


PAYBACK 1:

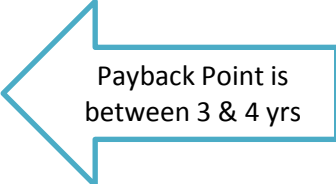
Year	Inflow/ (Outflow)	Cumulative
0	- 25,000	-25,000
1	8,000	-17,000
2	6,000	-11,000
3	5,000	-6,000
4	6,000	0
5	8,000	8,000



Payback period is 4 Yrs

PAYBACK 2:

Year	Inflow/ (Outflow)	Cumulative
0	- 20,000	-20,000
1	4,000	-16,000
2	6,000	-10,000
3	6,000	-4,000
4	7,000	3,000
5	6,000	9,000



Payback period is 3 Yrs and 6.86 months

PAYBACK 3:

Project		Yr 0	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
V	Cash Flow	-50000	14000	12000	20000	3000	35000
	Cumulative	-50,000	-36,000	-24,000	-4,000	-1,000	34,000
	Payback			4 Years		0.34 Months	
W	Cash Flow	-70000	15000	17000	18000	17000	50000
	Cumulative	-70,000	-55,000	-38,000	-20,000	-3,000	47,000
	Payback			4 Years		0.72 Months	
X	Cash Flow	-90000	20000	20000	20000	25000	40000
	Cumulative	-90,000	-70,000	-50,000	-30,000	-5,000	35,000
	Payback			4 Years		1.50 Months	
Y	Cash Flow	-100000	50000	30000	10000	11000	12000
	Cumulative	-100,000	-50,000	-20,000	-10,000	1,000	13,000
	Payback			3 Years		10.91 Months	
Z	Cash Flow	-150000	35000	35000	40000	35000	35000
	Cumulative	-150,000	-115,000	-80,000	-40,000	-5,000	30,000
	Payback			4 Years		1.71 Months	

Ranking (Preference Order)

- Y Shortest Pay back period
- W
- X
- V
- Z Longest Pay back period

PAYBACK 4:

Year	Profits after depreciation	Annual Depreciation	CASH Inflow/ (Outflow)	Cumulative
0			- 120,000	-120,000
1	12,000	12,000	24,000	-96,000
2	17,000	12,000	29,000	-67,000
3	28,000	12,000	40,000	-27,000
4	37,000	12,000	49,000	22,000
5	8,000	12,000	20,000	42,000

Payback Point is between 3 & 4 yrs

Depreciation is not a cash item - accounting adjustment so should be added back

Payback period is:

3 Yrs
6.61 Months

NOTE - Depreciation is over 10 years but for cash flow purposes we are looking at 5 yrs

£120,000 asset/ 10 yrs = £12,000 per year

PAYBACK 5:

Year	PROJECT X		PROJECT Y	
	Cash Flows £'000s	Cumulative £'000s	Cash Flows £'000s	Cumulative £'000s
0	-	500	-500	-500
1		50	-450	-460
2		75	-375	-400
3		110	-265	-270
4		200	-65	-95
5		130	65	285
6		300	365	535
7		250	615	685
8		200	815	785
9		100	915	835
10		50	965	855

Payback Period:

4 Years
6 Months4 Years
3 Months

Recommendation:

As both projects are mutually exclusive, then if the company wishes to recover the project cost in the shortest period - payback, then project Y should be chosen as this recovers costs 3 months earlier than project X. However note that the overall benefit to the company in terms of cashflow is greater with project X.

PAYBACK 6:

- 1) Annual Depreciation = £200k less residual resale value of £25 over 5 years
- 2) Residual value of £25k

PROJECT P				
Year	Profits after depreciation £'000s	Investment depreciation & residual value £'000s	Inflow/ (Outflow) £'000s	Cumulative £'000s
0			-	200
1	40	35	75	-200
2	50	35	85	-40
3	60	35	95	55
4	70	35	105	160
5	80	60	140	300

Payback Period: 2 Years
5.05 Months

PROJECT Q				
Year	Profits after depreciation £'000s	Investment depreciation & residual value £'000s	Inflow/ (Outflow) £'000s	Cumulative £'000s
0			-	200
1	30	35	65	-135
2	70	35	105	-30
3	40	35	75	45
4	60	35	95	140
5	100	60	160	300

Payback Period: 2 Years
4.80 Months

Recommendation:

As both projects are mutually exclusive, then if the company wishes to recover the project cost in the shortest period - payback, then project Q should be chosen as this recovers costs slightly earlier than project P. Note that the overall benefit to the company in terms of cashflow is the same with both projects.

