Structures for Major Contracts – Pros and Cons

البنى الأساسية للعقود الرئيسية : الحجج المؤيدة والحجج المعارضة

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يتحدث المقال عن المشاريع الكبرى في صناعة الإسمنت التي تتطلب استثماراً ضخماً من حيث العاملين والوقت والمال ، حيث يعتمد تحقيق الفوائد المرجوة من المشروع على مجموعة من العوامل تتراوح من تقييم أولي لسوق الإسمنت مروراً بالتشغيل الكفء وانتهاءً بصيانة المعدات التي تم تركيبها . ويتعلق أحد القرارات الهامة الواجب اتخاذها بهيكلية العقد وبالتالي إدارة المشروع ، وتتراوح الخيارات بين إرساء عقد تسليم المفتاح وإرسائه مع عدة جهات . يقدم المقال الوظائف الأساسية لإدارة المشروع ويقارن مزايا كل من النوعين الرئيسين لهيكلية المشروع ، كما يعطي توجيهات لمالكي المشاريع المستقبليين لمساعدتهم في اتخاذ قرارهم بشأن أفضل هيكلية للعقد والمشروع .

1.Summary

Capital projects within the cement industry invariably involve a large investment in people, time and money by the Project Owner, with the intention of realising (and preferably exceeding) the predicted benefits of the project. The successful delivery of the predicted benefits is dependent upon a wide range of factors, which in the case of a greenfield project, will range from the initial cement market assessment through to the efficient operation and maintenance of the installed equipment.

One of the most critical decisions to be taken concerns the structure of the contract and therefore the subsequent management of the project. The options range between awarding a single 'Turnkey' contract, through to using a 'Multi-package' arrangement, with a number of variants in between. This paper outlines the necessary functions of project management, compares the relative merits of the two main types of project structure and gives guidance to potential Project Owners upon the process of deciding their preferred contract and project structure.

It is concluded that no contract structure which will be optimal in all circumstances. However, analysis of the Project Owner's culture, objectives, core activity, available resource and skill base will provide a clear indication of the preferred route forward for any specific organisation.

2.Introduction

A company's decision to invest in new cement manufacturing plant, either as a new market entrant or an existing operator seeking to expand or modernise their existing manufacturing capacity, is normally a momentous occasion. The level of financial and personnel commitment is high while the consequences of decisions taken throughout the project will be felt by the company (and employees) for an extended period of time (normally at least 20 years). It is therefore vital that objective reasoning is used in arriving at these important decisions. As an illustration, a delay of one month in the start up of a 5,000 tpd clinker production line will result in a loss of revenue amounting to USD15.5 x 106 based upon a cement sales price of USD 100/tonne.

One early critical decision will be the choice of the contract and hence project structure.

To assist in this choice an analysis of the phases required for the successful delivery of a large capital project is required.

Phase I Feasibility Study

Objective: To investigate and report upon the technical and commercial feasibility of a potential project. The report should be of a standard to support the financing (optional) and permitting requirements, as well as owner's decision to continue.

Phase II Project Study

Objective: Basic engineering study to produce a Final Project Report for final project approval by the Project Owners Board of Directors.

Phase III Tendering and Contracting

Objective: Select suppliers and negotiate contracts

Phase IV Project Execution

Objective: Check and control safety, costs, time and quality while delivering the specified product

Phase V Start-up, Commissioning and Taking Over

Objective: Deliver a fully operational cement plant to the Project Owner.

