

Chapter 11

Replacement Analysis

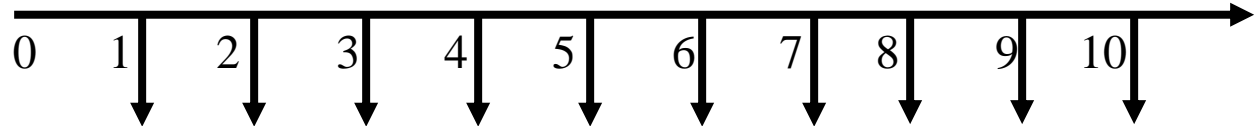
Problem 4 page 533

The Container Corporation of America is considering replacing an automatic painting machine purchased 9 years ago for \$700,000. It has a market value today of \$40,000. The unit costs \$350,000 annually to operate and maintain. A new unit can be purchased for \$800,000 and will have annual O&M costs of \$120,000. If the old unit is retained, it will have no salvage value at the end of its remaining life of 10 years. The new unit, if purchased, will have a salvage value of \$100,000 in 10 years. Using an **AW** measure and a MARR of 20 percent to see if the automatic painting machine should be replaced if it is taken as a trade-in for its market value of \$40,000.

- i. Use the cash flow approach (insider's viewpoint approach).
- ii. Use the opportunity cost approach (outsider's viewpoint approach)

□ Cash Flow Approach (insider's viewpoint approach).

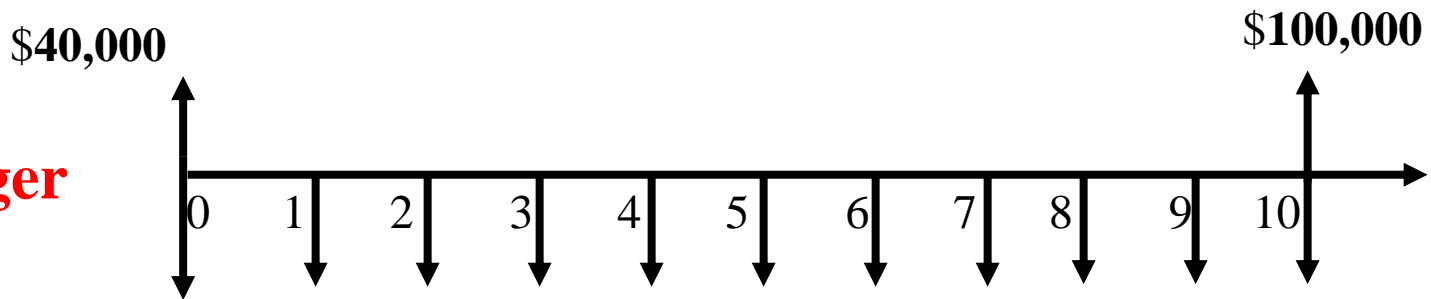
Defender



$$AW_1 (20\%) = -\$350,000/\text{year}$$

$$\$350,000 / \text{year}$$

Challenger



$$\$800,000$$

$$\$120,000 / \text{year}$$

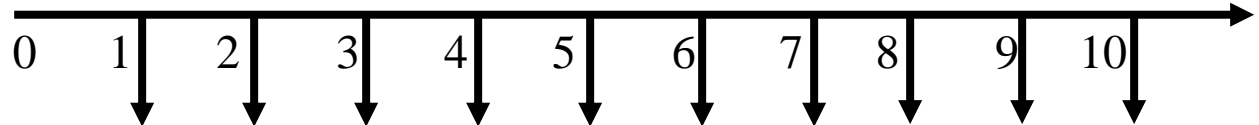
$$AW_2 (20\%) = -\$760,000(A/P 20\%, 10) + \$100,000(A/F 20\%, 10) - \$120,000$$

$$AW_2 (20\%) = -\$760,000(0.23852) + \$100,000(0.03852) - \$120,000 = -\$297,423.2/\text{year}$$

Replace with new painting machine

□ Cash Flow Approach (insider's viewpoint approach).

