

Carleton University

Department of Civil and Environmental Engineering

ECOR 3800 A

Assignment 4Release Date: June 13thDue Date: June 17th 4:00 PM

Submission: in designated filing cabin.

Question 1

The management of a company is considering replacing a number of old looms in the mill's weave room. The looms to be replaced are two 220-cm President looms, sixteen 135-cm President looms, and twenty-two 185-cm Draper X-P2 looms. The company may either replace the old looms with new ones of the same kind or buy 21 new shutterless Pignone looms. The first alternative requires the purchase of 40 new President and Draper looms and the scrapping of the old looms. The second alternative involves scrapping the 40 old looms, relocating 12 Picanol looms, and constructing a concrete floor, plus purchasing the 21 Pignone looms and various related equipment.

Description	Alternative 1	Alternative 2
Machinery/related equipment	\$2,100,000	\$1,000,000
Removal cost of old looms/site preparation	\$30,000	\$50,000
Salvage value of old looms	\$60,000	\$60,000
Annual sales increase with new looms	\$8,000,000	\$7,500,000
Annual labour cost	\$250,000	\$400,000
Annual O&M cost	\$1,000,000	\$1,500,000
CCA	30%	30%
Project life	8 years	8 years
Salvage value	\$160,000	\$60,000

The undepreciated capital cost (UCC) of all old looms at the time of scrapping is negligible. The cost basis of the new looms will only include the purchase price and the removal of old looms and site preparation. The corporate executives feel that various investment opportunities available for the mill will guarantee a rate of return on investment of at least 15%. The mill's marginal tax rate is 40%.

a] Which alternative is better? (Use NPW method)

b] Perform a sensitivity analysis on the project's data, varying on independently the annual sales increase, labour cost, annual O&M cost, and the MARR. Assume that each of these variables can independently deviate from its base value (given in the previous table) by $\pm 10\%$, by $\pm 20\%$, and by $\pm 30\%$. For each case, you may use NPW to test sensitivity. Analysis of simultaneous change in variables is not required.

c] From the results of part [b], prepare sensitivity diagrams and interpret the results.