EVE 420
Solid Waste System Design

Waste Generation Example Problem

Problem Statement:

From the following date, estimate the unit waste generation rate per week for a residential area consisting of 1200 homes. The average occupancy is 3.5 persons per home. The observation location is a local transfer station that receives all of the wastes collected for disposal. The observation period was one week.

Data:

- Number of compactor truck loads = 9
- Average size of compactor truck = 20 yd^3
- Number of flatbed loads = 7
- Average flatbed volume = 2 yd^3
- Number of loads from individual residents' private cars and trucks = 20
- Estimated average volume per domestic vehicle = 8 ft^3

Solution:

Step 1: Setup a computation table to estimate the total weight of waste disposed during this week.

Waste Source	Number of Loads	Average Volume, yd^3	Specific Weight, $lb/yd^{3\dagger}$	Total Weight, lb
Compactor Truck	9	20	500	90,000
Flatbed Truck	7	2	225	3,150
Private Vehicle	20	0.3	150	900
			Total, lb/week =	**94,050**

† based on estimates of average vehicle volume and weight

Step 2: Determine the unit waste generation rate.

$$\text{Unit or Per Capita Generation Rate} = \frac{94{,}050\ \text{lb/wk}}{(1200\ \text{homes})(3.5\ \text{persons/home})(7\ \text{days/wk})}$$

$$\boxed{\text{Unit or Per Capita Generation Rate} = 3.2\ \frac{\text{lb}}{\text{capita} \cdot \text{day}}}$$