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Industrial Design and Ecological Balance

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ABSTRACT.

This work presents the direct link between the Industrial Production process of products and the Ecological disaster we are witnessing today. The main contribution is the definition of the industrial designer's role in this process and the multiple ways the designer can influence and avoid the ecological imbalance. From the design concept to materials and processing, from packing and recycling to transportation, the author clearly defines the designer's complex involvement and offers solutions.

The relationship between design and ecological balance is of major importance. Producing goods to the extent that they address human needs is a concept that is very welcomed, and is progressive in its content. But when design is manipulation, and especially the solving tool of the competition, which I wouldn't say that serves the consumer's interest, leading to an overproduction crisis, it has deep ecological implications. Daily tons of millions of waste are produced, and unfortunately not all of them can be recycled, or if they can then hundreds of years are needed for their natural recycling. The planet is invaded by waste; the recycling issue has become a major science at the moment and especially for the future.

Fig.1 Waste disposed of in nature

Stocking waste in nature happens on a worldwide industrial level which leads to catastrophic, irreparable damage. Our planet is going through never seen before crisis: global warming as a result of burning gas, which in addition to the rising of waters due to the ice melting bring major changes to the temperature of waters and air movement as a direct effect; in fact in the last years the movement of the air has known unusual intensity and frequencies in hurricanes, tornadoes, earthquakes and other cataclysmic events. More and more unique species of fauna and flora have disappeared or have become endangered species as a direct result of the process of pollution and overheating.

One of the first indications signaled on a global level, regarding the poisoning process of our planet as a result of misguided industrialization was in Japan, in 1953, when it was proven that the mercury spilled in the Minamata gulf had poisoned thousands of fishermen, causing genetic deformities in their children. Since then, these disasters have grown in number: the thermonuclear disaster in Pennsylvania, in 1982, let's not forget Cernobal, in Ukraine, in 1986, thousands of people

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poisoned in Bhopal, India, in 1984 and by the chemical corporations in the USA, an accidental leakage of chemical toxins in the Rhine by a drug company in Switzerland, in 1986, which killed every living creature in the river that passed through Germany, France, Belgium and Holland. This last disaster needed over 5 years of hard work for an acceptable biological rebalancing. (V. Papanek: **"The Green Imperative"**).

Fig.2 Ecological disaster - Exxon Valdez

The oil carrier Exxon Valdez destroyed wild life on the coast of Alaska. I have remembered only a few of the countless ecological disasters that matter to us in this framework, in order to replenish the picture, namely the ecological and environmental balance is the basis of human life on Earth and we all have the deep responsibility to take care of it. Design is involved in the development of products, and it reflects directly in the development of industrial production, machinery and new equipments, that have a profound influence upon ecology. Design must assume the responsibility to control, stop and create a bridge between **human needs, culture and ecology.** When we talk about pollution as being a result of products, we generally think about the smoke coming from factory chimneys, chemical fertilizers that are toxic for man even if they help the rapid growth of plants, tires thrown into mountain rivers and other desolating but very representative images. But pollution has deeper roots when we refer to production, which is directly linked to the design process, which unfortunately is permanently sustained by it. If each designer were aware and responsible that in the design process, by making decisions that regard what solutions to choose, grand scale pollution actions could be avoided and contribution to protecting the planet would be felt considerably.

Victor Papanek in **"The Green Imperative"** defines **six distinct steps** where the designer can control the magnitude of the pollution that resulted from producing the designed product, namely:

1. Choosing materials used in the production process.

This step is vital because of many reasons, first it has an aesthetic nature, since materials and texture are very important when defining details. Considering the technology of each material, thus the energy consumption and collateral pollution it brings, great pollution could be avoided.
Metal used in cars, during the siderurgic process, creates great atmospheric pollution because of the fuel or electricity used in the furnaces (which in the end means fuel).

Fig.3 Smog caused by pollution

The designer's decision to use polyurethane foams for wrapping and containers, disposable dishes and cups, will bring destruction to the ozone layer. Of course all of these create problems in recycling them. We know that all sprays containing CFC in order to create pressure inside the container destroy the ozone layer (just a few situations where right from the beginning, by choosing smart solutions, such disastrous effects could be avoided). Even if, apparently, the designer's decision is not connected directly to an ecological disaster, on a long term and due to the chain reaction involved in the manufacturing process, the result of the ecological disaster will be the same. Being responsible in choosing the materials needed to manufacture products is a must, searching for the most harmless materials from this point of view, using more and more natural or recyclable materials, since we know very well their classification under the name of **"green design",** a conception largely used in architecture and design that is preoccupied with protecting the ecological environment.

2. Manufacturing process.

Choosing the manufacturing technology falls in the same category of professional ethical responsibility, because the designer must be aware of the atmospheric pollution caused by the chosen technological process, by loss of gas or toxic liquids that may leak into the ground affecting agricultural lands and animal life, and directly or indirectly the people's life that live around the area, by polluting their drinking water.

Fig.4 Industrial pollution

If there are possibilities for choosing less harmful technologies, then it is the designer's responsibility to fight for this, even if the cost price of the product may be slightly affected, but this can be adjusted where there isn't ecological damage.

