



EDITOR'S DESK

Happy New Year 2024!

It is a great pleasure to let all the readers know that after a gap of one year when no funding was available from the Office of the Principal Scientific Adviser (PSA) to the Govt. of India, there is a re-start from Oct. 2023 in the form of RuTAG 2.0. We were amongst the few hundred who applied against an open call made by the Office of the PSA. I am additionally happy that many of our young colleagues have joined the team as Co-PIs, besides Prof. M.R. Ravi being the Head of the Department has kindly agreed to be the PI of RuTAG 2.0. I, however, have decided to continue as the Editor of this newsletter.

One of the emphases of RuTAG 2.0 is to commercialize technologies developed under this programme. Hence, there are several good news: 1. One of our products "AC Motor-Powered Wooden Bead Making Device" has been licensed for commercialization to an industry in Delhi. Now, it will be available through online stores also, besides GEM for Govt. purchases. Not to mention that already an entrepreneur has acquired 10 of the above machines who is running training programmes to the local women; 2. There has been another sell of our Sheep Shearing Device through the Innovative Product Delivery (IDP) scheme of FITT-IIT Delhi to Central Wool Development Board, Jodhpur; 3. I am happy to share that three Hand-knotted Carpet Weaving Looms, which were originally developed for Bhadohi-Mirzapur in UP state during 2000-2010, have been bought by Arunachal Pradesh Handicrafts through the IDP scheme for their training center in Bomdila (about 270 Km from Itanagar). RuTAG supported the successful installation of the looms there. Hence, IIT Delhi is on the right track, as visioned by the Office of the PSA. I am sure with the support, ideas, and participation of the readers we will be able to reach much greater heights.

On the academic contribution of RuTAG IIT Delhi, I happy to share that about 250 UG students have earned NGU 1.0 credit after completing about 30-40 hours during May-Sept. 2023 based on the concept of Team-based Online/Offline Projects that involved group activity (4 in a team), followed by several online submissions on the tasks specified, peer review of at least five other fellow teams, and two physical presentations. This is the third consecutive year we ran this RuTAG Summer Internship successfully. Some of the feedback from the students on our internship programme is very encouraging. For example, "Really enjoyed the fact that there was no spoon feeding and we worked on our own and built things", "Great learning experience and helped to find new friends." Hence, we are convinced that RuTAG is successfully contributing towards professional education, rather than rote learning which we complain in general.

Happy reading!

Prof. S. K. Saha, Editor and Co-PI, RuTAG IITD

MESSAGE FROM THE PI

I am happy to write this column as the PI of RuTAG 2.0 at IIT Delhi for its 24th edition. I thank Prof. S.K. Saha for spearheading this newsletter for over a decade. Let me take this opportunity to also thank him for looking after RuTAG during last nine years (2014-2022). With RuTAG 2.0, many young colleagues have come forward to contribute to the cause of the RuTAG, which is a very healthy trend not only for IIT Delhi but in general for the nation. Our engineering inputs must improve the life of majority of the people in our country who live in rural settings, besides creating niche area of research which was already demonstrated last year when one PhD student (Dr. Suraj Bhat) who graduated working on the issues of the RuTAG at IIT Delhi. The recent Regional Workshop held in Lucknow with the support of the UP Khadi and Village Industries Board evoked a very energetic response from the KVIB institutions, artisans and craft clusters. Another exciting edition of RuTAG is surely on the cards, and with so much young blood flowing through its arteries, RuTAG 2.0 is expected to meet and exceed the standards set in the previous edition by Prof. Saha and his team. Personally for me, RuTAG always has been a source of energy and sense of purpose, and I hope to help our young warriors take to scale new peaks! I also take this opportunity to invite all the readers collaborate with us to make it a movement.

Jai Hind!

Prof. M. R. Ravi, PI, RuTAG IITD

PROJECT OVERVIEW

New Kiln Construction at Poonchhari, Rajasthan

RuTAG IIT Delhi team has constructed a new pottery kiln (Fig. 1) for the earthen tawa making at Poonchhari village in Bharatpur, Rajasthan. This activity is a part of the initiatives funded by the Khadi and Village Industries Commission (KVIC). The kiln is constructed using high alumina refractory bricks (40% alumina), and clay bricks. The choice of materials holds multiple advantages, promising enhanced durability, improved heat retention, and optimal firing conditions essential for quality pottery. One of the pivotal components of this kiln is the grate, which has been crafted with an exceptional level of expertise. This precision-crafted grate is poised to ensure uniform heat distribution, and load carrying capacity, a critical factor in the pottery-making process. The kiln is constructed with the Rat-trap bonded structure which has already proved to be beneficial to act as a natural insulating structure.

