



Report on the Visit to Germany for the Symposium titled Responsible Resource Use in the Textile Industry

Participants:

1. Prof. Dr. Muhammad Fazli Ilahi, The Vice-Chancellor, AUST
2. Prof. Dr. Lal Mohan Baral, Head and AUST-GIZ-ES Project Coordinator, Department of Textile Engineering, AUST
3. Md. Ruhul Amin, Associate Professor, Departmental Administrator
4. Rashed Al Mizan, Assistant Professor, Chair Holder, Chair for Sustainability and Textile Innovation
5. Noor-E-Farzana Annesha, Lecturer, Chair for Sustainability and Textile Innovation
6. Md. Mazharul Haque, Lecturer, Chair for Sustainability and Textile Innovation
7. Iffat Ara Anannya, Lecturer, Chair for Sustainability and Textile Innovation
8. Tamjida Islam, Lecturer, Chair for Sustainability and Textile Innovation

Date: From 30th August to 8th September

Place: Frankfurt and Dresden, Germany.

Preamble:

In pursuit of academic and research excellence, a delegation comprising members of the Chair for Sustainability and Textile Innovation team, as well as the esteemed Vice-Chancellor of Ahsanullah University of Science and Technology, Prof. Dr. Muhammad Fazli Ilahi, the Head of the Department of Textile Engineering, Project Coordinator, Prof. Dr. Lal Mohan Baral, and the Departmental Administrative Associate Professor, Md. Ruhul Amin embarked on a journey to Frankfurt, Germany. The purpose of this visit was to participate in the international symposium titled Responsible Resource Use in the Textile Industry. Hereafter, the delegates will be termed as the AUST team.

A Short City Tour:

On the 30th of August, 2023, AUST team arrived in Frankfurt, Germany, eagerly anticipating the valuable insights and knowledge exchange that awaited us at the symposium. Their initial experience was marked by a short but enriching city tour of Frankfurt, thoughtfully organized by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), which provided them with a glimpse of the city's cultural and historical facets.

Visit to Engelbert Strauss CI Factory - September 1, 2023

On September 1, 2023, AUST team embarked on a visit to the CI factory of Engelbert Strauss, Germany. Accompanied by representatives from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-Flores), the AUST team had the opportunity to explore various facets of Engelbert Strauss's CI factory (Figure 1).

Logistics Center and Warehouse:

Engelbert Strauss's CI factory functions as a dynamic logistics center. The warehouse boasts an impressive capacity, spanning approximately 20×100 square feet. What sets this facility apart is its advanced automation and meticulous sensor-based management. While manual inputs are required for overall system operation, the entire process is orchestrated with precision.

Goods within the warehouse are strategically stored without the constraints of dedicated sections for specific garment articles. Instead, a dynamic and cohesive storage approach is employed, fostering efficient material handling and time-saving operations. The warehouse spans from the 6th to the 9th floor, accommodating up to 430 thousand boxes.

In addition to the primary warehouse, the factory maintains a temporary storage facility known as the "Horizontal Shuttle." This intermediate point plays a vital role in the journey of materials and cartons, overseeing picking, delivery control, and the processing of return orders. Grey boxes often carry return packages for sorting and separation.



Figure 1: Chair Members with VC of AUST, ES, GIZ, UNU-Flores



Carton Assembly and Preparation:

Within the CI factory, a dedicated section handles carton assembly and preparation. Here, cartons are meticulously folded to ensure they conform to the required specifications. The facility offers a variety of carton sizes, all crafted from recycled paper materials. The packaging process is initiated upon the receipt of an order. The system calculates the box size based on the order's dimensions and weight. To facilitate easy identification, a barcode is generated from the order and printed on the box's exterior.

Customer Order Processing:

The Customer Order Process Zone is where orders are systematically sorted. At the picking station, packages from the shuttle warehouse and cartons from the assembly area converge. At this juncture, the crucial tasks of sorting and packing are carried out simultaneously. Operators meticulously inspect barcodes to ensure accurate order processing. Any rejected garments are promptly redirected to the shuttle warehouse for further assessment and handling. Once the final order is assembled, it undergoes additional security measures, including the adjustment of securing bars based on the carton's height.

Conveyor Belt Network:

The entire facility is seamlessly connected by a network of conveyor belts equipped with sensors. This intricate system spans a total length of 13 kilometers and plays a pivotal role in the swift movement of cartons and materials.

Quality Control and Improvement:

Engelbert Strauss maintains a rigorous quality control process, particularly for rejected or returned goods. These items undergo thorough inspections to identify areas for improvement and optimization. This visit provided our delegation with valuable insights into Engelbert Strauss's comprehensive logistics system. The company's commitment to efficiency and innovation in material handling and order processing was truly commendable.

