

PROJECT COST AND VALUE MANAGEMENT

- Cost classification, cost codes,
- Resource planning schedules,
- Cost planning,
- Cost budgeting,
- Value management in construction,
- time cost trade-off in construction projects, compression and decompression

PROJECT COST MANAGEMENT

“ is all about controlling cost of the resources needed to complete project activities”

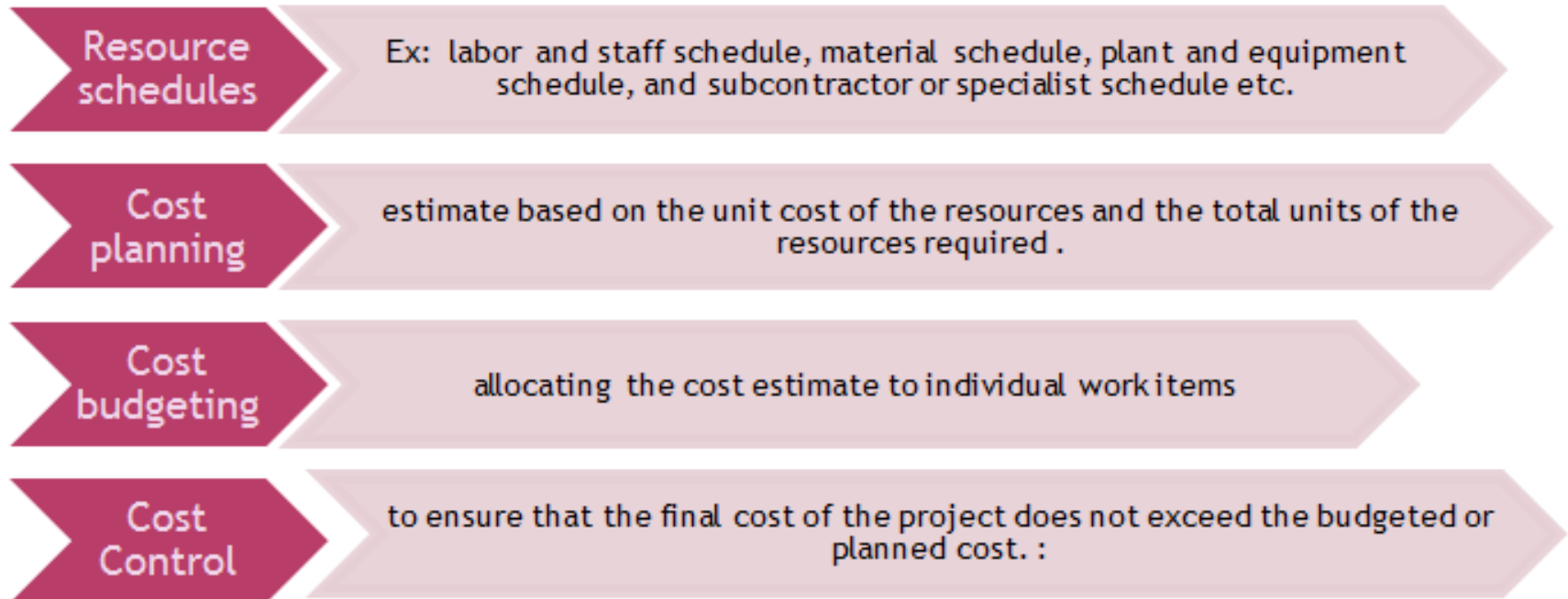
- ◉ Controllable costs
- ◉ Uncontrollable costs subject matter of risk management.

Estimate is progressively developed

1. *Conceptual stage rough estimate based on previous projects of similar size and nature I*
2.
3. ...
4. ...
5. *Detailed estimate when the scope gets clearer and a detailed design is ready.*
6. Planner and estimator should be continuously examining the cost aspects throughout the design process, ('ls a particular feature, material, or component really giving value for money?')

PROJECT COST MANAGEMENT

FOUR BROAD STEPS.....



Work items : groups of similar activities taken from BOQ

For ex: excavation at diff. depths, diff. grades of concreting

COLLECTION OF COST-RELATED INFORMATION

Major cost heads and relevant documents to assist in cost compilation



◉ Labour Cost:

1. Directly employed (departmental labor) :

- daily labour attendance and allocation form

2. Subcontract labour

- subcontract bill

◉ miscellaneous labour:

- cannot be associated with any activity cost codes; they are termed as miscellaneous labour and find their place in overhead cost.

