

FLOAT TIME REDUCTION POTENTIAL IN CONSTRUCTION PROJECT AND ITS IMPACT

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Abstract : The emphasis of this research is focussed on the float time reduction potential in construction project & its impact on project. In order to accelerate the project or to manage delays or to shorten the duration of the project ,so as to complete the project faster in order to employ their resources on some other project ,project crashing is generally performed. During project crashing process, total float can be loss or consumed and chances of non critical activities to become critical. Therefore, it is better to use some innovative construction techniques like Precast structures etc in order to reduce float time in construction project and completing the project faster.. This research work will provide the idea of the factors that affect float time and amount of float that can be reduced by using Precast slab instead of traditional slab and its impact on the project so as to compare the result for justification.

IndexTerms - Float time, Precast slab, Primavera P6 professionals

I. INTRODUCTION

- ❖ **Project management** can be defined as the application of processes ,methods, skills, knowledge and experience to achieve specific project objectives as per project acceptance criteria within agreed parameters. The primary goal of the project management is to achieve all of the project goals within the given constraints. An importance aspect of the project management is the management of risk.
- ❖ **Float** denotes the flexibility range within which an activity start time or finish time may fluctuate without affecting the completion of the project. In other words it is the amount of time that a task can be delayed without affecting the deadlines of other subsequent tasks, or the project final delivery date. The former is called Free float and the latter is called total float.
- ❖ The term float is associated with the activity times. It is analogous to the term slack which is associated with the event times. Slack is the difference between the earliest event time and the latest occurrence time. Just as the float denotes the flexibility range within which an event can occur , float denotes the range within which an activity start time or its finish may fluctuate without affecting the completion of the project.

There are four types of floats. They are:

- 1) Total float
- 2) Free float
- 3) Independent float
- 4) Interfering float

1)**Total float:** The time span by which starting or finishing of an activity can be delayed without delaying the completion of the project.

It is the maximum available time in excess of the activity completion time.

Total float is given by $F_T = LFT - EFT$ or $LST - EST$

Total float of an activity affects total float of succeeding as well as preceding activities.

2.)**Free float:** The delay which can be made without delaying succeeding activities. It affects only preceding activities.

It is denoted by $F_F = F_T - S_j$,where S_j is head event slack.

In free float, preceding activity is not allowed to occur at its latest time and hence total float of preceding activity is affected. However the succeeding activity can start at its earliest start time and hence its total float is not affected.

3.)**Independent float:** It is the minimum excess available time which exists without affecting any of succeeding or preceding activities. It is denoted by F_{ID} .

It is the surplus of minimum available time over the activity duration.

$$F_{ID} = F_F - S_i \text{ , where } S_i \text{ is tail event slack.}$$

4.)**Interfering float (F_{INT}):** It is similar to head event slack.

$$F_{INT} = S_j = F_T - F_F$$

The total float is the difference between maximum available time and the activity duration. There are three possibilities:

- i) Total float may have a negative value, if the time availability is less than activity duration.
 ii) Total float may have zero value if the time availability is equal to the activity duration.
 iii) Total float may have a positive value if the time availability exceeds the activity duration.

- Critical path can be determined with the help of total float calculations. The activities on critical path have total float equal to zero.

