BIA 650 A Homework#5 W&A Chapter 5, Problem 20

# Management Overview

Problem Statement:

The Objective is to minimize the Total Cost subject to additional conditions that goods cannot be shipped between Plants and between Customers.

Data Sources:

* + The **inputs** are identified as Cost of Shipping between different nodes in the network, Common shipping Capacity for an Arc,
  + The key **decision variable** is the amount of goods to be shipped in each node
  + **Constraints** are identified as
    - The net outflow for every node cannot be greater than the amount of goods in can hold
    - The net outflows for both the warehouses have to be 0.
    - The net inflows for both the customers must be at least equal to their demand for the goods.
  + **Output** is the Total Cost incurred in shipping the goods from the plants to the customers.

Model Approach:

* + Separate the data into inputs, decision variables, constraints and output and enter them on the spreadsheet.
  + Flows between plants and flows between customers are disallowed.
  + The objective cell, Decision Variables and objective cell to be minimized are added in Solver and it is run.

Sensitivity Analysis:

* **Total Cost Vs Arc Capacity**

The Total cost was plotted for values of Arc Capacities (Shipping capacities between nodes) ranging from 150 to 290 in steps of 20. It was observed that, in general the Total costs decreased as arc capacities increased but beyond an arc capacity of 200 there was no change in the Total cost.

Solution:

* The total Shipping cost increases to $4160 if subject to the condition that goods cannot be shipped between Plants and between Customers
* There is no change in the optimal solution beyond an arc capacity of 200, so there’s no need for the company to work on increasing Arc capacities.