

Environmental Problems and the Engineer Pollution Control - Part II

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In considering the subject of pollution abatement, the engineer is conventionally seen as faced with the disposal of solids, liquid and gaseous wastes as a result of man's activities. All three are important, but perhaps the greatest trials and tribulations have occurred in efforts to treat and dispose off liquid effluents. More harmful diseases are spread through the medium of water than through any other way. There is a long history of successes and failures which bears this out.

Engineers today are increasingly under pressure to think, not only in terms of handling pollutants which have been produced, but in terms of reducing or eliminating pollutants at source. If environmental management and planning were concepts integral to the thinking and training of engineers, a positive, rather than remedial attitude might prevail. This would encourage automatic consideration of waste reduction, sensitive siting, etc.

It is now well appreciated that sewage treatment has to be considered as an integral part of effluent disposal, by the biologist, chemist and engineer. They would then attempt to resolve the issues within the relevant public and private decision-making spheres. Such actions are in contrast either to those who pursue single-mindedly one set of societal objectives with no consideration of environmental values or those who pursue narrowly-defined conservation goals with no attempt to analyse the major changes that would occur in society as a consequence of radical changes in the status quo of human activities and societal development.

Thus, environmental management is a positive concept - not a negative 'halt progress' or 'back-to nature' concept. Some of the key aspects involved:

- identification of the 'needs' and 'want' of man in his individual and social development;
- identification of the resources that are needed for such development;
- identification of how meeting some needs and wants will inhibit or increase the ability to meet others are result of the destruction, degradation, or enhancement of resources;
- identification of the actors who have a stake in the conflicts that may arise between meeting needs and protecting resources;

- resolution of these conflicts.

There are two major elements involved in analysing environmental management processes: the role of values or purely subjective judgements in decision-making, and the role of scientific information or purely objective judgements. Because environmental management involves both people and the natural and physical environment, these two elements are present in every decision. The people supply the values and the 'laws of nature' create the need for a scientific objective understanding of cause-effect relation in the physical world.

Improvement of Environmental Quality

The working environment presents problems common to all engineering disciplines and is extremely important, because the worker is more directly exposed to hazards than are members of the public. However, a worker's exposure to risk at work may be accentuated by the conditions of his home environment, the problems of getting to work, and other social frustrations. The engineer has to know the effects of toxic substances on people, plants, animals and the environment generally, and be able to take the precautions to minimize them. Any rescuers from outside, e.g., firemen, must know in advance what to expect, whether they can use water, whether there are chemical risks to eyes, skin, etc. All this needs good preparation and organization by the engineers and their scientific colleagues. There is scope here for training in the 'role of the worker in environmental control' to give him a better understanding of the effects of his actions coupled with his responsibility to the community's environment. It is useless to introduce rules and regulations about health and safety, emission and effluent standards, operation of treatment plant, noise, environmental quality, etc. unless the worker understands and is convinced of their necessity, and implements them. The foundation is laid in the environmental education of the engineer, so that he can pass on to others some of the attitudes he has learnt about social and working environments.

Concern, especially over the last ten years, has carried the question of environmental quality far beyond the bounds of health and safety at work. The engineer has to be aware of the way in which the project touches the community, not just those working for it. This community depending on the nature of the project, may be scattered over a wide area (air-borne and water-borne chemical pollution), or through time (the risks associated with the disposal of nuclear waste). What the community considers to be acceptable is changing all the time and project which are not sensitive to this are paying the price in hard money terms.