NEWER CONCEPTS IN PROJECT FORMULATION AND EXECUTION

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SUMMARY

The marketing scenario which was showing a very healthy cement consumption trend till early 1997, has become quite sluggish. There is a general recession in the industry and cement is available in plenty in the market. Keeping this in view, in future, cement projects shall need careful planning in terms of

- *Location of cement unit.*
- *Cost effective solutions for project execution.*

The traditional way of executing the cement project does not meet the challenges of the present scenario. There has to be a shift in focus while implementing a cement project.

This paper deals with certain concepts which are emerging fast as the future trend in the cement industry. These are:

- *Stripped Down Concept*
- *Split Located Units*
- *Bulk Cement Terminal*
- *Ready Mix Concrete*

INTRODUCTION

The national scenario of cement industry has undergone a tremendous change in the decade of nineties. The demand-supply position till 1991-92 was almost evenly balanced. Due to cut-back in Government off-take, market slowly started showing surplus trend, thereafter. Also, as cement grade limestone is available in clusters, new capacity addition takes place in these clusters only and as a result, marketing of cement has now become increasingly difficult. This has discouraged new investments in cement projects and financing of the projects is becoming difficult. Financial institutions are also reluctant to finance the cement related projects.

The traditional approach of cement project execution is

- To locate plant near Limestone Deposit
- To have integrated plant of high capacity

However, in the present scenario, this approach needs to be changed. There has to be a shift in focus, giving due importance to market forces and put-in efforts to reduce investment/operating costs.

Keeping the above in view, certain important newer concepts in project formulation and execution which are likely to gain acceptance in future, are discussed in this paper.

1. STRIPPED DOWN CONCEPT (SDC)

1.1 Definition

The design of cement plants today requires considerable degree of professionalism in respect of technology, equipment design, project management and execution. The investment cost can have a significant effect on financial performance of a project.

Stripped Down Concept (SDC) is a radical departure from the traditional way of project execution. In the traditional way of project execution, the main objectives are high equipment utilisation, low operating cost and high level of comfort of operation. However, in the SDC, the main objective is to have as low investment cost as possible through elimination of excess capacity reserves, incorporation of only real necessities and deferrment of certain investments by a stagewise implementation of project depending upon requirements. The potential to save investment cost by applying SDC is tremendous. However, it has to be borne in mind that cost savings cannot be made possible without any trade-offs viz. higher operating cost, lower operating comfort etc.

These trade offs have to be revocable. Each SDC is expected to become a bottleneck sooner than in a traditional plant. This bottleneck becomes the priority for the continuing investment. The continuing investment ensures that after a certain period, the stripped down plant becomes equivalent to a traditional plant.

However, Environmental requirements, equipment specifications and anything that leads to quality of the end product, is not compromised.

1.2 SDC Concepts

Based on the above, some of the SDCs are listed below.

- Selection of equipment for required capacity only, without margin.
- Introduction of storage capacity according to `Just in time' concept and not on the basis of `Just in case'.
- Deletion of standby equipment like bucket elevator, screw pump, clinker conveyor, etc.
- Postponement of non-essential equipment such as spillage conveyor below belt conveyor , etc. which can be added later on.
- Production of one cement type only initially, if possible, resulting in fewer silos and less cement grinding capacity.
- Contracting rather than do-it-yourself for instance, quarry operations, raw material transport from quarry to plant, plant maintenance, etc.
- Initial investments can also be lowered by employing backward integration i.e, Cement Terminal → Cement Grinding →Clinkerisation
- Elimination of non-essential roofs, roads, etc. which can be added later on.
- **Fast Track project implementation**

1.3 Methodology

In the initial stage of the project when the technical concept is being formulated, the areas of SDC are decided. Each area is then studied in detail and various options/alternatives are evaluated as follows:

i. Various options/alternatives of SDC are developed
ii. Risk analysis of various options is carried out
iii. The option is evaluated by the project team including customer, by the risk profile diagram shown in **Fig.1,** whether the option falls in `Acceptable Risk Zone' or 'Unacceptable Risk Zone'
iv. The options falling in `Acceptable Risk Zone' are accepted and implemented.

