OVERTIME IN MINIMIZING CONSTRUCTION DELAY

SYAHMI BIN SAARI

A project report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Science (Construction Management)

Faculty of Civil Engineering
Universiti Teknologi Malaysia

JANUARY 2014

This study is specially dedicated to my beloved parents, supervisor, classmates, colleagues and all my friends for support and care throughout my studies.

ACKNOWLEDGEMENT

I would like I would like to express my sincere appreciation to my supervisor Assoc. Prof. Dr. Aminah Md Yusof for the guidance, assistance, criticism, and suggestions on this study.

To those who had contributed assistance and advice in this study, either directly or indirectly, yet their names are not cited here, they deserve my greatest gratitude. Millions thanks to all.

Last but not least, I would like to thanks my parents and family members for continuously supporting me and give me strength to face everything I have been through. I will always remember what you all have done to me.

ABSTRACT

One of the significant problems in construction industry is delay. Construction projects frequently suffer delays and completed later than agreed time? Amongst various efforts, overtime has frequently become the planned schedule from the onset of a project to overcome delay in project. This study aims to analyse the effectiveness of overtime work in addressing problem of delay in construction project. The study identified that excavation and concreting work required the overtime work. Based on the study, overtime can be used to minimize the construction delay but overtime can be efficient way to minimizing delay by application of some methods of managing overtime in the project management. The most efficient methods can be adopt in the project are time management and scheduling management.

ABSTRAK

Salah satu masalah yang kerap berlaku dalam industri pembinaan adalah kelewatan. Projek-projek pembinaan sering mengalami kelewatan dan siap lewat daripada masa yang dipersetujui. Antara pelbagai usaha yang dilakukan, kerja lebih masa ialah jadual yang dirancang dari bermulanya projek untuk mengatasi kelewatan dalam projek. Kajian ini bertujuan untuk menganalisis keberkesanan kerja lebih masa dalam menangani masalah kelewatan dalam projek pembinaan. Kajian ini mengenalpasti bahawa kerja-kerja penggalian dan kerja konkrit diperlukan untuk kerja lebih masa. Berdasarkan kajian ini, kerja lebih masa dapat digunakan mengurangkan kelewatan sesuatu projek tetapi kerja lebih masa boleh menjadi lebih berkesan untuk mengurangkan kelewatan dengan penggunaan beberapa kaedah menguruskan kerja lebih masa yang sesuai ke dalam pengurusan projek. Kaedah yang paling berkesan boleh diterima pakai untuk pengurusan projek adalah pengurusan masa dan pengurusan penjadualan.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDIX

CHAPTER 1

INTRODUCTION

1.1 Background

The construction industry is among the most important sector in the world and very large, diverse and complex in its nature. The industry is the fastest moving industry in the world. New methods, techniques and technology develop rapidly and legislation is always changing (Graham 2011). In the construction industry, building projects are becoming more and more complex and difficult due to the increasing uncertainties in technology, budgets, and development process. Despite this, cost, quality and time are the three criteria are always remained as the priority in every project undertaken (Yap 2006).

Construction industry is a growing industry in Malaysia. The industry had contributed to economic growth of the country because its demand depends on the increasing of the growing economy. Many of construction activities cause a lot of problems emerged in the process of completing the project and the delays in construction projects were scratching our country's image. The industry becomes more complex as it depends on many parties. Therefore, the main objective of construction is to complete the construction on time as stipulated in the contract.

One of the most important problems in the construction project is delay delivery. Delays occur in every construction project and the magnitude of these delays varies considerably from project to project (Majid 2006). Some projects are only a few days behind the schedule and some are delayed over a year. So it is essential to define what is delayed and identify the actual causes of delays in order to minimize and avoid it in any construction projects.

Delay is failure to achieve targeted time, budgeted cost and specified quality which result in various unexpected negative effects on the projects. Usually, when the projects are delayed, they are either extended or accelerated and therefore, incur an additional cost. The standard practices usually allow some percentage of the project cost as a contingency allowance in the contract price and this allowance is usually based on judgment. Although the contract parties agreed upon the extra time and cost associated with delay, in many cases there were problems between the owner and contractor as to whether the contractor was entitled to claim the extra cost (Sambasivan 2007).

Delays caused by the client are usually due to late submission of drawings and specifications, frequent change orders, and inadequate site information to generate claims from both main contractors and subcontractors with huge financial repercussions. Delays caused by contractors can generally be attributed by poor managerial skills. Lack of planning and a poor understanding of accounting and financial principles have led to many contractor's downfall.

In today's construction industry, overtime has frequently become the planned schedule from the onset of a project. This is due to the shortage of skilled workers and equipment and it becomes common for owners to request an accelerated project schedule to make sure an early completion of their projects. The owners know the financial benefit of early project completion.

