Sustainable Auto Worker Uniforms: Lessons Learned from Applying a Sustainable Product Development Tool

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Sustainability in the apparel industry will be achieved by improving environmental and socially responsible practices and performance (Dickson, Loker, & Eckman, 2009). In 2011, a group of leading apparel companies (brands and retailers), suppliers, and non-profit organizations founded the Sustainable Apparel Coalition (SAC, www.apparelcoalition.org), intending to reduce the environmental and social impacts of the apparel and footwear industry and make the industry sustainable. In summer 2012, SAC released a tool (the Higg Index 1.0) that enables companies to evaluate the environmental impacts of materials, products, facilities, and processes. Currently the Higg Index is being pilot tested for improvements. Higg Index 1.0 focuses on environmental sustainability, but a SAC working group has just concluded piloting the social responsibility performance measures that will be incorporated into Higg Index 2.0.

The purpose of this research was to develop a concept for a sustainable auto worker uniform and apply sustainability performance principles included in the Higg Index to evaluate success and further improve the concept. A university research team partnered with an automotive company and a uniform manufacturer to develop a sustainable uniform that could be worn daily by workers at an auto manufacturing facility. There were three objectives for the project: 1) apply sustainability principles to the design and development of the uniform, 2) evaluate the environmental performance of the uniform and production facility using Higg Index 1.0 and identify areas for improvement in the manufacturing phase, and 3) evaluate the social responsibility performance of the manufacturing by visiting several of its facilities and identifying areas for improvement. A first step involved developing a shared vision for sustainability between all project participants ─ the research team, the automotive company, and the apparel manufacturing partner.

Sustainability in product design and development. The research team was challenged in designing a sustainable product due to the functional needs of automotive workers and care requirements of the uniform. The requirements of being durable and comfortable as outlined by the auto industry partner, led to the decision to use a polyester and cotton blend, rather than a single fiber content. In the evaluation process using the Higg Index 1.0, the researchers were able to assess the environmental performance of using a polyester/cotton blend and were able to identify the greatest sustainability impacts that could be achieved based on their design criteria. A single fiber content (e.g., 100% cotton or 100% polyester) is more sustainable than a blend because the fabric can be easily degraded through composting (for 100% cotton), or recycled back into fibers (for 100% polyester). However, after-use material management is not possible for fabric blends, which may be considered as a monstrous hybrid according to McDonough and Braungart (2002). Using a polyester/cotton blend makes end-of-life considerations difficult,

resulting in a lower Higg score. In addition, commercial laundering is typically required for auto uniforms followed by tumble drying, which negatively affected the product care component of the Higg assessment. The team chose to use recycled polyester and organic cotton as a more sustainable choice. Including these two sustainability variables increased the assessment score for the product. However, the assessment showed some potential gaps in the Higg Index 1.0 for materials evaluation. Higg Index 1.0 included coatings/laminates, water use in the dye process, and applications of green chemistry, however, it did not include dyes and finishes for the textiles.

Environmental sustainability at the facility level. The apparel manufacturing partner provided the research team with assessment data from a garment facility that produces auto worker uniforms. Using the Higg Index 1.0 facility assessment tool allowed the researchers to evaluate where in the manufacturing phase improvements towards sustainability could be made. Researchers identified three main areas for improvement, i.e., water use, air emissions, and wastewater treatment, along with applications for improvement in each area. The Higg Index 1.0 assessment tool can be used by facility management as a framework for improvement efforts.

Social responsibility at the facility level. Researchers conducted a series of evaluations to assess the social responsibility performance of the uniform manufacturer and its facilities. The team made site visits to four foreign facilities utilized by the apparel manufacturing partner, two owned facilities and two contracted facilities. Reports of past audits for each facility were reviewed and interviews were carried out with corporate staff and factory management. Overall, the team found the owned facilities were well managed for social responsibility and the apparel partner had greater control over these efforts; whereas, the manufacturer had lesser control over social responsibility in the contract facilities. The research team determined that the use of factory certification and audits was insufficient. Instead employing a root cause analysis and proactive programs to prevent problems was recommended.

Conclusion. The research team found challenges to environmental sustainability and social responsibility at each phase of the sustainable uniform project. By clearly identifying these challenges the team was also able to identify areas of opportunities for creating sustainable apparel products through the choice of materials, product development processes, and choice and management of manufacturing facilities. Additionally, researchers found the Higg Index 1.0 to be a useful environmental performance assessment tool and found gaps within the tool that can be improved upon in later versions. This project emphasized that sustainability in the apparel industry requires a multi-disciplinary approach including product design, material development, pollution prevention, and social compliance in order to understand sustainability challenges and to engage across the supply chain for improvements.

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