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Plastics and Environmental Implications

Excerpts from presentation by
T. K. Bandopadhyay, *Technical Manager, ICPE*

In 12,000 BC, first deliberate man-made fire was created. That was the real beginning of civilization.

As the civilization progressed, so were the needs of the human race. Civilization brought about industrialization. Great inventions changed the world and brought comfort to our life style. These inventions have made a vast difference between the way of life as a human being and that of an animal. Industrialization has been rapid since the middle of the 19th century.

The environmental effects of many inventions were far reaching. The development of industries have created enormous impact on the environment to such an extent that it has become a concern to the very existence of the civilization.

MAJOR REASONS

If we analyse different reasons for environmental pollution, we note that the following are the major ones:

- Air pollution due to various types of gaseous emissions and Suspended Particulate Materials (SPM).
- Water & soil pollution due to various types of effluents and disposal of other waste materials.
- Global warming due to industrial emissions, especially carbon dioxide.
- Depletion of Ozone layer resulting in penetration of harmful UV rays on the Earth's surface.

We will attempt to examine the role of plastics in each of these environmental issues:

First of all let us discuss about plastics materials. Carbon atom is the backbone of the chemical compounds that make up all living things. Carbon atoms can build up chain links to form a large molecular structure. The most abundantly naturally occurring life process, plants, have this structure in the form of cellulose. And this cellulose was the mother of invention of plastics. In 1862, Alexander Parkes in Britain modified cellulose nitrate with camphor to produce the first man-made plastic material. Since then, various types of plastics have been invented involving many chemicals - organics as well as inorganics. Present annual consumption of plastics in the world is about 130 million tons which has almost doubled in last 30 years.

We will first try to analyse the impact of these plastics on environmental management. While analysing the impact/effect of material on the environment one should consider the Life Cycle Assessment (LCA) which includes the following aspects:

1. Production
2. Storage
3. Transportation/Delivery
4. Usage/reusage
5. Disposal, up to final disintegration

Life Cycle Assessment is an important environmental management tool to know the impact of a product on environment from its manufacturing stage to its final disposal/disintegration. However, LCA requires basic research to build up