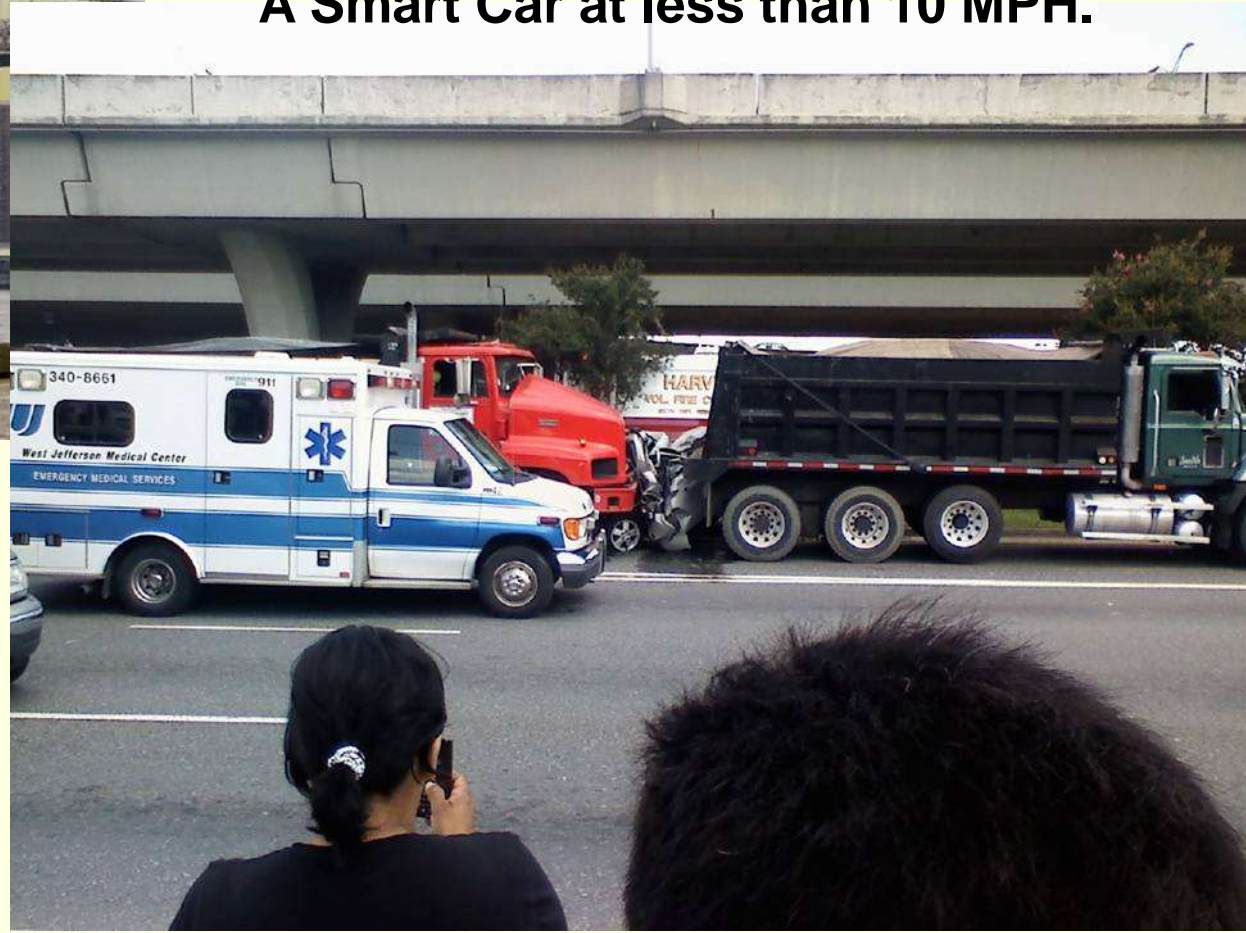# Chapter 12

Logistics, Logistics, and Distribution

Below is a Photo of An Accident Near New Orleans Involving Two Trucks And A Smart Car at less than 10 MPH.

Learning Objectives

- Know what a third-party logistics provider is
- Understand the major issues that need to be considered when locating a plant or warehouse facility
- Be able to use the transportation method of linear programming to analyze location problems
- Know how a factor rating system can be used to narrow potential location sites
- Understand the centroid method to locating entities such as cell phone communication towers

What is Logistics?

- **The movement of goods through the supply chain**

- **"the art and science of obtaining, producing, and distributing material and product in the proper place and in proper quantities"**

Decisions Related to Logistics

- How to best transport goods
  - Modes of transportation
    - Truck, rail, ship, pipelines
  - Warehouses
    - Consolidation
    - Cross Docking
    - Hub-and-Spoke systems
- Facility Location

Issues in Facility Location

- **Proximity to Customers**
- **Business Climate**
- **Total Costs**
- **Infrastructure**
- **Quality of Labor**
- **Suppliers**
- **Other Facilities**

Issues in Facility Location

- **Free Trade Zones**
- **Political Risk**
- **Government Barriers**
- **Trading Blocs**
- **Environmental Regulation**
- **Host Community**
- **Competitive Advantage**

Plant Location Methodology: Factor Rating Method Example

Two refineries sites (A and B) are assigned the following range of point values and respective points, where the more points the better for the site location.

Major factors for site location	Pt. Range	Site A	Site B
Fuels in region	0 to 330	123	156
Power availability and reliability	0 to 200	150	100
Labor climate	0 to 100	54	63
Living conditions	0 to 100	24	96
Transportation	0 to 50	45	50
Water supply Climate	0 to 10	4	5
Climate	0 to 50	8	4
Supplies	0 to 60	5	50
Tax policies and laws	0 to 20	5	20
Total pts.		**418**	**544**

Best Site is B

Plant Location Methodology: Transportation Method of Linear Programming

- Transportation method of linear programming seeks to minimize costs of shipping n units to m destinations or its seeks to maximize profit of shipping n units to m destinations

- See the Data Disk in the back of the book. Under Excel templates, look in chapter 12 for the U.S. Pharmaceutical Company example.

Plant Location Methodology: Centroid Method

- **The centroid method is used for locating single facilities that considers existing facilities, the distances between them, and the volumes of goods to be shipped between them**

- **This methodology involves formulas used to compute the coordinates of the two-dimensional point that meets the distance and volume criteria stated above**

Plant Location Methodology: Centroid Method Formulas

$$C_x = \frac{\sum d_{ix} \ V_i}{\sum V_i} \qquad\qquad C_y = \frac{\sum d_{iy} \ V_i}{\sum V_i}$$

Where:

C_x = X coordinate of centroid

C_y = X coordinate of centroid

d_{ix} = X coordinate of the ith location

d_{iy} = Y coordinate of the ith location

V_i = volume of goods moved to or from ith location

Centroid Method

Centroid Location

	Latitude	Longitude	Sales
Denver	39.739	104.985	500
Kearney	40.701	99.081	200
Minneapolis	44.983	93.267	1373
Dallas	32.776	96.797	777
Warehouse	40.434	96.693	2850
	40.43N	96.69W	