

EPSRC Centre for Doctoral Training in Sustainable Materials and Manufacturing

Title: Review processes and waste streams from yarn production and develop options for increased productivity, reducing, re-using and otherwise managing or adding value, with particular emphasis on lean manufacturing techniques

Supporting Company: Blacker Sheep Limited, trading as The Natural Fibre Company and Blacker Yarns

Location: University of Exeter

Primary Supervisor: [Dr Justin Hinshelwood](#)

Secondary Supervisors: TBC

Project Description

The collaboration with the named project partner is subject to contract. Please note full details of the project partner's contribution and involvement with the project is still to be confirmed and may change during the course of contract negotiations. Full details will be confirmed at offer stage.

The aim of this project is to review current manufacturing processes and waste streams and develop costed action plans to reduce, re-use and otherwise limit waste in the manufacture of wool yarns. This includes energy and water management, materials and consumables management and reviewing yields from production to improve raw materials utilisation without compromising quality or marketability.

Brief summary of context for the project: Since being acquired from retiring owners in 2005 and relocated from Wales to Cornwall, Blacker Sheep has grown to 8 times the original scale and increased capability with additional processing, including dyeing. Adding a mezzanine floor and container storage has helped manage the growth, along with increased productivity of equipment through investment in upgrades. However the challenge is now to manage a further step change while containing costs and environmental impact and continuing the specialised small batch, high value-added production which is the major competitive selling proposition and has led to Blacker Sheep being the UK and Europe market leader in this segment.

Brief summary of the sponsoring organisation: Blacker Sheep is an integrated yarn production facility, covering all processes from greasy shorn fleeces to finished yarns for sale, and is also accredited for organic processing to the Global Organic Textile Standard. The main part of the business is spinning small to medium batches (20-250kg) of yarn for smallholders, craft workers and other businesses, along with some larger customers (250kg-1 tonne) and a further activity is the manufacture of a range of branded hand knitting yarns. Blacker Sheep has spinning customers in the UK and Europe, with about a quarter of commission spun yarn exported, and knitting yarn customers across the world, with around half of retail sales exported.

General outline of the focus of the project:

We envisage the tasks undertaken will include:

- Gain familiarity with yarn production processes in integrated mill operation, including practical hands-on production
- Understand the differences between different yarn producers, as regards scale, waste management, etc.
- Map and review workshop organisation to seek lean working opportunities and increased productivity, prepare costed plans, including reviewing workflow, layout, scheduling, maintenance, staffing, OEE, levels, training and utilisation
- Map and quantify existing waste streams and costs of management
- Identify areas of environmental impact and concern with existing procedures and make recommendations for reducing impact cost effectively
- Identify waste streams to which value can be added within existing operation, quantify, review financial viability and impact on current production efficiency, prepare project plans for implementation, implement pilot and trial production projects to test viability
- Identify waste streams where increased value may be obtained outside existing operation, quantify, review viability, prepare project plans for implementation