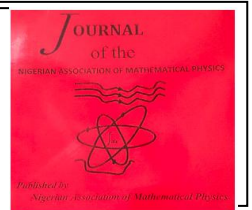


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## QUALITATIVE REVIEW ON IMPROVING CONSTRUCTION SITE WORKERS' BEHAVIOUR THROUGH VISUAL SAFETY COMMUNICATION

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### ABSTRACT

*Visual safety communication has long been recognized as one of the essential management tools for improving workers' safety behaviour. This study seeks to investigate the extent Nigerian construction companies use this simple safety management tool to improve site worker safety behavior. Semi-structured interviews were conducted with site managers, supervisors and workers in five (5) selected construction companies within the Lagos State. Thematic analysis was adopted to present results findings. A walk-about was also carried out on large, medium and small construction sites within the area. The interviews result indicated that none of the small construction companies provided safety signages on their sites. Provision of safety signages on site is a responsibility of management to ensure workers' safety. The study therefore, recommends that construction companies in respective of size should provide safety signages on site at strategic point for easy visibility to workers.*

## 1. INTRODUCTION

Globally, construction industry is one of the most vibrant sectors of any economy. According to [11] construction sector contributes 5.8% of the nation's Gross Development Product (GDP). The industry is also the largest employer of labour both skilled and unskilled. It has the potential to contribute much more due to high demand of buildings and infrastructural facilities particularly to developing countries like Nigeria. [13] states that the construction industry is noted for training and honing skills of all types. Despite the importance of this sector to the economy development of nations, the industry has been known for its high risks, accidents and fatalities [3; 9].

The causes of unsafe behaviors or unsafe acts of workers on construction sites, according to researchers and scholars amongst [7, 3, 11], are attributed to: poor leadership and lack of commitment to site workers' H&S by the top management.

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The World health organization [15], also notes that poor H&S attitude of site supervisors, inadequate H&S training of workers, and lack of a proactive approach to H&S management contribute to unsafe behaviour of workers on site. The International Labour Organisation [6] on major causes of construction site accidents pointed out that failure to provide safety signages on sites could contribute to accidents and incidents. The use of visual signages on construction sites have been noted to impact positively on workers' H&S behaviours [8]. The ILO [5] added that picture speaks more than thousand words and create lasting impressions. [3] and [6] averred that ineffective site safety communication leads to misunderstanding, mistake, injuries and even fatalities on construction sites.

Research conducted by [10] on supervisor's ability and competency to conduct construction site health and safety induction training in Nigeria, noted that small and medium construction enterprises commonly use written documents in conducting their training over visual safety signs such as pictures, symbols, images etc. Perhaps, this finding could be more common in developing countries where cost of procuring colorful posters, animations and cartoons is very high. Nonetheless, [11] noted that the use of written H&S policy manuals for safety communication has some limitations, as many construction site workers are rural migrants with little or no education. Thus, the idea to communicate safety policies through images, pictures, animations, illustrations etc. was based on the premise that an informed worker is more likely to perform his / her tasks at relatively low risk. This is the myth behind the introduction of Safety-First posters in workplaces. Hence studying the relationship between site workers' safety behaviour and the use of visual safety communication becomes imperative in the Nigerian construction industry.

### **Visual Safety communication**

Visual safety communication is the art of using posters, pictures, symbols, images, graphics, infographics, and animations to communicate safety information to construction site workers. The use of pictorial representation as a means of communicating safety in workplaces, particularly at construction site has been in existence for decades. The ISO 38664 safety colours and safety signs were developed in an attempt to standardised colours and symbols for safety signs around the globe [13; 2]. Visual safety signs that have been used in the workplaces; construction sites inclusive are shown in Figure 1 illustration. [2] posits that visual safety signs aid people to do right things even when no one is watching them. For example, safety signs on the use of safety equipment as illustrated in Figure1 and 2 helps workers to wear the appropriate personal protective equipment (PPE). In addition, instances have shown that the use of cartoons in H&S training, induction training, weekly toolbox talks has significantly improved site workers' safety behaviours [5;8].

