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INNOVATIONS IN THE TECHNOLOGY OF 3D PRINTING OF FASHION GOODS

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The modern innovations in the fashion industry are analyzed, namely the technologies of 3D printing; the materials used in 3D printers for printing the models of shoes and clothes are considered; the prospects for further development of this direction are determined.

Keywords: *3D printing, printer, 3D designing, production of clothes, materials.*

INTRODUCTION

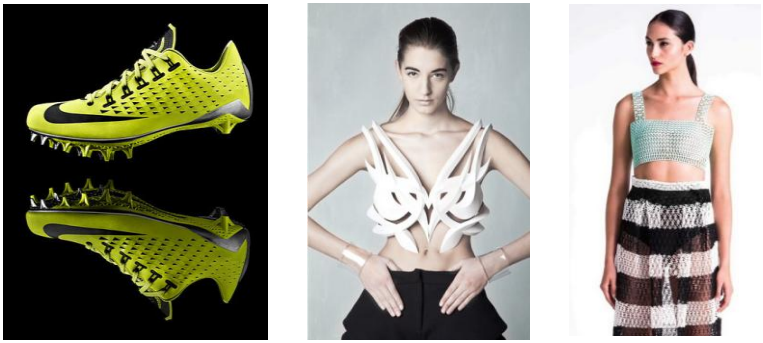
In the field of modern fashion, there are constant changes, aimed at improving the quality of finished products. Designers set hearts on making clothes and footwear as comfortable as possible, looking beyond the design of the products. Today, 3D printing is a promising way of production of the fashion industry products. Most often, the materials for the production of clothes and footwear, printed on a 3D printer, are developed using the selective laser sintering (SLS) technology since it ensures the highest level of detailing required to create the complex moving structures.

PROBLEM DEFINITION

The purpose of the work is to analyze modern innovations in the fashion industry, namely the technologies of 3D printing; to consider the materials used in 3D printers; to determine the prospects for further development of this direction.

RESULTS OF THE RESEARCH AND THEIR DISCUSSIONS

Nike was one of the first companies, which used the technology of 3D designing and printing of the fashion industry products. At the beginning of 2019, the company released Vapor Laser Talon sport shoes (Fig. 1, a), the sole of which was made using the method of selective laser sintering of powder materials (SLS). As a result, the lightweight footwear weighing 160 g was obtained, which provides maximum comfort for use on different types of surfaces. The main advantages of such an approach are not only the technical characteristics and the complex geometry of the obtained product, but also the possibility to adapt the model to the requirements of the sportsman in short term (rapid prototyping) [1].



a b c

Fig. 1. Innovations in 3D printing of footwear and clothes: a – Nike sport shoes; b – sleeveless, designed by Iris van Herpen; c – items of clothes, designed by Danit Peleg

3D printing allows developers to implement innovations in the production process much faster and to create unique, ready-to-wear products using digital technologies of any geometric shape, in the almost complete absence of wastes. The production of clothes with the help of 3D printing is likely to completely change the fashion industry in the future. Such an up-to-date approach will help to meet the growing demand for the exclusive personalized clothes and footwear.

There are at least three advantages of 3D printing over the traditional methods of clothing production, namely: absence of production wastes; reuse of irrelevant products as the materials for new models; customization of design of the products. The development of 3D technologies will increase the availability of more practical materials with new properties (including the increased durability); will make the production process cheaper, etc. With 3D printing, the producers of the clothes can only use the amount of material needed to obtain the final product.

To produce the clothes, it is advised to place a greater focus on the materials that have higher elasticity for ease of use. The most popular materials for 3D printing are: TPE – thermoplastic elastomers. TPE-based materials are used where softness and flexibility, as well as compaction resistance, are necessary, however, this material is hygroscopic, that is why it should be stored in hermetical containers in low humidity conditions; TPU – thermoplastic polyurethane, a subtype of TPE, but more rigid; FilaFlex (Recreus, Spain) – popular TP-based elastic and flexible material. It is used by many designers (Iris van Herpen, Mary Huang, Joshua Allen Harris, Danit Peleg, etc.) in the production of clothes. These materials are available in different colors [2].

Customization of design is an opportunity for consumers to develop their own design solutions. Together with the development and cheapening of household 3D printers, this may also lead to an increase in home production of clothes in the future. In addition to the option of customization of consumer goods, 3D printing makes it possible to significantly reduce and automate the production cycle itself, since it requires fewer workers and time.

In the future, when everyone will be able to afford a highly accurate 3D printer and various materials will become available, not only the production process, but also the format of consumption will change qualitatively: a project, a 3D model of any fashion product, including clothes, will be downloadable from the online store just like people download games and movies today, and printable. In that case, the buyer will become both the designer and the producer, eliminating the need to store and care for things – it will be enough just to keep their images in the printer database, and print as needed.

3D printing reduces time, and at the same time makes it possible to create more complex and stylish footwear, clothes, accessories that could not be made manually or using traditional methods. The color range of clothes or accessories can be represented by various colors and different materials, from matte to shiny, from bright to transparent.

CONCLUSIONS

The modern technologies in the fashion industry are considered and it is determined that this direction is promising and is based on the use of information technologies, modern materials, and the principle of customization.

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ІННОВАЦІЇ В ТЕХНОЛОГІЯХ 3D-ДРУКУ МОДНИХ ТОВАРІВ

Проаналізовано сучасні інновації у фешн-індустрії, а саме технології 3D-друку, розглянуто матеріали, які використовуються в 3D-принтерах для друкування моделей взуття і одягу, визначено перспективи розвитку цього напряму.

Ключові слова: *3D-друк, принтер, 3D-проектування, виробництво одягу, матеріали.*