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F I N A L R E P O R T

Working Group Meeting on The International Code of Environmental Ethics for Engineers

Malmoe, Sweden, 25-27 February 1991

Malmoe, 12 March 1991
Bengt E. Svensson

FINAL REPORT: WORKING GROUP MEETING ON THE INTERNATIONAL CODE OF ENVIRONMENTAL ETHICS FOR ENGINEERS, MALMOE, SWEDEN, 25-27 FEBRUARY 1991

An International Working Group Meeting on the International Code of Environmental Ethics for Engineers was carried through in Malmoe 25-27 February 1991 according to the plan made by Engineering and Technology Division, Science Sector, UNESCO.

The goal for the meeting was to discuss and make proposal of a condensed version of the Code as well as suggest actions for the promotion of the Code. A special background paper for the meeting (compiled by Stefan Anderberg, Hans T. Karlsson and E. Soloviev; Appendix 1) was available.

The discussions during the different sessions were active and productive, and before the meeting was closed on 27 February a preliminary text concerning Preamble, Code, Promotion of Code and Immediate Possibilities (Appendix 2) was agreed by the participants (Appendix 3).

During the discussions it was underlined the importance of different actions to be taken in order to promote the Code. In the Preamble text it is mentioned, among other things, that

> 'a new type of development has to be achieved - sustainable development - that can continue to provide social, economic, and cultural benefits to present and future generations. This implies a change in attitudes and behaviour of the main actors in development, including the general public.'

The general text of the Code itself is expressed in a condensed form and points to 'the ethical responsibility of each engineer to take into account the impact of his work on the social and cultural environment' as well as the impact on the eco-system and natural resources.

Promotion of the Code includes marketing strategy and marketing elements. Immediate possibilities and actions by UNESCO are suggested in the document. (Appendix 2)

19 persons participated, partly due to an invitation from Engineering and Technology Division, UNESCO, partly at the suggestion of Lund University and Dr. B.E. Svensson.

Professor O. Wärneryd acted as chairman for the Plenary Sessions on 25 and 26 February and for the Group Sessions (A). Professor L. Maystre was the chairman during the Group Sessions (B) and during the Plenary Session on 27 February.

Secretary General of the Swedish National Commission for UNESCO, Mr A. Falk, addressed the meeting on 25 February.

According to the plan (Programme: Appendix 4) Plenary Sessions and Group Sessions were held. The participants were divided into two groups (A and B). Group A mainly dealt with common and political aspects of the Code at the start, while Group B

concentrated upon Practical Aspects and the Promotion of the Code. Minutes from the sessions were typed at the end of each day and distributed to the participants before next day.

The Working Group Meeting was held at Hermods, Publishing House for distance education. Office services were offered by the Hermods staff. The services also included lunches.

Dr. Bengt E. Svensson was acting as coordinator for the meeting. The task as coordinator, in collaboration with Dr. E. Soloviev, UNESCO, included planning for the meeting (preparations, programme etc) and fund raising for the financing of travelling expenses and most of the accomodation fees.

Financial support for the realization of the meeting was given by Ministry of The Environment (UNCED-secretariat), Sweden, The Swedish National Commission for UNESCO, The County Administration of Malmöhus and Lund University. Part of the costs for the meeting was covered by contribution from Engineering and Technology Division, UNESCO.

The participants of the meeting were invited to dinners by the City of Malmoe (25 February) and Lund University (26 February). A visit to Lund University and the Research Park IDEON took place on 26 February. The construction firm SKANSKA invited the participants to lunch one of the days.

This Working Group Meeting reached the goal: to present a proposal of a condensed International Code of Environmental Ethics for Engineers to be considered and accepted by Engineering and Technology Division, UNESCO.

What will be very important in connection with the Code is that appropriate actions should be taken for the promotion of this Code in order to make a change in attitudes among and acting by engineers for the improvement of living conditions on earth.

Visits and other meetings

Besides the working group meeting some visits for the working group were arranged, as well as some special meetings were organized for Mr. S. Dumitrescu and Mr. E. Soloviev during 25-27 February. The places visited by the working group were Lund University and The Research Park IDEON, Lund. The special meetings took place at Lund University, the County Administration and Hermods. These visits and meetings are described in Appendix 5.

Appendices

UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL ORGANIZATION

International Working Group Meeting
on International Code of Environmental Ethics for Engineers
Malmö (Sweden) February 25-27, 1991

Background Paper

Compiled by

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BACKGROUND PAPER†

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Malmö, Sweden, February 25-27, 1991

INTRODUCTION

by STEFAN ANDERBERG
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From an ecological viewpoint technological development is mostly viewed as a mixed blessing, sometimes described as "the paradox of technology" (Gray 1989). Technological change usually comes about as solutions to problems and needs felt by people and has certainly had many beneficial effects. But often the introduction of new technology, however benevolent it may seem, also brings risks for misuse and unintended negative effects. A classical example is the "green revolution". The introduction of modern technology has made self-subsistence and even exports possible in many Third World regions but the price is sometimes high. Pesticides and fertilizers cause widespread pollution of water and soil, threatening the bases of the food chain itself. Similar examples can be found in connection to all the fundamental changes in the use of natural resources that have occurred during the past century. The sum of these unintended negative side-effects threaten to irreversibly damage the biosphere. On the other hand technology also brings our best hope for repairing environmental damage and to find sustainable paths into the future. But an ecologically sustainable development demands definitely radical changes in the technological system towards much more environmental consciousness and flexibility.