Presenting safety information in picture forms, according to [6] help workers to comprehend the information better. The ILO further argues that human brain is capable of processing pictorial representation easily than texts. Research conducted by [14] in America among Latino construction site workers assert that visual safety signs play crucial role in communicating and disseminating safety information to everyone on workplace regardless of nationalities, differences in languages and varying literacy levels among construction site workers. The [5] emphasized that visual safety signs are simple, easily comprehend and creates effective means of transferring knowledge to the viewers. Figure 1 below illustrates common safety signs in workplaces construction sites inclusive.



Source: Researchers; walk about

### Significance of visual safety communication on construction site

The construction industry by its very nature is complex (3; 8), and the complexity is compounded by high level of illiteracy among the site workers [13]. Consequently, the use of pictures, symbols etc. in communicating safety at construction sites will be one of the veritable tools to improve workers' safety behaviours as English is a second language to many.

According to [3] construction workers are directly affected by site activities, and also the general public. Going by this, the [6] in promoting safe and healthy working environment mandated that construction enterprises in respective of size should provide safety signages at strategic position on their sites for easy visibility by workers. Additionally, such safety posters/signages may include local languages as majority of the site workers are rural migrants with low level of education [13]. The negative impact of low education on safety behaviour among construction site workers is supported by [14] They assert that the inability to read written safety instructions, among Latino construction site workers resulted in poor H&S behaviours. Similarly, [12], surveyed urban immigrant workers in an immigrant community in Northern Virginia, and found that they face a high risk of occupational injuries, with adverse H&S outcome.

Research that has been conducted in social science domain concluded that pictures, images etc. create lasting impression to the viewers. [7] cited Oller and Giardetti (1999) asserts that from an advertising perspective, using animated images to capture attention of parents for Polio vaccination worked effectively. This follows that using coloured images to represent safety signs and mandatory PPE on construction sites will positively impact on workers' H&S behaviours. Visual safety signages according to [3] are tools management used to emphasize their commitment towards free accidents workplace and promote workers' safety behaviour. Below is an illustration of some safety signs common on construction worksites.



**Figure 2: An illustration of safety signs with explanation**

### **Advantages of using visual safety signs to communicate H&S on worksite**

Since prehistoric times, pictures, images, symbols etc. have been used to communicate information and ideas to people. More importantly, nothing works better than pictures, it creates a lasting impression. Research conducted by [1] on the use of visual communication to improve construction site H&S performance found that sometimes, getting your message across in a clear, concise way can be difficult with words alone, particularly among illiterate construction site workers. The use of pictures, images, symbols to communicate workplace H&S to workers of diverse cultures have been accepted globally. According to [11], the use of cartoons in workplace H&S training, visual (videos), picture and images has significantly improved workers H&S behaviours. [11; 3] listed the followings benefits of using pictures, images symbols to communicate safety on construction sites:

- **Effective for illiterate site workers:** Construction industry according to [14] is the highest employer of illiterate workers who migrant to urban cities after done with their farm works. The use of safety visual communication tools during weekly tool box talks, induction training will be more effective in communicating site H&S.
- **It aids in oral safety communication:** A picture speaks more than thousand words; therefore, pictures, images, cartoons used to demonstrate facts during H&S training sessions will in no doubt aid in better understanding of the topic by workers. According to [3] oral safety communication becomes more meaningful if key elements such as graphs, pictures and diagrams are used.

- The use visual artifacts such as pictures, cartoons, animations during safety training session make explanation easier: According to [3], the use of graphical representation in communicating H&S to workers has been of tremendous benefit in achieving safety communication goals. Easy explanation has made visual safety communication more popular.
- Using visual techniques to communicate safety at workplaces make it simpler: Geotsch (2) argues that communicating complex information and ideas to trainees become simpler and easier with the use of images, cartoons, figures, diagrams etc.
- Time is very important to site supervisors, using representations to demonstrate to workers what are required of them at a particular point in time can easily be achieved with the use of pictures, images cartoons etc. The use of visual communication help to prevent waste of time compared to using written and oral communication methods which takes much time to communicate the same information and ideas to workers [3]
- The use of visual safety communication helps in quick decision making among site workers: Visual safety communication helps site workers to take quick decisions as picture speaks more than thousand words.
- Graphic representation is believed to be more popular and appears attractive than long written documents [3]. Safety signs presented with colourful background need not long explanation. Torrance. [12] stated that visual safety signages are more popular among illiterate site workers, they do not like much speech and long explanation rather than pictures, images, animations, charts etc. The use of safety representation on construction sites limits the need for long speeches and voluminous safety manuals.
- Research has shown that there is a strong link between safety visual communication and improved site workers safety behaviour, as pictures, images, cartoons, infographics add impact to the information, quicker understanding and create lasting impression to the target audience.

