



INDUSTRIAL ACCIDENTS IMPACT ON ENVIRONMENT

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Industries contribute a lot to the upliftment of poor, creation of employment, changes in socio-economic fronts, which contribute on the whole to the improvement of economic situation of a Country. However the industries use raw materials from the environment, let it be chemical, oil, leather, mining, steel industries etc. which requires exploitation of natural resources causing changes in the local environment. In the later stages when the resources combine in the process the waste materials are to be discharged in large quantities into the same environment or its vicinity. This will have an impact as the waste of natural minerals together with new compounds would reach the environment for further degradation. In short the natural materials get transformed to artificial complex compounds which are to be simplified by natural through bio-geo chemical cycles. The natural occurring microbes would rather find it difficult as many compounds are non-degradable or toxic to them or the incapability of producing suitable enzymes. This leads to the ecological imbalance and cause detrimental effect to the sustenance of environment.

In the past there were several accidents minor or major in the industries or accidents due to transportation of hazardous materials or accidents due to storage facilities. All the industries have to note that the accidents may be due to human factor or unsafe equipment or due to improper precautions taken. During the accidents there may be loss of life, loss of damage to the machinery which are taken care of, by the necessary insurances, but least important is given to the degradation caused to the surrounding environment.

Let us take an incident of air pollution or an acid spill over the land or a nuclear blast which at one stage or the other would be damaging to the surrounding environment either air or water or land. The gaseous discharges can damage the human health or cause corrosivity to the ancient structures and modern buildings or increase in the concentration locally leading to global warming i.e., causing physical, chemical and biological destruction.

Whenever an impact assessment is made one has to look into the attribute parameters and assess the damage to be caused by an *event* Accident be anywhere occurs unwarned and the damage is beyond our comprehension due to unpreparedness. For instance a fire in an industry may spread to various units if proper preventive steps are not taken due to the apathy of the industrial managers. The fire while burning may also release some of the toxic gases into the environment which enters the eco-system causing irreparable damage to the balanced eco-system. The following major impacts may be considered in an “event” of accidents.

(1) Impact on the health of Biota: - The people will be subjected to shock and may be traumatized due to an unwarned accident. The residents of an area of an accident will run helter-skelter if there is no organized direction of passage from the area of accident. This may lead to confusion and sometimes run towards the direction of the accident in haste. Thus they may lose their lives in the process. In some cases the people due to curiosity would go close to the area of accident. If the gaseous concentration is beyond threshold limit value (TLV) it enters the body system impairing the functions. The evacuation procedures should be meticulous on the implements to protect the people in the accident area from inhaling the obnoxious gases such as SO_2 , NH_3 etc. should be available with the industry or with the people themselves. Safety equipment such as gas masks or nose fitters will help instantaneously to protect the affected people in the accident prone area.

(2) Impact on Eco-System: - The fallout dust or the gaseous clouds or dispersed toxicants are several pollutants that may spread through the environment. It may migrate to the neighboring places or effect the local fauna or flora by interacting with the living systems. The caustic gases will cause necrosis, chlorosis or prohibit the plants from photosynthesis causing low productivity.

These gases may also lead to acid-rain formation which ultimately damages the environment including soil and water. This has been experienced by a developed country like Canada whose lakes, pools and puddles have received the acid rains formed due to heavy industrial activity of U.S A. which lies to the southern side of Canada. This trans-continental migration of pollutants has also proved by the spread of the nucleocide in the European Countries due to the Chernobyl accident. The value of the damage to the environment is difficult to assess as the consequences of the damage are felt at a later stage by the future generations.

(3) Impact on Terrestrial System: - As it is known that 1 gram of fertile soil contains trillion of bacteria to participate in bio-geo chemical cycles in degrading the organic matter to form simpler compounds or nutrients for the uptake of trees. In the soil environment, surface of the soil will be receiving different chemicals which are toxic in nature such as pesticides do remain in the environment reaching through the soil profiles. The mine tailings or fly ash ponds which deposit several heavy metals will be joining the aquifer spoiling the natural sources of ground water. The solid

wastes that are dumped onto the land whether it is municipal garbage or hospital waste lead to severe degradation of soil profile and the incomplete oxidized soluble organic acids will enter the aquatic systems through surface run-offs or by reaching the water table through percolation. Thus the fresh water resources get contaminated if proper precautions are not taken by the industrial managers.

(4) **Impact on Aquatic System:**-The industrial effluents sometimes include the accident spills or during accidents sometimes the water in close vicinity get polluted due to the spills. The pollutants change the existing water quality and ecological balance. The fauna and flora which are stenohalino or urihaline, stenothermic or urithermic which are adopted to live in a set of conditions (niche) suddenly lose their balance and vanish from that environment or for that matter become extinct. Thus the productivity losses also increase due to the constant rupture with the environment. Here an example of a blow out of an oil well can be considered to understand the damage caused in the aquatic system as the spilled oil, washed oil, surface run-offs will cause damage to the closeby existing river. The fish, birds, plants, insects receive tarballs and choke to death. This interconnected damaging activity will be severe if it is a sensitive eco-system.

Suggestions for Protecting Health & Environment

(1) It should be mandatory for all industries to come under the Public Insurance liability Act (1993) for paying the compensation towards the losses and the damage caused due to the accident. The compensation to be paid to the people is assessed by earning capacity in his active period. But there is no indices fixed for the environmental damages. Hence the research should be directed towards the development of yard sticks to assess the ecological damage.

(2) The public should be made aware of the damages that occur due to possible accidents and the effective distance on the direction in which they have to travel in an event of industrial accident. In addition they should be equipped with the appropriate gadgets which might be useful in case of an accident. It is also necessary to think of a facility in the industrial area to take shelter temporarily in the underground to avoid long duration exposure to the released pollutants. The workers who are trapped can slip through the escape routes or take shelter in the bunker like structures for few hours.

(3) During any accident it would be very difficult to prevent land or water quality degradation as the depositions settled in due course of time. The land treatment or restorations of water quality by physical, chemical & biological processes are attempted in the western countries. As huge costs are involved it is necessary for the industry to insure the land available and retrieve the costs from the insurance companies for the land treatment in the event of an accident.

All the industries should adopt a comprehensive plan of action as a group to tackle the events that occur due to an accident in the industrial area. For this an establishment of emergency response cell would help in tackling the problems that are in the industrial area irrespective of any particular industry. The main function of this would be co-ordinate the activity with the administrators, industrial managers and academicians to take appropriate decisions in tackling the different problems that arise during an accident.