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REPUBLIC OF INDIA

Technical report: Second mission*

Prepared for the Government of the Republic of India
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of B.C. Goswami,
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Introduction

A plan of work on the projects (a) Fabric Engineering, and (b) Jute Blending, was submitted by the principal investigator in the beginning of 1989 and the work on the plan was initiated in July, 1989. The project (Technical Report - First Mission Report) outlined the task and the time table during which the planned work needed to be carried out. Since then, the first group of fellows, namely M/S N. Chattopadhyay and P.K. Chatterjee have completed their stay at Clemson and accomplished all the tasks outlined in the project document. The above mentioned fellows returned to IJIRA at the end of December, 1989.

Dr. Goswami visited IJIRA between December 26, 1989 and January 19, 1989. During his stay he discussed the progress made during the past six months and deliberated on the future work with Dr. S.R. Ranganathan, Mr. S. Palit and all the fellows involved in the projects. Following is a summary of the progress made by the first group.

Accomplishments of M/S Chattopadhyay and Chatterjee

- (a) As a part of the Fabric Engineering Project that included the development of insulation tapes and quilting material, the fellows were able to develop prototype tapes and quilting. Prototypes were produced by (i) the Ultrasonic bonding technique and, (ii) the Stitch Quilting technique. After a careful analysis of the economics of the two processes, it appears that the Stitch Quilting technique might prove an appropriate technology for the jute industry. The fellows visited the Branson Ultrasonic Corporation (Mfr. of Pinsonic Machines) in Connecticut and made contact with Gribetz, Inc. (Manufacturers of Stitch Quilting Machine). Prototype samples made with both these technologies were shipped to IJIRA for evaluation.

- (b) The second part of this project, which was handled by Mr. P.K. Chatterjee, dealt with the development of fertilizer bags. Prototype materials were made from woven jute fabrics bonded with HDPE and polypropylene films. Bonding was carried out on a Stork Calender machine at the Zima Corporation works located in Spartanburg, South Carolina. Excellent bonding (laminating) was achieved between 100% Jute woven fabrics and LDPE, HDPE or polypropylene films. The candidate materials produced show excellent characteristics and the possibilities of proving a success. The materials are now being evaluated at IJIRA.

Interaction With Industry

During my stay in Calcutta, I had the opportunity to visit Ludlow and Kanoria Jute Mills. In addition, I gave a seminar to a group of technical people from the jute industry.

Ludlow Mills, in addition to producing traditional jute products, has a needle punching nonwoven line. The batts produced by the opening and cross lapping unit in this line can be used for stitch quilting products. However, finisher sliver or carded web can be equally good materials for this technology.

The Kanoria Mills is one of the largest manufacturers and exporters of spiral bags and scrim fabrics used for making geotextiles.

Both these groups were very receptive to new ideas and are willing to experiment with new products.

Fellowship Training of M/S U. Dutta and D. Roy

M/S Dutta and Roy arrived in Clemson on February 2, 1990. They have started working in their respective areas of expertise.

Mr. Dutta has been designated to work in the area of quilting and seed tapes. Stitch quilting is one technology that has been identified for the quilting project. However, there is a lot that needs to be done in the area of identifying the form in which the jute material should be used. Experiments on the use of card sliver, finisher drawn sliver and scrim reinforced slivers in stitch quilting will be carried out. This is essential to ensure the development of the most economic manufacturing process. Presently, the machinery manufacturer is working with polyester continuous filament yarns. This can be an expensive proposition under Indian conditions. Use of stitching threads other than polyester will also be explored.

Mr. D Roy will be responsible for the development of geo-textiles products including seed tapes and Super Sod as indicated in the first mission report. He will also be responsible for looking after the project on jute spiral bags for bagging of cotton as indicated in the original project proposal document.

Recommendations for Field Trips

I suggest that M/S Dutta and Roy should be given permission to make the following trips to accomplish the tasks assigned to them:

- (a) Visit to Gribetz, Inc. in Sunrise, Florida is essential to further evaluate the Stitch Quilting Technology and run samples of sliver instead of batts with threads other than polyester. The trip should be made in late February or early March.
- (b) The fellows should visit Micrex Corporation, Walpole, Massachusetts, to run experiments on jute slivers, yarns and fabrics as a part of the jute softening project. This technology shows promises for the

development of unique characteristics in jute which will help in producing bulk in the material and enhance certain physical properties. This visit should be undertaken toward late March or early April.

- (c) The fellows will need to visit Belton Manufacturing in South Carolina and Sierra Bagging Co. in California as a part of the cotton bagging project. This visit should be made in April/May.

Recommendations for Equipment

- (a) Because of the excellent results achieved in laminating jute with HDPE and PP film on the Stork Calendar (with blanket), it was resolved to procure one machine and install it in a mill. The requisition for the Stork Calendar has already been filed and IJIRA should have the equipment installed in the next few months.
- (b) In the quilting and insulating tape area, I recommend that IJIRA should procure a "STITCH QUILTING" machine made by Gribetz International Inc. of Sunrise, Florida, USA. This technology is preferred over the "Pinsonic (Ultrasonic) Bonding technology, because the former does not require any blending i.e. of any thermoplastic fibers which is a prerequisite in Pinsonic Bonding. Moreover, Ultrasonic equipment is relatively quite expensive and the maintenance and spare parts might pose an undue burden. In light of these drawbacks, the stitch quilting shows excellent advantages.

Future Programs and Fellows

In consultation with the National Project Director, Dr. S.R. Ranganathan and Mr. Palit, plans for the visit by the third group of fellows was finalized. The fellows in this group are: (i) Mr. S.N. Ghosh and (ii) Mr. R.S. Krishnan. These two fellows will concentrate their efforts in Geotextiles and mechanical softening of jute materials. In addition, they will also make efforts in setting specifications for various pieces of equipment such as, Stitch

Quilting, and mechanical softening (Micrex Machines) if this proves successful in imparting the desired characteristics.

I suggest that M/S Krishnan and Ghosh join Clemson sometimes around the first week of June so that they overlap with M/S Dutta and Roy to pick up their activity and enhance the effectiveness of the project. Mr. Ghosh will spend his efforts on mechanical softening and stitch quilting technologies while Mr. Krishnan will concentrate in the development of Super Sod and cotton bale covering material. All these areas have been identified in the original project proposal.

Areas of Research

- (a) The possibility of blending a small quantity of stiffer fiber e.g. coir to enhance the bulk and rigidity of tapes for use in insulation applications.
- (b) For the development of seed tapes, the possibility of using waste jute fibers in the center of the structure along with the controlled release materials (fertilizer, nutrients, etc.) should be explored. Actual experiments in the field should be planned and carried out.
- (c) Lamination of fibers to scrim reinforced needle punched nonwoven batts or card slivers should be studied. These bonded structures can then be used for insulation tapes or for packaging.
- (d) The role of mechanical softening in improving the bulk and or blending and spinning is another area which requires some developmental efforts.