

PLASTICS IS NOT A DIRTY WORD

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During the last five years we have seen the development of increased attention to certain environmental factors that had previously received little or no concentrated action. And we now find that we are living in an era of high concern for first, safety-both environmental and consumer safety-
/ and second, for the proper utilization of our national resources.

Both of these factors are key elements in some of the most important programs that the plastics industry has been involved with for several years. The Society of the Plastics Industry, as the principal trade association representing both the supplier and user segments of the industry, has concentrated on these vital concerns through special new programs. These are the programs within the plastics industry association, SPI, that relate to the safe production, safe use and the safe disposal of plastics.

In the area of safe production, the increasing concern for the industrial workers' safety was brought into sharp focus by the Occupational Safety and Health Act of 1971. And there are several active SPI programs involving compliance with OSHA requirements by plastics processors, suppliers of plastics processing machinery and basic resin producers. To date our most critical concern within the jurisdiction of OSHA is the current program relating to the health hazards of vinyl chloride monomer.

In the area of safe use, we see increasing activities involving the safe performance of plastics with both industrial and private consumers of products manufactured from plastics. There are many federal agencies involved in establishing regulations to assure that these products will be safe. These agencies now include FDA, Bureau of Alcohol, Tobacco and Fire Arms, FTC, National Bureau of Standards, HUD and HEW to mention some of the more active. Many of

the SPI divisions have programs to assure conformance with both existing and new regulations. These activities by the plastics industry are required not only to assure the continued use of plastics in existing applications but to create opportunities for plastics to be accepted in new products and markets.

And when it comes to safe disposal, the role of plastics in the solid waste stream was one of the first of the new concerns and one that developed entirely new SPI activities to protect the interests of the plastics industry. In addition to properly representing plastics through information programs, the Public Affairs Committee of SPI and its subdivision, The Plastics Waste Management Committee have ~~also~~ studied new methods of disposing of plastics and encouraged work in the recovery of plastics from the solid waste streams.

B / It is important to note that the plastics industry programs involving safe production, safe use and safe disposal of plastics involve three basic points on what might be referred to as the life cycle of

plastics. Starting from the point the raw materials for plastics are extracted from our natural resources, it continues until they have completed their useful service to man.

In considering plastics from the standpoint of total life cycle we are really talking about the total environmental impact of the material for the service it offers.

The concept of looking at materials that might be used for production of a given product from a total environmental or systems viewpoint has now been developed by a number of research groups. These studies not only identify the material that has the least effect on consuming our resources and polluting the environment but they identify where corrective action can be taken to change undesirable situations in manufacturing, use and disposal aspects of the product.

The plastics industry has had particular interest in the environmental impact approach to package selection. In recent years the inherent

characteristics of plastics have made plastics particularly attractive materials for packaging engineers and designers to work with. And as a result, plastics packaging materials constitute the largest volume of plastics in collected municipal waste. Consequently, we have found that ^{the} environmental impact analysis is helpful in putting perspective on the contributions of plastics packaging vs. the material the plastics replaces.

The basic approach used in all of these analyses is to isolate the material or the specific product in order to conduct an input-output analysis on the material, energy and waste products involved.

There are ~~seven~~^{six} important environmental areas to be considered in the impact analysis of a specific package. They are:

1. Raw Materials: pounds of virgin raw materials used in each part of the process.
2. Energy: the energy used in each part of the process, reported in units of 10^6 Btu. (1 million Btu)

3. Water Volume: the amount of water discharged from each part of the process, reported in gallons.
4. Industrial Solid Wastes: the pounds of solids which must be landfilled or disposed of in some other way.
5. Atmospheric Emissions: those emissions generally considered to be pollutants.
6. Post consumer Solid Waste: the volume of solid waste generated by disposing of the package after use.

Because of our limited time today I would like to focus our attention briefly on two phases of these environmental impact studies - the start, or the raw material aspects - and the terminal, or post-consumer waste disposal areas. These are the areas that seem to have greatest opportunities for action and they also represent the areas where the plastics industry has gotten the greatest attention in recent years. In fact in the raw material area the current

versus non-plastics (even with the feedstock counted as energy). In the seventh comparison, the energy usage was equal for the plastics and non-plastics packages.

For those of you not directly involved in the plastics industry you may not be aware that the industry is now facing a critical shortage of materials.

In 1973, the total U.S. Production of plastics was about 27 billion pounds. Surprisingly, this was up about 3 billion pounds from 1972 (+10%). At this point, the best we can expect in 1974 is somewhere between 24 and 27 billion pounds. So it appears there will be no real growth in the industry while at the same time, it is estimated that demand for plastics will be in excess of 30 billion pounds. It seems clear that if we get the resin, we can sure sell it. It is pretty obvious to the industry that the plastics shortage is real and it is bad.

