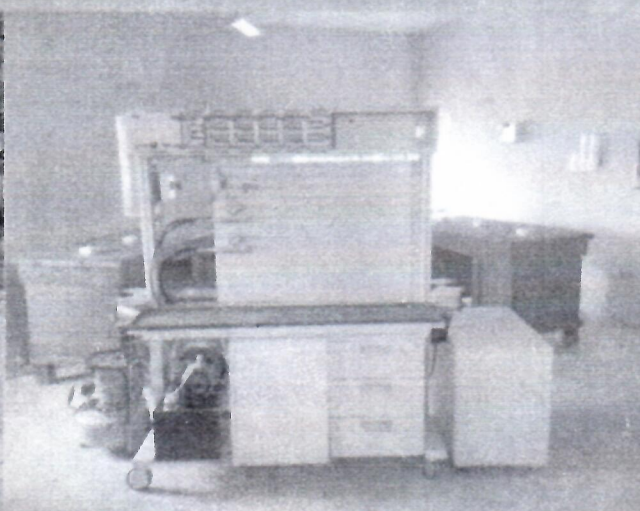




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Factors Affecting Effective Communication of Health and Safety Information on Construction Sites

Adebiyi R. T.¹, Babalola M. O.². & Amuda-Yusuf G.¹.

Department of Department of Quantity Surveying,
¹University of Ilorin, Nigeria, ²Obafemi Awolowo University, Ile-Ife, Nigeria.
Email: taibatranti@ymail.com & bolalola@yahoo.co.uk

Abstract

Poor communication of health and safety (H&S) information among construction practitioners is recognized as a major factor contributing to high rate of accidents on construction sites particularly in developing countries. Efforts have been made to address this problem, but the results have been far from satisfactory, as construction accidents continue to dominate construction industry. Occurrence of accident on construction sites usually leads to site closure for accident investigation, loss of man/machine hours, loss of output, loss of corporate reputation, payment of burial expenses/compensation/insurance claims for the dead. As a consequence, improving safety on construction site has become an area of increasing concern for researchers. This paper examined factors affecting effective communication of H&S information on construction sites. One hundred and thirty-six (136) questionnaires were administered on contractor and site workers through convenience and snowballing sampling. Channels of communication with mean rating of 4.0132 and organization's commitment to well-being of workers with mean rating of 3.8907 are the most important factors contributing to effectiveness of communication of (H&S) information on construction sites. Choice of a communication channel has a significant impact on communication of H&S information. These findings therefore indicated that a comprehensive communication plan must not only address communication among team members but also address appropriate communication channels.

Keywords: Communication, Construction sites, Hazard, Health and safety, Work environment.

Introduction

Communication failures have been identified as a contributory factor in accidents on construction sites (Enshassi, Choudhry, Mayer and Shoman, 2008; Tutt, Dainty, Gibb and Pink, 2011; Phoya, 2012; Ulang, 2012; Archibald, 2013). These are as a result of complex, multi-faceted and technically inclined construction projects. Construction working condition are constantly changing and various construction equipments, mechanisms and workers are involved (Phoya 2012). Occurrence of accident on construction sites, according to Agwu and Olele (2013),

usually leads to site closure for accident investigation, loss of man/machine hours, loss of output, loss of corporate reputation, payment of burial expenses/compensation/insurance claims for the dead. This unfortunate scenario has a monumental threat to the productivity and performance of construction projects. As a consequence; improving safety on construction site has become an area of increasing concern for employers as well as researchers. Therefore, safety extremely high risks (Phoya, 2012).

Improving health and safety (H&S) risk of construction workers and right to safe and healthy working conditions in the industry have been a central issue in global campaign where current H&S laws and regulations have separate sections specifically for construction industry (ILO 2005, Phoya, 2012). In Nigeria, how to reduce accidents and ill-health problems at construction sites has been a challenge for a long time (Akinwale and Olusanya, 2016). To address the aforementioned issue, communication among all parties involved in construction has been argued to be a focal point for reducing accidents and ill-health problems on construction sites (Kirchsteiger, 2005; Smith, Merna and Jobling, 2006; Jung, Kang, Kim and Park, 2008; Phoya, 2012). One of the major issues in construction H&S is access to information (Ringen and Seegal, 1995).

