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FINAL TERM PAPER of  
Construction Management.

Question 1:-

\* GIVEN DATA:-

Number of communication channels = 6.

Additional stakeholders = 2.

\* REQUIRED DATA:-

Identify the number of communication channels after increasing the scope of work = ?

\* SOLUTION:-

As we know that;

Number of communication channel =  $\frac{n(n-1)}{2}$

The number of people involved in

in communication channels  $\Rightarrow 6 = \frac{n(n-1)}{2}$

$$12 = n(n-1) = n^2 - n$$

$$n^2 - n - 12 = 0$$

$$n^2 - 4n + 3n - 12 = 0$$

$$n(n-4) + 3(n-4) = 0$$

$$(n-4)(n+3) = 0$$

$$\begin{array}{l} n-4 = 0 \\ n = 4 \end{array} \quad \left\{ \begin{array}{l} n+3 = 0 \\ n = -3 \end{array} \right.$$

So, the number of people involved = 4

As these are additional stakeholders

So, total number of people are;

$$n = 4 + 2$$

$$n = 6$$

Now the required communication

$$\text{channel} = \frac{6(6-1)}{2}$$

$$= \frac{3 \cancel{6} (6-1)}{\cancel{2}} = 3(5)$$

New communication channel = 15  
Ans.

## Question 2 :-

### \* GIVEN DATA -

$\Rightarrow$  Total no. of Package = 10  
 $\Rightarrow$  for each package Planned value  
Actual cost & %age of completion  
is known.

So find:-

for each package

- (1) Earned value = (EV) = ?
- (2) Cost variance = (CV) = ?
- (3) Schedule variance = (SV) = ?
- (4) Cost performance Index = CPI = ?
- (5) Schedule performance Index = (SPI) = ?
- (6) Comment on each package.

### \* Solution:-

Work Package 1.

- (1) Earned value (EV)

By formula

$EV = \text{Planned value} \times \text{Rate of Performance.}$

$$EV = PV \times RP$$

$$EV = \$100000 \times 100\%$$

$$EV = \$100000 \times 2$$

$$EV = \$100000$$

(2) COST VARIANCE (CV) -

$$CV = EV - AC$$

$$= \$100000 - 120,000$$

$$CV = -20000.$$

(3) Schedule VARIANCE -

$$SV = EV - PV$$

$$= 100000 - 100000$$

$$SV = 0.$$

(4) Cost Performance Index -

$$CPI = \frac{EV}{AC} = \frac{100000}{120000} = 0.83.$$

(5) Schedule Performance Index:-

$$CPI = \frac{107000}{107000} = 1$$

\* Comments on work Package 1:-

As we see the  $SU = 0$ ,  
 $SP I = 1$  that means the project is  
exactly on the plan path 100%.

$\Rightarrow$  As we see that  $CV$  is (-ve) & cost  
performance index is less than 1 when  
means that the project is over budgeted.

\* work Page 2:-

(1) EARNED VALUE (EV)

$$EV = PV \times RP$$

$$EV = 100000 \times 100\%$$

$$EV = 100000 \times 1$$

$$EV = 1000,000 \text{ \$}$$

(2) Cost Variance:-

$$CV = EV - AC$$

$$CV = 100,000 - 110,000$$

$$CV = -10000 \text{ ₹}$$

(3) Schedule Variance:-

$$\begin{aligned} SV &= EV - PV \\ &= 100,000 - 100,000 \\ &= SV = 0 \text{ ₹} \end{aligned}$$

(4) Cost Performance Index:-

$$CPI = \frac{EV}{AC} = \frac{100000}{110000}$$

$$CPI = 0.90$$

(5) Schedule Performance Index:-

$$SPI = \frac{EV}{PV} = \frac{100000}{100000} = 1$$

$$SPI = 1$$

\*Comments:-

Project is exactly on the base line  
As  $SV = 0$  ₹ &  $SPI = 1$  but in terms  
of cost the project is over budgeted  
as  $CV$  is (-ve) ₹ &  $(CPI)$  is less than 1.

