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PREAMBLE

NEED for the WORKSHOP

The Ethiopian Leather Industry is ready to take wings. It requires inputs in frontier domains of Fashion Intelligence, Trend Forecasts, Design and Styling, Automation, Quality and Productivity in Manufacturing to become global players and make a mark in the niche markets of the world. It was therefore felt appropriate that a WORKSHOP be planned to spread awareness and pass on information in the above areas to help the Ethiopian leather industry march with the best in the world.

TIMING OF THE WORKSHOP

At the end of the first year of Twinning, when LIDI and CLRI partnership is well established. It was therefore an opportune moment to draft in the ELIA members for a TRAINGULAR Convention so as to reach out the ‘knowledge base’ to the members of ELIA.

ENVISAGED OUTCOME OF THE WORKSHOP

- Cooperation on developing Colours for presenting as proposals at MODEUROP and at other international fora.
- Cooperation on Developing Customised Colour Cards for the various tanneries
- Cooperation in the development of Skill Training programmes
- Cooperation in linking University, LIDI and ELIA
- Cooperation in offering Short Term Training programmes in Specific areas like Design, CAD, Testing, Productivity Improvement
- Cooperation in setting up Product Development Centers totally geared for catering to the needs of the industry

WHY THESE TOPICS?

The workshop addressed the need for Technology adoption and ‘Advance Preparedness’ and therefore discussions on “Trends in Leather technology” was an important area that needed to be addressed.

In a globalising economy, versatility in design and concept are key to the business. Design is being perceived as a new engine of economic and industrial growth. Design and breakthrough innovations can play a pivotal role in positioning of Ethiopian Leather and Leather Product industries in the global arena apart from enhancing competitiveness. Design and brand driven value chain need to be developed as core strengths of Ethiopian Leather Products manufacturing industries. Ethiopia also needs to aim to be a leading influencer of global design and must have a focused multi-pronged strategy to enhance the quality and spread of designs and to increase their share in the world economy through this major value addition. Hence, we thought it prudent to include presentations on ‘Product Design’ and ‘CAD’.

Quality is the Hallmark of a product. One can gain global competitiveness through quality enhancement. The various Testing Protocols, procedures, Standards and regulations need to be known to manufacture products that would pass the most stringent quality parameters imposed. Hence, it was felt appropriate that we enlighten the members of ELIA to the latest Quality procedures, testing methodologies, parameter values and regulations. This prompted us to include the topic on ‘Quality Assurance.’
About the Twinning Programme

The Federal Democratic Republic of Ethiopia is aiming for giant leap in leather and leather products sectors in line with the national vision, which is ‘To become a country, where democratic rule, good-governance and social justice reigns, upon the involvement and free will of its peoples; and once extricating itself from poverty and becomes a middle-income economy’. In order to contribute to the realization of national vision, the role of the leather and leather products industry of Ethiopia is much significant. Leather Industry Development Institute (LIDI) had been established with the vision of developing the leather and leather products industry and thereby facilitating export revenue and employment creation. LIDI needs to undergo a major transformation in order to realize the national goals. The vision of LIDI is ‘To transform LIDI into a globally competitive center of excellence in the field of leather industry’. The TWINNING arrangement has been established to effect this much-essential transformation of LIDI.

The principal objective of this transformation program is ‘To transform LIDI into a globally competitive center of excellence in the field of leather sector.’ TWINNING aims at graduating LIDI to be competent and capable in providing all the necessary support and service to leather and leather product sectors of Ethiopia at the outset. Central Leather Research Institute, Chennai, one of the scientific institutions of Council of Scientific and Industrial Research, New Delhi had signed a MoU with LIDI and Engineering Capacity Building Program (ecbp), Addis Ababa to undertake the TWINNING project. Footwear Design Development Institute, New Delhi is the partner to CLRI for TWINNING project.

The project is structured, planned and will be carried out taking into account the principal objective of the transformation, national vision and vision of LIDI. The ultimate transformation of ‘enhancing LIDI’s capability to offer all the needed services and support for the whole leather value chain’ is the expected effect of the project.
Message from Prof Dr A B Mandal,
Director, CSIR-Central Leather Research Institute (CLRI)

“CSIR-CLRI is in the process of enabling LIDI to become a globally competent centre, envisaging a twinning period of three years (July 2011 to June 2014).

The major areas covered under twinning are strengthening academic programmes of LIDI, providing industrial consultancy in the areas of leather and products through applied research, establishing testing services and in the area of human resource development for the product sector through vocational programmes.

Footwear Design and Development Institute (FDDI) has been identified as a partner for activities related to the areas of footwear and leather goods. A series of activities are being planned and organised during the twinning period. This workshop aims at sensitizing the members of the Ethiopian Leather Industry on Leather Trends, Product Design & Quality Assurance.”
Message from Mr Wondu Legesse,
Director General, Leather Development Institute (LIDI)

Ladies & Gentlemen,

The Leather Industry of Ethiopia is in a phase of transition. What I mean by ‘transition’ is that the Industry here is moving in the right direction of “value added growth” and the role of LIDI is that of a catalyst that would hasten your growth.

I have myself undergone training at the prestigious Intuition in India – the Central Leather Research Institute. This is the world’s largest leather research institute and is the hub of all technological development related to leather. No wonder, they are our most apt partners in the development of our Leather Industry.

Our association began with the benchmarking exercise for the Leather Industry here which helped us in the technological upgradation and value addition of our industry from crust manufacturers to finished product manufacturers.

We have sown the seeds for your growth and have moved to the next phase of consolidation with the launch of the ‘Twinning Programme’ which is to help us replicate the CSIR-CLRI model.

About the Workshop:
Eminent Speakers from the CSIR-Central Leather Research Institute who have travelled all the way here to organize the workshop and my colleagues who were there in INDIA until very recently will share their experiences during the course of the workshop.

My dear Friends and members of the Leather Fraternity, I hope that we have many lessons to learn from the CSIR-CLRI experience which is so generously being shared with us.

I whole-heartedly welcome you to the workshop and wish you all benefit from the proceedings.
Message from Dr. B. Chandrasekaran
Chief Scientist & Head, CHORD & CLAD Divisions, CSIR-CLRI

"The speed, direction and impact of technological change are more pronounced than in the last century, and more pervasive. The future will depend on education and intellectual investment. Success will only come from what human mind can capture. This workshop focuses on what the human mind can capture. I invite you to participate and benefit."
**Introduction**

CSIR-CLRI is currently implementing a “Twinning Programme” in the Leather Industry Development Institute (LIDI) in Addis Ababa, Ethiopia which would enable LIDI to become a globally competent centre. The major areas covered under Twinning are strengthening Academic Programmes of LIDI, providing Industrial Consultancy in the areas of Leather and Leather Products through Applied Research, establishing Testing Services and in the area of Human Resource Development for the product sector through vocational programmes.

A series of activities are planned and organised during the twinning period. This workshop is one such initiative which aimed at sensitizing the members of the Ethiopian Leather Industry on “Leather Trends, Product Design & Quality Assurance.”

CSIR-CLRI as the lead institute for this programme innovatively planned this Indo-Ethiopian workshop on “Leather Trends, Product Design & Quality Assurance” to sensitize the Leather & Leather Product Industry of Ethiopia in the following areas:

- Trends and Fashion Forecasts for Leather & Leather Products
- Understanding Product Design & Retail Analysis besides Merchandizing
- CAD tools for Leather Products Design
- Productivity Improvement Techniques
- Quality Assurance
- Technology Trends

**Objective of the Workshop:** The workshop aimed at enlightening the Members of the Ethiopian Leather and leather products Industry on the following:

- Benefits of Advanced Preparedness
- Paradigm shift in Product Design, Merchandising and Retailing
- Automation in the Leather Product Industry
- Need for Quality Assurance & Quality Auditing

**CO-OPERATION:** This workshop, organized by CSIR-CLRI was held in co-operation with LIDI, Ethiopia and was held at Hotel Desalegn, Addis Ababa.
A Get-Together was arranged at the Cultural Restaurant which was attended by all the colleagues of Team CSIR-CLRI who were already in Ethiopia and the new members from CSIR-CLRI who had come there for the workshop.

