The Construction Industry: Issues and Strategies on Safety Management

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ABSTRACT
Safety plays vital role in the construction sector. This project discuss about behavior based safety culture in a construction site. Safety Culture is the enduring value and priority placed on workers and public safety by everyone in every group at every level of an organization. The objective of this project is to review the case study of fatal and non-fatal accidents to examine the current culture in the workplace regards to the management of safety and health and create a safe working environment for the construction company. A questionnaire is prepared for worker, and circulated to the construction firms. Based on many criteria such as accidents, safety in emergency period, safety information, workplace hazards, and workplace risks, workplace health & safety, welfare and time regulations and finally about review the questionnaire is prepared. The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, or to pass information on to others. The results for the analysis are graphically represented in bar charts for various criteria classified in questionnaire.

Keywords--- Safety, Safety Culture, Health and Safety Hazards

I. INTRODUCTION
Safety and the prevention of accidents is a topic that has interested both managers and organizational theorists for some time. Accidents or violations of safety regulations are often reported in the news and can bring disastrous consequences to individuals, organizations and to society as a whole, from the loss of human life to a loss of public confidence in the services that organizations provide. Recent notable examples include the deaths of several mine workers in Utah due to the alleged use of unsafe mining practices (Borenstein, 2007), and the death of a subway worker in New York City who failed to follow regulations regarding the crossing of live tracks while performing maintenance (Neuman, 2007). Similarly, in the United States conflict in Iraq, poor adherence to safety regulations has contributed to a large number of vehicle accidents, many of which have claimed soldiers’ lives (Minami & Madnick, 2007). Less dramatic examples are even more common: for example, the Boston Globe reported that many high-end Boston restaurants consistently fail to observe safety regulations related to the preparation of food, despite the risk of infecting customers with food poisoning (Nelson and Hankinson, 2007). Given the prevalence of news reports like these, the tremendous losses that organizations risk in the event of an accident, and the emphasis often placed on safety in public statements, why is it that so many organizations do such a poor job of adhering to safety regulations and preventing accidents?

Safety and Organizational Theory
Organizational theorists have debated the topic of safety and accident prevention in organizations for some time. On the one hand, Perrow (1984) argues that in certain ‘high hazard’ industries accident prevention may be impossible, despite the presence of regulations designed to prevent them. Because in such “complex” organizations interactions between parts are numerous, slack is limited and processes are highly time dependent, individuals face an especially difficult time interpreting cues and responding adequately to potential dangers (Perrow, 1984). In response to this argument, others have argued instead that organizations, including those in high hazard industries, can be designed and can learn to undertake difficult tasks with reliability (Roberts, 1990; Weick, 1987). Roberts (1990) defines “high reliability organizations” and suggests several strategies that these organizations use to overcome the deficiencies cited by
Perrow, including culture, redundancy, continuous training, and organizational design. Weick (1987) further argues that reliability can be developed through a culture of “storytelling” that encourages the exchange of rich and varied information through face to face communication.

Social Psychology

Consistent with this second view, there is also a rich literature in social psychology that identifies characteristics of organizations that promote safety. Although the earliest psychological research on occupational safety emphasizes either human error or technical failure as the source of accidents, organizational factors are now widely recognized as having a high importance (Clarke, 2000). A substantial portion of this work, beginning with Zohar’s (1980) influential study, draws on the notion of “safety climate” to explain the behavior of individuals with regard to safety.

Zohar defines climate as “perceptions that employees share about their work environment... that serve as a frame of reference for guiding appropriate and adaptive task behaviors (pg. 96).” Climate is hypothesized to mediate the relationship between a number of organizational characteristics, including management commitment to safety, the openness of communication links, and the stability of the workforce, and safety behavior. Thus, beyond the propensity of individuals to engage in safe acts independently, this research introduces the notion of a “shared cognitions regarding safety” that can be established within organizations (pg. 101). Building on Zohar’s original work, a number of studies have developed measures for safety climate and verified the relationship between this construct and the safety behaviors of individuals within an organization. Examples include Griffin & Neal (2000), Brown & Holmes (1986) in manufacturing, Hofmann & Stetzer (1996) in a chemical processing plant, and Mearns et al (1998) in a study of oil and gas production. In addition, Zohar (2000) extends this concept by showing that it applies to groups, in addition to organizations as a whole, through the actions of supervisors.

