RESOURCE CONSTRAINT: A MAJOR IMPEDIMENT FOR INFRASTRUCTURE GROWTH

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ABSTRACT-

Construction activities are resource intensive in terms of material and construction workers. Non availability of both the resources adversely affects the progress. To meet the increasing demand of raw material, obtained from non renewable natural sources, use of scientific quarrying methods to be adopted. Recycling of construction waste and use of alternate construction material must be encouraged. Steps must be initiated for the skill development of the construction workers to provide trained manpower for the construction industry. Govt schemes like MNREGA must be executed in close coordination with infrastructure project implementation.

I. INTRODUCTION

There is a wide demand and supply gap between requirement and availability of infrastructure to sustain the envisaged economic growth. The gap has further widened due to inordinate delays in delivery of infrastructure projects. The delays are attributed to lacunas in delivery model. Be it planning, project procurement, resource management or various bureaucratic hurdles. There is a requirement of developing an effective deliver model to ensure optimum utilization of fund allocated for infrastructure development. Needless to say infrastructure development is the foundation of all-around economic growth of any country. Critical infrastructure segments, like roads, railways and energy sector, have witnessed a shortfall in utilization of the allocated funds. The gap in terms of physical achievements of infrastructure projects is more perceptible than that in investment gap. Physical achievements in last couple of years have not matched the aggressive investment targets set. The project got delayed due to multifarious reasons starting from poor conception to inapt planning to non performing executing agencies, resource constraints in terms of trained manpower and availability of quality material.

II.RESOURCES REQUIRED FOR INFRASTRUCTURE DEVELOPMENT

Adequacy of funds and vision of the leaders is definitely the starting point for any Infrastructure project to be conceived. Further crafting of well conceived project in to viable working model and transforming the working model in to physical structure require an array of resources in terms of manpower – highly skilled to the last labour physically pouring concrete on work site, Tool and plants -starting from the simple auto level to the state of art ready mix concrete plant to automatic paver machines working at site day and night, and last but not the least 'The Construction Material'. Arena of construction material is just not confined to the material brought at the construction site for erection of the physical structure. It is much more wide spread. A wide range of

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supporting infrastructure is needed to sustain the present infrastructure development needs. Cement and steel industries are the flag bearer, as far as the basic needs of construction marital is concern. These industries are based on earth minerals & energy. They also require a well developed transportation network to meet the raw material requirement and delivery of finished products to destinations. In addition to the roll of organized sector as supplier of material for infrastructure sector, unorganized sector also plays a vital role to meet the material demand of infrastructure sector. Be it sand, aggregate, bricks, timber and many more.

A. Cement : A primary constituent

As per 2012 statistics India is the second largest manufacture of cement after china with per capita annual cement consumption as 176 kg. To meet the cement demand a manufacturing unit requires gypsum, fly ash, water and colossal amount of energy. The wet process requires 0.28 tonnes of coal and 110 kWh of power to manufacture one tonne of cement, whereas the dry process requires 0.18 tonnes of coal and 100 kWh of power. The production of cement has increased at a compound annual growth rate (CAGR) of 9.7 per cent to reach 272 million tonnes (MT) during FY 12–13. The production capacity is expected to grow to 550 MT by FY 20. For transportation of such huge quantities to the construction site a well developed road/rail network is a pre requisite.

B. Steel requirement for infrastructure

India is the fourth largest producer of steel in the world. Approximately 60% of the total steel production is consumed in the construction sector.

TABLE-1

Steel production in India

Indian Steel Industry: Production for sale(in million tonnes)				
Category	2007-08	2008-09	2009-10	2010-11
Pig Iron	5.28	6.21	5.88	5.68
Sponge Iron	20.37	21.09	24.33	25.08
Total Finished Steel (alloy + non alloy)	56.07	57.16	60.62	68.62

Steel production is directly dependent on mining and processing of natural ore. Approximately 20-to 40% cost of the steel is attributed to the energy required for processing the iron ore depending upon the process used.

C. Resources from unorganized sector

So far, the roll of organized sector was discussed for providing the basic raw material for construction sector. Well tabulated authenticated data is available from number of sources so as to give statistics of last ten years production, share as percentage of GDP, future demand trends and what not. What as an engineer as a planner we forget is - To convert cement and steel in to Reinforced Cement Concrete (RCC). Sand and aggregate are equally important. No authenticated data can be given as how much is the annual production of sand and aggregate in India? What are the growth trends? What type of sand and aggregate are more in demand? Who is controlling /analyzing the demand – supply patterns? Is there any agency, apart from the local influential people who control the price and production? The answer is NO. This huge market is purely a local phenomenon. The local market controls the production in such an organized manner that when there is large demand due to favorable working season, artificial crises is created; prices are increased leaving the executing agency in a dilemma. If the agency wants to progress the work, from where the additional funds will be generated, if it wait

for prices to come down, the favorable working season is over. These are the ground level problems faced during execution. Sand and aggregate are just examples, construction industry by and large is dependent on local suppliers to meet the demand of raw material be it timber, shuttering material, water, bricks and many more. It not only construction sector which is suffering, a very large scale evasion of taxes is also involved in this business, starting from royalty to mining department to Income tax.