3. Packing and wrapping the product.

Serious problems are involved in solving product packing in order to protect them during transportation.

Using foams and plastic materials to pack products represents a great danger for the ecological balance, due to the difficulty of recycling them. Reconsidering the materials used to pack products, orienting towards natural, biodegradable or recyclable materials, thus respecting the Green Design concept, is another possibility that a designer has to protect the environment with his design.

Fig.5 Waste plastic packaging

4. Product itself.

In the previous chapters I have showed the designer's role in solving the overproduction crisis. Most products – especially electronic ones – invade the market, choking it, not as a real necessity, but as attempts to try to seduce the buyer to purchase a machine that has the same performance, but from an aesthetic point of view is a bit different, very superficially solved (applied forms that "trick" the buyer, manipulate him psychologically, transmitting through this new "look" a fake message of improved quality, superior performance). But everything is just external, cheap cosmetics. A good example could be radios or portable CD players. Let's say we are looking at the same physical size, same capacity for sound reproduction, speakers, etc. Functionally, most products belonging to the same class have the same technical performance. But at a certain point saturation appears, that radio stops selling because everyone has that type of radio! This is the point where the designer intervenes. He is told to "trick" the consumer. He is the mercenary who executes the manufacturer's order. Now the social relation with the consumer is no longer a real, honest one, but a one-sided relation, it refers to creating profit for the producer and secondly, but as important as well, offering jobs to workers involved in the production process. The social and honest component, that of solving a real need, is lost. The designer will try to give this radio a more alluring look, a plastic case treated to seem metallic, suggesting a solid structure, but actually it isn't more solid than the black plastic. Some flickering lights are added, for they remind the strobe light and the synthesizer, and the average buyer, unknowing, is impressed. Moreover, the representative parts are visually and formally amplified, suggesting power, largeness and ruggedness.

Fig.6 NAS-D5HD Boombox, Sony

So actually, a little is added to the cost price by that artificial tinfoil that misleads, seduces the consumer. In order to stay on the market at the same cost price or even reduce it a little in comparison to competitors, some interior parts are removed, assemblies are replaced with "snap-on" screw carcasses, that close only once. When they break, everything is replaced, they are not repaired. This deceitful competition is a process that the designer must be aware of, and try, in spite of accepting the project as a professional need, to find better solutions that really bring value to the product and not deceive the consumer. Here is where professional ethics comes into play, to accept anything and earn the money that pays the family bills or, for the same amount of money, the designer looks for new ways, new materials that do not endanger the ecological balance, to be on the consumer's "side", to have this responsibility that I gladly define, every time I present design and the present crisis, as the conscious responsibility that

"changing the product, it changes us, changing our way of life".

Other examples: currently on the European, Asian and American market there are over 500 video cameras that have the same technical performances, with minimum differences, meaning labels or those cheap effects that I was referring to before, products that through their manufacture rapidly destroy the ecological balance.

In the northern hemispheres, where winter is longer than in other countries, but even in the common areas with mountains and snowy winters, the rich use more and more the "snowmobile" for recreation, this being an act of social definition, of "statute", but in using them they agitate nature, causing toxic and noise pollution. At first, this product appeared as a need for hunters in Canada and Alaska, for Eskimos, for workers at the Pole and from other areas that had a lot of snow, a necessity for transporting or saving lives on the mountain. Of course, this usage mutation was a quick one. Currently, the number of snow vehicles of this type, used for recreational purposes, is much bigger than the number of snow vehicles used for useful purposes by those for whom this program was initially designed for. Now there are also snowmobile world championships!

The equivalent of the same product, but meant for water, namely water scooters, appeared at first as a recreational product that destroyed the marine flora and fauna at an unimaginable speed, with noise, intrusion in the intimacy of the fauna and chasing animals away from their nests, but also through gas and petrol leakage during their usage. In the last decade, different governments (USA not included!) have taken steps to ban their use in areas where the balance of the fauna and flora are endangered by such use.

5. Transporting products.

The problem of transporting products is critical and has less immediate solutions, since such transportation is done with ships, trains, airplanes, trucks, all of which use Diesel fuel, petrol or electricity (which in the end use Diesel fuel for generators). Some transports can be easily reduced, but due to economy and global production, the solutions are more limited. These transports refer to supplying ores from the mine to the factory for raw materials, products from the factory to distribution centers, from here to outlet shops and, finally, to the consumer's home. So in certain limits, with attention and care, fuel consumption costs could be reduced, at least on the consumer's level.

Fig.7 Transporting products

6. Waste from product appearance.

Unfortunately, products, when no longer useful or desired by the consumer, represent a major problem, maybe the biggest problem in this chain created by the product-consumption process. We think with sadness about car cemeteries which are sources of pollution through their degradation in time. But beyond that, people consume more and more products wrapped in plastic, in ecologically unfriendly materials, that create big problems. Cathodic tubes are very dangerous because they contain mercury. And who has to dispose of this waste after the product is no longer good? The consumer.

