CSIR-Central Leather Research Institute

News you can use

Protective Apparel for Bikers Designed and Developed at CSIR - CLRI
Dear Doyens and Members of the Indian Leather Fraternity; Colleagues from CSIR, Colleagues and Friends! It gives us great pleasure in sending you our May 2019 edition of The LEATHER POST.

I have been given additional charge of CLRI on 30th April 2019 and I hope that this transition in CLRI as Director would be short. As Director of CSIR-SERC, I have always appreciated CSIR-CLRI for the plethora of activities being undertaken and CLRI’s close connection with the Industry it serves.

This edition of the LEATHER POST carries research activities accepted globally and for presentation at the XXX IULTCS Congress by at least eight scientists, the reflection of the members of the Research Council of CLRI who have made a clarion call for transition of Central Leather Research Institute to Global Leather Research Institute: a rich tribute to this Institution that is strong on its foundation and this foundation is the wealth of knowledge and the opportunity to be associated with the Industry it serves: the Indian Leather Industry.

We at CSIR-CLRI will strive to make this magazine informative and interesting and welcome your feedback for improvement.

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Hearty Congratulations!

Shri P.R. Aqeel Ahmed
Chairman & Managing Director, Florence Shoe Co. Pvt. Ltd
and
Chairman, Council for Leather Exports

has been elected as Chairman of Leather Sector Skill Council (LSSC) at the meeting of LSSC Governing Council held in Chennai on 11th July 2019.

LSSC is functioning under NSDC and is involved in skill activities

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Chairman of the Council for Leather Exports (CLE), Shri Aqeel Ahmed and the Executive Director, CLE, Shri R Selvam, IAS, met Prof Santosh Kapuria, Director, CSIR-CLRI on 2nd July 2019 and discussed about the leather industry and global trends.
Shri DVS Sastry, Administrative Officer, CSIR-CLRI welcomed the Staff of CSIR-CLRI to the Director’s Address at the Triple Helix Auditorium on 1st July 2019. He said that “we have gathered here to listen to Prof Santosh Kapuria who has taken additional charge as Director of CLRI since 1st may 2019. Shri Sastry welcomed Prof Kapuria and Dr C Muralidharan to the dais.

In his remarks, Dr C Muralidharan, Chief Scientist mentioned to the gathering that the purpose of Director’s address this day is that Director desires to share his views on the proposed activities for 100 days, three years and five years’ plan. Dr Muralidharan stressed that CSIR-CLRI is a performing laboratory and finds place in the Top 10 in terms of publications, patents, R&D, skill development amongst others. There is ‘no sphere unturned’ he said.

Prof Santosh Kapuria, Director, CSIR-CLRI said that he completed two months of temporary period and is very proud to be a part of this great organization even if for a short period. He said that since he was very new to CLRI, he observed for some time and chose to address the staff this day. Prof Kapuria reiterated that CLRI is a ‘well performing organization.’ There was nothing to add to the technical aspects of the lab. Thanked the staff for the extra-ordinary cooperation received. In CSIR, said Prof Kapuria, each lab has its own way of performing and he learnt how things were shaping up in CLRI. Recalled the meetings he had with senior colleagues and scientists under the age of 35 and was happy to share that there were future leaders amongst us. Prof Kapuria expressed joy over the progress of the LIDI project and said that it was a very prestigious programme. He had also reviewed the works and has identified areas of priority.

Little small steps were taken said the Director. Project leaders have been empowered to spend monies without the Director’s approval. Complimented the house-keeping department for a good job. Volunteers were needed to keep the campus and surroundings clean and these have to be participative in nature said the Director. CLRI’s contribution in different aspects: CLRI is on the top. But never be complacent, he cautioned. If one thinks that he/she has done enough, we are dead as a Scientist.

He moved on to speak on the Dhanbad Declaration. We do require basic research, applied research, earnings, skill development: whatever we do, we need to excel! Keep doing good research.

“Exploratory Research” and “Translatory Research” must interconnect and not be independent of each other. The goal is to be ‘SUCCESSFUL.’

said Prof. Santosh Kapuria, Director, CSIR-CLRI in his address to the Staff on 1st July 2019
As CLRI comes under the Chemical Theme, we need to plan ‘futuristic programmes’ forecasting the needs for three years and five years’ programme. We need to orient ourselves under the sub-themes and address a problem holistically through exploratory and translator research, only then can an impact be created said the Director. Work with specific deliverables, clear objectives, novelty and come out with two pages’ write-up and three slides for each project. Young scientists may have much higher stake. The projects must not be individualistic projects but Team work, complementing each other’s ability. The prime Minister has formed a S & T Advisory Council and some of our projects could also be sent. Number of good publications is important. Nothing is bigger than the opportunity we have now. “MUST CONSTANTLY ACHIEVE.”