II. CHALLENGES FOR RESOURCE MANAGEMENT

All raw materials for the construction industry are obtained from one or the other from of quarrying. Starting from iron ore for manufacturing steel, to gypsum for cement and sand & aggregate etc, the direct dependency is on minerals. It is not only obtaining environmental clearances, required for the project itself which is a small project in itself, but environmental aspects associated with the raw material also a potential delay factor for the progression of an Infrastructure Project.Material resource constraint is a major cause of concern. Very learned highly qualified people does the planning at national level, priorities various sectors, allocate funds. Next falls in the hierarchy are technocrats who use marvelous engineering skills, prepare the blue print for execution. This is followed by numerous funding agencies; which are eager to dish out fund to finance the projects, to expand their business. This is followed by the management wizards who prepare fabulous working strategy to progress the project with all sorts of time lines and objectives. Yes all this is a prerequisite for successful execution of the project. What we forget is the source of raw material? When we think of raw material for construction sector, straightway cement and steel are the primary constituents which will come to our mind. Very right, but how about sand, bricks, bullies, water, aggregate and many other miscellaneous materials which are assumed by the planners as available abinitio. It is a known fact that supply of this kind of material is controlled by the influential locals. There is no organized sector which supplies certified aggregate of desirable property. Even after amply specifying the size and quality of aggregate to the supplier, it is very difficult to get the material of requisite quality. Similarly for sand, do we have any agency at any level which can supply a certified sand of permissible size, controlled silt content? The answer is NO. Similarly brick manufacturing is a very-very local activity. Do we have any brick manufacture who is supplying class ‘A’ bricks of 75kg/cm2 compressive strength of ISI mark? No , we do have an IS code on quality of brick , quality of sand and aggregate and all sort of engineering to give a design mix of concrete of proportion of various kind of raw materials as per IS specifications , but sad to say no one to supply such material. The policies on sand mining, stone quarrying, clay brick manufacturing are not in sink with infrastructure development policies; they are not even in synergy with the cause of environment. Even if they are, there is a lack of will to implement. Rather in absence of well defined guide lines, illegal and unscientific quarrying is being encouraged. This results in short supply of raw material, which generate a demand supply gap and leads to supply of material not only at highly unpredictable rates but also one may not get the requisite material when it is actually required. This induces a very high amount of uncertainty in the infrastructure execution sector. Supply chain management of the project and supply –demand gaps in the market; both factors are responsible for delay on account of non availability of construction material. Supply / production of basic constituents of the construction material like sand, aggregate, bricks and other misc material is controlled by influential locals. There are no guidelines on quality of the product and quantity of the production. Various IS codes does specify the quality of basis raw materials, but these guide

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lines or specifications are for the engineers to design and implement. The suppliers or dealers of such raw material are not bounded by any means to adhere to IS specification.

III. STREAMLINING THE RESOURCE MANAGEMENT

It is imperative to streamline the process of material resource delivery model to the infrastructure sector. The demand is increasing to fulfill the growing infrastructure needs. Haphazard mining of natural resources will not only lead to depletion of non renewable national reserves but also will not be able to meet the growing demand. Following measures must be adopted to ensure optimum uses of the available minerals to meet the demand.

A. Scientific quarrying

Encourage scientific quarrying methods by bringing in reforms in auction/allotment procedures for quarrying of earth resources. Illegal quarrying which is the sole source of sand and aggregates must be curbed. It not only degrades the environment but fails to implement any checks and balances on the quality of the product.

B. Entry of organized sector in supply chain management

Supply of raw material like sand and aggregate is on the apathy of local suppliers who are not bounded by any compulsions. Entry of organized sector must be encouraged in this field under an umbrella of well defined regulations. It will bring in the much sought after transparency in the system and will be able to bring in standardization in the supply of raw material.

C. Recycling of construction waste

Any construction site produces approximately 5-10% construction waste of the material used, depending on the efficacy of site engineers. In addition to that demolition of old structure also produces sizable amount of construction waste. As on today disposal of this inert waste in the form of broken concrete, reinforcement steel, bricks etc not only increases the cost, but landfills required for disposal of such waste are also shrinking. Construction waste has the potential be to re used. It will not only save on the money required for disposal but also reduces the requirement of raw material. R&D must be encouraged to make recycling of construction waste more cost effective. Recycling of construction waste will also be a green initiative on part of infrastructure sector.