## \* Work Package 31-

$$(1) \text{ earned value} = EV = PV \times \frac{RP}{RT}$$

$$EV = 1000,000 \times 90\%$$

$$= 90,000 \$$$

(2) Cost Variance :-

$$CV = EV - AC$$

$$CV = 90,000 - 80,000$$

$$CV = 10,000 \$$$

(3) Schedule Variance = SV.

$$SV = EV - PV$$

$$= 90,000 - 100,000$$

$$SV = -10,000 \$$$

(4) Cost Performance Index CPI -

$$CPI = \frac{EV}{AC} = \frac{90,000}{80,000} = 1.125$$

(5) Schedule Performance Index -

$$SPI = EV/PV = \frac{90,000}{100,000}$$

$$SPI = 0.9$$



\* Comments:-

As we see that in terms of cost the project is under budgeted because the cr & CPI is the (+ve) of above than 1 but in terms of scheduling the project is potentially behind the base line as SV = -ve & SPI is less than 1.

Work Package	PV	AC	EV	PV
1	100,000	120,000	100,000	100% <del>70%</del>
2	100,000	110,000	100,000	100%
3	100,000	80,000	90,000	90%
4	100,000	125,000	80,000	80%
5	100,000	75,000	50,000	50%
6	100,000	0.00	0.00	0%
7	100,000	0.00	0.00	0%

$$CU = EV - AC$$

$$SPI = EV/AC$$

$$SV = EV - PV$$

$$SPI = EV/PV$$

Complete Perf Index.

$$CPI = \frac{BAC - EV}{BAC - AC}$$

$$= \frac{700000 - 420000}{700000 - 510000}$$

$$= \frac{380000}{190000}$$

$$CPI = 2.$$

$$ETC = \frac{BAC - EV}{CPI}$$

$$= \frac{700000 - 420,000}{0.5}$$

$$= \frac{280,000}{0.82}$$

$$ETC = 341463.41$$

OR.

$$ETC = EAC - AC$$
$$853658 - 510,000$$
$$ETC = 343658.$$

Estimation at completion.

$$EAC = BAC \div CPI$$
$$= \frac{700000}{0.82}$$

$$EAC = 853658$$

OR.

$$EAC = \frac{700,000}{0.6} = \frac{BAC}{SPI}$$
$$= 1166666.67$$

$$PV = 700,000$$

$$AC = 510,000$$

$$EV = 420,000$$

$$CV = 420,000 - 510,000 = -90,000$$

$$SV = 420,000 - 700,000 = -280,000$$

$$CPI = \frac{420,000}{510,000} = 0.82$$

$$SPI = \frac{420,000}{700,000} = 0.6$$

So it is over the budget schedule.

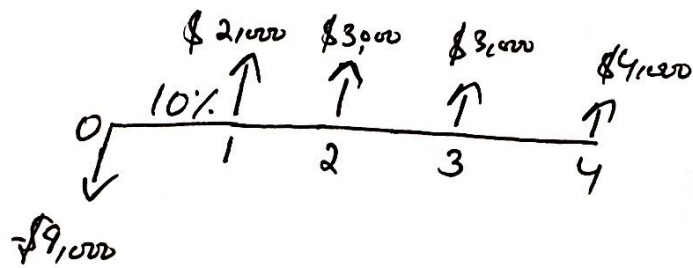


Work package	BCWS	ACWP	Progress	BCWP	(CV)	CPI	SPI	SV
	Planned value (PV)	Actual cost (AC)	%	Earned value (EV)	EV-AC	EV/AC	EV/PV	EV-PV
1	\$ 100,000.00	\$ 120,000.00	100%	\$100,000.00	\$ (20,000.00)	0.83	1.00	\$ -
2	\$ 100,000.00	\$ 110,000.00	100%	\$100,000.00	\$ (10,000.00)	0.91	1.00	\$ -
3	\$ 100,000.00	\$ 80,000.00	90%	\$ 90,000.00	\$ 10,000.00	1.13	0.90	\$ (10,000.00)
4	\$ 100,000.00	\$ 125,000.00	80%	\$ 80,000.00	\$ (45,000.00)	0.64	0.80	\$ (20,000.00)
5	\$ 100,000.00	\$ 75,000.00	50%	\$ 50,000.00	\$ (25,000.00)	0.67	0.50	\$ (50,000.00)
6	\$ 100,000.00	\$ -	0%	\$ -	\$ -	0.00	0.00	\$(100,000.00)
7	\$ 100,000.00	\$ -	0%	\$ -	\$ -	0.00	0.00	\$(100,000.00)
8	\$ 100,000.00	\$ -	0%	\$ -	\$ -	0.00	0.00	\$(100,000.00)
9	\$ 100,000.00	\$ -	0%	\$ -	\$ -	0.00	0.00	\$(100,000.00)
10	\$ 100,000.00	\$ -	0%	\$ -	\$ -	0.00	0.00	\$(100,000.00)
BAC								

**Comment: The Project is over schedule and Over budget.**

Q NO : 3

A company is planning to invest \$4000 in a project today. The project is expected to have a life of four years. Calculate Net Present Value (NPV) & comment on the result?



