CONFLICT EARLY WARNING SIGNALS IN THE EXECUTION OF CONSTRUCTION PROJECTS

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ABSTRACT

Most conflicts in the construction industry have long incubation periods. Meeting project objectives regarding time, cost and quality benchmarks is the bane of the industry. Therefore, the need to identify Early Warning Signals (EWS) of potential conflicts in construction project delivery has become very imperative. This research aims at evaluating the efficacy of existing theoretical models of EWS. This is vital in avoiding potential conflicts. The methodology involves extensive review of relevant literature and evaluative study using a questionnaire. The study revealed that a probabilistic model approach to managing construction project would mitigate conflicts by showcasing EWS that have higher probabilities of occurrence than others; by this, necessary mitigation measures are taken in a timely fashion. The study concludes that EWS probabilistic models will help stakeholders in the construction industry to identify potential construction conflicts with appropriate response strategies. The study recommends the use of EWS probabilistic model and a brief description of EWS functional components.

Keywords: conflicts, construction, Early Warning Signals (EWS) and projects.

INTRODUCTION

The rising cost of conflicts and the limited success of their resolutions have led to a growing realization that prevention is much better than cure. Cost control which is the effort put by a contractor to regulate the value of money spent in execution of a project to maximize profit is essential for the successful completion of the project. Looking at it from the cost – control point of view, more action of a preventive nature should be taken. The quest for preventive action in conflict management has led to the increasing demand for the development of conflict Early Warning Signals (EWS) in the execution of construction projects. Early warning is first in successful conflict prevention. Its goal is not just to predict whether or not conflict will occur, but to facilitate prevention by calling attention to potential dangers. "Prevention, achieved by employing inter – alia early warning, is 'evidently better' than having to undertake significant efforts to resolve conflicts after they have broken out." (Ghali as cited in Uwiano Peace Platform, 2012, p. 41).

The concept of EWS is not new. The first indicator that a potential conflict is developing is the identification of its EWS. EWS has mainly been developed for natural disasters such as climatic changes, earthquakes, drought and floods, resultant flow of refugees; and the effects of these disasters on people. The recent growing interest in the concept of EWS is geared towards detecting conflicts at the initial stage to take preventive measures. Today, as noted by Doom and

Vlassenroot (1997), this interest has extended as far as those responsible for shaping policy, and the importance of early warning is increasingly recognized. However, the purpose of EWS lies elsewhere to contribute to finding conflict remedies in such a way that they are 'fought-out' in a non-violent manner. Thus, the early warning must be seen as a strategy whose guiding principle is long-term development (Doom and Vlassenroot, 1997).

Rummel (1976) stated that societies comprise a general structure of expectations, which is divided into many different structures, some overlapping, some nested, some independent. He also stated that one of such structures is economic which is formed through conflict and may be disrupted by conflict. It is common knowledge that conflicts take place within societies, and the construction industry is one such area of economic activity. Stewart (2002) posits that the problem usually points to the fact that these conflicts are as a result of severe imbalances within the system. More so, projects in the construction industry are often in the hands of privileged few with the rest jostling to be accommodated under subletting; hence, the tussle for a fair share of the 'construction cake' by stakeholders in the industry. These conflicts have resulted in increased project cost, project delays, and reduction in productivity, loss of profits, damage in business/contractual relationships, waste of resources, decrement in staff motivation, etc.

EWS organizes efforts against threats to the successful execution of construction projects into a logical and systematic framework. This framework illustrates to clients, construction professionals and other stakeholders in the industry the necessary components of early detection and rapid response, and facilitates the practical consideration and inclusion of vital elements during planning and management activities. United States Department of Agriculture, USDA (n.d.) asserts that it is also for identifying gaps, weaknesses, and unnecessary redundancies in networking, and organizational structures. EWS also highlights opportunities for increased cooperation and collaboration and serves as an aid for prioritizing proposed projects, management emphases, or available resources.

Given the above, the study seeks to:

1. Identify Early Warning Signals (indicators) in the execution of construction projects.
2. Identify construction stages/elements that are more prone to potential conflicts.
3. Develop models for predicting the actual occurrence of potential construction conflicts to respond positively.

THEORETICAL FRAMEWORK

The theoretical framework as used here collects and presents interrelated concepts and theories on conflicts early warning signals in the execution of construction projects. It covers construction projects, conflicts, and early warning signals.