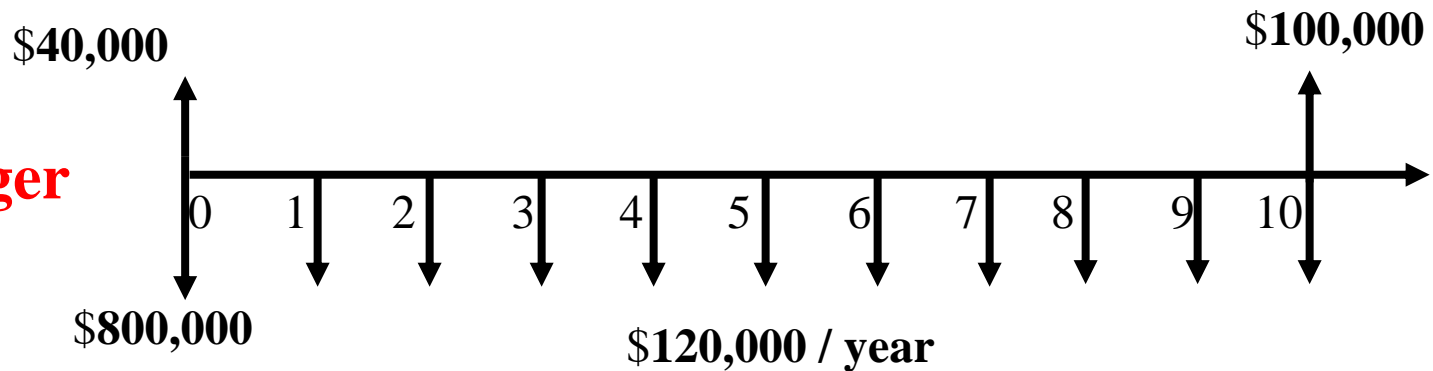
Defender



$$EUAC_1 (20\%) = \$350,000/\text{year}$$

$$\$350,000 / \text{year}$$

Challenger



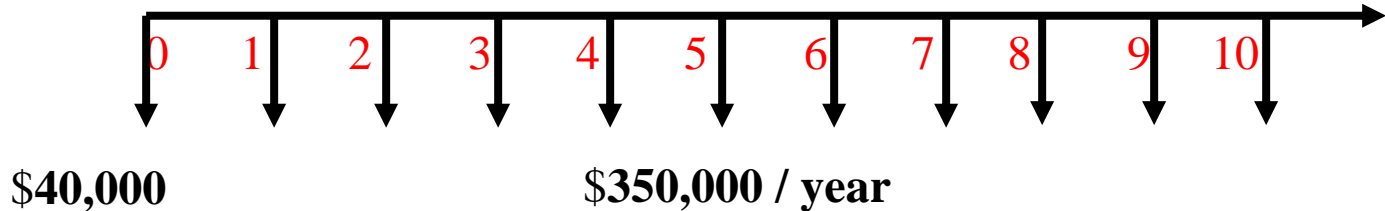
$$EUAC_2 (20\%) = \$760,000(A/P 20\%, 10) - \$100,000(A/F 20\%, 10) + \$120,000$$

$$EUAC_2 (20\%) = \$297423.2/\text{year} \quad \leftarrow$$

Replace with new painting machine

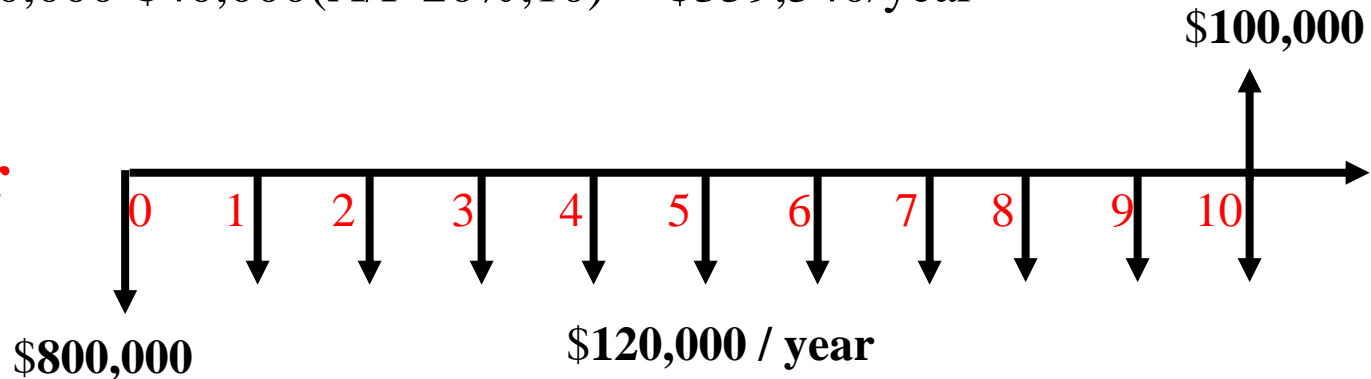
□ Opportunity Cost Approach (outsider's viewpoint approach).