The evening was very cheerful and enjoyable and gave a glimpse into the Cultural richness of Ethiopia.
Visit to LIDI
20 June 2012

The CSIR-CLRI Team visited the campus of LIDI and had a quick tour of the Institute. During their visit they interacted with Mr Rafaele Pauroso, CAD Expert from M/s Torielli, Italy with regard to the working of the CAD Centre in LIDI. The team also met Mr Ato Wondu Legesse, Director General of LIDI and briefed him about the workshop schedule. Mr Wondu also provided insights of the working of LIDI and underlined the importance of the workshop for the benefit of the Ethiopian Leather Sector. Mr Solomon
Tadesse, Director, Leather Garment & Goods Manufacturing Technology Directorate of LIDI also met the CSIR-CLRI Team and discussed the working of the Product Development Centre at LIDI. He also updated the team about the workshop participation and organization. The Team finally met Mr Berhanu Negus, Director, Testing & Research Laboratory Directorate and discussed the schedule of the next training programme and equipment installation at LIDI by the experts from the CSIR-CLRI Testing Laboratory.
Pre-Inauguration DINNER
Hotel Broadway, 20 June 2012

CSIR-CLRI hosted a pre-inauguration Dinner at Hotel Broadway, Addis Ababa and apart from the entire CSIR-CLRI team the Dinner was also graced by Mr Ato Wondu Legesse, Director General, LIDI and Mr Solomon from LIDI.

The Dinner was held in an Indian restaurant and a ‘TOAST’ was raised by all present to the success of the Indo-Ethiopian Workshop on “Leather Trends, Product Design and Quality Assurance.” There were lively interchange of views and the entire atmosphere was quite informal.

It set the tone for the workshop commencing the following day.
The Workshop Team from CSIR-CLRI

From L to R (Sitting): Dr Malathy Jawahar, Shri P Saravanan, Dr B N Das, Shri B Ramanaiah, Shri P Suresh Kumar, Shri Gautham G, Shri Md Sadig, Dr B Madhan, Shri Abhinandan Kumar, Shri S Krishnan (not in picture)

From L to R (Standing): Dr Malathy Jawahar, Shri P Saravanan, Dr B N Das, Shri B Ramanaiah, Shri P Suresh Kumar, Shri Gautham G, Shri Md Sadig, Dr B Madhan, Shri Abhinandan Kumar, Shri S Krishnan (not in picture)
The VENUE for the Workshop
Pre-arrangements for the Workshop
20 June 2012, Hotel Desalegn

The CSIR-CLRI Team travelled to the venue of the Workshop, Hotel Desalegn and co-ordinated with the hotel staff with regard to the seating arrangements, display arrangements, dais arrangements and audio-video facilities.

The Team then uploaded all the presentations, arranged the display of materials and carried out a dry run of the presentations and the programme schedule.

The Team was led by Mr P Saravanan, Co-ordinator of the Twinning programme.
Day 1

Workshop Programme
(21-22 June 2012)

Session I: Inaugural Session
Thursday, 21 June 2012; 9.00 am to 10.15 am

Welcome Address: Mr. Wondu Legesse, Director General, LIDI
Special Address: Mr. Solomon Getu, President, ELIA
Special Address: Mr. Mebrahtu Meles, Program Director, ECBP
Special Address: Dr. B N Das, CSIR-CLRI
Inaugural Address: His Excellency, Ato Tadesse Haile, State Minister, Ministry of Industry

Tea Break: 10.15 am to 10.45 am

Session II: Introductory Session:
Product Design
Thursday, 21 June 2012; 10.45 am to 12.30 pm

Footwear Components: Dr. B N Das, CSIR-CLRI
Overview of the LIDI Capacity Building Program: Wondu Legesse, DG LIDI
Evolution of Product Design Centre at LIDI: Eng. Solomon Tadesse Hailekiros Debessay

Lunch Break: 12.30 pm to 2.00 pm

Session III: Fashion Trends for Spring Summer 2013
Thursday, 21 June 2012; 2.00 pm to 3.30 pm

From ‘fashion forecasting’ to ‘value engineering’: Mr. Md. Sadiq, CSIR-CLRI
Trends for Spring Summer 2013 season: Mr. Md. Sadiq, CSIR-CLRI

Tea break: 3.30 pm to 3.45 pm
Session IV:
CAD for Leather Product Design - the 3D way!
Thursday, 21 June 2012; 3.45 pm to 5.30 pm

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<td>CAD for Leather Goods &amp; Garments</td>
<td>Mr PS Suresh Kumar, CSIR-CLRI</td>
<td>30 mins</td>
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<td>Automated CAD Tools for Shoe Design</td>
<td>Mr Gautham G, CSIR-CLRI</td>
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Day 2

Session V:
Understanding Shoe Design
Friday, 22 June 2012; 9.00 am to 11.00 am

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<td>Understanding Shoe Design &amp; Retail Analysis</td>
<td>Mr Md Sadiq, CSIR-CLRI</td>
<td>45 mins</td>
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<tr>
<td>Developing effective skill training modules for application in the shoe industry</td>
<td>Mr Gautham G, CSIR-CLRI</td>
<td>45 mins</td>
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<td>Productivity Improvement Techniques</td>
<td>Dr B N Das, CSIR-CLRI</td>
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Tea Break: 11.00 am to 11.30 am

Session VI: Technology Trends in Leather Manufacture
Friday, 22 June 2012; 11.30 am to 12.30 pm

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<td>Technology Trends in Leather Manufacture</td>
<td>Mr P Saravanan, CSIR-CLRI</td>
<td>30 mins</td>
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<td>Cleaner Technologies</td>
<td>Dr B Madhan</td>
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Lunch: 12.30 pm to 2.30 pm
## Session VII: Awareness creation session
Friday, 22 June 2012; 2.30 pm to 3.45 pm

| Human resource development for the leather sector | Tsegaye Teferra, LIDI | 30 mins |
| Wanke Skin: promising opportunity | Mohammed Hussein, LIDI | 25 mins |
| Cleaner Technology in Leather Technology | Dr. B. Madhan, CLRI | 20 mins |

## Session VIII: Valedictory Session
Friday, 22 June 2012; 3.45 pm to 4.30 pm

| Summarizing the Workshop | Mr Wondu Legesse, Director General, LIDI |
| Special address | Mr P Saravanan, CSIR-CLRI |
| Vote of Thanks | LIDI |

Tea break: 4.30 pm
DAY 1
Session I: Inaugural Session, 21 June 2012

The Workshop commenced with the Welcome Address by Mr Ato Wondu Legesse, Director General, LIDI, Ethiopia.

In his address, Mr Wondu welcomed everyone to the workshop and spoke about the historic relations between India and Ethiopia dating back to centuries past. He said that the two countries have been co-operating in diverse fields and this workshop was an extension of the existing relations between two sisterly countries.

Speaking about the Ethiopian Leather Industry, he said that it had one of the world’s largest livestock population and that the country’s cattle were well known for their fine grain patterns and fiber structures. He also pointed out that the Ethiopian Highland Sheep Skins have got worldwide reputation in quality, thickness, flexibility, strength, structure and cleanliness. However, he pointed out that the industry had been unable to take the benefit of this due to lack of technology and skilled and trained manpower.

Mr Wondu stressed that with the establishment of LIDI, things had vastly improved and the Institute had put in place Modern Laboratories, Model Footwear and Leather Garment factories, Model Tannery and Waste Treatment Plants with help from other nations. He also lauded the Co-operation with India and said that the Benchmarking Twinning programmes being carried out in co-operation with India would boost existing capacity and make the sector competitive and effective in the global market.

Mr Wondu said that many International companies are being attracted to invest in this sector and the export of Leather Products from Ethiopia had grown significantly.

Dwelling on the salient features of this workshop, he said that this was an effort to make the sector live up to the demands of the day and was expected to sensitize the industry on Trends, Design and Quality through Fashion Forecasts, Retail Analysis, CAD Tools and Productivity Improvement Techniques.