Formulate projects at the right time: Human Development, Rural Development and Import substitution. Well-articulated, well drafted proposals that could be readied within the next fifteen days. Use the current buzz words like A.I., Industry 4.0, smart materials. Director cited the example of ‘Sports Shoes’ that is using smart materials. Environment and its sustainability is an important theme stressed the Director.

In conclusion, Director presented a glimpse of the conflicts in the organization. Without being a good human being, you cannot be good in Science, he said. We need to conduct ourselves with magnanimity. Administration is heavily loaded with such things.

EACH ONE OF YOU IS VERY IMPORTANT TO THE ORGANIZATION. WORK WITH SINCERITY AND HAPPINESS.
Motorcycle riding is more than a passion, an art and a serene experience which is unique to every biker. Studies claim that Motorbikes are one of the fast growing products in automobile sector globally. Presently there has been an increase in the rate of accidents and finding clothing to shield the bike rider from impact and abrasion is very important.

To improve motorcycle safety many countries mandate the wearing of personal protective equipment. Protective clothing includes jackets, pants, gloves and boots. Jackets meant for motorcyclists are typically made of leather or specialized man-made fabrics like Cordura or Kevlar. Motorcycle jackets made of high quality leather have good abrasion resistance and a good protective gear can prevent or reduce injuries in a crash. These jackets typically include heavy padding on the elbow, spine and shoulder regions to ensure safety. The brands for biker’s jacket collection include ALPINESTAR, BMW, SCIMITAR, DSG, CRAMSTER, RYNOX, KLIM, ICON, RUKKAH, REVIT.

A well designed motorcycle gear will make the rider comfortable in riding position and still be reasonably comfortable while moving around when not on motorcycle. It is essential for a riding jacket to have reflectors. The reason being, it helps in improving the visibility in dark as riding at night can be dangerous. Reflectors on the riding jacket will glow in light from other vehicles and make the rider highly visible. Hence, other motorists will be able to spot from a distance.

A comfortable fit for a riding jacket is as important as its protection. The jacket should neither be too tight nor too loose so that it can be worn comfortably both, in summer and winter. Further, its length at the arms should be just perfect as longer sleeves can interfere while holding the handlebars.
While selecting a motorcycle jacket, safety should be given the priority. Because of its texture, leather is denser than textile weaves. When leather is subjected to mechanical strain it undergoes a process of load distribution by stretching slightly. This protects the material from ripping easily. Textile materials perform worse than leather in this respect. It is easier to tear the weave, causing unprotected areas of the skin to slide across the pavement. That’s the reason why motorcycle jackets made of a textile weave are reinforced with materials like leather or Kevlar. More and more manufacturers are offering jackets made of a combination of leather and textile materials. Leather usually covers the most vulnerable parts of the body, including the upper back, shoulders, and elbow. The textile weave offers better comfort by creating extra ventilation.

Motorcycle jackets should have integrated protectors. These are pieces of protective padding typically on the arms, back, and chest of jacket. Protectors shouldn’t restrict comfort, but should cover a large enough surface area to protect the upper body. Impact protectors only work if they remain in place in a crash. While buying gear that is protective we need to ensure that the products have been tested against recognized standards. European Standards set minimum levels for test performance of all motorcycle gear that claims to provide protection from injury. The tests examine abrasion, tear, burst and impact resistance. Seam failure is the most common failure in motorcycle clothing. The seams bursts on impact when the rider hits the ground.

Motorcycle protective gear made for the European market should be marked with a CE label which states that it has been tested and complies with the relevant European Standard. Good jackets will indicate they are “CE approved,” and there are both CE1 and CE2 levels of approval available for jackets. CE2 is a better level of protection. If a product has not been tested, it is not possible to know how well it will perform in a crash.

The letters “CE” are the abbreviation of French phrase “Conformité Européene” which literally means “European Conformity”. The term initially used was “EC Mark” and it was officially replaced by “CE Marking” in the Directive 93/68/EEC in 1993. “CE Marking” is now used in all EU official documents. All of this has to do with the European motorcycle safety standards. In contrast, to ride a motorcycle in Europe, the Protective apparel should meet these standards.

A study of motorcycle crash casualties, found that riders wearing protective clothing spent less time in hospital, and returned to work on average 20 days earlier, than those who were not protected. The protected riders were also 40% less likely to have suffered a permanent physical defect.

