Resource Management of Dairy Plant Infrastructure project using Value Engineering Concept

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Abstract

The Dairy industry is the combined efforts of architects, civil engineers, health engineers, farmers & different experts. Different types of problem can be in this type of food industry such as proper organized infrastructural facilities as similar as healthy environment, which includes time, huge amount of cost & resources. Huge resources high values of materials, men and major works involve heavy expenditure, investments for Dairy projects. For an open ended model effective management of resources and high level technology are important parameters. Construction manager have the plan of action for controlling and monitoring resources of materials and workers in coordinates and within stipulated timely manner in order to deliver successful project within the limited time and funding. Two main important factors (1) Time and (2) Resources which increase importance of cost reduction techniques. To reduce cost of construction in a every possible manner is the goal of construction industries and to enhancing the performance throughout the life of project without disturbing future needs and to maintain Quality, Reliability, Durability. Value Engineering and Sustainable development play a very important role.

Keywords: *Resource Planning , Resource Management , Value Engineering , Microsoft Project*

INTRODUCTION

Infrastructure is the fundamental facilities and systems serving a country, city, or area. It technical structures such as roads, bridges, tunnels, water supply, sewers, electrical grids, telecommunications. Infrastructure can include, Roads, tunnels, and bridges, including the Interstate Highway System, Mass-transit systems (e.g., trains and rails), Air control towers, Telephone lines and cell phone towers, Dams and reservoirs, Dairy Industry , Pumping stations, Waterways, canals, and ports, Electrical power lines and connections (i.e., the national power grid), Fire stations and equipment, Hospitals, clinics, and emergency response systems, Schools, and prisons, Sanitation and waste removal facilities - solid waste, wastewater, and hazardous waste, Post offices and mail delivery.

The management of any projects requires knowledge of management as well as an understanding of the design and construction process. Project management is the art of directing and controlling material resources throughout the life of a project by using modern management techniques to procure objectives of scope, cost, time, quality and participation satisfaction.

NEED OF THE STUDY

What is Resource Management?

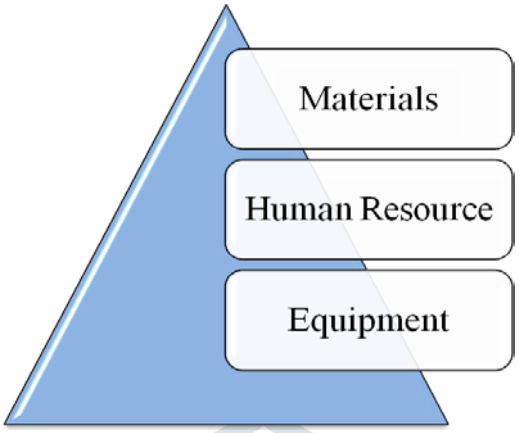

Figure 1 Resoreces

In major project development in construction and control of cost is an important and it's important to consider that high profit and quality from the designing part, we can use value engineering for achieving this profit and quality. Shortage in resources will expand the duration of project and because of this cost of the project will more than consider budget. Construction project include managing the resources –machines, money, materials and method. Resources are that which needed to complete the project.

The actual resources available for the project were analyzed by Resource leveling with increased duration. The time-cost implications have been analyzed to alert the management.

There are big issues facing the construction project management. such as, lack of Communication, scheduling lack of skilled workers, high insurance cost, available Cash, ever-changing regulations.

Figure 2 Cycle of Project Management

What is Value Engineering?

Value Engineering is a management technique that can make valuable contributions to value increase and cost reduction in the project. Value engineering is a problem-solving tool that can reduce costs while maintaining or improving performance and quality requirements.[3]

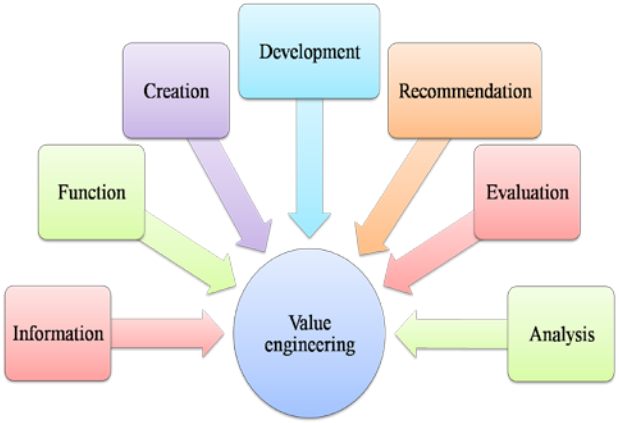

Figure 3 VE phases

For conducting Value Engineering study it is essential to prepare the estimates under study and generate creative ideas for effective cost reduction.
Eight essential qualification for Value Engineering study,

1. Knowledge
2. Imaginations
3. High degree of initiative
4. Self-organization
5. Personality
6. Cooperative attitude
7. Experience
8. Belief in importance of value

Benefits of Value Engineering,

- Lowering O & M costs
- Improving quality management
- Improving resource efficiency
- Simplifying procedures
- Minimizing paperwork
- Lowering staff costs
- Optimizing construction expenditures
- Developing value attitudes in staff
- Competing more successfully in marketplace

OBJECTIVE OF THE STUDY

- To study the need of Dairy Infrastructure project and its Management
- To analyze value assessment of Dairy project

PROJECT DETAILS

Table 1 State wise Dairy Plant

State	Number of Plant	State	Number of Plant
Andhra Pradesh	49	Maharashtra	14
Assam	3	Manipur	1
Bihar	5	Mizoram	1
Chandigarh	2	Nagaland	1
Chhattisgarh	3	Orissa	4
Delhi	37	Punjab	30
Goa	5	Pondicherry	2
Gujarat	51	Rajasthan	21

