

Major Delay Factors for Construction Projects in Ghana

Yue Choong KOG, Ph.D.
East West Engineering Consultants
Singapore

A literature research was conducted and identified ten studies reporting major delay factors for construction projects in Ghana. All these studies are based on self-administered questionnaire survey of views and perception of project participants. Over forty construction delay factors were reported in the literature, and have identified as one of the major construction delay factors by one out of the ten studies on Ghana. A thorough review of these ten studies was undertaken to identify major delay factors for construction projects in Ghana. With respect to the major construction delay factors identified, remedial measures to improve the schedule performance of construction projects in Ghana are presented.

Keywords: Delay factors, Ghana, Construction performance.

Introduction

Schedule performance is one of the most important criteria in assessing construction project success. In order to improve construction project performance through scheduling, it is important to identify the major construction delay factors is the first step in understanding the major factors affecting schedule performance. Second, appropriate management measures can be implemented to address issues related to the major construction delay factors to achieve good schedule performance. The problem with delays in construction projects has been identified as a global phenomenon. This is evident from the large number of studies of more than 208 studies to identify major construction delay factors for 55 countries/administrations reported in the literature published in English. The type of contract in most of the studies reported is traditional and not design-build.

Out of the 208 studies on construction delays reported, only 20 studies that are based on an analysis of the construction delays of actual projects. The other studies use questionnaire surveys, mostly self-administered, of the perceptions and views of owners, contractors and consultants, and a small number of studies reply on interviews or panel discussions of owners, contractors and consultants. A self-administered survey questionnaire is sent to contractors, consultants and owners (including civil servants in charge of construction projects). The questionnaire is developed based on either construction delay factors reported in the literature or by open-ended interviews with selected panels of contractors, consultants and owners. The major construction delay factors are established by statistical analysis of the survey data.

Previous studies on Ghana by Edmonds and Miles (1984), Ofori (1984) reported some of the construction delay factors such as delay in payments of contractors for work done, lack of credit facilities for firms, poor communication and unreliable material supply. In their procurement of audit of Ghana, the World Bank (2003), Westring (1997) and Crown Agents (1998) have continuously reported documentary evidence of contracts taking very lengthy periods to reach

financial closure and also, often subjected to unnecessary delays, poor coordination and communication structures, fiscal constraints and extensive systems of controls and land ownership disputes. There are ten studies, carried out after 2003, to identify major delay factors for construction projects in Ghana reported in the literature. All these studies are based on self-administered questionnaire surveys of views and perception of project participants. Almost all of the forty construction delay factors reported in the literature have been identified as one of the major construction delay factors by one of the ten studies on Ghana. Ghana is not a large country in its physical size and the wide diversity of major construction delay factors identified may be compromised. This has created confusion among the practitioners of the construction industry in devising appropriate measures to improve schedule performance of construction projects. This seems to be a major problem and this state of affairs may not provide the most accurate data. In this study, a thorough review of these ten studies is undertaken to identify the top major construction delay factors for construction projects in Ghana to clarify the confusion.

The methodology for the present study is to count the number of each major construction delay factors that have been identified by the ten studies. The top major construction delay factors are those identified by the most number of studies. The major construction delay factors should be factors identified by the most number of respondents in the ten studies on Ghana. Identification of major delay factors for construction projects in Ghana is useful not just for the construction industry in Ghana but also other developing countries. As in many other developing countries, government is the major construction client in Ghana and the market for major projects tends to be dominated by foreign contractors because of deficiencies with the indigenous construction capacity. Bribery and corruption are common used practices for both contractors and consultants in Ghana. Ghana is representative of other developing countries in Africa, Asia and South America. Therefore, major construction delay factors may be relevant to other developing countries in the world.

Major Construction Delay Factors in Ghana

The major construction factors are summarized in Appendix 1 under five categories, namely all project participants related factor, owner related factors, contractor related factors, consultant-related factors and other factors. Each construction delay factor is placed in the category linked to the party which can exert the most influence, though may not be totally, on the effect of that factor. The ‘other factors’ category is for delay factors that are beyond the control of the project participants.