Defender



$$AW_1 (20\%) = -\$350,000 - \$40,000(A/P 20\%, 10) = -\$359,540/\text{year}$$

Challenger



$$AW_2 (20\%) = -\$800,000(A/P 20\%, 10) + \$100,000(A/F 20\%, 10) - \$120,000$$

$$AW_2 (20\%) = -\$306,964/\text{year}$$



Replace with new painting machine

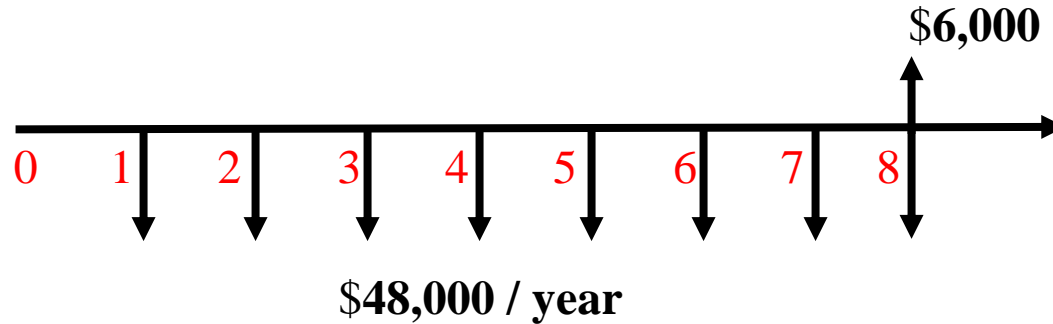
Problem 8 page 534

Dell is considering replacing one of its material handling systems. It has an annual O&M cost of \$48,000, a remaining operational life of 8 years, and an estimated salvage value of \$6,000 at that time. A new system can be purchased for \$175,000. It will be worth \$50,000 in 8 years, and it will have annual O&M costs of only \$17,000 per year due to new technology. If the new system is purchased, the old system will be traded in for \$55,000, even though the old system can be sold for only \$45,000 on the open market. Leasing a new system will cost \$31,000 per year, payable at the beginning of the year, plus operating costs of \$15,000 per year payable at year-end. If the new system is leased, the existing material handling system will be sold for its market value of \$45,000. Use an 8-year planning horizon, an annual worth analysis, and MARR of 15 percent to decide which material handling system to recommend: (1) keep existing, (2) trade in existing and purchase new, or (3) sell existing and lease.

- i. Use the cash flow approach (insider's viewpoint approach).
- ii. Use the opportunity cost approach (outsider's viewpoint approach)

