



## **REVIEWING MEASURING HEALTH AND SAFETY MANAGEMENT PERFORMANCE IN THE CONSTRUCTION INDUSTRY**

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### **ABSTRACT**

**Purpose:** The accidents on construction sites not only cause fatalities but also affect project performance severely in terms of delayed completion, cost overruns, reduced quality and eventually low productivity. This paper aims to identify the various components that form the measurement of a Health and Safety management performance framework for the construction industry.

**Design/Methodology/ Approach:** This paper adopts an empirical research methodology based on literature review and secondary data gathered systematically from peer-reviewed journals. Content analysis was adopted in analysing the secondary data.

**Findings:** Eight components of Key Performance Indicators in measuring Health and Safety management performance were identified in the literature and they are implementation of safety regulations, leadership, safety planning, safety compliance, performance measurement, risk assessment, safety inspection, and Safety Culture.

**Research Limitation/Implication:** It focuses on the measurement of a Health and Safety management performance framework for the construction industry.

**Practical Implication:** Compliance with the existing health and safety laws must be monitored regularly and effectively, and breaches of them should be taken much more seriously than it is at present. Management members must champion the crusade of good health and safety practices and motivate the employees through their visible leadership by wearing personal protective equipment, whenever they are at the construction site.

**Social Implication:** Health and safety education programmes should be designed such that, they would consider individual cultural aspirations to try to shape them to suit the organizational safety culture.

**Originality/Value:** Identification of components that influence the measurement of the Health and Safety management performance framework were reviewed.

**Keywords:** Construction; health; measurement; performance; safety

### **INTRODUCTION**

Health and safety performance should be measured by line managers, who should be responsible for ensuring that all standards are met (Podgórski, 2015).

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Haas & Yorio (2016) asserted that, like other management processes, health and safety systems degrade with time as working methods, materials, equipment and personnel evolve. Health and safety audits are designed to determine if current control measures are still effective and to identify where more, or altered, measures are required (Harris, McCaffer, Baldwin, & Edum-Fotwe, 2021). Maintaining performance and ensuring current relevance and effectiveness are the goals of performance measurement.

A literature analysis on leading pro-active safety performance indicators (PPIs) established a foundation for the concept of developing a modest number of key performance indicators (KPIs) to measure operational health and safety management performance. Leaders in the field were asked to rank and prioritize key performance indicators based on the SMART acronym (Specific, Measurable, Achievable, Relevant, and Time-bound).

It is the purpose of this study to identify the main components of a health and safety management performance framework in the construction industry. The recommended set of KPIs should be adjusted to the specific requirements of a business, such as those in the construction industry.

## **RESEARCH METHODOLOGY**

The empirical research approach used in this work is based on secondary data gleaned from peer-reviewed publications and a survey of the literature. A content analysis approach was used to examine the secondary data set.

## **THEORIES UNDERPINNING THE STUDY**

Dellacherie, (2010) claimed that insufficient auditor knowledge and competence in health and safety management, as well as a lack of auditor competency verification and validation, have been linked to poor health and safety management performance.

According to the authors of this study, health and safety management auditors tend to focus more on the formal compliance of system procedures with relevant criteria rather than on the core of technical issues (human factors) and the relationships between employees and employers, which provide the foundation of actions for the benefit of health and safety management. Concerning health and safety audits, Blewett & O'Keefe (2011) argue for a fundamental rethinking of their role, since the primary focus should be on improving working conditions rather than inspecting the system.

An effective safety management system (SMS) framework can only be achieved by effective (1) implementation of the safety regulations, (2) leadership, (3) safety planning, (4) compliance with the regulations, (5) performance measurement and (6) risk assessment and (7) safety inspection.



To significantly increase the safety performance target on construction projects, the priorities given to elements impacting safety performance must be re-aligned and re-balanced because they are interdependent and cannot be isolated (Khalid, Sagoo, & Benachir, 2021).

### **The concept of Health and Safety management**

The use of quantifiable or qualitative performance indicators to compare current performance against a predetermined target level should be considered when creating an instrument to demonstrate the efficacy of a health and safety management system.

Health and safety management performance can be measured in three ways, according to Cambon, Guarnieri, & Groeneweg (2005): (1) a focus on outcomes, (2) a compliance-based strategy, and (3) a methodical strategy. First, performance is assessed using what are known as "lagging indications" (also known as "outcome or negative indicators").

