

Notes by-

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CONSTRUCTION MANAGEMENT

ASSIGNMENT NO. 05

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Assignment No. 4.

Q.1. Write short note on DPR.

Detailed Project Report (DPR) :-

The DPR contains techno economic feasibility report in a more detailed format. The main idea of DPR preparation is to formally communicate the project promoters decision of venturing a new project to financial institutions for their personal & governmental departments for getting their approvals.

The main sub divisions of DPR are as follows:

- a) General information about the project.
- b) Back ground & experience of project promoters.
- c) Details & working results of industrial concerns already owned by project promoters.
- d) Details of project capacity.
 - 1) Plant capacity.
 - 2) Manufacturing processes.
 - 3) Tie up
 - 4) Mgt. team for project.
 - 5) Details of land, building plant & machinery.
 - 6) Details of industrial & infrastructural facilities.
 - 7) Raw materials availabilities.
 - 8) Effluents produced by the project.
 - 9) Sequence of implementation of project.
- e) Project cost.
- f) Means of financing the project.

- i) Working capital requirements.
- ii) Marketing & selling arrangements.
- iii) Profitability & cash flow estimates.
- iv) Mode of repayment of loan.
- v) Government approvals of local body consents & other permissions.
- vi) Details of co-lateral security that can be afforded to financial institutions.

Q-2. How will you compare two project alternatives for a construction project to carry out economic analysis.

Let there be two types of projects, namely project 'P' & project 'Q'.

These two projects can be compared based on following two keys.

- 1) Net Present Value.
- 2) Benefit - Cost Ratio.
- 3) Internal Rate of Return.

i) Net Present Value :-

$$NPV = \{ \text{Present value of cash inflow} \} - \{ \text{Present value of cash outflow} \}$$

First, NPV of both projects P & Q are calculated. Then it is compared that which NPV is greater.

If,

$NPV = 0$, i.e. cash inflow = cash outflow

$NPV < 1$ i.e. cash inflow > cash outflow.

$NPV > 1$ i.e. cash inflow < cash outflow.

If $(NPV \text{ of } P) > (NPV \text{ of } Q)$

i.e. it is positive project, P will be much more viable or vice-versa. The better project is then selected for implementation.

2) Based on Benefit-Cost Ratio (BCR):-

$$B/C = \frac{\text{Annual Benefit}}{\text{Annual cost}}$$

$$P_n = \frac{(1+i)^n - 1}{(1+i)^n \cdot i}$$

The B/C of project P & Q are calculated at specified percentage of discounted. If BCR is more than 1 it indicates the benefits from project are excess of cost incurred towards the project.

Q. 3. Explain various methods of project evaluation.

following are the methods of project evaluation.

1) Non-discounted cash flow

a) Payback period method.

b) Accounting Rate of Return method.

2) Discounted Cash flow techniques :-

a) Net Present Value method (NPV)

b) Internal Rate of Return (IRR)

c) Profitability Index method (PI)

d) Benefit Cost Ratio method (BCR)

1) Discounted cash flow techniques :-

a) Net Present value (NPV) method :-

It recognize time value of money.

$$NPV \text{ of cash flow} = \left\{ \begin{array}{l} \text{Present value of all future cash inflow over life of project.} \\ \hline \end{array} \right\} - \left\{ \begin{array}{l} \text{Present value of cash out flow} \\ \hline \end{array} \right\}$$

The present value of future cash inflows is arrived at by discounting future cash inflows at an interest rate equal to cash cost of project.

$$NPV = \left[\frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \dots + \frac{CF_n}{(1+r)^n} \right] - CF_0$$

Where,

$CF_1, CF_2, CF_3, \dots, CF_n$ = Future cash inflow occurring at end of 1st, 2nd, 3rd, ... nth year.

n = Life of project in year.

r = Discount Rate.

C_{F0} = Present cash outflow.

If,

$NPV = 0$, C_{F0} & $C_{F1}, C_{F2}, C_{F3}, \dots, C_{Fn}$ are equal.

