained the manpower for the manufacture of finished leathers. The shift has been smooth and the export of finished leathers increased significantly sans much hiccup.

The export was US$ 23.5 million in 1972-73 and increased to US$ 61.2 million in 1975-76 and increased further to a level of US$ 389.4 million in 1979-80 (Figure 2). The facts that the industry was not prepared for the transition and CLRI was the only national body having the technical competency in leather manufacturing indicate very clearly that without the intervention of CLRI, this growth could not have been achieved. Another important factor needs to be understood at this juncture. CLRI did not resort to formal and legal means for providing the necessary technical support, guidance and training. This eased the process of capacitating the small and medium tanners and resulted in strengthening of the organic linkage between the industry and CLRI.

3.2. CLRI’s Role in Manpower Generation

As stated earlier, the import of leather manufacturing machinery was encouraged due to reduction in import duties in early 80s. Many leather manufacturing units in India imported leather-manufacturing machines aiming better quality conformity and increased productivity. However, there were two avenues, where the industry had been desperate and seeking support. They are (a) trained manpower to operate the machinery and (b) trained manpower for maintenance and up keeping of the machines. In these two avenues, CLRI provided immediately the necessary support and training. CLRI had been instrumental to the industries all over the country to provide training in both operation and maintenance of the imported machines. The swift intervention of CLRI ensured no lag in the production accused. Except the initial declining trend between 1980-81 and 1983-84, the export of finished leathers had been in the upward trend steadily. The initial dip was also due to the increase in the export of footwear components significantly during this period (Figure 2). As it is clear from the export trend, the export of footwear, leather garments, leather goods and footwear components have started growing significantly from 1981. CLRI also closely linked to the industry.

The Leather Research and Industry Get-together (LERIG) formerly known as Tanners Get-together (TGT) has been a popular annual event. Tanners and researchers all over the country and also from various parts of the world participate in this event. Sharing of knowledge in all the avenues of leather and leather products is brought about and benefited the Indian leather industry. The current testing and analytical services of CLRI are not only credible but also effective and responsive.

4. Recent Achievements of CSIR-CLRI

4.1. Technology Supply

CSIR-CLRI has been a major source of technology for the industry. Specifically, CSIR-CLRI has been very active in providing technologies connected to wastewater treatment, solid waste utilization, leather manufacturing and leather chemical manufacturing. In the leather-manufacturing avenue, CSIR-CLRI had developed the technologies such as pike-free chrome tanning process, and zero wastewater discharge process. In the recent past, CSIR-CLRI has initiated the use of Waterless chrome tanning to around 50 tanning units in India. The major technologies that had been translated to the industry include Cattle Gut (CETP), Fluidized Activated Carbon Catalytic Oxidation (FACCO), Electro Catalytic Oxidation (ECO), Electro Autotrophic Activated Carbon Oxidation (CAACO), Fluidized Immobilized Carbon Catalytic Oxidation (FICCO), and Enzyme Immobilized Carbon Oxidation (ENICO). CSIR-CLRI has translated the technology of manufacture of chrome-melamine thread and bio-adhesive.

Matrix, Collagen sheet, Regenerated leather, leather chemicals, syntan and biodegradable dispersing agent for dry tanning. CSIR-CLRI has also been active in implementing the scheme for the modernization of the tanneries in Tamilnadu following the orders of the Supreme Court of India, a mega project of installation of in-process measures and end-of-pipe technological solution was launched. The project was financed by AISHMA of CLRI and NEERI had undertaken the project jointly. CLRI had conducted an initial baseline survey to understand the erstwhile process pattern, pollution generation, technological capability etc. On the basis of the outcome of the baseline survey, specific pollution reduction measures have been devised and implemented in all the units. NEERI on the other hand, introduced end-off-pipe technological solution. As the result of these efforts, all the units could comply with the discharge requirement and resumed the production in one year’s time. This not only saved the industry from a huge financial loss but also saved the continued employment of about 20,000 direct employees and their livelihood.

In 2001, the Tamilnadu Pollution Control Board (TNPCB) observed that the Total Dissolved Solids (TDS) of the treated wastewater from two CETPs namely the Dindigul CETP and Pernambut CETP was around 23000 ppm. The board ordered the member tanneries in these clusters to install and implement suitable in-plant measures so as to reduce the TDS of the treated wastewater to about 7500 ppm in six months. Also the board asked a roadmap for achieving the TDS limit of 21000 ppm. CLRI undertook these projects and implemented many pollution reduction measures such as hair-saving unhairing, recycling of liming wastewater, recycling and reuse of deliming wastewater, reuse of pickling wastewater. The TDS of the treated wastewater was reduced to about 6000 ppm in six months. The tanneries of these two clusters averted the closure of units because of the timely and effective intervention by CLRI.

As stated, in 2007 the High Court of Madras ordered the rehabilitation of two CETPs in the state. The tanneries had installed the RO. However, the tanning units in Tamilnadu did not have the technical competency (a) to operate the wastewater to fulfill all the prerequisites to operate RO, (b) to operate and maintain RO and (c) to manage the rejects of RO. CLRI provided the technical support and training to the tanning units of Tamilnadu.