Construction Projects and Conflicts

Construction projects cover areas such as building construction and mineral extraction; heavy and industrial engineering; mechanical and electrical engineering; civil and structural

engineering; cost and production engineering; town planning and urban development; surveying and geo-informatics; environmental economics; landscaping and interior decoration; etc. Construction conflict is a state of opposition between people (parties), ideas or interest in the industry. It is endemic, inevitable and could be constructive or destructive. From a construction project point of view, conflict can be classified into intra-project and interface conflict – with internal and external stakeholders (Awakul and Ogunlana, 2002). Ness (2013) avers that these internal and external stakeholders typically involve participants from disciplines and organizations with different loyalties, expertise, interests, and priorities. Their inputs are interdependent. These often produce conflicting views which often are the consequences of historical factors that have built up over an extended period, and of sudden dynamic accelerating factors (Doom & Vlassenroot, 1997).

Conflict seems to be very synonymous with construction projects. The two primary parties on any project are the owner and the contractor. A project owner wants a project completed on time at the lowest cost with the least exposure to the risk of regulatory attention or enforcement. On the other hand, a construction contractor's goal is to complete the project in the least amount of time and with maximum profit. When the clients' and the contractors' goals do not precisely coincide, the potential for conflict is present (Bilezikjian, 2012, p. 28).

Early Warning Signals (EWS)

If conflicts are contained at the initial stage, construction projects can be executed more economically. Identifying potential and existing threats so that detection activities may be planned and implemented is the first step in construction conflict prevention. EWS is all about the identification of potential threats entails gathering, analyzing and organizing pertinent information sourced from research institutes, professional construction bodies, government ministries, media houses, Non-Governmental Organizations (NGOs), 'fact-finding missions' and local networks in ways that facilitate awareness and detection of potential threats.

According to Brahm (2005), early warning provides the opportunity to do something to prevent the emergence and escalation of the conflict before they become costly. The ultimate goal is to avert damage from new threats and reduce to acceptable levels the impacts of existing threats. It is designed to detect areas of tension to make use of preventive action. Gilad (2003) states that Early Warning reveals how to: change strategy to meet new realities; learn from the mistakes of others; avoid common tactics like benchmarking and using consultants, which may do more harm than good; and tell executive what they need to know - not what they want to hear. Early Warning Signals (Indicators) among others include a repeated delay in payments, frequent use of derogatory remarks, excessive variation orders, false accusations and refusal to honor payments.

RESEARCH METHODS

A survey research was adopted which lead to the development of probabilistic and component models. A questionnaire was administered to 50 construction professionals of various disciplines

selected through a disproportionately stratified sampling technique. The questionnaire comprises two research questions (in line with the objectives of the study) with 34 multiple choice items. The questionnaire was constructed using Likert Five-Point Scale Response Alternative and analyzed using weighted mean. The decision rule of acceptability was 3.5 points and above while below 3.5 points was rejected.

PRESENTATION OF RESULTS

This section deals with the presentation of the data obtained from the study and results. It also reveals the summary of the information obtained from the respondents to whom questionnaires were administered. The data are presented in tables based on the research questions.

Table 1: The mean of respondents' views on Early Warning Signals (Indicators) in the execution of construction projects

SA – Strongly Agree, A – Agree, UD – Undecided, SD – Strongly Disagree, D – Disagree.
Research Question One: What are the Early Warning Signals (indicators) in the execution of construction projects?

S/N	Description	SA	A	UD	D	SD	VOID	MEAN	REMARKS
1.	Repeated delay in payments	23	23	1	0	3	0	4.26	ACCEPT
2.	Denial of access to relevant documents	10	13	17	7	0	3	3.56	ACCEPT
3.	Late handover of site	0	27	17	0	6	0	3.30	REJECT
4.	Denial of access to security arrangement/network	3	23	7	7	7	3	3.18	REJECT
5.	Excessive variation order	13	27	4	3	3	0	3.88	ACCEPT
6.	Frequent use of derogatory remarks	0	17	10	16	7	0	2.74	REJECT
7.	Unwillingness to attend site meetings	0	30	4	10	3	3	3.30	REJECT
8.	Non response to calls and mails	7	20	6	10	0	7	3.56	ACCEPT
9.	Exaggeration of minor problems	7	27	13	3	0	0	3.76	ACCEPT
10.	Refusal to honor payments	30	10	3	7	0	0	4.26	ACCEPT
11.	Unnecessary complains	3	23	11	10	0	3	3.41	REJECT
12.	False accusations	7	23	10	3	7	0	3.40	REJECT
13.	Lateness to work or any other	10	23	4	7	3	3	3.64	ACCEPT
14.	Late response to queries	7	23	10	7	3	0	3.48	REJECT
15.	Incessant communal disturbance	23	20	0	7	0	0	4.18	ACCEPT
16.	Frequent threats to terminate the contract	23	13	7	0	0	7	4.38	ACCEPT