With Government of India’s initiative to catalyze startup culture, M/s Wiser by the mile, a startup company evinced interest in developing Protective apparel for bikers and initiated discussions with Team SPDC, CSIR - CLRI. Intense Analysis on existing materials and identification and selection of materials for protective application was carried out judiciously.

The Prototypes (for both men and women) were developed at SPDC, CSIR – CLRI, based on the specifications and requirements of the client making it a special one using highly abrasion resistant material. One of the important property of bikers jacket is that it should be flexible so that bikers can stretch and move their body easily. Keeping this in mind, the Prototypes have been developed by combining leather with Special elastic material for flexibility. Vents have been provided in the jackets. Placement of the vent is very important as it helps in airflow for riders while travelling. The Padding materials in the jacket prevent the bikers from getting injured by efficiently distributing the energy in a crash when bikers fall down thereby reducing chances of injury. The collar is made using chemical resistant and flexible fabric which contributes to neck comfort. Reflectors were used to make the rider more visible. Waterproof Zippers have also been provided which prevents water from entering the jackets. The samples were ready and made available for an initial review before finalizing on the field test process and test elements. The jackets were then field tested using Triumph Street Triple 765cc Naked Street Bike and Royal Enfield Interceptor 650cc Modern Classic.

Feedback based on the ride:

The jacket was comfortable for the ride with good heat and wind deflection. The jacket fitted well along the arms with no restrictions to riding movements. The jacket looked very well made, with attention to detail, cleanliness in terms of design, and features. The materials, zippers, styling, stitching, branding, stretch parts, lining, armor positioning, neck cushion, cuffs were good. The designs will be transferred to the client soon.

Dr (Smt) Phebe Aaron, Senior Principal Scientist, Shoe & Product Design Centre, CSIR-CLRI & Principal Investigator of Protective Apparel for Bikers

It’s always a pleasure to field test a prototype, while being developed by CSIR CLRI to customer specification & requirements, makes it a special one. After a few mock ups, we had arrived at the prototype incorporating the closest to production parts/configuration of the jacket.
3D printing is a boosting technology to the manufacturers, traders and to the consumers. Since, this offers easy manufacturing ability of the components, in an affordable prices and in an astonishing designs to a trader. The idea of “3D Print- a Design” is a gift of this era since it bestows the ultimate styles for a common man, models, sportsmen, celebrity and a specially abled person. The competition in the business is decided by the ability of the company by putting forth customized designs, especially in the footwear sector. Thorough studying the fashion up-to-date and estimating the future market rate, and co-ordination between the producer and the seller to reach the consumer with the apt designs with the understanding the tang is where necessitates the utilization of 3D Printing technology. 3D Printing market demands Printers & their respective inks which are in several phases such as sale of Prototypes, Mass materials, Customized or personalized designs.

3D Printing offers die less manufacturing of prototypes, therefore denoted as Rapid Prototype Technique (RPT). To go for mass production, the die is required and the same could be made by the RPT in 3DPrinter.

It is well known that leather, Suede leather, several natural and synthetic fibres/fabrics are used in the upper part with the stitching, binding and nailing process. While rubbers, thermoplastics, Nylons and Urethane foams are used for making sole. Now the both upper and sole are designed in segments or integrated to get fabricated in 3D Printer.

Any polymer that is capable to melt, drawn into filament and able to liquefy could be used for making 3D Printable filament. If the company has Innovative design making CAD-Engineers, indigenous printing inks, printer technologies to expo standard footwear, have the potential to gain high economy growth rate in this arena.

CURRENT 3D PRINTING TECHNOLOGIES CATEGORISED INTO FIVE MAJOR TYPES

1. Fused deposition modelling (FDM)
2. Selective Laser Addition (SLA)
3. Digital Light Processing (DLP)
4. Selective Laser Sintering (SLS)
5. Laminated object manufacturing (LOM)
3D Printed Bio-Leather

To grow a leather in a lab of one square foot it requires only 45 days. Unlike from an animal source which need 2-3 years. Modern Meadow in Brooklyn interested in developing bio fabricated leather involving clothing designers. Horizons Ventures has invested $60 million in Modern Meadow expects to make business worth over $100 billion a year. In addition Horizons Ventures and Iconiq Capital have invested $40 million. The company has also attracted a further $33.9 million in grants and tax credits. Organova Company with $530 million to start up initiative in 3D Printed bio fabricated leather and planning as well to make a route to grow meat by tissue engineering method of culturing from cells to tissues. The advantages in 3D printing can be exploited to use in growing leather as so many consumers of leather can have prerequisites and get 3D customized leather printed. Further, they are into the sale of skin models to L’Oréal Company for cosmetics testing.

