GEODESIGN, ECO-BRUTALIST ARTEFACTS FOR ARCHITECTURE, TOURISM AND URBANISM

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ABSTRACT

Geodesign project is a co-promotion project funded by the Portugal 2020 program with the aim of developing new architectural products, integrating industrial waste and by-products generated by Portuguese companies, namely in the fields of steel, smelting, power stations, metallurgy and glassmaking. The partners of the project are W2V, SA, dedicated to waste management activities, Providência Design, dedicated to product design, the CVR technology center and the Portuguese universities of Minho and Trás-os-Montes and Alto Douro. Fly ash from thermoelectric plants, aluminum anodizing sludge and glass polishing dusts, among others, offer different plastic and chromatic qualities. When chemically integrated in the form of geopolymers or calcium-based materials, they exhibit different physical qualities of mechanical strength and aging. Taking into account their physical qualities and, consequently, the diversity of chromatic, textural and economical results, several functional products for wall covering, sound barriers and exterior furniture with expressive aesthetic impact were designed. Exploring the plastic qualities of a new brutalist, recyclable and sustainable aesthetic, a generation of artifacts was born that presents competitive advantages in the range of products for hotel, tourist architecture and urban planning in general. It will be the design of this brutalist aesthetic that, communicating sustainability, will be the factor of evidence to motivate the circularity of the economy and social inversion of the unsustainability of industrial consumption. The project provides for the technological test of development of new materials containing residues, their small-scale manufacturing and pre-industrial validation, after evaluating their economic and environmental impacts.

Keywords: architecture, design, geodesign, sustainability, waste

INTRODUCTION

Several industrial sectors in the northern region of Portugal, such as foundries, steel mills, polymers, metal-mechanics and paper production, generate waste (non-hazardous and inert), usually discarded by landfill, not being economically valued and generating costs. However, due to its physical and chemical characteristics, it can be used in the manufacture of civil construction products, namely for urban furniture and hotel applications. In view of this, the European Commission has defined strategies to guide waste management for recovery.

This is particularly the case with Directive 2008/98 / EC, which favors waste recovery solutions rather than disposal, taking into account the environmental issue and shortage of mineral resources on the European continent. It is in this context that the strategic lines, such as the "circular economy" or the creation of "industrial synergies", appear recently, with the objective of optimizing the use of secondary raw materials in the existing productive sectors. It is intended to develop 10 formulations of new composite materials incorporating lemon-based and geopolymer-like residues for applications in the manufacture of products to be developed with brutalist aesthetics, taking advantage of the natural characteristics of the material. Brutalism is a controversial and muscular term for a controversial and muscular style born in the 1960s, considered the high point of modern architecture (Barnabas, 2016).

Waste production in the European Union has increased unprecedentedly, reaching irreversible quantities in landfills, requiring measures to reduce, prevent and, if possible, abolish the amount of waste produced annually by the Member States. In 2014, according to Eurostat data, 2,598 million tonnes of waste were produced by the various productive sectors and domestic activities, the highest value since 2004.
The increase in waste production is due to the rapid increase in population, with the amount of waste produced by each Member State, related to its population density and economic size. It is estimated that the construction industry has produced approx. 33.5% of the total in 2014 (871 million tons), followed by the mining and extraction sector producing
29.8% (774 million tons), industry 9.8% (256 million tons), household waste 8.1% (209 million tons) and energy 3.7% (95 million tons). The remaining 15% of the waste generated is distributed by the treatment and waste / water services sectors. Of the total waste produced, 2,145 million tons were recycled, of which approx. 10.8% were used to fill areas previously excavated to recover slopes. However, the recycling rate varies widely between Member States. Belgium and Italy, for example, are among the top recyclers and Greece, Sweden and Finland among those favoring the transfer of waste to the landfill.

In order to make Europe a "recycling" society, avoiding waste, using wherever possible those that are unavoidable, many industries have aroused the interest of engineers and designers in reusing their waste. This is the case of several industries in the northern region of Portugal (already mentioned), which generate waste (non-hazardous and inert), usually deposited in landfills, and can be used, for their physical and chemical qualities, in the manufacture of construction products Civil, especially for urban furniture and hotel applications. In view of this, the European Commission has defined strategies to guide waste management for recovery.

It is intended to develop 10 formulations of new composite materials incorporating lemon-based and geopolymer-like residues for applications in the manufacture of products to be developed with brutalist aesthetics, taking advantage of the natural characteristics of the material. The term Brutalist originates in *beton brut*, a constructive solution used for example by Le Corbusier Unité d'habitation in Marseille, thus solving a construction problem, leaving its appearance in rough and taking advantage of the raw material evoking a handcrafted primitive purity. With the construction of formwork for concrete, maintaining its natural unfinished appearance that Calder considered to be the highest expression of modern architecture (B. Calder, 2016). By the moment this aesthetic became popular among governmental organizations and institutional customers, with numerous examples in the United Kingdom, France, Japan, the United States, Brazil (...), mainly for the construction of educational buildings and social housing. During the 60's of the last century, the Brutalist aesthetic had a significant social meaning, announcing a new aesthetics, whose scale and absence of ornament exceeded the paternalistic vestiges of the bourgeois heritage, giving meaning to the proletariat. Today the same formal principles serve ideologically the need to find alternatives for sustainability and environmental preservation and ecological protection of man in his environment.

EXPECTATIONS

Although it is acknowledged that there's a a problem and an opportunity in the absorption and utilization of industrial wastes, it is estimated that its viability is inevitably subject to the premise of a new aesthetic and in this sense, the inclusion of consumer understanding and ownership of a new generation products, designed to solve a problem (which is everyone's) and not to its aggravation.

The impact of Geodesign project will depend on the communication and emotional involvement of prescribers and consumers, whose efficiency can be enhanced by creative participation, not only in the choice of colors and models of geopolymer wall covering products, but also in the creation of environments and above all, new arguments of consumption, with high tourist impact.

The material nature of these artifacts (horizontal and vertical covering modules with potential for sound insulation, heat and moisture for vertical gardens, floor illumination, visual limiting, bath products for architecture and urban architecture, exploring the strong plastic textures and brown tones that resemble ceramic craftsmanship, giving visibility to a naturalistic, ecological and traditional expression, very timely in tourist hotel and ecotourism projects.

The Geodesign proposes to consume hundreds of thousands of tons of industrial waste, turning them into geopolymers and other ceramic materials with applications in architecture and urban planning and tourism development of the territory that will be presented in a more natural, environmentally friendly way and above all, communicating a more opportune ideology in the exemplification of an active, engaging, participatory and creative social ethics, which will generate a new tendency of consumption. This is the intention conveyed by its name: the hallmark of a chemical recycling process, but, above all, the necessary emergence of a new design for the Earth.

References

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