According to Vecchio-Sadus (2007), communication allows people, tasks, processes and systems to interact purposively and cooperatively to achieve health, safety and environment objectives. The strategy of communication of H&S information influences people's understanding and participation in safety process and the language used will often determine whether the process is accepted or rejected. Vecchio-Sadus (2007) confirmed that communication is integral to achieving a safe work environment by giving and receiving information about hazards and risk controls. Through communication, project participants are informed and educated about protective action and warned about disasters and how to manage emergencies. Ahadzie, Proverbs and Sarkodie-Poku (2014) emphasized that the quality of the communication experienced on construction projects is crucial to attaining acceptable level of efficient and effective H&S. Hence as projects get more complex, achieving and maintaining effective communication among key players becomes more problematic. This research examined effectiveness of communication of H&S information on construction sites in Lagos State, Nigeria. Lagos State was chosen as the study area because 60 - 65% of head offices of contracting organizations were located in this area (Babatunde, Babalola and Opawole, 2012). In addition, the study area is very active in terms of project/construction activities (Obamiro and Obasan, 2013).

Health and Safety Communication in Construction Industry

Studies indicated that construction industry is among the most hazardous industries (Hallowell, 2008; Fera, 2009; Gurcanli and Mungen, 2009; Fung *et al.*, 2010; Aneziris, Papazoglou and Kallianiotis, 2010; Rozenfeld, Sacks, Rosenfeld and Baum, 2010; Marhayilas, Koulouriotis and Gemeni, 2011). According to the National Safety Council reports, 8,993 people died during 2003 - 2011 at construction workplaces in the United States, which was the highest number of fatalities among deaths occurring in all types of industries over this period of time. The same trend was observed in other countries as well. The situation is even worse in developing countries. Available data suggest they are 3-6 times greater (Jason, 2008). In comparison with developed countries, construction sites in developing countries are ten times more dangerous (Hamalainen, Takala and Saarela, 2006). Other research conducted in developing countries corroborates evidence of this relatively high proportion of accidents on construction projects (ILO, 2005; Murie, 2007). Economic development activities are usually hampered in a country with high rate of construction fatalities; since productivity/national output will be low, inflation and rate of unemployment will be high while there will be an increase in social vices.

Due to fragmented nature of the construction industry, Ulang (2012) noted that effective communication has become a major challenge. Communication challenges among all parties involved in a particular construction project may result in an array of problems such as additional time needed for project completion and costs that exceed the budget including aspects of H&S (Dainty, Moore and Murray, 2006).

Communication has been posited to play a key role in H&S of construction workers (Dainty, *et al.*, 2006). Communication of H&S is to advise, inform, assist, train, learn, direct, warn, seek help, gain respect, acknowledge, reassure, motive, question and complain.

The effectiveness of communication relies on many factors. Dainty *et al.*, (2006) summarized four factors that enable communication:

1. The effectiveness of encoding and transmitting information through communication systems;
2. Channel and network;
3. The suitability of communication medium and channels;
4. Reactions of the receiver and the abilities to control noise.

According to Bohrmann (2000), effective communication depends greatly on characteristics of messages distributed, conveying authority, receiving audiences and context in which the communication process occurs. Effective communication is therefore the transfer of message, followed by feedback from the receiver to the sender indicating an understanding of the message. Effective communication about H&S relies on information coming into the organization, flowing within the organization and going out from the organization (Lahtinen 2010).

Littlejohn and Foss (2008) explained that by understanding communication theories, one

can develop certain important communication skills, which will develop habitual thinking, to become more adaptable, flexible and more sophisticated in communication. Titus and Brochner (2004) suggested that sharing information is a key component of communication. Darke (2000) recognized the importance of creating an environment for effective communication and contends that the risk of insurance claims is reduced when good communication is affected. On the other hand, according to Southard (2013), the significant reasons for ineffective communication are closed lines of communication due to protocols, unsuitable communication channels and unexpected communication breakdown. Akinwale and Olusanya (2016) added that information over load, lack of openness and filtering of information may increase the lack of communication efficiency.

Dainty *et al.*, (2006) developed a simple model of communication by electronic systems which, has relevance to the ways in which people communicate, interpret and disseminate information (Figure 1). This simple model comprises transmitter relaying information as a signal to a receiver, the efficacy of which is affected by noise, which distorts the clarity of the message to the receiver, who subsequently decodes the message. In this model, every transmission has to be encoded in order for it to be communicated because otherwise the message could not propagate (Littlejohn and Foss, 2008). Indeed, a message that has not been encoded would effectively have had to have been telepathically communicated. Noise is important part of this process because it can impair the transmission of the message from the sender to the receiver. This can account for any type of distortion or distraction that can affect the quality of transmission between parties.

