



## **DELAY AND ITS EFFECT ON THE DELIVERY OF CONSTRUCTION PROJECTS IN GHANA**

**Addo J.N.T.**

*Department of Building Technology, Cape Coast Polytechnic, Cape Coast- Ghana*

### **ABSTRACT**

It is common knowledge that our construction industry in this country has been bedeviled with a lot of delayed and uncompleted projects. Delays can be minimized when the factors causing them are identified. The objective of this study was therefore to identify the various delay factors that affect the delivery of construction projects, the effects of delays on the delivery of construction projects, and assess and identify the most critical delay factors that affect construction project delivery in Ghana. During the review a total of fifty-seven factors were identified and categorized into eight groups that contributed to the causes of delays. Six effects of these delays on construction projects and thirty five methods of minimizing construction delays were identified. Questionnaires were distributed to targeted respondents mainly contractors belonging to Association of Building and Civil Engineering Contractors, as well as Consultants who were on good standing with the Department of Feeder Roads. Results from the research indicated that the top three out of the ten most critical factors that cause delays in the delivery of construction projects were; Shortage of construction materials, poor site management practices and poor supervision. In order to minimize the effects of delays, it was recommended that contractors' managerial skills and technical knowledge be improved through frequently organized seminars, workshop and training programs which would help update their knowledge on project management techniques and processes.

**Keywords:** Delay, Delivery, Construction, Effect, Ghana

### **INTRODUCTION**

The construction industry is undoubtedly one of the most important sectors of the Ghanaian economy and it contributes an average of 12.6% of the Gross Domestic Product (Ghana Statistical Service, 2013). It employed about 2.8 % of the economically active population in 2013 (Ghana Statistical Service, 2013). The industry enhances the means of production by other industries. Since Ghana has now achieved a middle income status, and has recently discovered oil in commercial quantities, the role of the construction industry is absolutely important.

Construction delays are global phenomenon. Factors causing construction delays with projects differ from country to country, due to different prevailing conditions. The prevailing conditions that could exert an influence on project delivery time are: political, economic, and physical factors, as well as level of technological development, management style, and construction techniques. The construction industry is a major player in Ghana's economy, generating both



employment and wealth. However, many projects experience extensive delays and thereby exceeding initial time and cost estimates.

The delay in Construction projects is a major problem negatively affecting the Ghanaian construction industry today. It is widespread and its cost-effectiveness and societal impact is often discussed on both the print and electronic media. It is against this background that the assessment of the factors affecting the delivery of construction projects in Ghana and recommendation of measures to eliminate if possible or reduce them is of tremendous importance.

### **Problem Statement**

According to Frimpong *et al.* (2003), some projects are effectively and efficiently managed, while others are mismanaged, incurring much delay and cost overruns. In the occurrence of this delay, the owner of a construction company loses by missing out on the potential revenues from the project, through increased overhead cost for contract administration and supervision. Some contractors also lose as a result of increased costs in overheads and tied-up capital. This lack of performance of construction projects is a matter of concern, and it has become so worrisome that there is an urgent need to find a way to reduce its occurrence, if it cannot be eliminated completely. It is evidently clear, looking at the state of most construction projects today that construction projects in Ghana have been bedeviled by construction delays and subsequent cost overruns. These have resulted in litigations and the payment of huge judgment debts that have serious effects on the construction industry and the nation's economy at large.

### **Aim of The Study**

The main aim of this research was to investigate the factors affecting the delivery of projects in Ghana.

### **Objectives**

In order to achieve this goal, the following are specific objectives for the study. The study hopped:

- to identify the various delay factors that affects the delivery of construction projects;
- to identify the effects of delays on the delivery of construction projects;
- to identify the most critical delay factors that affects construction project delivery.

### **DELAYS IN THE DELIVERY OF PROJECTS ON SCHEDULE**

The literature review was done through books, conference proceedings, the internet, and engineering journals. In the next step, all the causes for delays that maybe encountered in a construction project were identified through a detailed review of literature.



<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

Factors that affect the delivery of construction projects on schedule basically refer to factors that cause delays in the execution of projects.

Delay of a construction project can therefore be defined as the late completion of work as compared to the planned schedule or contract schedule. It could 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, it is the contract period. When the project period is delayed, it means the project cannot be completed within original schedule. Delays in construction project would lead to either: extension of time; non-completion; termination of contract; or a combination of two or more of the factors mentioned above. Delays in construction may be caused by the client, the contractor, the consultants, acts of God, or a third party.