In contrast, leading indicators (also known as pro-active, positive, or predictive indicators) are used in the two remaining techniques. Leading indicators (also known as PPIs) used to assess a system's compliance with a given specification belong to the category of structural performance indicators, whereas operational performance indicators assess the efficiency of a system's internal processes.

According to the relevant literature, leading performance indicators are frequently contrasted with lagging indicators, with several publications dedicated to their selection and functions. According to numerous academics, lagging safety indicators, which are based on data like accidents at work and occupational diseases, absence from work due to illness or injury, and the number of near-misses are not useful for evaluating health and safety management performance. Consequently, the use of lagging safety indicators for the evaluation of health and safety management performance has been challenged.

Timely response and the implementation of corrective measures are unattainable because these indicators are built on data that is both historical and time-delayed relative to the occurrence of factors impacting the values being monitored.

Many small businesses, especially those with fewer than 500 employees, don't experience many accidents, therefore there's little data to use in evaluating the values of the indicators. PPIs, on the other hand, allow for earlier intervention in the event of possible non-compliance in the management system (structural performance) or weak points, disturbances, or the absence of expected results in the operational performance area, even before negative consequences, such as accidents at work or harmful exposures of employees, occur.

For structural performance evaluation, the technique is not fundamentally different from the standard ways of auditing Health and Safety management systems. It's because structural performance indicators are qualitative in nature, and their application boils down to verifying



whether specific system components are appropriately built or analyzing the extent to which system procedures are implemented and followed in the company.

Operations performance indicators, on the other hand, provide information on how each process inside the management system is performing. As a result, such indicators can be used to track the progress of change in the management system and to make predictions.

The number of workstations where risk assessments have been performed or updated, the proportion of employees trained in health and safety management over a certain period, and the percentage of safety checks on machinery and installations in comparison to the plan are some examples of such indicators.

For example, a shop-floor-level view of a given system can be gained from such indicators' values, but structural performance measurement tends to just reveal what the system comprises (Cambon, et al., 2006). Consequently, for this investigation, it was thought that operational PPIs would be the most useful in determining how well Health and Safety management systems were operating before this study.

Operational PPIs attempt to offer early warning signals on any inconsistencies or flaws in the Health and Safety management system operating, considering this notion. It is better to look at the system as a whole rather than just reacting to faults or non-conformances that have already been discovered. This is because it is better to comprehend the system as a whole rather than just reacting to errors or non-conformances that have already been discovered.

Health and safety management lagging performance indicators are not exempt from discussion and research, but the recommended strategy does not rule them out. Although lagging performance indicators have been purposely left out of the study's scope to improve the clarity of the concepts and methodologies given in this research.