Defining the organizational factors that predict safety climate has also received a lot of attention, with a focus especially on management commitment (Brown & Holmes, 1986; Dedobbeleer & Beland, 1991; Huang et al, 2004), managers safety practices (Naveh et al, 2005), leadership style (Zohar, 2002; Barling 2002), work pressure or the conflict between production and safety (Diaz & Cabrera, 1997; Clarke, 2006), overall job satisfaction (Barling & Kelloway, 2003), and the quality of communication or exchange relationships between managers and employees (Hoffman & Morgeson, 1999). In addition to the construct of safety climate, which emphasizes shared perceptions, a related concept of safety culture has also gained popularity in the literature. Drawing on established theories of organizational culture (Schein, 1985), this research looks beyond specific perceptions regarding safety to consider also more general “basic assumptions” that can shape safety behavior (Guldenmund, 2000). Along these lines, Pidgeon (1991) argues that a “good safety culture” will include not only positive norms and attitudes regarding safety, but also a basic reflexivity that allows organizations to discover and learn about potential new hazards (Pidgeon, 1991, cited in Clarke, 2000). Weick’s (1987) notion of “culture as a source of high reliability,” noted above, is very similar. Despite this broader theoretical foundation for culture, however, much safety research continues to operationalize ‘culture’ as “shared attitudes towards safety (Clarke, 2000, pg. 68),” a notion that is not inconsistent with safety climate. For example, Cheyne et al (2002) include a measure of “attitude” in their study of safety climate in two manufacturing firms, and conclude that “general attitudes to safety” do influence safety behavior and may also be seen to “facilitate climate change.”

II. A DYNAMIC MODEL OF SAFETY

At the heart of most organizations’ attempts to prevent accidents and build a culture of safety are rules and procedures that individuals and organizations are expected to follow. Adherence to rules and procedures is an important component of safety climate; for example, Zohar uses a questionnaire to measure safety climate that includes several questions explicitly related to following rules (Zohar, 2000, pg. 591). High hazard organizations are especially compliance focused, with the need to satisfy regulators and prevent accidents - leading to detailed analysis and structuring of work (Carroll, Rudolph & Hatakenaka, 2002).

As a result, a central construct in our model is ‘adherence to rules and procedures’, and this is assumed to have a positive effect on safety behavior, which in turn has a negative influence on the incident rate. It should be noted that we intentionally use the term “incident rate” rather than “accident rate”; this broader definition includes any abnormal event that could have the potential to lead to an accident, and that could also serve as the basis for either management action or learning (Cooke & Rohleder, 2006). The evidence is also clear that adherence to rules and procedures alone will not prevent incidents. Certainly, Weick’s notion of reliability is far broader; for example, reliability must also include the ability to handle the “unanticipated effects of emotional, social, and interpretive processes (1987, pg. 114),” the strength of communication norms, and the ability to learn and use learning to guide new routines (Carroll, Rudolph & Hatakenaka, 2002). Similarly, in the safety climate literature Katz-Navon, Naveh & Stern (2005) argue that the relationship between rules and procedures is curvi-linear, due to the costs of added complexity that come with too many rules.

For all of these reasons, we introduce a second causal driver of safety behavior, termed the “effectiveness
of rules and procedures.” Broadly, this variable represents the outcome of learning and the general effectiveness of organizational safety routines and procedures, assuming full “adherence.” Thus, even if adherence is 100% this formulation allows for the possibility that the rules themselves are flawed, by way of a low value for “effectiveness of rules and procedures.” Figure 1 shows the base causal structure of incidents that is used in the model.

![Diagram](image.png)

Figure 1: Basic causal structural for the incident rate

III. SCOPE AND OBJECTIVES

The main objective is to examine the current culture in the workplace regards to the management of safety and health and create a safe working environment for the construction company. This goal is realized through the following A questionnaire is prepared for worker. Questionnaire is circulated to the construction firms. Statistics analysis graphically represented in charts. Based on the statistics results suggestions are provided

IV. SUSTAINABLE CONSTRUCTION AND DEVELOPMENT

Ever since the Brundtland Report in 1987, the concept of sustainable development has continued to receive increasingly attention. The 1999 Agenda 21 for sustainable construction tends to drive home this issue in areas of construction activities and regulations associated therein as a response to the call of the intents of the Agenda. Since then, different views had been held of sustainable construction and development. According to Brundtland Report (1987), sustainable development is development which meets the needs of the present without compromising the ability of future generation to meet their own needs. Eisgruber (1993) sees sustainable development as a positive rate of change in the quality of life of people, based on a system that permits this positive rate of change to be maintained indefinitely. However, Brandon and Lombardi (2011) in their book “Evaluating sustainable development in the built environment” define sustainable development as process that aims to provide a physical, social and psychological environment in which the behaviour of human beings is harmoniously adjusted to address the integration with, and dependency on nature in order to improve, and not to impact adversely, on present or future generation. Sustainable construction therefore is the construction that tows the principles of sustainable development. Reffat (2004) argues that it is about much more than the fabric of the built environment. Yip (2009) views sustainable development as the responsibility of the members of the society and that a genuinely sustainable society is based upon and run by citizens who initiate development in sustainable ways and in

V. NEED FOR THE STUDY

Safety in construction is a very complex phenomenon, which is not amenable to explanations, much less to control. So this study is necessary for the following reasons: In construction, there are no licensing conditions or other regulations. Moreover, small capital is required to control. Entry into the industry is easy. Acquisition of work is by competitive tendering. Construction work is done under natural and hazardous conditions. The scope of the study was restricted to R.C.C. high rise buildings which fall under the residential and commercial category/type. The construction cost of the building is not considered as the decisive factor for this study.