Example

Area of SDC	:	Clinker Stockpile
Capacity as per Conventional Norms	:	2 x 24000 t
SDC Option	:	2 x 15000 t
Saving in Capital Cost	:	Rs. 30 lacs

Risk Analysis

◊ **Purpose**
⇒ To store clinker.

◊ **Risk Profile**
⇒ Risk : Cement Mill shall have to be stopped as stockpile may become empty faster.
⇒ Probability of risk : Low as sufficient clinker storage is still ensured.
⇒ Consequence : Small (as even if mill is stopped, cement stock is available in silos for 7 days)
⇒ Evaluation : Option falls in 'Acceptable Risk Zone' (see **Fig. 1**)

◊ **Risk Mitigation Option**
⇒ Spread out the excess clinker and reclaim with a payloader (on contract)

Conclusion

Based on the above, proposed SDC concept of 2 x 15000 t storage is acceptable.

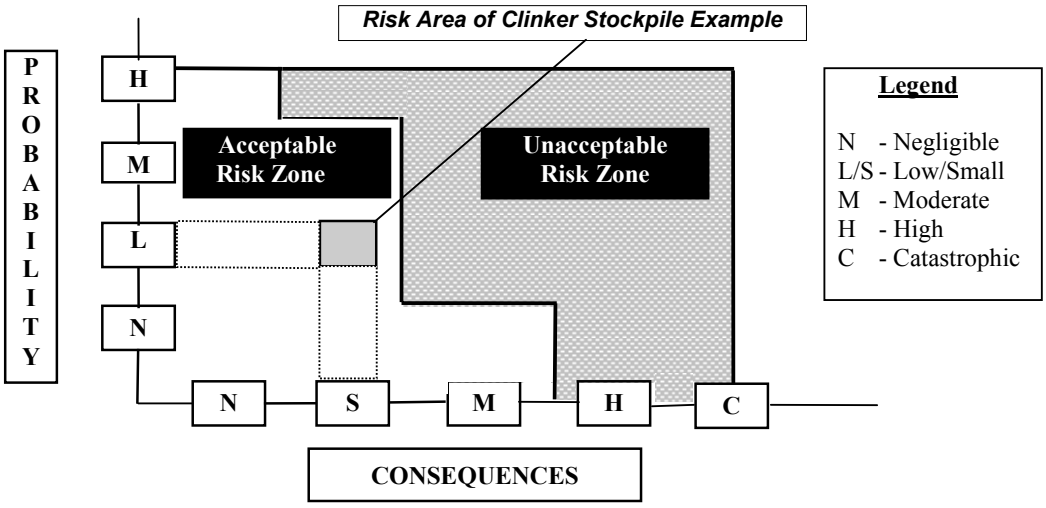


Fig 1 : Risk Profile Diagram

1.4 Fast Track Project Implementation

The time taken for a project execution is directly related to money. The project delays are a drain on the project funds. Thus, implementation of any project in shortest possible time can also be termed as SDC. Keeping in view, the difficulty in availability of funds and market situation, some of the guidelines which can be followed for Fast Track Project implementation, are given below.

- Finance for the project should be fully tied-up before start of the project so that no delays occur on account of the same.