Elaborating further, he said that, Preparedness, Paradigm Shift, Merchandizing, Automation and Auditing – all help and add value. Colour, Texture, Brands and Information leads us to improvement. In this ever changing global economy versatility in Design and concept are also key to business success. Mr Wondu also pointed out that Speed, Direction and Impact of Technologies are being felt now and the future depends on Education and success. According to him, Automation and Quality are also important in Brand Building. Right Information leads to Right Product and the Right Market.

He said that this workshop was co-organized by LIDI and CSIR-CLRI with the aim of making a meaningful difference in the sector. He urged all the participants, particularly the members of the Ethiopian Leather and Leather Products industry to take active part in this valuable workshop and make the most out of it.

He also congratulated all those who had made enormous efforts to make the workshop a reality and wished all the participants fruitful deliberations.
Mr Solomon Getu, President of the Ethiopian Leather Industries Association (ELIA) extended his appreciation to LIDI and CSIR-CLRI in organizing this workshop. He stressed that capacity building in the area of Design, Trend Information and Quality is the transformation required by the Ethiopian Leather and Leather product industry to shine in the global competitive markets. He said that the Leather Sector in Ethiopia was in a state of transition and was moving towards the right direction of ‘value added growth’ and also lauded the efforts of LIDI in being a catalyst to hasten the growth. The industry, he said, was planning for a giant leap in the Leather Sector and the industry was focussed to provide a national vision to develop the industry and facilitate export revenue and employment creation. Mr Getu said that CSIR-CLRI was their most apt partners as it was the hub of all Technological Development related to Leather and was the world’s largest Leather research Institute. The result of the co-operation was already being seen after a Benchmarking Programme which aimed at helping the Ethiopian Leather industry in the technological upgradation and value addition and progress from being ‘crust manufacturers’ to being ‘finished leather and product manufacturers.’ He concluded by saying that the industry had many lessons to learn from the CSIR-CLRI experience which was so generously being shared and wished that all participants benefitted from the exercise.

Mr Mebrahtu Meles, Programme Director, Engineering Capacity Building Programme (ECBP), Ethiopia in his address stated that Ethiopia had one of the fastest growing economies in the world and this was largely due to the implementation of appropriate strategies in all spheres. The economy, he said, was transforming from being ‘agricultural led’ to being ‘industrial led.’ Mr Meles stressed that the Leather Sector in Ethiopia was set to play an important role in the growth of the Ethiopian economy. The CLRI-LIDI collaboration was an important milestone in this direction. He said that ‘capacity enhancement’ and ‘manpower development’ were the focus areas of the Benchmarking and Twinning programmes between LIDI and CLRI. He also added that the Government of Ethiopia was also implementing many industrial friendly policies for spurring the growth. Mr Meles also pointed out that ‘pro-active and synergistic collaboration’ all along the value chain was important to compete in the global market. Recognizing this reality, he said that the Government of Ethiopia had not only established LIDI but had also provided unreserved Technical and Financial support. Laundering the topics selected for this workshop, he said that they would have a significant impact in helping the Ethiopian Leather industry plan their way forward. He wished that the deliberations of the workshop would be fruitful and encouraged the organizers to conduct many more such workshops for the benefit of the Ethiopian industry.
Dr BN Das, Chief Scientist and Head, CSIR-CLRI Shoe Design and Development Centre welcomed the dignitaries and delegates on behalf of the Director, CSIR-CLRI, Prof Dr AB Mandal. He said that he was immensely pleased to be standing here today and addressing such an august gathering.

He said that the Ethiopian Leather industry had been growing rapidly and it was a great pleasure to be part of this exciting journey. The CSIR-CLRI and LIDI Twinning project was indeed a milestone and was a symbol of friendship and cooperation between the two nations, he said.

Dr Das pointed out that CSIR-CLRI and LIDI had been working harmoniously on a number of initiatives and this workshop was one such example. He also highlighted the work being done by LIDI Colleagues in CSIR-CLRI India and said that their effort was pioneering and would result not only in the growth of the Leather Industry but would also be a driver of the national economy.

Dr Das also gave an overview of the workshop which, he said would sensitize the Leather & Leather Product Industry of Ethiopia in the areas of Trends and Fashion Forecasts for Leather & Leather Products, Understanding Product Design & Retail Analysis besides Merchandizing, CAD tools for Leather Products Design, Productivity Improvement Techniques, Quality Assurance and Leather Technology Trends. He wished the participants well and said that he was sure that they would find the Workshop to be exciting and beneficial.

Mr Ato Fekade, Advisor, Ministry of Industry, Government of Ethiopia in his address highlighted the high availability of livestock in Ethiopia. He said that Ethiopia had enormous potential to be a leading global player in the area of Leather and Leather Products.

Mr Fekade stressed that the development of this industry would lead to generation of large scale employment opportunities and enhance the growth of the economy. Lack of awareness and lack of Technology had hampered the growth of this industry hitherto, he said and hoped that with the new initiatives and policies of the Government of Ethiopia, the Ethiopian Leather industry would embark on a high growth path.

Lauding the LIDI-CSIR-CLRI partnership he said that this would help the Ethiopian Leather industry scale greater heights and achieve major growth. He also opined that the awareness generated from this workshop would act as a stimulus for improvement and future growth. He also wished all the participants well and wished all success for the workshop.

The programme was ably steered by Dr B Madhan, Senior Scientist, CSIR-CLRI, who conducted the proceedings very efficiently.

He also presented the detailed workshop schedule to the audience.
This session began with a presentation by Mr Ato Wondu Legesse, Director General, LIDI, Ethiopia on an “Overview of the LIDI Capacity Building Programme.” He listed out the various Capacity Building programmes of LIDI as:

- Benchmarking for 11 tanneries and 8 shoe factories
- 3 years Twinning program with CLRI and FDDI
- UNIDO’s program on capacitating LIDI in different areas
- UNDP’s Financial support to build the capacity of LIDI in terms of workmanship and equipment

Elaborating further on the ‘Capacity Building in Benchmarking’, he said that together with ECBP and ECF benchmarking was implemented in 11 tanneries and 8 shoe factories with the objective of creating competitive industries in the global market. He added that the benchmarking activity was done jointly with both CLRI and FDDI and the LIDI staff were assigned in each tannery and shoe factory and took a good lesson from the benchmarking activity.

Outlining the Areas of support from UNIDO, he said that they helped in funding the Marketing and Promotional Material preparation. They also assisted in the Physical and Chemical Lab strengthening by giving material and intellectual service while also giving technical support for the construction of CETP in Modjo as well as providing Product Development support in leather for different markets specially Moscow, he said.

With the help of UNDP’s financial support he said that achievements were recorded in Transformational leadership training and Awareness creation for the sector members and other stakeholders. He also added that other soft and hard skill developments as well as Women entrepreneurship training for selective regions were carried out through UNDP’s support.

Mr Wondu pointed out that the main capacity building program for LIDI’s transformation was the Twinning Programme being carried out jointly with CSIR-CLRI and FDDI and was being done by the
Government of Ethiopia through Engineering Capacity Building Program (ECBP) with a time span of three years ending in August 2014. He said that the overall objective of twinning was to capacitate LIDI for carrying out various functionalities in the areas of R&D, Education and Training, Consultancy, Testing and analytical services. The ultimate aim, he said, was to transform LIDI to be a ‘one stop Technological Service Provider’ for Leather and Leather Products industries of Ethiopia.

Highlighting the Twinning Plan and hierarchy, Mr Wondu gave an overview of all the forty eight activities which were grouped into Management activities, Leather activities, Goods and Garments activities and Footwear activities. He also briefly touched upon the Progress of the project and said that the following activities have been carried out so far:

- Intellectual Manpower Development
- Middle-level Manpower Development
- Strengthening of the Managerial Capability of LIDI
- Strengthening of the Technical Capability of LIDI
- Enhancing the Research Capability of LIDI
- Enhancing the Technical Capability of LIDI related to Environmental Technology
- Enhancing the Chemical and Physical Testing Capability of LIDI

He concluded his presentation by saying that the Ethiopian Leather Industry was on the right path of progress and thanked the industry members for their wholehearted participation in all of LIDI’s endeavours.

