Dr. B. Chandrasekaran, Director, CSIR-CLRI releases the MODEUROP Colour Card for the Autumn Winter 19/20 Season.
Dear Doyens and Members of the Indian Leather Fraternity; Colleagues from CSIR; Mentors and Teachers, Colleagues and Friends! It gives us great pleasure in sending you our June 2018 edition of The LEATHER POST.

CSIR-CLRI has been reaching out to the Industry in every sphere with its technologies and services. We hope to live up to the expectations of the Indian Leather Sector at all times.

New challenges keep evolving in our Industry from time to time. CSIR-CLRI aims to provide superior technologies to help the Indian Leather Industry meet these challenges. In this edition, we bring you the Colour Trends for the Autumn Winter 19/20 season; Electro-oxidation based Zero Wastewater Discharge Technology and Injection Moulded Biodegradable Polyurethane Shoe Soles. There is also a detailed feature on the history of leather education in India coinciding with career planning and support for the discerning students opting for Leather and Leather products Technology courses in CSIR-CLRI. World Environment Day was marked by planting of samplings and International Yoga Day too was observed in CSIR-CLRI.

I wish to thank you all for your unstinted support and kind co-operation at all times,
We will strive to make this magazine informative and interesting and welcome your feedback for improvement.

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| No | Description | Pg.
|----|-------------|---
| 1. | NEWS IN BRIEF | 3
| 2. | INSPIRATIONS | 4
| 3. | COLOUR | 4
| 4. | LOOKS | 4
| 5. | BAGS | 4
| 6. | SHOES WINTER 2019 | 4
| 7. | Demonstration of Electro-oxidation based Zero Wastewater Discharge Technology | 8
| 8. | Injection Moulded Biodegradable Polyurethane Shoe Soles | 11
| 9. | 70 years Journey of CSIR-CLRI in Nurturing Human Resources for Leather Sector | 14
| 11. | “Greening Leather Sector for Inclusive Growth” at the National Meet of Craft Council of India | 20
| 12. | Review of Projects under Fast Track Translation | 21
| 13. | Tirupur Corporation to set up bio-CNG bottling unit | 21
| 14. | Being a Private Secretary | 22
| 15. | International Yoga day celebrations at RCED- Kanpur & Jallandhar | 23
NEWS IN BRIEF

“The Leather Post" - The garlanding of Prof Nayudamma bust by Dr B Chandrasekaran, Director, CSIR-CLRI at the CLRI main building on 23rd June 2018.

“Assessment and facilitation of establishing a carcass rendering plant at the Hingonia Cattle Rehabilitation Center (HCRC), Jaipur”

An agreement was signed by CSIR-CLRI with Sri Krishna Balram Seva Trust, Non-Government Organization managing Hingonia Cow Rehabilitation Center (HCRC), Jaipur, Rajasthan on 22.06.2018 in connection with the project “Assessment and facilitation of establishing a carcass rendering plant at the Hingonia Cattle Rehabilitation Center (HCRC), Jaipur”

Banana fabric and Leather combination products

Handing over of Design package developed at SPDC, CSIR-CLRI, on Banana fabric and Leather combination products to MD, M/s ROPE International by Director, CSIR-CLRI on 22nd June 2018.

Remembering Late Prof. Y. Nayudamma

The garlanding of Prof Nayudamma bust by Dr B Chandrasekaran, Director, CSIR-CLRI at the CLRI main building on 23rd June 2018.
Digital AI, 3-D printing and drones are changing society and living together. Digitization and big data are seen as the new way to get customers excited and set new standards in design and sales. David Shah of View Magazine notes that human values such as empathy, innovation, and teamwork will become even more important in the future as it cannot provide a bot, let alone predict trends. ■ Meatless Future, or vegetarianism 5.0. and plant-based proteins are conquering the market. ■ Connection and tolerant fusion. Global community and tolerance, the synchronization of technology and nature. ■ Customization in a world of synchronism. ■ The longing for added value and emotional substructure can be felt.

Quality and artful finesse in design and materials • Millennials buying less, but better and more valuable: KRC calls this "buy less, buy better" trend as an alternative to fast fashion oversupply. Millennial desires are not addressed as target groups says Stella McCartney: "Authenticity is the key, meaning, value and uniqueness are in focus." ■ Jung is no longer just a "riot and party, party". Deceleration among young consumers. ■ According to WGSN, sustainable materials are on the way to commercial success and are becoming increasingly important for the future. ■ Anchor in yourself. Self-reflection and Body Mind Balance are considered self-protection in a troubled world. ■ New Formal is considered as a "new" fashion statement, in addition to the continuing enthusiasm for street and sports, especially among young consumers, as long as classic is staged modern, oversized, or coolly elegant.
GENERATION Z
Generation Z: There are 60 million people in North America alone. They think, feel, and consume differently. Status and luxury products are no longer in the foreground, preferred experiences, experiences and “real” products and people. The motto is “why burden ownership when access is sufficient?” Is “System Fashion” at a point where we talk about “real products” again? According to Eventbrite, in the future it will be about a manufacturing process of products, at the seams “Integrity” is incorporated.