## **2.0 RESEARCH METHODOLOGY**

Qualitative research approach was adopted for the study which utilized interpretative paradigm to explore construction site workers' perception on improving safety behaviour through visual safety communication. Qualitative research focuses on qualities of phenomena under investigation rather than numeric measurement. The real-world phenomena need to be studied from within the context of that reality. In broad term, any kind of research that produces findings which are not obtained from statistical procedures or other quantitative methods can be regarded as qualitative research. Data were collected through semi-structured interview questions. Purposive and convenient sampling techniques were used. The sampling criteria include interviewees' knowledge in their fields, managers currently working at sites in the study area. In addition, the sample criteria were

in line with research topic that seeks to explore the perception of managers and site workers on improving construction site workers safety behaviour through visual safety communication.

The interview approach was chosen, rather than quantitative method, due to problem and difficulties in obtaining accurate responses from the ever-busy managers. The interviews were complimented with walk about on construction sites within the study area

A semi-structured interview was developed to guide the discussions. The primary source of the interview questions was derived from exhaustive literature review on construction H&S management practices [3; 13]. In addition, the questions allowed participants to discuss H&S best practices relative to use of visual signages to improve site workers H&S behaviours.

Interviewees were informed of the voluntary nature of their participation and they were assured of the confidentiality of their comments. The discussions with each interviewee were recorded on iPhone with the permission of the interviewee before transcription. The opinions and suggestions of the interviewees were recorded on iPhone. The researchers then captured the data on computer after each interview. The principal investigator listened several times to the recorded opinions and suggestions, and personally transcribed them. To enhance validity of the findings, the transcribed versions of the discussions were obtained. After the transcription of the data, the analysis thereof brought about the identification of the following themes;

- Provision of visual safety signs on construction site;
- Advantages of using visual safety signs to communicate H&S on worksite, and
- Obstacles to optimum use of visual safety signs on construction site.

## **DISCUSSION OF FINDINGS**

The findings presented in this section are based on perceptions from the site managers, supervisors and worker who are always on construction sites.

### **Provision of visual safety signs on construction site;**

Provision of H&S signages on construction site has significant relationship with workers positive H&S behaviour. One of the H&S responsibilities of management is the provision of safety signages on sites. In fact, organization H&S is grown and nurtured by the management. Thus, it is the level of management commitment towards organizational H&S that influence the behaviours of site managers, supervisors and workers. One of the site managers from the large construction companies put it this way:

*“Companies H&S is determined by the commitment demonstrated by management”*

*“They set the company’s H&S policy through financial budgeting for H&S, provision of personal protective equipment (PPE) and site safety signages”*

*“Regardless of the company size, it is the commitment of the company management towards workers’ health, safety and wellbeing that influence site managers, supervisors and workers safety behaviours”*

Statements of supervisors from small firms include:

*“Owners of construction companies be it small, medium and large should demonstrate serious commitment towards workers’ health, safety and wellbeing through provision of site safety signages, PPE such as reflective cloths, boot, helmet”*

*“We site supervisors lead by example” a good H&S management system must come from the owners of the companies.”*

*“H&S culture has to start from the owners, we at the frontline nurture it”*

Literature findings showed that provision of visual safety signs on construction sites at a strategic point for workers’ visibility will improve workers’ attitudes and behaviours towards site H&S rules and regulations. This research finding corroborated the work of [12] that the use of cartoons in workplace H&S training, visual (videos), picture and images has significant relationship with workers positive H&S attitudes and behaviours. Graphic representation is believed to be more popular and appears attractive than long written documents [3]. Safety signs presented with colourful background need not long explanation

However, during the walk about, the researcher found that it was only one large company which is multinational provided PPE poster at both the head office and site. This research finding corroborated the work of [3] that the use of visual safety signages, pictures images, symbols are not common among medium and small construction enterprises in Nigeria

### **Advantages of using visual safety signs to communicate H&S on worksite**

Globally, construction site is made up of people with little or no education, using pictures, images in communicating H&S to such group of workers will be easier, and more comprehensible. Okorie and Smallwood [8] noted that the use of written H&S policy manuals for safety communication has some limitations, as many construction site workers are rural migrants with little or no education. Visual safety communication has been found to useful particularly during site H&S training like induction and weekly tool box talks. [3] maintained that the use of visual safety tools/aids on construction site globally, has resulted in improving site workers’ safety attitude and behaviour.