$NPV > 1$, $C_{F0} < C_{Fn}$

$NPV < 1$, $C_{F0} > C_{Fn}$

b) Profitability Index (PI) method:-

If there are two projects that requires same amount of investment, the project with a higher NPV can be chosen. If two projects have different investment outlays comparing the NPV of the projects will not give correct picture; since NPV indicates excess of present value of cash inflow over cash outflow in absolute term.

$$\text{Profitability Index} = \frac{\text{Present value of cash inflow}}{\text{Present value of cash outflow}}$$

c) Internal Rate of Return (IRR) method:-

The IRR of a project is discount rate that makes NPV equals to zero. In other words, IRR is that rate of return discount which would equate present value of cashoutflow to

present value of cash inflow.

d) Benefit Cost Ratio (BCR) method:-

This is another version of NPV. In this, benefits from project are reduced to their present values at a specified rate of discount & this figure is divided by present value of cost of project.
(i.e. cash outflow.)

$$BCR = \frac{\text{Present value of cash inflow}}{\text{Present value of cash outflow}}$$

$$\text{Net BCR (NBCR)} = BCR - 1$$

$$\text{if } BCR > 1 \text{ i.e. NBCR} > 1$$

It indicates that benefit from project are in excess of cost incurred towards the project.

As in BCR, cash outflows that occur over a period are reduced to their present values
BCR differs from P.I.

Q.4. A. Tombu lift irrigation scheme is to be established at a site 10 km away from Karad district Satara. Prepare list of items to be included in feasibility report & explain each. Assume suitable data if necessary.

The first step in development of a project is to analyse need of a client. This requires a critical examination of needs through feasibility studies.

The feasibility study evaluates project potential by examining technical feasibility, economic viability & financial implementations.

1) Proposed Project features:-

In this site, for lift irrigation is selected & then is thoroughly examined whether site is suitable or not & lifting of water is made from wires or canal & what is elevation of selected site. A thorough examination for this is carried out.

2) Demand Survey:-

It includes customers prospective consumption pattern, existing market, government policy, demand forecast & scale potential.

In this, the capacity of scheme is decided

& by how much extent it will satisfy the demand is decided.

3) Technical studies:-

This cover process selection, construction methodology, location study power & local sources availability, means of transportation, scope of work outline project organisation & statement of project time & cost objectives.

4) Financial Implementations:-

It contains sales forecast project budget, capital cost, profitability trends, payback period, NPV, cash flow forecast & sources of financing for Tembhoo lift irrigation scheme.

5) Economic viability:-

It highlight social implementations & cost benefit analysis. First total cost of project is estimated & how much benefit will come is estimated & then BCR is calculated. If $BCR > 1$, then scheme is feasible.

6) Summary of Recommendation:- In this, sizes of project, evaluation of site, capacity of project are specified in a written form & on standard one.

Q.5. A bridge project is to be estimated established at a site 100 km from Nasik. Prepare list of items to be included in feasibility report & explain each one.

The feasibility report of bridge project shall include following points.

1) Proposed project features:-

The examination of site, whether work can run properly or not, load coming on bridge, type of vehicular load, light, medium, or heavy availability of materials etc. are carried out.

2) Demand Survey:-

It includes prospective users existing conditions, governmental policy, demand forecast, scale potential, type of traffic to be handled.

In this load carrying capacity of project is decided & by how much extent it will enter needs of public is forecasted.

3) Technical studies:-

It covers procedure of site selection, type of construction, local sources, means of transportation, scope of work, time required for completion, outline project organisation & cost estimates.

4) Financial implementations:-

It includes primarily project budget, capital costs, profitability trend, payback period, NPV cashflow forecast & sources of finance.

5) Economic viability:-

It highlights social implementations & benefit cost analysis. First total cost of project is estimated & if tell is changed, the benefit have to be estimated & calculated.

