11th INTERNATIONAL CONFERENCE OF PRINTING, DESIGN AND GRAPHIC COMMUNICATIONS
Blaž Baromić

Publishers:
Faculty of Graphic Arts, University of Zagreb, Croatia
Ogranak Matice hrvatske Senj, Croatia
Pulp and Paper Institute, Ljubljana, Slovenia

For Publishers:
Prof. Stanislav Bolanča. Ph.D.
Mislav Bilović, B.Sc. iur.
Boris Tavčar, B.Sc.

Editor:
Prof. Zdenka Bolanča Ph.D.

Graphic art directors:
Assis. Igor Majnarić Ph.D.
Sanja Babić Getz

Cover design:
Darko Bosnar, B.Sc.
Jurica Dolić, B.Sc.

Print:
ITG-Goršić, Zagreb

CIP – Katalogizacija u publikaciji
Nacionalna i sveučilišna knjižnica Zagreb

UDK 655(063)7.05:76>(063)

11th International conference of printing, design and graphic communication Blaž Baromić (9; 2007; Zadar)

Proceedings / 11th International conference of printing, design and graphic communication Blaž Baromić, Zadar, September 26th-29th, 2007 ; editor Z. [Zdenka] Bolanča
Impresum: Zagreb : Faculty of Graphic Arts ; Senj : Matica hrvatska, Ogranak ; Ljubljana : Pulp and Paper Institut, 2007.

ISBN: 978-953-96020-7-7 (Faculty of Graphic Arts)

BLAŽ BAROMIĆ 87

11TH INTERNATIONAL

CONFERENCE ON PRINTING, DESIGN AND GRAPHIC COMMUNICATIONS

P R O C E E D I N G S

ZADAR – HOTEL KOLOVARE, CROATIA
September 26th – 29th, 2007

ORGANIZED BY:

FACULTY OF GRAPHIC ARTS, UNIVERSITY OF ZAGREB, CROATIA

OGRANAK MATICE HRVATSKE SENJ, CROATIA

PULP AND PAPER INSTITUTE, LJUBLJANA, SLOVENIA

SPONSORED BY:

MINISTRY OF SCIENCE EDUCATION AND SPORT, REPUBLIC CROATIA

UNDER THE AUSPICES OF:

CROATIAN ACADEMY OF ENGINEERING

Organizing committee

Z. Bolanča (*president*), M. Bilović, S. Bolanča, T. Goršić, D. Jakšić, R. Krajačić, M. Milković, N. Mrvac, R. Naprta, D. Nekić, Đ. Osterman Parac, V. Rutar, V. Salamon, A. Tomaš, A. Vrhovac, I. Zjakić

Scientific committee

W. Bauer (Aus), S. Bolanča (Cro), Z. Bolanča (Cro), N. Enlund (Swe) A. Hladnik (Slo), M. Jurković (Cro), H. Kipphan (Ger), A. Nazor (Cro), K. Možina (Slo), Z. Paszek (Pol), M. Plenković (Cro), A. Politis (Gre), F. Vreg (Slo)

BLAŽ BARIĆ 07
11TH INTERNATIONAL
CONFERENCE ON PRINTING, DESIGN AND GRAPHIC COMMUNICATIONS
26th-29 th September 2007, Zadar, Croatia Student paper

ECOLOGICAL RESPONSIBILITY OF GRAPHIC DESIGN

[1]Đurek, N., [2]Bolanča Mirković I.
[1]Faculty of Arhicteture, University of Zagreb, Croatia
[2]Faculty of Graphic Arts, University of Zagreb, Croatia

Abstract: *The resume of the basic propositions of ecological responsibility of graphic design is given in the article. The influence on environment is evaluated through the life cycle of the product. Taking into considerations the directives of the mentioned the choice of ecologically more suitable material and technology is essential. However, the "green design" is somewhat more than the methodology of the work. All those who accept the design as profession have the personal obligation of the social responsibility and the basic elements of that obligation should be incorporated in the career, so the graphic design should be used as the method for social changes, which is the frame of the discussion of this work.*