From the analysis of Table 1, the respondents accepted items 1 – 2, 5, 8 – 10, and 13 which have mean values of 4.26, 3.56, 3.88, 3.56, 3.76, 4.26 and 3.64. This is because these values meet the cut-off point of 3.5 and above. They rejected items 3 – 4, 6 – 7, 11 – 12 and 14 which have mean values of 3.30, 3.18, 2.74, 3.30, 3.41, 3.40 and 3.48 respectively. The means of these rejected items are below the decision point of 3.50.

Table 2: The mean of respondents' views on stages/elements of construction projects that are prone to potential conflicts

TGE – To a Great Extent, TCE – To a Considerable Extent, TME – To a Moderate Extent, TFE – To a Fair Extent, NAA – Not at All
Research Question Two: What stages/elements of construction projects are prone to potential conflicts?

S/N	Description	TGE	TCE	TME	TFE	NAA	VOID	MEAN	REMARKS
1.	Mobilization	2	9	1	1	2	0	3.54	ACCEPT
2.	Demolition and alteration	6	6	2	0	1	0	4.08	ACCEPT
3.	Groundwork (excavations, fillings, etc.)	3	7	1	2	2	0	3.44	REJECT
4.	Concrete works (concrete, formwork, and reinforcement	2	6	2	3	1	1	3.39	REJECT
5.	Masonry (block wall, damp proofing courses)	1	5	3	4	1	1	3.09	REJECT
6.	Structural works (metal and timber)	2	5	3	3	1	1	3.32	REJECT
7.	Cladding/Covering (e.g., roofing sheets)	3	5	2	4	1	0	3.36	REJECT
8.	Water proofing (asphalting, tanking and damp proofing)	1	4	6	3	0	1	3.20	REJECT
9.	Linings/Sheathing/Dry partitioning	2	6	2	3	1	1	3.39	REJECT
10.	Windows/Doors/Stairs (balustrades)	2	8	0	4	0	1	3.60	ACCEPT
11.	Surfaces finishes	2	7	1	5	0	0	3.40	REJECT
12.	Furniture/Equipment	2	6	3	3	1	0	3.36	REJECT
13.	Building fabrics sundries (e.g., ironmongery)	1	5	4	3	2	0	2.98	REJECT
14.	Paving/Planting/Fencing/ Site furniture	2	4	2	4	0	3	3.35	REJECT
15.	Disposal systems	3	9	1	1	1	0	3.82	ACCEPT
16.	Transport system (e.g. lifts, cranes, gantries, etc.)	2	8	3	2	0	0	3.68	ACCEPT
17.	Electrical and mechanical (plumbing) services	2	5	3	4	0	1	3.39	REJECT
18.	Geotechnical processes (explorations)	2	3	7	1	1	1	3.32	REJECT

Table 2 – Items 3 – 9, 11 – 14, and 17 – 18 with weighted mean scores of 3.44, 3.39, 3.09, 3.32, 3.36, 3.20, 3.39, 3.36, 2.98, 3.35, 3.39 and 3.32 respectively were rejected by the respondents as elements/stages that are not prone to conflicts. On the other hand, respondents accepted items 1 – 2, 10 and 15 - 16 as elements/stages that are not prone to conflicts. These items scored weighted mean of 3.54, 4.08, 3.60, 3.82 and 3.68 respectively.

Table 3: BOQ Summary showing Cost of Elements, Probabilities, Project Profit and Duration of a Proposed Fire Service Station

S/N	Elements	AMOUNT (Naira)	Probability (A)	Duration (Months)	Probability (D)	Profits
D.	GroundWork	466,429.03	0.0254	3.00	0.0417	46,642.91
E.	Concrete Work	,239,198.15	0.3940	15.00	0.2083	723,919.82
F.	Masonry	1,311,440.55	0.0714	8.00	0.1111	131,144.06
G.	Structural Carcassing Steel	2,855,788.87	0.1554	13.00	0.1806	285,578.89
H.	Cladding /Covering	1,574,870.03	0.0857	4.00	0.0556	157,487.01
L.	Windows / Doors / Stairs	1,163,614.41	0.0633	6.00	0.0833	116,361.45
M.	Surface Finishes	2,426,985.81	0.1321	11.00	0.1528	242,698.59
R.	Disposal System	355,406.63	0.0193	5.00	0.0694	35,540.67
Y.	Mechanical and Electrical Services	981,505.79	0.0534	7.00	0.0972	98,150.58
	Estimated Cost/Time	**18,375,239.27**	**1.00**	**72.00**	**1.00**	**1,837,523.98**

