



## Senior Project Consultant's Column

The technologies developed under the RuTAG programme are getting more attention and increasing appreciation from various agencies including State and Central Government Ministries/ Departments. Enquiries from individuals, both entrepreneurs and users are also being received. We have to therefore, increase our efforts to find manufacturers who are willing to fabricate the improved machines and market them commercially. For this to happen, RuTAGs need to document the improved technologies which should include technical and design specifications, complete list and details of parts, manufacturing and assembling procedures, etc. So far, we have been preparing fliers that give information on the usefulness of the products. It is necessary to attract buyers but for manufacturers additional details are an absolute necessity. RuTAG staff may not have time to do this specialized job. Will it be a good idea to involve the student community to prepare such documents under supervision of RuTAG coordinators?

Another point that has been noticed is about participation in exhibitions. In all such cases the RuTAG stall draws appreciable crowds. We somehow are not able to convert this interest of the general public into greater sale of the improved technologies/products. It is time that RuTAG looks at this issue more carefully.

**Major Sabyasachi Chatterjee**

## Student Editor's Desk

Around 70% of our country's population lives in villages and only by the utilization of technology we will be able to solve problem on this mass scale. In current times we need to address basic problems and need to come out of the problem of scarcity of basic needs which is still there in many village by putting the best technology in hands of every people. This Newsletter have solutions to some of the similar kind of problems faced in many places. Our team requests you all to spread this information & help those who have similar issues by letting them know about our work.

**Harsh Harlalka**

## Editor's Desk

Another pleasant feeling to be able to bring out the 2nd issue in the same year. We started our newsletter journey in 2013 with one issue a year, but since 2015 we have been publishing two issues in a year. More importantly, in last three issues we were able to compile news from other RuTAG centers as well. These give us an opportunity to interact within ourselves which I feel, is an important component to bring out strong solutions for the society. Our students are also showing strong commitment these days, which is very healthy trend. Our RuTAG club members now take up projects if not for providing solutions by themselves but at least for their awareness generation, and providing support system to those faculty and students who are solving the problems by doing literature survey, helping during experiments, making CAD drawings, formatting newsletters, etc. Keep it up RuTAG club members!

**Prof. Subir Kumar Saha**

## Chairman's Column

### *Need for Revamping and Expanding RuTAGs to Cope with the Challenges of Unnat Bharat Abhiyan*

As you are well aware, RuTAG project was started as a pilot level experiment to initiate the process of involving a few apex technical institutions in providing the much-needed S&T support to the rural sector, focusing on the innovative improvisation of technologies being used by rural people including the rural entrepreneurs. This experiment, even though limited by its scale, has very well exhibited its need and usefulness. Now, with the launching of Unnat Bharat Abhiyan, which is intended to be implemented by very large number of Professional Knowledge Institutions in the country expected to adopt rural clusters, collaborate with the local PR institutions and voluntary agencies and effectively assist in the process of development of these clusters, the role of RuTAGs as technical resource units of Unnat Bharat Abhiyan (UBA) becomes much more challenging and wide-spread. For this, the structure, modality of operation, the forward and backward linkages with the corresponding constituents of UBA as well as the level of funding support will have to be adequately revamped and expanded to cope with this challenge.

As mentioned in the last newsletter, UBA envisages to identify and further develop selective mentoring institutions or nodal centres to take up the responsibility of orienting, mentoring, monitoring and closely networking with other institutions in their vicinity to spread UBA in the whole country. These institutions need to have strong RuTAG units to carry out the required technical development and training work for the UBA teams interacting with the rural clusters. IIT Delhi being the national coordinating institution for UBA, we are presently engaged in visualizing the new enhanced role of RuTAGs and the mechanism for their integration with the Unnat Bharat Abhiyan to be proposed to PSA. Any suggestions in this regard will be valuable and helpful.

**Prof. R. R. Gaur**

## Student's View

- I have seen people in villages struggling to earn livelihood. At that time I wanted to do something for them but I was not supported enough or can say not capable enough to do that type of work. Through RuTAG, I got the opportunity to work on real life problems and contribute in welfare of such people to make them more productive.

**Abhishek, Sophomore, Mathematics and Computing, IIT Delhi**

- I found RuTAG to be a perfect blend of technical learning and on ground exposure where you are accepted irrespective of your department, year or skill and knowledge status.

