

# PROJECT MANAGEMENT – A CASE STUDY

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## **Abstract**

The importance of Project Management for large industrial projects does not require any introduction.

The extensive and unavoidable dependence of all major projects world-wide on project management is ushering an area where effective project management shall be a key factor for the success of the project.

A project normally involves a set up of inter-related components having a common objective of timely project realization. The project management of such projects, however, is a complex process as it involves number of agencies having diverse and divergent roles. The role of the Consultant/ Owner assumes greater significance to ensure that the project as a whole is effectively managed and timely executed as different agencies would try to manage their activities in a manner suitable to themselves.

This paper presents the various project execution modes, as prevalent, being adopted in various international projects. The paper also covers the role and responsibilities of the Monitoring Consultant or Lender's Engineer, assigned to project management agencies by the financial institutions/ agencies. The paper brings out the role of monitoring consultant vis-à-vis Owner's project management system.

The paper presents the actual experience of the Authors based on the role played by Holtec as Monitoring Consultant/ Lender's Engineer on behalf of an international financial institution for a large cement project in Northern Africa.

## **1. INTRODUCTION**

The cement industry has come a long way from kiln size of 300 tons/ day to about 12,000 tons/ day being the call of the day. The fund requirements, consequently, has also increased in line with increase in plant size, new technologies for cement manufacturing and plant automation in addition to normal inflation.

Most of the entrepreneur these days prefer to borrow money from financial institutions. With increase in plant size, the project cost and hence the loan components/ stakes have increased.

The financial institutions in many cases had bad experience of their investments turning into bad debts/ reschedule payments/ write off interest etc due to their feedback based on periodic reports prepared by customer for utilization of funds vis-à-vis actual project progress and poor/ absence of project management leading to delay in project completion and increased project costs.

The financial institutions due to involvement of higher investments and to avoid the risk of investments turning into bad debts due to lack of proper project management or due to mismanagement of funds, are looking for independent and experienced agencies to monitor proper utilization of their funds in the project. The independent agency appointed by the financial institution is known as Monitoring Consultant/ Lender’s Engineer.

Holtec was engaged by one of the leading financial institutions as Monitoring Consultant with the objective of monitoring the project progress vis-à-vis disbursement of funds.

This paper highlights the intricacies of the Role of Monitoring Consultant.

**2. PROJECT EXECUTION MODES**

Monitoring consultant’s role and involvement depends on mode of project execution.

The three possible modes of project execution are as follows:

- Turn-key (Single contractor)
- Semi Turn-key ( 3-6 suppliers and contractors)
- Shopping in packages ( 60-70 suppliers/ contractors)

The following table present comparison of various parameters as applicable for various modes of project execution :

<b>Element</b>	<b>Turnkey / Semi Turnkey</b>	<b>Package</b>	<b>Shopping</b>
Choice of Optimum Process Equipment	Limited depending upon Contractor	All main equipment, limited for auxiliaries	Free Choice
Total Investment Costs			
Project Execution Period			

<b>Element</b>	<b>Turnkey / Semi Turnkey</b>	<b>Package</b>	<b>Shopping</b>
Performance Guarantee	Entire Plant	By Department	By Department / single machine
Warranty	Undivided	By Package	By Individual machine or group
Execution Responsibility	Undivided	By Package	Consultant, contractor(s), client
Final Costs Known	At signing	After last package	At project completion
Risk of Cost Overrun			
Risk of Time Overrun	Moderate	Medium	Medium
Overall Risk			
Ability to obtain Insurance			
Client's remedy against Performance Failure	Claims based on total contract value	Limitation by counter claims of each package supplier	Limitation by counter claims of each package supplier
Client's Involvement			
Overall			

Turn-key and Semi Turn-key are the most preferred modes of project execution in international projects and are discussed in this paper.

The semi-turnkey mode of project execution can be implemented in following alternatives :

#### **Alternative 1**

- One supplier for plant & machinery
- One supplier for electrical equipment and control & instrumentation
- Engineering consultant for co-ordination of mechanical, electrical, control & instrumentation work, civil design and project monitoring
- Contractor for civil & structural works
- Contractor for erection of mechanical equipment
- Contractor for erection of electrical equipment, control & instrumentation

#### **Alternative 2**

- One supplier for supply of all equipment (plant & machinery, electrical equipment, control & instrumentation) and project engineering
- Engineering consultant for co-ordination of mechanical, electrical, control & instrumentation work, civil design and project monitoring
- One contractor for civil construction and electro-mechanical erection

Alternative 1 of semi turn-key mode has price advantage over Alternative 2. It has, however, risks of delay in inputs from one agency to another and thus price advantage may be lost if the project is delayed due to the same.

The risks in Alternative 2 of semi turn-key mode are similar but lower as compared to Alternative 1. The engineering is faster and coordination is better in Alternative 2. This alternative appears to be better than Alternative 1 in terms of Project cost and implementation.

Thus turnkey mode and Alternative 2 of semi turnkey mode of project execution have been considered for further evaluation.

#### **Comparison of Turn-key and Semi Turn-key (Alternative 2)**

##### **➤ Turn-key Mode of Project Execution**

A single contractor is responsible for supply of all the mechanical, electrical, control & instrumentation, civil construction, electro-mechanical erection etc.

The civil construction and electro-mechanical erection is the weakest link as the cement machinery manufacturers have to depend on external sources for this being not their business area.

The cement machinery manufacturers have to build in huge margin in project cost to save for penalties on account of delays in civil construction and electro-mechanical erection.

Most of the European machinery manufacturers have declined participation in turnkey projects.