II LITERATURE REVIEW

S.NO.	PAPER	AUTHOR	YEAR	RESEARCH WORK
1	Float consumption impact on cost and schedule in the construction industry	Zafer I.sakka and sameh M.EI-sayegh et.al	2007	This paper proposes a method to control the risk that are associated with float loss in construction projects using simulation and least square non linear regression
2	Risk Assessment for scheduling acceleration	Khalid S. Al-Gahtani et.al	2009	This Paper introduces a new approach i.e. "total risk approach" of float allocation that integrates several current approaches for allocation of float among project parties
3	Construction Scheduling using critical path analysis with separate time segments	Wail Menesi et.al	2010	To overcome CPM drawback ,this study presents a CPS(critical path segment) mechanism.
4	A Framework for project time cost optimization considering float consumption impact	Rana Ali Al Haj et.al	2012	This study uses two new frameworks that are developed to solve the time-cost optimization problem by taking float into consideration:a) stochastic framework b) Non linear integer programming(NLIP) framework
5	Application of project management system in reducing construction time	Adeleke J.S , Ankeli I.A , Buari T.a Esan M.T et.al	2013	The paper examines the application of project management system by exploring the cost slope graph to reduce project period at minimum cost.
6	Risk Assessment for scheduling acceleration	By:-Dr. Khalid S. Al-Gahtani et.al	2013	This paper relates the increase in risk with total float reduction of the non critical activities that have been affected by project acceleration.The paper proposes a method that works with time cost
7	Cost and time and also minimum project duration using alternative method	Komesh Sahu and Meena Sahu et.al	2014	The emphasis of this thesis is on schedule / time risk and associated costs.It gives an alternative method approach to obtain optimum cost and time and also minimum duration of project with fully crashing in critical path.
8	Time management practices in large construction projects	Aftab Hameed Memon, Ismail Abdul Rahman ,Ismaaini Ismail, Noor Yasmin Zainum et.al	2014	This paper aims to identify the effectiveness of various techniques and software packages of time management.
9	Float types in spatial scheduling	Hisham M.M.Said et.al	2016	Previous spatial scheduling models did not provide seamless integration with site logistics planning of material staging and temporary

				facilities.This paper therefore identify floats that can exist in spatial scheduling
10	Time and cost optimization techniques in construction project management	Mr.Bhushan V.Tatar and Prof.Rahul S. Patil et.al	2016	In this study, it was attempt to establish a non linear integer programming technique using what's best solver version 11: 0 software to the project of construction of culvert in order to find out the optimum time and cost value by taking into consideration the effect of total float consumption.
11	Minimize time and cost for successful completion of a Large scale project applying project crashing method	Shifat Ahmed et.al	2016	In this study , for effective scheduling of time as well as cost optimization of the large project, application of PERT/CPM and Project crashing method is used.
12	Effects of schedule acceleration on construction performance	Prof. Dr. A.W. Dhawale , Swapnil Naresh Bhardwaj et.al	2016	This paper aims to identify the factors constraining the activity and quality of construction based on the view of technical persons due to effect of schedule acceleration
13	Accelerating Repititive construction projects with uncertainty and contractors Judgement	Osama Moselhi , Ibrahim Bakry , Adel Alshibani	2016	In this paper the scheduled acceleration of repetitive construction is done based on cost slope and contractors judgement
14.	Design,Cost &Time Analysis of Precast & RCC Building	AkashLanke Dr.D.Venkateswarlu	2016	This Study concluded that precast concrete system is economical than conventional cast in place method but there are some conditions like type of building,site distance from manufacturing unit etc which have to be taken care of.
15	Time,Cost,Productivity and quality analysis of precast concrete system	B.Raghavendra K.Holla,Siddhant Anant,Muzzammil Ali Mohammad	2016	This study is focussed on reviewing and summarizing the role of time,cost,quality and productivity of the precast system in order to compare with the conventional.
16	The concept of float calculation based on the site occupation using the chronological logic	Adel Francis , Stephane Morin-Pepin et.al	2017	This paper explains the concept of margin(float) calculation based on the site occupation using the chronographic modelling.
17	Reviewing construction schedule float management	Jyh-Bin Yang et.al	2017	This paper thoroughly reviewed various float in literature and professional project management systems and discussed five managerial essentials and three proactive strategies on mitigating challenging float-related problems based on the perspective of managing schedules by controlling float.
18	Analysis on project acceleration and its impact along with profitable solution	Pulidindi venugopal,M.H.V Balaji et.al	2017	This paper analyze the project acceleration(Fast tracking) in construction project and its impact on quality ,cost, wastage of resources etc and techniques for getting profitable profit along with

				quality maintenance.
19	Path Float based approach to optimizing time cost trade off in project planning and scheduling	Sasan Nasiri and Ming lu .et.al	2019	This study proposes a new computing framework for time cost trade off optimization that takes advantage of path float based technique and integer programming(IP).
20	Risk assessment of an accelerated project to find the optimal risk point for crashing	JayaRohindh J, Thamiselvi P	2019	This paper deals with the analysis of the factors due to cost during project crashing by carrying out questionnaire survey and by process of project crashing using crashing model

