FIT3158 Business Decision Modelling
Semester 2 2022
Assignment – Case III

Case III (Inventory Modelling) – Heavy Machinery Operator Training at NorthStar Minerals

DynaSafe Training (DST) is an award-winning and accredited safety training provider for heavy machinery and earth moving equipment operators with a clientele of large mining companies. DynaSafe generally operates under contract with different employers to train a specified number of heavy machine operators in the safe and proficient use of earth moving equipment such as excavators, loaders, rollers, backhoes, and motor-graders.

NorthStar Minerals Inc. (NMI) is interested in having DynaSafe provide a safety training program for its new heavy machine operators and has submitted a contract proposal. NorthStar Minerals Inc. (NMI) requires a contract as it wants to ensure a steady supply of newly trained heavy machine operators to manage high demand across its multiple mining operations.

DynaSafe Training (DST) has estimated that a 4-week certificate level heavy machine operator safety training course costs $3000 for the instructor, $1500 for the machines and equipment facilities and $250 for office administration and support fees. In addition, NorthStar Minerals Inc. (NMI) incurs an opportunity cost of $1600 per month for each heavy machine operator, because they are being paid for the training duration but cannot be utilised productively.

Q1) If NorthStar Minerals Inc. (NMI) requires six trained heavy machine operators per month for the currently foreseeable future, how big should the training classes be to minimize the total annual relevant cost? Briefly explain your interpretation of relevant costs. Assume that according to the signed contract DynaSafe Training guarantees that trained machine operators will be available, and no shortages will apply.

Q2) Considering the answer in Q1) above,

a) How many classes will be offered each year by DynaSafe Training to NorthStar Minerals Inc. (NMI)?
b) What is the total annual relevant cost to be borne by NMI?

Q3) If the class size found in Q1) is not an integer, round it (both up and down) and compare the effect on total annual relevant cost.

Q4) An additional acquisition in the Pilbara has increased the demand for trained heavy machine operators at NorthStar Minerals for next year. It is estimated that as many as eight newly trained heavy machine operators will be required per month. Work out the answers for Q1) and Q2) considering the new situation. What if a sudden decrease in demand for trained machine operators alters the requirement to be four per month? Compare your answers in a table.

Q5) Construct a data table and perform sensitivity analysis on total annual relevant cost for variability in the training associated opportunity cost of $1600 per month per each heavy machine operator. Consider the cost to vary from $1000 to $2000 in $100 increments.

Q6) In Q1) DynaSafe Training (DST) has guaranteed that the trained heavy machine operators would be available as required. Now DST is not so sure and is thinking of renegotiating the contract, allowing for training delays. NorthStar Minerals Inc. (NMI) is agreeable to some delays but has found that this would cost the company an additional $2000 per month. A 1-week delay would incur $500 in additional cost, 2-weeks $1000 and so on. Find out how the delays would affect the answers in Q1) and Q2).

Delivery structure and submission instructions for Case III.

Your delivery should include an Excel file comprising work sheets answering the questions above.

Show your working for each of the questions above clearly and include resulting outputs/tables as relevant for each question.

Provide any assumptions, justifications, and explanations where applicable.

The Excel file should be named as <Group No.>_Assignment_Case3.xlsx (or.xlsm) where the <Group No> is the number assigned to your group by the tutor.

The file should be uploaded on the FIT3158 Moodle site under the submission link together with Case 1 and Case 2 files by the due date.

Marking Criteria

Question	Content/Criteria	Marks Allocation
Q1)	Correct Interpretation of Costs	4 Marks
	Correct Calculation of optimal class size	2 Marks
Q2)	a) Correct number of classes	1 Mark
	b) Correct calculation of total annual relevant cost	3 Marks
Q3)	Correct rounding and comparisons	4 Marks
Q4)	Correct calculations for increased/decreased demand	6 Marks
Q5)	Correct form and use of data table	2 Marks
	Correct values in data table	2 Marks
Q6)	Correct Interpretation of Costs	3 Marks
	Correct calculations	3 Marks