Interviews with site managers and supervisor revealed that visual safety communication could be of immense value to site workers and management alike.

One of the site managers made this statement:

*“Visual safety communication tools such as PPE posters, images and animations used during H&S training sessions make explanation of information to site workers, particularly the illiterate ones simpler and easier”.*

One of the interviewees site supervisors agreed that visual safety communication tools have the potential to improve construction site workers’ safety attitude and behaviour, and that its applicability in the industry should be researched. He went further to make the following statements.

*“Visual safety tools prevent wastage of time” “It also aids oral communication during H&S induction of new workers”. “Above all it is popular among illiterate site workers who cannot read safety rules and regulations written with English”.*

Literature review supported the research findings. According to [5], visual safety communication promotes workplace H&S culture, it is very useful to illiterate site workers, it makes presentation of information and ideas easier and simpler. Workers’ attitude and behaviour are positively impacted through the use of visual safety signs and posters on sites. Owners of construction companies should place high premium on workers’ health, safety and wellbeing since they are always on the frontline of site operations [5]. In addition, that the use of visual safety tools/aids on construction site, has resulted in reduction of site accidents, incidents, loss of life and properties financial gains.

### **Interviews with site workers**

Interviews conducted with site workers revealed that the use of visual safety tools such as PPE posters in communicating safety, promote the use of PPE and build a strong H&S culture among workers. Literature corroborated the findings, as indicted by the research conducted by [1] on the use of visual communication to improve construction site H&S stated that sometimes, getting your message across in a clear, concise way with illiterate site workers can be difficult with words alone. This question was asked to site workers. Do you think that having safety signs on site can improve workers’ safety behaviours?

All the interviewees answered yes. However, one of the workers from small construction enterprise made the following statements.

*“In this part of the world, owners and management of medium and small construction enterprises do not place premium on health, safety and wellbeing of their workers”. “They place emphasis on production and profits”.*

Another site worker from one of the small construction firms made these shocking statements.

*“In fact, during our induction training our supervisor distributed manuals written with English language knowing fully well that majority of us cannot read nor write”*

*“Also, on Monday morning during the toolbox talks there were no graphical representation for demonstration”. ‘PPE were not adequately provided”*

*“Cases of poor visual safety communication is among small and medium construction companies in Nigeria’.*

It was also noted in the literature by the research conducted on occupational fatalities of Hispanic construction site workers from 1999-2000 that small and medium construction enterprises commonly use written documents in conducting weekly and tool box talks over pictures, symbols,

images etc. [2]. Perhaps, this finding could be more common in developing countries like Nigeria where cost of providing colourful posters, animations and cartoons are very high [13]. Nonetheless, visual safety signs facilitate easy communication of H&S information to people of different nationalities and cultural background, thereby resulting in improved workers' safety behaviour.

#### **4. Conclusions and recommendations**

Based on the research finding of this study it could be concluded that the use of visual safety communication at construction site by Nigerian construction companies both large, medium and small sized are very low. The study also revealed that provision and use of visual safety signs by construction companies will build better and strong H&S culture on construction sites leading to improved site workers safety behaviour. The results of interviews conducted with site managers, supervisors and workers indicated that visual safety signs make explanation of H&S information to site workers, particularly the illiterate ones simpler and easier. The use of visual safety signs at construction sites both during the H&S induction training of new workers and weekly tool box talks by site supervisors have found to be of great importance in improving workers' safety behaviour. The study therefore recommends that:

- Management of construction companies irrespective of size should demonstrate visible leadership and commitment towards workers' H&S by providing H&S signages at strategic points in their sites for easy visibility,
- Site managers/supervisors should incorporate visual safety signs into their induction training and weekly toolbox, talks and manuals,
- Management should see provision of visual safety signs on construction sites as mandatory duty they owe to their workers as a majority of them are people with little or no education.

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