

DISPOSABLE PRODUCT DESIGN AND RECYCLING

Richard Ian Stessel

Department of Civil and Environmental Engineering  
University of South Florida  
Tampa, FL

ABSTRACT

Of late, recycling has lost some of its luster, even as prices are increasing for recovered materials. First, collection costs continue to be high. Second, recycling rates seem to be leveling off. These two difficulties are related. The paper begins with an overview of the causes of these problems, concluding, as have many practitioners, that an increase in automation is required. Automation expands options for solving some of the problems, but the structure of the recycling industry, embodying a fundamental "disconnect" between producers of consumer products and waste management, raises special difficulties.

Consumer product companies have done their best to be environmentally responsible, studying packaging reduction, sales of concentrated products, etc. They have included recycled content in packages. However, few significant steps have been taken to increase the recyclability of the products; elimination of base cups in PET (polyethylene terephthalate) bottles is a notable exception. This paper explores the gap between product design and recyclability. It brings the missing component to packaging design: the technology of materials recovery. The objective was to develop overriding design concepts.

INTRODUCTION

Within the last several decades, the growth in disposable products has been the greatest political impetus behind solid waste regulation. Public concern about disposable materials outlived the "landfill crisis" of recent years. The public reacts to visible litter. Thus, disposable materials, particularly packaging, are often specific targets of recycling-related legislation, such as bottle bills and advanced disposal fees. Recycling costs are dropping, but net savings often remain elusive [Powers, 1995]. Collection technologies, such as they are, present difficulties in broadening recycling. Markets, while

currently good, are notoriously unstable. Peaks in recycling rates, according to a recent Franklin Institute report, are far lower than goals set by many state legislatures. Trends are flattening [Rabasco, 1994].

TABLE I PLASTIC CONTENT OF VARIOUS SUBSETS OF WASTE (NUMBERS DO NOT SUM DUE TO ROUND-OFF)

PLASTIC	PERCENT OF STREAM CONSTITUTING PLASTICS		
	Plastic	Packaging	Total Waste
PET	7.0	.79	.26
PS	11	1.2	.41
HDPE	31	3.5	1.1
LDPE	31	3.5	1.1
PVC	5.6	.63	.21
PP	10	1.3	.37
Misc.	4.4	.50	.16
Total	100	11	3.7

Industries may argue that their product constitutes a small