Say No to Traditional Techs. But yes to modern Tech. Productions

It is possible to incorporate leather thickness, grain patterns, pore volumes, color’s, chemical compounds which results into the desired physical textures, strength, mechanical, hygrothermal, flame resistant, Ready to wear designs. “Digital leather making in design knowledge into utility can go beyond inquisitive usage new methodology will find new applications like “new wine into new wineskin” only. Therefore, 3D printing of leather have a dramatic impact on socio-economy, geo political, human labour, machinery which will hopefully restore back the quality land, water, air, eco-life cycle to the earth. Let us receive this technology and corner the customaries for a while to wait and see!

Footwear 3D Studio

Mr. West a German mechatronics engineer envisions that stunning high heel shoes is likely to emerge only from the high-end designers, accounting the criteria’s such as balance, fit, shape, flexibility, and mass productions. Myriad of products made possible with the multiple technological printers. Wiivv is one of the company is at the forefront of mass customization has worked out towards sustainable economy on personalized products at costs similar to mass manufacturing.

Sneaker market will always be in high trend, since all types of games wants Ultra hyper standard sneakers to do sport. The sports advertisements captures the minds of their fans and gets momentum to propagate in continuum word wide continually throughout the year. The brands like addidas, Nike, Puma etc., are in the battle on the cloud with Amazon, Alibaba to sneak out each one’s new model.

Advanced tooling machines, Robots for the monotonous labour works, and trivial work, jigs, fixtures, and metal components required for leather and footwear industries
Every customer who visits the shop, during their maiden visit, should be suggested by the seller to have their feet scanned and the software/data made available in the shop and the customer. If personalized last modelling and the data are made available with the customer, they can then go for virtual touring in the shop and virtually wear, view, and place orders from their home and from wherever they are. The customer is not required to make a visit in person to buy their choice of footwear. Every company and the shop must have a design studio to scan the foot and to create a model that fits well. The interaction between the customer and the shop and the industry should be made online to deliver products fast. The CAD software, innovation in design, and multi-material usage in making footwear would play a vital role in increasing the user's rate.

**Varieties of designs Jetted using FDM 3D Printer: Ms. M. Suganya, CAD Engineer**

Currently mentioned companies are the Manufacturers and the Sellers of the 3D Printers: ExOne, USA; PolyPico, Ireland; Optomec, USA; InnsTek, USA; Sciaky, USA; Irep Laser, France; Trumpf, Germany; Stratasys, USA; 3D Systems, USA; PolyPico, Ireland; 3Dinks, USA; WASP, Italy; ARCAM, Sweden; EOS, Germany; Concept Laser Cusing, Germany; MTT, Germany; Phoenix System Group, France; Renishaw, UK; Realizer, Germany; Matsuura, Japan; Voxeljet 3D Systems, USA; 3D Systems, USA; MCor, Ireland; Lithoz, Austria; 3D Ceram, France and several more.

These are the companies’ uses 3D Printing technology to fabricate stylish footwear: 3ntr, 3D Systems, 3D Ti, adidas, Carbon, Crocs, EOS, Brooks Running, Ania, Aetex ECCO, Feetz, Kings 3D, New Balance, Nike, OESH Shoes, Phts, Prodways, RESA, Scientifeet, SOLS Systems, Stratasys, Superfeet, Under Armour, Union Tech, Voxel8, Wiivv, Zoles and several more.

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**Season’s Opening**

**“SPRING SUMMER 21”**

Curtain Raiser: Spring Summer 21. In preparation for the Colour Meetings of MODEUROP and FASHION TREND POOL slated for October 2019, curtains were raised on the tendencies in leathers and colours for the Spring Summer 21 season on 11th July 2019 at the CSIR-CLRI.

**Calendar of Events: Spring Summer 21**

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<td>Curtain Raiser (tendencies in leathers &amp; colours)</td>
<td>11 July 2019</td>
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<td>Last date for readying leather/colour proposals</td>
<td>12 September 2019</td>
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<td>Colour Club Meeting MODEUROP</td>
<td>17-18 October 2019, Berlin</td>
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<td>Colour Club Meeting FASHION TREND POOL</td>
<td>20-22 October 2019, Antwerp</td>
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<td>New season’s Colour Cards (MODEUROP &amp; Fashion Trend Pool)</td>
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On the occasion of International Yoga Day, Yoga demonstration programme was organized in CSIR-CLRI and at all Regional Centers for Extension & Development. All the Officers, employees, contract employees and project staff participated in Yoga programme. The importance of yoga in the life was highlighted and all participants were advised to make Yoga an integral part of their daily routine life for good health.