The next presentation was by Dr BN Das, Chief Scientist and Head, CSIR-CLRI Shoe Design and Development Centre on “Footwear Components.” He said that the footwear industry was constantly booming and was gaining enhanced scope and potential worldwide and was primarily involved with the usage of various kinds of materials in the production. In the initial part of his presentation Dr Das gave a quick overview of the activities of the CSIR-CLRI Shoe Design and Development Centre
especially with respect to Design and Fashion Forecasting, Retail Trend analysis, Computer Aided Design Tools, Testing and Quality Assurance, Human Resources Development, Design and Development of Diabetic Footwear and Consultancy. He also highlighted the work done in the area of Enterprise Performance Management which was so effective in linking all the areas of Production Planning, Materials Management, Manufacturing and Human resources Development.

Dr Das also quickly highlighted the major R&D outcomes of the Leather Products departments. He then gave a very detailed presentation on the various components, their selection criteria, their Testing protocols and their Performance characteristics. The footwear components covered by Dr Das included: Linings and Interlinings, Insoles, Insocks, Soles, Toe Puffs and Counter Stiffeners, Fasteners including Threads, Buckles, Elastic Tapes, Zippers, Touch and Close Fasteners, Shoe Laces, Reinforcement and Binding Tapes.

Dr Das also presented the very efficient ‘Vendor Rating system’ developed which considered factors such as Quality, Delivery Schedule Adherence, Cost/Price, Capability and Service to Quantitatively arrive at the “Quality Index” and the “Delivery Index.” This would help in very objectively make decisions so that you can be assured of getting quality components at the right time.

He concluded his presentation by outlining the “Challenges Ahead” which according to him were:

- Gaining global competitiveness through cost control, quality enhancement and standardization and brand equity building
- Surviving trade barriers, environmental regulatory pressures, eco bans& demands of world trade
- Globalizing economy challenges, low economies of scale
offer new or additional benefits to the customer. He also highlighted that the three functions most central to a Product Development project as being: Marketing, Design and Manufacturing.

Mr Tadesse proceeded to show us how a product is developed and took us through the various stages of Market Study, Retail Overview, Consumer Profile, Trend Analysis, Range Building, Pattern Engineering and Prototype Development. He also underlined the ‘Success Factors’ as being the Ability to identify the needs of the customers, the Ability to quickly create products that meet these needs and the ability to produce at low costs.

He also defined the characteristics of successful Product Development and the challenges of Product Development. Identifying the reasons behind setting up the Product Development Centre (PDC) at LIDI, he said that this was because of:

- Lack of strong presence in the Global Fashion Market
- Lack of Fashion Concepts (Styles, Taste, Acceptance, change)
- Pressures on Lead Times
- High rivalry from competitors
- Lack of Market research (which have affected the industries in Ethiopia negatively)

Mr Tadesse was confident that the Product Development Centre at LIDI would enhance the competitiveness of the Ethiopian Leather products industry globally and listed out the services of the PDC at LIDI as: Fashion Forecasting, Range Building, Pattern Engineering, Design Consultancy and Human Resources Development.

Mr Solomon Tadesse also outlined the sophisticated and modern technology available at the PDC, LIDI with excellent 2D and 3D CAD/ CAM systems which helps the Designer improve his productivity and improve Design Quality. Mr Tadesse gave a glimpse of the Design Collections developed at LIDI-PDC and exhorted the Ethiopian Leather industry to make optimal use of the LIDI-PDC for better growth and profitability.

Mr Hailekiros Debessay then presented ‘Footwear Collection’ developed at LIDI and gave an overview of the ‘Footwear PDC at LIDI.’ His talk focussed on Fashion Trends, Design Market Synopsis, Collection design scene and Evolution of Footwear PDC @ LIDI. He said that Producing new styles or designs is usually a compromise between the trends, as identified from exhibitions or fashion shows, Market study including consumer profile and retail overview as well as the manufacturing restrictions imposed by the factory’s equipment, lab, our availability and cost.

Presenting the Style Trend Analysis, he said that STYLE TREND could be studied through Art, Design, Architecture while SOCIAL TRENDS are based on influences of Food, Music, Lifestyle, Cinema, Blogs and the PROFESSIONAL Trends need to be followed through International Fashion Weeks at various Fashion Capitals of the World. Mr Debessay also highlighted that Fashion and Trends are subdivided in four major segments: purist (traditionalist), random-pop (street fashion), embellishment and unconventional.

Elaborating further, he said that Fast fashion is a recent phenomenon and has a wide and quick development. The philosophy of the fast brands is Everyday trend with reasonable prices. Differently from the Pret a Porter, the fast fashion brands distribute only in their own brand shop, eliminating the big distribution channel and the showrooms. What is the most important thing for the good results of this new economic model is elimination of season cycles, instead they create a “drop collection”, that means the creation of capsule collections: mini collections with a limited number proposed in each store, and they change continuously. In this way different accessories and clothes “branded” can be mixed with fast fashion, keeping in any case style and trend.

Mr Debessay then outlined the process of Collection Development via sketches following the trend and market as: Creation of Mood boards, Selection of Basic shapes for the collection, Drawing of Sketches, Pattern Development and Sample Assembly. He also traced the evolution of PDC at LIDI and said that despite all the developments in technology, there are still a number of problems, due to that product development takes too long and is insufficient and costly. There is still the traditional division of responsibilities between designers, design engineers, pattern cutters, costing staff, production staff and
marketing staff which act as barriers to information transfer. There is little cross-training of staff to give skill flexibility in the different pre-production activities and this encourages compartmentalization.

He outlined the Objectives of the LIDI-PDC as:

- To develop designs as per the requirements of the market and samples as per the requirements of the designs & such conditions which are presentable to the industries with in time frame.
- To be able to grasp the trends in forecast regarding shades & material type accurately for the seasons as per the international cycle.
- To provide support for the technical & design solutions of the production issues to the industries.
- To carry out pattern engineering with the objective of cost reduction, quality improvement & process support.

He concluded his presentation by showcasing the Design Collections of LIDI-PDC, the Range of Services offered and the Way Forward for LIDI-PDC.
Session III: Fashion Trends for Spring Summer 2013, 21 June 2012

This session commenced with a presentation on “From ‘Fashion Forecasting’ to ‘Value Engineering’” by Mr Md. Sadiq, Senior Principal Scientist, CSIR-CLRI.

Mr Md Sadiq in his presentation touched upon INNOVATION and the Global Leather Industry’s ranking in INNOVATION. He defined INNOVATION and the various dimensions of Innovation as a new process, product, idea or design which has proved and reached its intended target: Consumer, Market, Business, Society, Security and is normally expected to confer benefit to a vast segment rather than individual interest.

Asking the question, “Where do we slot the Innovation in the Leather Industry?” he answered that “to emerge as a strong global player in the world leather trade, all efforts to take proactive measures to be ready with the fashion leathers when the fashion does emerge, is crucial.” Design and breakthrough innovations can play a pivotal role in positioning of Leather and Leather Product industries in the global arena by value addition apart from enhancing competitiveness, he added.

He said that ‘Success in being able to work with high-end customers’ requires building design capabilities that enable us to offer exciting collections that can compete internationally and to explain this paradigm of ‘concept’ to ‘market’, he illustrated the encapsulating stages of SHOE Engineering in a value chain. Design and brand driven value chain need to be developed as core
strengths of Leather Products Manufacturing Industries which is currently focused in the middle pie of the value chain engaging in pattern development, engineering and sample prototype development. The time to move up the value chain has come, he said. He also added that to achieve this one has to build not only in-house design capabilities, but also work in consultation with design companies internationally that have a deep understanding of lifestyle and fashion trends in Europe and the US, which will continue to be primary markets for the foreseeable future for up-market products.

