

ENVIRONMENTAL CRITERIA IN THE FINAL WORK (PROJECT) OF TECHNICAL CAREERS

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Abstract - It is clear that the technology development has an important role in the environment conservation. For this reason the academic institutions have to include in their studies planning all aspects that the future technician have to keep in mind. We present in this work the experience of the Technical University of Catalonia (UPC) in the sense to provide specially the Final work (Project) with contents referred to environment. It is necessary to complete the technical aspect with the environment respect and to propose the technical measures to preserve it.

Index Terms---Environmental criteria, Final work (Project),

INTRODUCTION

It is known the repercussion that all technical activity has on the environment in which will develop. The importance of this factor, more and more momentous, imposes that this effect is foreseen in the project. This characteristic can modify or to annul the realization of a project.

The institutions in charge of the technical teaching (engineers, architects, etc), have the responsibility of future professionals' formation, in the sense of environmental prevention, in all their learning levels.

For this reason it has settled down, recently and in a general way, a "protection plan of the environment" in all the academic institutions, for which all technological educational activity must contemplate the aspects of respect to the environment.

We present in this work the experience of the Industrial Engineering School of Barcelona (E.T.S.E.I.B.) of the Technical University of Catalonia (U.P.C.) that consists on the introduction of approaches of preventive application in environmental thematic in Final Work (project) of each technical career.

It is not the explanation of subjects of this thematic one, neither the creation of concrete specializations, neither the formation of environment experts. It is to give validity to the approaches of correct environmental requirements to all the manifestations of technical realization.¹

In the processes of technical formation the culminating point is the realization of the Final Work (Project) of the career. Indeed it is the academic act in which the student must applied way, the different knowledge acquired in the whole career. It is for

this reason that is necessary to elaborate some specific guidelines to elaborate his work (for any thematic one) contemplating the approaches of preservation of the environment.- It is considered, like performance base, the legal normative ones that can impact in the Final Work (Project) of career and their possible future realization, be European, national, of autonomous community or local, in the established hierarchy.

The Final Work (Project) is analyzed in all its content (presentation, reference surroundings, description, environmental impacts and its repercussion, costs and corrective measures, etc.).

TYPES OF PROJECTS

The projects are classified according to their pattern. In this sense, and because of their thematic diversity, are grouped in,

- Projects of territorial occupation
The main objectives of this kind of projects are, Generation and energy transformation, Energy distribution, Structures and industrial constructions, Structures of residual deposition, Process plants design, Mechanical factories, Sport installations, Conductions for transport nets, Sanitari nets, Laboratories,...
- Projects of services.
Contains essentially, Conditioned air, Transports, Illumination, Logistic and maintenance,...
- Design projects, with, Equipment design, Machinery design, Products design Vehicles design,...
- Projects of computer application, embrace each activity of other projects and some ones particular (waste material, contamination,...)

PHASES OF A PROJECT

For each one of these types they are defined the different realization phases, according to,

- Preliminary design phase
The main activity of this phase is to try to determine the localization and the adequate technology to use
- Writing phase. The study of necessities (fluids, energy, etc) are the principal aspect to know in order to prevent a disordered exploitation.

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- Construction phase

The most critical aspects are shown now and the listing of preventing and correcting measures must be elaborate in this phase.

- Phase of exploitation

The consumptions are analysed and the maintenance system is established. The corrective measures are incorporated

- Phase of it breaks up.

The main objective is to determine the effect of waste material in the environment, trying to minimize it

The environmental effects include all the phases of each project

MAIN ASPECTS

The aspects that are kept in mind are:

- Project type
- Dimension of the project
- Affected surface
- Main characteristic
- Possible environmental aspects
- Available information of the receiving media
- Legal limitations of the activity and media.

EXAMPLE

As an example the main points of a territorial occupation is related. Other type of projects are submitted to the same methodological procedure

Projects of territorial occupation.

(Preliminary phase)

- Activity, It is to try to vary aspects of the technology to get an activity more adapted to the predicted means, to get a rational consumption of disposable resources, to use alternative materials and minimize the production of residuals and their effects.
- Environment, the affection of protected areas, the climatic affection and the repercussion in available resources and social impact are the subjects to study.

(Project phase. Environment point of view)

- Soil (direct or indirect affected surface, accesses, changes of soil use, orography and lithology)
- Resources and structures (accesses, barriers generations, construction and structures, affection of agricultural resources, mining, cattlemen,..)
- Air (climatological characteristics of the location, diverse sources of emission, quality of the air,...)

- Water (hydraulic resources, needs and quality, superficial hydrology, hydrogeology, quantity and quality of residuals,...)
- Flora (existence of protected flora, alteration of the local flora, affection for emission of pollutants, ecological changes,...)
- Fauna (existence of protected fauna, alteration of the habitat, mortality for industrial presence, barrier effect,...)
- natural and singular spaces (protected and singular spaces, cultural patrimony,...)
- Landscape (quality of landscape and their modifications, integration of the project).
- Geology (geological characteristics of the location and their possible modifications, ...)
- Social aspects (demography changes, existence of urban centers and their affection, tourism, social aspects of the work,...)

(Construction phase. Technical point of view)

- Soil. (degradation and destruction of vegetal layer, acoustic and motion effects, contamination of soil by residuals, artificial orography, etc.)
- Resources and structures, (accesses for machinery equipments, barriers generation,...)
- Air (pollutant emissions, liquid contamination,...)
- Water (superficial hydrology, residuals liquid contamination,...)
- Flora (ecological changes, vegetation changes,...)
- Fauna (animal life alteration, increasing of fauna mortality, barrier effect,...)
- Geology (alteration of geological stabilization of environment)
- Social aspects (affection in villages by noise vibration, changes of demography,...)

(Exploitation phase. Technological point of view)

- Soil (contamination by residuals,...)
- Resources and structures (structures disponibility, necessity of installations for residuals management,...)
- Air (Climatological characteristics, quality of the air, permanent sources of emission, ..)
- Flora (indirect affection by pollutant emissions,...)
- Fauna (high level of mortality, affection by non autochthonous specimens,...)
- Natural and singular spaces (pollutants effects,...)
- Social aspects (demographic changes, affection of way of life, alterations in tourism and sport activities,...)

(Breaking up phase. All points of view)

- Soil (contamination, alteration of soil composition, necessity of management, re-qualifications,...)
- Resources and structures (accesses, possibility of recuperation,...)
- Air (quality of the air, alteration for industrial activity,...)
- Water (quantity and quality of pollutants, cleaning programs,...)
- Flora (regeneration of vegetal layer, reforestation, alteration by soil contamination,...)
- Landscape (alteration , rewcuperation ,...)
- Social aspects (demography changes, recuperation of zones,...)

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