Societal development has throughout the history from time to time produced collisions with the natural environment. But in most cases environmental degradation in the past was limited in both time, space and complexity (a single or few apparent causes and distinct effects). Rather dramatic landscape changes in larger scales have sometimes occured, but these have been rather slow and gradual. The development of the agricultural landscape in Western Europe and the depletion of the Mediterranean forests were extended over centuries or even millenia. With the industrial revolution and the connected accelerated technological change that have swept over the world, the environmental effects of the human activ-

ities have drastically increased. The changes in the landscape like cutting of forests, expansion of agricultural areas and urban growth, have accelerated and are now greater and more widespread than ever. The most revolutionary change is however connected to the changes of biogeochemical environment brought about by the increased use of chemicals and the burning of fossil fuels. The outflows from society of various substances cause problems like acidification, eutrophication and increased concentrations of poisonous substances in soil and waters. Ultimately they also threaten to disturb global ecological system by influencing the climatic cycles and destroying the protective layer of ozone in the stratosphere. To come into terms with these treats are among the most important challenges for the global society.

In recent years, essentially since the beginning of the eighties, evidence of these risks have become much stronger and convincing and the global environmental issues have, e.g with the Brundtland Report in 1987 (WCED), had a definite breakthrough on the international political agenda. Traditionally, the debate and views on the environmental future of the world have been rather polarized. On one extreme there have been technological pessimists like Barry Commoner (1971, 76) that have emphasized the maligne aspects of the modern civilization and technology and stressed the limits of resources, the fragility of nature, the abuses and hazards in the large-scale capitalistic industrial society and painted images of a very dark future. The message has most often been that it is necessary to stop economic growth and to find alternative development paths, based on e.g. small-scale technologies, local self-reliance and low energy consumption. On the other extreme there have been technological optimists like Herman Kahn (e.g. Kahn et al 1976) convinced that human ingenuity and technology can solve all upcoming problems and that there are no serious treats to this "Resourceful Earth". During the eighties "ecologically sustainable development" have become a major imperative in international environmental politics. As used in Our Common Future, it can be viewed as a kind of synthesis between the pessimistic and optimistic standpoints. On the one hand one recognizes the severity of the global environmental threats, but on the other hand one is rather optimistic about the prospects of finding ways to handle them. Economic growth and technological progress are here predominantly viewed as means to solve the problems and one is convinced that the development can be channeled into paths that are sustainable and thus not threatens the possibilities for decent conditions of living for future generations.

The relative optimism expressed in the Brundtland Report seems partly based on the results of the environmental management in the richest countries of the world, where one through the introduction of environmental legislation, development of waste technology, introduction of wastewater treatment and air pollution control, energy conservation and decreased burning of coal in many local areas is able to show a radical improvement. The air is today much cleaner than in sixties in heavily industrialized areas like Ruhr or Midlands and River Thames has not been as clean since the beginning of the 19th century.

But the value of such successes should not be exaggerated. In most regions of the world environmental degradation is accelerating as a result of increasing population, industrialization and consumption. Despite decreasing air and water emissions in some industrialized regions, the problems still persist. The total emmissions are still far too high and the degra-

dation of soil and water continues, even if the problems in some areas have become less acute, they have not been solved on a long-term basis. Important parts of the improvement have been achieved by moving and dispersing the waste flows. Higher chimneys have led to increased long-distance transport of pollutants and pollution control has radically increased the quantities of solid wastes. The dramatic increased waste volumes is today one of the major problems in most industrialized societies. The enormous circulation of chemicals and environmental hazards in connection to production, transportation and waste treatment are still not under sufficient control which the accidents during the 80s like Tchernobyl, Sandoz, the Alaska Oil Spill and Bhopal clearly have indicated. Studies on material flows in industrial societies (Ayres 1988, Anderberg et al 1989) show that consumption emissions (emissions in connection with and after use) have for many elements replaced the industrial emissions as the major environmental source. These are not so concentrated as the pointsource emissions, but for many of the large-scale, long-term changes and threats it does not matter if the emissions are concentrated or not. To decrease the pace of the biogeochemical change of the global environment it is no longer sufficient to control concentrated point-sources. It is necessary to aim at changing and reducing the flows of materials, instead of only improving waste treatment (e.g. Odum 1989).

