



RATIONAL USE OF WASTE FROM THE CLOTHING INDUSTRY

Ismatullaeva Khalida Zakrullaevna

Associate professor, Tashkent State Pedagogical University named after Nizomiy

Daminova Rano Baasitovna

Associate professor, Tashkent State Pedagogical University named after Nizomiy

Nasrullaeva Fatima Azatovna

Teacher, Tashkent State Pedagogical University named after Nizomiy

Article History

Received: 08 July 2023

Revised: 14 Sept 2023

Accepted: 12 Oct 2023

CCLicense

CC-BY-NC-SA 4.0

Abstract: The article discusses the issues of processing secondary raw materials: fiber, yarn, threads, fabrics, knitwear and other types of materials in order to produce new types of products from industrial waste, as well as from clothing, giving them new life. Scientists have analyzed waste from global textile production and its recycling. The issues of recycling textile products and the tasks of their rational use have been studied. Methods of an innovative approach in the manufacture of new products from industrial waste.

Keywords: product design, production waste, recycling, downcycling, recycling, re-production, upcycling, reconstruction, recycled, safe, environmentally friendly raw materials, patchwork waste, textile life cycle.

Smart design is the design of products that are durable, recyclable, sortable, and then recyclable or compostable; such products are created from industrial waste.

The idea of processing recycled materials first appeared in recorded history at the beginning of the last millennium in Japan. Europe became interested in recycling waste in 1630, where the first paper and textile recycling plant was opened. In 1895, New York City residents were ordered to separate their waste. Two years later, the world's first waste recycling plant was launched here. Today, in almost all areas, a linear economy prevails, which works on the principle of "extract - produce - throw away," which means that valuable resources are removed from the environment, they go through a production cycle, arrive at the end consumer in the form of goods, and after use they are immediately sent to the landfill [1]. This approach leads to a large number of environmental problems, deteriorates the quality of life of people and jeopardizes the well-being of future generations. The textile industry is no exception here.

Eventually, all clothing ends up in a landfill: according to the US Environmental Protection Agency, about 11.2 million tons of unwanted clothing are thrown away every year in the US alone. It's easier to understand the scale of these numbers if you try to imagine 509 thousand and another 100 trucks fully loaded with clothes that no one will ever wear again.

According to a UNEP study, of the total amount of used textiles, 87 percent are thrown into landfills or burned, and only less than one percent of old clothes are recycled and used to make new ones, 12 percent are used differently.

The environmental footprint that clothing leaves behind begins long before it goes to waste. To produce the raw materials from which the material will be made, many resources are needed: water, electricity, human labor, fuel, regardless of whether the fabric is natural or synthetic. In order for raw materials to grow, fertilizers and pesticides are almost always needed [2].

According to the UN Economic Commission for Europe, global greenhouse gas emissions from textile production are 1.2 billion tons per year, which is more than the emissions of all international flights and shipping combined.

The fashion industry uses 93 billion cubic meters of water every year. For comparison: this volume is enough to satisfy the consumer needs of five million people. About 20 percent of wastewater worldwide comes from the dyeing and processing of textiles.

Cotton clothing requires a lot of water. For one pair of jeans, the planet gives up 3,781 liters of water, and a cotton T-shirt can cost 2,450 liters (almost 18 full baths). Water is used to grow cotton, as well as during the production process (for example, for the necessary dyeing). In Uzbekistan and Kazakhstan, they paid for cotton with the Aral Sea after they changed the flow of two rivers to irrigate cotton fields. Before the Aral Sea became shallow, it was considered the fourth largest in the world. 2.4 percent of the world's arable land is planted with cotton, yet 10 percent of all agricultural chemicals and 25 percent of insecticides (chemicals used to kill insect pests) are used to grow cotton.

Irrigation systems introduce and distribute chemicals into groundwater, making cotton production the largest source of freshwater and soil toxicity in the world. Those who work in the cotton fields are also negatively affected. Although there is also organic cotton, the growing process of which does not use synthetic fertilizers and pesticides.

Recycling a cotton item is possible only if it does not contain polyester and elastane.

Disposal and recycling of textile waste is no less important than "getting rid of" other types of "waste". Textile waste usually includes materials remaining during the production of yarn, fiber and other non-woven products. In addition, these include outdated knitted clothing and interior items (tablecloths, curtains, etc.), which can be recycled. This process is divided into several stages and makes it possible to obtain recyclable materials from textile waste for further use [3].