Because of the support and efforts of CLRI, the leather manufacturing companies in Tamilnadu could comply with the orders of the Court and also attain zero liquid discharge.

4.2. Other Initiatives of CSIR-CLRI

Apart from these interventions, initiatives and efforts of CLRI also lies in the area of technology supply, implementation and up keeping of the machines. In these two avenues, CLRI has been closely linked to the industry. The Leather Research and Industry Get-together (LERIG) formerly known as Tanners Get-together (TGT) has been a popular annual event. Tanners and researchers all over the country and also from various parts of the world participate in this event. Sharing of knowledge in all the avenues of leather and leather products is brought about and benefited the Indian leather industry. The current testing and analytical services of CLRI are not only credible but also effective and responsive.

4.3. Testing and Certification Services

CSIR-CLRI has been providing services connected to testing and analysis of skins and hides, interrelated leather chemicals, wastewater, solid wastes, components for leather products, and leather products as per the relevant and internationally acclaimed procedures. This service of CSIR-CLRI facilitated the industry for securing the confidence of the buyers. The testing services have become much more critical in the wake of the introduction of REACH (Registration, Evaluation, Authorization, and Restriction of Chemicals) standards in 2007. CSIR-CLRI has been providing the service of certification of leathers to ascertain whether they qualify as per the requirements of Ministry of Commerce, for export. Since 2007, 1.35 lakh samples of leather have been assessed and certified by CSIR-CLRI.

The timely certification of leathers intended for export facilitated the timely export of finished leathers.

4.4. Other Activities

A scheme, “Integrated Development of Leather Sector (IDLS)” was launched by DIPP aiming a holistic development of the leather and leather products sectors. CSIR-CLRI has been the nodal agency for implementing the scheme for the modernization of the leather industry in India. Since the commencement of the scheme in 2002, a sum of Rs. 150 crores had been disbursed through CSIR-CLRI as subsidy to the Indian
leather industry.

MODEUROP is an International Institution, which forecasts fashion and trends in Leathers, Colours and Materials for the International market, three seasons ahead. CSIR-CLRI has been a member of MODEUROP since 1994 jointly with the Council for Leather Exports. CSIR-CLRI has been carrying out the activity of forecasting colours for leather and leather products. Over a period of time, this activity of CSIR-CLRI has expanded to forecasting trends in textiles and materials and has gained international recognition. This activity of the institute positions Indian leather and leather product industry in an advantageous status to gain significant business opportunities.

4.5. Efforts Connected to Societal Development

CSIR-CLRI had been directly and indirectly contributing to the societal development through Human Resource Developmental programmes and environmentally benign technologies. Some of the interventions of CSIR-CLRI in societal development are detailed hereunder:

As mentioned earlier, CSIR-CLRI had been conducting academic programmes such as B.Tech, M.Tech and Ph.D. programmes in Leather and Leather Products technology and had been an exemplary model for the Academy-Industry-Institute trinity. The total alumni base of this department is more than 1500 and they play a major role in managing and maintaining not only Indian Leather sector but also the global leather sector. CSIR-CLRI conducts various vocational programmes such as Diploma, PG Diploma and Executive training programmes in leather and leather products manufacture, directly contributing to the generation of skilled manpower for the sector. CSIR-CLRI had supported the establishment of various vocational training institutions in leather and leather products manufacture, directly contributing to the sustained availability of qualified manpower for leather and leather products industries. Today, leather sector employs about more than 3.5 million people and majority of them are women; hence this sector had contributed for the inclusive development of the country.

CSIR-CLRI during the period 2001 to 2005 implemented HRD mission for augmenting the availability of skilled manpower for the sector. During XI and XII Five year plan projects, Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Govt. of India appointed CSIR-CLRI as the National Monitoring Unit (NMU) for monitoring and evaluating the Human Resource Development programmes viz., Placement mission for augmenting the availability of skilled manpower for the sector. Prior to the interventions, the tanneries were producing predominantly semi-processed leathers from sheep and goatskins for export and poor quality finished leathers from bovine hides for local market and industries catering to the local market. After the conclusion of the Phase-I benchmarking technology upgradation project, the technology status in the sector got upgraded for producing finished leathers from sheep and goatskins with quality suitable for export markets and finished leathers from bovine hides with improved quality and value addition for export of intermittent materials such as wetblue and crust leathers. The export earnings of Ethiopia after the intervention increased steadily except for a minor decrease immediately after the ban. The successful completion of the project not only brought about credibility in Ethiopia but also demonstrated CLRI’s capability to the global leather sector.

4.6. Efforts Connected to Skill Development Initiatives

As a societal programme aiming social cause and empowerment, in association with National Scheduled Castes Financial Development Corporation (NSFDC), Delhi, CSIR-CLRI conducted skill upgradation programmes in different leather trades for SC candidates whose annual income does not exceed the double poverty line limit. CSIR-CLRI had successfully trained 650 candidates through skill development programmes during 2015-16 and about 70% of them were employed. The training was offered in different leather trades such as Vegetable Tanning, Leather Processing, Leather Goods, Leather Garments and Leather Footwear. These artisanal and skill up-gradation programmes correspond to the Qualification Pack (QP) and National Occupational Standards (NOS) under the National Skill Qualification Framework (NSQF) of the Leather Sector Skill Council. The successful association of CSIR-CLRI and NSFDC in empowering the needy candidates continued in the year 2016-17 also, about 2350 candidates were also trained during this period.

