BIA 650 A Homework#7 W&A Chapter 7, Problem 18

# Management Overview

Problem Statement:

The objective is to maximize the Profit with the available resources while satisfying the ‘minimum production’ condition for each vehicle type produced.

Data:

* + The **inputs** are identified as Total Resources available (Steel, Labour hours), resources needed for Production of each vehicle type, Profit contribution of each Vehicle type and the minimum production requirement set by the company. The key **decision variables** are Number of Units to be produced and a binary variable indicating if a vehicle type must be produced or not.
  + **Constraints** are as follows
    - Resources Used must be less than resources available
    - If a vehicle type is produced, the number of units must lie between the upper and lower limits of production.
  + Profit is the **Output**

Sensitivity of Profit to -

**a. Total Steel Available:**

There is a steady increase in the maximum profit when the amount of steel available changes from 6000 to 6600. Beyond 6600, the maximum profit doesn’t change until 7000. This means the company must not buy more than 6600 units of steel as it won’t have any impact on the maximum profit (Unless it plans to increase the total steel by a larger amount)

**b. Labour Hours Available:**

When the number of Labour hours increases, the Maximum potential profit also increases.

**c. Profit Contribution of Large Minivan:**

There is a 100$ increase in the profit contribution of large Minivan, the Maximum by approximately 45000 USD.

**d. Minimum Production Level of Large Minivan:**

As the minimum production level of Large Minivan is increased beyond 400, there is a drop in the maximum profit than can be achieved.

**e. Minimum Production Level of Compact Cars:**

When the minimum production level is increased beyond 800, the profit starts decreasing. When the minimum production level lies between 500 and 800, there is no change in the Maximum profit that can be achieved.

Recommendation:

Keeping other things constant, the maximum profit can be increased just by adding more labour hours.