MoU has been signed between CSIR-CLRI and Gherzi Consulting Engineers Pvt Ltd Mumbai on 5th July 2019.

| Title:          | M/s Gherzi Consulting Engineers Pvt Ltd, 301, Kumar Plaza, Kalina Kurla Road, Kalina, Santacruz (East), Mumbai – 400029 on 05.07.2019 |
| Purpose         | To carry out a comprehensive study on SUPPLY CHAIN OF FOOTWEAR INDUSTRY including of shoes, leather items and shoe components segments in ANGOLA |
Team CSIR-CLRI visited FILK on 24 June 2019 on invitation. FILK is an independent, non-university research institution and a non-profit organisation which focuses on research in laminar-flexible polymer materials such as leather and its natural source collagen as well as material compounds based on synthetic polymers. The major theme is applied materials research which includes the clarification of structure-property-relations, surface phenomena, bonding and reaction mechanisms and the behaviour of these materials under stress, which are of very high significance. Dr Michael Meyer, FILK gGmbH and Dr Dietrich Tegtmeyer, Former President IULTCS welcomed the CSIR-CLRI team and gave a brief presentation about the research activities of FILK.

After the presentation, Dr Michael Meyer and his research team facilitated the CSIR-CLRI delegation in visiting the various laboratories of the Institute. He explained that FILK focuses on the requirements of the companies in the perspective of innovation, which will be supported and strengthened with industry and application oriented research. As an industrial research institution, FILK contributes efficiently in this connection. The visit presented an opportunity to collaborate on various topics of mutual interests as a better understanding of their research and future goals with respect to leather and allied research was explained.

Day 1 (25th June 2019) IU meetings and XXXV IULTCS Opening Ceremony

Participation of CSIR-CLRI team in IUE Meeting

IUE commission endorsed the Indian participants Dr KJ Sreeram and Dr J Raghava Rao to prepare the framework document on the best available technologies for sustainability of leather sector. IUE is also considering a proposal for reducing the admissible limit for Cr(VI) from 3 to 1 ppm.

Participation of CSIR-CLRI team in the Asian Congress Meeting

Asian representatives in the 35th IULTCS congress met on the lines of the IU commission meetings. Team CSIR-CLRI attended the meeting along with Dr S Rajamani, convener. The meeting resulted in the decision to conduct the next AICLST Congress in New Zealand in 2022.

The Executive Committee and IULTCS Counsel of Delegates meetings were held during the Congress and Dr KJ Sreeram from CSIR-CLRI attended the meetings in his capacity of Vice President, Indian Leather Technologists Association (ILTA). In both the meetings, the delegates congratulated CSIR-CLRI for the excellent arrangements made during the 34th IULTCS Congress held at Chennai in 2017. The delegates looked forward to a possibility of organizing the IULTCS 2025 Congress in India.
Participation of CSIR-CLRI team in IUR Meeting
Dr J Raghava Rao, Dr KJ Sreeram and Dr N Nishad Fathima attended the IUR meeting held during the Congress representing CSIR-CLRI. The topic related to defining collagen based products was presented by LASRA. It was felt that there is a need to popularize the IUR certification process of research projects related to leather. Members also suggested giving oral presentation opportunity at IULTCS for all the student awardees to motivate youngsters.

Participation of CSIR-CLRI team in IUT Meeting
The IUT commission discussed on coming out with worldwide training modules to benefit the global leather sector. The training modules will focus on challenges faced by the leather sector in Waste Management, Chemical Management, Process and Product Management, People Management and Safety Management. Animated tools and self-training methodologies, self-assessment tools for understanding machinery, chemicals, working environment and handling harassment will be created. As a first step, mapping of training institutions will be carried out. CSIR-CLRI will be one of the institutions to carry out the above work in association with UNIDO, Stazione Sperimentale Per L'Industria Delle Pelli E Delli Materie Concianti and Leather Working Group. Dr Swarna V Kanth, Dr Jayakumar and Dr J Kanagaraj represented CSIR-CLRI in the meeting.