4.7. Global Outreach

Benchmarking (Technology Up-gradation) of Ethiopian Tanning Sector

Ministry of Trade and Industry of Federal Democratic Republic of Ethiopia had enrolled the services of the CSIR-Central Leather Research Institute (CSIR-CLRI) by invitation for the Benchmarking Program aimed at the Technology Up-gradation of Ethiopian tanneries.

CSIR-CLRI has taken up the benchmarking program with the primary objective of transforming the Ethiopian tanning sector through capacity building to enable them to produce finished leathers for International market in competitive manner by improving the efficiency and effectiveness of these units through process evaluation. Prior to the interventions the tanneries were producing predominantly semi-processed leathers from sheep and goatskins for export and poor quality finished leathers from bovine hides for local market and industries catering to the local market. After the conclusion of the Phase-I benchmarking technology upgradation project, the technology status in the sector got upgraded for producing finished leathers from sheep and goatskins with quality suitable for export markets and finished leathers from bovine hides with improved quality and value addition for export of intermittent materials such as wetblue and crust leathers. The export earnings of Ethiopia after the intervention increased steadily except for a minor decrease immediately after the ban. The successful completion of the project not only brought about credibility in Ethiopia but also demonstrated CLRI’s capability to the global leather sector.

Twinning Project for Capacity Building of Leather Industry Development Institute

Leather Industry Development Institute (LIDI) has been established by the Govt. of Ethiopia primarily to serve the leather and products sectors. In view of the new national policy on leather and leather products sector, the support systems in terms of technology supply, manpower developments in Ethiopia are needed to be in place. The role to be played by LIDI in this context is crucial. In order to realize the national goals and vision, LIDI’s capability and capacity need to be enhanced significantly. The transformation of LIDI to be capable of serving the industry and ultimately to bring about the envisaged growth of the leather and leather products sectors, a project to twin the capabilities of CSIR-CLRI by LIDI was envisioned. The TWINNING project had been structured, planned and executed taking into account the principal objective of transforming LIDI. The major objectives of the Twinning project are as follows:

- To create functional tripartite linkage among the University, R&D/laboratories and industry to start a joint research and creating strengthening BSc, MSc and PhD programmes in leather.

Establishment of Leather Park in Botswana

CSIR-CLRI has carried out a viability study for the establishment of a Leather Park in Republic of Botswana. The viability study was conducted at Botswana and a detailed feasibility report had been submitted to the Local Enterprise Authority, Government of Botswana. The feasibility study dealt with the following aspects:

- Current status of leather sector in Botswana
- Development of Leather Park
- Technology requirements
- Recommendation for investment

The feasibility report indicated the commercial viability in establishing the Leather Park in Lobatse, Southern Botswana. The Government of Botswana through Local Enterprise Authority (LEA) is taking up the establishment of the leather park. Further government of Botswana had proposed to provide funding the basic infrastructure and basic treatment plant facilities associated with the park. Currently LEA had sought equity investor for the establishment of the park. Further LEA is seeking the support of CSIR-CLRI to be a technical monitoring agency to monitor the establishment of the leather park.
At the present time, complete utilization of bovine parts will lead to the development of exotic leathers with attractive grain patterns. In this work, an attempt has been made to prepare exotic leathers from bovine ear, which is a solid waste from the slaughterhouse. Ears are the peculiar part of bovine, where a thin sheet that forms the flat pinnal surface and rolls into a thicker sheet that constitutes the internal ear canal. Both are composed of elastic cartilage, which is covered by the skin matrix and stitch resistance property of the leather also exhibits good topography like the orientation of grain, surface smoothness of the processed crust leather has been studied thoroughly by using scanning electron microscopy technique (SEM). Air permeability analysis revealed that the air permeability decreased with increase in the cartilage thickness. The air permeability analysis showed that the ear from bovine ears has been optimized. The physical and morphological characteristics of the leathers have been carried out. The air permeability analysis revealed that the ear permeability decreased with increase in the cartilage thickness. The processed ear possessed high resistance towards stitch year and delamination. The attractive reversible grain pattern along with stitch year property provides an opportunity to utilize this waste material as a new source of raw material for leather making.
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Autumn Winter 18/19 season

The MODEUROP Roundtable and Colour Club Meeting for the Autumn Winter 18/19 season has concluded successfully during 29-30 March 2017 in Pirmasens, Germany.

Winning Colours from INDIA:
- 16 out of 20 colours for Shoes & Accessories and
- 8 out of 10 colours for Leather Garments feature from India.