One of the major difficulties in summarizing various construction delay factors identified by various studies is the lack of standardization of the construction delay factors. The following reclassifications are made:

- Chileshe and Yirenkyi-Fianko (2011): “Inflation” and “price fluctuation” are combined and reclassified as “rise in prices of materials,” “Financial failure” is reclassified as “economic conditions,” “Quality and performance control” is reclassified as “rework due to mistakes in construction/construction defects,” “Change of government” is reclassified as “political situation.” “Change of government policy” is reclassified as “government regulations and

permit approval.” “Organization and co-ordination” is reclassified as “poor site management and supervision.”

- Ahadzie (2011): “Low morale and motivation of craftsmen” identified by is reclassified as “low productivity level of labors.” “Over reliance on casual labor” is reclassified as “unqualified workforce/low skilled labor.”
- Amoah et al. (2011): “Access to finance” identified by is reclassified as “financing by contractor,” “Government policies” is reclassified as “government regulations and permit approval,” “Interest rate” is reclassified as “economic conditions,” “Ability to delegate responsibility” and “availability of training proprietors and technicians” are combined and reclassified as “lack of technical professionals/incompetent project team,” “Professionals engaged” is reclassified as “incompetent or inexperienced staff,” “Execution of other projects” is reclassified as “poor site management and supervision.”

Construction delay factor “client satisfaction” identified by Amoah et al. (2011) is not included in Appendix 1 because it has never been identified as a construction delay factor in any of the 208 studies in the literature. Construction delay factors such as “owner interference”, “slow decisions from owner”, “mistakes and discrepancies in design documents by consultant”, “delay in inspection and approval of works, approval of shop drawings, materials, and documents submitted by contractor”, “late issuance of instructions, information or drawings/incomplete drawings/inadequate information/delay in revising design documents and approving works or materials/delays in design work”, “inclement weather”, “lack of community buy-in/environmental impact/civil disturbances, youth unrest, militancy and communal crises”, “delays by utility agencies/relocation/inaccurate as-built utility drawings” and “natural disaster/acts of God” are common among the major construction delay factors for other developing Asian, African and Middle Eastern counties are found not to be significant by the ten studies.

Perceptions and views may not be correct because they are not based on facts that have been critically reviewed and validated by an independent party. The construction delay factors in studies based on actual projects were assessed and identified by the authors based on past records of construction projects. The construction delays identified were the assessment of the supervising staff and the interpretation of the authors. The accuracy of findings of studies based on self-administered questionnaire surveys hinges on the quality of the survey data. It is obvious that the concern to the quality of the survey data in questionnaire survey studies varies. The number of years of working experience of respondents is crucial because respondents’ views and perceptions are formed based on their working experience. According to Kog and Loh (2012), views and perceptions of the survey respondents are affected by the duration of working experience of respondents. Views and perceptions of respondents with less than 15 years are found to be not consistent with respondents with more than 15 years. This seems reasonable considering that the construction period for a reasonably sized project will be around 3 years. A respondent with 15 years working experience will have completed a number of projects equivalent to about 5 reasonably sized construction projects that enable a broader and more incisive understanding of the construction delay factors affecting the construction projects. On the other hand, a respondent with less than 6 years of experience will only have completed one project. Some of the construction delay factors identified are unique to the project only and not typical for the construction industry. This is evidenced from the fact that the major delay factors

identified by these studies are not among the major delay factors identified by the present study. Therefore, validity and reliability of major construction delays for each study reported must take into account the profile of working experience of respondents. Of the ten studies of Ghana using self-administered questionnaire survey, no information on the profile of working experience of respondents was reported in Fugar and Agyakwa-Baah (2010), Frimpong et al. (2003), Danso and Antwi (2012), Buerterey et al. (2013), and Chileshe and Yirenkyi-Fianko (2011). This shows a lack of appreciation of the importance of working experience to the quality of the survey data and the validity and reliability of the major construction delay factors identified. There are four out of the nine studies using questionnaire survey that provide information of the profile of working experience of respondents. Out of the 31 respondents of Amoatey et al. (2014), there were 8 respondents (25.8%) with more than 15 years working experience. In Asiedu and Alfen (2016), 6 out of 44 respondents, i.e. 13.6%, have more than 20 years working experience. When the minimum working experience is reduced to 10 years, the respective proportions are: 55/184 (30%) in Amoah (2011), 13/31 (41.9%) in Amoatey et al. (2014) and 12/44 (27.3%) in Asiedu and Alfen (2016). In Afram et al. (2015), 18 out of the 38 respondents, i.e. 51.4%, who were consultants, have 11 to 15 years of working experience. Also, there is no information given for the 58 respondents who were builders and 42/79 (53.2%) of owners claimed that they were “fairly experienced with building construction.” The low proportion of “experienced” respondents common in these studies, show a lack of appreciation of the importance of working experience to the quality of the survey data and the reliability of the major construction delay factors identified. Despite the above criticisms, the studies summarized in Appendix 1 are not without values. The major construction delay factors identified by combining the findings of the ten studies for Ghana are more credible because of the larger number of respondents.

