Application of Lob Technique in Multi-Story Building

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Abstract- *This seminar reports one aspect of a Repetitive Scheduling Method (RSM) or Line of Balance Scheduling Technique (LOBST) applied for a housing project having project activities repetitive in nature. Linear scheduling methods are planning and scheduling techniques mostly used in construction and manufacturing industries where repetitive operations are abundant. The Line-Of Balance Scheduling Technique (LOBST) is a linear scheduling method that allows the balancing of the operations such that each activity is continuously and efficiently performed in each consecutive unit. Some construction projects that involve sets of tasks organized in repeating sequences are similar to continuous manufacturing processes in their structure. The basic concepts of LOBST have been applied in the construction industry as a planning and scheduling method Examples of such projects include pavement construction, multi housing projects, and high-rise building construction. Today, LOB application has been further expanded, making it suitable for a whole spectrum of activities ranging from research and development through job - shop and process flow operations.*

Keywords- Construction planning, lean construction, line of balance, Repetitive scheduling

I. INTRODUCTION

The Line of Balance Scheduling Technique *(LOBST)* was introduce by the Goodyear Company in the early 1940's and itwas developed by the U.S. Navy in the early 1950's for the making ease in repetitive and non-repetitive activities. It was originated for industrial manufacturing and production control. The basic concepts of LOBST have been applied in the construction industry as planning and scheduling method.by using of this method we can easily saves precious time that required for the project activities. That's where the Line of Balance Scheduling Technique comes under the frame. By using Line of Balance Scheduling Technique instead of traditional critical path methods and Project Evaluation and Review Techniques.

II. HOUSING SCENARIO IN INDIA

Affordable housing refers to housing units that are affordable by that section of society whose income is below the median household income.

Affordable housing becomes a key issue especially in developing nations where a majority of the population isn't able to buy houses at the market price. Disposable income of the people remains the primary factor in determining the affordability. As a result, it becomes the increased responsibility of the government to cater to the rising demand for affordable housing.

India, like most major emerging economies, has been witnessing accelerating urbanization. As per the census of India in 2001, about 72% of the population lived in rural areas and 28% in urban areas. By 2011, these figures had changed to 69% rural population and 31% urban population. In fact, as per census 2011, for the first time since India's independence, the absolute increase in population was more in urban areas than in rural areas.

According to estimates, around 600 million people are expected to make urban India their home by 2031, a whopping 59% growth over 2011. As an increasing proportion of India's population starts participating in its growth story, it brings with it mounting pressure on the existing infrastructure, which needs to at least keep pace with the growing demand, if not be ahead of the curve. The current housing deficit in India stands at 19 million units, which, in the absence of any meaningful intervention, is slated to double to 38 million units by 2030. 95% of this deficit is around the EWS (Economically Weaker Sections) and LIG (Low Income Group) segments, which technically puts the figure at a staggering 18 million units in this category (approximately). While this number is huge, there is also a substantial chunk of upper end of LIG band and lower to middle end of MIG band, which we can say comprises 'the emerging middle class', who are also deprived of decent living conditions. The deficit in this category is approximately 4 lakh units, which, if not addressed, would further aggravate the proliferation of unplanned and unsustainable urbanization. Statistics show that more than 80% of this category are staying in congested homes.

The Government of India has ambitious plans when it comes to affordable housing in India. The Government of India has revealed their plan where they want every Indian to have home to live in by 2022. To make this a reality, the Government has been taking lot of initiatives. There is a huge demand for affordable housing in the country as we speak. For the same, the Government is planning to collaborate with private builders to form a public-private partnership model. It's no secret that high real estate prices have made it difficult to buy a house. Lot of Indians can only dream of a house at the moment due to this. But with the introduction of affordable housing, lot of Indians can now dream about a house of their own.

III. METHODOLOGY

Step 1-Study of traditional scheduling method and repetitive scheduling method.
Step2-Study of line of balance.
Step3-Collection of literature review.
Step4-Selection of siteData collection.
Step 5- Detailed study of LOB technique.
Step6- Study of actual technique used at site
Step7-Application of LOB technique onsite.
step 8-Comparison of both techniques.
step9-Conclusion.

IV. CASE STUDY

CLIENT: Tirupati regalia (Tirupati group.)

Total Area: 0.87 acres.

Step-1 Output Rate Determination :

To determine the length of the task, rate of output must be ascertained. This can be done through communicating with knowledgeable individuals, such as schedular, the project manager, and especially the actual subcontractor performing the work.

For performing the Line of Balance Scheduling Technique(LOBST) we select thevarious activities that are performed.