**Shailendra Dhakad, Engineering Physics, IIT Delhi**

### 1. Old Saree Cutting Machine for Handlooms operated by Visually challenged Individuals

Project Investigator: Prof. Suhas Joshi, Mechanical Engineering, IIT Bombay

Co-Project Investigator: Prof. Bakul Rao, CTARA, IIT Bombay

Collaborative agency: Grameen Shramik Pratishthan, Latur Maharashtra

Saree winding & cutting machine (Fig. 1) has been developed by RuTAG IIT Bombay to improve the productivity and safety of winding and cutting sarees to make ribbons which are used to weave mats by blind women. Grameen Shramik Pratishthan, Latur was using a hand held cutter for cutting and manually winding the sarees. Due to the technological intervention by IITB, productivity of an average blind person has doubled and safety factor has improved substantially, compared to earlier method of processing (manual operation).



Fig. 1 Saree Cutting Machine

### 2. Potter's Wheel – By IIT Madras

Project Investigator: Mrs. D. Rajalakshmi

Collaborative agency: Kumaraguru College of Technology, Coimbatore and Center for Social Development, Nagercoil.

This device (Fig. 2) is the substitution of manual driven wheel. In this device potter can work on constant speed and also instantaneously change the rotation speeds as per requirement. The product is designed for precision pottery and is easy to maintain. This new Potter's wheel is motorized and consumes lesser energy than similar products. This product is available in two models with different rotation speeds. It is suitable for the skilled potter as well as semi-skilled potter.



Fig. 2 Potter's Wheel

### 3. Evaluation of effectiveness of locally available fibers for water storage tank construction in rural villages for watershed management

Project Investigator: Prof. T. I. Eldho, Civil engineering Dept. IIT Bombay.

Collaborative agency: Jalavardhini Pratishthan

In rural areas, for effective water management on a water shed basis, surface water tanks/ ponds are used. The tanks commonly used in most areas in Maharashtra are of capacity of 50,000 liters. The technique used for construction is by using conventional techniques of reinforced cement concrete (RCC). The cost to construct the tanks by this method may be around Rs.10/ liter. An NGO, Jalvardhini has come up with a novel technique of water tank construction using natural fiber such as coconut, banana and flax. The natural fibers are used as a substitute to steel to cope with tensile stress and to deal with shrinkage. The project was undertaken with objective of field evaluation of the existing fiber based water tanks (Fig. 3) which especial emphasis on – evaluation of various properties of fiber based water tanks, evaluation of effectiveness against seepage, durability and cost effectiveness. It was found that the fiber based tanks are quite effective for construction of water storage structure. The seepage losses were also found to be minimum. The cost of construction of a 10,000 liter capacity tank was found to be Rs.2-3 per liter capacity. This is much lower compared to standard RCC tanks.



Fig. 3 Constructed Water Tank with natural fibers



Fig. 4 Water Level Measuring Device



Fig. 5 Jaggery Making Unit



Fig. 6 Hand Operated Dhoop Making Machine



Fig. 7 Prototype of Sheep Hair Shearing Device



Fig. 8 Motor with Flexible Drive

#### 4. Design & Development of low Cost Ground Water Level Measuring Device

Project Investigator: Prof. A. K. Gosain, Dept. of Civil Engineering, IIT Delhi.

Collaborative agency: Ram Krishna Jaidayal Dalmia Seva Sansthan, Rajasthan.

The water table measuring agencies generally use various kinds of ground water measuring device for measuring water table in the monitoring well. The commercially available water table measuring equipment are expensive. There is a constant demand from the rural agencies for the low cost and robust ground water measuring device. Therefore, RuTAG IIT Delhi developed low cost ground water measuring device (Fig. 4) which helps and encourages the ground water user/ stake holders at grassroots level for their effective participation in water management practices and developing ethical concepts for making efficient use of water resources available for agriculture.

#### 5. Process & Product Improvements in kolhapur type jaggery making unit: Possibilities of value addition through making liquid jaggery (kakvi)

Project Investigator: Prof. N. G. Shah, CTARA, IIT Bombay and Prof. S. Mahajani, Chemical Engineering Dept. IIT Bombay.