Project name			Time office in-charge		
Name of the worker	Category	Cost code	In-time	Out-time	Signature

Figure 12.2 A typical format for recording daily labour attendance

○ Material Cost

1. Client's Supply

2. Own purchase

(I) Bulk or basic materials

(ii) Heavy tools

(iii) Scaffolding/staging materials

(iv) Temporary structures/installation

(v) Small tools

Project name

S. No.	Description	UOM	Quantity	Cost code	Rate	Amount	Remarks
Requisition by							
Authorized by							
Storekeeper							
Planning engineer							

Figure 12.3 A typical indent format for requisition of material used in projects

All figures in Rs.							
Cost code	Description	Labour cost	Subcontract cost	Material cost	Plant cost	Overheads	Total
	Bid items						
2010	Excavation	92,233	1,081,975	590,604			1,764,812
2100	Reinforcement	126,809	7,380,561	46,472,033	2,452,271		56,431,674
	Infrastructure						
1501	Labour colony	123,861	1,191,575	761,994	452,687		2,530,117
1505	Approach road		29,907				29,907
	Overheads						
1020	Conveyance	52,193	1,062,573		137,481	513,511	1,765,758
1130	Taxes					1,480,085	1,480,085
		395,096	10,746,591	47,824,631	3,042,439	1,993,596	64,002,353
		↓	↓	↓	↓	↓	
	Source of charges:	Time office	Subcontract records	Stores	Cost statement of plant and equipment	Voucher payment	

Figure 12.6 Integrated cost statement

CONTRACTORS' COST-CONTROL AND MONITORING PROCEDURES

Purposes of a contractors' cost-control system:

1. comparing actual with budgeted expenses and thus draw attention, in a timely manner, to operations that are deviating from the project budget;
2. to develop a database of productivity and cost-performance for use in estimating the costs of subsequent projects;
3. to generate data for valuing variations to the contract and potential claims for additional payments

TYPES OF CONTRACTORS' PROJECT COST-CONTROL SYSTEMS

- ⦿ 1. cost-value reconciliation (used by building contractors);
- ⦿ 2. contract variance - unit costing (used by civil engineering contractors)
- ⦿ 3. **earned value analysis** (US approach/used on major projects).

METHOD 1: COST-VALUE RECONCILIATION (CVR)

- ◉ *brings together the established totals for cost and value to illustrate the profitability of a company.*

EXAMPLE OF MONTHLY CVR

Prepare the contractor's cost-value reconciliation (internal valuation) for work done up to the end of November 2008 on the following project:

High-street development with ground-floor shops and three-storey offices above.

- Accepted tender: £2,555,000
- Contract period: 15 months
- Date of commencement: 1 January 2008

Particulars appertaining at end of November 2008:

◉ Cost to end of November 2008:	1,850,000
◉ Gross bill claimed(valuation)	2,055,000
◉ Claims disputed by architect:	255,000
◉ Value of materials on site:	10,000
◉ Over measure:	17,850

◉ Other issues:

- vandalism/theft likely;
- project running three weeks behind master programme (liquidated damages £5,000 per week);
- Solution: At first sight this project would seem to be showing a profit of 205,000, with an interim valuation of 2,055,000 against an cost of 1,850,000.
- However further analysis is required

Cost to end of November 2008: ***1,850,000***

Gross bill claimed(valuation) ***2,055,000***

Corrections in valuation:

Claims disputed by architect: -- 255,000

Value of materials on site: + 10,000

Over measure: -- 17,850

Provisions

Deduct (a) *Remedial works* --5,000

(b) Defects liability period --2,000

(c) Vandalism/theft --5,000

(d) Late completion: Liquidated damages --15,000

Corrected valuation

1,765,150

- ◉ So after making the necessary adjustments a more realistic financial comparison emerges.
- ◉ This shows that the project is actually making a loss of -84,850

METHOD 2: CONTRACT VARIANCE - UNIT COSTING

- ◉ In this system costs of various types of work, such as driving piles, or concrete work are recorded separately.
- ◉ The actual costs are divided by the quantity of work of each type that has been done.
- ◉ This provides unit costs, which can be compared with those in the tender.