So much for the very real shortage. Now, what caused it? A year ago, the plastics industry was at and all-out level of production. Most of the plastics industry was only vaguely aware that we were going to have

a shortage and it was felt that the first shortage would hit us in terms of resin capacity. Most of us weren't really aware how tight the oil and natural gas situations were, and, therefore, how scary and tenuous the petrochemical feedstock situation really was. So our first squeeze in the plastics business was in resin capacity. Then came rapidly -- in the summer of 1973 -- price controls which ushered in the beginning of horrendous dislocations where uses of feedstocks for other than plastics resins were found to be far more profitable, and diversions to these other uses began to take place. This situation was made worse by the squeeze brought on by the needs of the natural gas and petroleum industries.

Here, I think it's well for all of us to remember that the Arab involvement was not the cause of the energy crisis but really was a result. They saw an opportunity. I think there's been a tendency in the press and elsewhere to blame them for all our energy problems. They really capitalized on the situation--they did not bring it about. Actually,

almost everybody caused it. The oil companies didn't persuade us that there was a problem. The government didn't listen. The environmentalists didn't care about the problems they might cause. The public didn't realize the gravity of the situation and, therefore, didn't conserve. And the plastics industry was too busy to stop and listen.

I think one of the real societal problems today is that nobody believes anybody, anymore. Skepticism pervades our society and, in this instance, it is totally unrealistic because the energy shortage is a very serious and difficult situation to resolve.

Thus, solutions for plastics are totally dependent on basic solutions for the whole energy crisis. This is why our industry strongly advocates and supports all of the programs aimed at increasing and conserving our energy resources. Everyday we delay, now lengthens our sideways drift in plastics. There is no way we can or should expect to carve out a disproportionate share for plastics in the meantime.

As we develop other sources of natural energy - such as nuclear, solar, geothermal - we should begin to recognize petroleum as a non-fuel resource.

In a statement made by the Shah of Iran during the oil embargo of last winter he said that petroleum is too noble a material to use for fuel, it should be converted into products...

This statement was one of the many recent indications that man has apparently come to the realization that we are living in a sensitive environment with finite resources that man has plundered almost without plan for hundreds of years. We should be grateful, perhaps, for the embargos and the resulting shortages of petroleum that caused much of the world to take another look at our energy consumption and long term sources for new energy. However, in all of the frenzy and confusion over how much petroleum we can recover from the earth, what countries have the reserves and how they will be recovered and refined, too little attention has been given to the role that petroleum should play as a material than can be converted into

products rather than be oxidized to release energy.

Products that man produces from petroleum and natural gas now are essential to the basic food, shelter, clothing and health needs of every nation in the world. Yet, when the world's resources of petroleum are considered, no effort is made to assign a high priority to petrochemical feedstock used for the manufacture of synthetic fibers, pharmaceuticals, agricultural chemicals, synthetic rubber and plastics.

In projecting the increasing volumes of petrochemical based synthetics into the future, it is estimated that the percentage of total petroleum consumption going to such uses could easily triple or quadruple before the year 2000. Such an increasing percentage of petroleum going into non-fuel uses is likely to occur only under the following circumstances:

- First, that there is an adequate world recognition that petroleum has a greater value to man as a non-fuel resource than as a fuel resource.

• And second, that there is a substantial start made in the development of other sources of energy to meet the world's long term needs.

Both of these changes must evolve from the recognition that the world's material needs and energy needs are highly interrelated.

So much for the raw material aspects of plastics in the life cycle analysis. As I have indicated I would like to jump over the production aspects - because of the lack of time and also because they are perhaps the oldest and best understood - and summarize the industry's views and activities in the post-consumer, or waste, area of the life cycle.

Although plastics wastes form only a very small portion of the total wastes generated in the United States, considerable concern has been expressed over the apparent nonrecyclability of plastics. The plastics industry has made a careful study of the existing and potential recycle opportunities for plastics.

both within the industry and from solid waste material. This study, conducted by The Society of the Plastics Industry included a detailed analysis of some 30 plastics recycle and reclamation projects being conducted on a limited scale.

A The conclusion as a result of these studies is that the use of waste plastics in an unsorted form for the recovery of energy by either pyrolysis or incineration will be the most successful plastics recycling program in the context of present day technology and economics. However, the technology and economic evaluation of these opportunities is still in a development phase. Therefore, until energy recovery is clearly shown to be the optimum reuse of plastics, the industry will continue to support other short-term activities. These activities include programs for sorting plastics from mixed solid waste and economic research ^{of} ~~for~~ markets for products from such materials. The plastics industry continues to encourage programs that demonstrate that plastics can be

recycled if the circumstances are such that clean material of one kind can be obtained in volume quantities. However, the recovery of large quantities of ~~completely~~ sorted plastics may never become a broadly practiced procedure at the consumer level and there is serious doubt that it can ever be made viable on an economic basis.

