

Planning and Analysis - Conducting a Recyclables Materials Composition Study

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The composition of recyclable materials can vary significantly due to variations in collection methods, consumer preferences, and the success of the recycling education program to minimize contamination. In recent years with changes in recycling markets, many local solid waste agencies and MRF operators have conducted recyclables composition studies, either as part of initial contract negotiations or at regular intervals during the contract term. The following article describes the results of a recent recyclables composition study conducted for the City of Pensacola, which is currently in contract negotiations to deliver its residential, single-stream recyclables to the new MRF operated by the Emerald Coast Utility Authority (ECUA).

Approach

The City of Pensacola runs four weekly recycling routes: Monday, Tuesday, Thursday, and Friday. Trucks usually dump at the City's Transfer

Material Category	Examples
Mixed Paper	Copy paper, computer printouts, junk mail, notebooks, magazines, telephone books, shredded paper, brown paper bags, kraft paper, catalogs, boxboard, dry pet food bags
Newspaper	Wood pulp/ plant fiber derived paper
Corrugated Containers	Packing/ shipping boxes, pizza boxes
Aluminum Cans/Foil	Cans (e.g. soda cans, beer cans), aluminum foil, baking pans
Steel Cans	Cans (e.g. pet food cans, soup cans), tin cans
#1 PET	Water bottles, soda bottles
#2 HDPE Natural	Milk, water, and juice jugs
#2 HDPE Colored	Opaque bottles and containers, laundry detergent containers
Comingled Plastics #3-7	Plastic produce clamshells, hard plastics, styrofoam
Bulky Rigid Plastics	Plastics that don't fall into the numbered category
Glass (3-Mix)	Glass, any color (e.g. beer and wine bottles)
Mixed Metals	Metal pots, pans, and cookie sheets, metal parts
Rejects	Unacceptable materials including: plastic bags, ice cream cartons, waxy/paper milk cartons, aerosol cans, food, garbage, yard waste, carpeting, construction materials, clothes, diapers, garden hoses,

Table 1 - Material categories.

Station twice per day, once in the morning and once when their route is complete. Two samples from each route (one sample per truckload) were collected on each day of the field activities, resulting in eight samples per day.

An SCS Engineers Field Manager supervised the sampling operation, which took place on four days, from October 10 through October 14, 2016.

The Field Manager interviewed the drivers of the incoming vehicles to determine the route number of each vehicle and screen out atypical loads. Given the limited size of the data set (eight samples sorted per day), it was important that unrepresentative data be avoided. Therefore, brief interviews were necessary to assess the "representativeness" and origin (route) of each load.

If a load was deemed suitable for analysis, the driver was directed to discharge a portion of the load in a clear area of the floor. The sort sample was subsequently obtained via a backhoe loader. Samples were hand sorted to into the material categories noted in Table 1.

Consistent with good practice in such sampling programs, efforts were made to minimize sampling bias or other impacts on the integrity of the database. To this end, field sampling had been coordinated to avoid holidays and other out of ordinary events. During actual sampling, the SCS Field Manager kept records of weather (particularly moisture) encountered and any other relevant factors.



Setup of sorting area.



View of sample collection area



View of sorting activity.

Material Category	Percent By Weight
Mixed Paper	27.4%
Newspaper	12.6%
Corrugated Containers	11.5%
Aluminum Cans/Foil	1.3%
Steel Cans	1.6%
#1 PET	4.1%
#2 HDPE Natural	0.7%
#2 HDPE Colored	1.4%
Corningled Plastics #3-7	1.6%
Bulky Rigid Plastics	1.8%
Glass (3-Mix)	11.5%
Mixed Metals	2.4%
Rejects	22.1%

Table 2 - Mean composition by weight.

Results

Thirty-two samples were collected during the sampling event. The mean composition by weight is presented in Table 2, which is the average of the 32 separate samples that were collected.

The recyclables composition study provided the City with an initial baseline for a proposed agreement with ECUA, a basis for negotiating any consequent changes in operations, as well as data on where improvements could be made to its public education program to help minimize contaminants in the setouts on specific collection routes.

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