Note: *The amounts are inclusive of preliminaries and profits.*

Source: (excluding probabilities) – Airgof Konzorlt, 3 Okigwe Road, Umuahia, Abia State, Nigeria

From Table 3, the probability relates the estimated cost of the project and projected project time to each element of the construction works. Thus:

Probability of Ground Work Element -Amount = 466,429.03/18,375,239.27 **= 0.0254**
Probability of Ground Work Element-Time = 3/72 **= 0.0417**

The profit margin is 10% while the project duration is 72 months.

Table 4: Probability of Mean of Slack Time and Tolerable Loss of Profit of a Proposed Fire Service Station

S/N	DESCRIPTIONS	Percentage (%)	AMOUNT (Naira)	Duration (Months)	Probabilities
1	Profit	10%	1,837,523.93	-	0.1000
2	Tolerable Loss of Profit (TLP)	25%	459,380.99	-	0.0250
3	Slack (Extra) Time (ST)	5%	-	3.60	0.0500
4	Mean of ST and TLP	-	-	-	0.0375

(Profit, TLP, and slack vary from organizations to organizations)

The assumed TLP for Airgof Konzorlt is 25% of the total project profit while slack time is 5%. Thus:

TLP = TLP/Project Cost
= 25% of ₦1,837,523.93
= ₦459,380.99

Probability of TLP = TLP/Project Cost
= **0.025**

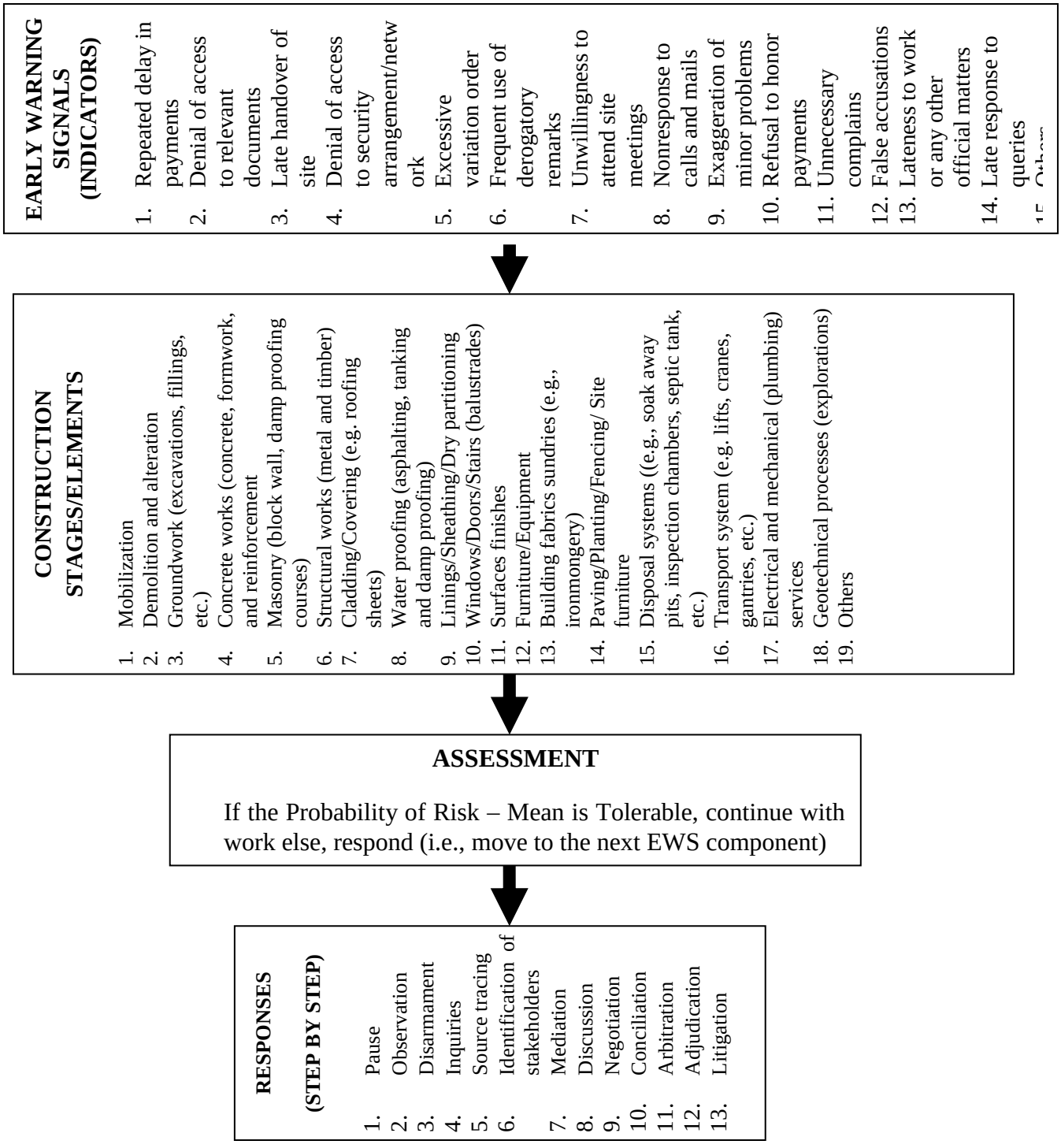
Probability of TLP = TLP/Project Cost
= **0.025**