Assigning responsibility for project delays is critical to the allocation of responsibility for time-related costs (Al-Saggaf, 1998). Lost productivity or loss of productivity is one the most important causes of delay among the various causes of construction delays. Delays can be minimized when their causes are identified. Identification of the factors that contributed to the causes of delays has been studied by numerous researchers in several countries.

Frimpong *et al.* (2003) revealed the main causes of delays in construction of groundwater projects in Ghana to include: monthly payment difficulties from agencies, poor contractor management; poor material procurement, poor technical performances, and escalation of material prices. Koushki *et al.* (2005) also identified the main causes of delays in the construction of private residential projects in Kuwait as: changing orders; owner's financial constraints; owner's lack of experience in the construction business; contractor-related problem; and material related problem. They revealed that the problems could be grouped under five major factors; incompetent designers/contractors; poor estimation and change management; social and technological issues; site related issues; and improper techniques and tools.

### **Factors of Material Related Delays**

The category of material related delays was identified as one of the groups of factors that cause delays in construction projects. Any factor that is related to materials was categorized under this group of causes. One of the sources used to identify the factors under material group of causes was the literature review. Several studies have identified the factors of material related delays.

Majid and McCaffer (1998) identified the shortage of material, poor quality of material, poor procurement of material, late delivery of material, and unreliable Suppliers as the factors which contribute to delays. Chan and Kumaraswamy (1996) also revealed that shortage of material and poor procurement of material as causes that contribute to delays. In Ogunlana *et al.* (1996), the result of their studies showed that factors such as shortage of material, poor quality of materials,



<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

escalation of material prices and late delivery were identified as factors that cause delays in construction project. Odeh and Bataineh (2002) identified the factor of poor quality of materials having high influence to cause of delays. Koushki *et al.* (2005) also revealed that shortage of construction material, poor quality of material, and poor procurement of material are the factors that contribute to material related delays. Frimpong *et al.* (2003) further identified the factor of poor procurement of materials as a cause of delay. Based on this literature reviewed seven factors of material related delays were identified as: Shortage of construction materials; Poor quality of construction materials; Poor procurement of construction materials ; Escalation of material prices; Late delivery of materials and Unreliable suppliers.

#### **Factors of Labour Related Delays**

Several factors that were related to labour can be distinguished and categorized under the principal cause. The methodology of establishing the factors of this group of causes was similar to that of the material related delays. Ogunlana *et al.* (1996) identified the factor of shortage of skill labour and labour productivity as having high influence to causes of delays. Based on this previous literature review, there are seven factors of labour related delays which were identified.

#### **Factors of Equipment Related Delays**

Odeh and Bataineh (2002) identified the factor of equipment allocation problem as having a high occurrence to causes of construction delays. Long *et al.* (2004) identified the factor of equipment related delays as; Insufficient numbers of equipment ;Frequent equipment breakdown; Shortage of equipment parts; Improper equipment; Slow mobilization of equipment; Equipment allocation problem and Inadequate modern equipment.

#### **Factors of Finance Related Delays**

The methodology of establishing the factors of this group of causes was similar to that of the material related delays, labour related delays, and equipment related delays. These factors of finance related delays were identified mostly through content analysis and these included inadequate fund allocation; High interest rate; Contractor's financial difficulties; Client's financial difficulties; Unreasonable constraints to client; Delay payment to suppliers/subcontractors; and Monthly payment difficulties (Long *et al.*, 2004) .

#### **Factors of Contractor Related Delays**

The methodology of establishing the factors of this group of causes was similar to that of the material related delays, labour related delays, equipment related delays, and finance related delays. In reviewed literature for this study, it was discovered that researchers have identified the factors of contractor related delays that contribute to causes of delays. Chan and Kumaraswamy (1996) identified the factors of poor site management and supervision and improper project planning and scheduling as contributing to causes of delays. Inadequate contractor experience; Inappropriate construction methods; Inaccurate time estimate;



Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

Incompetent project team; Unreliable subcontractor; Obsolete technology were also contributory factors to contractor related delays.

