FIT3158 Business Decision Modelling

Tutorial 3

Sensitivity Analysis

- Download FIT3158 Tutorial 3.xlsm. This file has worksheets for: ElectroTech, Sanderson and ElectroPoly

Exercise 1 (Ragsdale Chapter 4, Q7 8E/9E)

Use Solver to create Sensitivity Reports for the model in Electro-Tech worksheet and answer the following questions (re-name the report created):

a) How much excess wiring and testing capacity exists in the optimal solution?

b) What is the company's total profit if it has 10 additional hours of wiring capacity?

c) By how much does the profit on alternators need to increase before their production is justified?

d) Does the optimal solution change if the marginal profit on generators decreases by $50 and the marginal profit on alternators increase by $75?

e) Suppose the marginal profit on generators decrease by $25. What is the maximum profit that can be earned on alternators without changing the optimal solution?

f) Suppose the amount of wiring required on alternators is reduced to 1.5 hours. Does this change the optimal solution? Why or why not?

Exercise 2 (Ragsdale Chapter 4, Q10 8E/9E)

Use Solver to create Sensitivity Reports for the model in Sanderson worksheet and answer the following questions (re-name the report created):

a) If the profit on doors increased to $700 would the optimal solution change?

b) If the profit on windows decreased to $200 would the optimal solution change?

c) Explain the shadow price for the finishing process.

d) If 20 additional hours of cutting capacity became available how much additional profit could the company earn?

e) Suppose another company wanted to use 15 hours of Sanderson's sanding capacity and was willing to pay $400 per hour to acquire it. Should Sanderson agree to this? How (if at all) would your answer change if the company instead wanted 25 hours of sanding capacity?

Exercise 3 (Ragsdale Chapter 4, Q11 8E/9E)

Use Solver to create Sensitivity Reports for the model in Electro-Poly worksheet and answer the following questions (re-name the report created):

a) Is the solution degenerate?

b) How much can the cost of making model 1 slip rings increase before it becomes more economical to buy some of them?

c) Suppose the cost of buying model 2 rings decreased by $9 per unit. Would the optimal solution change?

d) Assume workers in the wiring are normally make $12 per hour and get 50% more when they work overtime. Should Electro-Poly schedule these employees to work overtime to complete this job? If so, how much money would this save?

e) Assume workers in the harnessing area normally make $12 per hour and get 50% more when they work overtime. Should Electro-Poly schedule these employees to work overtime to complete this job? If so, how much money would this save?

f) Create a spider plot that shows the effect of varying each of the wiring and harnessing requirements (in cells B17 thru D18) to 90% of their current levels in 1% increments. If Electro-Poly wanted to invest in training or new technology to reduce one of these values, which one offers the greatest potential for cost savings?

Extra Questions: Ragsdale Chapter 4, Ex 3, 5 & 6 (in both 8E and 9E).

Open FIT3158 Tutorial 3_Extra Ex. For Questions 3 (use Prb04_03), Question 5 (use Prb04_05), and Question 6 (use Prb04_06).