The plastics industry is continuing to experiment with and test degradable forms of plastics while keeping in mind the potential problems which could be associated with them.

Because we now identify energy recovery as the best current prospect for resource recovery from plastics, I'm going to quickly review some of the logic of these conclusions. But the identification of energy recovery as the most practical form of resource recovery for plastics and other organic fractions of waste comes at an opportune time when our national energy

shortage has come into sharp focus for the many individuals who for so long have been disbelievers that there is a real energy crisis. Plastics uses 1.3% of total petroleum and natural gas as feedstock. And in return plastics contribute major energy and material savings in virtually every major market in our economy. For many of its uses plastics have no really acceptable substitutes.

The composition of municipal solid wastes varies according to the climate, the season, the geographical area, the socio-economic character of the community, and even according to the day of the week. A little more than half of solid wastes consists of materials that are combustible and therefore can be converted into energy or; the organic fractions of refuse can be processed by pyrolysis to produce synthetic fuels that can be stored and transported. At an average of 1.5% plastics in municipal waste it contains the

highest unit energy value of any of the material found in waste. The amount of energy potentially available from this solid waste is enormous -- the equivalent of about 1 million barrels of oil per day. This is about 7 percent of all United States oil consumption, which is just about what we imported directed from the Middle East prior to the embargo of last winter.

The energy potential of solid waste is also increasing steadily. The average heat content per ton is rising; more tonnage is being collected; and, as a result, the energy content of solid wastes represents a growing percentage of national energy requirements.

Although there are regional and seasonal variations, the typical heat content for municipal solid waste is now about 4,700 Btu per pound and can be expected to reach 5,000 Btu per pound in the 1980's.

As I've said, plastics are, pound for pound, the most energy-rich component of solid wastes, with a heat content averaging 19,000 Btu per pound, This is

comparable to the heat value of fuel oil and is considerably higher than even the better grades of coal, which run about 13,500 Btu per pound. Currently, plastics make up from 1 to 4 percent of the solid wastes collected by cities and towns throughout the United States, yet the fuel value of plastics is such that it represents about 6 percent of the total energy content. This may seem like a modest percentage, but, as we know, the use of plastics is on a strong upward curve. In the next 20 to 25 years, the proportion of plastics in municipal refuse will approach 5 percent. At this level the plastics portion of total energy content in solid waste will increase to about 20 percent.

Clearly, the opportunities for recovery of energy from municipal solid wastes are vast. As the proportion of plastics in solid wastes increases, especially plastics packaging, the economics of energy recovery will become increasingly attractive to municipal governments and energy users.

The recovery of energy from waste plastics

represents a truly efficient use of fossil fuel resources, and the plastics product itself can be regarded as a temporary stage or the first stage in the flow of petroleum from the oil well to its end use as fuel.

Therefore, in the post-consumer area of plastics' life cycle, we can say that although plastics currently represent a relatively small portion of collected municipal waste at the present time, it represents the most energy rich component and that recovery of this energy as a fuel component in power generation is the most reasonable short term concept for plastics. In the meantime the industry will continue to encourage material recycle concepts that are economically viable.

I would like to leave you with the knowledge that plastics materials have enjoyed spectacular growth for more than 25 years - averaging 11-12 percent growth rate. And this demand for plastics continued until mid-1973 when industry capacity and feedstock

shortages have now plateaued this long record of growth.

The growth in the use of plastics is a direct result of high performance at reasonable cost.

Faced with many critical issues during its history of growth, the plastics industry has always stepped in with responsible answers and actions. And the industry is proud that despite attacks from many quarters, "plastics" is not a dirty word but represents quality and performance in products we use and depend on in daily activities.

While the immediate future looks a bit grim for plastics, the industry is totally optimistic about the long term outlook. I believe that we can still reach the 200 billion pound industry predicted for the year 2000. I believe that plastics will be needed to help our world conserve its dwindling resources of metals and other materials. I believe that plastics will play a significant role in energy.

recovery through the incinerator power plants of the future.

The Shah of Iran said it all when he noted that oil is too taluable a resource, too noble a material, to burn as a fuel. There's a beautiful future for plastics, provided we work hard to demonstrate the utility, versatility and economy of plastics. And provided we help bring about total energy solutions.

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