PROJECT SCHEDULING USING MICROSOFT PROJECT AND PROPOSED ANT COLONY OPTIMIZATION TECHNIQUE USING MATLAB

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Abstract – *In our country, we are still facing issues such as time and cost overruns which has led to large delays in construction projects in turn has effected the common people. According to the Ministry of Statistics and Programme Implementation as many as nearly 245 Central Sector Infrastructure Projects out of the 1315 projects have shown time overrun and nearly 350 of them have shown cost escalation. There are cases where the projects have shown both time and cost overrun and the number goes up to 98 to be exact. Managing the time, Cost and quality in a construction project has become a tough challenge for a project manager in our country. In our project, we are representing a clear difference between Microsoft Project and Ant Colony optimization which makes it cost effective and in turn helps to reduce the duration of work to be done. Nearly 85% of construction companies still use the traditional MS Excel to schedule their activities and duration and among all of them many felt the need to adopt Modern Software.*

Key Words: Construction management, Ant colony, Construction project, Matlab. Microsoft Project

1. INTRODUCTION

During any construction process, keeping the cost within the limits is the most difficult task for a manager and others involved in the process. There are various tools which record the financial transactions as well as providing the update of all the progress and problems related to the project. There are various problems in the field of resource utilization, monitoring and control of the project. The main focus should be to identify the deviations from the project plan. Major cost savings can be achieved during planning and the design of the project. During the construction, changes are likely to delay as well as increase the cost of the project.

On the other hand, Time control keeps the project on time, within budget and on track. The estimate of the duration of the activities is based on the resources available. The estimate should be realistic. There are certain delays and accelerations during the course of project which cancel out each other for example: there will be certain activities which will be done before estimated time, certain activities will take longer than the estimated time and some activities might finish exactly as estimated.

2. LITERATURE SURVEY

A proper construction plan is the backbone of any construction project. Proper management is required for proper allocation and balance between cost time and resources. Scheduling enables the resource utilization, monitoring and control of the project. Time control keeps the project on time, within budget and on track. The estimate of the duration of the activities is based on the resources available. The estimate should be realistic. There are certain delays and the accelerations during the course of project. These are research review on application of project management tools in building construction project.

Prof P.M Wale and N.G Jain (2015)

They concluded that the construction of a building using MS EXCEL is proven to be an uneconomical and is more time consuming. Microsoft project is a precised and modern technique for construction management and planning. It also helps for the optimum organization of the tasks and duration which helps to give the vision to the complete the project in planned duration and within the Economy

El-Alfy and Ryosuke et al. (2010)

stated that the correct approach and a database of available systems with classification of compilation of each system with the different sustainability factors are proposed to be used during system' s selection process, and also the need to update database on a regular basis with new and improved systems and materials.

Shruti Singh and Sahil Pandey (2018)

Stated that using the efficient software such as Microsoft project the work can be done prior to what has been expected from traditional planning methods. Hence software is required for proper planning of cost duration and resources.

KB VIGNESHWARAN (2017)

States that proper scheduling of tasks can result in cost efficiency of project and hence makes the project completed well on time and within the expense limits. Some factors affecting the cost and time are local social problems, Environmental conditions lack of resources and local festivals. Thus if they are managed properly work can be perfectly on estimated time.

Monish Kumar K and Sparsha B.P (2017)

Using microsoft project as a project management tool is a efficient way to manage and schedule a project this enables organisation and resources of the project can be efficiently used as the task resources planned. Cost of the project is

accurately obtained using the softwares. Labour management can also be carried out using MSP.

Mr Umesh Kamble and prof. Shashank U. Vanakudari (2015)

States that any construction project can be successfully scheduled using tools. Scheduling mainly depend on time and cost constraints and the resource allocation. They also told that cost ioverruns can be precisely handled if managed properly, it creates a huge difference in construction project considering material and labour management.

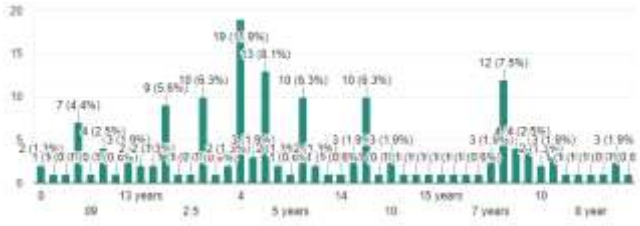
3. METHODOLOGY

The aim of the study is to ensure that the construction projects do not face cost and time overruns. For that, we have conducted a survey to know the opinions of the people involved.