TREND TOPICS_ENLIGHTMENT

ZEN UNIVERSE FEELING AT ZAK IK, BAREFOOT BOUTIQUE IN TULUM • ANIMATED NATURE: PHOTOSHOP FANTASY HOUSES BY CRISTAL.REZA • STUNNING SCULPTURAL ORGANIC LAMPS BY NACHO CARBONELL • THE NEW RAW LUXURY BRAND „THE SALTING “FROM NEW YORK • GREEN FOOD: DANDELION SEED PICKLES AT NOBELHART & SCHMUTZIG RESTAURANT BERLIN

THEME COLOURS –COMBINATION INSPIRATIONS

1. THE COMBINATION OF FOGGY ROSE, WINTERSKY WITH OAK LEAVE BRINGS A TOTAL MODERN TOUCH THEME
2. CLASSY AND REAL –NIGHTBLUE IN COMBINATION WITH LOLLIPOP AND DARK BROWN FOR A NEW TWIST
3. HARMONIOUS BARK AND CURRY HIGHLIGHTED BY ADDING HINTS OF COPPER

ENLIGHTMENT

A CURATED RETRO PALETTE WITH A WARM AND NATURAL ATTITUDE –COPPER INVIGORATES AND GIVES A MODERN TOUCH
TREND TOPICS _SHIFTING

DIGITALIZATION IS CONQUERING EVERY PART OF LIFE – 3D PRODUCT PRINTING – SERVICE ROBOTS AND SHOES WITH CLOSING FEATURES AND HEEL VARIATION VIA APP ARE CONNECTED TECH SNEAKER AND SHOES THE FUTURE OR WHEN WILL THEY BE COMMERCIAL?

• KANTINI: FIRST INDOOR FOOD MARKET BY AISSLINGER @BIKINI BERLIN • COUTURE IS YOU: CUSTOMIZATION STORE TOMORROW SHOWTIME @ KL • Tata Christiane: Modern Graphic Fashion Statements • Moncler Art Editions: Craig Green • Boros Art Bunker • TV Studio Design by Nendo

CREATE IT YOURSELF, BE YOUR OWN ARTIST: CUSTOMIZATION CONCEPT AT TOMORROW SHOWTIME (KL) FOR BAGS AND SHOES.

THEME COLOURS – COMBINATION INSPIRATIONS

1. AT FIRST VIEW DISTURBING – THIS IS A NEW AESTHETIC STATEMENT FOR AS WELL MAT AND SHINY PAT-ENT SURFACES

2. THIS PROGRESSIVE COMPOSITION OFFERS NON CONFORMIST COMBINATIONS WITH FUTURISTIC THRILL

3. NEW CLASSIC IN SIGHT – WARM GOLDEN HUES MEET UP WITH COOL FOGGY ROSE

SHIFTING

NONCONFORMIST PALETTE OF COOL DRY TONES IN COHABITATION WITH NEUTRAL CLASSICS FOR EXCITING COMBINATIONS
RAW LUXE – MAGIC OF THE UNIVERSE
IAMX: THE BURLESQUE AND DRAMATIC SOUND IS MIXED WITH HYPER ELECTRO AND HEAVY METAL.
ESTEBAN DIÁCONO: THE MASTER OF FLUID ANIMATED 4D CREATURES. THE NEW VOLUME OF THE
HUMAN BODY. FLEXIBLE, AIRY, TRANSFORMABLE.
• RUBEN WU: MODIFIED DRONES AS AERIAL LIGHT SOURCES FOR HIS PHOTOGRAPHY • MATTY
BOVAN BALLOON INSPIRED COLLECTION • ESTABAN DIÁCONOS MORPHED, FLUID 4D ANIMATIONS
• KEI NINOMIYA DARK FLOWER MASKS • MAXIM ZHESTKOV MOVIE „VOLUMES “EXPLORES THE
CONFRONTATION OF EMOTIONS AND THE LAW OF NATURE

THEME COLOURS – COMBINATION INSPIRATIONS

1. SENSUAL AND WITH A HINT OF MYSTIC IS THE COMBINATION OF BURNT SIENA WITH MAT GOLD AND
STEELBLUE
2. PURE WINTER MAGIC PRESENTS THIS ARRANGEMENT OF DEEPEST GEMSTONE TINTS
3. DEEPLY RICH VELVETY HUES ARE FULMINANTLY COMPLEATED WITH FUCHSIA

RICH SHADES COLLABORATE WITH FOGGY TINTS AND MAT GOLD FOR A MODERN MAGICAL THRILL

ENCHANTMENT
Demonstration of 

**Electro-oxidation based Zero Waste-water Discharge Technology**

at M/s Kings International Ltd., Unnao, Kanpur (UP)

Dr. S. Sundarapandiyam, Scientist, RCED-Kanpur, CLRI

M/s Kings International, Unnao has been manufacturing and exporting saddlery finished leathers from wet salted buffalo hides (heavy and extra heavy). The production volume is 200 hides per day (6 tons per day). The total volume of wastewater generated per day is around 143.5 m$^3$. Out of which, 131.5 m$^3$ of wastewater is sent to PETP and then to CETP, 6 m$^3$ is sent to chrome recovery and 6 m$^3$ is reused. The organization is contemplating to establish effective plant for the wastewater treatment in order to meet the zero discharge in tannery. CSIR-Central Leather Research Institute (CSIR-CLRI) had developed a ‘Zero Wastewater Discharge Technology (ZWDT) through Electro-oxidation’. Mr. Taj Alam, Managing Director, M/s Kings International Ltd., has approached CSIR-CLRI seeking the licensing of the Electro-oxidation based zero wastewater discharge technology.

M/s Kings International and CSIR-CLRI have deliberated and arrived at consensus, according to which CSIR-CLRI had to study the process system of Kings International Design and conduct demonstration of zero wastewater discharge system at M/s Kings International. Accordingly a demonstration plant has been installed by CSIR-CLRI at M/s Kings International Ltd, Unnao. On the basis of the process scheme, characteristics of the wastewater and hydraulic load, CSIR-CLRI had designed a ‘Zero Wastewater Discharge System’ (ZWDS) and the demonstration is being conducted successfully. According to process developed, the waste streams after screening (to remove the gross solids such as fleshings and trimmings) is collected in equalization tank. The wastewater is sent to their existing PETP to remove the suspended solids. Then, the PETP treated wastewater is subjected to Electro-oxidation for 2 hours. After Electro-oxidation, the treated water is being reused for appropriate unit processes. Quality of the leathers produced is also being tested and analysed.
On 11th November 2017, Mr. H.E. Alphonsus Stoelinga, Ambassador of the Netherlands along with the dignitaries Mr. Ella Lammers, The Sustainable Water Fund (FDW), Mr. Nico Roozen, Executive Director, Solidaridad Network, Mr. Johan van de Gronden, Global CEO, PUM, Mr. Michael Costello, Global Sustainability Director, Stahl, Mr. DP Mathuria, Executive Director, National Mission for Clean Ganges, Mr. Ashish Tiwari, Member Secretary, Uttar Pradesh Pollution Control Board, Kanpur, Dr B Chandrasekaran, Director, CLRI, Mukhtarul Amin, National Chairman, Council for Leather Exports, India, Dr Shatadru Chattopadhayay, Managing Director, Solidaridad Network Asia visited M/s Kings International to witness the Electro-oxidation based Zero wastewater discharge demonstrated by the scientists of CSIR-CLRI.