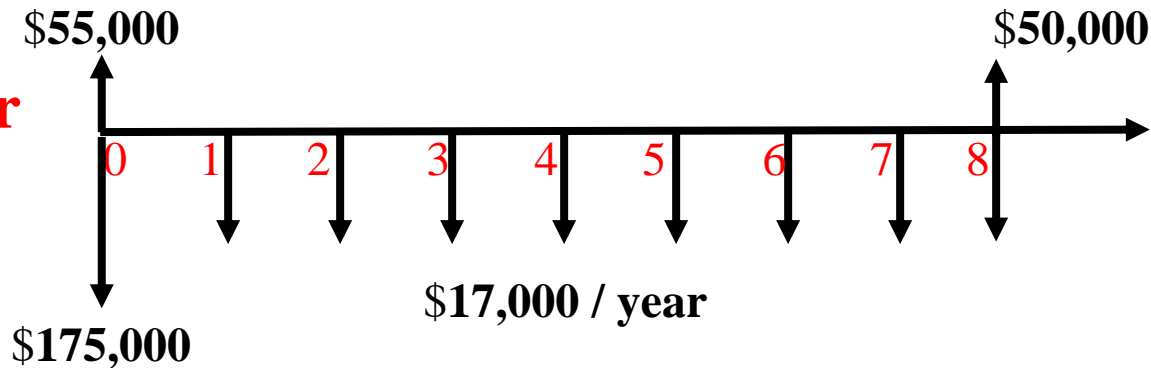
□ Cash Flow Approach (insider's viewpoint approach).