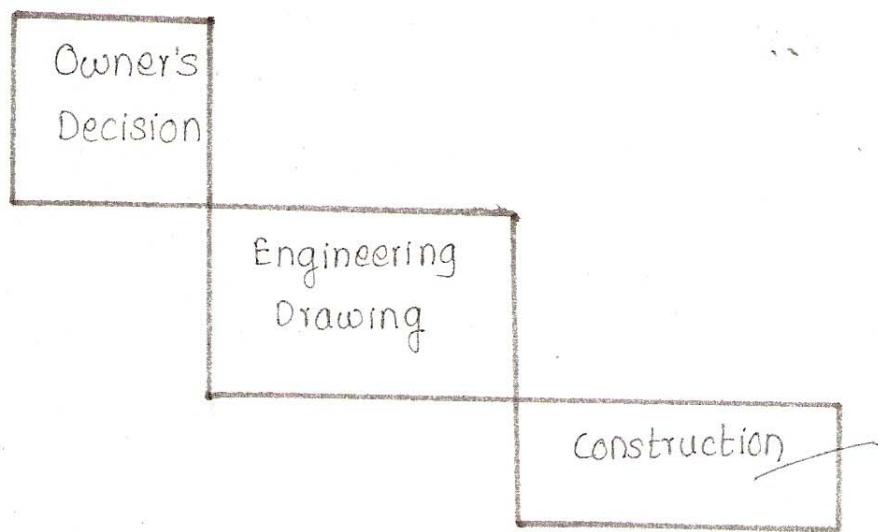
6) Summary of Recommendation:-

In this, size of project evaluation or site capacity of the project are specified in written form on standard one.

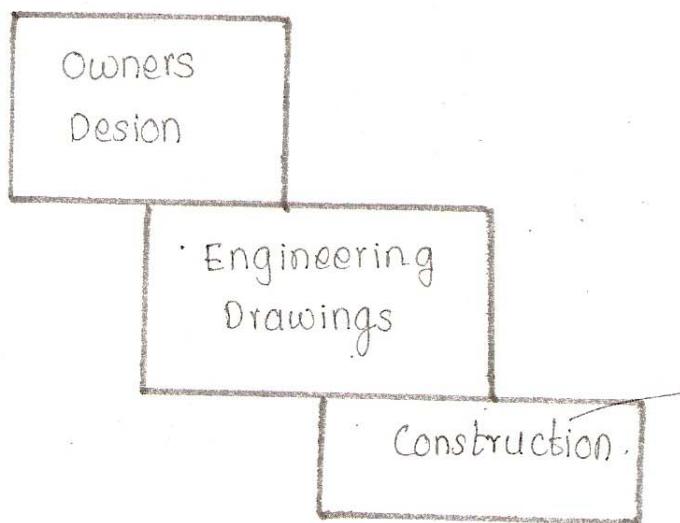
Q.6. Explain in detail "Fast Track Technique."