Haryana	26	Sikkim	1
Himachal Pradesh	1	Tamilnadu	37
Jammu & Kashmir	5	Tripura	1
Jharkhand	1	Uttar Pradesh	40
Karnataka	25	Uttrakhand	3
Kerala	9	West Bengal	20

Name of project : Construction of dairy plant
Built up area : 32680 sq.mt
Capacity of plant : 1LLPD
Duration of plant : 649 days

There are 12 unit of this plant.
1. Plant building
2. Tanker bay
3. Utility building with WTP
4. Weigh bridge cabin
5. Security cabin
6. Worker cabin
7. Parking shed
8. Admin office
9. Scrap yard
10. ETP plant
11. Toilet block
12. General store

This dairy plant is considered to be the largest source of processing wastewater. Effluent treatment plant system is designed to handle and treat wastewater having high organic content and suspended solids .Most of the water consumed in a dairy processing plant is used in processes such as the cleaning and washing of floors, bottles, crates, and vehicles, and the cleaning of factory equipment and tanks as well as the inside of tankers.

Preparation of Estimates

Generally, for resource constrained analysis the man power requirements for various activities are very essential and these are to be calculated based on the quantities. These quantities required for man power study are calculated from the drawings.[2]

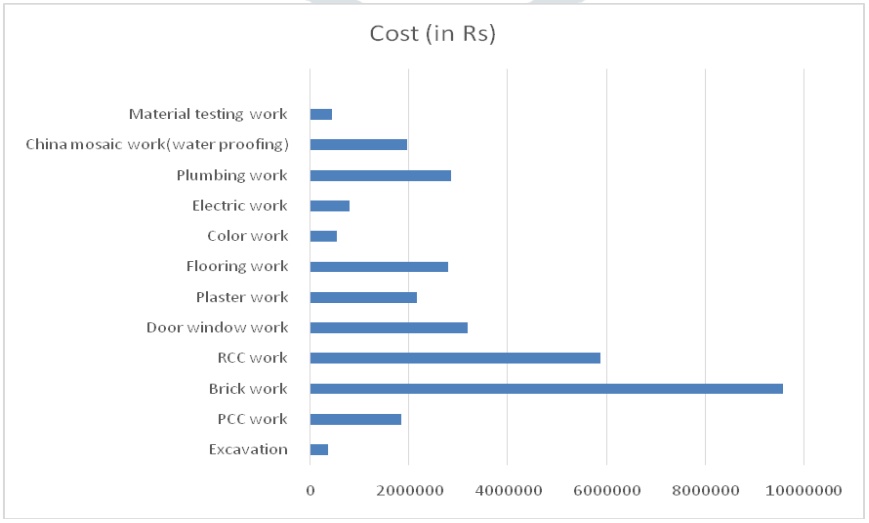

Figure 4 Cost model chart

Manpower required

Manpower output is the output quantity i.e., the quantity of work which can be done per day per person considering all safety and quality measures as required by client. This was calculated based on the and also considering views based on the experiences and thorough technical knowledge of many project managers, architects, engineers and many contractors who are experts and have been working in this field for many years. The study is limited to these activities only under normal working and site conditions.[2]

Table 2 Manpower required for various works

Activity	Per unit	Mason	Bhisti
Plain Cement Concrete (PCC)	1 cum	0.1	0.7
Reinforced Cement Concrete (RCC)	1 cum	0.17	0.9
Masonry work	10 sq.m	0.72	0.21
Plastering work	10 sq.m	0.67	0.93
Painting work	10 sq.m	0.54	---

Based on Value Engineering concept

First phase is Information phase ,cost model will be prepared. How much cost of the project will be prepared. Second phase is Functional phase, identify functions of the project systems and components, develop function models, select functions to focus the creativity phase. Third phase is Creativity phase, involves the generation and listing of creative ideas. Fourth phase is Evaluation phase, evaluates the ideas developed during the creative phase. Fifth phase is development phase, idea is expanded into a workable solution.

Require changes as per value engineering concept

For brick work,

Table 3 Evaluation phase for brick work

ORIGINAL CONCEPT Brick work using normal clay brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth.	
PROPOSED CHANGE Brick work using fly ash brick having crushing strength not less than 35 kg/sq. cm. in foundation and plinth.	
DISCUSSION: Reduction in the material cost of this proposal is a definite advantage.	

The Cost summary of brick in wall construction is,

Table 4 Cost analysis for brick work

COST SUMMARY (IN INR)	
Original cost	2401200
Proposed cost	1920960
Total saving	480240

For cement bag,

Table 5 Evaluation phase for cement bag

ORIGINAL CONCEPT OPC 53 grade cement bag is used in wall construction.	
PROPOSED CHANGE PPC cement will be used for cost reduction.PPC cement is higher durability concrete structure due to less permeability of water.	
DISCUSSION: Reduction in the material cost of this proposal is a definite advantage.	

The Cost summary of cement bag in construction is,

Table 6 Cost analysis for cement bag

COST SUMMARY (IN INR)	
Original cost	1492847.8
Proposed cost	1332967.8
Total saving	159880

CONCLUSION

In India, dairy industry has taken booming development in recent years and which will rise more in future. For such development value engineering is a better approach to reduce its overall cost, & increase its quality and prolong its sustainability. If by changing such little materials brick, sand, cement, with the most suitable alternative can save the cost by just performing value engineering for 1 unit building out of total 12 units. Then if such approach is performed for entire dairy industry, a huge cost saving can be achieved, as well as a value added business can be developed.

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