Visit to Weaving Museum Braunsdorf and INNOTEX Printing Factory - September 4, 2023

On September 4, 2023 the AUST team from Ahsanullah University of Science and Technology, in collaboration with Dr. Christina Froemder, Associate Programme Officer for Capacity Development in Sustainability and Innovation Management at UNU-Flores, embarked on a journey to explore the rich heritage and promising future of the local Saxon textile industry in Germany.

Visit to Weaving Museum Braunsdorf:

The day commenced with a journey from Dresden, Germany, to the Weaving Museum Braunsdorf. This museum, with a history spanning over two centuries, serves as a testament to the enduring legacy of weaving (Figure 2). Initially, weaving was a necessity for crafting car decorations and seat covers. In the annals of textile history, Michel Toughman's name shines as the illustrious loom

maker of 1883, responsible for crafting the looms used in Limmnit. The museum also chronicles the invention of the Jacquard weaving machine by Marc Josep Jacquard in 1886, a groundbreaking innovation that reverberates through time.

The museum further delves into the contributions of Franz Paul Cdmman and his wife, who established a cabinet section within the museum. Here, they wove opulent fabrics for cabinet and interior designs. Unfortunately, the luster of this factory dimmed after the turmoil of World War I, with many of its machines being exported to Russia.

Visit to INNOTEX Printing Factory:

Following the enlightening experience at the Weaving Museum Braunsdorf, the AUST team proceeded to the INNOTEX Printing Factory on September 5, 2023. This family-owned company boasts a remarkable lineage dating back to 1815, and in 2003, INNOTEX Merkel emerged as a significant entity within the textile industry. Their expertise lies in the art of printing on running meter fabric, with proficiency in both rotatory printing and digital printing technologies.



Figure 2: On the left- Carpet Weaving Machine, On the right- Jacquard Machine

INNOTEX focuses exclusively on the printing and finishing aspects of the textile chain, sourcing bleached fabric from overseas for their printing and finishing processes.

The visit included a comprehensive presentation on the factory's operations, offering valuable insights into their printing and finishing techniques. This was followed by an immersive tour of the factory floor, providing a firsthand view of the intricate processes involved. The experience extended to a visit to the factory-owned shop, where guests had the opportunity to explore an array of textiles and enjoy traditional culinary delights.

As the day concluded, the AUST team wrapped up their visit by 5:30 pm, enriched by the knowledge and experiences gained during this exploration of the Saxon textile industry's past and present.

Activity of the AUST Team on September 5, 2023

On September 5, 2023, the AUST team led by Prof. Dr. Muhammad Fazli Ilahi along with the UNU-Flores team, actively participated in a series of significant events.

HILO Prototyping Workshop:

The day commenced with a visit to the UNU-Flores office, where the team attended a workshop conducted by HILO Prototyping. This enlightening session stretched from 9 am to 12 pm. During this workshop, various types of prototype machinery designed for small-scale and lab-scale processing of innovative fiber materials, such as spinning, were introduced. Participants were provided with hands-on demonstrations of how to operate and control parameters during the spinning process using these cutting-edge machines (Figure 3).



Figure 3: The chair members actively participating on the workshop



Meetings:

During the team's brief but productive stay, several pivotal meetings were convened to discuss crucial matters.

Meeting 1 - Project Progress Discussion (9 am):

Date: September 5, 2023

Location: UNU-FLORES Office

Participants:

Prof. Dr. Muhammad Fazli Ilahi, Vice-Chancellor of AUST

Prof. Dr. Lal Mohan Baral, Head of the Department of Textile Engineering, AUST

Prof. Edeltraud Guenther

Prof. Daniel Karthe

Dr. Christian Bochmann

Johannes Foerster

The focus of this meeting was to review the progress of Mr. Rashed Al Mizan's PhD study.

Meeting 2 - Project Meeting with Stakeholders (1:30 PM):

Date: September 5, 2023

Location: UNU-FLORES Office

Participants:

The AUST team

Friederike Hoppe, Engelbert Strauss

Sophie Deuerlein, Engelbert Strauss

Dr. Christian Bochmann, GIZ

Johannes Foerster, GIZ

Prof. Edeltraud Guenther, UNU-FLORES

Dr. Christina Froemder, UNU-FLORES

Adiba Afroz, UNU-FLORES and

Kamol Gomez, UNU-FLORES

The primary objective of this meeting was to provide an update on the current project activities led by the AUST Chair team. Prof. Dr. Edeltraud Günther, Director of UNU-FLORES, extended a warm welcome to all attendees. Following her welcome, Rashed Al Mizan and Noor-E-Farzana Annesha presented updates on the ongoing project activities. Subsequently, important decisions were reached during discussions with the stakeholders:

- Engelbert Strauss expressed their interest in involving their suppliers in the research projects undertaken by the Chair team. As a result, a decision was made to collaborate with Engelbert Strauss suppliers on research topics, although specific plans were yet to be finalized.
- Engelbert Strauss committed to engaging with their suppliers to explore how they could contribute to or benefit from the research project activities.