Defender



$$AW_1 (20\%) = -\$48,000 + \$6,000(A/F\ 15\%, 8) = -\$47,562.9 / \text{year}$$

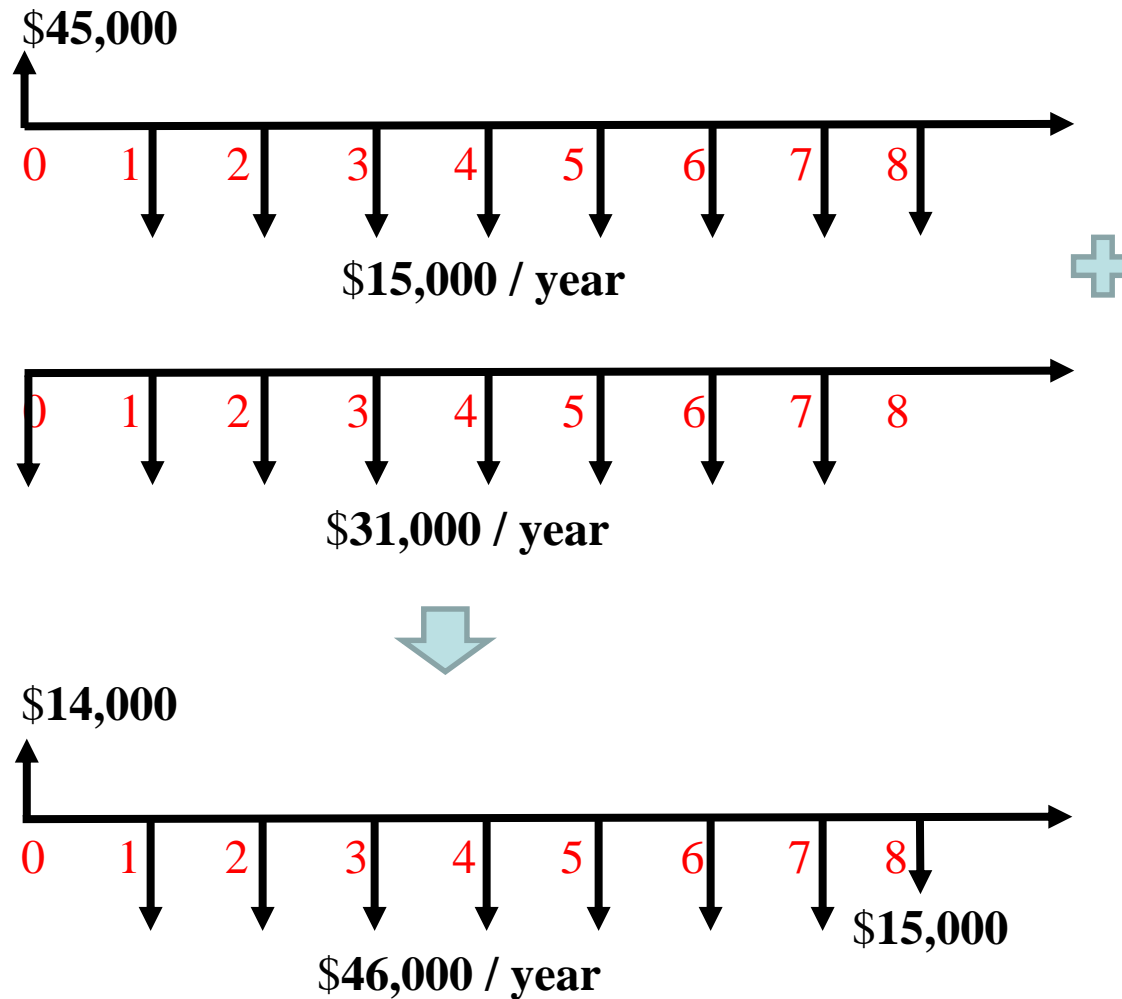
Challenger



$$AW_2 (20\%) = -\$120,000(A/P\ 15\%, 8) + \$500,00(A/F\ 15\%, 8) - \$17,000 = -\$40,099.5 / \text{year}$$

□ Cash Flow Approach (insider's viewpoint approach).

Lease

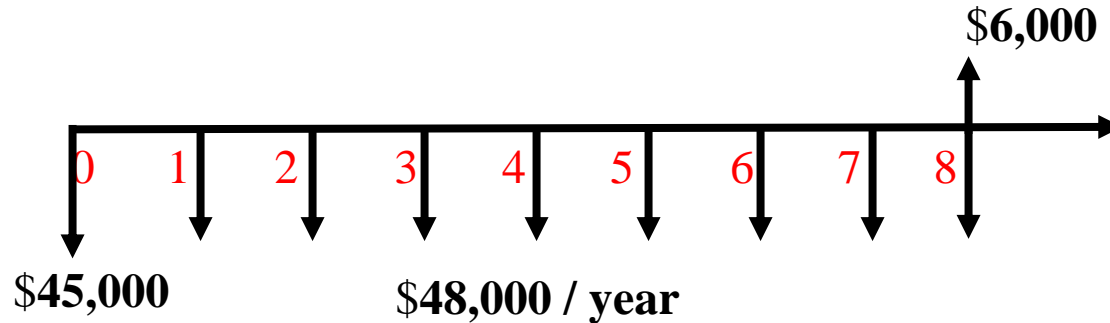


$$AW_3 (20\%) = [\$14,000 - \$46,000(P/A 15\%, 7) - \$15,000(P/F 15\%, 8)](A/P 15\%, 8)$$

$$AW_3 (20\%) = -\$40621.72 / \text{year} \quad \textit{Trade in existing and purchase new system}$$

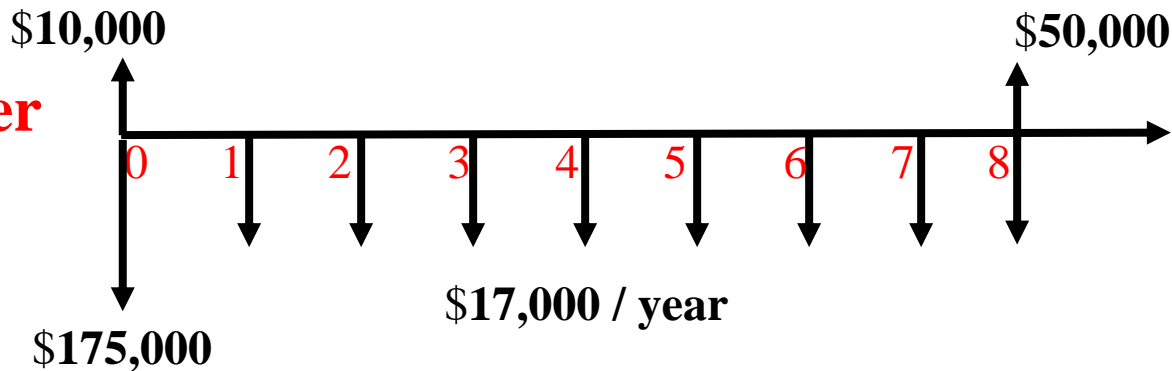
□ Opportunity Cost Approach (outsider's viewpoint approach).