Overtime can increase productivity and accelerate the project. The effect of the acceleration is the increased resources deployed to the project to overcome the effects of the delays caused to the works by disruption arising from various changes. The acceleration may be voluntary to overcome contractor's delay or reduce time related costs or undertaken in response to an instruction from the client to accelerate the works.

1.2 Problem Statement

Construction projects frequently suffer from delays and completed later than agreed on by the contracting parties. It could be possibly be interpreted as a loss of time. "Time" refers to the duration for completing the construction project. Time in a construction project is the construction period or in contract administration is the contract period. When the project period is delayed, it means the project cannot be completed within original schedule (Majid 2006). In 2005, about 17.3% of government projects in Malaysia were delay more than three month or abandoned (Sambasivan 2006).

Construction projects can be delayed for large numbers of reasons. Different categories of delays and different types of delays can be found in construction projects. Delay has significant effect on completion cost and time of construction project. Substantial financial claims can arise from these circumstances and as the consequences, employer and contractor often argue about the causes and liability due to the delayed circumstances.

Delay refers to what has cause a project to run late, that is delay to the completion of work or contract milestones caused by the time impact of events such as variations, late information, excessively inclement weather, poor performance,

remedial works, and the hundreds of other delay causing circumstances that arise on construction projects. Delays can be minimized when their causes are identified and appropriate measures are adopted to mitigate it. Knowing the cause of any particular delay in a construction project would help avoiding the same issue.

Delays can lead to many negative effects such as lawsuits between owners and contractors, increased costs, loss of productivity and revenue, and contract termination. Therefore, improving construction efficiency by means of cost effectiveness and timeliness would certainly contribute to cost saving for the country as a whole. Effort directed to cost and time effectiveness is associated with managing time and cost.

It is becoming habits for a contractor to use overtime in the event of delays to ensure the successful completion of the work. Normally, overtime work is frequently used to meet tight project targets from owners, and to make up for late changes and project delays.

The practice of scheduling overtime in machine-paced fabricating and other businesses is widespread. Perhaps some scheduled overtime to maintain production schedules is less costly than bringing new employment into the work force in the repetitive machine-paced factory operations. However, any advantages in scheduled overtime which might be found in manufacturing do not apply to construction. Non-repetitive work, fatiguing physical labour and other measures make construction work far different from machine-paced factory employment.

Most contractors are mindful of some of the deleterious effects of overtime on costs and productivity. However, particularly on large cost-reimbursable projects, scheduled overtime is sometimes ordered by owners or construction managers in an effort to accelerate completion make up for previous delays, complete an originally scheduled project, which has been increased in size and complexity, or compensate

for shortages of skilled construction workers in the area. One of the worst but the most common reasons is to use overtime premium pay to induce needed workers to leave other jobs and accept employment on the project on which the overtime is scheduled.

The Malaysian construction industry and the services sector are expected to grow more in 2013. In order to achieve this encouraging but challenging target, it is important for clients and contractors to understand how the overtime can overcome delay in the construction industry. It is hard to understand the effect and benefit of overtime due to many factors that affecting the productivity in the overtime situation.

There are many methods to minimize the construction delay can be found in this industry, it is overtime work is effective to minimize the construction delay? Do we really understand what is overtime? How to minimize the construction delay if the construction industry allows such practice? A study needs to be carried out to explore the matters.

1.3 Aim and Objective

Overtime has been frequently used in many part of the construction phases as an inducement to attract labour and to accelerate schedule performance. There might be positive short-term benefits to work on overtime schedule.

The aim of the study is to analyse the effectiveness of overtime work in the addressing problem of delay in construction project. The aim is supported by the following objectives:-

1. To study the methods of minimizing construction delay through identify the activity required overtime work.
2. To analyse the impact of overtime in construction industry.
3. To analyse the methods of managing overtime in minimizing construction delay.

1.4 Scope of Study

Previous studies concentrated on the cause and effect of delay to construction projects and method of minimizing delays in construction. One of the studies by Yap (2006) entitled "Extended Overtime and the Effect to Labour Productivity in Construction: Workers Perspective" discussed about labour productivity when using extended overtime. Overtime has been studied in other areas such as manufacturing. The work on overtime in construction and its effectiveness in construction project almost non-exist. The study focuses on obtaining views from all sectors in construction industry such as engineer, contractor, client and consultant. This study is to identify impact of overtime and activity required in the construction phases and

to study and analyse the effectiveness of overtime work in the construction industry. This study extends Yap (2006) by different samples at different location. Thus the study explores the possibility of change in findings of Yap (2006).