The number of times each major delay factor were identified by these studies summarized in Appendix 1 are calculated. The top eight construction delay factors most cited in the ten studies for Ghana are summarized in Appendix 2. It is noted that the top construction delay factor was identified by 80% of the ten studies and the eight construction delay factors were identified by 30% of the ten studies. This amply illustrates the wide diversity of the views and perceptions of the respondents of the ten studies. This can be explained by the low proportion of respondents with more than 15 years working experience of the ten studies. The wide diversity of the views and perceptions of the respondents reinforces the importance of a consistency check of the survey data before they are used for further analysis pointed out in the earlier discussion.

Asiedu and Alfen (2016) identified “contractor selection methods (negotiation, lowest bidder)” as a major construction delay factor responsible for delays of construction projects in Ghana. Buerterey et al. (2013) identified “owner interference” as a major construction delay factor. Afram et al. (2015) identified “owner’s lack of experience/incompetent project team” and “late release of site/land acquisition problems” as major construction delay factors. Danso and Antwi (2012) identified “unrealistic/optimistic deadline set by client” and “poor site coordination” as major construction delay factors. Chileshe and Yirenkyi-Fianko (2011) identified “subcontractor problems” and “shortage of labor” as major construction delay factors. Ahadzie (2011) identified “low productivity level of labors” and “low level of mechanization” as major construction delay factors. Fugar and Agyakwa-Baah (2010) identified “corruption” as a major construction delay factor. However, none of these factors was identified by other studies as a major construction delay factor. This shows that the views and perceptions with respect to construction delays

among the respondents are very diverse as a result of the low proportion of “experienced” respondents.

Measures to improve schedule performance of construction projects in Nigeria

It must be pointed out that these major delay factors identified by various studies are apparent causes. Some of these apparent causes may not be the root causes of delay as defined by Ellis and Thomas (2002). For example, when utility relocations are an apparent delay factor for a highway project, an in depth investigation by Ellis and Thomas (2002) found that the root cause is insufficient resources. Generally apparent causes are many; root causes are fewer in number. According to Ellis and Thomas (2002), the approach to identify root cause is to trace the process beyond the point of the apparent cause to find the root cause and appropriate corrective action. Root causes of delay may be determined during interviews with practitioners including the contractors. Sometimes, the root cause is not identified by any one individual or organization, but rather emerged from repeatedly hearing similar problems and statements. For the same apparent delay factor, the root cause may be different in different countries because of differing economic and political conditions, practices in the construction sector and cultural background.

The major construction delay factors summarized in Appendix 2 can be grouped under three categories, namely owners, contractors and consultants. The construction delay factor under the owner category is ‘finance and payments of completed work by owner’. Financing of the construction private sector projects depends on the financial strength of the owner/developer and the general economic conditions, in particular the real estate sector, of the country. One measure that can be implemented to address this issue is to require the owner/developer to submit all the necessary financial documents for an exclusive bank account to be set up strictly for the project only prior to the issuance of the permit to commence construction work for the project. In other words, the owner/developer must secure all the financial arrangements prior to the commencement of the construction project. The purpose is to ensure that the owner/developer possess the financial capability to undertake such a development project. Similar administrative measures may be set up for public sector construction projects. If the funding is from an overseas aid agency, then all the necessary document required for the release of the fund must be expeditiously forwarded to the funding agency so that monthly progress payment to the contractor will not be delayed. The root cause of slow progress payment to the contractor may be attributed to the financial problem encountered by the owner. If financing of the project is no longer a problem with the measure discussed earlier, there is a strong need to professionalize the project management teams of owners so that decisions and progress payment to the contractors can be made within the stipulated period. This is consistent with the findings of Kog et al. (1999) and Chua et al. (1999) that project manager competency is one of the critical success factors in schedule performance. According to Laryea (2010), “there is also almost no penalty for delay and short comings on contracts especially because clients tend to default on their responsibilities.” Owners must be educated to understand and reminded repeatedly that any delays in making decisions and progress payment to contractors may lead to construction delays. The costs of construction delays will definitely be more than any benefits that can be obtained from slow decision making and progress payment to contractors.

