CONCEPT OF SMART WEARABLE TECHNOLOGIES FOR INDIVIDUALIZATION OF ARMY UNIFORM

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EXTENDED ABSTRACT (12 pt, CAPITAL LETTERS, BOLD)

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1. INTRODUCTION

The National Armed Forces of the Republic of Latvia use uniforms of different levels, depending on the mission and responsibilities. Field uniforms of level four are the base element. In the field, different problems related to the uniforms' durability have been identified: the uniforms burst and are not properly maintained (cleaned, repaired, etc.). In order to solve these problems, a complex approach is necessary, which includes research of body size correlations for ensuring individual comfort and increasing uniform longevity, RFID for identifying uniforms, etc.

2. MATERIALS AND METHODS

2.1 Fabric testing and improvement

The elongation capacity and flexibility of field uniform fabrics is very low. This situation is practically not solved by adding a small percentage of elastic fiber; the uniforms are subjected to heavy mechanical loads and rupture. During rapid, broad leg movements, the crotch part of the trousers faces a critical tension, especially, if due to the insufficient size or moisture caused by sweat [1,2], the trousers cannot freely move along the whole leg surface in order to compensate the dynamic changes of the body size. One of the solutions might be particularly flexible fabric with the elongation capacity of at least 40%, used in the single crotch wedge part in order to ensure freedom of movement, as well as comfort. Meanwhile, the breathing and air permeability capabilities of the fabric should also be provided. The common micro-climate of the underwear might be improved by integrating the aforementioned elastic fabric in the gusset, back yoke and under the patella [3].

2.2 Anthropometrics

In order to provide the comfort for individual wearers, it is essential to implement the body size correlations. The main premise is the availability of extensive and accurate information on the body measurements of certain populations or targets, as well as their distribution per body size groups or sizes. Acquisition of rapid and wide measurement data is now possible via the 3D scanning or contactless anthropometric data acquisition method. In addition to obtaining the measurements necessary for designing the clothes, the 3D technology also allows studying different types of wearing habits, and the interactions between the human

body and clothing layers, considering the body movement types and postures to be carried out during daily work processes, as well as the dynamics of these movements [4,5]. For the awareness of soldiers and warehouse employees, an apparel labeling should be implemented [6] in order to facilitate the selection of uniforms of the appropriate size. This system includes interval pictograms, as well as letter codes of sizes.

2.3 Identifying and maintenance of Uniforms

Currently, the soldiers of the Latvian army keep take care and fix the uniforms themselves. Not always proper maintenance and use of specific detergents is observed. As a result, after a short wearing time the uniforms already look faded and worn. The problem could be solved by introducing centralized uniform maintenance. In order to keep each soldier's individual uniform, RFID tags (chips) are recommended to be integrated.

RFID Chips can be directly embedded into the materials of the products themselves. RFID Chips can be inserted into clothing fabrics, embedded inside plastic consumer products and packaging. The design of an RFID tag consists of a thin, flat circuit composed of a tiny silicon chip and an antenna. Each RFID Chip can store a unique serial number for each individual product. The integration of an RFID chips in clothing would provide clothing individualization, the ability to provide centralized uniform maintenance and cleaning, as well as an easier way to track inventory units and to control their depreciation.

3. CONCLUSION

A complex system improvement (including all the aspects mentioned) would not only solve the previously mentioned problems, but also help to arrange the uniform accounting system, choose soldier uniforms of the appropriate size, develop a more accurate tracking system and a new system for ordering uniforms, thereby reducing the amount of the army warehouses and providing a more efficient use of financial resources.

4. ACKNOWLEDGMENT

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