

MUNICIPAL POLYMERIC WASTE AS A SECONDARY SOURCE OF RAW MATERIAL

Galina Borovik

Sumy State Teachers' University, Sumy, Ukraine

Waste is formed during extraction, processing, and use of natural resources, at the stage of manufacturing and the use of final products. Thus the amount of products for which manufacturing expends a lot of energy and human work, results in waste after a single use (for example, canning containers, aluminum containers, various kinds of packing materials, polymeric materials, paper and etc.). On one side, waste is the main pollutant (annually hundred million tons of wastes are formed); on the other side waste frequently represents valuable products, potentially suitable for processing and secondary use. Proper waste handling can provide about 15 % gain on the total national income.

During the USSR period, 2.5% of municipal waste was used as secondary raw material. Today, the processing of waste with the extraction of all valuable raw components is the most effective form of recycling and production of high-grade kinds of raw materials used for more economical manufacture of consumer and technical goods. Nowadays, this problem is very real, especially because we are having the shortage of landfills and also with the transition to a market economy. Simultaneously, by using secondary raw materials, a significant amount of primary resources can be saved; we may use primary resources as additional resources for other needs, deliver it to other regions, or export it. Such increases in regional resource potential without incurring large expenses results in additional finances to the budget. Besides, the activated work in preparation and processing of secondary raw material creates an opportunity to increase the number of new workplaces and the level of employment of the population.

The polymeric material waste requires special attention. The reason is a wide spectrum of their use and, accordingly, constant growth of volume of these waste products.

The structure of the polymeric waste is: 34 % of polythene, 20.4 % - from PETF, 17 % - from the laminated paper, 13.6 % - from PVC, 7.6 % - from polystyrene, 7.4 % - from polypropylene.

Synthetic waste can be recycled; consumption waste in the form of a polymeric film withdrawn from circulation, polymeric bags and other packing materials; plastic boxes, canisters, pipes, utensils, toys; a wide range of plastic products and details of complex household and industrial equipment, including cars and radio-electronic equipment.

After products that use polymeric materials are discarded, they retain their physical and chemical properties after processing. These properties define the growing interest in the secondary processing of polymeric materials and the increasing demand on secondary crushed, agglomerated, or granulated plastic.

20 % of polythene waste, 10 % waste of PVC, 12 % of polystyrene, 17 % of polypropylene and 12 % of PETF are processed and recycled. The secondary crushed, agglomerated, and granulated plastics are the main products from polymeric waste.

The ability to manufacture products from secondary polymers continues to develop quickly, while the supply of these secondary crushed, agglomerated, or granulated plastics lags behind. Various kinds of equipment are made to process polymeric waste in all developed industrial countries. There are manufacturers for specific kinds of equipment for waste recycling in the CIS too, but such equipment is for processing of pure industrial wastes only. The polluted waste has, on one hand, commercial benefit. On the other, the waste creates real environmental problems.

The secondary raw material is used practically in all spheres of economy: motor industry, home appliances, floor coverings, utensils, and furniture – these are only a few examples. In some sectors the use of secondary materials (the food-processing industry, medical equipment and etc.) is limited, but for the majority of manufacturers of technical goods it is possible and necessary to work using a secondary material. For example, secondary PE and PP granulate are used to manufacture plastic wrap for packing goods, technical film, sewer pipes, and polymeric tile to improve the properties of bitumen composition of asphalt manufacture, etc. Secondary PET is applied as the additive to primary raw material up to 50 %, in the manufacture of building materials, trash containers, sewer pipes, etc.

The process of recycling polymeric waste solves the environmental problems by reducing waste generation, saving primary raw material, and by producing the necessary products for human life.