Opening Ceremony of XXXV IULTCS 2019, Dresden Germany (25th June, 2019)
XXXV IULTCS CONGRESS THEME 2019 was BENIGN BY DESIGN focusing on the development of leather through science and sustainability. The IULTCS Congress in Dresden was a conglomeration of the best minds from the global leather industry. The Opening Ceremony highlighted the advancements in leather science and technology, industry, material testing, performance and applications and sustainability and was presided over by the Dr Dietrich Tegtmeyer. Benign by Design is the overriding principle in many green chemistry and sustainability initiatives. The Congress theme was indeed meaningful and relevant to the present scenario where it is believed that research and development should be focused on achieving sustainability goals.
The scientific session of the congress started on Day 2 with the Hiedemann lecture by Dr K.L. Goh on topic "As tough as leather: Macro to nano scale perspectives of collagen stability". He gave new insights on the degree of collagen fibril alignment in tissue and the new dimensions of crosslinking mechanism between fibrils through interfibrillar stress transfer.

The first scientific session had five oral presentations. The major theme of the session was on intervention of biotechnology in leather processing focusing on eco-friendly tanning system and bioremediation. The session was followed by scientific poster session 1. There were about 26 posters which were displayed in the Exhibition Hall. During the first poster session, Dr. Sanjeev Gupta and Ms. S. Sharmila from CSIR-CLRI presented their posters on "Enhancing performance properties of conventional leather finishing topcoat by incorporating metal oxide-based formulations" and "Polymeric bio-composites: Cleaner leather processing and its role in property enhancement of tanned leather" respectively.

The second scientific session continued after lunch with Keynote lecture on "Sulfide unhairing: Rethinking the received wisdom" by Dr W.R. Wise. He discussed about the mechanics of conventional sulphide unhairing. This was followed by four oral presentations. One of the oral presentations was delivered by Dr J Raghava Rao, Chief Scientist CSIR-CLRI on "A novel preservation-cum-unhairing process for sustainable leather manufacturing: An unconventional approach in leather making" which contributed immense inputs to the session theme. He discussed about the recent technology developed at CSIR-CLRI, the one pot system for salt free preservation and low sulfide dehairing for sustainable leather manufacture. The session was followed by speed science session; this

During the opening ceremony, IULTCS announced the prestigious IULTCS Merit Award for Excellence in the Leather Industry. Mr Jakov Buljan was chosen as the winner of IULTCS Merit Award. Mr Buljan has launched various novel initiatives with emphasis on projects dealing with environmental issues in various developing countries, where many Effluent Treatment Plants (ETPs) have been constructed and are operational even today. More than 50 ETPs were designed, constructed or supervised under Mr. Buljan’s leadership.
session comprised of scientific lectures for duration of three minutes by each of the speakers. There were about five oral presentations, which were delivered on topics such as release kinetics of chrome from finished chrome tanned leather, less slat preservation techniques, preparation of novel microspheres for enhancing mechanical property and understanding the mechanism of acid protease on bating mechanism of wet blue leathers. This session was followed by Poster session 2 where 18 posters were exhibited in the exhibition hall.

Following the poster session was the scientific session 3, which commenced with the Keynote lecture by Dr A. Flores on Brazilian leather certification of sustainability. The speaker explained the importance of sustainability in leather sector which can be attained by developing indicators. He stressed upon the work of Brazilian leather certification and its implications on Brazilian leather industry sector. There were 5 oral presentations in the session which mainly focused on application of biopolymers for sustainable leathers, lignin based syntans, use of acrylic resins for wet white leather manufacture, effect of finishing agents on leather surface and role of enzymes in wet end finishing. Two of the oral presentations were delivered by Dr Swarna V Kanth and Dr GC Jayakumar on “Comparative studies on effect of cationic and anionic finishing agents on surface property of finished leather” and “High exhaustion system for leather process: Role of biocatalyst as an exhaustive aid for wet-end” respectively.

Day 3 Scientific and Poster Session of XXXV IULTCS, 27th June, 2019

Third day of the Congress started with the opening ceremony of the Freiberg Leather Days. Freiberg Leather Days is a two-day, annual International Conference jointly organised by the German Association for Chemistry and Technology in Tanning (VGCT) and the Research Institute of Leather and Plastic Sheeting (FILK). It is a forum for communication, personal exchange of experiences and transfer of innovation within the leather industry.

Two parallel Scientific and Engineering sessions were conducted on 27th June 2019 forenoon. Scientific session 4 comprised of five oral presentations under concepts of ageing processes of bookbinding leather, molecular level understanding of chrome tanning, role of Microscopic X-ray Tomography (MCT) technology to produce cross-sectional images of the leather without destroying its structure, comparative structural and molecular analysis of deer skin with cow hide and importance of 3D image analysis of leather for co-relating structure-property simulation.