The construction delay factors under the contractor category are: “late delivery/shortage of construction materials,” “ineffective planning and scheduling,” “lack of technical professionals/incompetent project team” of contractor, “inadequate contractor experience/incompetence contractor,” “rework due to mistakes in construction/construction defects” and “poor site management and supervision.” The non-compensable construction delay factors such as “late delivery/shortage of construction materials,” “ineffective planning and scheduling,” “rework due to mistakes in construction/construction defects” and “poor site management and supervision” identified by the present study are strong evidences that there is a need to professionalize contractors in Ghana. One of the crucial steps is for contractors to employ technical professionals so that a competent project team will be involved in the project. The aim is to improve their planning and scheduling (including the ordering and delivery of construction materials and procurement of equipment), site management and supervision, and site coordination of the project. Most of the local contractors are a family business and they are very reluctant to trust technical professionals outside the family. More importantly, they feared that the overheads of the contractor’s company will be increased resulting inevitably in higher tender prices. This may lead to failure in securing any project in the cut-throat “destructive” competition in tender. Fortunately, as each generation because are educated there will be increasingly a changing trend towards professionalizing the project team. The younger contractors recognize that the benefit of a professional project team outweighs its costs. Despite the existence of the classification system for contractors in Ghana, the schedule performance of contractors needs to be improved further judging from the findings of the present study. Annual review of the classification system of contractors is needed. The contractor’s classification system has to be tightened by including feedbacks from owners and consultants on the schedule performance of construction projects for the last 5 years when assessing the appropriate class of the contractor during the annual review in addition to the current criteria. This requirement is only for higher classes of contractors. Contractors with inadequate appropriate experience will not be awarded the tender for any construction projects if the contractor classification is administered correctly.

The construction delay factor under the consultant category is “substandard contract/incompetent or inexperienced staff.” This suggests that consultants working on construction projects in Ghana have to achieve much higher standards by attending training courses run by reputable universities and professional institutions. Another measure to address this issue is to require tie-up with some reputable international consultants for construction projects in Ghana or appointing reputable international consultants to work on construction projects in Ghana.

For all project participants, construction delay factor “communication problems/lack of adequate project coordination” is identified as a major construction delay factor. Most of the delay caused by the above delay factors can be minimized by better communication among the various project participants. A joint review by the design team has to be conducted during the working drawing stage to minimize any discrepancies in the architectural, structural, mechanical, and electrical drawings that may lead to variation orders. Once the building contract commences, changes that affect critical activities must be avoided whenever possible. According to Kog et al. (1999), “frequency of meetings project manager holds with project personnel” is one of the critical success factors for schedule performance. Chua et al. (1999) found that “construction control meetings” is one of the critical success factors for schedule performance. The owners or

architects must convene regular project meetings to be attended by all consultants and contractor to achieve better communication and co-ordination among project participants. This is necessary also to discuss jointly by all project participants to resolve any issue that may arise that requires the issuance of variation order so that the necessity for variation orders can be minimized. The construction delay factors under the “other factors” category are “rise in prices of materials,” “economic conditions,” “political situations,” and “government regulations and permit approval.” The various issues identified by the present study depend to a large extent on government governance and policies. All participants in the construction sector must work together to lobby the government to formulate policies that will improve the operating environment for the construction sector in Ghana.

Conclusion

Good schedule performance can only be achieved by identifying the truly major construction delay factors so that appropriate management measures can be implemented to address issues related to the major construction delay factors. A review of ten studies to identify major construction delay factors was performed in the present study. Major construction delay factors for construction projects in Ghana identified by the present study include: “finance and payments of completed work by owner,” “late delivery/shortage of construction materials,” “ineffective planning and scheduling,” “communication problems/lack of adequate project coordination,” “inadequate contractor experience/incompetence contractor,” “lack of technical professionals/incompetent project team” of contractor, “poor site management and supervision,” “financing by contractor,” “rework due to mistakes in construction/construction defects,” “substandard contract/incompetent or inexperienced staff” of consultants, “rise in prices of materials,” “economic conditions,” “political situations,” and “government regulations and permit approval.” Remedial measures to address issues related to the major delay factors include requiring the owner to submit all the necessary financial documents for an exclusive bank account to be set up strictly for the construction project only. The current contractor classification system must be tightened by including the contractor’s schedule performance of past years during the annual review. There is a strong need to professionalize the project team of owners and contractors. Consultants working on construction projects in Ghana must achieve much higher standards in their professional works. The construction delay can be further minimized by improving communication in timely review meetings for owners and all consultants and regular project meetings for owner, consultants and contractors. The practical implication for the construction industry in Ghana is the level of improvement in the schedule performance of construction projects will depend on the extent the various remedial measures have been implemented rigorously.