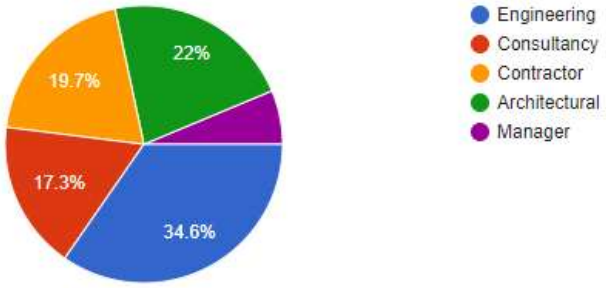
3.1 SURVEY REGARDING PROJECT MANAGEMENT

This survey is done to identify the notion of contractors, engineers and other people related to construction projects management isuues and techniques used by them.

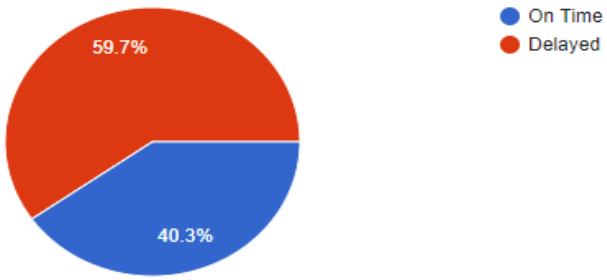
EXPERIENCE IN YEARS



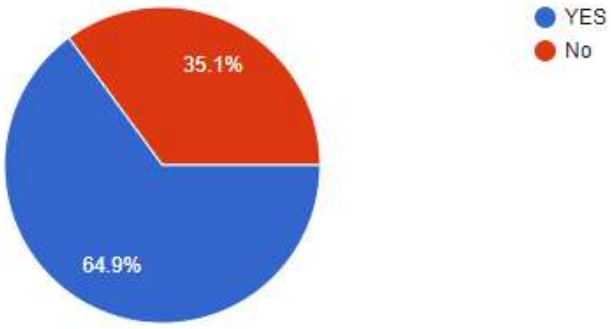
Kind of Work you are into?



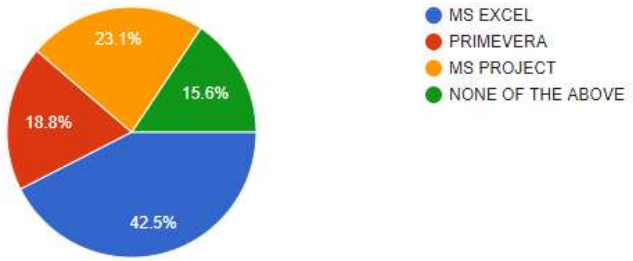
Are your previous projects completed:



Are You facing problems related to cost and time balancing?



Which software do you use to carry out Construction Management for your projects ?



RESULT OF THE SURVEY

- The common outcome of the survey was that almost all of them are using traditional methods, with only few of them having excess to Microsoft project.
- Many of them are frustrated over lagged and unorganised progress of their projects.

3.2 ANT COLONY OPTIMISATION

This algorithm is based on the behaviour of real ants i.e how they find the shortest path between the food source and their nest. While moving towards the food source, they deposit a substance on the ground called pheromone. Ants smell the pheromone while moving towards the food source and choose the path with higher pheromone concentration to determine the shortest path. We have applied this technique in MATLAB to generate a solution.

Algorithm:

Step 1: Find the total number of paths using Depth First Search

Step 2 – Initialise a pheromone table

Step 3 – Initialise the first ant to initial node of the possible path

Step 4 – Find the probability of choosing next node for each single path

Step 5 – Calculate the amount of pheromone deposited on each node

Step 6 – Ananlyze that if a better solution is obtained than the previous one and perform a global update on the solution

Step 7 - repeat steps 3 to 6.