The first engineering session had five oral presentations delivered on various concepts such as characterization and automation of leather with less human interaction, inline process control for color monitoring, influence of cutting parameters in the leather splitting process and new cutting edge techniques for the leather shaving. This was followed by poster session 3 which had 18 posters displayed on various basic and applied leather science.
Scientific Session 5 of the congress was Chaired by Dr N Nishad Fathima, Principal Scientist, CSIR-CLRI along with Dr. Tang Keyong, Professor from Zhengzhou University, which had 4 scientific lectures on traceability of hides and skins, concepts on false positive verification of the presence of chlorophenols, new vegetable tanning agent from Coriaria nepalensis and a model for prediction of the charge of collagen in different stages of leather manufacture.

Parallel to Scientific Session 5, Engineering Session 2 was organized which had five oral lectures on various concepts of cold milling, embossing to perforating, machine learning techniques, intelligent sewing systems and accelerating industry 4.0 in the leather cutting room.

After Scientific Session 5, Speed Science session had 6 oral lectures. The topics of discussion for this session were sound absorbing nanofibers, REACH implications, biogas from chrome waste, waterborne polyurethane from cattle hair wastes and closed loop systems for liming and tanning. In this Speed Science session, Dr N Nishad Fathima, CSIR-CLRI delivered a lecture on “Sound absorbing nanofibers from tannery waste: Trash to treasure”. This session was followed by Poster session 4 which had 28 posters displayed on various aspects of fundamental and applied leather sciences. CSIR-CLRI presented a poster on “Effective Use of Enzymatic Processes in Beamhouse through Nanoparticle Immobilization”.

Dr J. Kanagaraj, CSIR-CLRI presented a poster on “A Protein based Polymeric Syntan from Leather Waste: Retanning agent for Sustainable Leather Processing”. The poster described the synthesis and application of co-polymer from leather waste as a retanning agent which aids in improving physical properties of leathers. In the same session, Dr GC Jayakumar, CSIR-CLRI presented a poster on “Leathers for marine applications: Instigating physico-chemical properties of conventional leather”.

The last scientific session of the day started with Key note lecture delivered by Dr S. De Veechi on “Automotive leathers-evaluating the performance limits (part II)”. This session had four scientific lectures on VOC contents from car interiors and its influence in leather performance, retannins from lignosulfonates, tanning process under microwave irradiation and natural tannin interaction with shoe inhabiting bacteria. Following this was the Speed Science session, which was chaired by Dr Swarna V Kanth, CSIR-CLRI and Dr Rafea Nada, LASRA. This session had four topics of discussion on new multiepoxy reinforcements agent, biopolymeric tanning systems, cleaner chrome tanning technologies and advanced solutions for leather defects. This session ended with Poster session 5 which had 13 scientific posters and was followed by the Congress Dinner and Appreciation Ceremony of the sponsors.

Day 4 (28th June 2019) Scientific Session of XXXV IULTCS

Final day of the 35th IULTCS Congress started with the Key note lecture delivered by Dr V. Rabe on “Minimizing emissions of automotive leather”. This was followed by the Scientific Session 7, which had four lectures on shoe soling materials using nano fillers, extended surfactants for leather, factors affecting the discussion of acrylic resin during retanning process and biopolymeric liposomes for surfactant free fatliquoring process. During this session, Dr Sanjeev Gupta, CSIR-CLRI lectured on “Sustainable Value Creation from Leather Solid Wastes: Preparation of Shoe Soling Material using Nano Fillers”. He described the efficient way of utilizing fibrous waste material in polymer synthesis for the manufacture of shoe sole.

Mrs. N. Bhargavi, Research Scholar, CSIR-CLRI delivered a presentation on “Biopolymer-Liposome Composite for Fatliquor Applications- A ‘Green’ Approach to Optimal Transport and Delivery of Natural Oils”. She presented a novel method to prepare surfactant free fatliquors for leather process through biopolymer based liposomes.
The last scientific session 8 started with the Key note lecture by Dr MP Costello who delivered his talk on “Capturing the environmental impact of leather chemicals”. The Key note lecture was followed by 5 oral lectures on new approach for shaving process using novel blades, automation in leather making, polymers for leather fatliquoring, cationic protein syntans for dye adsorption and water resistant finishing agents. During this session, Dr J Kanagaraj, CSIR-CLRI lectured on “Automation in Leather Making – A Cleaner Production Approach” that described the cleaner production through automation of dosing and pH monitoring, minimization of pollution load in exit stream, role of artificial intelligence and data analytical techniques for standardization of pollution load.