Key words: *graphic design, ecology, life cycle of a product, ecological aspect of the material, ecological aspect of the process, sustainable development*

1. INTRODUCTION

For the development of the conscious of an individual about the environment protection the education on long lasting effect, primarily of industry, energetics and traffic, on environment is necessary. On the other hand they are the branches of economy which enable higher standard of living, more luxurious and simpler life. It is completely clear that although it is more difficult to admit to those who are included in the run after profit as the prestigious segment of the human life, that on the global plan the changes in thinking are necessary if one wants greater quality of the environment on this our planet.

In the last thirty years, our society becomes more ecological conscious. Ecological suitableness becomes gradually the social priority, and in this segment the design can help, but the mentioned process can be slowed down or even prevented. The talent of the graphic designer is the essential thing which puts him into the position in which he can influence the changes in the society. If the designer should not have the social responsibility, it means that he does not use the ability to create the sense and the sending of a determined message.

One of the designs theoretic V. Papanek stated that the design should be independent about the care of the national gross product, no matter how high it is, in order to be ecologically responsible (Papanek V, 1973)

Looking through the history for the introduction of aspect of environment into the design, the ideas of W. McDonough and M. Braugart concerning the reshaping the industries through the ecologically integrated design are interesting (McDonough W., Braugart M., 1990). Further, there should be no contradiction between the profile and the ecological suitableness. The design of the products and the production systems which developed from the industrial revolution reflected the spirit of the moment and resulted in unintentional but important consequences. By the ecologically engaged design, by adopting the knowledge on environment quality and the state on the planet, the design can reflect the new approach using the intelligence of the natural systems, because the nature is incomparable designer itself, especially when speaking about the design of packaging.

2. EVALUATION OF THE LIFE CYCLE OF THE PRODUCT AS THE METHOD OF THE "GREEN DESIGN"

The life cycle can b defined as a series of mutually connected system phases of the product, which comprises the obtained raw materials, the usage of the natural sources up to the disposal of the used product. The gaining of the products is defined as the group of the processes and the connection are the material or the energy by which the determined functions are performed (Shen T.T., 1995).

The estimation of the life cycle comprises recording and evaluation of all the inputs and outputs, as well as the influence of the products on the environment during its whole life span. In fact, it could be said that the concept of the life span is a holistic approach of evaluation of the

product influence on the environment "from cradle to grave" (McDonough W., Braugart M., 1990; McDonough W., Braugart M., 2000).

The estimation of the life cycle is set into the sharp quantitative frames. It demands a series of data in order to fulfil the inventory component of all the inputs and outputs. This is in fact the tool which ensures the determined kind of information which can initiate researches and development of the new materials and technologies. Except that, it can point at the black spots of the production which represent the risk, which then can be eliminated by the corresponding methods, having in mind the hierarchy of the processes (Keoleian G.A., Meanery D., 1999).

The estimation of the life cycle can act on ecological consciousness of the producer as well as of the consumer. The interested parties such as the groups of citizens, nongovernmental organizations for the consumer's protection and the similar ones, can influence the break of the production of harmful or dangerous products (Bailey P.E., 2000). The possible consequences of disobedience, non undertaking the measures in the context of decreasing the influence on environment, can weaken the reputation of the producer in public or they can cause the credibility of the company (Henn C.L., Fava J.A., (1998).

According to the Society for Environmental Toxicology and Chemistry the definition of estimation of the life cycle is as follows: the life cycle is the objective process for estimation the burdening of the environment connected with the product and production, so that it identifies and quantifies the energy, the used materials, emission from the production, transport and distribution, usage, maintenance, recycling and finally disposal (Overby C., 2000).

In figure 1, the scheme of the life cycle estimation is presented.