#### **Factors of Client Related Delays**

Odeh Battaineh (2002) identified some factors as slow decision making by client; lack of experience of client in construction; change orders; client interference; lack of capable representative; lack of communication and coordination and improper project feasibility study were all factors associated to factors of client related delays

#### **Factors of Consultant Related Delays**

Long, et al. (2004) identified the factors of inadequate consultant experience; poor design and delays in design; inadequate project management assistance; slow response and poor inspection; incomplete drawing/detail design and inaccurate site investigation. Odeh and Battaineh (2002) identified the factors of slow response and poor inspection as factors of consultant related delays. While Ogunlana, et al. (1996) claimed that some of the factors that are attributed to the consultant related delays included poor design and delay in design, slow response and poor inspection and incomplete drawing and detail design.

#### **Factors of External Related Delays**

Long *et al.*(2004) identified the factors; unforeseen ground condition, inflation/price fluctuation, slow site clearance, and poor weather condition as factors of external related delays. Long *et al.* (2004) also identified the factor of inflation/prices fluctuation having high influence on the causes of delays. Ogunlana *et al.* (1996) however identified the factor of problem with neighbours as contributing to causes of delays.

#### **Effects of delay on the delivery of projects on schedule**

Aibinu and Jagboro (2002) after studying the effects of construction delays on project delivery in the Nigerian construction industry identified six effects of delay as: time overrun, cost overrun, dispute, arbitration, total abandonment, and litigation.

### **RESEARCH METHODOLOGY**

The entire population of 40 contractors and five consultants registered with the Accra Metropolitan Assembly was used for the study. Questionnaires were administered to solicit response from the respondents and interview was used too. The procedure used in analyzing of data was aimed at establishing the relative importance of the various factors that contribute to causes of delays, effects of delays, and methods of minimizing construction delays. There are three steps used in analyzing the data: calculating the relative importance index; ranking of factors in each category based on relative importance index, and to determine degree of correlation on ranking the factors. A ranking method was used to achieve this objective and the



[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

significant of using these methods is it can reveal the most influential factors within each category of causes. The data was analysed using the ordinal scale.

**FINDINGS AND DISCUSSION**

**Groups of factors that cause delays**

A total of fifty -seven major factors that contribute to causes of delays were identified. The fifty-seven factors were grouped into eight major groups: material related; labour-related; equipment related; finance-related; contractor-related; client related; consultant-related; and external related factors. These factors were ranked in each group based on relative importance index from the viewpoint of contractors and consultants. In order to establish the level of agreement of correlation in the ranking between both groups of respondents, the Spearman's Rank correlation coefficient was calculated and the null hypothesis was analyzed. The null hypothesis would be accepted if the level of significance observed was more than 5%. This indicated that a probability of 95% is required to conclude that there is a significant agreement in the ranking between both groups of respondents. The following is a brief description of these factors in each group.

**Factors of Material Related Delays**

In this group there were seven factors that were identified to be the major contributing causes of delays related to material. These were then ranked from the view point of contractors and consultants. In this category, the null hypothesis  $H_0$  is rejected and this indicated that there was a significant agreement in the ranking among the groups of respondents. This was because the Spearman's Rank correlation coefficient, rho ( $r_s$ ) which is 0.964 is greater than the critical value ( $\alpha=0.714$ ) of the Spearman's Rank order con-elation coefficient on the  $r_s$  tables.

*Table 1: Results of factors of material related delays*

Factors	Contractors		Consultants		Spearman's Rank Coeff. Rho ( $r_s$ )
	Index	Rank	Index	Rank	
1. Shortage of construction materials	4.05	1	4.35	1	$r_s = 0.964$
2. Poor quality of construction materials	3.05	7	3.45	6	
3. Poor procurement of construction materials	3.25	5	3.65	5	
4. Importation of construction materials	4.00	2	4.20	2	
5. Escalation of material prices	3.90	j	4.10	3	





<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

6. Late delivery of materials	3.65	4	3.90	4	$\alpha=0.714$
7. Unreliable suppliers	3.15	6	3.35	7	
					thus $H_0$ accepted

### Factors of Labour Related Delays

There were seven factors of labour related delays which were ranked based on the relative importance index from the perspective of contractor and consultants. The results of analysis showed that factor of labour productivity was ranked as the most critical and significant factor that contributed to causes of delays among seven factors of labour related delay.

