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Expanded Polystyrene Foam (AKA "styrofoam")

The term "styrofoam" has worked its way into the public domain and is commonly, and wrongly, used to describe the ubiquitous white disposable items such as cups, serving trays, take-out cartons and packaging materials. Actually, "Styrofoam" is the trademark held by the Dow Corporation for its insulating and other polystyrene construction materials, and is made by a unique process. The method was invented during WW II, and the first use of this buoyant and water resistant material was by the Coast Guard for 6 man life rafts, followed by many other uses by the Navy and Coast Guard. Today the most commonly seen Dow product is the trademarked blue insulation applied to homes and other buildings.

The subject for this Reusable News is the familiar white items named above that are made from expanded polystyrene beads. This "polyfoam" does not have the strength and insulating properties of Styrofoam. A touch of irony enters here, as these foam items are not reusable or recyclable to any extent, and the real issue is their effect on the environment and how to dispose of the stuff. Perhaps we should rename this column "Disposable News".

The manufacture of polystyrene is petroleum based, and the basic building block is the styrene molecule, which in turn is benzene based. The Environmental Protection Agency (EPA) named the polystyrene manufacturing process as the 5th largest creator of hazardous waste. Hydrocarbons are released during manufacture which, when combined with nitrogen oxides, form tropospheric ozone, a serious pollutant at ground level. When polyfoam is burned, some 57 toxic chemicals are released. In a nutshell, the manufacture of polystyrene products pollutes the atmosphere and creates large amounts of liquid and solid waste.

Styrene is known to leach from polyfoam cups into the fluid contained, the degree depending on the nature of the fluid and the temperature. Some research suggests that it mimics the action of estrogen in the body, with potential ill effects on the endocrine system. The EPA has classified styrene as a possible human carcinogen, and the Styrene Information and Research Center encourages member companies to limit exposure of their employees.

Each year, at least 2.3 million tons of polystyrene products are dumped into landfills, because they are difficult to recycle. Considering the fact that the foam is 95% air, it is hard to imagine the sheer volume of the stuff going in, but the saving grace is its compressibility. Would that all those cups and trays ended up in landfills, but they are notorious for littering the landscape, breaking up, sometimes choking birds and beasts, and clogging their digestive systems. A beached Beluga whale was recently found to have nearly a ton of plastics and packing material in its stomach. Buoyant polysterene products undoubtedly constitute a large portion of the huge floating island of debris recently discovered in the Pacific Ocean.

However, there is some progress in solving the above problems, in three areas: the chemistry of polystyrene breakdown, the banning of their use in food handling, and replacement by paper and biodegradable polymers.

* Pyrolysis is a process that involves heating polystyrene in the absence of oxygen. It produces an oily substance that can be converted by bacteria into a biodegradable plastic that can then be used to manufacture disposable items.

* McDonalds got rid of polystyrene clamshells in favor of wrapping their burgers in paper ten years ago. A number of cities have outlawed polystyrene takeout containers, e.g. Portland, Berkeley, Oakland, and, more recently, San Francisco. Laws prohibiting their use statewide are under consideration in California and New York.

* Paper can and has replaced polystyrene foam in its many forms, but acceptance is slow and reluctant because it is more expensive. It also has to be noted that the manufacture of paper is equally if not more polluting than that of polystyrene. There are many alternatives to polyfoam on the market that focus on "green" manufacturing, using a variety of plant materials e.g. corn starch, sugar cane (bagasse), oats, and some grasses and reeds. All are biodegradable and compostable. To get an idea of the variety of options out there, google "biodegradable food containers".

It is not unreasonable to hope that with decreasing reliance on petroleum in manufacturing, and as part of the movement toward energy independence, styrene products will become obsolete in favor of the type of natural materials mentioned above.

The Reusable News is a monthly column by the Selectmen's Recycling Advisory Committee. This article was written by committee member, John Moran.