The engineers play certainly a key role in the modern societys interactions with the environment. They are responsible for designing technologies, products and processes that all can have serious impacts on the environment. They also have leading positions in controlling processes in industry, energy production and waste treatment. This is an enormous responsibility. Engineers are not only responsible for how the production system works, they are also the only ones that possess sufficient insights for early warnings and to reform processes and products in a more sustainable direction. This also means that attitudes and actions of this group is greater importance for the environmental development than those of any other group.

No sector of society is autonomous and our technological system have developed with society in general. Most technological decisions are influenced by economic considerations, some of political decisions like legislation, economic planning and allocation of resources and also other factors like religion, ideology and tradition can be of great importance. But of course there is often strong influence of technological expertise in many decisions. Engineers seem to have viewed environmental problems basically as side-effects and the dominating way to solve them has been through end-of-pipe strategies e.g. improved wastewater treatment, air emission control and waste management. (Often described as "technical fix" by e.g. Lynn 1989) Environmental concern has generally entered the arena late and when all important process decisions have been made. An obvious example is e.g. the introduction of nuclear power where many stations were started before the waste questions had been settled. Even if impressive progress has been made in waste technology and energy conservation much of this progress is still unrealized. The energy use is often very inefficient in e.g. electrical products (e.g. Ayres 1989). The main criticism towards the industrial system is that it has been very slow to correct itself and in finding new solutions. Most often a long process of societal discovery-debate-actions has been needed before industry has reacted or become forced to act. Changes are most often only smaller adaptations, a compound is replaced by something

less dangerous, but very little effort has sofar been put into making the processes and products as friendly to nature and as risk-free as possible. This can of course be blamed on the often short-sighted economic rationality that is dominating industry, but technicians must also have a responsibility for this failure. One can also suspect that many engineers are not totally aware of the environmental aspects of their work (Friedlander 1989).

There is often an exaggerated belief in the prospects for political action to control the environmental pressure. The evidence of several decades of environmental politics shows that political decisions and economic policies are important tools to modify technology and consumption and decrease their negative effects, but they are often slow and inefficient and seldom sufficient to induce any deeper structural change. In addition different sectors in society must actively seek for more appropriate solutions. "A production system that respects the obligation to preserve the ecological base" and "a technological system that can search continuously for new solutions" that are two of main requirements for a sustainable development put up by the Brundtland Report cannot be possible without that this development is regarded as a major challenge by the engineering community.

WORK WITHIN UNESCO[1]

by E. SOLOVIEV
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Paris, France

Social aspects of the education and training of engineers and technicians, particularly those relating to environmental quality, have been continuously emphasized by Unesco. The essence of the engineering profession is to create, modify and develop the environment of Man. This has always required contact with disciplines other than those of mathematics and natural sciences. Engineering, as an activity and profession, is a system. It operates or lives in an environment with many aspects - physical, biological, commercial, economic, political, legal and psychological, and in this sense all engineering is ultimately about environment.

Changes which have occured in the biosphere over recent decades, as a result of accelerating human activity, are comparable in scale with natural changes occuring over periods of millions of years.

The volume of operations and the nature of some new technologies create risks on a scale previously unimagined. In the years ahead, environmental problems will be of greater magnitude and complexity and, consequently, will pose a greater potential risk. In this connection, engineering leaders in every field have begun to recognize their social responsibilities.

If development errors of the past and the present are to be avoided, it is essential that the number of environmentally sensitive and informed engineers be rapidly and significantly increased. In this effort, the quality of instruction and priorities of schools of engineering backed by financial assistance by governments will be critical to this success.

SC/TER Division's Environmental Engineering Programme, and a number of joint projects initiated with other U.N. organizations, stem from the consideration of the major role played by engineers in the shaping of our environment and the insufficient attention which has been given to their awareness of environmental problems in the past.

Most of the world's practising engineers have been educated at a time when the interactions between engineering works and the environ-

[1]Compiled from two papers by E. Soloviev

ment were taken less into consideration by society than is the case now. For the next 20 or 30 years or so, these men will be dominating engineering activity. Many will be working in environmental engineering management, with or without any formal training for such role, and many more will be in areas where their work will have direct impact on the environment. In this respect, it is essential to retain the full basic training in specific skills fundamental to engineering, but at the same time it is necessary to introduce an informed awareness of social, economic and cultural values.

At present, the major challange for an engineer is to balance his technical efficiency with socio-echological efficiency and responsibility for the consequences of his work. This takes into account the fact that the fundamental task of the engineer remain, but their relative weight may be changed and new responsibilities added.

Educational effort aimed at improving environmental understanding among engineers must be directed usefully towards education in the following three phases, set out in order of priority:

- in-career education and training of practising engineers of specific professios should be promoted, based upon short-term courses and examination of case studies involving the use of multidisciplinary principles;
- under-graduate education of all engineers shall include ecological and environmental principles and studies aimed at a general understandig of environmental problems;
- engineering intended to specialize in environmental impact should pursue suitably arranged post-graduate higher degree courses.

