

ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XXI INTERNATIONAL FORUM

Le Vie dei
Mercanti



World Heritage and Dwelling on Earth



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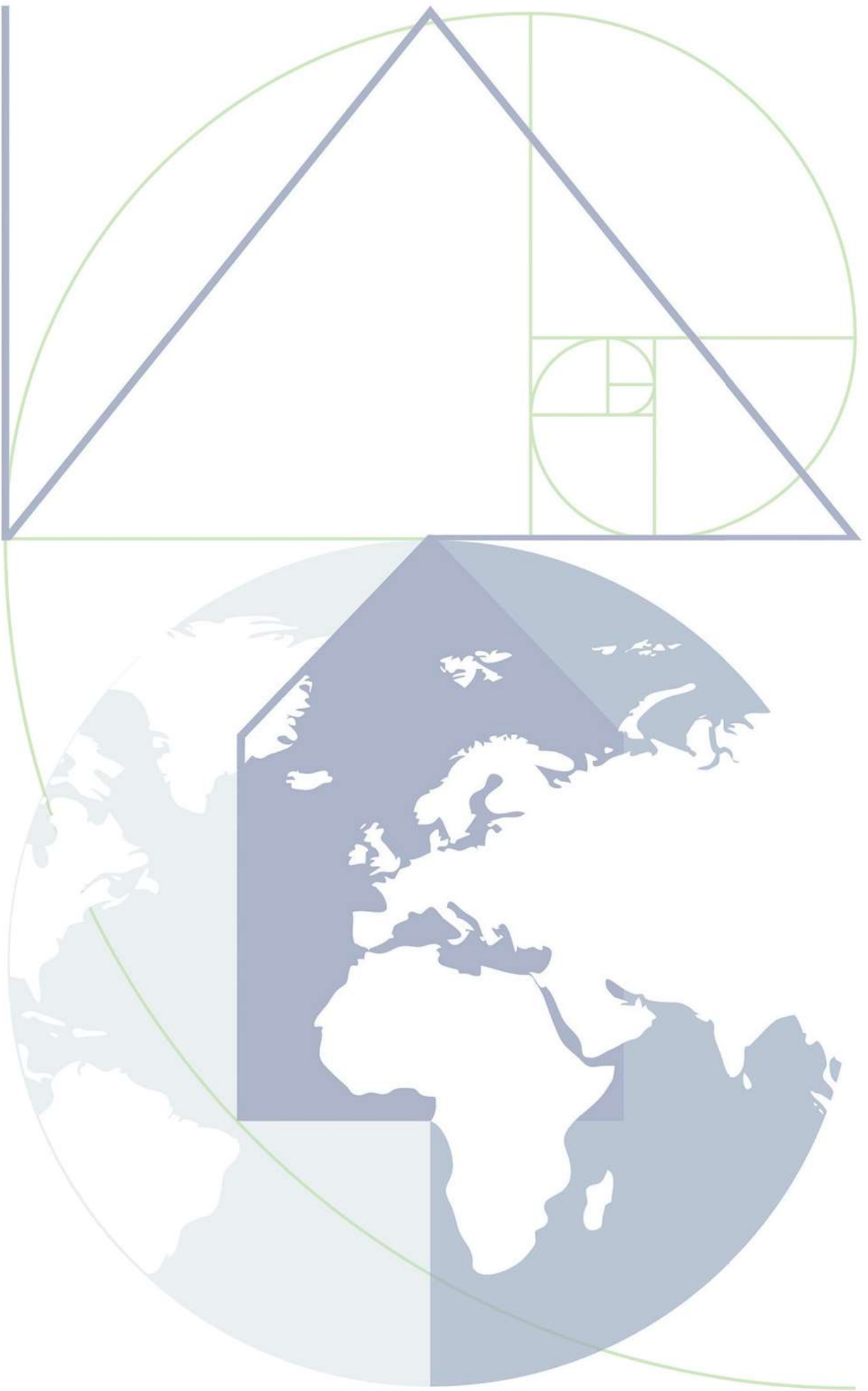
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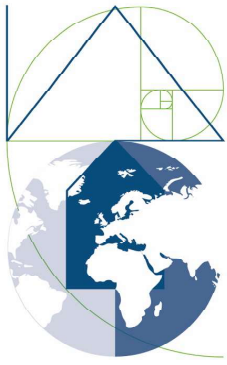
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From waste to resource for a sustainable future

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Abstract

Every day we produce waste that constitutes an environmental and economic problem.

