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Design Product Projecting Made Of Recycled Materials

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Abstarct: In this article, basing on the analysis of studies concerning the problems of consumption waste disposal and their secondary use, the basic approaches to this problem solution are analyzed from different perspectives. A particular attention is paid to the field of art, which launched a propaganda movement today for the use of outdated domestic resources in new conditions. The authors presented the Russian experience concerning the projecting of design products from recycled materials, aimed at the formation of ecological ideology in the educational process.
Keywords: processing, recycling, secondary materials, design products, disposal, ecological outlook, projecting, educational process.

Introduction

The consumption of natural resources increases every year and at the same time the production of waste increases. Over the past hundred years, this process quickened many times and already today it is ready to absorb a person. It is not surprising that in the second half of the twentieth century a global review of the views on the organization of production started all over the world in terms of surrounding reality damage. In this multidimensional phenomenon a special role was played by the trends aimed at the processing of raw materials and waste and the second use of materials. The "second life" of waste is a direct alternative to natural sources of raw materials and energy. In European understanding waste is a raw material that requires complex and expensive processing, so saving technologies and the methods of ecological safety become more popular.

Methods

The methods of comparison, analysis and synthesis, generalization, artistic design as the part of students' works are used to achieve the goal.

Main part

This is a recent phenomenon which still has no strictly established limits. In the world environmental concept of waste management, it is called "3 R initiative» (Reduce, Reuse, Recycle). Different English terms appear in Russian language trying to clarify the word "recycling" (successfully or not). In literature and in press the following concepts appear - recycling, recovery, disposal [5,6]. All these words denote practically the same phenomenon that our article will consider as the use of old things or materials in new conditions of consumption.

The analysis of scientific publications [2,3,4,14,15,17] shows that today the problem of recycled objects and materials use is seen from different points of view, and therefore they try to solve it from different positions:

- State solution because the inefficiency of legislation in most countries is evident, including our own country;
- Economic solution, taking into account the global nature of recyclable materials amount;
- Technological solution, taking into account the shortcomings of chemical technologies for the recycling of most materials;
- Ideological solution, where, in addition to a cultural approach one should include educational and upbringing aspects.

The last position is the most important one, since it involves a person carrying out almost all the previous ones. The world outlook, the part of which is aimed at the evaluation of one's own work and the consequences of it, it is the cornerstone in the environmental policy of the countries. The evidence of environmental issues penetration, including the reuse of objects and materials in people's minds is the expansion of such human activities as:

- Production;
- Arts;
- Creative space of an individual;
- Design.

In some developed countries, where the environmental problems are solved by the state, through a strong legislative framework, the recycling and the use of recycled material is carried out at the production level, a special attention is paid to the latest technological solutions in various fields.

Traditionally four main types of industrial waste are considered. We presented them in Table 1 with their advantages and disadvantages.

Table 1. Advantages and disadvantages of industrial recycling

Types of recycling	Advantages	Disadvantages
Burning.	Small time costs	Expensive and energy inefficient approach with hazardous emissions of highly toxic dioxins.
Burial	Simple technological process	Seriously dangerous as the environmental pollution within large area.
Composting plus fermentation	Environmentally safe, widespread production of vermicompost, an organic natural fertilizer produced by earthworms.	At simple storage poisonous liquid drains into the ground, in the absence of a landfill or a clay castle protective geomembrane, gets into the groundwaters.
Recycling	Waste and used products are cheap and available raw material for many products.	Sophisticated technological solutions for specific types of materials.

Today, recycling is considered as a rationalized system of municipal solid waste components collection and processing into the products with use value [16]. However, this phenomenon is not really new. The history of the emergence and the production of tissue paper suggests a long-standing historical tradition of recycling. And the trend on the threshold of the third millennium, states that the whole world had gone from a partial burial and incineration, introducing recycling. This is the opinion by M.U. Pletnev who analyzes the wealth of foreign and domestic experience of recycling [16]. Table 2 presents the basic materials, which are the main ones today from the perspective of economic efficiency for recycling and their supposed "second life". This fact is explained by the technological features of specified materials production, makes it possible to recycle the so-called "expensive" recycled materials.

The following technologies of material processing are demanded by economy, which is explained primarily with the manufacture of chemicals and innovative solutions, as they are basically the most "significant in monetary terms". The analysis of the scientific literature showed that the most high-tech processing technologies are developed and implemented abroad usually. There was only a shift in this direction in Russia [1,7,12,16,17].

Table.2. Basic material for recycling

Basic recycling materials	Complete decomposition period	«Second» assumed life	Possible technologies for recycling
Plastic and polyethylene	Various types of plastics degrade from 50 years and up to five centuries	Again packages, plastic bottles and packaging, mobile phone housings	Two groups: mechanical and physico-chemical
Paper wastes	Cardboard decomposition takes up to three years	Disposable hygiene products (napkins, towels) and dishes, boxes, greeting cards, wrapping paper	Recycling of paper in a traditional way is possible
Glasses	Glass may decompose for several millennia	Cans and bottles for food and drinks, lights and lamps, displays	By the traditional way of sterilization, or in glass production
Aluminum cans, metal	Corrodes from 10 to 30 years	Converted into raw materials for the production of machine, computer elements and new cans.	For subsequent remelting
Electronic devices with burnt chips		New phones, computers, kitchen appliances	Precious metals are melted - gold and platinum.
Besides, a proper disposal demands construction waste, batteries, accumulators, lamp bulbs, complex household appliances and even vehicles			

Gradually, the range of products manufactured from various waste was increased to fifty [4]. For example, the result of used food packaging processing is not only new "forks and plates", but also handbags, wallets and other accessories. The production of various decorative products made from recycled plastic, cardboard, textile scrap and even wine corks and also household chemicals.