METHOD 3: EVA : EARNED VALUE ANALYSIS

- ◉ EVM is a fully integrated project cost- and schedule-control system
- ◉ EVM is superior to independent schedule and cost control systems

EVM involves calculating three key values for each activity or/and project

- ◉ 1. ***The planned value (PV):*** *Bill for planned work*
- ◉ 2. ***The actual cost (AC):***
- ◉ 3. ***The earned value (EV) :*** *Bill for work actually completed.*

$$\text{Cost variance (CV)} = \text{EV} - \text{AC}$$

$$\text{Schedule variance (SV)} = \text{EV} - \text{PV}$$

same data can be expressed as ratios

$$\text{Cost performance index (CPI)} = \text{EV/AC}$$

$$\text{Schedule performance index (SPI)} = \text{EV/PV}$$

EARNED VALUE EXAMPLE

- ⦿ Packing meters to be installed = 1000 no.s
- ⦿ Estimated value of project = 2,00,000
- ⦿ Planned duration = 40 Days
- ⦿ At the end of 18th day , 400 meters are installed.
- ⦿ Actual cost at the end of 18th day = 100,000
- ⦿ Calculate SV, CV, CPI, SPI

Cost variance (CV)

$$= EV - AC$$

$$= (400 \text{ meters} \times (2,00,000/1,000)) - (1,00,000)$$

$$= 80,000 - 1,00,000$$

$$= \text{-- } 20,000$$

Schedule variance (SV)

$$= EV - PV$$

$$= 80,000 - ((1000 \text{ meters} / 40 \text{ days}) \times 18 \text{ days}) \times (200000/1000)$$

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

$$= \text{-- } 10,000$$

$$\text{Cost performance index (CPI)} = EV/AC = 80,000/1,00,000 = \text{0.80.9}$$

$$\text{Schedule performance index (SPI)} = EV/PV = 80,000/ 90,000 =$$

- ◉ **Earned value** :value of the product of the project increases as tasks are completed. Therefore, the earned value is a measure of the real progress of the project.

Ex. 1

Suppose that a **5 km length** of road is to be constructed in **5 months** at a budgeted cost of **Rs. 500 lakh**.

It is proposed that 1 km of road length will be completed every month and, thus, Rs. 100 lakh s planned or budgeted for each month.

At the end of **2 months**, suppose that **1.5 km** of road length is completed at an actual cost of **Rs. 180 lakh**.

Is the project under-spending or overspending?

Is the project behind schedule or ahead of schedule?

- ◉ The project is clearly behind schedule(1.5 km road length has been completed against a 2 km)
- ◉ The project appears to be ‘under budget’ because the budgeted cost at the end of month 2 was supposed to be Rs. 200 lakh and the actual cost is Rs. 180 lakh.
- ◉ ***However, this seemingly ‘under budget’ schedule scenario is due to the project being ‘behind schedule which is why less money has been spent. In fact,***
 - ◉ According to the EVA,
 - ◉ $EV = 150$ lakhs, $PV = 200$ lakh, $AC = 180$ lakh
 - ◉ $Cv = EV - AC = -30$ lakhs.....cost overrun
 - ◉ $Sv = EV - PV = -50$ lakhs.....schedule overrun

Ex. 2

- house is to be constructed and is scheduled to take 12 months.
- Its budgeted cost of construction is Rs. 3,000,000.
- The month-wise plan for costs to be incurred in the different activities of house construction is given in Table

	January	February	March	April	May	June	July	August	September	October	November	December
Budgeted cost of work scheduled (BCWS)	50	100	200	250	350	500	500	400	300	200	100	50
Budgeted cost of work performed (BCWP)	50	100	200	200	250	300	400	400	300			
Actual cost of work performed (ACWP)	50	100	250	250	250	300	450	500	300			

- ◉ According to the EVA, At Sept end
- ◉ $EV = \text{Rs. } 2,200,000$
- ◉ $PV = \text{Rs. } 2,650,000$
- ◉ $AC = \text{Rs. } 2,450,000$.