The ranking between the two groups of respondent of this category had the Spearman's Rank correlation coefficient; rho ( $r_s$ ) = 0.893 which was greater than the critical value ( $\alpha=0.714$ ) of the spearman's Rank order correlation coefficient from the  $r_s$  tables. Thus the null hypothesis ( $H_0$ ) is rejected and alternative hypothesis,  $H_1$  is accepted. Therefore it can be concluded that there is a significant degree of agreement between the two groups with respect to their ranking.

*Table 2 Results of factors of equipment related delays*

Factors	Contractors		Consultants		Spearman's Rank Coeff. Rho ( $r_s$ )
	Index	Rank	Index	Rank	
1. Slow mobilization of labour	3.00	3	3.30	3	$r_s = 0.821$ $\alpha = 0.714$ thus $H_0$ accepted
2. Shortage of skill labour	3.55	2	3.75	2	
3. Labour productivity	3.60	1	3.80	1	
4. Labour supply	2.15	7	2.75	5	
5. Absenteeism	2.60	5	3.00	4	
6. Strike	2.45	6	2.20	7	
7. Low motivation and morale	2.70	4	2.30	6	



[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

**Groups of Factors that Cause of Delays**

The research survey was conducted based on 57 factors that were grouped into eight groups of causes of delays. The average index of all the factors for the various groupings were calculated and used as the relative importance index of the main groups as shown in Table 2. Based on relative importance indexes calculated, the major groups of delays were ranked between two groups of respondent of contractors and consultants. The Spearman's Rank correlation coefficient, rho (rs) is =0.928 and greater than the critical value ( $\alpha=0.634$ ) of the spearman's Rank order correlation coefficient from the (rs) tables. The null hypothesis,  $H_0$  is rejected and alternative hypothesis,  $H_1$  is accepted. There is therefore a significant degree of agreement in the ranking between contractor and consultant.

*Table3: Results of Major Delays Groups*

Factors	Contractors		Consultants		Over all	
	Index	Rank	Index	Rank	Mean	Rank
Contractor	4.96	1	4.76	1	4.86	1
Finance	3.88	2	3.55	3	3.72	2
Material	3.58	3	3.86	2	3.72	2~
Equipment	3.27	5	3.46	4	3.37	3
Client	3.35	4	3.06	5	3.21	4
Consultant	3.19	6	2.82	7	3.01	5
Labour	2.86	7	3.01	6	2.94	6
External factors	2.76	8	2.59	8	2.68	7

**Identifying the effects of delays on construction projects**

Based on literature reviewed and some interviews during the preliminary investigation of this research, it was possible to identify certain major effects of delays on project delivery. The six major effects of delays identified were: time overrun; cost overrun; dispute; arbitration; total abandonment; and litigation as shown in table 4. The questionnaires distributed on the effects of delays on construction project from the viewpoint of contractors and consultants were analyzed. The ranking of the two respondent groups as having the Spearman's Rank correlation coefficient, rho (rs) was 0.405 less than the critical value ( $\alpha=0.829$ ) of the Spearman's Rank order correlation coefficient from the (rs) tables. Therefore the null hypothesis,  $H_0$  is accepted and alternative hypothesis,  $H_1$  was rejected.





<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

Table 4: Results of Effect of Delays

Effects of Delays	Contractors		Consultants		Overall		Spearman's
	Index	Rank	Index	Rank	M	R	Rank Coeff. Rho (rs)
1. Cost Overrun	3.60	1	3.95	1	3.78	1	rs = 0.405  α =0.829
2. Time Overrun	3.60	1	3.85	2	3.73	2	
3. Litigation	3.20	2	2.40	5	2.80	3	
4. Total Abandonment	2.80	3	2.50	6	2.65	4	
5. Arbitration	2.40	4	2.70	4	2.55	5	
6. Disputes	2.00	5	3.05	3	2.53	6	

## CONCLUSION AND RECOMMENDATIONS

### Factors that Cause Delays

During the research a total of fifty seven factors that cause delays were identified through the review of literature. These were further grouped into eight categories of delays. These factors were then analyzed using the Relative Importance Index formula and assigned indexes. These indexes were then used to rank the factors in order of importance to know which once were critical than others. It was concluded from the results that out of the fifty- seven factors, the top ten most critical factors that contributed to the causes of delays included: shortage of construction materials; poor site management and supervision; monthly payment; high interest rates; improper project planning and scheduling; importation of construction materials; incompetent project team; inaccurate time estimates; contractor's financial difficulties and escalation of material prices.