The idea to redo things and make them a part of art has been successfully implemented in the works of many artists for a long time. The history of art knows many examples of a thing transformation into a beautiful art object. Italian artists created the whole trend of the avant-garde, so-called Arte Povera (poor arts) in the late 1960s - early 1970s. During the creation of installations the artists used the simplest, "poor" materials: earth, sand, coal, trash scum, basic household utensils, old worn clothes and shoes and so on). In the future, this trend became widespread in other European countries, including Russia. In our country, "Russian Povera" had a provocative meaning and was used by a renowned curator and Soviet risk ideologist M. Gelman to promote some specific ideologies in the art space of modern Russia [10].

In general, recently the representatives of the arts are the leaders of the propaganda movement for the processing and further use of obsolete products as new ones. An example of such an approach is the collection of decorative products for the Japanese interior designer Daisuke Hirayava. This collection was made of a used single-use utensils and toothpicks. Tom Deninger developed this trend and created realistic portraits and sculptures from household waste.

The repeated use is carried out by thousands of people in their own homes. For someone it is a random, episodic approach, and someone performs it systematically and purposefully. People with a minimum creativity of thinking are able to create unique and inimitable products. In this case the creative transformation of waste does not require usually any additional manufacturing costs, and sometimes there are art objects, household items, accessories, clothes which are better in terms of functionality and the aesthetic qualities of a source material.

Drip watering systems, decorative figurines of animals and insects are developed out of empty plastic bottles, curtains and wall panels from multi-colored caps, feminine accessories and bags are made from beer bottle elements, tables and fixtures are made of used sanitary fittings, etc. One of the most popular materials for flower bed and front garden decoration are tires that are transformed not only into a kind of flower pots, fencing, sports equipment and swings for children, but are also widely used in landscaping for the organization of mini-ponds. Glass bottles are used as a primary building material in the construction of greenhouse foundations and garden house walls. Even the theme of an eco-Christmas tree implementation makes people wonder for many years: fir-trees of different bottles, glass and wooden tubes, complex installations from used CD-s. A limitation in the process of various objects creation may be the lack of a corresponding man's imagination and his ability to reproduce the plans.

However, there is a large group of people who are engaged in creative recycling quite purposefully and professionally. These are the designers of different trends. Even in 1980s the environmental design trend appeared in Russia direction that became a response to the negative effects of social life. It oriented designers for a maximum economy of resources and materials, the achievement of the best balance between economic costs for a product manufacture and its service life, the development of new materials and technologies that are not harmful for the environment [9].

A little later redesign trend was developed, which provides the opportunity to express one's own imagination and give a second life to the things for recycling. The most popular, the most stable and most promising global trend of fashion, design, industry, and, of course, of handmade is the idea of recycling. This idea unites many fashion trends in art and design, as well as many hand-made techniques [9]. These include plastic art, weaving from newspaper tubes, kinusayga, patchwork, etc. The projecting from recycled materials may be performed in different ways: the selection of necessary materials, the experimenting with the methods of their processing, the search for a desired image using an author's technique. Every designed product on the basis of a used material heterogeneity is a unique one. Most importantly: this type of activity makes us think about the things we are doing to the environment in which we live. Fashion designers succeeded here most of all. Woman imagination transforming the old clothes into new ones always encouraged this process. The passion of contemporary fashion for various styles in the spirit of "retro" and "vintage", contributes to the life extension of obsolete products which became fashionable again after some.

There is a government support abroad for those who are involved in this issue at the level of enterprises, universities, chemical and technological centers and design institutes. This allows you to deal with this "heavy" issue from all aspects. In Russia, due to various objective and nonobjective factors this problem is solved by individual universities, where scattered groups of scientists try to solve the issue on their own or with their students [8,11,16].

The projecting of design products from non-traditional and recycled materials has many advantages, the most important of which is the value importance of performed work. The project presented on Figure 1, continues the ideas of Dutch designer Piet Hein Eek, who produces exclusive furniture made of recycled materials. And the students found a new field: they design a usual (at first glance) hallway furniture wall for compact standard houses, which are built in a half of Russia. However, it is also the result of design from the furniture production waste and laminate scraps.

Figure 1. Furniture cabinets from laminate scraps.

Figure 2 shows the ottomans for seating that almost look like standard ones. However, this is an example of of packaging recycling (usual water and juice plastic bottles) and bored jeans.

Figure 2. Ottomans made of recycled materials

Design means the interference in the relationship of lifestyle and objective environment for a designer, and therefore the influencing not only the value of each object, but also the changing of its sense of values [13]. Students are generally well aware of the waste disposal problems, because they participate in this design quite actively. The process is quite fascinating: it is a pleasure to collect all available plastic bottles, to provide them with sufficient stiffness, to make a necessary form and reinforce it through the use of discarded cardboard, to make a textile composition of recycled jeans and combine everything into a single environmentally friendly whole.

Summary

Summarizing this article we may stated that the main purpose of designer products design from recycled materials is neither technically correct handling or processing, nor the variability of recycling idea, but the upbringing of younger generation with an ecological outlook, which is bound to be implemented in life. The developed mentality and value orientations will give them the clue concerning the correct and interesting cleaning, and most importantly the conversion of their own consumption waste.

Conclusion

1. The problem of secondary materials recycling is relevant and perspective in a rapidly changing society.
2. The creation of design products from recycled materials is not only cost effective, but also aimed at the creation of a modern society culture.
3. The development of ecological ideology is possible and necessary to carry out not only in the educational process of designers, but also for other professionals..

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