ARR 4

PROJECT L

PROJECT M

Year	Investment £000's	Profits £000's	Investment £000's	Profits £000's
0	-750		-750	
1		100		200
2		150		300
3		200		400
4		250		250
5		300		250
6		350		200
7		400		150
8		200		125
Total		<u>1,950</u>		<u>1,875</u>
Avg Profit		<u>244</u>		<u>234</u>

(i) ARR - on INITIAL CAPITAL INVESTED

$\frac{\text{Avg Annual Profit} \times 100}{\text{Initial Capital Cost}}$

$$\frac{244 \times 100}{750} = \underline{\underline{32.50\%}}$$

$$\frac{234 \times 100}{750} = \underline{\underline{31.25\%}}$$

(i) ARR - on AVERAGE CAPITAL INVESTED

$\frac{\text{Avg Annual Profit} \times 100}{\text{Average Capital Cost}}$

$$\frac{244 \times 100}{(750 + 0)/2} = \underline{\underline{65.00\%}}$$

$$\frac{234 \times 100}{(750 + 0)/2} = \underline{\underline{62.50\%}}$$

ARR 5									
Initial Investment	£ 2,000,000				Initial Investment	£ 1,500,000			
Depreciation	(£2000K - £250)/5 YRS		350	per annum	(£1500K - £200)/5 YRS		260	per annum	
PROJECT S					PROJECT T				
Year	CASH FLOW	DEPRC	ANNUAL PROFIT		CASH FLOW	DEPRC	PROFIT		
	£000's	£000's	£000's		£000's	£000's	£000's		
1	1,800	350	1,450		1,500	260	1,240		
2	1,700	350	1,350		1,300	260	1,040		
3	1,400	350	1,050		1,000	260	740		
4	375	350	25		280	260	20		
5*	375	350	25		280	260	20		
TOTALS			3,900				3,060		
Avg Profit			780				612		
(i)	ARR - on INITIAL CAPITAL INVESTED								
	<u>Avg Annual Profit x 100</u>		780 x 100				612 x 100		
	Initial Capital Cost		2000				1500		
			39.00%				40.80%		
(i)	ARR - on AVERAGE CAPITAL INVESTED								
	<u>Avg Annual Profit x 100</u>		780 x 100				612 x 100		
	Average Capital Cost		(2000 + 250)/2				(1500 + 200)/2		
			69.33%				72.00%		
ALTERNATIVE LAY OUT									
Total Depreciation	(£2000K - £250)		1750		Total Depreciation	(£1500K - £200)	1300		
PROJECT S					PROJECT T				
Year	CASH FLOW				Year	CASH FLOW			
	£000's					£000's			
1	1,800				1	1,500			
2	1,700				2	1,300			
3	1,400				3	1,000			
4	375				4	280			
5*	375				5*	280			
TOTAL CASH FLOW	5,650				TOTAL CASH FLOW	4,360			
Less total depreciation	1,750				Less total depreciation	1,300			
TOTAL PROFITS	3,900				TOTAL PROFITS	3,060			
Avg Profit	780				Avg Profit	612			

BARCLAY LTD - PROJECT A

Year	Investment	Cash Inflow	Cumulative Cash Flow
0	-250,000		-250,000
1		85,000	-165,000
2		95,000	-70,000
3		100,000	30,000
4		65,000	95,000

Payback Period	2.70 years
or	2 years 8.40 months

Total Cash Inflows	345,000
Less total depreciation	- 250,000
Total Profits	95,000
Avg Profit	23,750

When given CASH FLOW, investment less residual value must be deducted to calculate PROFIT (equivalent of

(i) ARR - on INITIAL CAPITAL INVESTED

<u>Avg Annual Profit</u> x 100	<u>23,750</u> x 100	<u>9.50%</u>
Initial Capital Cost	250,000	

(i) ARR - on AVERAGE CAPITAL INVESTED

<u>Avg Annual Profit</u> x 100	<u>23,750</u> x 100	<u>19.00%</u>
Average Capital Cost	(250,000 + 0) / 2	