VI. RESEARCH METHODOLOGY

A questionnaire survey research design approach was adopted in the study. The approach involves the use of structured questionnaires which was considered to be the most appropriate tool to reach the population of the study especially when data required for the study can be obtained by the instrument. Respondents were randomly selected from management personnel of contracting (contractors) and consulting construction organizations (consultants), and tertiary institutions, research institutes (training instructors) in areas of built environment professions across the South East of Nigeria. A total of 220 questionnaires were distributed to the potential respondents but only 172 questionnaires were completed, returned and found suitable for use in the analysis. This represents a response rate of 78.18%. Of these, 71, 43 and 78 were from the contractor, consultant and instructor groups respectively. Data were collected on issues relating to health and safety culture and its relationship with sustainable construction practices in the zone. These were measured on a five point Likert Scale where 1 = strongly disagreed, 2 = disagreed, 3 = not sure, 4 = agreed, and 5 = strongly agreed.

The methodology for achieving the above objectives is as follows,
VII. DISCUSSION AND CONCLUSIONS

Teo, Ling and Chong (2005) identified four factors affecting the safety climate in construction sites. Out of these, the personnel factor that is the attitude and commitments towards the safety climate were investigated in this study. Structured questionnaire surveys consisting of three sets of queries for worker’s safety perceptions, manager’s safety practices and prevailing safety culture were conducted among one hundred construction site workers and fifty site supervisors and managers. The questions were based on the similar studies conducted in other developing countries. Factor analyses were conducted for extracting smaller number of underlying dimensions for the three surveys shown in Tables 2, 3 and 4. The scree plots in Figure 1 would show that a few of the factors would account for most of the results which are common in factor analyses. The factors were given names in line with similar studies (Okolie & Okoye 2012; Tahua 2006). Hofstede’s (1991) cultural dimensions have been used for naming cultural factors. Pearson Correlation Coefficients have been presented in Table 5 for investigating the interrelation among extracted dimensions. Regression analyses were conducted in Table 6 to find if worker safety perceptions can be predicted through manager’s safety practices and cultural dimensions. The results have been presented in the following.

1. It has been noted that awareness and belief of the workers have no significant correlations with the cultural dimensions in the surveyed site. It shows that the workers’ safety awareness is not influenced by any ideas embedded in culture which is expected in a contemporary society. It also means that workers would abide by reasonable logic for taking safety measures but would not be tied to any preconceived notion.

2. Worker awareness is weakly related to manager’s strategic plan. It indicates that the workers pay some but not serious attention to the safety planning of the management. It is so expected because the workers would not have full information or training about the managers’ safety planning.

3. Physical work environment is negatively correlated to power distance. As the power distance that is the respect to authority increases the workers’ sensitivity to safety hazards decreases. The workers tend to think less about safety aspects and expect that the managers would advise about these. Similarly, work dynamism is negatively correlated with power distance. It shows that as the respect to authority increases the workers’ sensitivity in reacting to managers’ safety feedback decreases. The workers seem to expect that the managers would advise them continuously for the safety actions.

4. Work dynamism is positively correlated with collectivism. Work dynamism that is the safety training and feedback acceptance would increase with the cultural collectivism that is the tendency of group thinking. The training and feedback acceptance is also positively related to strategic safety plan. This is so expected because an increase in safety planning should also increase the receptivity of safety feedback.

5. Physical work environment that is workers’ sensitivity to safety awareness is positively correlated with operational practices of managers. This is an important finding. It indicates that the safety practices adopted at site by managers would have a trickledown effect in increasing the workers’ safety perceptions.

6. Strategic management is positively correlated with collectivism. It indicates that as the safety planning increases the collectivism that is group thinking about safety also increases. It signifies that the training involved with the safety planning has a positive impact on group thinking about safety perceptions.

The findings provided a road map for instituting an effective safety scheme in sites. Firstly, the workers have no preconceived cultural baggage about safety effectiveness. There would be no inbuilt cultural resistance from workers in imposing safety rules. Secondly, the training imparted on the managers would percolate through the workers’ safety perceptions. Since trainings to managers are logistically easier and comparatively economical focus of safety training on managers would
result the desired effect of higher safety perceptions to the workers.

REFERENCES