The group of contractor-related delays was ranked as the most significant groups that cause delays, followed by group of finance-related delays, material related delays, equipment related delays, client related delays, consultant related delays, labour related delays, and external related delays.



<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

### **The Common Effects of Delays**

The second objective of this research was to identify the common effects of delays in construction project. This objective was successfully achieved by identifying through the review of literature, six effects that these factors of delays have on construction projects. These six effects: time overrun, cost overrun, dispute, arbitration, total abandonment; and litigation were analyzed from the point of view of both contractors and consultants. It could be concluded from the outcome of the analysis that, the top three (3) most common effects of these factors that cause delays in our construction industry are cost overrun, time overrun and litigation.

### **Recommendations**

Following from the findings of this study, some recommendations are given as follows:

1. It is quite clear that most construction companies are owned and run by entrepreneurs and businessmen who have the financial capacity due to the capital intensive nature of Construction projects. However, most of these people have very low technical and project managerial skills. In order to improve contractors' managerial skills and technical knowledge, there would be the need to frequently organize seminars, workshops and training programs for the contractors in the construction industry to update their knowledge and be familiar with project management techniques and processes.
2. It is also recommended that contractors hire competent project managers and qualified engineers with requisite experience in project management and professional practices to manage their projects effectively and efficiently to cut down cost and time overruns that result from delays in the implementation of projects.
3. Delay or non- payment of certificates and claims to contractors have become endemic in the construction industry causing a lot of projects to either slow down drastically or being totally abandoned. This has given rise to a lot of litigation resulting into arbitrations which end up with clients paying huge judgment debts. It is therefore recommended that all the lengthy bureaucratic channels and processes that contractors have to go through before their certificates are honored be reduced to ensure the continuous cash flow for projects to be completed on schedule.
4. It is also recommended that clients make sure that they have secured adequate funding for projects before the commencement of these project to ensure that payments for works executed are made on regular basis to ensure that there is continuous flow of work on sites to avoid delays.

### **Acknowledgement**

Author is particularly grateful to Mr. Michael Orleans Francisco Riberio, a Bachelor of Technology degree holder in Building Technology at the Department of Building Technology in the Cape Coast Polytechnic, for enormously assisting in the preparation of this paper.



<sup>1</sup>[tonado62@yahoo.com](mailto:tonado62@yahoo.com)

Addo J. N. T.(2015) Delay and Its Effect on The Delivery of Construction Projects in Ghana. In: Mojekwu, J.N., Ogunsumi, L.O., Ojigi, L. M. Atepor, L., Thwala, D.W., Sackey, S. Awere E., and Bamfo-Agyei, E. (Eds) African Journal of Applied Research .(AJAR) Journal, Vol.1,No.1 ISSN 2408-7920 January 2015, Cape Coast, Ghana. 236-246

## REFERENCES

- 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* 20, 593-599.
- Al-Saggaf, H. A. (1998). The Five Commandments of Construction Project Delays Analysis. *Construction Engineering, ASCE*, 40(4), 37-41
- Bubshait, A. A., and Cunningham, M. J. (1998). Comparison of delay analysis methodologies. *Journal of Construction Engineering and Management*, 124(4), 315-322.
- 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*, 15 (1), 55-63
- 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*, 21, 321-326.
- 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*, 23 (3), 285-294.
- Long, D. N., Ogunlana, S.O., Quang T., and Lam. K.C. (2004). Large Construction Projects in Developing Countries, a case study from Vietnam. *International Journal of Project Management*, 22, 553-561.
- Majid, M. A., and McCaffer, R. (1998). Factors of non-excusable delays that influence contractor performance. *Journal of Management in Engineering*, 14(3), 42-49.
- Odeh, A. M., and Battaineh, H.T. (2002). Causes of Construction Delay: Traditional Contracts. *International Journal of Project management*, 20, 67-73.
- Ogunlana, S.O., Promkuntong, K., and Jearkjirm, V. (1996). Construction Delays in a Fast-Growing Economy: Comparing Thailand with Other Economies. *International Journal of Project Management*, 14(1), 37-45.