Modern teaching tools and techniques allow for a greater range of alternatives to be studied than in the past. SC/TER Division, on the basis of its activities and experience, is promoting these advances and, in particular, it will concentrate on the promotion of the following learning packages at post-graduate level:

- Case studies allied to the real local situation and presented in such a way as to oblige the student almost continuously to ask himself questions and find out the answer himself and, consequently, to learn things with high speed and strong determination, which otherwise might not be observed.
- Other effective educational techniques are games, simulations and role-playing. To some extent they overlap and they may all be represented by the word "simulation".
- Recently, the technique of modelling has developed rapidly and mathematical modelling is frequently used to simulate environmental parameters on a large scale and can assist decision-taking in complex situations.

During the 1990-91 biennium, SC/TER Division will concentrate its activities in the following two areas. a/ The development of new teaching/learning materials for Environmental Engineering Education and Training which is a high priority area, especially at post-graduate level. The preparation of such modern aids should become the responsibility of well-equipped and experienced national centres, rather than expecting each institution to develop them locally. b/ Promotion of the Code of Environmental Ethics for Engineers. Another priority area of SC/TER Division is the official establishment, approval and wide dessimination

among member States of the Code of Environmental Ethics for Engineers (A draft of the code is attached).

Environmental ethics is a young field and new ideas and concepts are constantly being advanced in this area. In order to develop an environmental ethic, we must change our perception of, and behaviour towards, the rest of the nature. The prevailingh view of ourselvs as the conquerors of the land should be changed to that of our being its citizens, a notion which implies the preservation of the integrity, stability and beauty of Nature.

The strengthening of the environmental awareness of all engineers implies an entirely new dimension in the engineering profession and, correspondingly, a fundamental change in the philosophy of engineering education.

Engineers are generally quite cognizant of secondary impact of their decisions and they take this into account when formulating solutions to problems. Prevailing engineering practice is where the law is followed and the client's interests are protected without being complicated by ethical considerations. Here, ethical issues can be ignored as long as the law is not broken. Due to the fact that engineers are often unable to assimilate the effects of their projects on nature in general, many governments have introduced specific laws or statements aimed at forcing engineers, planners and managers to at least consider the effects of their plans on the visual environment, as also on long-term conservation and the use of resources.

A truly professional engineer will infuse ethics into his/her decision making, and with the increasing pressure on the natural environment, a growing population, and accelerated technological development, environmental ethics will play an ever greater role in the engineer's role in society. In this respect, the integration of environmental concerns, should be accompanied by official adoption by engineers of the Code of Environmental Ethics. The code, consisting of a general agreement between the engineer and society, would help to raise the level of society awareness of the engineer, which is necessary for him/her to be able to serve the community usefully.

To ensure high-quality preparation and approval of the code, as well as its wide dissemination among member states, consolidated effort and a well established promotion policy on the part of governmental and non-governmental organizations, as well as engineering associations and world renowned professionals, will be required. In this respect, a very important role should be played by Unesco Interdisciplinary Working Group on Environmental Engineering Education, with the participation of leading environmental experts and representativies of the major organizations concerned. When the Working Group prepares the final version of the code, it should receive official approval by Unesco and be submitted for inclusion in the agenda of the U.N. Conference on Environment and Development (Brazil, 1992).

REVIEWERS VIEWPOINTS ON THE DRAFT CODE[1]

The draft code of environmental ethics for engineers has been subjected to review by experts and administrators from a variety of countries. A total of eight responses were obtained from the request of reviewing the code.

Most of the comments were positive to the concept of a code of environmental ethics. Some of the reviewers comments and suggested alterations were only of cosmetic nature.

[1] as interpreted by H. T. Karlsson

Two revievers pointed out the necessity of comprising the application of the code to managers, poleticians, admnistrators, etc. That is, all categories of people for which decisions and activities may have an impact on the environment. One of these reviewers suggested the code to be extended considerably and thus also include operative tools and ethic standards of a more general nature.

One reviewer pointed out the need for inclusion of a const-benefit consideration; a proper balance between unreasonably high costs and minor impact on the environment. He also suggested the assessment of the performance of operating processes (eds. note: the shutting-down stage of processes should then also be considered).

Finally, two of the reviewers submitted completely revised codes of environmental ethics for engineers to Unesco.

VIEWPOINTS OF AN ENGINEER

by HANS T. KARLSSON
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Man-made pollution stems from activities an decisions by all categories of people, such as politicians, consumers, company owners, managers, and engineers. The latter category of people may play a twin-role in this respect. The lack of knowledge or ethics may lead to the use of technology having undesirable impact on the man and environment. On the other hand, technology for pollution prevention (PP) is developed, designed and implemented by engineers. The need to reinforce a code of environmental ethics for engineers has thus been alleged to enhance the use of environmentally compatible technology.

