

# RESOURCE LEVELLING OF G+4 BUILDING BY REMODIFIED MINIMUM MOMENT METHOD

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*Abstract- This study includes the Re modified minimum moment method of resource levelling to construction projects. The method is based upon the critical path method & it was developed with the assumption of no activity splitting and fixed project duration with unlimited availability of resources. The criteria of selecting the activity that has to be shifted from its original position to a better position is judged by the change in the statically moment of the resource histogram before and after such movement as well as by Resource Improvement Coefficient. To achieve the objectives of the study, the data of residential construction projects is taken. Initially the activities are arranged according to their EST then as per the Re modified minimum moment method & as per their LFT. Bar chart & histogram is prepared for each solution. Maximum daily requirement of mason, moment of histogram & RIC are calculated for each solution from the respective histograms. These values are then compared for each solution. It has been observed that Maximum daily requirement of mason, moment of histogram & RIC are reduced by Re modified minimum moment method.*

## I. INTRODUCTION

Though importance of project planning is recognized in many project based industries, but construction companies depend on scheduling skills. As they are operating under continuously changing environmental conditions and being involved in complex and unique projects, which require multidisciplinary collaboration, they have to develop realistic schedules and update them regularly. Increasing competition within industry also forces construction companies to provide products of higher quality, in shorter durations, for lower costs & under safer working environments. Obviously, it is not possible to achieve these objectives simultaneously during the preparation of schedule. Addition to these, resource requirements of activities, availability of resources and shape of the resource requirement curves also need to be considered to ensure economical resource utilization.

## II. OBJECTIVES

1. To involve the study of minimum moment method & its modification for resource leveling.
2. To conduct the study about labour requirement by conventional & minimum moment method

3. Comparison & Analysis of data of the above study.

4. Discussions & suggestions carried out about economical resource leveling for construction Industry.

### III. PROBLEM STATEMENT

- Optimizing resource leveling in order to maximize resource utilization efficiency while maintaining the original project duration.
- Optimizing resource allocation and leveling in order to minimize the negative impacts of resource availability constraints on project time while maximizing resource utilization efficiency.
- Optimizing resource fluctuation costs in order to provide the most cost effective and efficient resource utilization for construction projects.

### IV. LITERATURE REVIEW

#### 1. Pallavi Patil, Karthik Nagarajan, And Raju Narwade (2019)

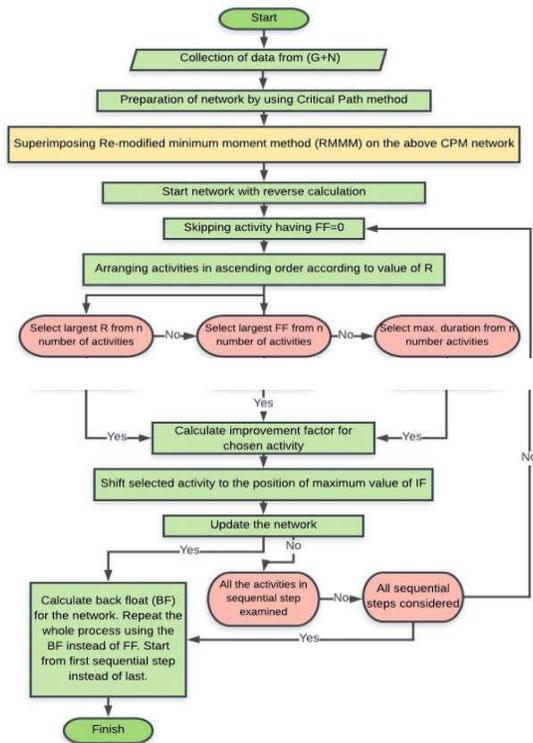
Infrastructural industry is facing a global challenge in optimisation from the past few decades in the field of resource management namely man, machine, material, money (4Ms). A well-designed sound scheduling technique for future cities other than normal traditional methods needs to be carried out to keep the country's economic growth well within its boundaries. Various past research experts have shown that the inter dependency of 4Ms and its varying consequences with the increase in duration directly affects the project cost. To

overcome this issue, the objective of this research emphasises in identifying a unique approach by real time monitoring of 4Ms and hence providing a optimize solution by a methodology termed as Re-Modified Minimum Moment Method (RMMM) with considering a case study from Mumbai region, stating post project analysis. Result signifies that RMMM gives better results in terms of optimization than traditional method.

#### 2. Doddy Prayogo and Christianto Tirta (2019)

States that Scheduling and resource management is crucial in any construction project. Bad scheduling and resource management can cause delays or cost overruns. Optimization in solving resource leveling is necessary to avoid those problems. A total of nine objective criteria are used to solve resource leveling. Each of them has the same objective, which is to reduce the fluctuation of resource demand of the project. This study compares the performance of symbiotic organisms search (SOS) and particle swarm optimization (PSO) in solving resource leveling problems using separate objective functions in order to find which one produces a better solution. Those nine objective functions generate differing resource demand diagrams since each of them minimizes differing parameters. The results show that SOS produced a better solution in eight of the nine objective functions that are used, and only one objective function produced the same objective value in both SOS and PSO. Further finding reveals that one objective function is better in solving resource leveling than the others.

## V. REMODIFIED MINIMUM MOMENT METHOD



**FLOWCHART # 02: Remodified Minimum Moment Method**

## VI. Results

### 5.1 Rahul Residential Project

**Table # 02: Analysis of Rahul Residential Project**

Parameter	Moment	RIC
EST solution	3300	2.07
Remodified Minimum Moment method	3084	1.93

1. Moment of histogram is reduced to 3084 by Re modified Minimum Moment method than EST.
2. RIC is reduced to 1.93 by Re modified Minimum Moment method from 2.07.

## VII. DISCUSSION & CONCLUSIONS

Various methods of Resource leveling are studied in literature review & based on this, Heuristic methods are found to be easier than the others. Traditional Minimum Moment Method, its modification & remodification are studied in details and compared. Base on this comparison, it is found that Re modified Minimum Moment Method is easier & involves less calculations than the other two. Hence Remodified Minimum Moment method is selected for resource leveling of Construction projects. Though all these methods are used for resource leveling in Project Management, it is very important to check whether they can be applied to Construction Management. The minimum moment by traditional method and re-modified method is identical. The resource improvement coefficient (RIC) is 1.2079 for both the methods and 1.19 by modified method.

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