

Advances in Workwear: Protection from Steam & Hot Water

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Purpose of the garment system: The design objective was to create a garment system using semi-permeable fabric to protect workers from steam and hot water injuries.

Design Process:

The clients, comprised of safety officers and specialists who work in the extraction and refinement of oil products in Western Canada contacted the department of human ecology to engage in testing and developing fabrics and creating a garment system that would protect workers exposed to steam and hot water hazards. The request followed a number of injuries where one worker was



killed and others were maimed during a work accident. Over the course of 3 years this trouser and jacket combination was developed utilizing an in-depth research process called designing in the wild (Strickfaden, 2013). The stages of the design process are reported in a series of papers (Yu, et al., 2011, 2012a, 2012b, 2013) and a master's thesis (Yu, 2013).

Materials & Techniques Used: The garment system is created using a semi-permeable tri-laminate fabric allowing for improved comfort and protection. This fabric makes the trouser and pant set breathable while protecting from steam and hot water impingement and splash. Seams used are a standard overlock seam that is not suggested as the best seam for protection (see Sunder et al., 2013) but is used because this is the most common seam used manufacturing protective clothing. The garment system is sewn using Nomex thread Fluorescents are used to adhere to safety standards in the Alberta context. The colour varies depending on industry

application, and in this case, the garment system is orange for high visibility. The garment uses hardware (buckles, clips, zippers, snaps) that is hard-wearing to withstand the work environment and massive fluctuations in temperatures. The chosen zippers do not clog with snow, freeze when impinged with moisture, or heat with steam or hot water.

Design Features: The garment system includes trousers and a jacket combination created to be worn together for maximum protection. It features trousers with a vested detail and high waist for greater comfort and mobility, knee pad pockets, wide legs for ease of donning and doffing while wearing boots, and venting at the rear of the leg to aid in preventing heat exhaustion. The trousers have deep openings on each side, again to aid in donning and doffing efficiently. The trouser also features a front fly opening to accommodate toileting. The jacket features a high collar for maximizing chest protection, a double cuff feature for improved interfaces with gloves, triangulated venting at the upper and lower back to prevent heat exhaustion, and a waist band to improve fit and mobility. The garment has an overall improved tailored fit that is not common in North American protective clothing that aids with mobility and comfort. Pockets on both the trousers and jacket are minimized and carefully designed to avoid water collecting and pooling inside. This garment system protects from all hazards associated with working in the oilfield including flash fire.



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