Knowledge and awareness of possible environmental problems and impacts of technological activities might be a problem among engineers. However, it is far from the major problem. Knowledge comprises tecchnology for pollution prevention such as emissions control and mitigation strategies; methods for identification of environmental impact and critical load of pollutants; general methods for assessment and audit of environmental problems. The future challange includes the further development of methods of this latter category. On the other hand, tehniques and methods of the two other types are the basic and underlying tools for enginnering it self as an art and science. The major driving forces for the development of new technology on a worldwide basis has clearly been legislation and fundings from a variety of governmental agencies.

When approaching the problem of environmental ethics, it is of utmost importance to identify the source of the problem. One source is the "producing company" as a unit. A clear change in companies attitudes towards the environment has been seen over the past decade. The single most important factor or driving force for this change in attitudes has clearly been news media.

The major ethic dilemma for an engineer emerges due to the mechanism by which a company's organisation is functioning. An engineer can only prctice his profession within a company if he is "loyal" to the company. All other situations are unacceptable for the engineer as a human being. For instance, loyalty means that the engineer does not disclose information to competitors. The engineer often faces types of problem to which there are only bad solutions. Conflicting interests may then emerge if there is a gap between the managerial and the engineer's level concerning the policy of the company. It is quite questionable

if the engineer now and the has to ask himself the question: should I betray the company or the environment? In practice this situation emerges mainly due to the lack of information on the managerial level.

Hence, to enable good environmental ethics to be practiced a bridge has to be built between the engineer's level and the managerial level. A code of environmental ethics has to be stated in the company's policy. This problem has been resolved in many companies.

A code of environmental ethics for engineers may be developed in a number of different ways. Three philosohies have been identified for this purpose. First, the *content* of the code can be formulated such that it is congruent with the *objective* of the code. Second, a code can be a list of detailed instructions for the engineer. Third, a code can be derived on the basis of a systematic methodology.

A code of ethics has to fulfil two general requirements. The code must be adoptable and implementable on one hand, and the code must enable the objectives to be met on the other hand. A systematic methodology to meet these requirements may include the following aspects:

- A code of ethics has to meet a set of general requirements
- A code of ethics has to be integrated with necessary utilities
- A code of ethics has to comply with the mechanism of impact

The most important general requirement is the fact that the code has to comply with legislation, standards, culture, moral and ethics in general. Hence, if the code is intended as an international one, the code has to be phrased very general and not containing detailed instructions. A dissadvantage of a detailed code is that it automatically excludes what is not included.

The code should be the framework of an integrated strategy for an engineer. Necessary utilities include operative tools such as technologies for audit and assessment of environmental problems.

A code of of ethics should be applied during assessment and audit of environmental problems as well as during decision making. It is therefore of utmost importance to build a bridge between the concerned engineer and the manager, owner and policy maker. A code of ethics can thus only be efficient via a mechanism according to which the code has been adopted by the concerend employer of the engineer. This adoption should be clearly stated in the policy of the organisation/company. Furthermore, the company should further develope the code to comply with the specific problems and features related to the company.

The engineer follows certain criteria for decision making. The every-day ethic dilemma facing an engineer is the requirement of selecting one alternative out of several bad options. Furthermore, the dicisions have an impact on other people and may also have an impact on the environment. Each option has conflicting interests. This stems from the fact that the manager, the owner, the authorities, the environment, the employees and the engineer all represent different interests.

It is therefore strongly advocated that a code of environmental ethics should be adressed to all levels wihin cooporates, companies and organizations including the managerial and policy levels as well as owners an shareholders. This imediately raises the question: for whome should efforts on environmental education be intended?

Based on the previous arguments a code has been drafted as shown on the next page.

CODE OF ENVIRONMENTAL ETHICS FOR ENGINEERS AND POLICY MAKERS

To you as an engineer:

Throughout your career you will undertake assignments involving processes, products and chemicals. Use your best knowledge when undertaking the environmental assessment for each assignment. The assessment should state:

a: the environmental impacts of the activity in question
b: if it can be deduced if no impacts will occur
c: if data or knowledege were not sufficient for the assessment
d: when the next assessment should be undertaken

To you as a policy maker:

Establish a code of environmental ethics within the frame of the policy of your company. Make sure no gap is prevailing between the management and the engineers in this respect.

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CODE OF ENVIRONMENTAL ETHICS FOR ENGINEERS

TO YOU AS AN ENGINEER

Always remember that war, greed, misery and ignorance, plus natural disasters and human-induced pollution and destruction of resources are the main causes of the progressive impairment of the environment and that you, as an active member of the engineering profession, deeply involved in the promotion of development, must use your talent, knowledge and imagination to assist society in removing those evils and improving the quality of life for all people including our descendants, to whom we wish to leave cultures which have learned to live in unity with nature instead of being bent on its unwitting destruction.

When you develop any professional activity:

1. Try, to the best of your ability, courage, enthusiasm and dedication to obtain superior technical achievement, which will contribute to and promote healthy and agreeable surroundings for all people, in open spaces as well as indoors.

