LEcTure NOtes – 17a

Replacement - sunk cost no matter to decision today!

Cash flow approach

Opt 1: Defender (Def.)
- No additional for purchase
- May be maintain. Def.
- Annual oper. cost Def.
- Salvage value Def.

Opt 2: Challenger (Chal.)
- Reduce 1st cost by price of def. today
- Def. salvage value!
- May have repair cost before sell def.
- Ann. op. cost Chal.
- Salvage Chal.

Opportunity cost approach

Treat price of defender today as opportunity cost for keeping defender (x, y from Chal and to def, now)

Cost is the same

Econ. Service Life

\[ AEC = CR(i) + OC(i) \]

- Usually increasing function of time
- Usually decreasing function of time

Solution: Compute NET AEC for each year
- Replace a year after min w/ challenger
Lecture 17A

The biggest real-life problem is in valuing the defender.

**Priority Order:**

1. **Market Value** - (Usually most accurate)
   - Independent audit for Co. valuation
   - Want ads in paper/trade mag.
   - Selling/asking price @ auction

2. **Trade-In Value** - (Usually influenced by the salesman)
   - Must use if accepting lower price of replacement equip. (challenger price) from vendor - "Part & parcel of the deal"
   - Can shop equipment around different vendors to estimate true Mkt value from trade-in deals
   - Blue book price
   - Bank/savings & loan

3. **Book Value** - (Usually lowest value)
   - Book depreciation method is usually better at valuation than MACRS depreciation
Example 1

<table>
<thead>
<tr>
<th></th>
<th>Defender</th>
<th>Challenger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purchase Price</td>
<td>25,000 (3 yrs ago)</td>
<td>35,000 (6 yrs)</td>
</tr>
<tr>
<td>Life</td>
<td>3 years remaining</td>
<td>5 years</td>
</tr>
<tr>
<td>Book Value</td>
<td>12,000</td>
<td>10,000</td>
</tr>
<tr>
<td>Op Costs</td>
<td>9,000</td>
<td>7,000</td>
</tr>
<tr>
<td>Overhaul Cost</td>
<td>20,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Trade-In Value</td>
<td>15,000</td>
<td>0</td>
</tr>
<tr>
<td>Salvage Value</td>
<td>0</td>
<td>10,000</td>
</tr>
</tbody>
</table>

\[
\text{AEC}_d = 70,000 \left( AIP, 15\%, 5 \right) + 9,000 + 7,000
\]

\[
\text{AEC}_c = 60,000 \left( AIP, 15\%, 5 \right) + 12,000 - 10,000 \left( AIE, 15\%, 5 \right)
\]
Current

- Initial Cost
- Heating Cost: $500/month
- Improvement Life
- Salvage Value: $500
- Market Value
- MARR (?)

Overhaul

- Initial Cost: $1600
- Heating Cost: $450/month
- 10% efficiency improvement
- Improvement Life: 10 yrs.
- Salvage Value: $0

Challenger 1

- Initial Cost: $4200
- Heating Cost: $375/month
- 25% reduction
- Improvement Life: 10 yrs.
- Salvage Value: (4200 x 2) = 840

Challenger 2

- Initial Cost: $7000
- Heating Cost: $325/month
- 35% Savings
- Improvement Life: 10 yrs.
- Salvage Value: 7000(1.12^10) = 1400

**Overhaul Defender**

\[ PW_D = -2100 - 450 \times (P/A, 19\%, 120) = -33,465 \]

**Challenger 1**

\[ PW_{C1} = -4200 - 375 \times (P/A, 19\%, 120) + 840 \times (P/F, 19\%, 120) = -30,083 \]

**Challenger 2**

\[ PW_{C2} = -7000 - 325 \times (P/A, 19\%, 120) + 1400 \times (P/F, 19\%, 120) = -29,228 \]
LECTURE NOTES – 17A

Example 3

Initial Cost

Capacity

Unit Cost

Life

Salvage

Trade-in

Production Cost

C.F.D.

Cost of challenger:

Replacement cost: $45,000

800 units

5 years

$0.22

Challenger:

Current cost:$27,000

400 units

5 years

$0.26

Defender:

Identical cost:$27,000

400 units

5 years

$0.26

PWc = -$158,330

PWd = -$170,982