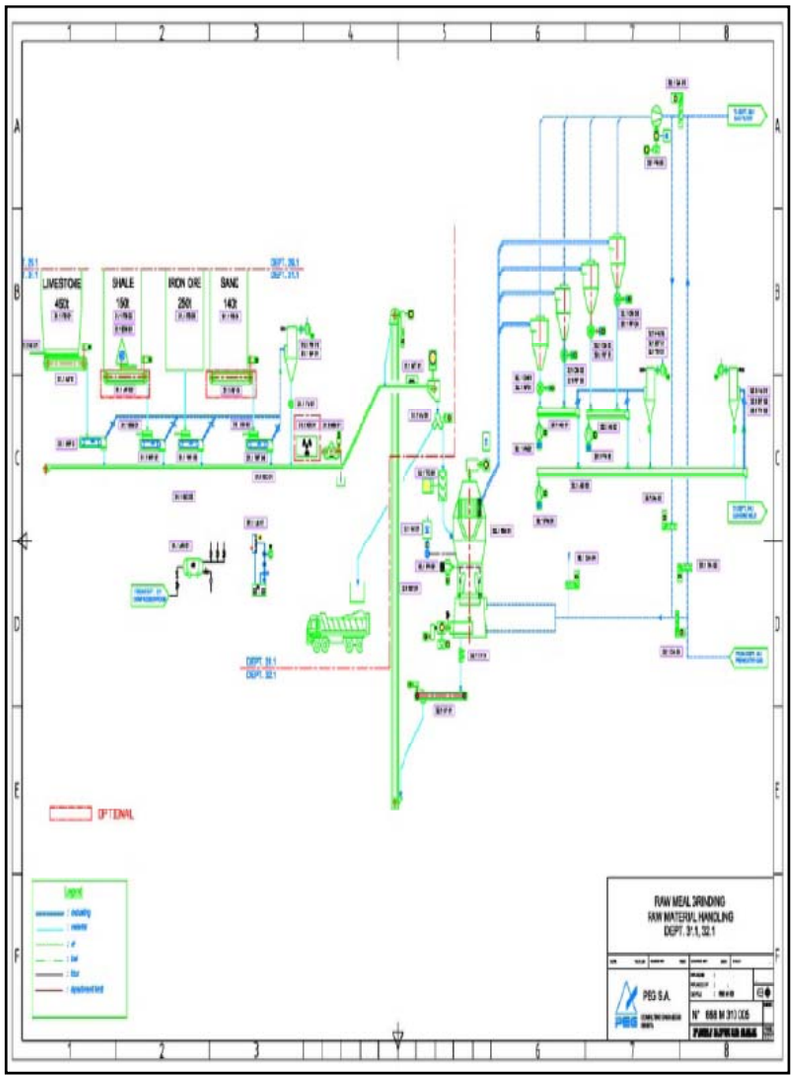
The above phases are common, whether a turnkey or multi-package approach is adopted. The decision upon the optimal approach is dependent upon the attitude of the Project Owner, but should take into account their ability and desire to supply the skills and resources necessary for successful project delivery. Further detailed consideration of individual phases is therefore required.

3. Project Phases

3.1. Phase I – Feasibility Study

The feasibility study should include:

- A review of the cement market situation, including an evaluation of the expected future market development, a definition of the objectives for market share, and what products will be manufactured and their relative percentage (type of cement and bulk or bags.).
- An assessment of the quality and quantity of the raw material reserves, based upon a geological drilling programme.
- The confirmation of fuel source and its availability.
- The identification of the optimum plant location after consideration of land availability, logistics and infrastructure
- The identification of the preferred manufacturing process with specification of the key equipment
- The generation of mass flow charts, process flow sheets and equipment lists
- An estimation of investment and operational costs
- A commercial projection to meet 'bankable' status (optional)
- An environmental impact study



3.2. Phase II – Project Study and Basic Engineering

Subject to a satisfactory and positive outcome for the Feasibility Report, Phase II allows for more detailed project and engineering studies, including a more detailed drilling campaign with comprehensive sample analysis. The reserves will be more accurately assessed and a quarry plan developed, with identification of the required quarry equipment. Geotechnical investigations at the identified plant site will also take place during this phase. The plant concept identified in the Feasibility Study will be optimised and developed in significantly more detail and potential suppliers and contractors will be identified. The Project Study report should be in sufficient detail to allow the Project Owner's Board to reach a decision regarding the future of the project.

Phase II is also the latest stage at which a decision regarding the Project Structure can be taken as this decision will impact upon the project contingency costs allowed and included in the report.

3.3. Phase III – Tendering and Contracting

After approval of the project and dependent upon the project structure, tender documents for the requisite number of contracts need to be prepared. It is important that the tender documents are prepared to international quality standards to allow proper analysis, comparison, evaluation and optimisation of the received proposals. Eventually, contract preparation and negotiation can take place with the agreement taking into consideration contract

structure, interface definition and the formulation of performance and project guarantees. This is also the appropriate time to decide on the detail of the tender documents, either performance orientated or a detailed engineering specification.

3.4.Phase IV – Project Execution

Efficient execution of the project requires:

- Management of the health and safety programme.
- Management of the contract interfaces.
- Checking the quality of equipment fabrication.
- Checking and approval of design drawings.
- Checking the installation and erection for conformity to design.
- Monitoring project time schedule and recovery of any time delays.
- Identification of bottlenecks.
- Identification of potential schedule improvements and their implementation.
- Management of the Project Budget.
- Ensuring the flow of contractual payments.
- Management of claims in the event of failure to meet contractual obligations.

3.5. Phase V – Start up, Commissioning and Taking Over

An efficient, planned and speedy start up and commissioning period is crucial in order to achieve the design production capacity as quickly as possible.

Detailed plans are required for the start up programme and schedule, with installed equipment being subject to final checks, 'no load' running, safety interlock checks and load test – all of which need to be recorded and certified. Snagging lists for deficiencies are prepared at this stage and the agreed performance test procedure is conducted at an agreed time within the contractual period.

Once the performance test is satisfactorily completed and the snagging list is cleared then 'Taking Over Certificates' can be issued.

4. Main Project Structure Options

4.1. Turnkey Contracts

Turnkey contracts can be defined as 'a project where the contractor undertakes the entire responsibility from design through to completion and commissioning. The client has only to turn the proverbial key to make everything function as it should'.