‘Merchandizing’ would be another crucial area of attention and synergies would have to be built with international agencies to master this art, he opined. As a case study to illustrate his point he presented the ‘Travel of India in ‘fashion forecasting’ for leather’ which he said was an initiative to bring to the fore the ability of the Indian Leather Industry to take pro-active measures in fashion forecasting and design development by providing a scientific leather product development focus in the areas of colour forecasting, range building, design and retail analysis and the outcome envisaged was to strengthen the Indian leather product design capabilities which would be reflected in product quality enhancement.

Mr Sadiq underlined the fact that from being a mere resourcing partner in the early 90’s to being able to deliver the right product for the right market and the right season, TODAY; the Indian Leather Industry has travelled a long way. In particular reference to the MODEUROP endeavour, he said that getting one Indian colour into the MODEUROP Colour Card in 1994 was a matter of prestige and today almost 70% - 80% of the colours chosen are featuring from Indian proposals. The challenge and opportunity today is to capitalize on the winning colours and translate them into fashion products, he opined. Proceeding further he gave a background of MODEUROP as an International Institution founded in 1960 in Zurich / Switzerland by the most important institutions of the leather and footwear
industry for forecasting fashion and trends in Leathers, Colours and Materials for the International Market, three seasons ahead. He also described the process of Colour Selection and gave an insight into what happens in MODEUROP vis-à-vis the Curtain Raiser, Showcase, Review, Pre-selection, General Assembly, Roundtable, Colour Selection, Colour Christening and the release of the Colour Card stating that the MODEUROP initiative has been very successful in catapulting India into the foreywards of fashion.

Mr Sadiq also pointed out that GLOBAL COLOUR SHADE CARD is first released in India giving a tremendous lead time over the competition. The official MODEUROP Colour Cards are now ‘Made in India’ with suitable acknowledgements to the contribution of CLRI/CLE as well as to the contributing tanners; thereby enhancing the marketability of Indian Leather in International markets. He also explained as to how the Scientific Analysis of the market trends had helped the shoe manufacturers to understand the Trends in Retail and gear up with apt products for exposition at leading International Fairs. He clearly demonstrated as to how the ‘Black and Brown’ story had indeed become the ‘Colour Story.’

He then detailed the several dissemination/ outreach programmes that were organized in the major leather centres coupled with the release of ‘TREND REPORTS.’ The benefits accrued to the participants through the advance information presented resulted in increased ‘business advantage’ and ready acceptance of the designs, he said. He also added that the THEME PAVILION’s conceptualized and presented by CLRI captured the spirit and essence of Modern day India’s relentless surge to the top and presented the finest of ‘leather ware’ for the season’s, comprising leathers, footwear, bags and garments which leading brands are eager to source and the visitors to the fair truly marvelled at the impeccable quality and great finesse of the merchandise on show and it also served as a right forum for both buyers and sellers to augment business prospects.
Mr Sadiq also briefed about the url: [www.indiadesignclub.com](http://www.indiadesignclub.com), which is a dedicated portal for dissemination of fashion trend reports, analysis, fair reports, technology tips and market information, well in advance so as to help the industry always stay a step ahead of competition. He also touched upon the new course being offered UNDERSTANDING SHOE DESIGN – the 3D WAY as also upon Custom Made Shoes – the new age retailing where Technology was being applied to benefit Humanity.

He stressed that Research - Academia - Industry synergy is a prime driver of Innovation and through “Fashion Forecasting” & “Value Engineering” the Ethiopian Leather Industry would gain a major edge over the competition and Ethiopia could be among nations in the foreyards of INNOVATION! Concluding his presentation, Mr Sadiq gave two Case Studies of how Innovation meets Reality and said that Future growth of Global Leather Industry will continue to be market driven, Technology partnerships with major merchandising houses and market leaders are decided advantages in the integrated developmental plan of a growing economy and that Investment backed technology support for this industry is of critical importance for the way forward! Summing up, he presented the audience with a few examples of ‘Innovation Drivers.’

The next presentation of this session was again by Mr Md Sadiq, Senior Principal Scientist, CSIR-CLRI on “Trends for Spring Summer 2013 season.”

He gave us a sneak peek into the process of Colour Selection at MODEUROP and took us through this process for the Autumn Winter 2013/14 season at the MODEUROP Colour Club meeting held at Heilbronn, Germany in April 2012.

Starting with the Pre-selection process, Mr Sadiq described as to how a select group of Invited Fashion Experts narrowed down the Leathers/Colours for final selection from the huge number of leather/colour proposals submitted. He continued and explained about the review of the season past,
which in this case was the Spring Summer 2013 season and took us through the three colour groups namely Luminous Brights which were discrete and refined; Powered Pastels which were delicious and fresh and Vivid Naturals which were Tropical and Vegetal.

Mr Sadiq then briefed about the MODEUROP Activities, its publications and its Fair Updates. He also gave a tour of the MODEUROP Website and the information it contained. He then presented the MODEUROP update from Le Cuir and Lineapelle fairs and it gave a very good indication of the very high match with the MODEUROP Leather/Colour predictions. He then took the audience through the exciting ‘Voting' for the Top Colours for the Spring Summer 2013 season and then displayed the Top Colours Papaya, Porcelain, Sky, Citrus with the fifth place being shared by Mango, Jungle, Biscuit and Shell. He concluded his presentation by highlighting the Colour Trend Presentations for the Autumn Winter 2013/14 season by the Fashion Experts following which the colours were selected and christened, which would feature ion the MODEUROP Colour Card for the Autumn Winter 2013/14 season.
Session IV: CAD for Leather Product Design – the 3D way!, 21 June 2012

The first presentation in this session was by Mr PS Suresh Kumar, Senior Scientist, CSIR-CLRI on “CAD for Leather Goods and Garments” who began his presentation of what constitutes Leather Goods and Leather Garments. Moving on, he said that the CAD systems for leather Goods and Garments could be classified as Pixel Based system which uses dots or pixels to build lines & images and Vector based System which uses vectors, based on coordinates to build lines & pattern blocks and listed out the names of the various CAD systems available in this sphere.

Mr Suresh Kumar pointed out that Concepts could be developed quickly with variations in colour, texture and dimensions and by Micro texture mapping (draping) to get true images of any picture and proceeded to give graphic illustrations of these procedures. He also described the CAD Pattern Engineering systems which were capable of doing Pattern Grading, Pattern Designing and Marker Making.

Describing the abilities of a Pattern Engineering system, he said that they could be used in drawing straight lines, curves, free sketches, Deleting lines and sections of lines, Extending lines, Changing lines freely or to specific lengths, Measuring any line or section, Changing whole pattern shapes, Changing the perimeter shape of a pattern, Cutting patterns into sections, Reproducing whole pattern shapes or sections, Rotating and mirroring patterns, Joining patterns or sections of patterns, Swinging sections of patterns, Inserting flare into patterns, Adding seam allowance and Adding notches, drill holes, texts
etc. He added that the Patterns could be digitized, edited & graded and the Pattern area, perimeter etc., could be verified at any time and also obtained in report form.

Mr Suresh Kumar then outlined the various output devices and cutters available for cutting of the patterns and then proceeded to give an interesting demonstration of using “Simulation” for ‘Virtual Stitching of apparels “where the entire apparel could be simulated on a virtual platform for perfect fit and design.

The next presentation in this session was by Mr Gautham Gopalakrishna, Senior Principal Scientist, CSIR-CLRI on “Automated CAD Tools for Shoe Design”. His presentation cited the various technology trends and innovations in footwear. He stressed on the use of Automation in every step of the Product Lifecycle and highlighted the state-of-the-art in Footwear Design and Manufacturing.

Presenting the Technologies for the Design Process, he underlined the typical 2D CAD which was easy and intuitive and a low cost entry investment and how we could graduate to typical 3D integrated CAD systems which were highly integrated, had full potential and were relatively more difficult to use. This was illustrated through the CAD system for LAST Design which could automatically import style lines and were also equipped with softwares for “Bottom” or Sole Designs and other components like the Heel. He also demonstrated graphically how Digital design and advanced rendering algorithms make it possible to create virtual prototypes virtually indistinguishable from the real object.