- Complete project team should be motivated and committed to the project (mission). Only experienced and competent Consultants, Suppliers, Contractors and project team members should be deployed for implementation of a project.
- Reworking and procrastination should be avoided except for in unavoidable situations.
- The RCC/steel floors should be decided on the basis of availability of the details. All such floors for which the details are likely to be delayed, should be kept in steel.
- The civil contract as well as the supply packages should be suitably divided into groups/packages. Selecting a single source/contractor often leads to delays and it has been the experience that more than one contractor leads to a healthy competition and substantial reduction in project completion time.
- Proper infrastructure should be built in the initial phase of the project itself viz. batching plant (with transit mixers and concrete pumps), tower crane(s), mobile cranes, construction power (or DG set), welding and gas cutting sets, housing for construction/erection staff (with fooding arrangement), adequate water supply, illumination of site, arrangement for regular supply of construction materials and consumables.
- State of the art communication systems between site, customer, suppliers and Consultants should be established. For site team, advanced communication facilities like walkie talkies/pagers, etc. should be provided.
- Proper approaches to individual buildings should be ensured for faster construction and erection.
- Delivery of material (sequencing) needs meticulous planning. A lot of time in double handling can be saved by directly unloading of material at/near the place of installation.

However, it has to be kept in mind that in a fast track project implementation, certain modifications do take place and the same shall have to be accepted.

2. SPLIT LOCATED UNITS

2.1 Definition

In an integrated cement plant, operations right from raw meal preparation, clinkerisation, clinker grinding upto despatch of bagged cement, is carried out at one location. In split located unit, the clinker grinding, cement storage and despatch operation are carried out at a suitably selected location, away from the main unit (clinkerisation).

The concept of split located grinding unit is not new for India. Split located Units have been set up by many cement companies. This concept is gaining wider acceptance due to the current market situation.

These days, the capacity of new cement plant is in the range of 3000 - 6000 t/d. Difficulty in marketing of such a huge quantity of cement from a single location have been experienced. The problem is further aggravated as many plants are located in a cement cluster (near the limestone deposits). Thus locating the cement grinding or cement packing unit near consumption centres is gradually becoming a necessity.

2.2 Site Selection for Split Location

Site selection is a crucial activity and needs careful analysis.

The criteria evaluated for locating the grinding units are:

- **Nearness to the Consumption Centres/Rail Heads**

  Market price is one of the most important factor affecting the profitability. Hence, access to attractive markets is the prime criteria governing choice of locations. Locating Grinding Units near consumption

centres is being increasingly preferred in view of increasing cost of long distance cement movement and shortage of wagons. With cost of production varying in a narrow range for competing cement companies, the freight cost advantage often becomes the deciding factor in marketing of cement.

- **Availability of Blending Material (slag, fly ash, etc.)**

  The clinker cement ratio in India is around 90 : 100 which is as low as 60 : 100 in Europe. Production of blended cement thus has tremendous scope in India.

  Use of blending material leads to value addition in two ways. Firstly, though the cost of blending material is negligible (compared to that of clinker), the price of blended cement is only marginally lower than OPC. Secondly, blending coupled with split locating the unit near the source of blending material, results in considerable saving in transportation costs.

  Locating the Grinding Units near Steel Plants or Power Plants ensures cheap or regular availability of industrial wastes – Slag or Fly Ash.

- **Sales Tax Incentive**

  The Sales Tax incentive generally available to new units, contributes significantly to profitability. In the prevailing situation, this incentive is available, for all practical purposes, only on the sales made in the home state. It is thus, often not possible for a unit to avail the maximum benefit due to market limitations. In this event, splitting the grinding unit between two or more states, maximises the returns.

