

Effective Application of Site Layout in Small Construction Project in Densely Populated Areas

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Abstract— The effectiveness in site layout and construction designing for large-scale and sophisticated construction comes not solely affects productivity and value, it additionally controls whether or not a project is handled and completed in a very economical manner. In Asian nation site layout designing is generally a neglected side. Most construction sites that run into hassle do thus for reasons associated with social control factors instead of due to technical issues. The site-based management will create vital enhancements within the price and time savings throughout the development method while not involving a mass of further work. Now-a-days because of site insufficiency i.e. restricted site area, high price of buying, choice and site area is taken into account as vital as alternative resources. The review of literature for varied aspects of site layout is given during this paper.

Keywords: Site Layout, Site-Based Management, Construction Planning

I. INTRODUCTION

Site management, in general, involves several tasks, like site investigation before construction methodology starts, material delivery and procural management, keeping higher site records, keeping smart website communication and high level of knowledge flow, observation performance frequently, establishing a well co-ordination system among completely different elements, and acting a decent site layout designing. Among the necessary tasks of site management is that the site layout designing. In depth time loss and price overruns might lead to giant comes, wherever the amount of men, subcontractors, and instrumentation concerned square measure high, if there's no effective and systematic approach to site designing.

And in depth designing of the location layout and site of temporary facilities will alter the management to create hefty improvement by minimizing time period, waiting time, and increasing employee morale by showing higher and safer work surroundings. Construction site layout involves distinguishing, sizing, and putting temporary facilities at intervals the boundaries of construction site. These temporary facilities vary from easy laydown areas to warehouses, fabrication outlets, maintenance outlets, batch plant, and residence facilities. Needed temporary facilities and their square measures are relying in several factors together with project kind, scale, design, location, and organization of construction work. Site area may be a resource that's as necessary as cash, time, material, labor, and instrumentation. Website area may be a restricted wherever all facilities square measure needed to be provided at intervals the boundary of the location. Ideal site layout is one wherever the price of the merchandise is unbroken to minimum, with an oversized market share, the smallest amount risk and also the most social gain.

Generally, utilization of site relies on project manager's expertise and correct site planning coming up with is neglected. Sensible site layout, however, is very important to push safe and economical operations, minimize period, decrease material handling, and avoid obstructing material and instrumentation movements. There are 2 general objectives that planners ought to obtain to fulfill through careful organization of the positioning for construction. First, the positioning should be designed to maximize potency of operations so as to push employee productivity, to shorten project time and to scale back value. Second, the ultimate set up should produce a project with an honest work setting so as to draw in and retain the simplest personnel and so contribute to raised work quality and productivity.

II. METHODOLOGY

Site layout plans are ready by contractors as a part of their mobilization activities before work on construction site commences. They are an important a part of construction management, as sites are often terribly complicated places involving the co-ordination and movement of enormous quantities of materials also as high-value merchandise, plant and folks. Effectively and accurately giving birth out a site will facilitate make sure that the works are undertaken with efficiency and safely. Careful size and positioning of temporary facilities will facilitate scale back travel times, congestion, waiting times, and so on, and facilitate to create the positioning a simpler geographical point with higher employee morale.

Site layout coming up with involves four basic processes:

- Identifying the positioning facilities that may be needed.
- Determining the sizes, and different constraints of these facilities.
- Establishing the inter-relationships between the facilities.
- Optimizing the layout of the facilities on the positioning. Essentials of a particular site layout are as follows:
 - 1) Security fencing.
 - 2) Approach road.
 - 3) Internal road.
 - 4) Parking.
 - 5) Main gate.
 - 6) Security cabin.
 - 7) Drinking water supply.
 - 8) Storage water tanks.
 - 9) Toilets.
 - 10) Drainage lines.
 - 11) Septic tank / sewage treatment plant.
 - 12) Electrical supply, meter location.
 - 13) Generator set.

- 14) Common lighting.
- 15) Labor accommodation.
- 16) Safety & health check-up center.
- 17) Separate pedestrian access.
- 18) Client office.
- 19) Contractor office.
- 20) Cement godown.
- 21) Material store.
- 22) Steel yard.
- 23) Machinery & equipment's yard.
- 24) Site testing lab.
- 25) Concrete test cube curing tank.
- 26) Canteen / pantry.
- 27) Sign board / layout map.
- 28) Material storage in open.
- 29) Temporary dumping / storage of materials.
- 30) Concrete batching plant (if applicable).
- 31) Crane/s (if applicable) with radii.
- 32) Vehicles yard.
- 33) Fuels / oil / lubricants supply (if applicable).
- 34) Scrap yard.
- 35) Allocated areas for mock-ups & trials.