Proceeding to enlist the benefits of CAD/CAM to the Footwear industry, he said that CAD/CAM systems were simple to use and were based on the concept of “You see what you get” thus being able to Convert Conception to Reality so that you could quickly get agreement with your customer
Deliberating on the Enhanced CAD solutions for footwear applications, he described the graphical work flow of the 3D and the 2D processes of Design and Pattern Engineering. He also enumerated the features and benefits for the shoemaker as showing Increased productivity with Shorter lead times, Quality of upper assembly being good due to Better fit on the last, Better shape retention and Reduced factory rejects, Cost Savings on Material and Labour, excellent Design flexibility, Enhanced sales appeal and Closer liaison with buyers. He also pointed out that these were Knowledge-based software and they de-skilled the work and were Task-oriented software with easier operation, better job flexibility, increased motivation, improved job satisfaction and easier recruitment and training. According to him, these softwares were Menu-driven with good file security, flexible manning and configuration, Global technical support, Equipment software and upgrades and ease of data transfer.

Mr Gautham then gave a brief presentation on the process of Last digitization, surface rendering, last cross-sectional measurements, storage of last skeletons, flattening to 2D, Export of profile and style lines to 2D, Toe Modifications using 2D templates, Toe Swap from Library of Toe shapes and interfacing to CNC machines for manufacture. He rounded off this section with a graphical overview of the entire “CAD Product Integration including 2D and 3D systems.”

Continuing his presentation, he highlighted the step-by-step process of 3D Design, rendering with colours and thickness of materials, rotating in real time, flattening to 2D, pattern definition and then Grading of these patterns both Normally and through Special grading. He also spelt out CSIR-CLRI’s ‘CAD for Footwear’ Facilities and Services which included the 3D CONCEPTUAL DESIGN system comprising the SCANNY 3D -Last scanner, the CREATIVE Software and the SOLE DESIGN Software. He
also underlined the expertise for 3D LAST MODELLING AND GRADING which comprised 3D Software Solutions and e-last software. PRODUCT DATA MANAGEMENT (PDM) comprising PDM Software, CUSTOMISED /ORTHOPEADIC FOOTWEAR: comprising 3D Foot scanner and CUSTOM Software and also the DIE LESS CUTTING SYSTEM. He gave the detailed background and features of each of these softwares and outlined the Services offered by CSIR-CLRI in each of these areas whilst clearly spelling out the Inputs required and the Outputs that would be delivered. He also lightly touched upon the new Training course being offered titled “Understanding Shoe Design the 3D way which included elements of both 2D as well as 3D CAD systems.

Mr Gautham then gave an overview of the State of the Art in Technologies especially for the Design Process and how CAD/CAM systems could be linked to Manufacturing after the Design process is complete. He concluded his presentation with a peep into the future where New generation CAD systems would be Intelligent and capture the knowledge and genes of the Shoe Design itself thus bringing more efficiency and intelligence into the design phase. He also touched upon the highly integrated and flexible production cells with programmable machines for ease of manufacture and enabling rapid manufacture of shoes. Rounding off his presentation, he said that the footwear industry has proven it can embrace Technology and it can now use CAD/CAM Technology to Produce better quality products with improved efficiency, Strengthen its position in the world market, Improve their communication links with “Buyers”, Integrate Last Making with Shoe Making and Design Complete Shoe Ranges more easily.
SOCIAL EVENING, CULTURAL RESTAURANT, 21 June 2012

LIDI hosted a Social Evening at the conclusion of the first day of the workshop. The event was held at the ‘Cultural Restaurant’ and was graced by His Excellence Mr. Ato Tadesse Haile, State Minister, Ministry of Industry, Government of Ethiopia. Mr Ato Wondu Legesse, Director General LIDI played the gracious host.

The CSIR-CLRI Team was treated to a fascinating glimpse of the Ethiopian Ethnic culture and dance traditions through a breath-taking display of energetic Dance movements by a cultural troupe. It was indeed amazing and the perfect way to round off a successful first day of the workshop.

The Honourable Minister interacted with Dr Wondu and with Dr BN Das and the Team members who shared with him the pioneering work done by the LIDI Team at CSIR-CLRI in developing a new process for ‘WANKE SKINS’ which would otherwise be used as non-value adding leather to a high quality value added leather for use in niche fashion products. This would benefit the Ethiopian Tanners and would also boost the national economy.

The Honourable Minister was very happy with this development and promised all support.
The first presentation in this session was by Mr Gautham Gopalakrishna, Senior Principal Scientist, CSIR-CLRI who spoke on “Developing Effective Skill training Modules for Application in the Shoe Industry.” He set the Agenda in his talk as looking at The Skills and Competitiveness Challenge and devising New approaches to address the gap while spelling out as to what the Industry could do to lead change. He also listed out the ‘Challenges’ as being Employability & Availability with the need for huge capacity addition to meet future demand while at the same time addressing the quantity, quality and qualification mismatch.

Mr Gautham listed out the problem points with this industry and suggested new approaches to address this gap like linking Education to Employability in the Global Knowledge Economy. He also cautioned that there was ‘No One Solution’ and every ‘Geographical Area’ demanded an innovative approach. He also urged to significantly enhance Government-driven vocational training efforts as well as increase scale of PPP initiatives to better utilize Government infrastructure which meant that we should foster Private sector / Industry participation in skill development in a big way.

The talk also recommended the need for constituting Sector Skill councils with the avowed purpose of Identification of skill development needs including preparing a catalogue of types of skills, range and depth of skills to facilitate individuals to choose from them; Development of a sector skill development plan and maintain skill inventory; c) Determining skills/competency standards and qualifications; Standardization of affiliation and accreditation process; Participation in Affiliation, accreditation, examination and certification; Plan and execute Training of Trainers; Promotion of academies of
excellence and the Establishment of a well-structured sector specific Labour Market Information System (LMIS) to assist planning and delivery of training.

Elaborating on the role of the industry, he added that they must identify competencies and set up competency standards; do a Skill demand analysis and curriculum development; Facilitate training of trainers; ensure delivery of training, monitoring and evaluation; Participate in examination and certification; Participate in affiliation and accreditation process; Share work place experience, machinery and equipment; Support by way of physical, financial and human resources; Facilitate employment of trained persons and own the skill development activities. He added that the industry needed to be proactive and Set up collaborative “Skill Development Centres” ; Support existing and future skill development initiatives; Encourage employees to act as trainers, assessors; Reward life long learning; Refund training fees to encourage retention; Support participation in the Sector Skills Councils; Reach out to the skill development centres with requirements and Lead setting up of Leather Sector Skills Council. He also said that Skill development initiatives are a competitive advantage and said that the future depended on what you do today.

Mr Gautham then traced how CSIR-CLRI has effectively implemented Leather and Leather Product Technology Education and Training through Innovative education in Leather Technology and synergetic and symbiotic interaction between the Academy, Industry and Institute. He also provided a detailed list of the various levels of training programmes both academic and Vocational being carried out at CSIR-CLRI. He then proceeded to highlight the HRD Activities of the CSIR-CLRI Shoe Design and Development Centre.

He concluded his presentation with two case studies on “Developing an Effective Skill Development Training Module for application in Design and CAD Training”, the first being the 2D CAD Pattern Engineering Course and the second being “Understanding Shoe Design – the 3D way!” the new course being offered at CSIR-CLRI Shoe Design and development Centre.
The second presentation in this session was by Mr Md Sadiq, Senior Principal Scientist, CSIR-CLRI who made a presentation on “Understanding Shoe Design and Retail Analysis.” In a very interesting presentation which had the audience completely enraptured, Mr Sadiq traced the Genesis, Growth and the Metamorphosis of the CSIR-CLRI India Fashion Studio. He spoke about the origins of the Studio in 1993 and how the studio had played the role of a ‘Resourcing Partner’ and how over a period of time it had been transformed into an “a leading design school of the East” with quality Designers being trained and placed in the footwear industry worldwide.