So ideal rate of the performing the various activities we can plan this various work in the line of balance graphical representation

By keeping the output rate constant as "15" for this project we can draw the graph for LOB. Arranging all dependent and non dependent activities sequence wise and maintaining constant rate of output following graph is drawn :

By appling LOBST the total project duration is **280 Days.**

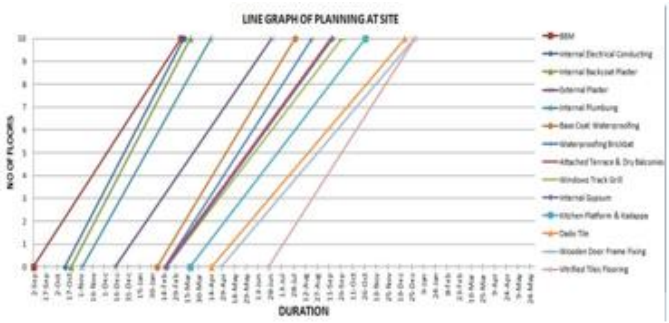

Fig.1-Graph as per LOBST

Step-2 As per their planning the total duration of project at site was**416 Days.**

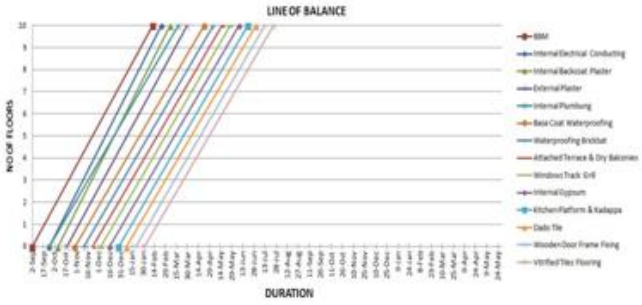

Fig.2-Line Graph of Planning at Site

Step-3 But while actual work it takes**424 Days** to complete the total project activities.

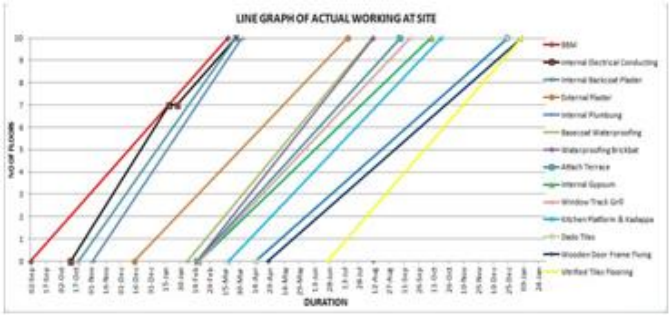

Fig.3-Line Graph for Actual Work at Site

V. FINDINGS& DISCUSSION:

When a group of activities are extracted from a program in this manner it can be seen how these common activities are grouped and over what duration they are planned to be carried out. Then, the quantities that each activity on the bar chart for the operation in question represents are established, aggregated against time and plotted as a line on

the Line of Balance Chart. The Line of Balance Chart shown in Fig. shows the ideal situation as all of the operations listed show the rate at which work is achieved as uniform. This usually means the resources required will also be constant and is the ideal scenario. It is much easier to manage the different operations of a project where there is a common and uniform output required and a steady level of resources. However, when a number of similar activities are extracted as a group and then converted into a Line of Balance Chart it is not unusual to see that the rate at which the work has to be carried out is erratic. Consequently, the fluctuation in the resources required is similarly erratic.It is very difficult to increase and decrease resources quickly and regularly.

Resource leveling can greatly assist this situation although it can be found that even after resource leveling is undertaken the outputs and their sources required will still be erratic. In such circumstances it is not unusual for a Line of Balance chart to be produced from a program and then find it is advantageous to modify the program, even after resource leveling has been implemented, to achieve a steady output. Often, producing a Line of Balance Chart can be a more effective and an easier method in which to resource level a project. A Line of Balance Chart is progressed by plotting on the chart the work achieved. The planned rate of completion of the various trades can then be compared with the actual. Based on the rate at which the work has been achieved the likely completion date can be extrapolated to establish the likely completion date. If the rate at which the work is being achieved is lower than required, adjustments are made to increase the output.

VI. CONCLUSION

When we compare the progress of project by traditional scheduling technique use at site and LOB technique, we conclude that, CPM lacks the ability to manage the rhythmic production and ensure crew continuity. However, LOB provides simple visual presentation which can track and control the progress in a better way. The graphical presentation of LOB technique makes it very easy for the project team to manage the crews, rhythmic production, buffer among the tasks, resources waste and work interruptions. Subcontractors may compromise the advantages of LOB due to their lack of knowledge in the technique. Nonlinear activities within the project need careful attention from the planner and must be accommodated in the LOB calculation and reporting system.

By implementing LOBST we save **136 Days** from actual planning by traditional method.

In India the problem of affordable housing is much more stark with an estimated shortage around 18 million houses, with 99 % of this in the economical weaker sections of society so it is very important to carried out affordable housing project effectively by saving time and cost wherever possible for that proper scheduling technique like LOB should be used.

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