Additionally, a poster presentation of students' project works was conducted by Md. Mazharul Haque, Noor-E-Farzana Annesha, Tamjida Islam, and Iffat Ara Anannya. The audience expressed their appreciation for these student projects guided by dedicated tutors (Figure 4).

The activities of the Chair team on September 5, 2023, were marked by productive discussions, knowledge-sharing, and collaborative planning for future endeavors.



Figure 4: The Chair team with all stakeholders

Welcome Reception of the Textile Symposium - September 5, 2023

The grand Welcome Reception of the Textile Symposium, a significant event on the symposium's itinerary, took place on September 5, 2023, at 4:30 PM at the prestigious International University Dresden. The occasion was graced by the presence of esteemed project partners and distinguished guests attending the Symposium.

The inauguration of this remarkable event was an honor, as His Excellency, Md. Mosharraf Hossain Bhuiyan, the Bangladesh Ambassador in Berlin, presided over the opening ceremony (figure 5). During his inaugural address, Ambassador Bhuiyan expressed optimism about the potential collaborations between Bangladesh and Germany, further strengthening the bonds of friendship.



Ahsanullah University of Science and Technology (AUST)

(Chair for Sustainability and Textile Innovation, Department of Textile Engineering)

Prof. Dr. Muhammad Fazli Ilahi, Vice-Chancellor of AUST, extended a warm welcome to all attendees and officially inaugurated the symposium. Following this, Prof. Dr. Muhammad Fazli Ilahi delivered a heartfelt welcome speech, setting the tone for the event's proceedings (figure 6). The Director of UNU-Flores, Prof. Edeltraud Günther, also graced the occasion with her presence and shared her insights.

The Welcome Reception featured an array of distinguished speakers, each addressing various topics of relevance to the symposium's theme. The esteemed speakers included:

Rashed Al Mizan & Noor-E-Farzana Annesha, AUST

Shirin Araghi, Designer at C&A / GIZ Consultant

With the conclusion of the opening ceremony, the Welcome Reception marked a successful beginning to the Textile Symposium. It served as a platform for the exchange of ideas, fostering collaboration, and setting the stage for insightful discussions and interactions in the days to come.



Figure 5: The Ambassador of Bangladesh, Berlin during his speech



Figure 6: Prof. Dr. Fazli Ilahi, VC of AUST giving his speech

Participation in the International Textile Symposium - September 6-7, 2023

The AUST team proudly participated in the esteemed International Textile Symposium, themed "Responsible Resource Use in the Textile Industry," which was held in Dresden, Germany. This event was an integral part of the broader project's activities.

Organized through the collaborative efforts of GIZ and UNU FLORES, the International Textile Symposium took place on September 6-7, 2023. It was a forum where experts and stakeholders gathered to explore various facets of sustainable textile practices, emphasizing the United Nations Sustainable Development Goals (SDGs).

The symposium featured five insightful sessions, each dedicated to a specific aspect of the textile value chain, including water and chemical consumption reduction, sustainability assessment, the resource nexus, social innovation, and circular economy considerations. Furthermore, the integration of nature into textiles was a prominent theme throughout the event. The AUST team actively participated in the fourth and fifth sessions, contributing to these important discussions (Figure 7).



Figure 7: The AUST Team Participated in the Textile Symposium



Figure 8: Prof. Dr. Lal Mohan Baral gave a welcome note to the symposium

Day 1 Highlights:

The symposium commenced with a warm welcome note delivered by Prof. Dr. Lal Mohan Baral, Head of the Department of Textile Engineering at AUST (Figure 8).

Keynote speakers Friederike Hoppe and Sophie Deuerlein, representing Engelbert Strauss, provided an enlightening overview of their company's initiatives, including their groundbreaking project "Botanica" – STRAUSS' pioneering venture into completely biodegradable workwear.

Session 1: Processes and Materials to Reduce Water and Chemicals Consumption: This session featured a panel discussion with experts Aslihan Memisoglu, Amira Jehia from Drip by Drip, Tanvir Kabir from the Embassy of Bangladesh in Berlin, and Dr. Holger Erth from Textilausrüstung Pfand GmbH (Textile Finishing SME).