1.5 Significant of Study

There are several valuable benefits expected from this study. The significance of establishing the issues related to the construction project delays is to provide a greater insight and understanding on the effectiveness of overtime work particularly among the main project players: contractors, client and consultants. This can be achieved by applying theoretical concepts discussed in many literatures into practice in real projects. It is hoped that these findings will guide the efforts to improve the performance of the construction industry and will be useful to the construction players. Therefore, these findings might encourage the practitioner to focus on overtime work that might have existed in their present or future projects. Other than that, this study is expected to provide a better ways and methods in delivering construction projects by minimizing the major causes of delays.

REFERENCES

Abd. Majid, M.Z. and McCaffer, R. (1998) *Factors of Non-excusable Delays that Influence Contractors' Performance.* Journal of Management in Engineering, ASCE. May/June, pp: 42-49.

Abdul-Rahman, H., and Berawi, M. A. (2002). "*Power quality system, A new system for quality management in globalization-towards innovation and competitive advantages.*" Qual. Assur.: Best Practice, Regulation, Law, 9(1), 5–30.

Abdul Rahman H., Berawi M. A., Berawi A. R., Mohamed O., Othman M. and Yahya I .A., (2006). *Delay Mitigation in the Malaysian Construction Industry*. J. Constr. Eng. Manage. 2006.132:125-133.

Ahmed Hassanein & Osama Moselhi Corresponding author (2005): Accelerating linear projects, *Construction Management and Economics*, 23:4, 377-385

Aibinu, A. A. and Jagboro, G.O.(2002).*The Effects of Construction Delays on Project Delivery in Nigerian Construction Industry*. International Journal of Project Management, Volume 20, Issue 8, November 2002, Pages 593-599.

Alaghbari, W.A.M. (2005), "*Factors affecting construction speed of industrialized building systems in Malaysia*", Master's thesis, University Putra Malaysia, Serdang.

Awad S. Hanna, Craig S. Taylor and Kenneth T. Sullivan, (2005) '*Impact of Extended overtime to Construction Labour Productivity*'. Journal of Construction Engineering and Management, *Vol 131*, No. 6, June 1, 2005.

Barbara Graham (2011). Construction: Overview. *Association of Graduate Careers Advisory Services*. Retrieve June 2013, from http://www.prospects.ac.uk/industries_construction_overview.htm

Bramble, B. B., and Callahan, M. T. (1992). *Construction delay claims*, 2nd Ed., Wiley, New York.

Brandon Olson and David Swenson, (2012). *OVERTIME EFFECTS ON PROJECT TEAM EFFECTIVENESS*. Department of Computer Information Systems The College of St. Scholastica Duluth, Minnesota.

California Department of Transportation, *CONSTRUCTION PROGRAM GENERAL OVERTIME GUIDELINES*. Retrieve June 2013, from http://www.dot.ca.gov/hq/construc/CPDirectives/CPD0011_guide.pdf

Chan, D.M.W. and Kumaraswamy, M.M. (1996). *A Comparative Study of Causes of Time Overruns in Hongkong Construction Projects*. International Journal of Project Management, Elsevier. Vol. 15 (1): 55-63

Chan, D.M.W. and Kumaraswamy, M.M.(1997). *A study of Causes of Time Overruns in Hongkong Construction Projects*. International Journal of Project Management, Elsevier. 1997, 1:55-63.

CIDB, (2009). *Senario Sektor Pembinaan Tahun 2009*.

Clogh, R. R. (1981). *Construction contracting*, 4th Ed., Wiley, New York.

D. Darshi de Saram and Syed M. Ahmed, 2001. *Construction Coordination Activities: What is Important and What Consume time*. Journal of Management in Engineering.

Erik Van Tongerloo, (2014). *Benefits of Working Overtime*. Retrieve January 2014, from http://careers.knoji.com/benefits-of-working-overtime/

Frimpong, Y., Oluwoye, J. and Crawford, L. (2003). *Causes of Delay and Cost Overruns in Construction of Groundwater Projects in a Developing Countries, Ghana as a case study*. International Journal of Project Management, Elsevier.
21:321-326.

H. LI, P. E. D. Love & D. S. Drew, (2000). Effects of overtime work and additional resources onproject cost and quality. *Engineering, Construction and Architectural Management 2000* 7|3, 211-220

Italia, 2012. *Overview on Malaysian Construction Sector*. Istituto nazionale per il Commercio Estero.

Kamar, K. A. M (2011), *The Critical Success Factors and Readiness Model of Industrialised Building System (IBS) Contractors in Malaysia*, Unpublished PhD Thesis, University of Salford Manchester

Kang Sik Wei (2010). Causes, *Effects and Methods of Minimizing Delays in Construction Projects*. Master of Science in Construction Management. Universiti Teknologi Malaysia. 2010

Kathy Peters, (2011). *Managing overtime: Setting the stage for success*. Retrieve July 2013, from http://www.purdue.edu/hr/LeadingEdition/LEdi_0508_Managing_overtime.html

Koushki, P.A., Al-Rashid, K. and Kartam, N. (2005). *Delays and Cost increase in the Construction of Private Residential Projects in Kuwait*. Construction Management and Economics Journal. March, 23-285-294.