- The processing of textile materials is divided into two types:
- - production;
- - consumer.

Industrial waste refers to textiles left over from the production of threads, fibers (linen, cotton, etc.), linens and other garments.

Consumer waste includes old or worn-out clothing, overalls, curtains, knitted, non-woven materials, and household items.



In turn, production work can be divided into three types depending on the type of material:

- natural - made from organic raw materials (silk fabrics, cotton and linen fibers, woolen products);

- chemical - the basis is synthetic fabrics made using artificial and chemical substances;

- mixed - natural and chemical components are used in the production of fibers.

It is also customary to separate textile waste according to its subsequent use:

- spun - secondary raw materials are combined with basic materials for the production of yarn;

- cotton wool - used for processing into cotton wool;

- felting - processed into non-woven textiles.

During the recycling process, recyclable materials can be mixed with virgin material to produce recycled textile fibers. If we talk about the secondary component as the only component, such fiber is suitable for the manufacture of non-woven fabrics. These include:

- packaging products; floor coverings of the synthetic segment;

- filters;

- insulating and insulating materials [4].

Any technology for processing textile waste includes the preparation of secondary textile raw materials, the composition of the operations of which depends on the source of the raw material and its further use. Raw materials received from the population undergo disinfection, dust removal, sorting, washing or dry cleaning, cutting and defibering, and when preparing secondary textile raw materials coming from production, operations such as disinfection, dust removal, washing or dry cleaning are eliminated.

Most of the textile waste from production and consumption is used as secondary raw materials in the production of nonwoven materials [8].

The technological process for the production of nonwoven materials consists of four stages:

- fiber preparation (de-fibering, cleaning, mixing),

- formation of fibrous canvas,

- fastening the fibers in the canvas,

- processing of the resulting material and its finishing.

There are quite a few types of products obtained from textile waste from production and consumption - these are insulation materials for various purposes, ropes, cords, twines, bag fabrics and other products.

Canvas-stitched non-woven and needle-punched non-woven materials can represent products made from linen industry waste.

Silk industry waste is used to produce nonwoven materials. More than 200 types of products are made from waste from knitting production [9].

The resulting nonwoven materials from waste are used in the clothing industry as insulating material - batting; in the footwear industry - gaskets in the production of shoes and uppers for house shoes; in the furniture industry - flooring material in the production of upholstered furniture; in construction - flooring, cushioning and insulating materials and when performing other construction work.



Reusing textiles derived from existing clothing is what we call remanufacturing. Millions of tons of textile waste are created at the production stage of fabrics and clothing, that is, before the finished product reaches the consumer. It is estimated that about 15% of the fabric intended for tailoring ends up on the floor of sewing workshops. This means that a huge amount of textiles intended for creating clothing, after cutting out the product, turns into scraps or waste in the form of residual rolls of unnecessary fabric; when textiles are wasted, then both the natural and labor resources that were invested in the production of textiles are wasted [10].

By using textile upcycling techniques, you can extend the life cycle of textiles, slow down the production of excess textile products and reduce the demand for natural resources.

			
Textile edging	Textile fibers	Yarn	Fabrics

During the mass production of clothing at sewing enterprises, when processing fabrics, waste appears in the form of a measured flap with textile defects. The size of such a flap ranges from 20 to 70 cm in length, and its specific gravity is 6.2% of the processing volume per year.

More and more people in the fashion industry are recognizing that the textile industry must be sustainable. Brands are striving to use natural, recycled or synthetic materials based on organic raw materials, trying to make production zero-waste, reducing the consumption of resources in the production process and refusing to participate in fashion weeks. All this speaks of a new responsible approach – the circular economy [11].

The circular economy, or closed-loop economy, is built on a “cradle to cradle” approach (extract - produce - reuse). The approach is opposed to linear economics and assumes that any removed resources should be retained in the production cycle for as long as possible, without generating waste. This is achieved through thoughtful design of goods and services, conservation and use of what has already been produced, and regeneration of natural systems. The textile sector is very important for the circular economy, since it affects various areas: agriculture, chemical industry, clothing production, retail,” noted Evgeniy Lobanov, director of the Center for Environmental Solutions, at the recent conference “Circular Economy - Opportunities and Prospects for the Regions of Belarus” in Minsk.

The Ellen Mac Arthur Foundation, the UN Alliance for Ethical Fashion and other organizations are calling for a new textile economy. Their goal is to explore the use of new materials to make clothes more durable, increase their chances of being recycled into other products and thereby have an impact on reducing environmental pollution.