BARCLAY LTD - PROJECT B

Year	Investment	Cash Outflow/Inflow	Cumulative Cash Flow
0	-350,000		-350,000
1		60,000	-290,000
2		80,000	-210,000
3		100,000	-110,000
4		105,000	-5,000
5		200,000	195,000
6		150,000	345,000

Payback Period	4.03 years
or	4 years 0.30 months

Total Cash Inflows	695,000
Less total depreciation	- 350,000
Total Profits	345,000
Avg Profit	57,500

When given CASH FLOW, investment less residual value must be deducted to calculate PROFIT (equivalent of depreciation over project life)

(i) ARR - on INITIAL CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Initial Capital Cost}} = \frac{57,500 \times 100}{350,000} = \underline{\underline{16.43\%}}$$

(i) ARR - on AVERAGE CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Average Capital Cost}} = \frac{57,500 \times 100}{(350,000 + 0) / 2} = \underline{\underline{32.86\%}}$$

Barclay (alternative)

CALCULATION OF PAYBACK PERIOD

Project A - Payback Period = 2 years + (70/100 year) = **2.7 years**

Project B - Payback Period = 4 years + (5/200 year) = **4.0 years** (to one decimal place)

Using the Payback Period method, Project A is the better project since it pays back more quickly. Moreover, Project B would be ignored by this business because it takes more than three years to recoup the initial investment.

Year		Project A		Project B	
0	Initial cost	£250,000	Cum	£350,000	Cum
1	Cash inflow	£85,000	£85,000	£60,000	£60,000
2	Cash inflow	£95,000	£180,000	£80,000	£140,000
3	Cash inflow	£100,000	£280,000	£100,000	£240,000
4	Cash inflow	£65,000	£345,000	£105,000	£345,000
5	Cash inflow		£345,000	£200,000	£545,000
6	Cash inflow			£150,000	
7	Cash inflow				
8	Cash inflow				
		£70		£5	
		0.736842105		0.000025	
	ARR			ARR	
	total cash flows	£345,000		£695,000	
	total profit	£95,000		£345,000	
	average profit	£23,750		£57,500	
	ARR (on initial invest)	<u>9.5%</u>		<u>16.4%</u>	

- 2 Based on the ARR, Project B would be chosen as it gives the higher return.
There may be other, qualitative factors that influence the decision.

PROJECT ALPHA

Year	Investment	Cash Inflow	Cumulative Cash Flow
0	-1,500,000		-1,500,000
1		220,000	-1,280,000
2		350,000	-930,000
3		480,000	-450,000
4		550,000	100,000
5		400,000	500,000
Total Cash Inflows		2,000,000	
Less total depreciation		- 1,500,000	
Total Profits		500,000	
Avg Profit		100,000	

Payback Period	3.82 years
or	3 years 9.82 months

When given CASH FLOW, investment less residual value must be deducted to calculate PROFIT (equivalent of

(i) ARR - on INITIAL CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Initial Capital Cost}} = \frac{100,000 \times 100}{1,500,000} = \underline{\underline{6.67\%}}$$

(i) ARR - on AVERAGE CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Average Capital Cost}} = \frac{100,000 \times 100}{(1,500,000 + 0) / 2} = \underline{\underline{13.33\%}}$$

PROJECT DELTA

Year	Investment	Cash Outflow/Inflow	Cumulative Cash Flow
0	-1,500,000		-1,500,000
1		200,000	-1,300,000
2		280,000	-1,020,000
3		400,000	-620,000
4		560,000	-60,000
5		640,000	580,000

Payback Period	4.11 years
or	4 years 1.13 months

Total Cash Inflows	2,080,000
Less total depreciation	- 1,500,000
Total Profits	580,000
Avg Profit	116,000

When given CASH FLOW, investment less residual value must be deducted to calculate PROFIT (equivalent of depreciation over project life)

(i) ARR - on INITIAL CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Initial Capital Cost}} = \frac{116,000 \times 100}{1,500,000} = \underline{\underline{7.73\%}}$$

(i) ARR - on AVERAGE CAPITAL INVESTED

$$\frac{\text{Avg Annual Profit} \times 100}{\text{Average Capital Cost}} = \frac{116,000 \times 100}{(1,500,000 + 0) / 2} = \underline{\underline{15.47\%}}$$