Session 2: Resource Nexus and Sustainability Assessment: Academic insights were shared by Serena Caucci from UNU-FLORES, followed by a panel discussion with Serena Caucci, Zarmina Khan from Easer, Roman Houlbrequé from Retraced, and independent researcher Natascha van der Velden.

Session 3: Social Innovation & Responsibility: Aslihan Memisoglu from the University of Applied Sciences Niederrhein delivered an academic input, followed by a panel discussion involving academics Tanja Strukelj and Theresa Falter from TU Dresden, Kamol Gomes from UNU-FLORES, and Adiba Afros, an independent consultant.

The symposium's program concluded with a visit to the Institute of Textile Machinery and High-Performance Material Technology (ITM). Prof. Kyosev and Md. Hasan Saeed provided a comprehensive overview of TU Dresden University and ITM, highlighting topics such as high-performance textiles produced in Dresden, ITM's network, and ongoing research activities (Figure 9)



Figure 9: The Participants of the Symposium Visited TUD, ITM



Day 2 Highlights:

Welcome and Keynote:

The second day of the International Textile Symposium began with a warm welcome note delivered by Prof. Edeltraud Günther, Director of UNU-FLORES.

The keynote address, titled "Sustainability and Circularity in the Textile Value Chain - A Global Roadmap," was presented by Dr. Robert Reinhardt, a consultant specializing in sustainable business and strategy.

Session 4: Promoting Circular Economy with Joint Efforts:

In this session, academic insights were provided by Henrike Schmitz and Johannes Leis, representing SOEX/TU Chemnitz and Sächsisches Textilforschungsinstitut e.V. (STFI).

Notably, two members of the AUST team, Noor-E-Farzana Annesha and Md. Mazharul Haque presented their student projects. Noor-E-Farzana Annesha's presentation centered on "Reusing Denim Waste as a Replacement for Fusible Interlining in Garments," while Md. Mazharul Haque discussed "Sustainable Flock Printing: Utilizing Cotton Microfiber Waste Collected from Dyeing Machines as Flock."

A panel discussion featuring academics and Shirin Araghi from C&A/GIZ enriched the session (Figure 10).

Session 5: Nature & Textiles:

This session featured academic insights by Isabell Rzepecki, an intern specializing in Sustainability & CSR at VAUDE Sports GmbH.

Additionally, two members of the AUST team, Iffat Ara Anannya and Tamjida Islam from AUST, presented their student projects. Iffat Ara Anannya explored "A Nature-Based Solution for Decolorization of Discharge Water in the Textile Industry," while Tamjida Islam discussed her research on the same topic (Figure 11).

A panel discussion, involving academics, Kay Kölzig from Sachsen Leinen GmbH, and Rony Khan from Eco Fresh Agro, rounded off the session.



Figure 10: The two members of the AUST team Md. Mazharul Haque and Noor-E-Farzana Annesha participated in the circular economy session





Figure 11: The two members of the Chair team Iffat Ara Anannya and Tamjida Islam participated in the nature and textile session

Impulse Talk:

During the symposium, two noteworthy Impulse Talks took place. The first, titled "The Future of Textiles," was delivered by the representative of Bangladesh Institute of Management (BIM), shedding light on upcoming textile trends and innovations. The second talk, "Sustainability in Textiles: Bangladesh Perspective," was presented by Md. Ruhul Amin from AUST, offering insights into sustainability within the textile industry from a Bangladeshi standpoint (Figure 12).



Figure 12: Impulse Talk on “Sustainability in Textiles: Bangladesh Perspective” by Md. Ruhul Amin

Feedback Workshop:

Subsequently, a feedback workshop was organized by the UNU FLORES Team. This session likely provided an opportunity for participants to share their thoughts, suggestions, and impressions from the symposium.

Meeting 3:

On the 7th of September, a crucial meeting was held at 3 pm, attended by Prof. Dr. Fazli Ilahi, VC of AUST, Prof. Lal Mohan Baral, Prof. Edeltraud Guenther, Dr. Christian Bochmann, and Johannes Foerster. The meeting centered on planning future steps for project activities. Key decisions from this meeting included:

- Mr. Rashed Al Mizan will prioritize his Ph.D. studies, stepping back from active involvement in project activities. Dr. Mohammad Tajul Islam will assume responsibility for the Chair during Mr. Rashed Al Mizan's period of absence.



Figure 13: MoU Signing Ceremony between AUST and GIZ

The symposium concluded with the signing of a Memorandum of Understanding (MoU) between Ahsanullah University of Science and Technology and GIZ, marking an important step in further collaboration (Figure 13).

With the successful conclusion of the Germany visit, the AUST team returned to Dhaka, Bangladesh, on the 8th of September, 2023.