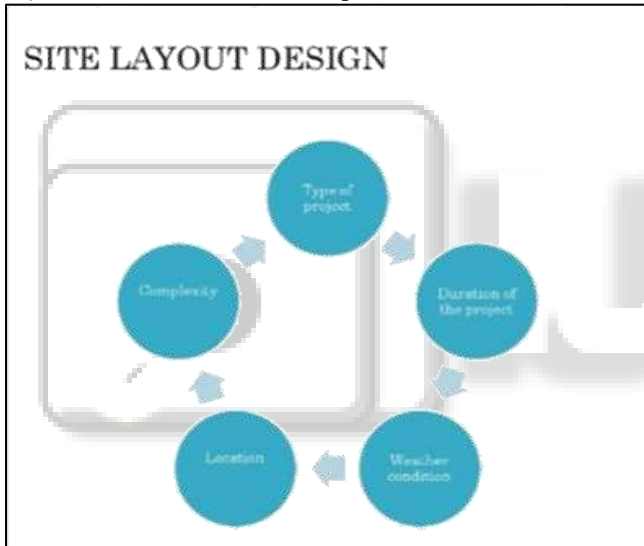


Fig. 1: Fundamental of a site layout.

Site layout also helps in following factors listed below,

- 1) Economy in material handling-
Economy in handling of materials, work-in-progress and finished stock.
- 2) Optimum utilization of resources-
Making certain optimum utilization of men, materials, instrumentation and area on the market.
- 3) Better inventory control-
Minimizing work-in-process and increasing inventory turnover. The fabric ought to move speedily through the plant and therefore the points of congestion ought to be eliminated to possess low levels of inventory.
- 4) Good work flow-
Reducing possibilities of delay and removing errors within the production system guarantee an honest work-flow avoiding accumulation of labor at important points.
- 5) Efficient control-
Smart planned layout helps in economical oversight and production management in a company.

- 6) Avoidance of changes-
Smart plant layout ensures economical oversight and production management in a company.
- 7) Safety-
Ensuring safety for the workers by eliminating or at least minimizing the chances of accidents.
- 8) Better services-
Providing adequate service center's at convenient locations.
- 9) Higher morale-
Boosting up employee's morale by providing incentives and also comforts while at work.
- 10) Flexibility-
Ensuring flexibility of layout for future changes and requirements.

The on top objectives of plant layout square measure commendable in themselves, however it's typically troublesome to reconcile all of them during a sensible scenario. As such, a highest level of talent and judgement square measure needed to be exercised by a management government to realize this, an in-depth coordination between him and therefore the production manager is extremely essential.

III. EXPERIMENTAL STUDY

The current study is based on the live case scenario of a construction project in Pune region. The site is so located in a congested area or we can say a fringe area with narrow roads and is an old industrial estate surrounded by. The project site layout is so designed that it helps in proper functioning of the project, without any congestion following all aspects which are to be achieved in the site layout.

The project was so divided in pours as shown in the figure below which helps us to understand the feasibility of the project and its characteristic parameters of the project.

I would like to explain the characteristics which helps us to understand that a project with a smaller area needs to be functioned properly without any congestion, the simple plan was to apply the site layout parameters in point were the very important objective for successful working of the project.



Fig. 2: site layout plan for the project.

Firstly, distributing it in to four different pours was a thought full act, because we didn't had scope to transport the debris out as it was a crowded area and letting heavy fleet of vehicles of debris out was a big problem to get stuck in traffic.

As a result, excavation a pour section up and letting it settle over the other two pour areas and working on the construction activities and later on we used that material of debris for the backfilling purpose over the constructed pours. Similarly further activities would work simultaneously for the other. Mainly dividing in to four pours was to effectively carry out construction activities such as excavation of one pour then casting of footings, columns, slabs because the scope to work on site was limited due to limited spaces and also planned schedule for excavation of footing pit and transferring debris it to the adjacent pour and working on the planned schedule was a task, thus the project was divided in to pours. By this we also saved on costs and ease of work was attained, also flexible work of construction activities was carried out. In designing the site layout three openings were provided one for the clients which would have access to the sales office and a brief look of the work ongoing on the site., the second was material gate which had access to all construction related material needed in to site and third for RMC'S which would not have interruption for concrete work throughout the day. All other facilities such as drinking water, toilets, and safety information boards were provided in to the premises, with access roads for site movements were provided with proper safety precautions. Engineering room was provided for working staff for both client and the contractor where all records and planning of construction was done for the project.

IV. CONCLUSION

- 1) Site layout implementation in small scale projects helps in proper planning and execution.
- 2) Site layout should be applicable in all scale type projects such as small scale, medium scale, and large scale.
- 3) Site layout drafting is also an important aspect before actual application, which can be understood by this project.
- 4) Site layout implementation can be also done in small scale projects.
- 5) As in India site layout application is implemented on a small scale, by this we can prove that site layout implementation is easy and helpful in various aspects.

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