On 1st June 2018, the state pollution control board authorities (UPPCB) and Central Pollution Control body authorities (CPCB) have witnessed the treatment and expressed satisfaction upon the treatment efficacy. The following members were present in the team.
Mr. Ashish Tiwari, Member Secretary, U.P. Pollution Control Board
Mr. Gupta, Zonal Head, Central Pollution Control Board, Lucknow,
Mr. Singh, Scientist, CPCB, Lucknow Zonal Office,
Mr. P.K. Agarwal, Chief Environmental Officer, Circle 5, UPPCB, Lucknow,
Mr. Vimal Kumar, Regional Officer, UPPCB, Unnao,
Mr. Rajendra Prasad, Asstt. Engineer, UPPCB, Unnao.

They were amazed to see the outcome of electro-oxidation plant and discussed about the technical details and possibilities of promoting to other Kanpur-Unnao cluster industries. They had advised to document the process and the final outcome of this breakthrough technology and share it with the concerned authorities, so that they may take its cognizance and accordingly approve/validate this technology for replication purposes.
On 8th June 2018, a team of M/s Solidaridad from Netherlands visited to see the Electro-oxidation plant & its outcome and Zero Discharge processes being carried out. CSIR-CLRI made a presentation about the technology and its benefits to Netherlands delegates. They were impressed and deliberated about the promotion of this technology. They expressed their willingness to work along with CSIR-CLRI as technology partner in their endeavors to promote technologies of CSIR-CLRI under pollution reduction and efficient water use in Kanpur- Unnao leather cluster project.
“Injection Moulded Biodegradable Polyurethane Shoe Soles: Development, Characterization and Process Optimization”.


Dr. (Mrs) G. Saraswathy, Scientist, Shoe & Product Design Centre, CSIR-CLRI
The Conference was organized by International Union of Shoe Industry Technicians (UITIC), Portuguese Footwear Technological Centre (CTCP), Portuguese Footwear, Components, Leather Goods Manufacturers’ Association (APICCAPS).

The theme of the Congress is “From Fashion to Factory: A New Technological Age” which reflected the role of technology as the driving force of the economy and its impact on the global industries. The Congress highlighted the importance of the Roadmap for the Digital Economy, the FOOTure 4.0. This roadmap seeks to exploit the opportunities created by Industry 4.0 and defines four strategic priorities such as flexibility, digital technologies, customization and the management of relation between brands and consumer and fourteen measures, including: create new forms of customer interaction in a digital context; improve flexibility, customer response time, business intelligence and sustainability; qualify the industry for the Industry 4.0 principles, making it more dynamic, innovative and capable of creating new business; improve the intelligence and image of the sector.

Dr. G.Saraswathy presented paper in technical session 3 titled: Sustainability, Regulatory Trends Impacting on Factories. The topic of my presentation was “Injection Moulded Biodegradable Polyurethane Shoe Soles: Development, Characterization and Process Optimization”.

Following points are highlighted in the presentation:

**Introduction:**
Recently, synthetic polymers have gradually acquired importance on the world market and currently are an essential part of everyday life. However, among the various synthetic polymers, PU is being explored as an extensive material due to its versatile properties with enormous end use like footwear, etc. According to APICCAPS estimation worldwide footwear consumption reached 24.3 billion pairs in 2014 which are up by 3% than previous year and continuous to rise.

As PU soles have been replacing PVC soles in the past decade, and the majority of the formal higher priced leather shoes use PU for soles. PU in footwear with 13.5% of usage is the third largest application of PU in India. At the end of their life cycles these enormous footwear cause disposal problems, whose impact has ramifications worldwide. Hence to reduce the adverse effect of the waste materials from non-renewable sources, the utilization of polymeric products from biodegradable/renewable sources such as starch, cellulose and several other biodegradable monomers are being explored to improvise commercially in the market and few of them are under study.

**Objectives of the present work:**
The present work focused on the preparation of injection moulded biodegradable PU soles and footwear. In this context, the suitable choice of monomer to start synthesizing of biodegradable PU and the compatibility of the blowing agent with polyol is critical in terms of availability/cost effectiveness. It is our aim to formulate the composition of biodegradable and environmental friendly polyurethane materials from a suitable biodegradable/renewable polyol, diisocyanate, chain extender, catalyst, additives.

**Materials and Methods used:**
Injection moulded PU shoe soles are prepared using polycaprolactone diol (PCL), diphenyl methane diisocyanate (MDI), monoethylene glycol, water and tri amine catalyst. The reaction injection moulding system is optimized for isocyanate index and other processing parameters like cream time, tack free time and pinch time recommended for PU system.

To improve the flexibility of the soles, biodegradable PU nano-composites are prepared by adding the nanofiller in the control system and further optimized for Isocyanate index in each loading of filler to maintain the recommendation for Injection Moulding System. The injection molded shoe soles based on biodegradable PU nanocomposites were characterized by X-ray diffraction study (XRD), Infrared spectroscopy (ATR-FTIR), Thermogravimetric analysis (TGA), Differential scanning calorimetry (DSC) and Scanning Electron Microscopy (SEM). Physical properties were determined by measuring hardness, density, Bata belt flexing, Abrasion resistance, tensile strength following standard test methods.