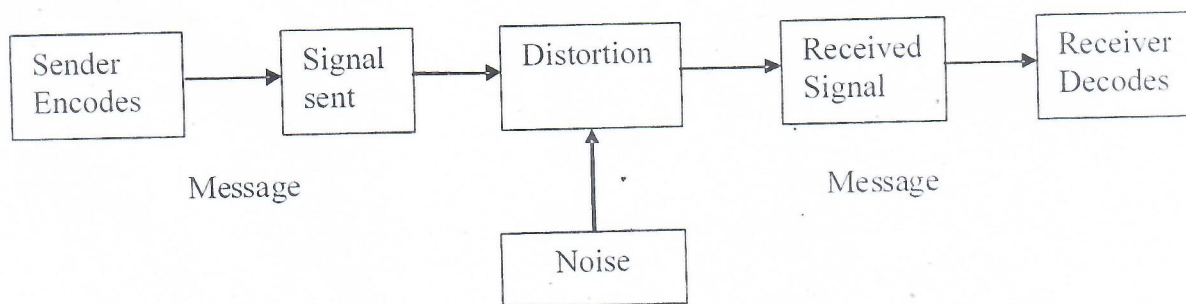


Figure 1 A model of the communication process

Source: Dainty, Moore and Murray (2006)

According to Hampel (2006), communication is not a task where bits of information are transported from the sender to the recipient but a process, where both sender and recipient interact in order to develop a common frame for an understanding of the problem. It is essential to ensure that all those who need to be involved in communication are given an adequate opportunity to do so and are kept informed of the developments and the measures taken to deal with them.

In construction, effective communication is very important, because many parties are involved in a project. These parties may consist of those who are strangers to one another cooperating temporarily in a construction project, which is known to be complex, highly competitive and fragmented, time and cost constrained, as well as prone to hazards (Charoenngam, Coquinco and Hadikusumo, 2003). According to Phoya, (2012) it is communication that enables people to coordinate, collaborate and make important decisions that would affect many individuals or a group of people that are united as an organization. Furthermore, Elliot (2005) contended that construction workers need to understand the value of effective communication in order to excel. Elliot (2005) confirmed that several of the 2005 winners of the Construction Safety Excellence

Awards at the Annual Convention of Associated General Contractors of America, where considerable attention was placed on effective communication

Factors Affecting Communication of Health and Safety Information

The construction sites are complex in nature because of involvement of many personnel in different activities on the sites (Charoenngam *et al.*, 2003; Bouchlaghem, Kimmance, and Anumba, 2004). Cheng, Leu, Lin and Fan (2010) stated that the personnel involved on construction represent different professions, including bricklayer/plasterer, roofer, painter, welder, glazier, plumber etc., and their multidisciplinary skills limit the scope of cooperation between them. The significant reason for this lies with problems of effective communication of H&S information among all the individuals involved.

Cole (2000) highlighted some factors as barriers to effective communication. These are: lack of information or knowledge, lack of attention to detail, not explaining priorities or goals clearly, selective listening, and lack of empathy, self-image, status prejudice, accents and differing perception of risk. According to Cheng *et al.*, (2001), effective and efficient communication relies on a few aspects such as inter-organizational communication, a

communication channel created for close or distant parties, and the choice of channel which must be appropriately depending on the amount of information and the speed of the channel to deliver the information. Vecchio-Sadus (2007) added other factors as: failure to explore alternative solutions, mind made up, preconceived ideas, language barrier, poor judgment, losing patient and allowing decisions to become emotional. Other factors identified by Ulang (2012) include: resistance to information technology, lack of information management, highly fragmented and non-collaborative nature of the industry and multidisciplinary team members.

Methodology

Qualitative research methods were chosen. This is due to the need to understand the nature of issues being investigated. The literature review revealed that there are communication issues in construction, particularly as regards health and safety on construction sites. The target population comprises contacting organizations within Lagos State of Nigeria. One hundred and thirty six (136) questionnaires were administered on contractor and site workers through convenience and snowballing sampling.

The questionnaire was structured and divided into two categories: the first category was designed to get information about personal data of the respondents such as education, profession, roles and year of experience in construction industry also involvement in H&S matters, and level of awareness of communication of H&S information.

The second set of questions was designed with the purpose of establishing the most important factors that affect effectiveness of communication of health and safety information. Respondents were therefore requested to rate their

agreement with each of the 18 variables identified from literature review on a five point Likert scale from 1 = strongly disagree to 5 = strongly agree. Respondents were also requested to state and rate other factors considered not included in the questionnaire that affects and contribute to effectiveness communication of H&S information on construction sites in the study area.

A total of 58 completed questionnaires were analyzed therefore, resulting in effective response rate of 43%. A total of 47% of the respondents are contractors while the remaining 53% are site personnel. The years of construction experience of the respondents are 1-5 years (15%); 6-10 years (7%); 11 – 15 years (24%); 16 – 20 years (32%); and 20 years and above (22%). In summary, about 78% of the respondents have more than 10 years construction experience. This observation suggests that the data collected from these respondents are reliable.