A quantity of this waste is recycled, reused or composted and a quantity is sent to landfills.

How can we produce less waste and using waste as a resource?

Reducing waste is one of the objectives of the circular economy and their recycle asks us to rethink production and consumption models, this implies that design is a strategic element.

In fact, in recent years design played a key role in the transition from a linear to a circular economy with a design based on the efficient use of materials, the reduction of the amount of waste generated, intervening on durability, reparability, the possibility of updating and recyclability of the products themselves.

This article will analyse the contributions of design from processes optimization to waste prevention strategies, up to process circularity. The sector of stone materials and recycled materials born from processing/production or consumption waste and reintegrated into the biological cycle will be considered. The aim of this article is to show the connection of contemporary design with the environment, products and materials and to show that wastes will be a problem or a resource depending on their management.

Keywords: Zero Waste, Circular Economy, Sustainability

1. Introduction

Our society is producing more and more waste, surpassing the resilience of the earth [1]. Europe produces considerable volumes of waste: food and garden waste, construction and demolition waste, industrial waste, sludge, paper, sanitary waste, old furniture, plastic bags, etc.

In 2018, the total waste generated in the 27 Member States of the European Union (EU) was over 23 million tonnes [2]. Furthermore, waste generation is predicted to increase by 70% by 2050 [3].

The ecosystems, like the marine, can be damaged by poor management of waste, or by littering.

Waste impacts nature indirectly as well.

Everything is not recycled or recuperated from waste signifies a loss of raw material and other inputs used in the chain. Eco-friendly impacts in the life-cycle chain are larger than those in the waste management phases alone.

Directly or indirectly, waste touches our health and well-being in various modes: methane gases contribute to climate change, freshwater sources are contaminated, etc. Therefore, a reduction of this waste is now needed. Waste is not only an environmental problem, but also an economic loss. How can we change the way we produce and consume to produce less and less waste, while using all waste as a resource?

EU legislation has already set determined targets

The legislation in this area is the Waste Framework Directive (UE, Directive 2008/98/CE - WFD)

It outlines a waste management hierarchy: beginning with prevention, followed by re-use, recycling, recovery and ending with disposal. It is aimed to preclude waste production as much as possible, to use waste that is produced as a resource and to minimise the quantity of waste directed to landfill.

Anyway, the amount of waste we generate is closely linked to our consumption and production patterns as well.

What if we could use waste as a resource and thereby scale down the demand for extraction of new resources?

Extracting fewer materials and using existing resources would help avoid some of the impacts created along the chain.

Today one approach to reduce waste is to imagine a transition from a linear economy to a circular economy. The circular economy described by its goal to regularly decouple economic activity from the consumption of finite resources and to strategy waste out of systems has become a central concept used in production, and in policy [4]

2. From linear to circular economy

To leave a linear economy the designers must go beyond recycling and focus on systems-level to passage to a circular economy. The circular economy is a mode to solve this by dissociating economic growth from the consumption of resources. It's about redesigning products, services and the mode businesses work to shift the economy from one waste system to one that eliminates waste, circulates products and materials, and regenerates nature.

Designers must beyond rethink how they make individual products and consider the entire system that surrounds them. However, to drive action forward, it is crucial that we focus upstream to prevent waste before it is created.

To change the system, and this means redesigning the way we make and use products and food. This modification will give us the control to not only reduce waste, pollution and greenhouse, but also to grow opulence, occupations and resilience

The designer is crucial to this transformation. In the field of design this implies a reflection on the aspects of the profession to understand how design can contribute to restoring value to what production evaluates as waste. The transition from material of value to waste takes the form of a shift in typology. This is even more important in the case of stone materials both for their characteristics and qualities presented by the single block, and because they are non-renewable resources. How is it possible to present the inclinations of the waste stone materials from production? There is a range of objectives ranging from the optimization of processes to waste prevention strategies up to the circularity of production processes.

In stone materials, the actions for closing the cycles are complicated precisely because of the uniqueness that characterizes the material; instead, it is easier to identify examples in which the material offers ideas for waste prevention.

It is in this case that the ability of designers to give value to what is considered waste depends, as well as to find a new identity in these waste or semi-finished products, or rather, an identity born from the shape of the piece itself.