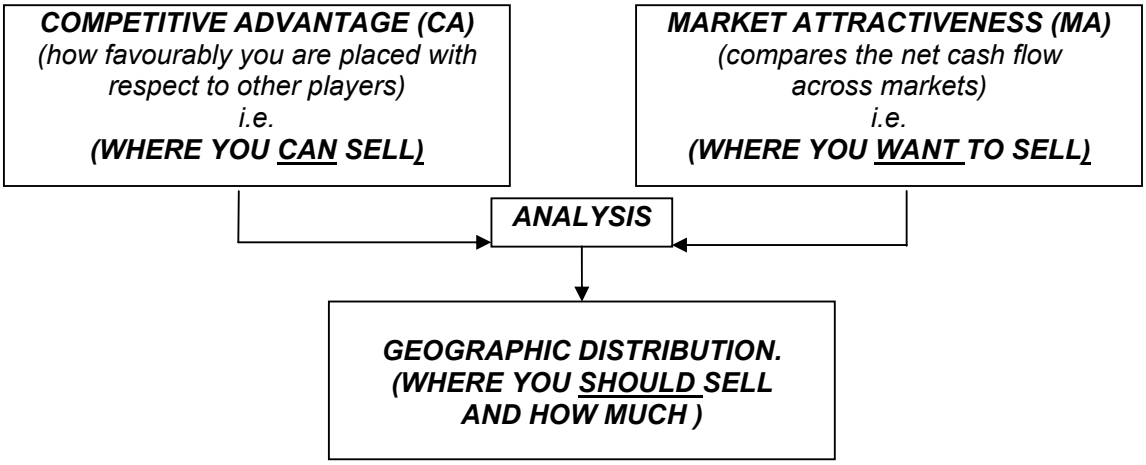
2.3 Viability

Apart from site location, key parameters considered by the entrepreneurs are:

- What shall be the project cost?
- What should be the capacity of the unit?

For this purpose, an Option Evaluation Study - `Competitive Advantage – Market Attractiveness' (CAMA), can be carried out to facilitate decision making.

The **Competitive Advantage (CA)** indicates **how well** a player is **positioned** with respect to its competitors to sell in a given market. It is measured as the Cash Flow Projection (CFP) of the player in a market compared to the average CFP of other players in that market. CFP is based on market price, dealers margins, sales tax, freight and production cash flow, etc. The **Market Attractiveness (MA)** indicates the **interest** of a player to sell in a market with respect to the other possible markets for that player. It is measured as the CFP of the player in a market compared to the player's minimum CFP among all its markets.



2.4 The methodology is explained by an example given below.

Example

One customer wanted to evaluate the option of setting up a split located grinding unit at the most appropriate location.

Based on qualitative analysis, three options were selected for a detailed evaluation.

For the Grinding unit at different locations, the following emerged out after CAMA study.

Location	State A (OPC:70% & PPC:30%)		State B (OPC:70% & PPC:30%)		State C (OPC: 80% & PPC:20%)	
Capacity	0.5 mio tpa	0.3 mio tpa	0.7 mio tpa	0.5 mio tpa	0.7 mio tpa	0.5 mio tpa
Project Cost (in Rs. Crores)	92.	74	114	92	114	92
Markets	100% in State A	100% in State A	100% in States A,B, C	100% in States A&B	100% in State A	100% in State B
Average Price (Rs/Bag)	129	129	141	140	138	142
Average Freight (Rs/Ton)	240	193	256	206	418	425
Sales Tax Advantage	Rs. 96 Crore	Rs. 70 Crore	Rs. 50 Crore	Rs. 40 Crore	Rs. 53 Crore	Rs. 42 Crore
No. of years ST advantage is enjoyed	6	6	3	3	3	3
Net Present Value (Rs. Lakh)	3087	2824	11576	9210	2814	2664
Internal Rate of Return	15.95%	16.18%	26.33%	26.45%	13.86%	14.70%

Of the options evaluated, returns from a grinding unit at **location B** is above other locations.

Therefore, 0.5 and 0.7 mio tons capacity at location B were checked for various sensitivities, and the best option was chosen.

3. BULK CEMENT TERMINAL

Where there is a huge concentrated cement demand (big cities) and supply sources are far away, it makes sense to transport loose cement in bulk to such places and then sell it locally either in bulk or in bags.

Bulk consumers prefer to receive loose cement. This results in savings of packing and bag costs. It also avoids possible adulteration during transit. In India, one such rail based terminal has already been put in operation and others are in the process of development. Since the transportation by sea is the cheapest, installation of shore based packing terminals, where cement is received by ship either from abroad or a coastal based cement plant gives a lot of competitive edge over others. Sea based cement terminals are already developed by some cement manufacturers where they receive cement by ships from their own cement plants. Transporting in

bulk, by ships to coastal based grinding-cum-packing terminals not only gives benefit of the lower transport cost, it also provides sales tax benefit (if available) and lower loading/unloading costs.