The construction of this project was a collaborative effort involving skilled artisans and dedicated professionals. Mr. Amad, from Bhuj, Gujarat, brought forth his expertise in kiln construction, along with the craftsmanship of a local mason. Together with the vigilant guidance of Mr. Davinder Pal Singh and the support of Mr. Yashwant Prasad from the RuTAG team, the kiln's progress was monitored with high attention to detail.

However, this transformative project wouldn't have been possible without the unwavering support and invaluable contributions of Mr. Padam from Poonchhari, whose local insights and assistance were instrumental. After the firing of tawas in this recently built kiln, it was observed that the baking of the tawas occurred uniformly and with excellent quality. Remarkably, there was a record-low percentage of breakage noted among the tawas. Further trials will be scheduled to gather field data in the near future.



Fig. 1(a): Kiln constructed by RuTAG IITD during 2021

(b): Newly constructed Pottery kiln

Decentralized Miniature Wool Carding Machine

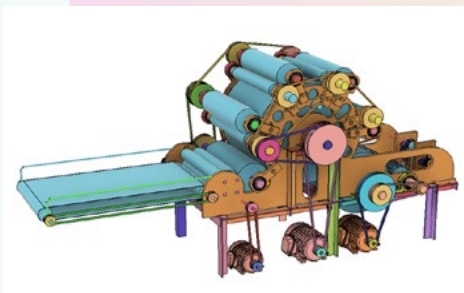


Fig. 2: Concept CAD model of new carding machine

Recently, the project for the development of a decentralized miniature carding machine was funded by KVIC. A thorough exploration of existing wool carding machines was done to get insights for the development. As per the requirements of the NGO, the output of the machine was finalized to have 5kg/hour productivity. With these insights and parameters, six different roller configurations were designed, and analyzed keeping in mind their 2D spatial requirements for optimal efficiency.

Along with this comprehensive research, the team finalized the design specifications (Fig. 2) for the new machine. Detailed drawings and specifications were shared with the manufacturer to start the prototype fabrication. The team also visited and had close discussions with carding cloth suppliers, ensuring precise selection and specifications for each type of roller. Later, it was decided that the manufacturer will procure the carding cloth alongside standard parts like motors, drive mechanisms, and electrical components, ensuring seamless integration into the prototype.

PROJECT OVERVIEW



Fig. 3 (a): Shearing in action at Ranipat; (b) Sheep flock; (c) Sheared wool

Sheep Hair Shearing Device demonstration at Rajkot, Gujarat

In a collaborative effort between RuTAG IIT Delhi and Sahajeevan, an NGO based in Bhuj, Gujarat, a demonstration of a sheep hair shearing device took place in Rajkot, Gujarat. The demonstration was at Ranipat village (Figs. 3 a, b, and c), which is about 80 kilometers away from Rajkot, where a flock of 44 sheep was arranged to witness the working of the device on November 1st. The device exhibited impeccable performance throughout the shearing process, efficiently shearing nearly 24 sheep. This successful demonstration was made possible through the diligent monitoring of Mr. Ashish from RuTAG IITD accompanied by Mr. Aslam and Mr. Pratap from Sahajeevan.

The activity wasn't solely about showcasing the device's prowess; it was an opportunity for knowledge exchange and empowerment. During the shearing, several shepherds were trained using this mechanized device, expanding their skill set and introducing them to modern shearing techniques. Two skilled shearers were arranged by the Sahajeevan team in collaboration with the Gujarat Sheep and Wool Board (GUSHEEL). Their involvement not only facilitated the shearing process but also fostered valuable interactions between the team and the local shepherds.