In this study we want to report on waste that has a defined formal configuration and not on the reuse of residual dust and sludge from stone processing

What is rejected from a process can be considered of value in areas even distant from those for which the stone material was originally selected.

This transversal use of waste and this ability to regain value (material, commercial, etc.) are precursory aspects of the Circular Economy, in which the figure of design emerges which sometimes manages to recognize a value even when others see it as waste.

3. From waste to resource

In the stone materials production sector, the contribution that the designer can offer for waste and waste prevention can be traced back to three choices: the optimization of production processes (from cutting to the final product); the use of waste elements re-evaluating their formal characteristics; the exploitation of powders for the production of new materials. In this study we focus our attention on the re-evaluation of the formal characteristics of waste and on the influence that some fundamentals of product design can have on the correct approach to the relationship between waste and value or from elements abandoned by a process or production.

Furthermore, stone materials also offer further opportunities when the reuse of residual dust and sludge from stone processing find a use within other productions (from paper mills to construction and road paving, etc.) and in the production of new materials.

Here the geometries can be redefined with the use of new machinery and processes much as with the thermoplastic material made up of marble dust and resins by Carmine Deganello and Pietrasanta Industries in 2015. It is therefore interesting to confirm that there are numerous viable paths and solutions. The theme of the productive reevaluation of dust and sludge opens up another area of intervention, but as already mentioned here we continue with the potential of those residues that present a morphological-structural characterization and, in particular, of scrap slabs.

In this context the work of Paolo Ulian is admirable because the cutting processes and the recomposition of the elements allow to give three-dimensionality, without waste, to the material in slabs as in some of his projects

Paolo Ulian aim at creating beautiful and functional objects and possessing an ethical and social value. The key words ethics, respect the material, good form, observe behaviours, enable us to venture into his creative universe which is, first of all, design vision and view of the world. Because of this personal vision of things, his concern to avoid waste, by recycling and retrieving, is central to his personal approach to a material such as marble, characterized by large amounts of waste in the manufacturing process.

Paolo Ulian's objects are produced of the use of waterjet technology and observation of manufacturing discards.

In his approach he has tried to eliminate the difference between usable pieces and discards. He tries to give the same practical value to both. An example that expresses this concept is the Without Waste table (Fig.1). In this work a series of cuts made in a marble slab provided all the pieces needed for the three-dimensional support of the glass top. Then the skeleton of the hollowed slab, apart from representing using all the worked marble, becomes the natural base of the table.