The aim of the life cycle is the estimation of the effects of all the inputs and outputs of products, as it was earlier already presented by the definition, while the purpose of the system boundary definition includes the definition of prepositions, demands and the limitation of estimation (USEPA, 1993, USEPA, 1999).

LCA not only discovers the basic ecological problems but builds the consciousness on the influence on environment and helps in tendency for environment quality increase (SATEC: (1993).

However, according to W.Mc Donough and M Braugart, the effects originating from the estimation of the life cycle of some product such as consumption of natural resources or decrease of pollutant emission in the determined process is not the strategy for the real change (W.McDonough and M Braugart, 2000). With Cradle to Cradle paradigm one wants to point at the designing the industrial plants which in fact produce no waste. Long term prosperity does not depend on the effectiveness of the fundamental destructive systems but on the effectiveness of the processes designed so that they are ecologically acceptable and do not influence the devastation of environment.

The already mentioned book Cradle to Cradle- Remaking the Way we think was not printed on paper but on polymer film.

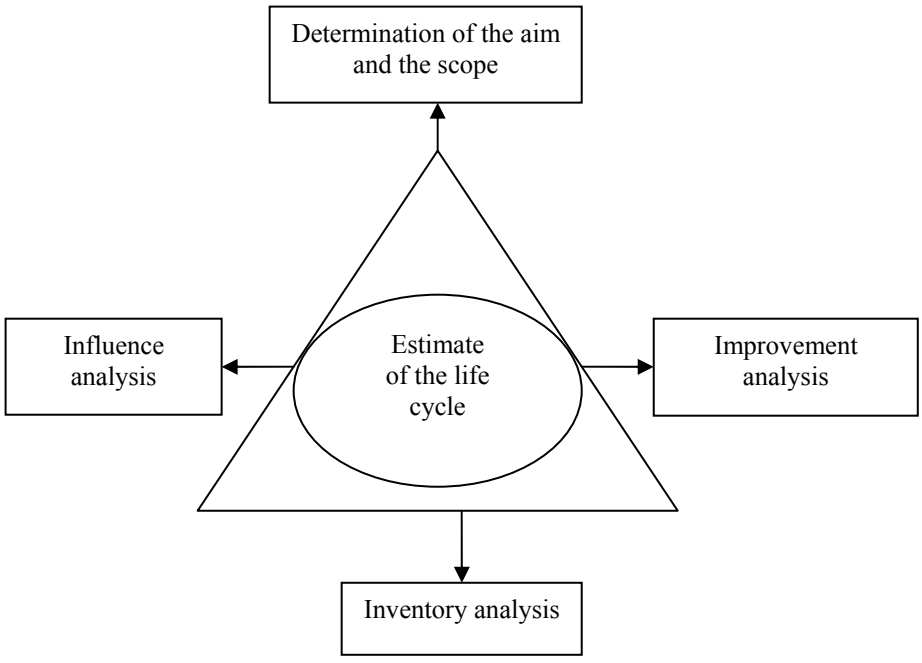

Figure 1. Schematic presentation of the life cycle estimation

The cause for such process resulted in recognizable destructive effects in environment in the phase of resource consumption, in the phase of production (pollution of air, water, soil during the production of cellulose and paper in relation to the polymer production), but it resulted also with the last phase in the life cycle which refers to disposal of the used product by the recycling of paper. In this process, depending on the conditions the technology the quality of the cellulose fibers gets lost. This is the process with limited possibility of the renewed usage. The earlier mentioned paradigm gives here advantage to composting, degradation, using the biological metabolism. However, the mentioned way is in the very technological moment inexecutable because of the usage of chemicals in the cellulose and paper production, as well as in inks composition and the printing process. In this segment, there are some materials of the future in the domain of the printing substrates, but the adaptation of a series of factors in the process is necessary in order to create the conditions for the complete life cycle according to the principle Cradle to Cradle (Vigon B.V., 1999).