\* Sol:-

As we know

$$NPV = C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_T}{(1+r)^T}$$

$$P_{V0} = -C_0$$

$$P_{V0} = -9000$$

$$P_{V1} = \frac{C_1}{1+r} = \left( \frac{2000}{1+10/100} \right)$$

$$P_{V1} = 1818.18$$

$-C_0$  = Initial investment

$C$  = Cash flow

$r$  = Discount rate

$T$  = Time

$$C_1 = 2000$$

$$C_2 = 3000$$

$$C_3 = 3000$$

$$C_4 = 4000$$

$$PV_2 = \frac{C_2}{(1+r)^2} = \frac{3000}{\left(1 + \frac{10}{100}\right)^2}$$

$$PV_2 = 2479.34$$

$$PV_3 = \frac{C_3}{(1+r)^3} = \frac{3000}{\left(1 + \frac{10}{100}\right)^3}$$

$$PV_3 = 2253.94.$$

$$PV_4 = \frac{C_4}{(1+r)^4}$$

$$= \frac{4000}{\left(1 + \frac{10}{100}\right)^4}$$

$$PV_4 = 2732.05$$

$$\begin{aligned} \text{So, NPV} &= -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \frac{C_3}{(1+r)^3} + \frac{C_4}{(1+r)^4} \\ &= -9000 + 1818.18 + 2479.34 + 2253.94 + 2732.05 \end{aligned}$$

$$NPV = \$ 283.51$$

Ans.

QUESTION NO: 4:-

ANSWER:- THE POWER/INTEREST MATRIX:-

classifies stakeholders in relation to their power & the extent to which they are likely to show interests in the actions of the organization.

=> It can be used to indicate the nature of the relationship which should be adopted with each group.

LEVEL of INTEREST.

	Low	A Minimal effort	B Keep informed
<u>Power</u>	High	C Keep satisfied	D Key players



## \* POWER / INTEREST MATRIX:-

### (1) STAKE HOLDERS IN GROUP A:-

Effort an <sup>Need only minimum</sup> monitoring.

### (2) STAKE HOLDERS IN GROUP B:-

Informed as they <sup>It should be kept</sup> may be able to influence more powerful stakeholders.

### (3) STAKE-HOLDERS IN GROUP C:-

level of interest is <sup>Are powerful but</sup> low, generally expected to be passive but may move into group D on an issue of particular interest.

(4) STAKE HOLDERS IN GROUP 1)-

Are both powerful and interested. Their co-operation is of key importance for new strategies.

QUESTION : 5.

ANSWER:-

\* CHECK LIST FOR RISK MANAGEMENT:-

Stage : 1 Initiation.

- ⇒ Assemble risk management resources.
- ⇒ Appoint the team leader & ensure a breadth of skills/experience within the team.
- ⇒ Assign risk management responsibilities appropriate to task.

## \* STAGE 2 PERSONAL FAMILIARIZATION

- ⇒ Specify objectives & criteria.
- ⇒ Familiarise the team with the Proposal, assemble documentation & define the key objectives.
- ⇒ Assess the proposal in relation to the Agency's objectives & strategies.
- ⇒ Determine assessment criteria for proposal.
- ⇒ Define key elements (target 20-50 elements items or activities) to structure risk analysis.

## \* STAGE 3 RISK ANALYSIS-

- ⇒ Identify risks.
- ⇒ Prepare a comprehensive schedule of risks for each element.

⇒ Describe each list & risk the main assumptions.

\* Assesses Risk likelihoods & consequences:-

⇒ Assemble data on risk & their consequences.

⇒ Assess risk likelihoods.

⇒ Assess risk impacts.

\* Identify significant risks.

⇒ Rank risks to reflect impacts & likelihoods.

⇒ where applicable estimate risk factors.

⇒ Discard / accept minor risks.

⇒ Identify moderate risks for management measures.

⇒ Identify major risks for detailed risk action planning.

## \* STAGE 4 Risk Response Planning

⇒ Identify feasible responses.

⇒ For each moderate & major risk, identify the feasible responses.

⇒ Responses may include.

- a) risk prevention
- b) impact mitigation
- c) risk transfer & insurance.
- d) risk acceptance.