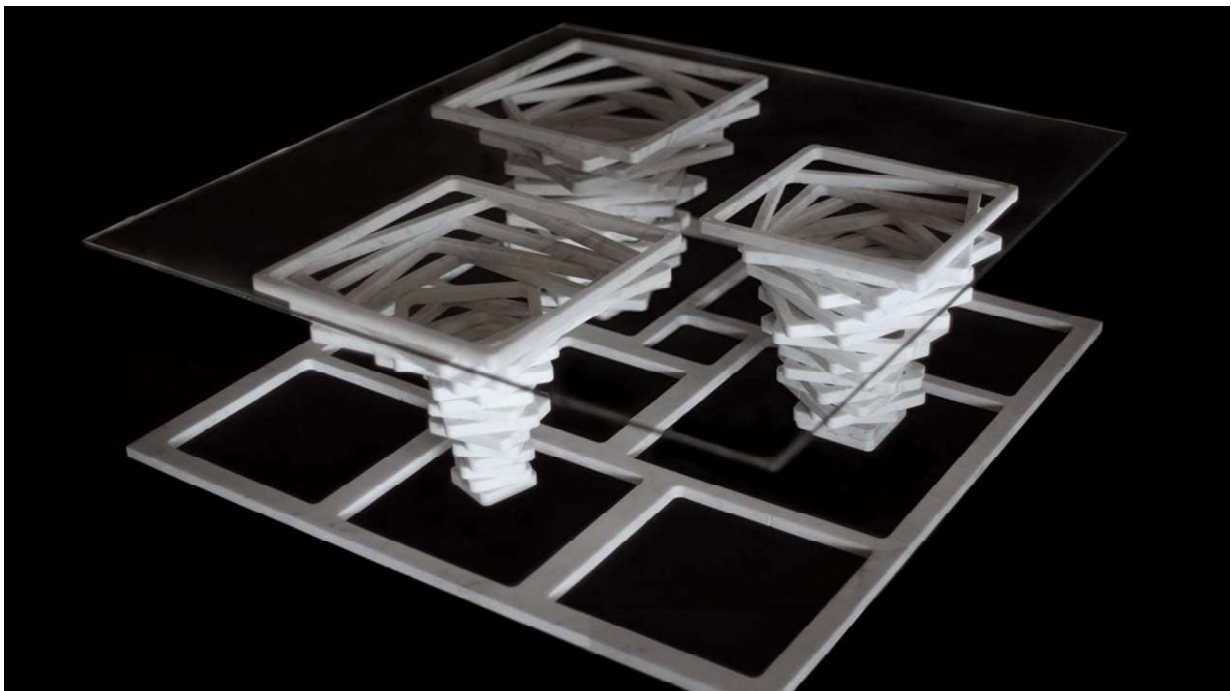


Fig.1: Without wate table Photo © Bufalini Archives © Davide Calafà

Instead with the Vase Vago (Fig.2), Ulian has make a big vase without producing large amounts of waste.

So, he started from the two- dimensionality of three slabs of marble measuring 60x60 x 2 centimeters and he cut them out to produce a number of concentric ring of marble

He then superimposed them, so they overlapped to form a vase 50 centimeters tall.

In addition, he has also made other projects marble bookcase and tables

The bookcases used marble tiles salvaged from the odd lots in warehouses transformed by simple processes into modular units

Numerica, modular bookcase in White Carrara marble. Starting from marble pieces in current production, mainly wall tiles, the designer combined four different modules in a compositional pattern alluding to Roman numerals I to IV

In the tables he tried to develop his research into designing with waste where the decorative holes piercing the tops were necessary in order to extract the small round pieces stacked on top of each other that form the legs

Autarchico, tables of Bardiglio marble. Each tabletop is made by assembling three slim staggered marble slabs pierced using waterjet cutting technology to form abstract designs. The pieces left over from drilling the tops, usually discarded are here stacked to create the table legs

Concentrico, modular coffee table is made of White Carrara marble. Waterjet cutting technology is used to turn production tiles into hollow square shapes. The definition of the form derives the optimization of the concentric cut in the square surface of the tile in order to avoid wasting the material.

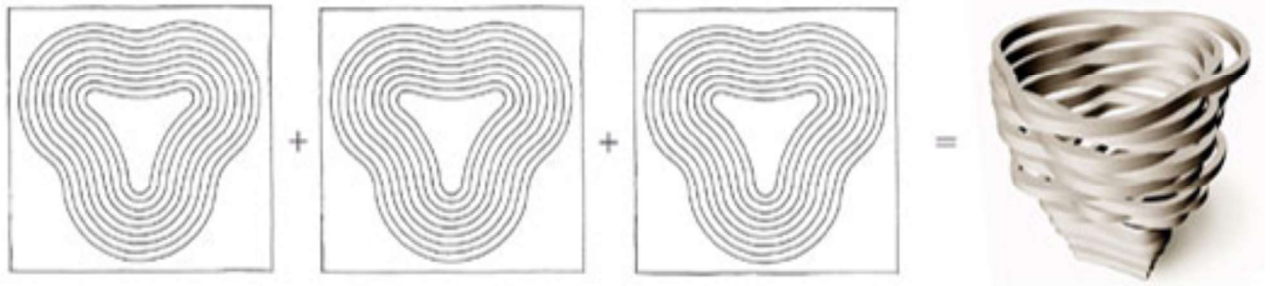


Fig.2 : Vase Vago production UP Group

With his projects Paolo Ulian tells his relationship with marble through the attention to reuse and the optimization in the construction phase. His projects reflect a vision that brings out aspects related to the social context, ethics and environmental issues, combining digital technologies and craftsmanship. As we have seen, the previous projects show the designer's skills with the formal characteristics of the products. These skills will be useful in a circular economy perspective

4. Conclusions

The examples cited above show how waste becomes a resource and how it is the designer's responsibility to rethink marble starting from a basic premise: consume the minimum amount of material and that every marble waste becomes an opportunity not to be wasted.

This experience on marble can become a potential laboratory for experimentation to be applied to any other material because too often we do not consider that for each piece produced there is a quantity of waste which can contribute to its creation. It is from this approach that some rules can be established in order to rethink the ethical dimension of good design, where waste becomes matter of conscious design that engages the designer and companies in a production method that also has positive effects from an economic and social point of view for a fair and sustainable future.

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