3. STRATEGY OF THE ENVIROMENT PROTECTION IN THE PRODUCTION AND THE APPROACH TO THE DESIGN IN ENVIRONMENTALLY CONSCIOUS WAY

With the development of the civilisation and with the growth of population the increase of negative influences on environment appears, and it is necessary in this technological moment to discuss about the basic strategy of the environment protection in the production and the approach to design in environmentally conscious way (Bolanča Mirković I. 2007). Earlier approaches to the problems of environment devastation consisted of avoiding the problem. They can be systematized in several approaches: devastate and run (degradation of the cultivable soil, dilute (auto purification), concentrate and keep (waste disposal) (Schmidheiny S., 1997).

In the sixties in the last century, it became clear that the mentioned approaches of the strategies were not effective, and the new technologies were introduced which include the introduction of the purification process at the end of the production, known as „end of pipe“. It was proved that the mentioned treatment was effective only to the determined measure and that the determined problems of environment pollution, as the by-product of the production, stayed unsolved.

The idea of sustainable or ecologically acceptable development has been used since 1987. The World Commission on Environment and Development adopted the concept of ecologically acceptable economic development in the context of the care increase for environment. The idea of sustainable development was the satisfaction of the needs and the growth of standard of the contemporary generation, but not at the expense of the quality of environment of the coming generations. The aims and the basic propositions of the sustainable development are schematically presented in figure 3 (Schmidheiny S., 1997) .

The concept of the pure technology is based on the preventive approach. The aim of such production is the decrease or complete disappearance of waste, the rational usage of energy and resources. For achieving of such aims it is necessary to adopt the new technologies and techniques, new formulations of materials in accordance with the new values and ways of satisfying the needs of the humanity. The new approach should be applied in the production process as well as in the consumption and the domain of goods and services.

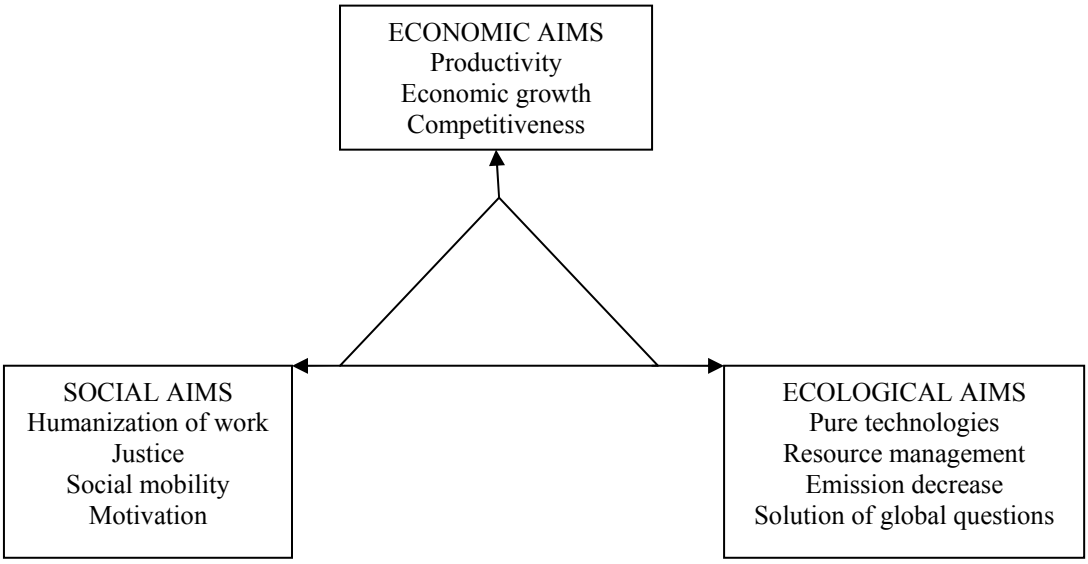

Figure 2.Basic propositions and the aims of the sustainable development

The propositions of the pure production are schematically presented in figure 3.