SHOES & ACCESSORIES

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<td>ALUMINIUM &amp; LASER</td>
<td>PEBBLE</td>
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Addition of ‘NEW’ Colours for Spring Summer 2018 season: The following TWO Colours may be added to the Spring Summer 2018 season:
1. PINK
2. KHAKI

TOP Colours for MODEUROP Spring Summer 2018 season (please refer to MODEUROP Colour card for the Spring Summer 2018 season)

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<td>1. PINK CANDY</td>
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<tr>
<td>2. ALUMINIUM &amp; LASER</td>
<td>2. ACID</td>
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CSIR-CLRI | CLE | ISF | FLMIA
endeavour
in association with
Aihant Dyechem | BASF India Ltd | Colourfast | Colourtex | Pure Chemicals | Stahl India Ltd
An MoU for Technological, Infrastructural Support and Technical Training for the Development of Leather Sector in Andhra Pradesh has been signed between CSIR-CLRI and Leather Industry Development Corporation of Andhra Pradesh (LIDCAP) for an inclusive growth of the leather sector for the state of Andhra Pradesh. The MoU contents include a comprehensive survey of state, capacity building, training, capacity building for processing and products manufacture for their mini parks.

CSIR-CLRI leads Indian Tanneries to present ‘fashion leathers’ for the Autumn Winter 17/18 season at the ILM Bag Show in Offenbach, Germany held during February 2017.
**Training in leather goods manufacture to rural women by CLRI RCED**

Ahmedabad at village Bopal(Ahmedabad) and village Prempur (Sabarkantha). These training programmes sponsored by Commissioner of Cottage & Rural Industries / GRIMCO Gov’t of Gujarat.

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**Meeting with Industry stake-holders to discuss Environmental Issues and disposal of SALT**

Dear Editor

Let me thank you for sending to me “The Leather Post” regularly and promptly. It is enabling me to update my knowledge on the recent developments of Leather Sector. The novel development thinking process has been well featured on page 10 of Feb.2017 issue. It is well written by Dr B Madhan and Dr B Chandrasekharan. The emerging dimensions of the demand for leather products clearly indicate new direction for Leather Science and Technology. It is the time to break the convention and come out from classical tag as authors elucidated. I completely agree with this, as we have witnessed foot loose nature of the industry moving one region to another in the world. I wish CLRI to chalk out a new road map to make Indian leather sector sustainable.

Thanking you

D Chandramouli, Scientist (Retd), CLRI

---

**Game changing “Waterless Chrome Tanning Technology (WCTT)**

_translation at M/S Ruksh International, Banthar, Kanpur;_ trial for heavy buff 4.2 tons.

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**Wet blue lot of cow hides made with WLCT process at Gee Kay International jalandhar on 30.3.17 avg wt 20kg/hide, lot wt 2.3 tons**
India - Reduced slaughter to hit tannery business

The crackdown on illegal slaughterhouses in Uttar Pradesh, Jharkhand, Chhattisgarh and Rajasthan will hit the inputs of the leather industry. Factories and tanneries, which use raw material from the slaughterhouses, are seeing a 20-40% increase in prices, owing to shortage of supply.

Factory owners say that this situation will affect the already-suffering leather industry, which is impacted owing to unfavourable market conditions in Europe. Leather exports fell 4.5% in FY 17.

Javed Iqbal, a factory owner in Kanpur, is already seeing a 40% increase in prices due to reduced supply and stocks are running out. “We hope the situation eases out or else we may contemplate moving to another city. We cannot defy the state government’s orders,” he said. The cluster in Kanpur exports Rs 20,000 crore worth leather shoes and upholstery to Europe, Middle East and USA. Uttar Pradesh alone supplies close to 50% of the buffalo hide required.

In Tamil Nadu, while there is no immediate impact, factories are in wait-and-see-mode. They expect the reduction in inputs to hit them in the next 2-3 weeks. With the clusters depending over 78% of the inputs from the North, the industry would have to depend on imports.

“As such sales are down. We can look at importing, but the raw material costs 30-40% more. We might have to sustain losses,” said Rafeeqeque Ahmed, chairman Farida group.

India already imports 10-15% raw material (animal hides and skins) from Russia, Brazil and Africa and higher grade leather from Europe. Some factories add that they have stopped purchasing raw material to process orders. Compensating losses by increasing the prices of exports is not possible, factories add, as the orders are made on a need basis with quotations discussed in advance. “Also, we might have to lose out on competition to players like Brazil, where products are available at lower prices,” said Mukhtarul Amin, chairman, Council For Leather Exports.

However, Amin adds that the impact would be short-lived, as only unhygienic slaughterhouses, which do not adhere to norms, will be taken down and they will soon be replaced by more compliant ones. “In Kanpur itself, one new slaughterhouse was commissioned with an investment of Rs 5 crore and it is a matter of time before they invest more to comply with the norms. The industry would recuperate in the next 3 to 6 months,” he said.

Source: APLF.com

Vietnam - Ambitious leather and footwear exports of US$26 billion set for 2020

Vietnam’s Ministry of Industry and Trade (MoIT) has released a revised plan for the development of the country’s leather and footwear industry. It extends until 2025, with a vision to 2035, reports Leatherbiz.

The MoIT expects the industry to continue to develop at a high speed, which will see it maintain its position as a key export industry for Vietnam. It is also predicted to create more jobs, which will offer better income for workers.

The government hopes that exports of leather and footwear from the country will increase 10-15% per year between 2016 and 2020, 8-9% per year between 2021 and 2025, and 4-5% per year between 2026 and 2030. This would result in export revenues of US$24-26 billion in 2020, US$35-38 billion in 2025 and US$50-60 billion in 2035.