2. Strive to accomplish the beneficial objectives of your work with the lowest possible consumption of raw materials and energy and the lowest production of wastes and any kind of pollution.

3. Study thoroughly the environment that will be affected, assess all the impacts that might arise in the state, dynamics and aesthetics of the ecosystems involved, urbanized or natural, as well as in the pertinent socio-economic systems and select the best alternative for environmentally sound sustainable development.

4. Examine in particular the consequences of your proposals and actions, direct or indirect, immediate or long-term upon the health of people, social equity and the local system of values.

5. Promote a clear understanding of the actions required to restore and, if possible, to improve the environment that may be disturbed and include them in your proposals.

6. Reject any kind of commitment that involves unfair damage to human surroundings and nature and aim for the best possible social and political solution.

7. Be aware that the principles of ecosystemic interdependence, diversity maintenance, resource recovery and interrelational harmony form the bases of our continued existence and that each of those bases poses a threshold of sustainability that should not be exceeded.

UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION
(UNESCO)

WORLD FEDERATION OF ENGINEERING ORGANIZATIONS
(WFEO)

Appendix 2

DRAFT: 27 February 1991

The International Code of Environmental Ethics for Engineers

This preliminary version of code was made up by the Working Group Meeting in Malmö, 25-27 February 1991.

Preamble

We have inherited an earth rich in resources. Humanity was able to benefit from these resources, and to build up gradually societies whose development liberated their members from the uncertainties related to natural processes. The engineering profession has contributed to make it possible to raise the health and wellfare of the population to their present levels in industrialized and developing countries. However, population growth and the human ability to alter the environment have reached a stage where natural resources are being depleted or polluted, biological diversity endangered, ecosystems destroyed, and envision mental damage affects human life and well-being.

Therefore, a new type of development has to be achieved - sustainable development - that can continue to provide social, economic, and cultural benefits to present and future generations. This implies a change in attitudes and behaviour of the main actors in development, including the general public. This code consisting of a general agreement between the engineer and society, recognizes that these are issues of basic values, inseparable from each individual's personal and professional life.

As part of the professional functions of the engineer, we understand that these goals could be achieved only by respecting the principles of ecosystem functioning and maintenance of biological diversity.

This is the great challenge for us, the engineers, and will require all our knowledge, talent, and imagination.

The Code

It is the ethical responsibility of each engineer to take into account the impact of his work on the social and cultural environment and on the vulnerability of ecosystems and the natural resources, in line with concepts of sustainable development.

The responsibility of the engineer to the improvement of living conditions of the community should be considered along with his responsibility to himself, his profession or his employers and clients.

This responsibility entails the following obligations:

1 Remain up to date about the wider environmental and social consequences on their work, both on present as well as future generations.

2 Communicate to professional colleagues, employers and clients the need to consider social and environmental impacts and consult other professions about eventual negative impacts.

3 Strive to accomplish the beneficial objectives of their work with the lowest possible consumption of raw materials and energy and the lowest productions of wastes and any kind of pollutions and avoid taking part in projects causing significant irreversible damage to the environment.

4 Contribute to the further environmental education within their profession, and inform the public about he impact of engineering projects.

5 Pay regard to the cultural context of engineering projects and their effects on the quality of life.

Promotion of a code

Two (2) types of audience

(I) Peak Organizations - engineering, employers, academic (Top Down Process)

(II) Grass-roots (individual) (Bottom-up Proecess)

Adoption at both levels is essential to success

Different promotion stategies for each.

Marketing strategy

General approach is to contact a number of key organizations and individuals who carry out themselves further action (snow-ball effect)

Marketing elements

- Publicity campaigns
- Special publications
- Seminars and meetings (new and existing)
- Educational curricula (univ.; continuing)
- Data gathering
- Consultation programme

Immidiate possibilities

UNESCO to coordinate

* UNESCO to finalize MODEL CODE
* Publicity in newsletters of UNESCO/UNEP/WFEO etc
* WFEO to survey members for environment. Committees and statements

  Also put on meeting agenda
* UNESCO to contact FIDIC to ask for environmental profits of members
* M. Pécoux to contact UNIDO
* UNEP to contact ICC
* UNESCO to contact ICO, CEFI, CRE, ICSU

* Needs a fulltime/special project officer

1991-02-22

International Working Group Meeting
on the International Code of Environmental Ethics for Engineers
Malmö, Sweden, 25-27 February 1991

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Specially Invited Persons

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(25 February, a.m.)
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UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL ORGANIZATION

International Working Group Meeting
on International Code of Environmental Ethics for Engineers