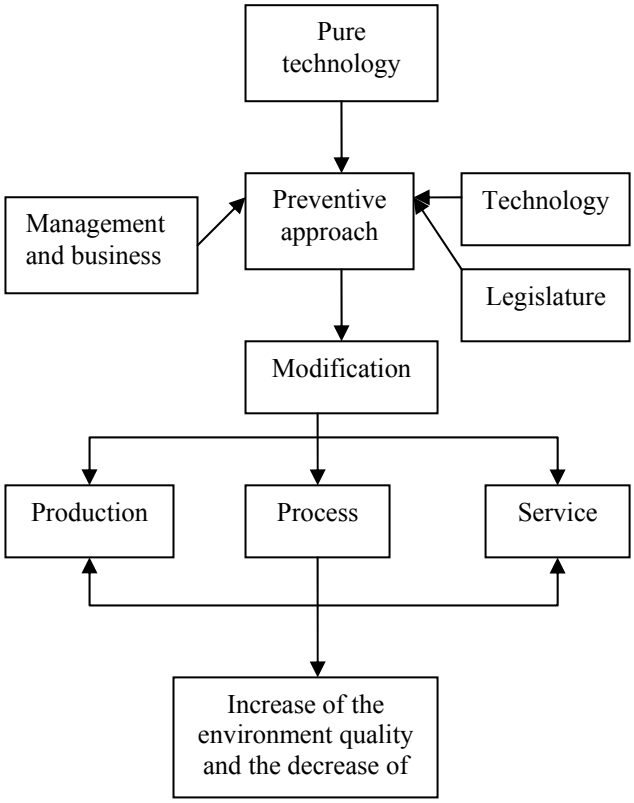

Figure 3. Schematic presentation of the pure technology proposition

As it is visible from the presentation, the pure technologies are based on the decrease of the waste quantities, and if the waste is formed it had to be reused in the same or in some other technology as the raw material, in more effective usage of the resources and energy and in the formation of the products of greater ecological suitableness with the realization of greater profit and lower product prices.

The basic principles of the strategy of the pure technology are as follows: The principle of caution includes the decrease of inputting the anthropogenic pollutants into the environment which is achieved by the modification of the production process

The principle of prevention consists of the introduction of the exchanges in the standard proposition of the production and consumption system. The principle of integration includes the adopting of complete considering of the production cycles and one method is the analysis of the life cycle of the product. The principle of democracy includes all the personnel structures in the same way as they are organized in the production. Figure 4 presents the strategy of the pure technology in the function of the basic principles.

The pure technologies give the possibility of the more effective production. They are rational in relation to the energy and raw materials and they realize the positive financial effect. With the decrease of the pollutant emission and the waste they contribute to the quality of environment.

The improvements in this segment are: the usage of the pure technologies by using the alternative energy sources, by the extending the life cycle of the consumable goods and by the effective technological processes of reusing the raw materials.

In this segment it is necessary to explain the way of thinking in solving any problem on the level of the design so that the total influence of the design on the environment is recognized. Unfortunately there are not finished answers to that, but it is important to stress that the question of the design is not only the question of the given problem solving but the attempt to see the functioning within the broader system and the attempt to find the best solutions in that context. The real approach to the choice of environmentally acceptable methods of the design execution is important in order to avoid too high price, impracticality and unattractiveness which could contribute to the fact that the product does not find the buyer. What does that mean? The design should take into consideration the factors of the environment but at the same time it has to be commercially successful, it has to function and it must have a high aesthetic attractiveness (MacKenzie D. 1991).

Thinking in the ecologically acceptable way within the design is surely a challenge, encouragement for innovations and creativity.