Most of the turn-key jobs are being bagged by general contractors/ small machinery manufacturers from East Asian countries. These contractors source critical equipment like Vertical Roller Mills, main gear boxes, coolers etc. from European suppliers. The risks on account of delay in engineering and delivery is relatively high.

➤ **Semi Turn-key Mode of Project Execution**

The project execution responsibility is clearly divided between the machinery supplier (off-shore) and contractor (on-shore). The progress of engineering, manufacturing, deliveries etc for the machinery supplier and actual site progress will need to be reviewed, co-ordinated and monitored by a consultant to avoid any impact on project execution.

The risks of price and time over-run are relatively lower as each party is responsible for their roles and scope coupled with possible remedial measures initiated, if required, during review of engineering and site construction.

The monitoring consultant has a much bigger role to play in semi turn-key type of project execution as compared to turn-key mode.

### **3. MANAGING THE PROJECT**

The following activities, mainly, lead to successful project execution:

- Technical Project Management which basically involves co-ordination between various agencies and receipt of approvals etc.
- Management of inputs/ resources from
  - From engineering consultant
  - From machinery suppliers
  - Adequacy of construction/ erection machinery, materials and consumables
- On-site inspection and quality assurance management
- Manpower management to ensure adequacy of competent staff during various stages of project execution
- Safety and security
- Environment management
- Funds management
- Statutory and Administrative clearances from various agencies
- Administrative management for support services in terms of telephone, fax, transport, medical facilities etc.
- Conflict Management through periodic site coordination meetings

The monitoring consultant, even though, responsible for part of the above activities has to observe that project progress is not getting constrained by other factors.

#### **4. RESPONSIBILITY OF MONITORING CONSULTANT**

The key responsibilities of monitoring consultant are as under :

- Check technical acceptability of plant
- Assess adequacy of resources at site
- Check quality of work
- Assess timeliness of project
- Assess implementation of pollution mitigation measures during project implementation
- Proper utilization and adequacy of funds
- Arrangements for taking over of the plant

The proper monitoring of above parameters and its periodic presentation to the financial institutions of correct project parameters shall meet the requirements of the financial institutions.

#### **5. INTERFACE OF MONITORING CONSULTANT**

The monitoring consultant is appointed by the funding agency. The monitoring consultant has to co-ordinate with the Owner, The contractor and the project monitoring agency appointed by the Owner to achieve effective monitoring of the project and to ensure that the funds are properly utilized and envisaged goals are met without any cost and time over-run.

#### **6. ROLE OF MONITORING CONSULTANT – A CASE STUDY**

##### **6.1 Project**

HOLTEC was appointed by an international financial institution as monitoring consultant to monitor a 2.0 mio tpa cement plant in Northern Africa.

The plant & machinery had been ordered and the site activities had started at the time of appointment of Holtec as monitoring consultant.

##### **6.2 Scope of Monitoring Consultant**

The scope of work of Holtec as monitoring consultant was as under :

- Project due diligence
  - Review of turn-key contracts
  - Review of other service agreements
  - Review of technical suitability of plant & machinery
  - Assessment of physical and financial progress of project at the time of entry of monitoring consultant

- Quarterly review of project progress and reporting to financial institution based on site visits

### **6.3 Monitoring consultant's Team**

The monitoring consultant's team constituted of following specialists:

- Monitoring Consultant (Project Manager)
- Technology specialist
- Construction and erection specialist
- Operation specialist
- Human resource specialist

### **6.4 Contents of Progress Reporting**

The monitoring consultant's report, based on the data collected during the site visits and observations made, included the following:

- Introduction
- Project Key Targets
  - Effective date of contract
  - Proposed date of commissioning and provisional acceptance
  - Proposed date for start of commercial production
  - Time elapsed since start of project and the progress which should have been achieved on review date
- Project status
  - Progress of works in terms of civil works, equipment manufacture, deliveries and erection
  - Infrastructure and utilities
  - Quality Control
  - Safety and security
  - Human resources
- Commentary on actual situation vis-à-vis targets, variation analysis and mitigation measures
- Financial data
  - Fund flow position
  - Status of expenditure vis-à-vis work progress
  - Order value/ pricing of input values
  - Variation analysis

- Issues between contractors
  - Differences related to responsibility
  - Delays
  - Lack of co-operation
  - Attitudinal problems
- Major Issues and Mitigation Measures
  - Technical
  - Infrastructure
  - Financial
  - Environmental
  - Social
  - Political

## **6.5 Benefits Achieved**

The major achievements to the financial institution in general and to the project in specific with appointment of monitoring consultant are as under :

- Project completed within budgeted amount
- Duration of provisional acceptance reduced by one month
- All actual performance indicators proved to be better than guaranteed
- All claims and issues of contractors settled amicably
- Repayment of loan started as per schedule (based on feedback received after conclusion of monitoring consultant's role)
- Project appreciation by Government
- Satisfied financial institution

The Owner, its staff and different agencies contributed heavily in achieving above results.

The monitoring consultant has once again appointed by the same financial institution for the 2<sup>nd</sup> line being installed.

The monitoring consultant has also received similar assignment from another financial institution based on the feedback of the project.



## **7. CONCLUSION**

The decision regarding method of execution and corresponding contracting plan has to be arrived during the planning stage itself. These decision are of paramount importance to the final outcome of the project in terms of investment cost, execution schedule and technical performance.

The experience of the Owner in execution of large projects greatly benefits the project. The availability of resources at Owner's disposal in terms of financial and experienced management team coupled with Owner's funding arrangement play a vital role in successful project implementation.

The financial institutions have realized the importance of monitoring consultant's contribution, in the back-drop of their past experience of poor recovery of funds, who not only provides independent assessment of the project during execution phase but can also provide lot of comfort and good feeling to the financial institution for recovery of investment.