The plan also calls for an increase in the percentage of local content in footwear products exported from Vietnam. It wants this to increase to 45% by 2020, 47% by 2025 and 55% by 2035.

Source: APLF.com
Dr J Raghava Rao, Academic Co-ordinator formally welcomed all the research scholars. He expressed his happiness to have one-to-one interaction between Director and Research Scholars after a long period. He also appreciated the Director for releasing of enhanced arrear pay for Project Assistants. Dr J Raghava Rao then invited Dr B Chandrasekaran, Director CLRI to address the gathering.

Director’s Address:

Dr B Chandrasekaran, Director, CLRI started his address by recollecting research scholars and Director’s meet held 15 years ago. He said that he wishes to have scholars and Director’s meet once in every 6 weeks. He stressed that research scholars should engage on weekly seminars dealing with research problems to improve overall course culture and for enhanced results. He also outlined the importance in improving the inter-personal relationship through discussing the contemporary research problems which is the key for their growth. To facilitate the wellbeing of students, he has taken initiatives such as building hostel both for local as well as international students interested in undergoing training and research programme at CSIR-CLRI with well-defined standards.

The salient features of the meet include –

• Scholars and Directors meet once in every six months
• Weekly seminars by the scholars for the scholars
• Plan for building a hostel of international standard within 2 years

The Director invited the research scholars to interact by raising issues faced by them and sought suggestions for overall improvements.

Dr. T Narasimhaswamy thanked the Director CLRI, research scholars and those who were present in the meeting for their attention and valuable time spent to make the event a success. Also he outlined the importance in improving the inter-personal relationship through discussing the contemporary research problems which is the key for their growth. To facilitate the wellbeing of students, he has taken initiatives such as building hostel both for local as well as international students interested in undergoing training and research programme at CSIR-CLRI with well-defined standards.

The programme commenced on 17th Feb, 2017 and it came to an end on 06th Mar, 2017. During the programme the Customs officers were taken to three leather making units in CLC for visit. The officers, who were directly involved in clearing the consignments, the Customs Office at Air Cargo Complex of NSCBI Airport nominated ten officers to receive training at RCED(CSIR-CLRI), Kolkata. The Kolkata office of CSIR-CLRI designed a special programme titled ‘Examination of Finished Leather & Products for Export’ for the Customs officers. It was a 4-day training programme having a blend of theory and practice supplemented by plant visit, discussion and self-study. The programme covered a number of key areas like i) Microstructure of different hides and skins, their commonalities and distinctive features, ii) Leather making operations and their impact on leather properties and physical appearance, iii) Finishes of various types and their distinctive features and classification. iv) Characteristics of various types of finished leather and their assessment in the light of finish leather certification norms, v) Standard protocols for physical & chemical testing needed for finish leather certification, vi) Leather making operations and guidelines for ascertainment of leather product in India and abroad, and vii) Overview of Indian leather industry, its export dependency, economic importance, growth potential, development constraints and expectations such as simpler export procedure and faster customs clearance, etc. which can place this region and the country at par with the competing regions.

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The Leather Post

APLF’s 33rd edition held from 29 - 31 March proved to be a success from the outset. There was a bustling atmosphere in the halls on Day 1 as buyers arrived to do business, look for new suppliers, materials and solutions for their manufacturing operations.

The vibrant atmosphere continued into Day 2 and Day 3 with total visitor numbers exceeding the previous year’s show by 4.33% reaching 16,948 from 83 countries and regions.

There were 856 exhibitors from 46 countries with 24 national pavilions participating over half of which were exhibiting high added value finished leather. In other words, the Global Leather Industry had once again gathered for its Annual Meeting Place at APLF in Asia’s business hub of Hong Kong.

The ten main visiting countries were China, India, Korea, Taiwan, Japan, Italy, USA, Thailand, Australia, and Indonesia in that order with an influx of local visitors from Hong Kong.

Conditions were right for an upturn in business as the price of competing synthetics has been impacted by higher crude oil prices whereas hide prices have not spiraled out of control pricing leather out of the market as happened almost three years ago. The continuing boom in auto sales in China, North America and Europe is underpinning demand for leather seating as well as demand from furniture manufacturers for ever popular leather upholstered sofas.

Synthetics form an integral part of sport shoe and sneaker manufacturing and higher range products are often embellished with leather trim, thus bringing both natural and man-made materials together into the modern manufacturing process of footwear.

This trend has resulted in the emergence of the urban activewear / sports chic / athleisure sports fashion which is currently dominating the style choice of millennials on all continents and hence has to be catered for at major manufacturing trade fairs such as APLF. The APLF Materials+ sector was created to function in synergy with APLF’s core leather sector.

And it was precisely the + in Materials+ that attracted buyers to see the latest laser cutting technology of Comelz, and ATOM as well as the robotic handling arm from the latter company that is pointing the way to a more automated manufacturing future. The + attraction of these CAD-CAM applications was more than obvious based on the crowd of visitors watching demonstrations of precise advanced material cutting technology that exactly represented the “Experiencing the Future” slogan of Materials+.