**Results obtained:**
The physical properties of the biodegradable PCL based PU shoe soles and PU nano-composite based shoe soles are good as per the standard requirements. SEM pictures of cross sectional view of PU foam showed spherical bubbles of size 80 to 170 µm which confirms the normal foam formation with PCL polyol with conventional isocyanate and additives with existing injection molding system. Upon addition of nanoclay particles of 0.5 % to 1% the range size of bubbles is reduced and resulting in more uniform pores distribution. The hydrolysis resistance performance test showed no significant change with increase in nanofiller content.

**Field trial:**
Based on the results the biodegradable polyester polyurethane composites with 0.5% nanoclay is selected for bulk production of footwear with best physical properties and good morphological features. 120 pairs of footwear for men, women and children were manufactured in PU footwear manufacturing Industry using reaction injection molding system and...
distributed to people for regular use for field trial. After 2 months of regular usage, feedback is good and the footwear and soles are intact. At the end of 6, 9 and 12 months of usage, few pairs of footwear will be received back for testing the physical properties.

**Visits to Other Scientific Institute/Industries**

CTCP, Portugal is the Portuguese Footwear Technological Centre, a non-profit organization supporting the footwear industry in the fields of testing and quality control, technical assistance and consultancy, research and development of new materials, products, processes and equipment. This Centre has advanced physical testing facilities, run and managed by professional technicians, to offer all-around and comprehensive leather/footwear and components testing services.

CTCP is supporting the footwear cluster since 1986 and provides specialized services based on their skills and know-how and is the agent of public policies in the fields of innovation, standardization, technological surveillance, prospects, sustainability and industrial property.

CTCP has a full-time 45 staff, mostly senior managers. It has its own facilities in S. João da Madeira and Felgueiras, the two main centers of shoe industry. The scope of testing covers leather, footwear, artificial leather, soling materials made of rubber and polymeric products, thread and textiles, metallic components, fasteners, Adhesive and shoe finishes as per International Testing methods and standards.

CTCP also tests a range of chemicals and products including leather, textiles, paper, coatings as well as provide regulatory and compliance certificates for substances covered under REACH and other standards. The testing includes Heavy metal analysis, Chromium(VI), Formaldehyde, Phthalates, Organotins, Pesticides, Volatile organics, Fungicides and pesticide, etc.

**Visits to Shoe Industries**

**Company: Fábrica de calçado Anjonel, Lda**

Address: Rua Marco de Simães, n. 75. 4615-380 Caramos, Lixa

Brands: Mile / Volca

Pairs of shoes per day: 650,

No. of Employees: 60

The Footwear Factory Anjonel was born at 13 March 1985. Now Anjonel is a technological advanced and well-equipped company that essentially dedicates itself to the men’s casual footwear production with a flat construction.

**Company: Bolflex - A. Ferreira & Pereira, Lda**

Address: Rua Nicolau Coelho N.º 3315 Felgueiras, 4610-741 Sendim, Portugal

Brands: BOLFLEX

Employees: 130

The Bolflex is a leading market, specialized in the sector of components for shoes, with skills and credits established in the production and supply soles to the European footwear industry. The project began in 1992 installed capacity to produce about 20,000 pairs a day.

**Company: KYAIA - FORTUNATO O FREDERICO & CA, LDA**

Address: R. 24 de Junho 453, 4800-128 Penselo, Guimarães

Brands: Fly London / Foreva / Softinos

Employees: 600 (group) – 370 (company)

Kyaia footwear currently reaches 56 countries and the group currently produces 4 500 pairs of shoes per day.

**Company: GUILHERME DA SILVA ALMEIDA & FILHOS S.A.**

Address: Rua de S. Mamede, 824 - Apt. 97, 4610-539 Penacova, Felgueiras

Brands: RICAP / Softwalk/Da Silva/ Easyone / Botland

Employees: 170

With more than 30 years of experience, RICAP Shoes operates in the footwear sector, producing every day about 2000 pairs of shoes ready to be shipped to anywhere in the world.
During the pre-independence period, organized tanning activity was narrowed to a few British owned tanneries only. But certain significant historic events like the First World War fashioned the pattern of industrial production in India, i.e. transitioning to an organized scale. The requirements of the British army personnel in large volumes necessitated formal training of human resource in leather tanning. The first tanning school was set up in Chennai in 1914. Subsequently tanning centers were set up in various leather centers pan India including Kanpur (1916), Calcutta (present Kolkata) (1919), Jalandhar (1934) and in many places post-Independence. These tanning schools imparted technical education leading to vocational courses. But as the organized scale of production increased, it was felt that technical education should be adorned with professional education also to nurture quality manpower at all levels. This called for an advent of formalized education through professional courses in the field of Leather Technology.

The University of Madras had stepped forward as early as 1945 to offer courses in technology especially Chemical, Textile and Leather. The seed was sown by Dr. Alagappa Chettiar, the great philanthropist and humanitarian of the times, who endowed a grant of Rs.5 lakhs towards the same. The University of Madras established the Alagappa Chettiar College of Technology (A.C.Tech) to offer professional courses in technology. The attempt and efforts towards professionalizing leather technology education in the 1940’s has uniquely positioned the course, rather than classifying it as a customary engineering/technology programme. Initially the leather technology programs were of two years duration where students had to take up this course after a basic science degree leading to B.Sc (Tech) degree. Thus, this programme was basically a post-graduate degree. The first batch of leather technology graduates (B.Sc. Tech.) passed out in 1947.