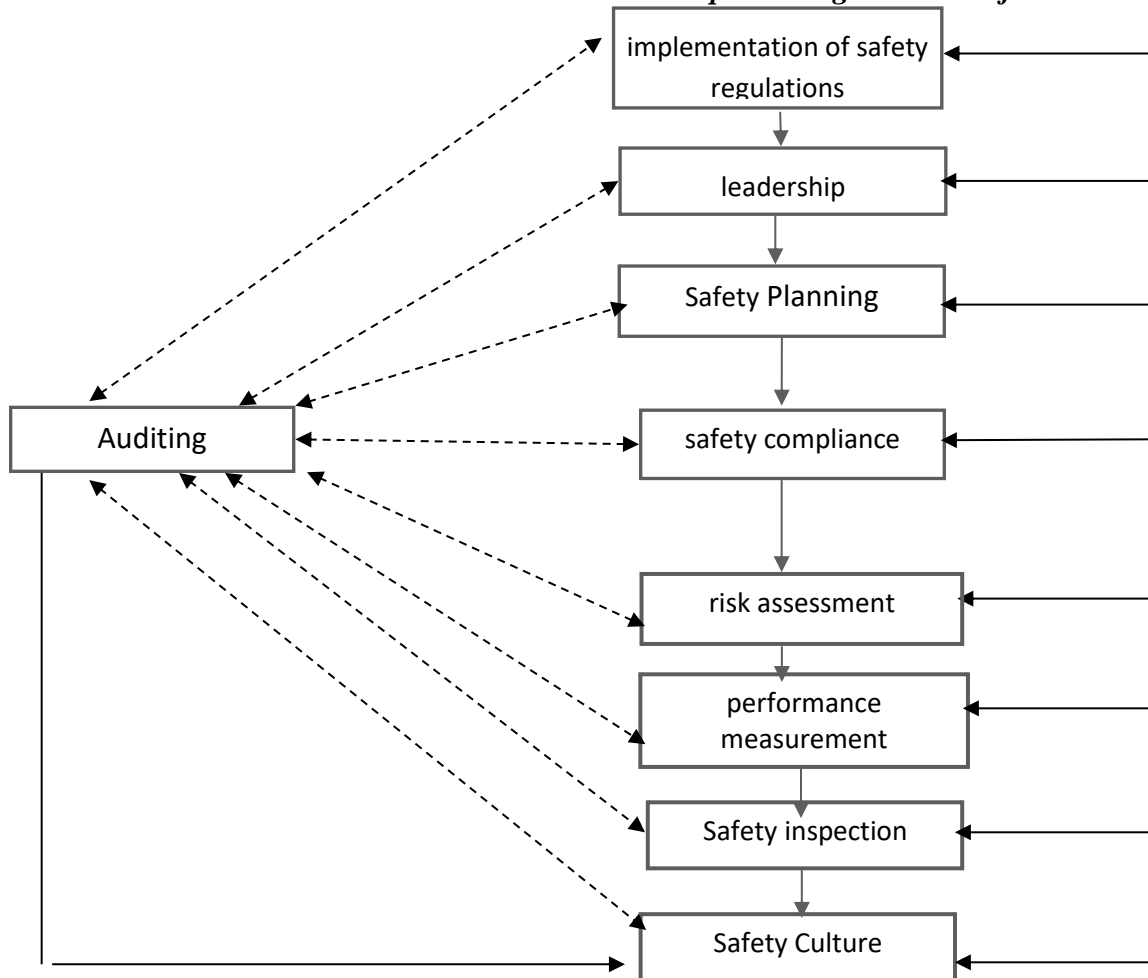


Figure 1: Safety management system (SMS) framework (Khalid, Sagoo, & Benachir, 2021).

**The need for key performance indicators (KPIs) for Health and Safety management systems**

Several studies have already dealt with the topic of performance indicators for monitoring the success of Health and Safety management system actions (e.g., Cambon et al., 2006; Podgórski, 2015).

Study after study reveals that the tools they suggest have many PPIs and multiple levels inside their underlying architecture. Since it requires a considerable investment in time, training and preparation of staff, and a great deal of data collection and processing effort to implement such systems, the practical application may prove problematic. In addition, managers and decision-makers face an ever-increasing amount of information and a wide range of information, which can have a detrimental impact on the quality of their decisions (Podgórski, 2015). As a result, the amount of data and information on which critical judgments must be based should be kept to a minimum.



In a similar vein, Mazri (2016) emphasized the importance of ensuring that applied KPIs are representative and feasible. The selection of some indicators that are representative of the system's real-world conditions is referred to as "feasibility," while the requirement to lower this number is referred to as "representativeness."

It's possible that multiple factors, such as data or cause and effect interactions, are interdependent when it comes to a big number of indicators (Rodríguez-Rodríguez, Alfaro-Saiz, & Carot, 2020). The interdependent indicators should be deleted, leaving only those that are optimal for evaluating performance in a certain area, to save time on the performance analysis.

### **Aggregation versus a selection of KPIs**

Aggregation and selection are two primary methods for reducing a large initial set of PPIs to a smaller set of KPIs, respectively. A comparison of the two methods has been provided below to help you decide which one is best.

#### *Aggregation of the indicators*

A higher-level performance indicator's value is derived through the process of "aggregation," which is a combination of several lower-level performance indicators. Integrated, aggregate, and composite indicators are common terms for these types of collective indicators.

The arithmetic mean, often known as linear, is the simplest and most generally used method for aggregating indicators in the management field. It is also important that all of the sub-indicators be measured in the same unit to use linear aggregation. While it is possible to aggregate data using the geometric aggregation method, the values of all sub-indicators must not go below zero (Di Nardo, Madonna, Murino, & Castagna, 2020).

Although the idea of using aggregate indicators to measure performance is attractive and easy, several academics have raised concerns about its limitations. Furthermore, an aggregate indication cannot be used unless all of the sub-indicators are mutually independent, which is not the case in the health and safety management system.

### **Safety Audit**

As stated by Gadd (2017), the usage of audits is a beneficial technique for determining whether or not the organization's policies and processes are being followed and how they can be improved. Their feedback helps the organization to keep, strengthen, and improve its capacity for risk management and risk reduction.