The presentation also traced the expansion of the studio as it moved into the domain of ‘Fashion Forecasting’ and its metamorphosis into a ‘Fashion Designer’ with the establishment of an online portal – www.shoedesignclub.com which transformed into www.indiadesignclub.com as the activities of the studio widened and the horizon expanded. Mr Sadiq highlighted some of the recent activities of the studio as setting up ‘India TREND PAVILIONS’, ‘THEME PAVILIONS’ at various INTERNATIONAL FAIRS and also ‘CONCEPTUALIZING EXHIBITIONS.’ Rounding off this segment, he said that the “Feather in the CAP” is that the studio activities now include advising on ‘RETAILING’ and to ‘TOP IT ALL’ ‘DESIGNING in the 3D WAY!’

Mr Sadiq then gave an overview of the Potentials and Prospects of the Indian Leather industry and gave statistics showing the growth of India’s Export of leather & leather products, at a CAGR of 5.87% in the last 5 years. He also gave a detailed statistical highlight of all segments of the leather industry and enunciated the reasons as to why India was a global player of standing in this area which according to him was Raw material adequacy, Best Tanning expertise, Available skilled workforce, Rapid increase in domestic consumption, Increasing capacity of the production units, World class institutional support for designing & testing, Changing product-mix in favor of comfort & Ladies shoes, from men and formal shoes and Long experience in EU& USA. Mr Sadiq then illustrated the points made by him through a film on the Indian Leather Industry titled “I-Potential.”

He then presented a detailed Retail analysis through the MODEUROP Leathers/Colours for the Spring Summer 2013 season and how these could be related to products in retail. He demonstrated the various Leather Products of Shoes and Bags which conform the three sub themes Luminous Brights, Powered Pastels and Vivid Naturals are being developed commercially. He expressed the desire that he was here in Ethiopia to share his experiences and to establish a Partnership with the Ethiopian Leather fraternity.

Concluding his presentation Mr Sadiq gave the audience a detailed overview of the MODITALIA Trend which was the Italian perspective on Leathers and Textures for the Spring Summer 2013 season which he divided into four sub-themes namely Cruise Mood, Art Apparel, Gipsy Trip and Dark Soul.

The final presentation in this session was by Dr BN Das, Chief Scientist and Head CSIR-CLRI Shoe Design and Development Centre on “Productivity Improvement Techniques” which started with a fundamental definition of Productivity and talked about optimization of Men, Machines, Materials and Space. He emphasized as to why productivity Improvement was necessary and listed out the drawbacks of the production system as being due to ineffective utilization of plant layout, Imbalance in men & machines utilization, Improper materials handling, Improper production methods, Lack of safety standards, Poor working conditions, Lack of awareness on productivity among the production personnel and Lack of training for working personnel. He also drew the ‘The Vicious Circle from lesser productivity’ and broke down the total Work content into Basic and Additional.

Dr Das then enunciated the ‘Productivity Diagnosis’ as Q – The quality of the process – the conformance level of the products generated by the process; C – The cost of the process – the cost of labor, material, expenses absorbed by the process; D – The throughput time of the process – The time the products have to spend within the process. (This can also be called as manufacturing lead time) and F- Flexibility – the response of the process for quick changes. He then proceeded to highlight the Productivity Improvement Tools as Elimination of Division of Labour, Elimination of non-value adding activities’ Reduction of the number of separate activities within a process, Performance of activities in parallel or concurrently, Make the process error proof, Resequence the activities, Empower the worker,
Introduce a case manager, caseworkers or case team. Move activities out of the process and Create multiple routes or paths through the process.

Presenting Case Studies, he highlighted the benefits of Material Productivity and the Cost benefits from it and also enunciated the CSIR-CLRI System of estimating and ensuring Material Productivity norms. He then presented the case of Assembly line productivity for manpower optimization and suggested a strategy for Line balancing for smoothening the WORK FLOW operations and to increase the worker efficiency thus resulting in a Streamlined And Organized Production Processes Vis-À-Vis Layout, Manpower And Work Flow.

Dr Das then presented Time Study Data as a Case Study and presented suggestions for improving productivity. The outcomes of this exercise were Manual of Good Housekeeping, Scientific system of Leather Grading, Optimization of materials, Improvement of Cutter's efficiency and Sustainable productivity improvement. Dr Das also demonstrated the improvement in productivity through implementation of Lean Manufacturing concepts and presented Case Studies to illustrate his observations.

In the final part of his presentation, Dr Das presented an approach plan for Benchmarking and presented the EFQM model on Business Excellence. He highlighted the Processes in the Manufacture of Leather and Footwear and computed the Process and result scores to identify strong and weak processes in the manufacturing unit being studied.
Session VI of the Workshop was focused on the recent technology trends in Leather manufacture with a special focus on eco friendly options for Leather Manufacture.

The session started with a presentation by Mr. Saravanan. He briefed the significant technological developments that impacted the leather manufacture, and mentioned that major development had happened in Waste management in making the leather manufacturing activity more sustainable. The Ethiopian Tanning sector, which is at its nascent growing stage, need to make concerted efforts in developing their waste management system to meet the requirement of environment regulatory norms. Mr. Saravanan in his presentation addressed on the “Trends in Leather Manufacturing Technology” with a specific focus on “Profitable propositions for wastewater management”. In his lecture, he highlighted the Indian experience in managing the treatment of wastewater, especially the end of pipe treatment. He detailed the pros and cons of effluent treatment plant (ETP) and centralized (C) treatment of effluent through CETP. His presentation had lessons for Ethiopian tanners to choose in process control measures than addressing the issue of wastewater at the end. He introduced the concept of zero discharge and highlighted the possibility of making zero discharge through in process control measures. Mr. Saravanan highlighted the salient features of the new zero wastewater discharge technology and more importantly the economic benefit of adopting Zero Wastewater Discharge technology, a profitable proposition for the Ethiopian tanning sector.
Mr Saravanan, addressing the Ethiopian Tanners, said that the need of the hour for the Ethiopian Leather Industry was that the Ethiopian discharge standards demanded the tanneries to opt for appropriate measures to meet them and it has to be complied with. Many tanneries are contemplating establishment of wastewater treatment system but they should examine whether the sustainability of all the possible environmental protection measures are well-understood and is there a profitable proposition for environmental protection?

The presentation then highlighted the pollutants in tannery wastewater and detailed the Indian experience in wastewater management. He then enumerated the hierarchy of wastewater management as Alternate process or material, Recycling or reuse and End-of-pipe treatment. He said that End-of-the pipe treatment systems have been construed as the important technological solution for managing the wastewater successfully. Globally many tanning clusters had resorted to centralized wastewater treatment facility. Giving an overview, he said that Pretreatment consists of Removal of debris, gross solids and to some extent the suspended solids, Screening consists of removal of gross solids and debris and Equalization comprises equalizing the waste streams of varying characteristics.

Analyzing the Pros and Cons of centralized wastewater treatment, he said that Advantages of CETPs is that common technological solutions can be installed, Issues could be addressed centralized, Monitoring is easier and there is relatively lower operational cost. He also pointed out the Disadvantages of CETPs as being Seldom possible to monitor the volume and quality of wastewater from individual units, Low amenability to technological modifications, Wastewater conveyance is a nagging issue and that Sludge management is cumbersome. He also compared In-process pollution reduction vs end-of-pipe. Mr Saravanan also cited the Sustainability and Cost equation and related the Indian experience.

He said that Internalization of hydrological cycle is the best and appropriate strategy for addressing the wastewater problem to provide sustainable solution and pointed out the advantages of Recycling. He also discussed zero wastewater discharge through in-process measures and said that two strategic points are crucial namely Segregation of waste streams from different process and Treatment to remove organic contaminants and reutilizing the inorganic pollutants continually. He also discussed Zero wastewater discharge versus conventional wastewater treatment and described in detail the Basis of zero wastewater discharge. According to him, the salient features were that Zero wastewater discharge shall not lead to new solid waste or gaseous emissions, it is easier treating the sectional streams instead of the combined wastewater and the treatment shall not generate any undesirable Products.