Fast Track Technique:-

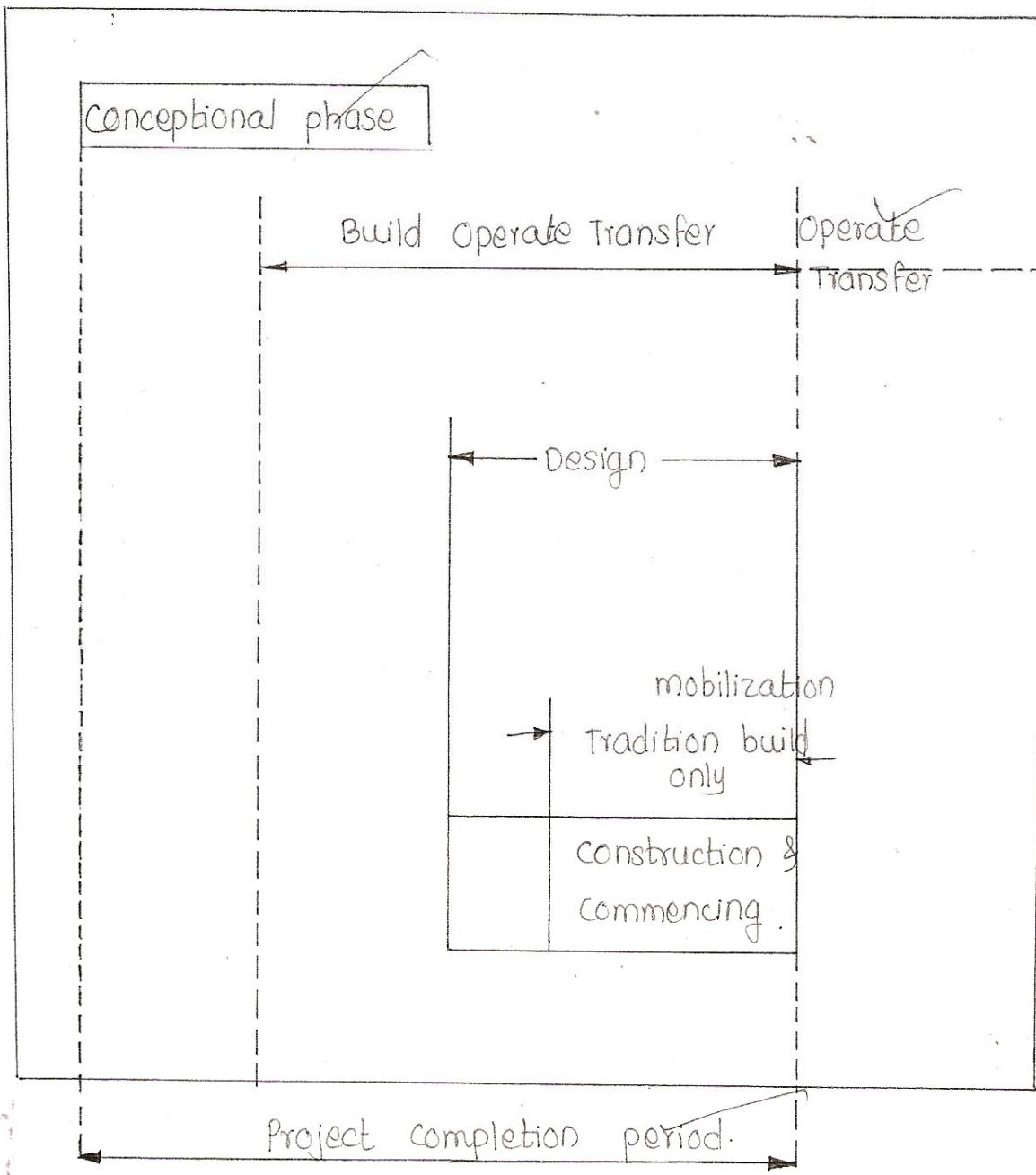
Traditionally, the construction mgt., processes follow a sequential approach. It starts with owners decision to produce facility & is followed by decision finalisation by architect, Engg. associates & is delivered by contractor under the supervision of client consultant. Each stage is completed prior to commencement of next stage.



Sequential Traditional approach.



Fast Track Technique.



Modes of fast track approach in capital projects.

Fast track development approach aims at reducing project construction time by overlapping project development phases. The emerging trend for economically speeding up of constⁿ process by a potential owner is to engage An experienced professional agent or agency to co-ordinate the entire constⁿ process including project feasibility, design guidance, contracting planning & execution with the objective of minimizing the constⁿ time & cost & maintaining the quality that meets owners requirements. This mode of processing constⁿ is termed as professional constⁿ mgt.

It is designed to overview as well as assist working of project manager, designer, & specialise sub contractors.

The first track approach uses the Build Operate Transfer family of technique. The BOT family includes a variety of build, operate, Transfer, (BOT), Build Own Operate (BOO), Built own Operate & Transfer (BOOT).

The first track approach requires high degree of co-ordination & transfer information processing to keep pace with constⁿ.

Q. 7. Two mutually exclusive project involve an investment of Rs 10,000/- each at cost of capital as 16%. Their net cash inflow within first five years are predicted as mentioned below. Calculate NPV in each case. Which project alternative is desirable for organisation.