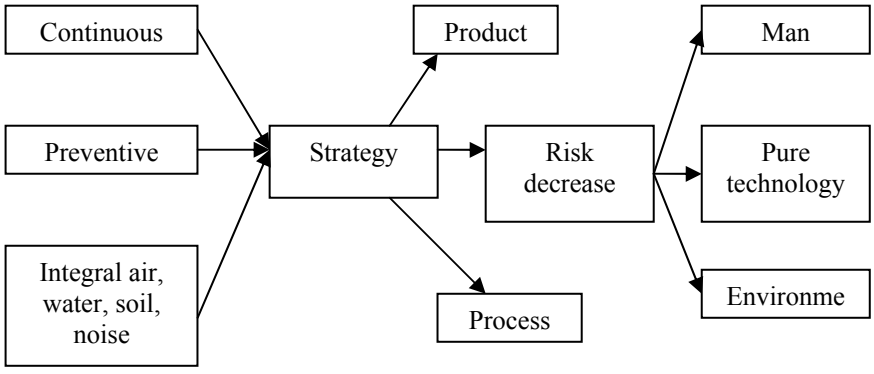

Figure 4. Schematic presentation of the pure technology strategy in the function of the basic principles

The new challenge includes renewed thinking on design of products so that high standards of the environment are connected together with the adoption of elements of economics. The ability of the designer to see the influence of the design on environment should not be the additional effort and skill but the part of the thinking within the creative solution of the determined design problem.

4. CONCLUSION

It can be concluded from the above mentioned that in the approach to design one should see and get acquainted with the influence on environment of all the factors which are included in the problems of the task solving. In this context we shall cite only several ones: energy preservation, waste problems, decrease of the material usage in the technological performance, the choice of ecologically acceptable materials, biological degradability of the materials, the design should be conformed to the benefit of recycling, redesign of industrial processes etc.

The designers, in the search of the acceptable answers to clients needs, have ethical responsibility to ensure the product which minimizes the unsuitable consequences, which points out the creativity and the skill in addressing the communicational needs with the balance of economical, social and ecological proposition

5. REFERENCES

Bailey P.E., (2000) Life Cycle Costing and Pollution Prevention, *Pollution Prevention Review*, **10**(2000)1

Bolanča Mirković I. Doktorska dizertacija, Grafički fakultet, Zagreb, 2007

Henn C.L., Fava J.A., (1998), Life Cycle Analysis and Resource Management, in Environmental Strategies Handbook, ed. by Kolluru, McGraw-Hill,Inc. 550.

Keoleian G.A., Meanery D., (1999), Sustanable Development: Review of Life Cycle Design and Related approaches, J. AWMA 44(1999) 664

MacKenzie, D., (1991), Green Desing, Design for the Environment, Laurence Kong Ltd.

McDonough W., Braugart M., (1990), Cradle to Cradle-Remaking the Way we Think, McGraw-Hill, Inc. 25

Overby C., (2000), Design for the Entire Life Cycle: A New Paradigm, Proceedings. International Conference on Pollution Prevention, 2000, 20

Papanek V., (1973), Dizajn za stvarni svijet, Nakladni zavod M. Marulić, Split, 219

SATEC: (1993), Guidelines for Life-Cycle Assessment: A Code of Practice, from the workshop held at Sesimbra, Portugal,

Schmidheiny S., (1997), Novim smjerom-globalni poslovni pristup razvoju i okolišu, Društvo za unapređenje kvalitete življenja, Zagreb

Shen T.T.,(1995), Industrial Pollution Prevention, Springer Verlag, Berlin

USEPA, (1993), Life Cycle Assessment: Inventory Guidelines and Principles, Cincinnati, Ohio, EPA/600/R-92/245

USEPA,(1999), Designing Environmentally Compatibile Products of Facility Pollution Prevention Guide, Washington, D.C. EPA/600/R-99/088

Vigon B.V., (1999), Life Cycle Assessment: Inventory Guidelines and Principles, Columbus, 1999