TERMS OF REFERENCE FOR THE R&D PROJECT FOR TEXTILE MACHINERY AND ACCESSORIES SECTIONAL COMMITTEE, TXD 14

1. Title of the Project: Study the requirements of Baxter Flyer and Heart Cam for slip draft spinning frame for use in jute mill.

2. Background

The roving coming out of the front delivery roller is threaded through the top of the baxter flyer, passes through its hollow leg around the presser arm on to the bobbin. The purpose of providing twist in roving is to give the strand sufficient strength to withstand the strain during unwinding in the creel of the slip draft jute spinning frame. The insertion of twist is achieved by the rotation of the Baxter flyer. Baxter Flyers are a type of flyer used in jute spinning machinery. They replaced the two-legged flyer with tubular flyers, enabling machines to run at very high speeds up to 4500 RPM whereas two-legged flyers could manage speed up to 3800 rpm.

The heart cam is a mechanical element that is used in slip draft jute spinning frames to control the movement of the baxter flyer spindle. It is a revolving wheel that has a heart-shaped groove on its circumference. The heart cam mechanism ensures that the baxter flyer spindle and the bobbin move in sync with each other, which is essential for the production of high-quality jute yarn.

Jute mills purchase spinning spare parts from several supplier/manufacturers. There is no such IS standards (except few) available for critical/ essential spare parts of SD spinning frame. Hence manufacturers produce the spares and mill store accept the spares without maintaining any standard or reference bench mark of quality. As a result, there is variation in metal composition, hardness, depth of hardness etc.

The outcome of R&D will establish the criteria for Baxter Flyer and Heart Cam that cater to the particular demands of the Jute mills. Baxter Flyer and Heart Cam will enhance the productivity of slip draft spinning frame in jute mills by adhering to requirements such as hardness, hardness depth, coating, and material composition, and by minimizing waste.

3. Objective

The project aims to collect the relevant technical data/information and scientific evidence from both primary and secondary sources in regard to requirements such as hardness, hardness depth, coating, and material composition, and other relevant factors of Baxter Flyer and Heart Cam for slip draft spinning frame.

4. Scope

a) Undertake study and analyse of the existing literature which includes but not restricted to the followings:
   - Books and magazines
   - National/International standards and regulation
   - Journals and research papers
   - Standard operating procedures (SOPs)/ instructions/ guidelines issued by ministry/ regulatory body concerned

- Studies/research conducted by any organization
- Any other relevant published information

b) Collection of scale-wise (small, medium and large scale) data for manufacturing base, testing infrastructure and users in the country.
c) Collection of the import and export data, type of standards and technical regulations being followed by domestic/foreign manufacturers and carry out comparative analysis of these standards and technical regulations.
d) Undertake 2 visits to each of small, medium and large scale manufacturer to collect the data/information for the following:
   - types of raw material being used
   - manufacturing processes
   - in process quality checks being exercised during manufacturing
   - varieties being manufactured
   - Standards being followed
   - in process test facilities
   - post manufacturing quality checks/ in-house data
   - marking and labelling
   - packaging and storage conditions
   - sustainability practices [energy consumption, renewable energy sources, sustainable practices, 3Rs (Reuse, Reduce and Recycle), waste management and disposal mechanisms, carbon footprints]
   - Focused group discussions with teams involved in production, testing, and R&D to address quality issues, discuss challenges faced, and gather suggestions for improvement
   - The feedback from other manufacturers (where visit is not carried out) shall be collected by circulating suitable questionnaire covering above information through email or any other digital means
e) Undertake 2 visits to users to collect data/ information including but not restricted to the following:
   - Standards and regulations being followed
   - Focused group discussion on quality issues, challenges being faced and suggestions if any

   The feedback from other users and labs where visit is not carried out shall be obtained through suitable questionnaire covering above information.
f) Collect 2 samples from each from small, medium and large scale manufacturer and generate data after testing the product for important requirements such as hardness, hardness depth, coating, and material composition and other relevant factors of Baxter Flyer and Heart Cam for slip draft spinning frame.
g) Preparation of comprehensive project report on entire scope covered above.

5. Research Methodology

a) Collect and analyse the data/information as specified in the scope [4(a), (b) and (c)].
b) Visit manufacturers and users to collect data/information as specified in the scope [4(d) and (e)].
c) Collect and test the samples as specified in the scope 4(f).
d) Analysis the data/information and prepare a comprehensive project report.

6. Deliverables

a) Comprehensive report in both digital and hard copy formats of study on covering all the aspects mentioned in scope.
b) Questionnaire feedback, testing report, focussed group discussion report, other relevant documents and information shall be appended to the project report.

7. Requirement for the CVs

Bachelor Degree in Textile Engineering/ Textile Technology/ Jute & Fibre Technology/ Fibre Technology/ Jute Technology or Master Degree in Technical Textile

8. Timeline and Method of Progress Review: The timeline for the project shall be 120 days from the date of award of project, the stage wise timeline for execution of project shall be as follows:

No. of Days (Timeline)	**Task/Status of work to be done**
0 to 15 days	Literature review, desktop study and collection of data/information Note - The sampling plan for visit and collection of samples shall be discussed and finalized with nodal officer after literature survey and desktop research.
16 to 60 days	Visit to manufacturers, users and collection of samples
61 to 90 days	Testing of samples, preparation and submission of first draft report
91 to 120 days	Submission of final report of the project

9. Support BIS will Provide

a) National/International standards required for carrying out the projects will be provided by BIS.
b) Correspondence from BIS to government bodies and regulatory entities to facilitate the R&D project.
c) Facilitate testing of samples in BIS Lab/BIS Recognized Lab.

10. Nodal Point

In case any queries or clarification required, Shri Swapnil, Sc-B/AD & Member Secretary, TXD 14 may be contacted on txd@bis.gov.in/swapnil@bis.gov.in.