In 1950, A.C. Tech building was completed and ready. The Department of Leather Technology was moved from Washermanpet to Guindy in June 1951. On the demise of Prof. Seshachalam Choudhary, Mr. Siviah Choudhary, Principal of Institute of Leather Technology (ILT) was appointed to act as the Head of Department of Leather Technology. Dr. A.L. Sundara Rao, Planning Officer, CSIR-CLRI helped in conducting the classes. The role of CSIR-CLRI until then was to provide the necessary backing for the conductance of the programme. CSIR-CLRI by then had its full-fledged tannery operations.

The Leather Post
<table>
<thead>
<tr>
<th>Courses offered</th>
<th>Duration (Months)</th>
<th>Place of Training</th>
<th>Eligibility</th>
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</thead>
<tbody>
<tr>
<td>PG Diploma in Leather Technology</td>
<td>18</td>
<td>Chennai, Jalandhar</td>
<td>Any Graduate with Science background</td>
</tr>
<tr>
<td>PG Diploma in Leather Products Technology</td>
<td>18</td>
<td>Chennai, Jalandhar</td>
<td>Any Graduate with an aptitude for Design for Leather Products Technology</td>
</tr>
<tr>
<td>Diploma in Leather Processing</td>
<td>12</td>
<td>Chennai, Kanpur, Jalandhar, Ahmedabad</td>
<td>50% in 10+2 or equivalent</td>
</tr>
<tr>
<td>Diploma in Leather Goods Manufacture</td>
<td>12</td>
<td>Chennai, Kanpur</td>
<td>50% in 10+2 or equivalent</td>
</tr>
<tr>
<td>Diploma in Leather Garments Manufacture</td>
<td>12</td>
<td>Chennai, Kanpur, Jalandhar, Ahmedabad</td>
<td>50% in 10+2 or equivalent</td>
</tr>
<tr>
<td>Diploma in Leather Footwear Manufacture</td>
<td>12</td>
<td>Chennai, Kanpur</td>
<td>50% in 10+2 or equivalent</td>
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Fee: Rs.75,000/- for P.G.Diploma course (18 months), Rs.40,000/- for Diploma course (12 months) each course. Applications can be downloaded from CSIR-CLRI website [www.clri.org](http://www.clri.org). Filled in application along to be sent to Head, CHORD, CSIR-CLRI, Adyar, Chennai – 600 020. Applications can also be obtained in person at the above address or in the respective regional centers: Kolkata: 033-23292381, Jalandhar: 0181-2651306, Kanpur: +91 9695330786 and Ahmedabad: 079-25840352.

**Note:** Reservation for SC/ST candidates as per Govt. of India Norms

**IMPORTANT DATES:** Last date for issue and receipt of application forms: 29/06/2018; Date of course commencement: 09/07/2018

### Milestone events for Academic Leather Education at CSIR-CLRI

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1944</td>
<td>Establishment of A. C. Tech and in 1945, a 2 year post B.Sc. (PG) programme in Leather Technology, known as B.Sc. (Tech) was introduced and continued up to 1958 with University of Madras</td>
</tr>
<tr>
<td>1955</td>
<td>The first Ph.D in Leather Technology was presented to Dr. E.C. Mathews</td>
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<tr>
<td>1956</td>
<td>Commencement of the 1st M.Sc. (Tech) by Research degree</td>
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<tr>
<td>1957</td>
<td>B.Sc. (Tech.) programme was introduced and in 1961 this program was replaced with a 5 years B.Tech.</td>
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<tr>
<td>1963</td>
<td>2 year M.Tech degree program introduced in leather technology</td>
</tr>
<tr>
<td>1978</td>
<td>Anna University was established and A.C. Tech became a part of Anna University</td>
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<tr>
<td>1980</td>
<td>Introduced the 4 year B.Tech. degree programme in Leather Technology</td>
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<tr>
<td>1983</td>
<td>3 semester M.Tech. degree in Leather Technology was introduced</td>
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<tr>
<td>1987</td>
<td>M.Tech. degree in Footwear Science and Engineering was introduced</td>
</tr>
<tr>
<td>1996</td>
<td>M.S. (by research) Programme commenced in the Department of Leather technology, Anna University</td>
</tr>
<tr>
<td>2000</td>
<td>Developing professionalism among working technicians, a 7 semesters B.Tech (part time) degree programme in Leather technology was introduced</td>
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<tr>
<td>2002</td>
<td>M.Tech degree programs were converted into a four semester course</td>
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<tr>
<td>2015</td>
<td>Alumni base of Dept of Leather Technology, Anna University – CLRI crossed 1500</td>
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Research-Industry-Academy – Triple Helix Model at CSIR-CLRI

Academy-Research-Industry interaction enhances better co-ordination between industrial houses and engineering education institutions. Any well-designed and developed chain in an innovative sector would call for a symbiotic relationship among the trinity of academy-research-industry. Education pertains to the preparation of an unprepared mind. Training deals with the preparation of an underprepared mind. Academy is designed to create new ideas. Research is structured to add values to such creative ideas and reduce risk through the development of waste and cutting edge technologies. Science links academy with research. Technology links research with manufacture and industry. The science and technology chain in leather technologies in India is linked by CSIR-CLRI through a unique function. CSIR-CLRI plays the role of three-dimensional organization simultaneously in HRD programs. It is involved in education, training and consultation simultaneously. Therefore, the various stages of preparation of mind are being catered to by CSIR-CLRI under a single roof.

Marching forward with Technological Education

The technological education system caters to two types of courses namely conventional and industry oriented courses. In conventional courses, the output indicator is not required whereas technological education in leather has direct impact on the industrial growth as technical education provides the human resources, manpower for a successive economic growth of a country. Technological education forges ahead of the industry. The success of economic reforms depends upon the quality and quantity of technical manpower engaged in manufacturing and service sectors. Social ethos and work culture of the society do influence learning skills and methods. A close interface of the technical education and the public policy of the nation are necessary as the society expects higher education to develop technology, productivity, international competitiveness and the economic development. The environmental constraint posed by the leather processing demands innovations in technical education.