- ◉ $C_v = EV - AC = - \text{Rs. } 250,000$cost overrun
- ◉ $S_v = EV - PV = - \text{Rs. } 450,000$schedule overrun

VALUE MANAGEMENT IN CONSTRUCTION

- ◉ The concept of value management (VM), also known as value analysis (VA) or value engineering (VE),
- ◉ evolved during World War II
- ◉ systematic approach for obtaining value for the money spent.
- ◉ To identify and eliminate unnecessary costs in product design, testing, manufacturing, construction, operations and maintenance.
- ◉ VE involves answering the question—
‘What else will accomplish the function of a system, process, product, or component at a reduced cost?’

$$\text{Value index} = \frac{\text{Worth}}{\text{Cost}} = \frac{\text{Utility}}{\text{Cost}}$$

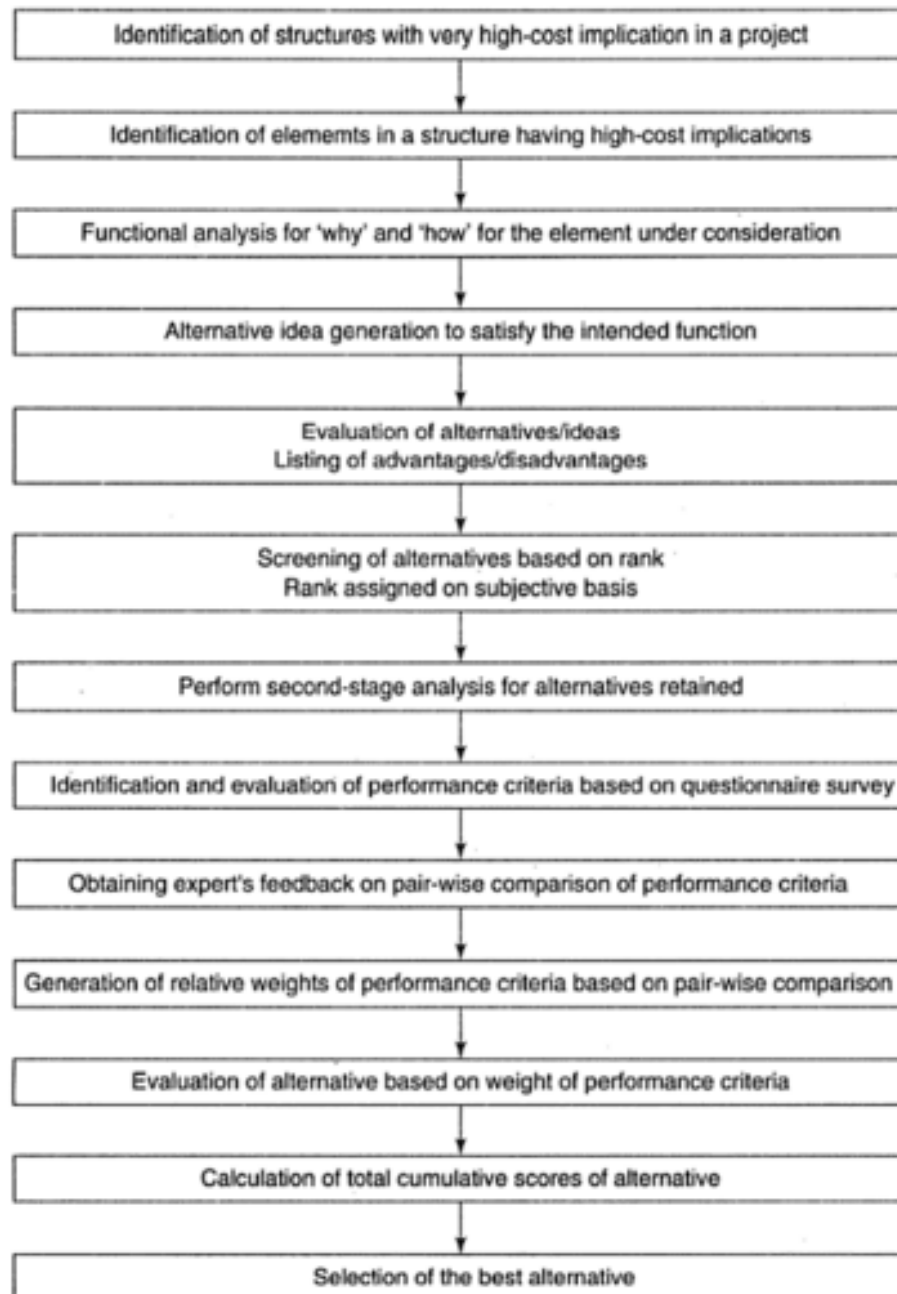


Figure 12.8 Schematic diagram depicting different steps in the application of VE in design-and-build project