The Leather Post

who took keen interest in learning, went around the units, watched the on-going operations and interacted with the unit managers/proprietors to get a comprehensive view of leather making processes. The lecture-discussion and demonstrations that formed an important part of the programme were held at RCED, Kolkata Office. It was observed during and after the programme that the officers could identify the animal species and distinguish finished leather from the crust leathers independently and with confidence. They also became very familiar with the prevailing country norms for assessment of finished leather and leather articles. At the end of the programme feedback was collected. In the feedback the officers expressed their full satisfaction over the training course.

This initiative for capacity building taken by the Customs authority to achieve faster clearance of all export-import consignments is a welcome move for the exporters in this region and the trade in general. Appropriate and timely support from CSIR-CLRI to enable the Customs authority to achieve its goal will be a great boost. It is hoped that this programme will help the regulatory authority achieve the stated goal and facilitate the export trade from this region in a very significant manner.
Talking to stand manager of WIG Korea, Johnny Kim, he informed us that he had been unable to eat lunch due to the constant flow of visitors in the new Materials+ hall. The wide range of reflective, shiny products displayed on his stand was not only designed for safety but also important complements to the athleisure trend. Hence the company’s main customer is Nike.

Other companies such as the German company, Wilhelm Textiles with a very extensive product mix of linings for the shoe, automobile, sports goods and home furnishings, were also meeting existing and new customers and were busy right up to the end of the fair on Friday. The combination of APLF Leather & Materials+ covering the manufacturing supply chain was complemented by the positive business-like atmosphere at the 2017 event. This augurs well for the future as materials are brought together by designers that need such events to source materials and receive inspiration from the many exhibitors displaying their products - all under one roof during three intensive days in Hong Kong.

APLF Leather & Materials+ will return in Hong Kong from 14 - 16 March 2018. For more information, please visit the fair website at www.leatherfair.aplf.com.
Dehydration applies to a condition when the body is deprived of fluids. Excessive loss of water from the body along with metabolic disruption is not met with enough intake of fluid. The causes of dehydration can be many, but the condition is aggravated during summers, due to high temperatures. Preventive measures include:

1. Drink plenty of water, glucose water (at least 8 glasses of water) every day to stay hydrated during the summer. Take juices from natural, mineral rich fruits such as lemon, orange, apple, pineapple or eat lots of fruits like banana, orange, watermelon, stone apple, papaya, kiwi and apple etc., and consume butter milk and coconut water which are very helpful to replenish lost water within your body and also help replace minerals and cool down the body temperature at any time. Avoid soft drinks and alcohol. Avoid drinking water from refrigerator; if you need cold water place a mud pot and drink water from it.

2. Don’t let your stomach get empty; Eat green salads, cucumber, onion and spinach as much as you can in each and every meal.

3. Avoid heat generating foods like oily, non-vegetarian, spicy food and even salt intake.

4. Have an umbrella and a bottle of water anywhere & everywhere with you. It is very important to carry bottle with water or any other energy drink to replenish the lost fluids.
5. It is advisable to cover face with light clothing when outdoors; it prevents direct contact with high temperatures outdoors. Wearing hats and sunglasses provide full protection to the face and the eyes.

6. If you have some work and need to move outside, it’s better to avoid the afternoon hours where temperature will be at its peak. Either move out early in the morning or take the schedule after the sun set. Those will be the time when you won’t fact the extreme heat of the summer season.

7. Apply antiseptic talcum powder to the body and sunscreen lotion to all the exposed skin which helps in protecting skin. Re apply sunscreen every 3-4 hours when working outdoors.

8. Change your clothes and inner wears regularly in order to prevent infection. Don’t use any others towel or handkerchief. Wear clothes (cotton clothes) which allow good ventilation and make sure the fabric of the clothes is light.

9. Take bath only at early morning and evening; don’t take bath at late afternoons. Wash your eyes and face many times as possible.

10. If you feel weakness, excessive tiredness, exhaustion or giddiness, consult your physician immediately.

“Team CSIR-CLRI will now remain connected even while on duty travel or even off-duty” says Shri G Sathiamoorthy, CSIR-CLRI who has designed the new INTRANET portal.
FICCI R&D Innovation Award is Given annually to recognise the best and brightest innovation that has come out of large Indian research establishments, universities and industry house.

Waterless chrome tanning technology was selected for the Award for its PAN India acceptance with tanners in all clusters enrolling for its adoption.

Building on the success of the two previous years with C-level contributions from policy makers, brands, vendors and other industry stakeholders, the Global Footwear Retail Conference (GFRC) resumed the debate on the key issues impacting the future of the retail footwear industry.

There is a lot of uncertainty about the future of global commercial development. De-globalisation and increasing protectionism prevail in some parts of the world such as in the US which recently withdrawn from the Trans-Pacific Partnership. Yet, at the same time trade facilitation reforms such as the first Trade Facilitation Agreement (TFA) concluded by the World Trade Organization (WTO) which entered into force in February, aim at expediting the movement, release and clearance of goods across borders. China, which still heavily relies on exportation to continue its economic growth, is also taking the lead in promoting bi-lateral agreement with individual countries.

All these new commerce and trading systems have an impact on the sourcing, the production sites and on the prices of footwear. “The FDRA was very supportive of the TPP, which would have saved our industry $6 billion over ten years and we worked for years to advance this important agreement,” recalled Thomas Crockett, Director of the Government & Regulatory Affairs of the Footwear Distributors & Retailers of America (FDRA).