Defender



$$AW_1 (20\%) = -\$45,000(A/P 15\%, 8) - \$48,000 + \$6,000(A/F 15\%, 8) = -\$57,591/\text{year}$$

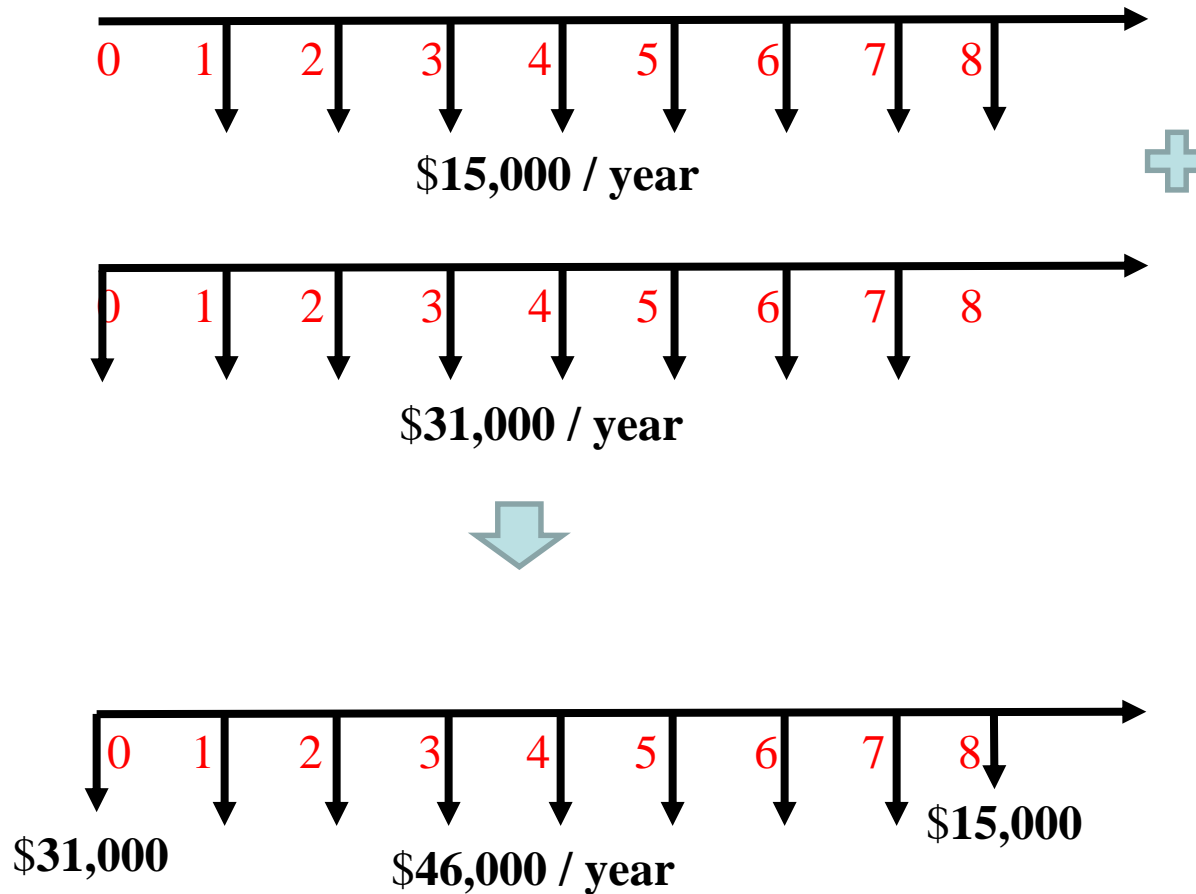
Challenger



$$AW_2 (20\%) = -\$165,000(A/P 15\%, 8) + \$50,000(A/F 15\%, 8) - \$17,000 = -\$50,127/\text{year}$$

□ Opportunity Cost Approach (outsider's viewpoint approach).

Lease



$$AW_3 (20\%) = [-\$31,000 - \$46,000(P/A\ 15\%, 7) - \$15,000(P/F\ 15\%, 8)](A/P\ 15\%, 8)$$

$$AW_3 (20\%) = \$50,649 / \text{year}$$

Trade in existing and purchase new system