Data Analysis and Discussion of Results

Data analysis was done using Statistical Package for the Social Sciences (SPSS) version 20. The hypothesis for this study was that, there is a causal link between communication strategies adopted on construction sites and effective health and safety information. T-tests of the means were used to check the significance of the responses to the issues raised in the questionnaires. The level of significance was set at 0.05 (5%). The $H_0: \mu \leq 3$ or $H_1: \mu > 3$. Therefore, to accept H_0 is to say that the factor being tested is not significant and has no relationship with effectiveness of H&S information on construction site, while H_1 indicates that the factor is significant. The hypothesis $H_0: \mu = \mu_0$ and the alternative hypothesis $H_1: \mu > \mu_0$ was set out. Where μ is, the population mean. μ_0 is the critical rating above which the variable is considered to

contribute to the factors affecting effectiveness of communication of H&S information on construction sites.

In this study, μ_0 was set at 3 because in the rating scale, all ratings above 3 are considered as a contributory factor. Table 1 shows the t-test results with the significant level set at 0.05.

Table 1 Mean ratings and t- test results on factors affecting effectiveness of communication of health and safety information on construction sites.

Rank	Factors affecting effective communication of health and safety information on construction sites	Mean	t-test	p-value
1.	Channels of communication	4.0132	28.494	.000
2.	Organization's commitment to well-being of the workers	3.8907	15.142	.000
3.	Worker's lack of empathy on health and safety information	3.8245	13.001	.000
4.	Lack of attention to detail	3.7980	12.531	.000
5.	Type of information being communicated	3.7748	11.637	.000
6.	Communication skills of management	3.6987	11.017	.000
7.	Clarity of message	3.6871	10.499	.000
8.	Size of the project	3.6788	8.154	.000
9.	Physical properties of construction project itself	3.5877	7.490	.000
10.	Workers' mind made up	3.5828	6.534	.000
11.	Availability of time	3.5563	6.008	.000
12.	Literacy skills	3.4768	4.361	.000
13.	Language barrier	3.4437	4.045	.000
14.	Number of people to be informed	3.4288	3.918	.000
15.	Long-winded message	3.4056	3.229	.002
16.	Resistance to information technology	3.3758	2.892	.005
17.	Not up-to-date information	3.1921	2.220	.028
18.	Source of information	3.1308	1.807	.073

Findings

As shown in Table 1, the t-test result revealed that sixteen (16) out of the eighteen (18) factors identified actually contribute to effectiveness of communication of H&S information on construction sites. Meanwhile the 3 most important factors based on the t-test result are:

1. Channels of communication
2. Organization's commitment to well-being of the workers
3. Worker's lack of empathy on health and safety information

This shows that, channels/medium of communication with mean rating of 4.0132 and t-test value of 28.494 and organization's commitment to well-being of the workers with

mean rating of 3.8907 and t-test value of 15.14 are the most important factors contributing to effective communication of health and safety information on construction sites.

Discussion of Results

From the perspectives of the respondents, the channel of communication is considered significant to effectiveness of H&S communication on construction sites as shown in Table 1. Appropriate communication mediums are used to fit the message content resulting in communication efficiency and effectiveness. However, inappropriate communication mediums can result in communication breakdown, mistakes loss of trust and integrity. This finding

is supported by the research carried out by Lando (2012) on failure of large infrastructure projects. Respondents are of the opinion that for communication of H&S to be effective, management must first be committed to the well-being of the workers by identifying and considering the hazards that the work poses on sites. Contractors may not be able to eliminate all H&S risks, but they can make significant contributions to workplace safety by communication of H&S information to site workers.

Furthermore, workers lack of empathy to understand information on H&S is another major factor affecting communication of H&S information as shown in Table 1. Knowledge and understanding are awareness gained through experience, familiarity or leaning. This is line with the study by Akinwale and Olusanya (2016) that empathy on possible risk factors and knowledge on how to reduce these risk factors among workers and contractors will enhance effective communication.

Conclusion

A total of eighteen factors affecting communication of H&S information were identified from literature. These 18 factors were evaluated and 16 out of the 18 factors are considered as affecting effective communication of H&S information on construction sites. The study concludes that, channels of communication, organization's commitment to well-being of the workers and worker's lack of empathy on health and safety information are the three major factors affecting the effectiveness of communication of H&S information on construction sites.

A comprehensive communication plan must not only address communication among team members but also address appropriate communication channels. Workers' attitude can

sometimes be a big barrier because of their lack of empathy on H&S information. Some site workers refuse to take on contractors' suggestions for carrying out a task in a safer way. Effective communication between team members from the start of the project until construction completion would ensure that all of the relevant H&S information is transferred to and referred to by all of the participants in the construction project. An appropriate communication channel must be identified and considered to retain the correct and appropriate H&S information. Accidents could be avoided by communicating to the team members through appropriate channels.

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Adebiyi R. T.¹, Babalola M. O.². & Amuda-Yusuf G.¹
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