This demonstration was conducted to act as a bridge to a larger vision. RuTAG IITD team is enthusiastically keen to share Sahajeevan's aspiration to popularize mechanical shearing in the region. This dream isn't just about technology, it's about enhancing the livelihoods of local shepherds, elevating their skills, and fostering a sustainable future for the community. This successful demonstration stands as a testament to the potential of technological advancements in transforming age-old practices, promising a brighter future for shepherds.

Mr. Ashish Dahiya

OTHER ACTIVITIES AT A GLANCE

Delivery of Sheep Hair Shearing Device developed by IIT Delhi to Wool Testing Centre, Bikaner

In a significant effort towards modernizing sheep shearing techniques, RuTAG IIT Delhi has successfully delivered a sheep hair shearing device to the Wool Testing Centre in Bikaner. The procurement of this device was facilitated by the Central Wool Development Board (CWDB), Jodhpur, which is also the funding agency for this project. Their support and investment in the indigenous development of this shearing device have paved the way for its integration into the practices.

Technology Transfer of Tulsi Mala Bead Making Device

Mr. Harpreet from Harraj Industries has been our longstanding manufacturing partner, playing an important role in RuTAG's initiatives. Recognizing the invaluable collaboration, in the commercialization, RuTAG recently solidified this partnership by doing a technology transfer with Harraj Industries (Fig. 4). This technology transfer is one step further towards the commercialization of the technologies developed by RuTAG..

Fig. 4: RuTAG Team with Mr. Harpreet from Harraj Industries



OTHER ACTIVITIES AT A GLANCE

RuTAG Received Best Paper Award

At the ICMERE Conference 2023 held at CUET Bangladesh during November 16-18, Mr. Ashish and Prof. Saha's remarkable paper titled 'Empowering Youth through Team-based Online Projects (TOP): Addressing Rural Issues and Fostering Awareness' was appreciated, earning the coveted Best Paper Award (Fig. 5). The work done by the authors not only showcased innovative approaches but also highlights the pivotal role of online projects in tackling rural challenges while nurturing the empowerment of today's youth."



Fig. 5: Best Paper Award in CUET ICMERE 2023 International Conference



Fig. 6: RuTAG team interacting with students during Open House IITD

RuTAG Regional Workshop at Lucknow

RuTAG IIT Delhi hosted its first (RuTAG 2.0) regional workshop in collaboration with Uttar Pradesh Khadi and Village Industries Board on December 15, 2023 (Fig. 7), at Khadi Bhawan, Lucknow, U.P. Prof. M. R. Ravi (PI, RuTAG) along with his team including faculty and staff of RuTAG IITD received a warm welcome by Shri Arun prakash (CEO, U. P. KVIB), Shri Rajeev Tyagi (Dy. CEO, UPKVIB) and the team. RuTAG team visited pottery and bamboo clusters on Dec. 14 to get in-depth view of the problems faced by the artisans. The workshop witnessed a huge success with active participation of various S&T based organizations. A participatory discussion on the problem was also held. "This workshop was a transformative experience, enriching not just RuTAG but every participant involved."



Figs. 7(a and b): RuTAG Regional Workshop at Khadi Bhawan, Lucknow, U.P.

RuTAG Summer Internship 2023

The RuTAG Summer Internship 2023 has embarked on a whole new level this summer with a phenomenal engagement of over 475 enthusiastic students participating. These students were later on sorted out into 105 teams, each comprising 4-5 members from random departments/sections. After the project preferences submitted by the teams, various tasks were given to the students. The pinnacle of their endeavors unfolded during the presentation session held at the Lecture Hall Complex on September 26, 2023, where an overwhelming gathering was witnessed, showcasing the culmination of their hard work. Over 231 students have successfully completed the internship so far and received their well-deserved Non-Graded Units, marking a remarkable achievement for each participant, and RuTAG's commitment to connect the engineering minds with the society

Open House IITD 2023

RuTAG IITD team displayed its technologies at the Open House event held on 4th November 2023 at the Lecture Hall Complex, IIT Delhi (Fig. 6). The event witnessed a surge of enthusiastic school students and teachers from various locations, eager to explore the world of technology. Adding a unique touch to the event, RuTAG invited two skilled artisans from Mathura to demonstrate the Tulsi mala bead making process during this event. The RuTAG team's participation at the Open House proved immensely successful, igniting a passion for technology and innovation among young minds.

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