India has accepted the policy of globalization and has produced world-class adaptive work force. The ever-increasing competition at national and international scenario would impose upon highly qualified trained human resources an ability to remain competitive. An important development in technical education in leather technology in India is in the design of various courses, course materials by CSIR-CLRI matching the needs of various learner targets. The Indian industry
had employed methods for long. It was recognized that value addition to leather is best achieved through addition of technology leading a change in the outlook of manufacturing systems gained much importance during 1950’s and 60’s. CSIR-CLRI has played the role of the agent of change. The technological capacity into manufacturing systems of India has grown in leaps and bounds during 1980’s, 90’s, the millennium and beyond.

As an institute with strengths in many areas of leather as well as frontier areas of science, CSIR-CLRI is able to harness in faculty resource to cater almost any need of HRD activity in the area of leather technology. Strong ties and a continuous interaction with the industry help CSIR-CLRI to fine tune academic and vocational training programs periodically to suit the changing needs of the manufacturing systems in leather sector. This three-way interaction among industry-research-academy has helped in setting up a unique base for education and training in the area of leather and related technologies.

**Education and Training paradigms at CLRI**

Today the Leather Industry in India being mostly manned (tertiary level) and managed by the alumni of CSIR-CLRI, the Institute’s training Paradigm is one of its kind imparting the much needed technical as well as professional skills. CSIR-CLRI, being an organization of rich pedigree, believes in synergetic efforts to culminate into the best of outputs. Hence, the Institute has entered into many HRD partnerships as well apart from R&D partnerships to gratify the HRD element of its mandate. CSIR-CLRI is proficient enough to guide in policy-making for the Leather Industry in all aspects including Technology, R&D and HRD. The Institute is instrumental in development of quality manpower with respect to all skill levels and capacity building as well. Moreover, Government of India recognizes CSIR-CLRI as an apex body for leather sector where the Institute serves as a certifying and accreditation body for leather and leather product exports.

The following are the major education and training models through which skill training at different levels is imparted to the trainees:

1. Academic Programs
2. Vocational Programs
3. Artisanal Skill Programs
4. Executive Training Programs
5. Project Work and Internship
6. International HRD
7. CSIR-CLRI a National Monitoring Unit (NMU)

CSIR-CLRI organizes various education and training programs for the leather industry that includes academic programs like B.Tech., M.Tech. and Ph.D. in collaboration with Anna University, Ph.D. in collaboration with Madras University and AcSIR, vocational training programs, executive training programs, project work/ internships and also international training programs. Each of these courses/programs are in line with the qualification by levels across the NSQF proposed by the National Skill Development Corporation (NSDC)/ (LSSC) in the newly formed Skill Ministry.

**Artisanal Training**

Majority of the workforce in leather sector is primarily skill-oriented. And performing shop-floor operations requires appropriate skill training which is well-formulated and structured. Often this training need is overlooked where the artisans are hired and trained on the job. CSIR-CLRI with an aim to bring an organized way of skill acquirement by the artisans has ascertained another avenue, which is, skill development. This will result in increased productivity and effectiveness of the workforce who are of the greatest proximity to the end product.

CSIR-CLRI took up several socio-economic projects on a mission mode and few of the projects are elucidated below:

- Evolution of ‘Athani’ Model – Adoption of Villages by CSIR-CLRI
- Kolhapuri Revolution - Transformation through Technology
- Empowering artisan from Rural Non-Farm Development Agency (RUDA) of Rajasthan
- Empowerment of leather cooperative society artisans through Gujarat Rural Industries Marketing Corporation (GRIMCO)
- NSFDC sponsored skill training programme for artisanal candidates who are below the poverty line and double poverty line limit pan India

**Wide portfolio of training areas**

CSIR-CLRI has always been there to support the industry whenever it requires a hand either in the form of technology or in training. When it comes to training, the industry needs are dynamic and the training programs have to be structured based on the specific training requirements. CSIR-CLRI takes every effort to cater to rare training needs of the industry as well. Apart from the standardized modules we also offer customized/tailor-made programs for the industry people depending upon their request. The industry officials concerned are invited for interaction, training needs are analyzed formally and the training programme schedule/content is prepared with utmost care to deliver quality output. Many such programs organized on need- basis were one of its kind training whose course contents are designed distinctively.

Some of the atypical modules that were conducted by CSIR-CLRI include - Basics, preservation and Testing of Leather and Leather Products; Examination of Finished Leathers and Products for Exports, design...
and development of Leather Upholstery; Online quality control and inspection in shoe-making; Design and development of open footwear making and so on.

**India: a developed country in Leather Training**

Right from economically developing to developed countries, CSIR-CLRI remains the leather technology super power for all the countries. CSIR-CLRI involved in both ‘teaching a student’ and ‘teaching a teacher’ simultaneously and dealt with prepared minds and elevated their levels for beneficiaries from various countries. CSIR-CLRI has always exhibited its global leadership as an international trainer organization catering to the training requirements of the world leather sector. The Institute ever since its inception has trained more than 450 candidates from 50 countries all over the world.