In this sense, after the World Conference in Kyoto held in 1997 regarding the world ecological crisis, known as the "Kyoto protocol", after two years of diplomatic fights, treaties were made in which it was established that in the near future (every producing country has a specific deadline, except countries that aren't participants) all industrialized countries are asked to reduce emission gases to 5.2 by the year 2012, so the process of global warming, of destroying the ozone layer and others are reduced. Of course the Bush government shamelessly defied this protocol, refusing to align to it.

Fig.8 Tin canisters disposed of in nature and used by people

America, considered as being the "Axis of Ecocide", is bound to remain alone, if Europe, Japan and recently Canada succeed to pressure president Putin, who following his "friend's" example, also initially refused to participate, although recently there have been serious discussions and optimistic opinions regarding the alignment of Russia. Nevertheless, the Russian government did not abandon the discussion and the idea of joining the protocol.

Canada, which initially did not want to align, changed recently its position and in September 2006, has officially announced that, beginning with 2007, the protocol recommendations will be implemented.

Another problem discussed at the conference referred to products with serious problems created by their recycling, like TV screens, the proposal was for the recycling to be included in the buying cost of the product, but it must be the producer's responsibility to collect and recycle them

A common family living in the technological developed countries produces between 16 to 20 tons of garbage per year! Besides the danger of pollution there is also a great loss of materials that could be reused, saved, if recycling were encouraged. There are countries like Japan, Scandinavian countries, Germany and others, that give a growing and strategic attention to the recycling process of reusable materials, at the level of government and even law.

Sadly, the great economic powers have practiced solving the problem of waste by paying third-world countries to accept their storage on their territories. So, the cost of cleaning up China, which is one of the biggest victims of this practice, after the country was polluted with foreign waste in 2004, was estimated at 136 billion dollars. Besides the danger of ecological pollution, direct pollution, intoxication and poisoning the population, this is also a great danger. These poor people are trying to reuse the waste, radioactive containers or from the chemical industry, leading to very sad disasters.

"Green Design" projects in the Scandinavian architecture and recently in other parts are proof of respect and special responsibility, worthy to be followed, showing a remarkable care towards our planet.

Fig.9 House with solar panels

Green Design, or **"eco-design"** is a growing movement in architecture, landscaping, industrial design and interior design, where the attention is to consider in the offered projects minimum pollution and ecological dangers by using materials that have the lowest negative effect upon the environment. An essential part is recycling or reusing products, as I've said before, after these are abandoned, thrown away by the consumer. If the initial thinking considers this factor when choosing materials and manufacturing technologies, choking the planet with these wastes can be reduced substantially. The rapid growth of the world population on one hand, and the decrease of vital resources on the other hand make this global ecological crisis to be taken more seriously. Green Design aims to reduce the impact of ecological aggression by building new artificial objects with natural materials, less harmful manufacturing technologies and, most importantly, recycling materials and discovering new energy resources. A great representative of the Green Design movement is E.F. Schumacher, who appears in England as one of the fiercest environmentalists in the last 20 years, in his book **"Small is Beautiful"**. His writings and lectures are valuable in the Green Design world, being animated by the convinced desire to define protection systems for Mother Nature.

In addition to the suggested materials that should be used, the chosen technological processes, as I've mentioned before, must also be efficient in terms of energy consumption.

A long-term solution which defines efficiency, in addition to reusing and recycling materials, is the idea of using more durable materials, of better quality, thus providing a significant opportunity. Certainly here it enters in conflict with the producer who wishes to use materials that are as cheap as possible and do not last more than 3-4 years, in order to force the buyer to keep buying, thus ensuring continuous market, continuous production, continuous profits.

Even reconsidering the way some products are used on a global scale can bring savings and substantial changes. Advanced countries encourage that more people use the same car, in going to work or generally speaking, by providing special lanes on highways where cars that have more than two passengers in them can circulate, thus having a lower traffic on lanes and therefore transportation efficiency is higher and faster.

Using some materials that by natural degradation produce energy sources, burning gases, or a come-back to using the forces of nature, hydraulics, windmills etc., would be a source suggested by Green Design. Of course if to this we add using technologies that have repeatable industrial cycles and recyclable materials, reusable even, it would be a solution which if started on a

personal level could generate a serious source of saving resources and reduce the ecological imbalance.

Fig.10 Wind generators

As a final suggestion that I've mentioned earlier, returning to the concept of design where parts of products can be repaired, replaced, would bring big changes. This idea triggers an aggressive reaction of rejecting big producers on a global scale, who double their income from a product by offering the "Service" system, where broken parts are not repaired, but replaced.

Destroying the ecological balance is a direct result of the thirst for gain which great magnates manifest as a direct and overt politics, for they are not interested in tomorrow's situation of the planet, of the life of our future.

This shameful example, like the one proven by the "Bush clan", who although aware of the oil reserves they wanted to drill in the natural reserves in Alaska would not last more than a few months, kept stubbornly insisting on this project. It is hard to talk about these human responsibilities towards the balance of nature to which we owe our best, without going into political interpretations, because politics itself is a reflection of the thirst for power, profit and domination.

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