This 12-nation agreement involved key markets for the U.S. footwear industry, including Vietnam and Japan, and would have saved U.S. footwear companies and consumers more than half a billion dollars a year, according to the FDRA. Despite its disappointment, the FDRA pledged to continue to support efforts for U.S. bilateral free trade agreements and to work on trade agreements that would deliver real value for American footwear consumers and strengthen U.S. footwear companies.

The TPP, the role of China and other hypothesis were discussed at the GFRC. Thomas Crockett was joined by Peter Mangione, Managing Director and Founder of the Global Footwear Partnership LLC, Felix Chung Kwok-Pan, member of the Legislative Council of Hong Kong for the textiles and garment constituency and by Frank Leung Yat Cheong, President, Federation of Hong Kong Footwear Ltd to debate about these issues.

Successful brands are the ones capable of creating compelling products and stories through personalised experiences. In the topic about “disruptive technologies” footwear specialist and founder of the Hong Kong based “Fashion Disruptors” community, Ashok Jayaraman provided examples and tools to illustrate the various existing and future technologies that enable to craft the personalized experiences that would bring customers back to retail. The “fashion disruptors” community of about 100 members included entrepreneurs, designers and industry professionals and is a platform for networking and for helping entrepreneurs bring disruptive fashion concepts to market.

Despite all the buzz about multi-channel retail, surveys show that shopping in-store is still the dominant means of buying for consumers both in the US and in the Asia-Pacific region. While the majority of US consumers have purchased apparel both online and offline, brick-and-mortar is still the most-used transaction channel for apparel and footwear purchases. In November 2016, 62 % of footwear was purchased online versus 39% online and 10% over mobile phones, according to the survey US Consumer Analysis: Apparel and Footwear, released in February 2017 by Fung Global Retail & Technology. In fact, US consumers’ attitude towards fashion and their purchase behavior has changed little over the past five years.

“We expect brick-and-mortar to remain the dominant store format for US apparel and footwear retail in the near future,” says Eddie Wong, Senior Research Associate, Fung Global Retail & Technology. However, a majority (78%) of consumers search for footwear online before they go to the store to buy shoes, which shows how necessary it is for footwear vendors to offer a seamless online to offline experience to their customers. “The internet is not yet a significantly large channel in terms of apparel and footwear purchases but it increasingly influences how consumers shop for apparel offline,” Wong added.

Wong spoke about the increasingly important senior market and how to cater to them. 
Advances in bio-based polyurethanes for automotive interior coatings

By Michael Costello, Director of Sustainability at Stahl

In Automotive, the importance of a sustainability agenda is paramount. Think of electric cars and vehicles that are more fuel-efficient. With these kinds of innovations the industry is working hard to cut down on greenhouse gas emissions from cars.

As a highly specialized chemicals company and the expert in car interiors materials and surfaces, Stahl is at the forefront of these developments. Yet, there are more ways to approach environmental responsibility and Stahl is pro-actively working on improvements to stay ahead of the competition. Without letting the other developments slip under the radar, we are working towards solutions to further reduce the environmental footprint in the automotive industry.

One such development is the advancement in bio-based polyurethanes. Until recently, coatings technology for finishing automotive leather and synthetic surfaces was largely based on petroleum feedstock chemicals, like ethylene and propylene. But recent advances in biotechnology have allowed a new class of polymers to be developed. Made from renewable raw materials, these bio-based aqueous polyurethanes can also demonstrate superior film performance to their fossil fuel-based predecessors. Obviously, this is good news for Automotive regarding sustainability. Whether used for car seats, steering wheels, dashboards, door trims or consoles, polyurethane-based finishes - for both leather and synthetics - can be found everywhere in a car.

The reduction of VOC’s and the need for more durable coatings, especially in the automotive industry, has meant that water-based polyurethanes have become the standard for high-performance leather finishing. Polyurethane films are both durable and flexible and they protect the leather from staining, abrasive damage and the long-term effects of weathering. Furthermore, they provide the characteristic touch, surface appearance and durability. Polyurethane dispersions are also known as water-based polyurethanes.

The main chemical building blocks for the manufacturing of polyurethane dispersions are isocyanates and polyols. In recent years, thanks to advances in the biotech industry, polyols have been developed with plant-based (renewable) resources instead of petroleum-based raw materials. In this case the oils are extracted from plants and transformed into polyols - the unsaturated fatty acid from the oil is dimerized then polymerized with a diol to produce the polyol, in this case a polyol diol (graph 1).

Graph 1: Schematic representation of the synthesis of a bio-based polyurethane polyol based on vegetable oil

Many different plant oils can be used to make these bio-polyols, like canola (rapeseed), soy, palm or linseed. Some advantages of using renewable oils versus fossil fuel-based materials are:

- Polyls can be re-grown, avoiding depletion of the earth’s crust
- Wide availability of the plant resources in all regions
- Lower carbon footprint vs extraction and transport of fossil fuels
- Some plant oils are already being used in animal feedstuffs and biodiesel (eg: rapeseed)

A question that sometimes arises about renewable resources for industrial applications is land-use. As graph 2 illustrates, the land use required for biopolys, which itself is a subsegment of bioplastics, is a tiny portion of the total land use for materials.