![Global outreach in HRD by CSIR-CLRI](image)

**Details of International training programmes in the past five years**

<table>
<thead>
<tr>
<th>S. No</th>
<th>Nationality</th>
<th>Training Discipline</th>
<th>Marking the beginning of the Industry Trinity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Kenya</td>
<td>Diploma in leather processing and leather goods</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Germany</td>
<td>ETP in Leather and Leather Products</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Ethiopia</td>
<td>Training Programme in Leather and Leather Products Manufacture; MSc in Leather Technology and PhD programmes</td>
<td>104</td>
</tr>
<tr>
<td>4.</td>
<td>Finland</td>
<td>Training programme on Leather Processing - Fur/Hair on skin</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Netherland</td>
<td>Training programme in leather and leather products manufacture</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Vietnam</td>
<td>Training programme in “Cleaner leather processing and tannery waste water treatment technologies”</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>South Africa</td>
<td>Executive training programme in leather processing</td>
<td>2</td>
</tr>
</tbody>
</table>

Role of CSIR-CLRI in skill development through NSDC

The leather sector is confronting major problem of shortage of skill manpower, particularly for performing shop floor level operations as these workforces are employed without any professional vocational training but are given only on-site training in the factories concerned. This has led to non-availability of trained manpower and a major stumbling block which is affecting the productivity and price competitiveness of the sector. The Council for Leather Exports has formed the LSSC an approved body of National Skill Development Council (NSDC) to promote skill development by catalyzing the association of several training institutions at varied levels of education and training. CSIR-CLRI plays a critical role in the development of skilled manpower by developing the trainers through training of trainers programme, assistance in the development of National Operating Standards (NOS) provide training in niche areas and also certification to the workforce/potential workforce as an assessor body.
The role of CSIR-CLRI in this endeavor is to play an effective role as the representative apex body in the leather sector with its rich education and training experience facilitating the development of skill solutions for industry players in acquiring and developing the requisite skilled manpower needed to sustain the envisioned growth of the leather and leather products industry with a perspective to emerge as a global leader. CSIR-CLRI will support and facilitate the LSSC in providing skill training/up gradation to 2 million learner and workforce by 2020, which will be 56% of the estimated new workforce of 3.6 million and 33% of the total workforce of 6.1 million by 2020.

Research professionals at CSIR-CLRI are in resonance with academy and industry. It enables the institution to remain virtually young. With about 1000 students being engaged in learning and training annually, CSIR-CLRI benefits by the large number of young minds being invested with the leather sector. The institute has also developed networks with other training and educational institutions world-wide. Hence, CSIR-CLRI plays the role of a mother body in the HRD for Leather. CSIR-CLRI as a living organization with its legendary stature has set an example to be emulated by any other organization, which need not be a R&D organization too, as to how to be “useful and relevant” to the society concerned. In this modern era, its heralded international status has marked newer dimensions. Reaching globally would become a very fundamental requirement of any growing organization when liberalization, privatization and globalization are commonplace.

World Environment Day (2018) was celebrated on 5.6.2018 in this Institute. While celebrating, variety of trees planted in this Institute campus. On this Occasion, Dr.B.Chandrasekaran, Director, CSIR-CLRI highlighted the importance of this celebration and insisted to plant the trees which are suitable for this environment and also enrich the existing bio-diversity in this Institute. Dr. B N Das, Chief Scientist, Shri DVS Sastry, Administrative Officer and other Staff of the Institute and students from SONA Engineering College, Salem participated in the programs and planted the trees in this campus.
National Meet of Craft Council of India was held at the Mayor Ramanathan Chettiar Centre Hall (MRC Centre), Santhome High Road, Chennai on 4th April 2018. The major focus of the national meet had been on building of an uninterrupted green value chain in crafting products, from raw material to processes and post production practices. The argument so far has been that the craft sector is environmentally green and more sustainable because of its dependence on natural materials, low use of fossil fuels and decentralised patterns of production. Reconciliation is sought to be achieved between environmental and economic concerns. Hence deliberations of the national meet were focused on the presentation by experts and stake holders on successful green craft clusters and use of green technology. Scientists from CSIR-CLRI Dr Swarna V Kanth, Dr B Madhan, Ms Malathy Jawhar, and Mr K Karthikeyan were all participants of the National Meet as special invitees by the Craft Council.

Dr B Madhan, Principal Scientist, CSIR-CLRI made a presentation on “Greening Leather Sector for Inclusive Growth”. In his presentation, Dr Madhan covered the evolution of leather manufacture from early age to middle age to modern age, and proportional increase in the need of water and thereby the discharge of wastes. In his presentation, he highlighted current initiatives of CSIR-CLRI in making the leather manufacture sector greener and cleaner. The work carried out by CSIR-CLRI in skilling the leather products’ artisans in Karnataka, Rajasthan, Gujarat and North Eastern states were also highlighted in the presentation. Delegates who attended the national meet were able to realize the value chain and the employment generation associated with leather and leather products manufacture; and how this sector connects a rural farmer to a fashion world. The presentation was well received and appreciated by the participants and members of Craft Council of India.
Review of Projects under Fast Track Translation

Director along with the Core Evaluation committee reviewed the on-going FTT projects funded by CLRI on 13th June 2018. The progress made on the projects were evaluated. Each Project Leader made a PPT presentation for about 10 minutes highlighting the activities carried out.

In picture: Dr A Gnanamani is seen explaining her work on ‘Health-care product for infected wounds.’

Projects reviewed include:
1. Smart Leathers Responsive to Electrical and Magnetic Fields - CLRI/FTT - 01/17
2. Preparation of Compost from Animal Hair- CLRI/FTT - 02/17
3. Sequential oxic-anoxic bio reactor technology for reduction of primary chemical sludge in wastewater treatment- CLRI/FTT - 03/17
4. A health care product for infected wounds - CLRI/FTT - 04/17
5. Chicken feet leathers - CLRI/FTT - 05/17
6. Odor abatement system for tanneries – CLRI/FTT - 06/17
7. Protein syntan from trimmings waste – CLRI/FTT - 07/17
8. Co-digestion of tannery Solid Waste – CLRI/FTT - 08/17
9. Lubricant with retanning effect - CLRI/FTT - 09/17
10. Activated Carbon and Soles from Fleshing Waste - CLRI/FTT - 10/17
11. A Composition for Preservation-Cum-Unhairing process - CLRI/FTT - 11/17
12. New Dimension in children shoes - CLRI/FTT - 12/17

Tirupur Corporation to set up Bio–CNG bottling unit

MoU signed with CLRI for project report preparation

The Tirupur Corporation is all set to build a bio-Compressed Natural Gas (bio-CNG) bottling plant where organic degradable wastes generated in the city would be converted into CNG that could be used to run automobiles.