In the coming years, more Bulk Cement Terminals are likely to come up near major consumption centres.

An attractive feature of a cement terminal could be low cost flat storage for bulk cement. A typical flowsheet of a shore based packing terminal having a flat cement storage is shown in **Fig. 2**.

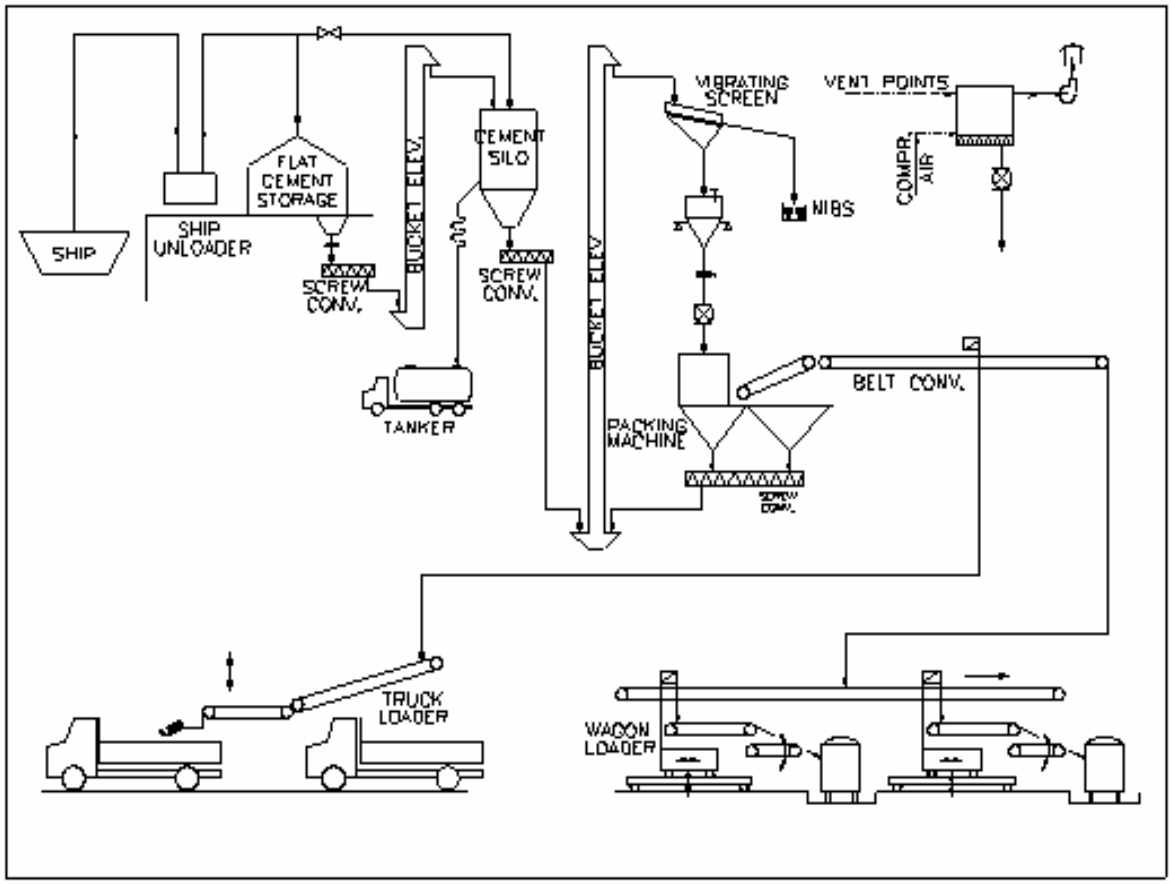


Fig 2 : Typical Flowsheet of a Shore Based Packing Terminal

4. READY MIX CONCRETE (RMC)

In developed as well as in many developing countries, the RMC Industry consumes more than half of the cement industry's output. However, in India, the concept of RMC has not yet caught up. Since RMC is a low cost product, of very high consistent quality and can be supplied uninterruptedly at a very fast rate, it is expected to gain wide acceptance in India too, in near future. Government have already taken steps to popularise RMC by removing the excise duty on RMC totally.