enter the no of iteration 100

enter the number of ants 100

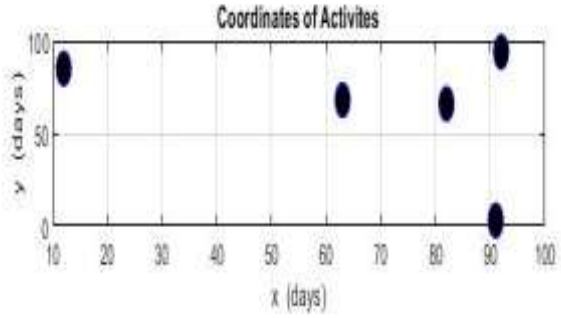
1-2-3-4-5=339.283348

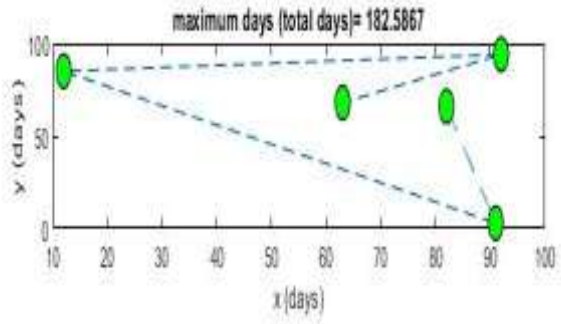
1-3-4-5=185.009472

1-2-4-5=240.190974

1-3-4-5=320.660084

1-4-5=182.586667

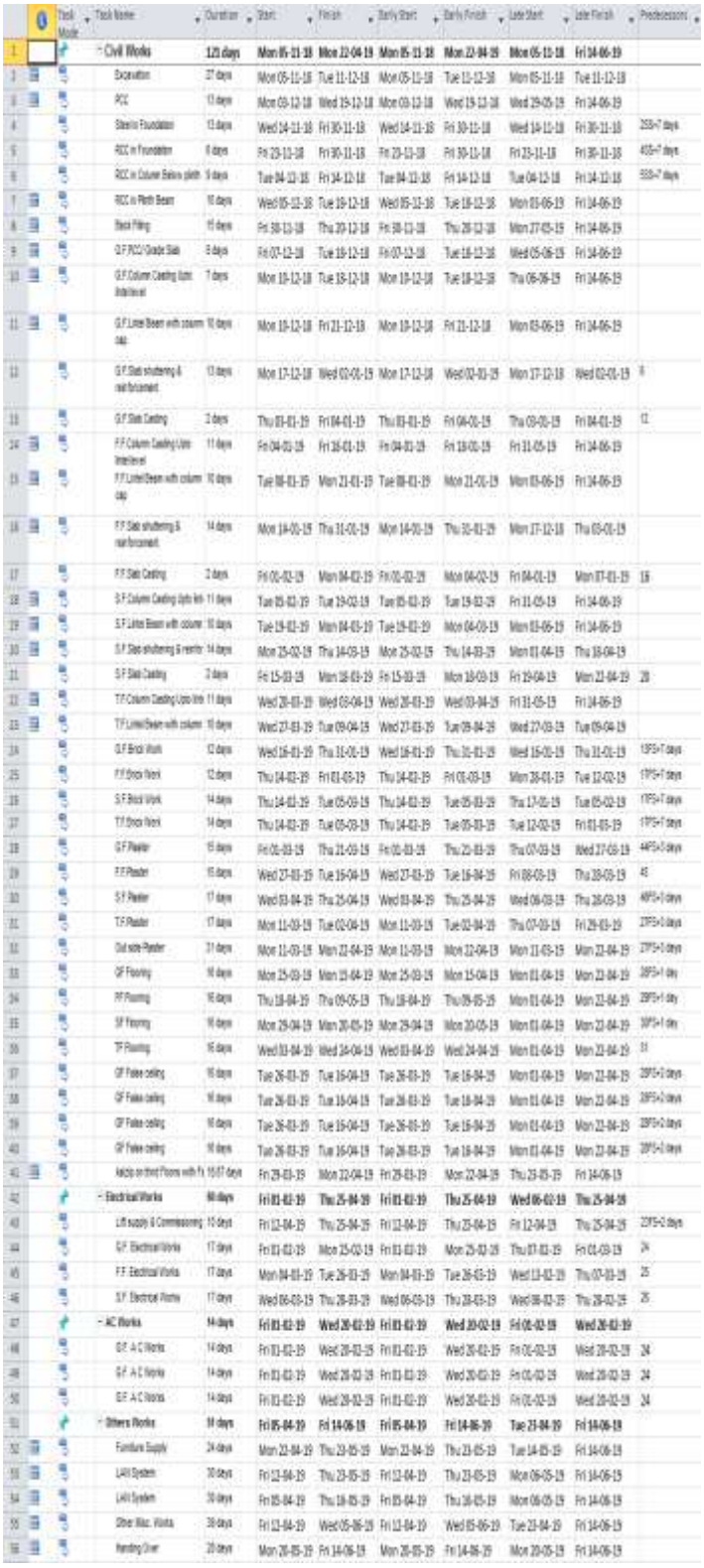


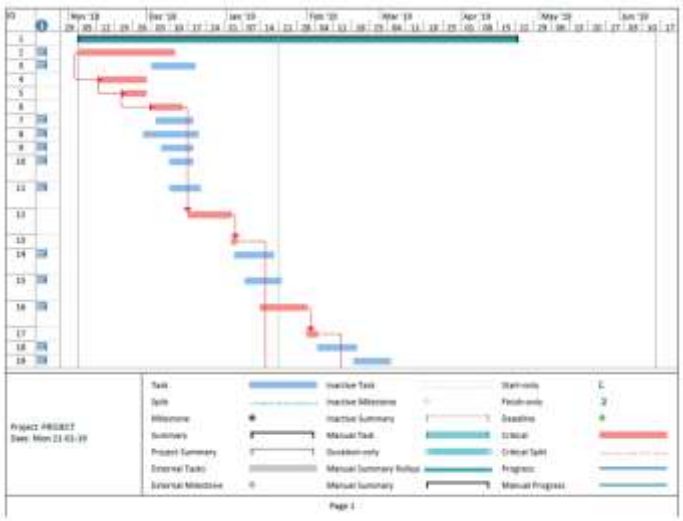


3.3 MICROSOFT PROJECT

In our project, we are representing a clear difference between Microsoft Project and Ant Colony optimization which makes it cost effective and in turn helps to reduce the duration of work to be done. Nearly 85% of construction companies still use the traditional MS Excel to schedule their activities and duration and among all of them many felt the need to adopt Modern Softwares.