People who are qualified and have received required training should conduct audits on their own or as part of a team. The people conducting the audit should have no connection to the subject matter under scrutiny. The auditing procedure consists of gathering information regarding a company's health and safety management system and determining whether or not it is sufficient.



## **Monitoring**

Continuous improvement relies on measurement, according to Hughes & Ferrett (2020), a critical step in every management process. An ineffective health and safety management system will have no credible information to demonstrate to managers how successfully health and safety hazards are controlled if measurement is not done correctly.

To guarantee that health and safety risk control measures are in place, the types of the monitoring systems need to be considered. Active and reactive monitoring systems are the two most common types of monitoring.

### *Active Monitoring Systems*

Active monitoring gives critical information about performance in the event of an accident, illness, or catastrophe. Compliance with performance criteria and the accomplishment of particular goals are both parts of this process.

Measure success and encourage positive achievement by rewarding good work, not penalizing failure, is its major function (Kalteh, Mortazavi, Mohammadi, & Salesi, 2021). Those objectives and criteria that managers and their subordinates are responsible for monitoring and measuring should be delegated to them.

Active monitoring should serve as a foundation for making decisions about how to enhance operations while also serving as a means to recognize and reward employees who put their health and safety first. Such a reward motivates workers to keep improving their performance. (Son, Bosché, & Kim, 2015)

### *Reactive Monitoring Systems*

Accidents, illnesses, and other occurrences are kept under constant surveillance by reactive systems (Rowlinson, & Jia, 2015). Injuries and cases of illness must be documented and reported; Incidents (including all those that could cause harm, illness, or loss); Hazards; Weaknesses and omissions in performance requirements; and other types of loss events

## **CONCLUSION**

Compliance with health and safety rules is a major issue, which has to do with people's attitudes, behaviour as well as the perception of the situation. Because people's actions and inactions support health and safety practices if they see them as crucial to other benefits, this is why they should care so much about them.

Construction workers do not wear helmets and safety boots because they do not feel that they're safe enough to wear them. The cultural beliefs about the use of the helmet and the boot are to blame for the respondents' reluctance to use them. To extend the lifespan of the boot, some people use them as dressing shoes from home to work and swap them out for other slippers.



It is well recognized that health and safety management has developed several techniques for auditing, monitoring, and measuring performance to ensure that the health and safety culture is maintained.

Tender evaluation criteria for contractor competency should include considerations for health and safety because this will help to improve health and safety management from the start of a project.

To enhance present health and safety standards, all stakeholders must realize that they are the ones who can make a difference by recognizing their involvement in the situation, being more aware of their safety duties, and making an effort to implement the recommendations.

### **RECOMMENDATION**

The following recommendations have been made based on findings and conclusions drawn from the study to improve health and safety practices in the Ghanaian construction industry.

1. The stakeholders in the industry must develop positive attitudes, perceptions and behaviour toward health and safety practices in order to contribute effectively to the socio-economic development of the country.
2. Management members must champion the crusade of good health and safety practices and motivate the employees through their visible leadership by wearing personal protective equipment, whenever they are at the construction site.
3. Each employee should cultivate a culture of being his brother's keeper so that whenever any practices can result in injury or accident by a colleague, they quickly prompt them or the authorities for the necessary action to be taken to save the situation.
4. Compliance with the existing health and safety laws must be monitored regularly and effectively, and breaches of it should be taken much more seriously than it is at present. This means that there should be a body with well-defined responsibilities to be responsible for construction workers' health and safety than it is sparsely done now.
5. Management of the construction firms should organize regular meetings with the operatives and educate them on the importance of good safety practices, which will serve as a means of instilling a safety culture into them. Such health and safety education programmes should be designed such that, it would consider individual cultural aspirations to try to shape them to suit the organizational safety culture.
6. Proposed health and safety check system should be in place to improve safety practices in the Ghanaian construction industry. It is highly recommended that Supervisors should





regularly check their operatives concerning compliance with the health and safety regulations, and also that operatives should constantly check themselves. It is also recommended that Consultants should have their eyes on contractors and their representatives as far as health and safety regulation compliance is concerned. Finally, well-defined bodies that are charged with the responsibility concerning implementation, compliance and enforcement of health and safety regulations should ensure that all stakeholders in the Ghanaian construction industry play their roles very effectively to ensure a safe work environment for both management and operatives.

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