Project	Year	1	2	3	4	5
A		4500	2000	3000	3800	3400
B		1000	1500	5000	4000	4000

Solⁿ: Given: $CF_0 = 10,000/-$

$$r = 16\% \\ = 0.16$$

$$NPV = \left[\frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \frac{CF_3}{(1+r)^3} + \frac{CF_4}{(1+r)^4} + \frac{CF_5}{(1+r)^5} \right] - CF_0$$

$$NPV_A = \left[\frac{4000}{(1+0.16)^1} + \frac{2000}{(1+0.16)^2} + \frac{3000}{(1+0.16)^3} + \frac{3800}{(1+0.16)^4} + \frac{3400}{(1+0.16)^5} \right] - 10 \times 10^3 \\ = 1005.09/-$$

$$NPV_B = \left[\frac{1000}{(1+0.16)^1} + \frac{1500}{(1+0.16)^2} + \frac{5000}{(1+0.16)^3} + \frac{4000}{(1+0.16)^4} + \frac{4000}{(1+0.16)^5} \right] - 10 \times 10^3 \\ = 1221.57/- \\ = 122.15/-$$

As NPV of project A > NPV of project B,
Project A is viable.

Q. 8. For a project with a given data, calculate IRR

Year	0	1	2	3	4	5	6
Cashflow	12×10^5	12×10^5	12×10^5	12×10^5	12×10^5	12×10^5	12×10^5
Cashinflow	-	4×10^5	2.5×10^5	2.5×10^5	2×10^5	2×10^5	1.5×10^5

Soln: let 'r' be the internal rate of return (IRR) is calculated by equating present value of cashinflow & CF₀.

$$\therefore 12 \times 10^5 = \frac{4 \times 10^5}{(1+r)^1} + \frac{2.5 \times 10^5}{(1+r)^2} + \frac{2.5 \times 10^5}{(1+r)^3} + \frac{2 \times 10^5}{(1+r)^4} + \frac{2 \times 10^5}{(1+r)^5} + \frac{1.5 \times 10^5}{(1+r)^6}$$

IRR is calculated by trial & error method.

Let us assume r = 10%.

$$\therefore \text{Cash inflow} = \frac{4 \times 10^5}{(1.1)^1} + \frac{2.5 \times 10^5}{(1.1)^2} + \frac{2.5 \times 10^5}{(1.1)^3} + \frac{2 \times 10^5}{(1.1)^4} + \frac{2 \times 10^5}{(1.1)^5} + \frac{1.5 \times 10^5}{(1.1)^6}$$

$$= 11.03 \times 10^5 \neq 12 \times 10^5 = \text{cash out flow}.$$

∴ Assume r = 11%.

$$\begin{aligned}\therefore \text{cash inflow} &= \frac{4 \times 10^5}{(1.11)^1} + \frac{2.5 \times 10^5}{(1.11)^2} + \frac{2.5 \times 10^5}{(1.11)^3} + \frac{2 \times 10^5}{(1.11)^4} + \frac{2 \times 10^5}{(1.11)^5} + \frac{1.5 \times 10^5}{(1.11)^6} \\ &= 10.7 \times 10^5 \\ &\neq 12 \times 10^5 = \text{cash outflow.}\end{aligned}$$

\therefore Assume lower value of r

\therefore Assume $r = 6.5\%$

$$\begin{aligned}\therefore \text{cash inflow} &= \frac{4 \times 10^5}{(1.065)^1} + \frac{2.5 \times 10^5}{(1.065)^2} + \frac{2.5 \times 10^5}{(1.065)^3} + \frac{2 \times 10^5}{(1.065)^4} \\ &\quad + \frac{2 \times 10^5}{(1.065)^5} + \frac{1.5 \times 10^5}{(1.065)^6} \\ &= 12.07 \times 10^5 \\ &\approx 12 \times 10^5\end{aligned}$$

$\therefore IRR = 6.5\%$

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