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Appendix 1

Major Delay Factors for Construction Projects in Ghana

Table Legend:

S = Study is based on a survey of perception of owners, contractors and consultants.
 P = Study is based on actual construction projects.
 I = Open ended interviews.
 A = Building, road, water and sewer etc. projects.
 B = Building projects.
 C = Civil engineering infrastructural projects such as highway, water and sewer projects.
 G = Ground water work projects.
 O = Oil and gas projects.
 ? = Number of respondents not stated in the reference.
 @ = Unable to check

References:

1 = Fugar and Agyakwah-Baah (2010).
 2 = Frimpong et al. (2003).
 3 = Amoatey et al. (2014).
 4 = Danso and Antwi (2012).
 5 = Asiedu and Alfen (2016).
 6 = Buertey et al. (2013).
 7 = Afram et al. (2015).
 8 = Chileshe and Yirenkyi-Fianko (2011).
 9 = Amoah et al. (2011).
 10 = Ahadzie (2011).

Reference	1	2	3	4	5	6	7	8	9	10
Methodology of study	S	S	S	S	S	S	S	S	S	@
Number of respondents in the questionnaire survey/projects	130	72	31	67	132	109	172	103	184	@
Type of construction projects studied	B	G	B	C	A	A	B	A	A	B
All project participants related factor										
Communication problems/ lack of adequate project coordination			X	X		X			X	
Owner-related factors										
Finance and payments of completed work by owner		X	X	X	X	X		X	X	X
Variation orders/changes of scope by owner during construction				X						X
Contractor selection methods (negotiation, lowest bidder)					X					
Owner interference						X				
Owner's lack of experience/incompetent project team							X			
Excessive bureaucracy in project-owner organization			X							X
Late release of site/land acquisition problems							X			
Unrealistic/optimistic deadline set by client				X						
Contractor-related factors										
Inadequate contractor experience/incompetence contractor			X			X		X		
Lack of technical professionals/incompetent project team		X		X		X			X	
Ineffective planning and scheduling	X	X				X	X			
Inaccurate estimating of construction materials quantities/price							X			X
Poor site management and supervision	X	X				X	X	X	X	X
Poor site coordination				X						

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Late delivery/shortage of construction materials or fuel	X	X		X				X	X	
Financing by contractor	X	X	X		X				X	X
Subcontractor problems							X			
Rework due to mistakes in construction/construction defects				X		X		X		
Low productivity level of labors										X
Shortage of labor								X		
Unqualified workforce/low skilled labor							X			X
Labor disputes/Strikes						X				
Low level of mechanization										X
Consultants-related factors										
Inadequate site investigation/unforeseen subsurface conditions			X			X				
Lack of clarity in project scope						X				
Lack of constructability reviews in design				X			X			
Substandard contract/incompetent or inexperienced staff								X	X	X
Other factors										
Rise in prices of materials			X				X	X		
Economic conditions			X					X	X	
Political situations			X		X			X		
Corruption	X									
Government regulations and permit approval							X	X	X	

Appendix 2

Top Eight Construction Delay Factors for Construction Projects in Ghana

Rank	Construction delay factor	Identified in Studies	
		Number	Proportion (%)
1	Finance and payments of completed work by owner	8	80
2	Poor site management and supervision	7	70
3	Financing by contractor	6	60
4	Late delivery/shortage of construction materials	5	50
5	Communication problems/ lack of adequate project coordination	4	40
5	Lack of technical professionals/incompetent project team of contractor	4	40
5	Ineffective planning and scheduling	4	40
8	Inadequate contractor experience/incompetence contractor	3	30
8	Rework due to mistakes in construction/construction defects	3	30
8	Substandard contract/incompetent or inexperienced staff of consultants	3	30
8	Rise in prices of materials	3	30
8	Economic conditions	3	30
8	Political situations	3	30
8	Government regulations and permit approval	3	30