ST = 5% of Project Time (i.e. 5% of 72 = 3.6months)

Probability of ST = ST/Project Time
= 3.6/72 = 0.05

Mean of ST and TLP = [Pr (ST) + Pr (TLP)]/2
= [0.025 + 0.05)/2
= **0.0375**

MODEL DEVELOPED FROM THE STUDY



EWS Component Model

From the developed EWS model above, the arrows show the direction of movement of actions to be taken. Once the preceding action is affirmative, the next step is taken. Thus, if any of the early warning signals occur, the stakeholders in the construction project should check the stage or element that it occurs and calculate the probability of possible conflict (i.e., mean of ST and TLP) as shown above.

DISCUSSION OF FINDINGS

The findings in response to the Research Question One ***(What are the Early Warning Signals (indicators) in the execution of construction projects?)*** identify EWS in the execution of construction projects. They corroborate the positions of Doom and Vlassenroot (1997), Gilad (2003) and Braham (2005) which acknowledge the existence of EWS.

Though, it is not all the elements that are prone to construction conflicts as shown in the findings linked to responses from Research Question Two ***(What stages/elements of construction project are prone to potential conflict)***; the acceptance of one element as being prone to potential conflict is high enough to take preventive measures that will avert construction conflict as warned by Braham (2005). The finding in response to Research Question Two aligns itself to that of Rummel (1976) who stated that conflicts take place within societies. It should be noted that the construction industry is part of the society.

By using the EWS models developed above, trends of possible potential construction conflict are detected from historical information and then carried through into the future. Thus, if the outcome of the probability of possible conflict is tolerable, (i.e., below 0.0375) work should continue else the next component,i.e.,RESPONSES should follow suit.

CONCLUSION

Conflict Early Warning Signals in the construction industry are being acknowledged as preventive measures and peacebuilding strategies. Construction conflicts can no longer occur without prior indicators or signals. Thus, for a thriving construction industry devoid of escalating conflict, there is a need for peaceful disposition and commitment on the parts of the construction stakeholders who will be the worst hit if construction conflict is not tamed early enough.

More so, conventional approaches to construction conflict resolution can no longer mitigate project failures. A contemporary strategy is the application of EWS model. The models give direction to help prevent construction conflict by finding out whom to warn with appropriate procedures at the right time. The outcomes of the application are derivable from the operational set of indicators which in turn contain construction stages/elements, EWS, and tolerable risk. These indicators help in understanding the causes of construction conflict and whether or not the conflict is likely to escalate beyond control.

RECOMMENDATIONS

1. Development of very explicit indicators which reveal both the background conditions against which conflicts come about and the escalation dynamics of conflicts.
2. Regular updating of information gathered on EWS.
3. EWS models should be based on reliable statistical data sourced from similar construction projects.
4. Setting up of Construction Conflict Data Bank (CCDB) to network all EWS and information sources. The CCDB should gather data obtained from a spectrum of information suppliers in a lasting (i.e., regularly repeated), speedy and standardized manner to provide the basis for further analysis.
5. EWS arrangement should be in such a manner that information gathered can be synthesized with environmental indicators to assess whether a threat exists and to analyze what actions might be taken to alleviate it.

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