Graph 2: Land use for bioplastics 2014 and 2019

Recent advances in biotechnology have made it possible to formulate high performance polyurethanes using polyls derived from plant-based oils. This innovation has implications for all the touch points in our cars: the door panels, seats, steering wheel, gear shift, instrument panel, middle console etc. all use polyurethane based coatings. As these coatings are derived from renewable resources rather than petroleum-based materials, this represents a significant environmental advantage in itself, but since these new polyls also provide higher durability and performance to the car interior, we can consider this to be a turning point in the industry.

After extensive testing, the conclusion is that polyurethane films made with the latest bio-based polymer technology are more resilient to hydrolysis than previously studied bio-based polyls. Indeed, the properties come close to the level of polycarbonate-based polyurethanes, which are considered to be the gold standard for automotive finishing.

An added advantage of this innovative bio-based technology is the environmental gain made in the first stages of manufacturing, since the amount of co-solvent required can be significantly reduced by using biobased polyls.

The bioccontent level achieved in polyurethanes of this type can range between 10 - 60%, depending on the final product design, and is typically 35% in the pure PUD. Given that only a few years ago we were observing lower performance with a lower bioccontent, it is only a matter of time before higher bioccontent polyurethanes can be developed with even higher performances. All good news for the industry.

Global leader in innovation

Being the global market and innovations leader in its field, Stahl works hand in hand with all renowned OEMs. As an example of our progressive approach, we joined forces with Rinspeed, to create the Rinspeed Ziba concept car, which was launched in January 2016. This ‘driverless car’ is our view on a futuristic and sustainable car interior and boasts eye-catching technologies such as glow-in-the-dark for leather. Other innovations that are particularly interesting for car interiors are:

- Stahl EasyWhite Tani™. Our innovative chrome free tanning technology has strong green credentials regarding the use of water, energy and chemicals. Leather tanned with Stahl EasyWhite Tani™ is of high-quality, soft and smooth and offers unique advantages for pale and vibrant colors in leather for car interiors. Furthermore, it enables the production of leather that is thinner and lighter than ever before.
- PolyMatte® and Green PolyMatte®. Smooth finishing technology that is matt in itself. Compatible with water-based, polyurethane coatings, provides a luxurious feel to the finished article. Green PolyMatte® is based on rapeseed oil.
- Proviera® - probiotics for Leather™. A 100% biodegradable and 100% natural biobased alternative to existing chemicals and processing techniques for the beaming stage. This probiotic formulation enables the production of high-quality leather, while significantly reducing the effluent load.
- STAHL EVO. Next generation of polyurethane-coatings for synthetics for finishes, pre-skin, base and adhesive layers. This new technology supports brands, manufacturers and OEMs in their ambitions towards Zero Discharge of Hazardous Chemicals (ZDHC) in the supply chain.

Contact details

Visit www.stahl.com for more information about Stahl’s sustainable solutions for Automotive. For questions regarding this technical article, please contact: Michael Costello, Director of Sustainability at Stahl via michael.costello@stahl.com.

If it can be imagined, it can be created.
Fashion Statements @ ModEurop Colour Meeting.
We believe in Pink, White, Alu and Laser will be strong for Spring Summer 2018 season

Retail - America losing interest in shoes and bags?
20 April 2017

Looks like America is falling out of love with fashion, at least for now: A new report from the NPD Group highlights worrisome drops in sales of both footwear and accessories.

Total spending on what we wear accounts for a staggering US$334 billion in sales, according to the Port Washington, N.Y.-based market research company. And apparel, at about 65% of the total, is continuing to grow at rates seen in recent years. But spending in the trendier footwear category has fallen 1% to US$65 billion in the 12-month period ending in February, with fashion shoes tumbling 6%. (Athletic footwear sales gained 3% in the last year, according to NPD's most recent analysis, and athleisure clothing continues to be a bright spot.)

Fashion accessories sales lost 7% to US$51 billion, with sales dropping off both online and in-store. And handbags alone tanked more than US$1 billion, to US$7.3 billion in that 12-month span.

Those declines came even as Millennials increased their buying in those categories.

It's all added to retailers' woes, from discounters like Payless announcing bankruptcy earlier this month to struggles at higher-end brands, including Michael Kors and Coach.

"The losses happening within footwear and fashion accessories are leading indicators of the fundamental changes occurring within the whole of fashion at retail," says NPD's Marshal Cohen, chief industry analyst, in the report.

"Consumers tend to build their wardrobes through accessories and footwear, giving their outfit a fresh look, so when sales of either of these industries slow or decline it signals a decline in fashion as a priority."

While the NPD report follows sales through February, the National Retail Federation analysis of March sales sees softness, too. While apparel sales gained 1% from February levels, the Washington D.C.-based trade group says those results represent a 2.5% decline from March last year.

Source: APLF.COM
INDIAN LEATHER INDUSTRY - STRIDING WITH CONFIDENCE

COUNCIL FOR LEATHER EXPORTS
(An Export Promotion Organisation sponsored by Ministry of Commerce & Industry, Govt. of India)

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