Various aspects about setting up of a RMC plant are briefly discussed below:

4.1 Plant Location

The major criteria for selecting the location are :

- ❑ Market
- ❑ Aggregate Source
- ❑ Availability of around one hectare land (Since RMC plant has to be preferably located within city limits or at its outskirts, availability of land becomes important)
- ❑ Availability of Power and Water
- ❑ Good Communication Facility (for dealing with numerous customers)

4.2 Raw Material

The raw materials required for RMC plant are:

- ♦ Cement
- ♦ Aggregates
- ♦ Sand
- ♦ Water

4.3 Type of RMC Plants

RMC is loaded on to transit trucks either in Dry Batches or Premixed (green or wet concrete). These two options are briefly described below:

4.3.1 Dry Batch

In this system, a batching plant to produce only a dry mix is installed. The mixer trucks receive dry batched material from the batching plant and the mixing operation takes place enroute while transporting the same to construction site.

Advantages of a dry batch plant are:

- ❑ Investment and operating costs are lower
- ❑ The operating capacity is about 30% higher than a Premix plant
- ❑ Consumers over a larger area can be covered by the plant
- ❑ The installation and operation are simpler
- ❑ Plant maintenance is less demanding

Dry Batch plants may be set-up initially to keep the initial investment low with provision for adding facilities for producing premixed concrete, in future.

Dry Batching plants are quite helpful in entering temporary markets.

4.3.2 Premix Plants

As the name implies Premix, plants are having a mixer unit along with the batching plant. Transit mixer transports wet concrete to consumers.

The main advantage of Premix Plants is that the mixing process can be controlled perfectly as required for the quality of concrete to be produced, in the plant itself before its loading on to the transit mixer.

4.4 Plant Equipment

4.4.1 *Aggregate Handling*

Different types of the storage of the aggregates are possible. Depending on the local conditions and land availability, the equipment for conveying the aggregate from storage to the main plant could be a :

- ❑ single bucket elevator
- ❑ multi bucket elevator
- ❑ belt conveyor
- ❑ gravimetric free fall (tower type)

4.4.2 *Batching Plant*

Batching is done by any one of the following methods:

- ❑ volumetric dosage devices
- ❑ belt scale weighing system
- ❑ weighing hopper (scale)

4.4.3 *Control System*

The mixer (in a stationary plant) is the heart of concrete plant. The main function is to homogenise the mix, improve the workability and increase product uniformity.

The control panel of the batching plant is capable to store different type of recipes in order to make different types of concrete mixer. Further, monitoring of production and material consumption is also possible.

RMC is delivered to site(s) in specially manufactured mixer trucks which are capable of mixing, delivering and distributing concrete in a very economic manner. They are capable of receiving wet concrete directly from the plant or of receiving dry batched material from the batching plant, mixing the ingredients en-route and adding water in the final mix at an appropriate time (depending on distance of destination).

4.5 Manpower Requirement/Implementation Schedule

Manpower requirement for a RMC plant is very low. Approx. 20 to 25 people are sufficient to take care of plant operation as well marketing function. Depending on the size of the plant, this number can vary.

To set up a RMC plant, approximately 6 to 8 months time is required. This schedule can vary depending on various factors such as capacity of the plant, location of the plant, supplier of the plant etc.

5. CONCLUSION

The project execution in future is going to be more and more, based on the concept of SDC and fast track. The capacity of the plant, the technological level etc., are to be decided by the availability of finance. However, the location of the plant is going to be governed by the market forces. The concept of RMC plant alongwith a Cement Grinding Unit/cement terminal has a good potential near major consumption centres/metropolitan cities. In the current scenario, need is to precisely assess the market requirement and take proactive action.