Malmö (Sweden), 25-27 February 1991

P R O G R A M M E

February

Sunday	24	Afternoon/evening: Arrivals	
Monday	25	09.00-12.00	Start of the Working Group Meeting at Hermods; Participants are asked go arrive to Hermods 08.30-08.45
		12.00-14.00	Hermods invites to lunch
		14.00-16.30	Working Group Meeting (Hermods)
		17.00-17.45	Visit to the World Maritime University (WMU), Malmö
		19.15	Malmö Town invites to dinner
Tuesday	26	09.00-11.30	Working Group Meeting (Hermods)
		11.45-12.45	SKANSKA invites to lunch
		13.30	Departure for Lund
		14.00-17.00	Visit to Lund: Lund University and the Research Park IDEON; short sightseeing in Lund
		17.30	Lund University invites to dinner
		20.00	Departure for Malmö
Wednesday	27	08.30-11.30	Working Group Meeting (Hermods)
		11.30	Closure of Working Group Meeting
		12.00	Lunch - Departures

Draft: 18 February 1991
Bengt E. Svensson

UNITED NATIONS EDUCATIONAL,
SCIENTIFIC AND CULTURAL ORGANIZATION

International Working Group Meeting
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P R O V I S I O N A L A G E N D A

1. Opening of the meeting - Presentation of participants (Plenary Session)

2. Procedures for the meeting

3. International Code of Environmental Ethics for Engineers (Plenary Session and Group Sessions)

   i) Presentation of background paper

   ii) Discussions

   iii) Proposal for the Code; Position paper

4. Prospective actions (Group Sessions)

5. Conclusions and recommendations of the Working Group Meeting

6. Closure

*

Participants will be devided into two groups (A and B). Group A will deal with common and political aspects of the ethic code, and Group B will deal with practical aspects and prospective outcome of the code.

Appendix 5

Visits and special meetings 25-27 February 1991

Besides the Working Group Meeting some visits were arranged for the working group, and some special meetings were arranged for Mr. S. Dumitrescu and Mr. E. Soloviev during 25-27 February. Thus, the following visits and meetings were achieved.

Visits

25 February * Dinner at the Town Hall

The City of Malmö invited the participants to a dinner in the Town Hall. Informal discussions were held between Mr. E. Soloviev, Mr. S. Dumitrescu and one of the top level politicians in Malmö, Mrs Anna Brandoné, on prospective collaboration between UNESCO and the City of Malmö. The group was addressed by the Chairman of the City Council, Mr. A. Pettersson.

26 February * The working group visiting Lund University and the Research Park IDEON

Mr. B. Nilsson informed about Lund University, the largest one in Scandinavia.

Mr. Sven-Thore Holm, director of IDEON, informed about the various activities at this regional industrial development project. The aim of the project is to generate new job opportunities. In 1982 The Lund University, together with The Administrative Board for the County of Malmö, initiated the formation of a foundation whose task was to create new industrial enterprise with the university as its central point.

An information article on the IDEON organization will be sent to Mr. E. Soloviev for its eventual publication through Unesco channels.

Special meetings

Special meetings for informal discussions were arranged for Mr. S. Dumitrescu, Mr. E. Soloviev and Mr. B.E. Svensson as follows.

26 February * Meeting at Lund University

Meeting with the Vice Chancellor of Lund University, Professor Håkan Westling, and Mr. Bengt Nilsson, Vice Chancellor's office. Mr. L.M. Nilsson, The County Administration for Malmö, and Mr. Bengt E. Svensson attended the meeting.

Prospective collaboration between UNESCO and Lund University in the field of environmental education for engineers and a electronic data base network (UNEP, PARIS) for environmental issues was discussed. Mr. Soloviev also informed about the project Environmental Engineering Education and Management Project. Further information about the project should be sent to Mr. B. Nilsson. It was suggested that Mr. B.E Svensson should inform Secretary General Mr. A. Falk, The Swedish National Commission for UNESCO, about the further development of collaboration between Lund University and UNESCO.

The interest of such a collaboration was expressed by the Vice Chancellor.

A meeting will be arranged with Mr. E. Soloviev when Professor H. Westling is visiting Paris later this spring.

26 February * Meeting at the County Administration for Malmö

The meeting was arranged by Mr. L.M. Nilsson. Presentations were made concerning the following:
- The County for Malmö (L.M. Nilsson)
- South Development (B. Modig, Eva-Britt Grönberg; Appendix 5.1)
- Silvi Nova (Å. Jacobsson) and Terra Nova (H. Berch)

Information material about South Development and Silvi Nova was distributed during the meeting.

Mr. E. Soloviev will send the project document about "Women in Technical Education Programme" to Mrs Eva-Britt Grönberg.

Unfortunlately, the limited time for the meeting did not give the opportunity to discuss further collaboration between UNESCO and the County Administration concerning strategies for longterm programmes and implementation of a longterm

cooperation. (See also Preliminary Agenda for the meeting; Appendix 5.2)

(Comment: Further collaboration between the County Administration and Engineering and Technology Division ought to be discussed.Key question: Which will the intentions of UNESCO be and what might UNESCO be able to offer in this respect?)

* Meeting at Hermods

A short meeting was arranged with Mrs Viveca Serder, director of Hermods, and one of her colleagues, Mrs Birgit Hortlund.