L. Brennan, J. Browne, B.J. Davies, M.E.J. O'Kelly and A.R. Gault (2007). *An Analysis of the Overtime Decision.* University of Manchester Institute of Science and Technology and University College, Galway, Republic of Ireland.

Larisa Benson and Liz Du Bois, (2012). *Tips for Improving the Efficiency and Effectiveness of Overtime Management.*

Lisa McQuerrey, *Overtime Management Techniques*. Small Business. Retrieve June 2013, from http://smallbusiness.chron.com/overtime-management-techniques-50565.html

Leong, M. (2010) The Construction Market in Malaysia. *Frost & Sullivan*.

Lock, D. (1996*). Project management,* 6th Ed., Gower, Aldershot.

M.A. Hossain, D.K.H. Chua, 2013. *Overlapping design and construction activities and an optimization approach to minimize rework,* Int. J. Proj. Manag.

Majid, I.A. (2006). *Causes and Effects of Delays in Aceh Construction Industry. Master of Science in Construction Management.* Universiti Teknologi Malaysia. 2006.

Martin, C. C. (1976). *Project management: How to make it work*, New York.

Mezher T.M., and Tawil W. (1998). *Causes of Delays in the Construction Industry In Libanon*. Engineering Construction and Architectural Management Journal, Emerald. 1998, 5 (3): 251-60.

Murali Sambasivan, Yau Wen Soon, *Causes and effects of delays in Malaysian construction industry*, in International Journal of Project Management.2007. p. 517-526.

National Institute for Occupational Safety and Health. (1997). *Plain Language About Shiftwork.* Retrieve January 2014, from http://www.cdc.gov/niosh/docs/97-145/pdfs/97-145.pdf

National Institute for Occupational Safety and Health. (2004). *Overtime and Extended Work Shifts: Recent Findings on Illnesses, Injuries, and Health Behaviors*. Retrieve January 2014, from http://www.cdc.gov/niosh/docs/2004-143/pdfs/2004-143.pdf

N. Hamzah, M.A. Khoiry, I. Arshad, W.H.W. Badaruzzaman, and N. M. Tawil. Identification of the Causes of Construction Delay in *Malaysia. World Academy of Science, Engineering and Technology 72 2012.*

Northern Ireland Business, (2014). Manage overtime: Pros and cons of overtime. Retrieve January 2014, from http://www.nibusinessinfo.co.uk/content/pros-and-cons-overtime

Odeh AM, Battaineh HT ,(2002). *Causes of construction delay: traditional contracts*. Int J Project Manage 2002;20:67–73.

Robert W. Hollman, (2007). *Overtime Working: Employee Willingness.* School of Business Administration, University of Montana.

Paul Chung, Raymond W. Wolfe, Tom Ostrom And Susan Hida,(2008). *Accelerated Bridge Construction Applications in California.* Caltrans- Engineering Services Accelerated Bridge Construction

Sanders, D. & Eagles, W.D. 2001. *Delay, disruption and acceleration claims*. Borden Ladner Gervais LLP, May, 3.

Sara Mahuron, (2014). *The Disadvantages of Overtime*. Retrieve January 2014, from http://work.chron.com/disadvantages-overtime-5388.html

Shiftwork Solutions LLC (2013). *Managing Overtime. Shiftwork Solutions*. Retrieve July 2013, from http://shift-work.com/shift-schedule-issues/managing-overtime/

Stanley Alderson, (1977). *Overtime Cure For Unemployment*. Industrial Management & Data Systems, Vol. 77 Iss: 10

Teamsters, (2004*). Overtime and Extended Work Shift: Injuries, Illnesses, and Other Effect*. International Brotherhood of Teamsters Safety and Health Department, Page 2 of 4 August 2004

Theodore J. Trauner Jr. et al. (2009). *Types of Construction Delays*. Construction Delays (Second Edition), 2009, Pages 25-36

The Associated General Contractors of America, American Subcontractors Association and Associated Specialty Contractors (2003). *Guidelines for a Successful Construction Project.*

The Star (May 2013). *Malaysian Construction Industry*. The Star, Retrieve June 2013, from http://biz.thestar.com.my/news/story.asp?file=/2013/5/9/business/20130509164038&sec=business

Wa'el Alaghbari, M.R.A.K., Azizah Salim and Ernawati, The significant factors causing delay of building construction projects in *Malaysia.Engineering, Construction and Architectural Management, 2007*. 14(2):p. 192-207.

Yap Ean Mei (2006). *Extended Overtime and The Effect to Labour Productivity in Construction: Workers Perspective*. Master of Science in Construction Management. Universiti Teknologi Malaysia. 2006.