Collaborative agency: Shree Laxmi Rural Technologies Alternatives Charitable Society

Jaggery production is a small-scale village industry in Maharashtra (predominantly Kolhapur area) largely characterized by its ‘unorganized’ feature. Liquid jaggery (kakvi) is made in small quantities and sold on a restricted scale without using smart packaging materials and methods, making the product unhygienic and ‘clumsy’ looking. Typical capacity of jaggery making unit is about 1-3 Tons/day and ‘liquid jaggery’ by a single producer is made in small quantum of about 1.5 tons in a season of ~ 6 months. The objective of the project (Fig. 5) was to review production, processing and packaging aspects of making ‘liquid jaggery’ to help establish a branded product that will improve financial sustenance of jaggery units.

#### 6. Hand operated machine for making dhoop sticks from cow dung

Project Investigator: Prof. Ganesh R., CSE Dept., IIT Bombay.

Collaborative agency: Venumadhuri, Kolhapur, Maharashtra.

The objective of project was to devise a cost effective dhoop making machine (Fig. 6) to enable farmers and rural people earn additional income from the cow dung which otherwise is not used as fertilizers and is wasted. The project has generated additional source of income for families in rural areas engaging all family members including women and children.

#### 7. Adaption of Sheep-Hair Shearing Machine

Project Investigator: Prof. S. K. Saha, Mechanical Engineering Department, IIT Delhi

Collaborative Agency: Jansamarth, Tehri, Uttarakhand.

Currently, shepherds of Uttarakhand region use hand scissors for removing hairs from sheep’s body. This method removes only about half of hair length which does not yield good quality yarn. Shepherds of Rampur, Phata, Utterkashi, Devprayag, Kadernath and other remote villages of Uttarakhand are unaware of mechanized device. Hence, RuTAG IIT Delhi conducted two workshops with the help of Wool Board of Uttarakhand to introduce the device developed by IIT Delhi during 2005-2008 (Fig. 7). The device would reduce the shearing time from 30 min. per sheep only to 5 minutes. The new technology was well appreciated.

In second phase of the project, RuTAG is focusing on production standardization for indigenous manufacturing and dissemination of all indian made components of complete set of sheep hair shearing machine including motor, flexible drive (Fig. 8), hand piece, comb & cutter.

## RECENT ACTIVITIES

### 1. Testing of Bangle Making Furnace at IIT Delhi with Artisans from Bharatpur (March 28-30, 2016):

The newly developed furnace was tested at micro model facility at IIT Delhi, along with artisans from Bharatpur. Several tests were conducted. Artisans appreciated the modified furnace and were happy with the reduced pollution and heat exposure, better sitting posture and easier to operate modified *kalbhoot*. It is believed that the design improvements in furnace would help the villagers to have relatively comfortable workspace and enhanced productivity of bangles.



### 2. Visit to Kondagaon, Chhattisgarh (February 29-March 2, 2016):

In Bastar district of Chhattisgarh (India), 'Bell Metal craft' or 'Dhokra craft' is a traditional art. This is an energy intensive craft. The wood-fired furnaces used for this craft are very primitive having very low efficiency and high emissions resulting in adverse working environment for the artisans. IIT Delhi developed and tested natural-draft LPG-fired metal-melting and mould-heating furnaces along with a metal pre-heating unit to utilize the waste heat effectively for better overall efficiency of the integrated system. The furnaces were installed at Kondagaon, Chhattisgarh.



### 3. Open House at IIT Delhi (March 23, 2016):

IIT Delhi organized its 12th edition of open house on 23rd of March 2016. RuTAG IIT Delhi also exhibited the developed technologies, a total of 7 projects were showcased including 4 demonstration projects. There was an over-whelming response among students towards the devices developed for the rural use & people were enthusiastic about the end use of the technology. All-around appreciation was there, for yielding high-end results with small-modifications.



#### RuTAG CENTERS

IIT DELHI	<a href="http://www.rutag.iitd.ac.in">www.rutag.iitd.ac.in</a>
IIT KANPUR	<a href="http://www.iitk.ac.in/rutag/">www.iitk.ac.in/rutag/</a>
IIT KHARAGPUR	<a href="http://www.iitkgp.ac.in/rutag">www.iitkgp.ac.in/rutag</a>
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