It was discussed further collaboration between Hermods and Engineering and Technology Division, UNESCO, concerning the production of learning materials and learning packages within the field of environmental engineering education and management.

Reference was made to earlier discussions with Mr. Moore, UNESCO Publications, when Mr. B.E. Svensson visited Paris 14-16 February 1991.

Some prospective products were mentioned:
- One or two modules within the learning package concerning Energy Engineering
- "Handbook" on the International Code of Environmental Ethics for Engineers
- English version of "A Clean Future" (Swedish title: En ren framtid). Two books, at present only available in Swedish. A Clean Future is a distance learning course on university level.

It was decided that Hermods will present some more concreat ideas and facts about the products mentioned above.

SWEDEN-ZAMBIA COOPERATION PROGRAMME-
a programme to develop Zambian, privately owned companies of small and medium size, with technology transfer from their Swedish counterparts. This project of sister-industry-cooperation is unique and for the two-year pilotphase SIDA, who is financing the project, has made an input of 10 MSEK.

The project was initiated by representatives of the industry sector and public industrial support organizations in the region of Skåne, southern Sweden. When it was time for implementation a specific organization was needed; South Development was created by the Local Chamber of Commerce, the Regional Development Fund (Utvecklingsfonden i Malmöhus län) and the Swedish Savings Bank Association. The aim of South Development is to stimulate the cooperation between Swedish and Third World enterprising, and hereby enhance the economic and industrial development in the Third World.

The programme has its strength in being a concept for entrepreneurs, formulated by entrepreneurs. It is handled the entrepreneurial way with a clear orientation towards results and a limited bureaucracy.

When we chose our participants on the Zambian side the criteria were:
- the enterprises should be Zambian owned, already operating, labour intensive, and/or utilize local raw material, and/or have important linkage effects and/or have an export potential. The project should be commercially viable and be possible to implement stepwise with limited resources. Above all was the importance of the managers showing a strong entrepreneurial spirit. Nine Zambian companies were finally chosen. They represent five different branches; metal- and woodworking, leather, pottery, and printing. Even sizewise they make a heterogeneous group, the largest with 121 employees while the smallest only engage 8 people.

The main components of the programme:

1) credits for import of machines, spareparts and assessories
2) on-the-job training both in Zambia and Sweden
3) consultancy visits, transfer of know-how
4) management training

The training and the consultancy are grants, while the Zambian companies pay for the machinery in local currency. This money is then channelled into two funds; the Special Fund, which will be used for financing of other small scale industry projects and the Training Fund, which will be used for training activities in Zambia.

SOUTH DEVELOPMENT ek för

Address	Office	Telephone	Telefax	Telex	Org.nr.	Bankgiro
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Sweden						462 78 13-1

1) The machines are selected by the Zambian managers in cooperation with the Swedish managers. Since the Swedish enterprises work within the same branch as their Zambian sisters, or counterparts, they are well acquainted with the equipment their sisters need. The Swedes also have a good overview of the market for both reconditioned and new machinery. Their wholehearted contributions have made it possible for the Zambians to get a lot of good equipment to a reasonable price.

2a) The training in Zambia takes place on the premises of the enterprises and is very practically oriented. Instruction on how to utilize the new machines and instruction of new methods of production, professional skills are revitalised and the importance of maintenance and security measures are pointed out. The instructors come from the Swedish sister companies.

2b) The training in Sweden means that some of the Zambian foremen go to Sweden for training with the Swedish companies. The purpose is to give them a different perspective on industrial manufacturing and an insight into our way of organizing the work.

3) Consultants visits, are made regularly by different people from the Swedish sisters (1-3 weeks / occasion). Those weeks are mainly for planning the layouts of the factories, discussing the work organization, advising on the final products, production planning etc.

4) The management development is continuous and can be shaped differently. The most important part is the establishing of contact and cooperation between the Swedes and the Zambians. That gives the Zambian managers a possibility to ventilate his/her ideas and problems with an experienced colleague who does not feel competition but ambition to develop and ameliorate. The Zambian entrepreneurs have all visited their Swedish counterparts and even other companies within their branches.

Moreover the programme gives seminars on management, like "investing in people", "financial management" etc. We have also introduced computers and a new accounting system.

The Zambian companies have on our initiative formed an association, which is something completely new in the Zambian business world. Before they did not know eachother at all but already their new relationships admit them to get support and help when needed. Together they function as a pressure group in terms of dealing with the authorities. They buy from each other and they repair each others equipment.

The first phase of the programme lasts until June 1991. The planning of phase two is without recess. With this phase we intend to further develop our nine sister companies and to expand with another twelve sister pairs. Furthermore we want to help starting up completely new industries. For these "New Generation Companies" our firstly involved Zambian companies will function as "godfathers". Another feature of our second phase will be to try a model ("starters") for creating new micro enterprises in the compounds.