In his concluding remarks, Mr Saravanan opined that Zero discharge of wastewater through in-process measures does not lead to generation of new solid waste, there is no increase in volume of prevailing solid waste, there is no hazardous entity generated, there are no toxic gaseous emissions and that ZWD system is feasible and economically viable. He also gave the benefits and economics of ZWD. He rounded off his presentation by saying that the Ethiopian Leather industry was better positioned and the Ethiopian tanners need not take the long path (which India did) to attain environmental security with better sustainability and therefore there is an option of profitable proposition for environmental management.

The next presentation in this session was by Dr B Madhan, Senior Scientist, CSIR-CLRI on “Cleaner Technologies.” He opened his presentation by differentiating between ‘pollutant’ and ‘pollution’ and described how industrial activities cause pollution. Switching his attention to Leather Manufacturing and pollution, he said that in the conversion of 1 ton of raw hide or skin into leather about 700 kg of chemicals and chemical products and 35 m$^3$ of water are used. This results in about 250 kgs of leather 35 m$^3$ of waste water, 700 kg of solid waste and 20 kg of gaseous emissions. He also classified wastes from leather manufacturing as wastes generated due to release of extraneous materials and wastes generated due to the residual inputs. He also listed out the parameters that need to be contained as BOD (Biochemical Oxygen Demand), COD (Chemical Oxygen Demand), TS (Total Solids), TDS (Total Dissolved Solids), Chromium, Chloride and Sulfide.

Dr Madhan made a presentation on “Cleaner Technologies in Leather Manufacture”. In his presentation he had defined pollution, and said that pollution is a part of industrial activity and in
development process pollution is inevitable, but what is more important is to manage the pollutants within the carrying capacity of the environment. He discussed about the input output analysis in leather manufacture and characteristics of the effluent generated from each unit processes. The source of BOD, COD, TDS contribution from each unit processes has been presented in detail. He brought about the basket of technological strategies available for controlling these parameters through in process control measures. Some of the cleaner in process measures discussed by Dr.Madhan is listed as follows:

- Salt free preservation systems
- Segregation of Soak liquor and treatment for organic pollutants and evaporation; the salt obtained can be reused
- Green fleshing reduces the usage of lime and sulphide
- Paint liming for segregation of hair
- Recycle of Lime liquor
- Enzyme based beamhouse processing
- Ammonia free deliming
- Recycle of pickle liquor
- Recycle/Reuse of chrome liquor
- Pickle free chrome tanning
- Optimal usage of wet finishing chemicals

Dr.Madhan highlighted that sustenance and competitiveness of Ethiopian tanners depends on their preparedness to meet the environmental regulatory norms. Dr.Madhan in his presentation had driven the point that “Prevention is better than cure” and that Cleaner processing is the appropriate option for containing pollution and importantly it has a business advantage.

Dr Madhan also illustrated the Input-Output analysis of leather manufacture graphically and highlighted the Characteristics of Effluent from Unit Processes. Giving the hierarchy of Pollution abatement he said that the following order is followed namely Process (and material) optimization, Alternate material and process, In-process pollution reduction measures, Recycling and reuse, End-of-pipe treatment and Secured disposal. He also listed out the sources of BOD and the current practices in Liming/Deliming. He also opined that Enzyme Unhairing and Fibre opening was the way forward. He also proceeded to highlight the Technologies for Ammonia-free deliming.
The presentation then looked at the sources of TDS, Source and abatement of Sulfide and Abatement of Chromium. With regard to Solid Waste, he said that Utilization of solid wastes (particularly the proteinous wastes) is an economically lucrative solid waste management option and the possibilities are: Manufacture glue or gelatin from hide trimmings, Manufacture of animal (or bird) feed from fleshings, Manufacture of compost from fleshings, Generation of energy from fleshings, Manufacture of compost from hair and Manufacture of syntan or leather boards from shavings.

Dr Madhan concluded his presentation by saying that Environment conscious consumers demand for not only eco product but also eco process as well, to remain globally competitive and the Ethiopian tanning sector has to be prepared to meet the environment regulatory norms. He opined that Prevention is better than cure and that Cleaner processing is the appropriate option for containing pollution and importantly it has a business case.

The final presentation in this session was by Dr (Mrs) Malathy Jawahar, Senior Scientist, CSIR-CLRI who spoke on “TANSOFT” and ERP software for Tannery management. She described the various packages contained in the software and gave a detailed menu run of the Chemical Inventory Module, the Raw Material Handling module and the Process Automation Module.

She pointed out that the benefits of the software are many and the primary benefit is that it would improve the efficiency of Leather manufacture and considerably save raw materials assessing time. She described the various packages contained in the software and gave a detailed menu run of the Chemical Inventory Module, the Raw Material Handling module and the Process Automation Module. She highlighted the usefulness of the Tansoft especially in managing the inventory of several consumables including chemicals, which happens to be one of the critical issues for the Ethiopian Tanneries. She pointed out the benefits of TANSOFT as it would enhance the efficiency of Leather manufacture.
The Director General of LIDI, Mr Wondu Legesse expressed his deep sense of gratitude to the CSIR-CLRI Team Members who were departing for home after a successful workshop.

Each of the members was honoured with a special shawl that depicted the Colours of the Ethiopian National Flags.
Session VII was titled "Awareness Creation" aimed to create awareness among the Ethiopian Leather about the efforts taken by LIDI in creating Skilled and intellectual manpower for the sector and pionering R&D work. As a part of this session, the first presentation on the title entitled "Human resource development for Ethiopian Leather Sector" was made by Mr.Tsegaye Teferra, Registrar, LIDI. In his presentation he detailed the efforts taken Leather Industry Development Institute (LIDI) through Twinning programme in setting up road map for the development of skilled and intellectual manpower to meet the demand of leather and leather products industry anticipated in Growth Transformation Plan (GTP) of Ethiopia. Mr.Tsegaye in his presentation highlighted the quotes “The speed, direction and impact of technological change are more pronounced than in the last century, and more pervasive. The future will depend on education and intellectual investment. Success will only come from what human mind can capture. This workshop focuses on what the human mind can capture. I invite you to participate and benefit.” of Dr.B.Chandrasekaran

The second presentation of the session was made by Mr. Mohammed and Mr. Aysanew. They made a presentation on “Wanke Skins: Promising Opportunity”, which is an outcome of the joint R&D activity carried out between LIDI and CLRI under the Twinning Programme. Mr.Aysanew in his presentation highlighted the loss of opportunity in value addition of Wanke skins. From the R&D work carried out at CLRI, Mr.Aysanew presented the fundamental histological and chemical characterization of Wanke skins and compared the same with Abyssinian Sheep skin. Through their fundamental research efforts on Wanke Skins, the structure of these skins were understood much better and they have come out with effective strategy for designing the process for the manufacture of Upper, Garment and Glove leather from Wanke skins. Mr.Mohammed presented the process strategy interventions they brought out in the conversion of wank skins into different leather and these leathers were characterized for physical and chemical testing parameters. They presented a promising opportunity for the manufacture of value added leathers from wanke skins. The presentation from Mr.Mohammed and
Mr. Aysanew had evoked great response from all participants of the 1st Indo-Ethiopian workshop. Mr. Wondu Legesse in his comment on the presentation mentioned that this R&D work carried out by LIDI research is a landmark work. He mentioned that Ethiopian’s are not aware of the characteristics and value of their raw materials and they get to know through other people only, but this research work on Wanke Skins is one of the pioneering work which is going to remain in history of Ethiopian Leather sector, were Ethiopians were involved in unwinding the mystery of the wanke sheep skin.
Mr Wondu Legesse, DG, LIDI summarised the workshop and Mr P Saravanan, Senior Principal Scientist, CSIR-CLRI offered special remarks.

Mr Wondu then felicitated all the speakers with floral bouquets.

The workshop concluded with a Vote of Thanks from LIDI.

As a part of Valedictory session, all speakers were invited to the podium; discussions and deliberations were invited from the participants of the workshop. Most of the discussion were focused on the clarification on the possibility of utilization of wanke skins for making high value leathers. Finally Mr. Wondu Legesse thanked all the speakers, organizers from CLRI and LIDI for making the 1st Indo-Ethiopian workshop a grand success.
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