UniformReuse.co.uk Research Report

Alternative Joining Methods to Enable Reuse of Corporatewear

Introduction

The barriers affecting the recovery of corporatewear are numerous, and are examined in detail across a number of reports carried out for the Centre for Remanufacturing and Reuse (CRR). This document looks at alternative joining methods which could be incorporated into corporate clothing in the future, to enable reuse and recovery of fabric, therefore diverting textiles from landfill. Six fabrics were identified by De Montfort University as typical fabrics used within the corporatewear industry across several garment types.

The six fabrics are:

1. **100% recycled polyester polar fleece**
2. **65% polyester / 35% cotton woven shirting**
3. **100% polyester knitted jersey**
4. **54% polyester / 46% cotton knitted pique**
5. **100% polyester woven bottom weight**
6. **55% polyester / 45% wool suiting**

Introduction

The fabrics identified as typical for corporate clothing were used for conventionally sewn seams and heat bonded seams in both warp and weft direction (both weave directions).

Heat bonding is a three phase application:

• Phases 1 and 2 - A heat adhesive tape is applied to both edges of a potential seam, sacrificial paper is removed on both, and the edges are then laid over (one over the other) to enable the adhesive to stick together.

• Phase 3 – The overlaid material is then put through a second operation which reheats the adhesive and applies pressure to join the seam securely.

The trial looked at various heat bonding machine systems and concluded that the best system for this project was developed by Sew Systems in Oadby, Leicestershire, UK. Other machine systems may have produced slightly different results, but these were not compared.

Originally this technology was developed for the lingerie industry and is therefore capable of dealing with all weights of cloth, both rigid and stretch, knits and wovens. The concept was introduced as a means of making seams less visible, but the potential for use in disassembly of the garment was deemed a worthy side benefit.

Prepared seams were sent out for independent seam strength testing by Bemis Laboratories (see full technical report for detailed results). In five of the six fabrics tested, all seams were stronger in the heat bonded versions (both weft and warp direction seams) which is theoretically plausible, as conventionally sewn seams are penetrated by a needle, thereby potentially weakening the seam. During the heat bonding process the glue is forced into the fibre of the fabric, by a combination of heat and pressure, and therefore no seam damage occurs.

Of the six fabrics the only fabric type with a weaker heat bonded seam was the polar fleece. This may have been due to either a bad adhesive choice or the fabric having a surface finish applied such as a Teflon coating. Surface finishes on cloth are not conducive to successful heat bonding.

An additional set of heat bonded seams was also prepared out of the six fabrics and left to cure for two months, to determine the ease of disassembly. Normal heat bonded seams cure within 8-12 hours, but an extended curing process, to an extreme timeline, was needed to be confident the bond was fully secure, and give more comparability to 'real' garment service life.

These seams were put through the final stage of the heat bonding process in reverse, and in all cases the bond was successfully undone at the first attempt. This is due to the bond being a mechanical bond, rather than a cross linked bond which would be much more difficult to reverse. An adhesive residue was seen to remain after the bonds were undone, but this is minimal, and will either be covered if the panel is being used as is, or could be cut around if the fabric is to be used in a different application.

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Conclusions

In the future, corporate clothing garments produced using the heat bonding process could be successfully disassembled at the end of life (EoL), and panels utilised for a second life.

As this technology is currently an expensive way to produce garments this is seen as having a more feasible application in high value garments, such as protective wear. In these cases, a damaged panel could be replaced in the garment for continuous use in its first life, or total garment disassembly at EoL could enable panels to be used to create a second-life garment. This would be dependent on garment disassembly and panel re-use being designed into the product at its conception.

Future development may result in the cost of the technology falling, which may allow a wider uptake of this process for disassembly in a lower value range of garment types.

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