III RESEARCH METHODOLOGY



IV. CONCLUSION

In the construction of traditional concrete slab, generally the slab shuttering is removed after 10-14 days of slab casting and till this time the other work like plastering and painting of wall stops which consume a much time, this time gap between removal of slab and other associated work to start is float time which can be reduced by using some innovative techniques. This research Paper work concluded the amount of float that can be reduced by replacing traditional concrete slab by Precast concrete slab in building construction & also the impact of this replactment on cost of project.

REFERENCES

1. Zafer sakka and Sameh EI-Sayegh , “ Float consumption impact on cost and schedule in the construction industry”, Journal of construction engineering and management, February 2007
2. Wail Menesi , “Construction Scheduling using critical path analysis with separate time segments”, University of waterloo, Ontario, Canada, 2010

3. Rana Ali Haj(2012), "A Framework for project time cost optimization considering float consumption impact",Sharjah U.A.E
4. Dr. Khalid S. Al-Gahtani(2013), "Risk Assessment for scheduling acceleration", International journal of application or innovation in engineering and management, vol.-2,Issue 2
5. Nuhu Braimah(2013) , Construction delay analysis techniques – A review of application issues and improvement needs www.mdpi.com/journal/buildings.2013
6. Adeleke J.S,Ankeli I.A,Buari T.A,Esan M.T"Application of project management system in reducing construction time",International journal of scientific and engineering research , vol-4,Issue 10,October 2013
7. Komesh Sahu and Meena Sahu ,Cost and time and also minimum project duration using alternative method, "International review of applied engineering research",vol-4,number 5(2014),pp,403-412
8. Aftab Hameed Memon, Ismail Abdul Rahman ,Ismaaini Ismail, Noor Yasmin Zainum(2014) ,"Time management practices in large construction projects",IEEE colloquium on humanities,science and engineering (CHUSER), vol.1, No.1.pp.61-65
9. Prof. Dr. A.W. Dhawale , Swapnil Naresh Bhardwaj (2016), "Effects of schedule acceleration on construction performance",International journal of research in engineering and applied sciences,vol.6,No.6,pp 21-29.
10. Shifat Ahmed, "Minimize time and cost for successful completion of a Large scale project applying project crashing method",International journal of Scientific and engineering Research, volume 7,Issue, February-2016
11. Mr.Bhushan V.Tatar and Prof.Rahul S.patil (2016), "Time and cost optimization techniques in construction project management", International journal of latest trends in engineering and technology,vol-7,Issue 3,pp.230-237
12. Osama Moselhi , Ibrahim Bakry , Adel Alshibani (2016)," Accelerating Repetitive construction projects with uncertainty and contractors Judgement",Canadian journal of civil engineering ,vol. 2,No.1,pp 1-37
13. B.Raghavenendra K.Holla,Siddhant Anant, Muzzammil Ali mohammad,Akash Periwal,Akash Kapoor(2016),"Time,Cost,Productivity and Quality analysis of Precast Concrete System",IJISSET,Vol.3,Issue 5, May 2016.
14. Akash Lanke,Dr.D.Venkateswarlu,"Design,Cost &Time analysis of Precast & RCC building,"International research journal of engineering and technology(IRJET),Vol.03,Issue:06,June2016.
15. Adel Francis ,Stephane Morin-Pepin , "The concept of float calculation based on the site occupation using the chronological logic",Creative construction conference 2017, CCC 2017 ,19-22 june 2017, Pimosten,Croatia
16. Pulidindi venugopal,M.H.V Balaji(2017), "Analysis on project acceleration and its impact along with profitable solution",International journal of civil engineering and technology,Vol. 8,No.9 ,pp,471-476
17. JayaRohindh J, Thamiselvi P "Risk assessment of an accelerated project to find the optimal risk point for crashing" International journal for research in engineering application and management,ISSN: 2454-9150 vol-05, Issue -01, April(2019)