D. Inventory management

Inventory management takes precedence over all activities. Stocking of material means blocking of funds, on the other hand by not maintaining adequate reserves, construction schedule will be jeopardized. Over stocking may lead to wastage and block circulation of funds. As inventory manager the primary job is to ensure availability of right type of material at the right place in the correct quantity with minimum cost and wastage. Adequate funds must be allocated to maintain optimum inventory level. Availability of material during lean period of supply must be planned to ensure availability for sustenance of work and also to minimize the fund requirement which needs to be blocked for bulk procurement.

E. Technical advancement and awareness

In order to overcome shortage of raw material in the construction industry use of new technologies must be encouraged. Designers must be encouraged to use alternate construction material and recycling of construction waste. Use of local material and area specific traditional construction techniques must be incorporated in the drawings.

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IV. SKILLED MANPOWER REQUIRMENT

No amount of automation, use of latest technology and labour saving devices can undermine the importance of skilled manpower for execution of the infrastructure project. Infrastructure Projects have a very large aura. The requirement of skilled man power is just not limited to the white collared job of managers at various levels. The requirement of skilled manpower trickles down to the last labour, physically working at work site, whether he/she is a site engineer / a supervisor/ a mason / an electrician / a machine operator / a carpenter or any other trade out of hundreds of skilled people of various fields required to progress the work. First and foremost constraint is availability of such an array of people for the requisite time frame, they are actually required. The second constraint is, do they possess requisite skills to accomplish the assign task? In order to address this issue Industrial Training Institutes & "Industrial Training Centers" were set up by the Government of India long back. The efficacy of these institutes in terms of quality and quantity of trained manpower produced vise via employability in infrastructure sector is yet to be ascertained. The other aspect of skilled man power constraint is supply demand ratio. In Indian context the labour sector is a non organized sector. Labour gangs are mustered through 'Lamberdars' or 'Mates'. The poor of the poorest people are invariably form part of the thousand of thousands of crore rupees infrastructure sector at the grass root level. They are inadequately skilled, poorly paid thus perform accordingly. Human Resource constraint in terms of quality and quantity affects the furtherance of infrastructure projects in a big way.

V. HONING THE HUMAN RESORCE

India has the second largest population in the world with youngest age profile. At the same time there are large numbers of unemployed youths. On the other hand there are sectors which are suffering due to shortage of skilled manpower. This dichotomy can only be resolved by honing the human resources in the right direction.

A. Skilled construction workers

Shortage of skilled construction workers has a major impact on construction industry and quality of work. The construction workers develop their skills through on the job training, a traditional acceptable norm. This traditional approach cannot produce skilled construction workers who have to handle modern construction machineries and tools. The efficiency is reduced, expensive machines and tools aimed to cut down on time, becomes counterproductive. This problem can be resolved by imparting formal training. This initiative has been taken by Construction Industry Development Council (CIDC). The Planning Commission, Government of India, jointly with the Indian Construction Industry has set up the Construction Industry Development Council (CIDC) to take up and promote activities for the development of the Indian construction industry. Based on extended deliberations with the various stakeholders of Construction Industry, job oriented training and skill enhancement courses have been designed and disseminated for secondary level school students at Supervisory levels and Site support Staff

B. Entry of organized sector

Construction industry is by and large dependent on 'Labour Mates' or 'Lamberdars' as sole employment agency. These so called employment agencies not only blackmail the contractors but also exploit the construction workers. Construction workers are exploited to the hilt –poorly paid, forced to stay in inhuman conditions, lack of medical facilities, and no insurance for accidents despite unambiguous government directives. Entry of organized sector must be encouraged to provide skilled manpower for infrastructure sector.

C. Implementation of Govt schemes in close coordination with infrastructure project implementation

Implementation of Government schemes like Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA) must be in synchronization with Infrastructure Project implementation. As per data available from the official web site of NREGA, 'nrega.nic.in' , during the financial year 2013-14 , a total of 644 districts comprising of 6576 blocks , 247643 Gram Panchayts and 778134 villages were covered under this scheme with a total expenditure on payment of wages as Rs 37648 crores. As evident from the data, NREGA has a very vast network across the country, this agency if synchronized with infrastructure project implementation, will not only ensure availability of construction workers for infrastructure development but also ease the Government of it financial burden of Rs 37648 crorers as welfare funds. The financial liability will automatically shift to concern infrastructure sector. This synchronization will also abolish the monopoly of so called labour employment agencies.

D. Emphasis on well defined project management organization

Establishment of a well defined Project Management Organization, formulation of working guide lines, unambiguous targets for core appointments and effective management & monitoring can, up to some extend help in negating the effects of shortage of manpower at management and supervisory level. The systematic approach with availably of project specific database will streamline various procedures and ease out decision making.

VI.CONCLUSION

Infrastructure development is the need of today. It has a dependency on large numbers of resources in terms of material obtained from organized sector, locally available materials and an array of construction workers with different skills. There is a need to bring in reforms in supply chain management system to ensure timely availability of quality construction material at reasonable price. The constructions workers need to be well trained in their respective skills. These two aspects if addressed appropriately will bring in respite from the recurring case of time and cost overrun in infrastructure projects.

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