Dr Malathy Jawahar making her presentation at the Engineering session

The Congress closed with the demonstration session 9 which focused on “Sustainability 4.0- the passport to the future of leather industry” which was delivered by the Congress President Dr D. Tegtmeyer and “Recycling/upcycling the leather products by Zirkeltraining” demonstrated by Mr. B. Dorra and Mr. M. Kreykenbohm. This was followed by the Image Campaign of Leather Naturally which was delivered by E. Dikkers.

Prof. (Dr.) M. Mwinyihija, Director, The Africa Leather and Leather Products Institute (ALLPI) briefed about the 36th IULTCS congress which is to be held at Ethiopia through a visual presentation. The Ethiopian team received the IULTCS flag in the closing ceremony.
The CSIR-CLRI Jigyasa program was organized at KV No. 1-Madurai and KV-Nagercoil during 10-12 July 2019. The inauguration of the event was conducted at KV No. 1 on 10th July 2019 and was graced by Shri. C. Mani, Deputy Commissioner, KVS Chennai Region and Dr. C Muralidharan, Chief Scientist, CSIR-CLRI. Mr. P. Selvaraj and Mr. A. Jerald, Principals of KV No. 1 and KV No. 2, Madurai, respectively were also present. In the inaugural address, Dr. C. Muralidharan said that Jigyasa is an important outreach program organized by CSIR-CLRI across the Tamil Nadu. He said that science can solve the problems faced by the society and advised the students to make use of Jigyasa program for their own carrier development.

C. Mani, Deputy Commissioner described the horizon of the Jigyasa and the role played by CSIR-CLRI in implementing it in Tamil Nadu. He advised the students to make use of the two days program by interacting with scientists through question answers session after witnessing the scientific demonstrations. He also emphasized on the importance of theory and experiment in the development of science and technology. Mr. P Selvaraj, Principal, KV-No. 1, Madurai thanked Shri. C. Mani and Dr. C. Muralidharan for organizing the Jigyasa at KV No. 1. After the inauguration, students of KV-No.1, Madurai, KV-Rameswaram and KV-Mandapam were provided registration kit and divided them into four groups. The following scientific and technical demonstrations were carried out by CSIR-CLRI Scientists for the benefit of students. The experiments include, Introduction to Leather Manufacture by Dr. R. Aravindan, Gene Amplification and Expression by Dr. N. Ayyadurai, Chemistry of Colors by Dr. S. Easwaramoothi, Supramolecular Gels by Dr. S. Ganesh, Apoptosis by Dr. M.S. Kiran, Magnetic Levitation by Meissner effect by Dr. Nitin Prakash Lobo, Semiconductor Nanophotocatalysis by Dr. A. Sivasamy and Dr. D. Murugan, Iodination of Alkene by Dr. R. Srinivasan and 2D Flow Patterns of Liquids by Dr. V.G. Vaidyanathan. In each class room, the scientists gave introduction to their experiments followed by the demonstration. After each session, the questions raised by the students were answered by the scientists in simple and comprehensible manner. The next day (11-07-2019), the Jigyasa team CSIR-CLRI had repeated the experiments for the benefit of students of KV-No.2 Madurai, KV- Sivaganga and KV- Virudhunagar and KV-Dindigul.

Besides, on 11th July 2019, the Class X students of KV No.1 Madurai had an interactive session under “Student - Scientist Connect” event with scientists in question-answer mode. Dr. T. Narasimhaswamy and Dr. R. Srinivasan of CSIR-CLRI participated in the event where 202 students of Class X were interacting with them on Science and its relevance & importance in day-to-day life. While witnessing this Student - Scientist interactive session, Shri. C. Mani and Mr. P. Selvaraj provided their messages to the participated students.
During the valedictory session in the afternoon of 11th July 2019, the students were given opportunity to offer their feedback for which the students expressed their happiness for the scientific content as well as the selection of topics for the Jigyasa program.

The team CSIR-CLRI proceeded to Nagercoil on 11th July 2019 and conducted the Jigyasa program on 12th July 2019 at KV-Nagercoil. In addition to Class 11 and Class 12 students of KV- Nagercoil, KV - Vijayanarayanam students were also participated in the program. They were all accommodated in three class rooms for the parallel session of scientific demonstrations. As many as 804 students and 40 teachers participated in both the Jigyasa programs organized at Madurai and Nagercoil by CSIR-CLRI and 202 students involved in Student - Scientist Connect Event at KV – No.1, Madurai.
Best Wishes on your Retirement

Shri IRUDAYARAJAN G
Asst Section Officer(Gen)
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