It is unprofitable to produce clothes from surplus stock using the current cutting technology due to increased costs for individual cutting and large sizes of parts. To organize residue-free cutting at a sewing enterprise when designing clothes of this type, it is necessary to use ergodesign, which uses accessories and finishing materials. This allows you to improve the image of products from rejected measuring flaps [7].

Clothes, unfortunately, are not mass-processed into clothing. Today, textiles are being processed on a large scale into two types of new materials: cleaning cloths and regenerated fibers. The rest of the projects that you might have heard about are experimental developments or individual collections that have not yet been implemented on a large scale, so they do not change the main picture.

Globally, only 25% of used clothing is collected for reuse and recycling. Only 1% of collected clothing is recycled back into clothing (Ellen MacArthur Foundation, “A New Textiles Economy”).

Using leftover fabric on rolls will allow you to work with large lengths of textile and create repeatable pieces, allowing each one to be slightly unique. And the use of scraps and scraps will allow your imagination to run wild.



In addition, textile waste can be widely used for the manufacture of a various range of folk art products [5, 6].



From year to year, per capita, one can observe a growing trend in income, wages and pensions. On the other hand, there is an increase in demand for various products, the production of which requires already limited natural resources. This also leads to increased waste [13, 15].

However, the trend applies to everyone: the demand for clothing items increases by two percent every year, but we wear it a third less than at the beginning of the 2000s. This luxury consumes additional resources of the planet. 87 percent of used clothing ends up in a landfill; globally, it could fill an entire garbage truck every second [14].

Breathe new life into your clothes, advises the Deputy Mayor of Paris, Antoinette Guy, - and Parisians know a lot about fashion. "Wear old items like new, it's now as stylish as a little black dress," she says. We want the fashion industry to be environmentally friendly."

References

1. Waste disposal and recycling. – URL: <https://greenologia.ru/othody/tekstil>.
2. Textile waste. – URL: <http://recyclers.ru/modules/section/item.php?itemid=190>
3. Gerasimovich E.M. Problems and prospects for recycling waste from the textile industry // Journal "Actual problems of the humanities and natural sciences". – M., 2016. – No. 5-1. – pp. 79–81.
4. Pugacheva I.N., Enyutina M.V., Nikulin S.S., Zueva S.B. A PROMISING DIRECTION FOR PROCESSING AND USING TEXTILE WASTE // Advances in modern natural science. – 2012. – No. 2. – P. 119-119.
5. Siluyanov E.V., Makarova N.R. TRADITIONAL ART OF PATCH SEWING. PATCHWORK // Advances in modern natural science. – 2012. – No. 5. – P. 24-24.
URL: <https://natural-sciences.ru/ru/article/view?id=30039>
6. Staub-Wachsmuth B. Patchwork and quilt. Patchwork sewing. - Profizdat, 2007. - ISBN 978-5-255-01535-1.

7. Petkanova N.M., Urumova D.G., Chernev V.P. Recycling of textile waste and secondary raw materials. M.: Legprombytizdat, 1991, 239 p.
8. Textile waste and its processing [Electronic resource]. - Access mode: <http://clean-future.ru/info-tekstilnye-othody-i-ih-pererabotka.html>.
9. EAT. Gerasimovich - Composite materials based on waste - materials of the future // Higher school. - 2016. - No. 4, volume 1. - P. 101-103.
10. Waste processing [Electronic resource]. - Access mode: <http://ru-wiki.ru/wiki/>
11. Effective use of regenerated fibers and the possibility of their production [Electronic resource]. - Access mode: <http://waste.org.ua/modules.php?name=Pages&pa=showpage&pid=96...>
12. Textile waste: processing and unsolved problems [Electronic resource]. - Access mode: <http://www.recyclers.ru/modules/section/item.php?itemid=165>.
13. All about waste, textile waste processing [Electronic resource]. - Access mode: <http://waste.org.ua/modules.php?name=Pages&pa=showpage&pid=132>.
14. Waste disposal in various sectors of the national economy [Electronic resource]. - Access mode: http://uchebnikonline.com/ekologia/ekologichniy_menedzhment_-_semenov_vf/utilizatsiya_vidhodiv_riznomanitnih_galuzyah_narodnogo_gospodarstva.htm
15. Textile waste and its processing [Electronic resource]. - Access mode: <http://clean-future.ru/info-tekstilnye-othody-i-ih-pererabotka.html>.