Sometimes project might get off track due to some unavoidable reasons owing to this it is very essential to manage the work schedule in effective and precised manner . Microsoft Project arranges critical activities (Task Functions) in appropriate manner





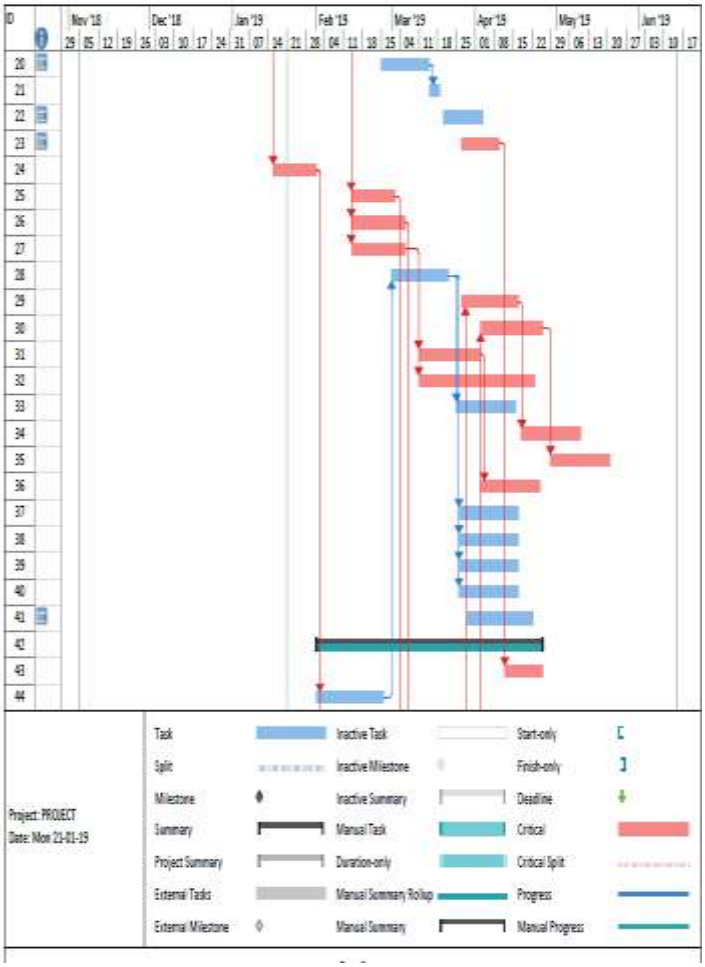
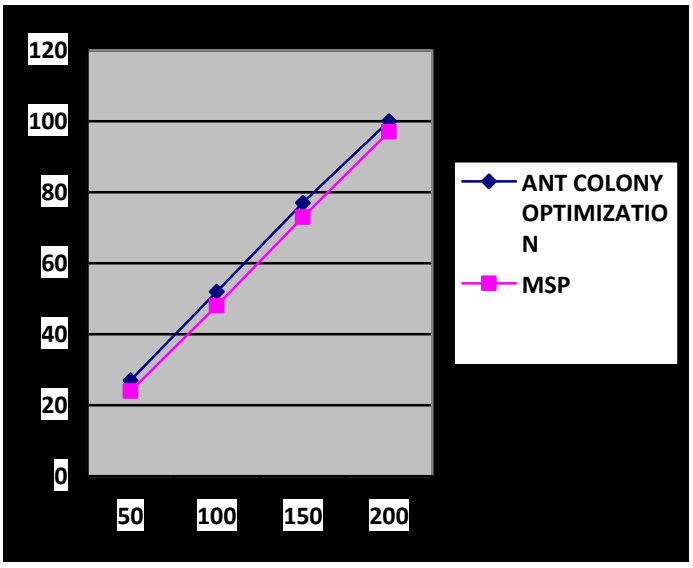


Fig -1: Activities and Durations of the project

RESULTS



Ant colony optimization technique was found out to be more efficient and worthy technique as it completes the work as early as possible considering all the labour material and cost overruns issues

4. CONCLUSION

If one is using optimised and modernized methods it sequesters a manager from all others who are using traditional methods using ant colony optimization we propose that scheduling can be more precised and efficient if the algorithm is used. Modern techniques enables us to manage activities and duration and tasks are completed well on time

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