A turnkey contract is characterised by the Project Owner entrusting their chosen supplier to deliver the full package, with potentially a minimum of input from the Owner.

A SWOT analysis (as conducted from the Client's perspective) is given in Figure 1.

Figure 1

SWOT Analysis(by the Client) - Turnkey Contract	
Strengths	**Weaknesses**
• Single contractual interface • Project continuity • Reduced tendering effort • Reduced project management expertise required • Client can concentrate upon company core strengths • Previous comparable project examples available	• Dependent upon one supplier • All 'eggs in one basket' • Independent, expertise not automatically available • One supplier's equipment will not be the optimum in all cases • Can be difficult to introduce equipment from specialist suppliers • Contract price will be higher because of larger built in contingencies • Limited number of capable companies - less competition, higher price • Supplier is in control, not the owner • In-house project management experience is not developed
Opportunities	**Threats**
• Build long term relationship with major supplier • Involve independent technical and commercial expertise	• Limited choice if considering an O&M contract • The issue of 'Taking Over Certificates' is potentially difficult

In summary, this type of contract potentially minimises the technical and commercial input from the client, while also potentially minimising their responsibility for active management of the project. The client can merely pay the bills, while incurring a premium for reliance upon the project management expertise of the supplier. Furthermore, the contract must be completely detailed before signing, as any subsequent changes will result in claims.

4.2.Multiple Package Contracts

As the name suggests, the overall project is split into a number of defined packages. The objective is normally to allow selection of specialist equipment suppliers and minimise the overall project cost. As a result, the Project Owner has a larger and more complicated workload when managing this type of project structure. Since cement plant projects are infrequent occurrences (except for the largest of cement manufacturers) it is likely that the Project Owner does not retain the necessary project management skills in-house, therefore it is normal for the Project Owner to appoint an Engineering Contract Consultancy to act as their representative during the Project.

Figure 2

SWOT Analysis(by the Client) - Multi-package Contract	
Strengths	**Weaknesses**
Optimum equipment selection Gives full control of contingency allowances which may result in savings overall Overall cost of optimised plant and design will be significantly reduced (up to 20%) Owners involvement must be increased The contract can be prepared and let in stages	More suppliers, more interfaces to manage More onerous tendering procedure Owners involvement must be increased
Opportunities	**Threats**
Develop relationships with specialist equipment suppliers Keep abreast of future developments Involve independent technical and commercial expertise Independent management of Performance Testing Independent management of Taking Over Certificates Develop 'in-house' competency	Poorly specified interface between packages Poor project management control

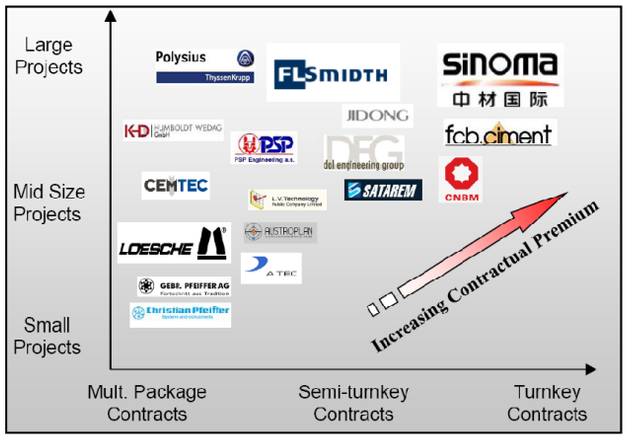
4.3. Summary of Selection Drivers

A simplified illustration of the current assessment of the impact that the type of project structure has upon selected factors is shown below. The colour green indicates a positive effect.

Factor	Turnkey	Multiple Package
Supplier Willingness		
Plant Performance		
Project Cost/ cash Flow		
Project Schedule		
Project Quality		
Contractual Interfaces		
Owner's Resources		
Owner's Project Control		

5. Contracting in the Cement Industry

5.1. The Players



- Volatile labour and commodity prices are increasing risk premiums.
- The volatile money market is increasingly restricting project financing to those driven by equity or supported by operational cash flow.
- Some suppliers are becoming less willing to execute turnkey projects.
- Increasingly, country specific pre-conditions are being imposed for labour and materials thus increasing the degree of complexity.
- Machinery delivery lead times have decreased, increasing the importance of competent project management.

6. Conclusion

5.1. If money is no object and you have no in-house expertise, then simply asking a major international equipment supplier to build a plant for you, producing the required tonnage of clinker is an obvious choice.

5.2. If you have no in-house expertise and would like to save a little money, employ an Engineering Contract Consultancy to assist in the selection of, and negotiation with, a major international equipment supplier.

5.3. If you have no in-house expertise and would like to save significant sums of money, employ an Engineering Contract Consultancy to assist in the optimisation of the design, procurement, construction and commissioning of your prize asset.

5.4. If you already have adequate in-house project management expertise, your choice may depend upon your current project workload.