As the first step, the Corporation administration had now signed a Memorandum of Understanding (MoU) with Council of Scientific and Industrial Research- Central Leather Research Institute (CSIR-CLRI) for the preparation of Detailed Project Report and development of suitable technology.

“We are expecting to get the DPR prepared in six months and the project will come up under the concept of ‘waste to wheel’”, said City Engineer G. Ravi.

Dr. P. Shanmugam, Principal Scientist at CSIR-CLRI who is also the project leader for the bio-CNG plant project, told The Hindu that the project would be implemented on public private partnership (PPP) model.

“Under this, a new plant with the capacity of converting 100 tonnes of organic degradable waste per day into bio-CNG will be set up. Apart from that, we will also upgrade the 10 tonne capacity pilot biogas plant presently been functioning in Tirupur city and make it suitable for producing bio-CNG”, he said.

Currently, nearly 520 tonnes of mixed municipal solid wastes get generated every day in Tirupur city of which 100-odd tonnes were organic degradable wastes. The two plants would have a cumulative capacity to produce 300 bio-CNG cylinders per day (each cylinder holds 14 kg).

“Each kilogram of CNG will cost much lesser than fossil fuels and give more mileage to the vehicles”, pointed out Dr. P. Shanmugam.
“BEING A PRIVATE SECRETARY”
“We must accept finite disappointment but we must never lose infinite hope”

A C Balasubramanian, PS to Director, Director’s Secretariat, CSIR-CLRI

Born in a remote village of Annur and brought up by the Textile City of Tirupur, with ray of hope and dream to become an auditor in accounts, this 20 years’ young man, A. C. Balasubramanian, marched towards the erstwhile Regional Research Laboratory (currently the Indian Institute of Chemical Technology), Hyderabad as a trainee in Feb 1979. Soon he changed the line and became a Stenographer during September 1980. With the knowledge gained in accounts, recruitment and inorganic and physical chemistry divisions, he was chosen to work in Director’s Office since 1982.

A Boss can choose a Private Secretary and a Private Secretary cannot choose a boss

“A Private Secretary will keep the officer free from routine nature of work by mailing correspondence, filing papers, making appointments, arranging meeting and collecting information so as to give the officer more time to devote himself to the work in which he has specialized. The PS will also maintain the confidentiality and secrecy of confidential and secret papers entrusted to him. He will exercise his skill in human relations and be cordial with the persons who come in contact with his boss officially or who are helpful to his boss or who have dealings with the boss as professional persons.”

That may be defined by the office and role of a Private Secretary (PS). “He is a mirror through which the employees see the boss and vice versa”. People are different but not difficult to handle. With INTEGRITY, LOYALTY, TRANSPARENCY, CONFIDENTIALITY, ACCOUNTABILITY, HONESTY, EXERCISING LEGITIMATE AUTHORITY, IMPARTIALITY, RESPONSIVENESS, SERVING THE PUBLIC INTEGRITY, RESPECTING LAW and EXERCISING THE LEADERSHIP, the so called PS can win over hearts. Let me come back from indirect to direct.

Goals are met when we coordinate our efforts with those of others

From the School of Dr G Thyagarajan, Formerly Director of three National Laboratories, mentored by Dr T Ramasami, Former Secretary of DST who have also treated me as their own family member, I had the joy of working with Dr A V Rama Rao, Dr R B Mitra, Dr K V Raghavan, Dr A B Mandal, Dr S R Wate and Dr B Chandrasekaran.

Our happiness and emotional security depends closely on the way we relate to others

Getting along with boss is not a difficult one until we know the kind of bosses. Interestingly, bosses are of four types, viz., the openly sensitive boss, the fake sensitive boss, the truly responsive i.e., dream boss and neutral. God was very kind to me that I had dream bosses during my tenure who were genuinely interested in my work, advancement, happiness and well-being.

I had the privilege of working with the Teacher (Dr T Ramasami) and his first student (Dr B Chandrasekaran). The uniqueness is that both are student-turned Directors from this great institution. My present and last boss of my career, Dr Chandrasekaran, whom I saw as a student turned Director, a highly tech-savvy Director, is a perfect blend of knowledge, simplicity, accommodativeness and pro-activeness.

While performing the duties I had always kept in mind the following:

Anger leads to clouding of judgement
And that, in turn, misleads.
Lack of direction triggers loss of mind
Which leads to destruction.

Bid adieu

I had entered CLRI on 1.1.1987 on transfer from Hyderabad. I will be demitting my office on 30th June 2018. I had fully enjoyed my stay at CSIR-ICT and CLRI. I thank my bosses, colleagues, academic institutions and industry partners for their valuable cooperation in carrying out my tasks.

I fail in my duty if I do not acknowledge the support of my parents, my wife Satya and my children, all my family members and my colleagues at Director’s Secretariat, Mr B Sivaraj, Mr P Ponnukrishnan, Ms T K Varalakshmi, Ms Krishnaveni Bhasker, Mr K Chandra Babu, Mr J Ashok, Mr Ratnesh Kumar and Ms N Manju.

“Carry a heart that never hates.
Carry a smile that never fades.
Carry a touch that never hurts.”

Thank you, Jai Hind!
International Yoga day celebrations at RCED- Kanpur & Jallandhar

Retirees during June 2018

Shri BALASUBRAMANIAN A C
Private Secretary,
Director’s office
ADMINISTRATION

Smt MUTHULAKSHMI R
Sr. Technician (2)
PROJECT PLANNING &
BUSINESS DEVELOPMENT
(PPBD)

Shri THIAGU R
Senior Principal Scientist
ENGINEERING
SERVICES - AC &
REFRIGERATION
INDIAN LEATHER INDUSTRY - STRIDING WITH CONFIDENCE

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