Influencing Sub-Contracted Operatives' Attitudes and Behaviours Towards Improved Health and Safety Culture in Construction

Abstract

Purpose: Health and safety is an important issue in workplaces, and despite safety procedures becoming more strict, serious accidents are still happening within the UK construction sector. This demonstrates poor performance in the implementation of safety procedures on construction sites. One of the key challenges is the unwillingness of the site workforce, especially the subcontracted operatives, to adhere to safety provisions on construction sites. As such, this study investigates the strategies for enhancing safe behaviour among subcontracted operatives in the UK construction industry.

Methodology: The study used exploratory sequential mixed method research, involving interviews and questionnaires as means of data collection, and thematic analysis, reliability analysis and exploratory factor analysis as methods of data analysis.

Findings: The study suggests that various carrot and stick measures are expected to be put in place as part of the strategies for enhancing safe behaviour among subcontracted operatives. These include adequate enforcement of safety practices by the management, operative engagement and motivation, commendation and rewards, site safety targets, leadership style and motivation.

Originality/Value: Application of the suggested measures could enhance safety on construction sites, as it provides practical measures and solutions for inculcating safety behaviours among the site operatives who are most likely to be the victims of site accidents.

Keywords: Construction safety, Site operatives, Construction site, Behavioural safety, Health and safety, Sub-contractors.

1.0. Introduction

Despite all the precautions that are taken in the UK, the Health and Safety Executive (HSE) reported that 111 people still died from all work-related accidents and around 1.6 million working people are suffering from work-related illnesses in 2019/2020 (HSE, 2020). Previously, the HSE reported an average of 143 deaths and 1.4 million work-related ill health per year between 2015/2016 -2017/2019 (HSE, 2020). Although the rate of fatal injury showed a marginal improvement, the rate of reported work-related ill health in 2019/20 is above the recent averages, getting slightly worse.

The standard of safety in the construction sector is still a major concern, as HSE (2020) statistics show that the construction sector has the highest number of fatalities than any other sector at 40 out of 111. In the same year 2019/2020, agriculture, manufacturing and transportation sector recorded 20, 15 and 11 fatalities respectively (HSE, 2020). Gray (1992) and Basahel (2021) pointed out that the construction industry is unsafe due to the nature of the activities that take place, treacherous work conditions and the general negative persona and machoism of the workforce, with site work by its nature being wet, dirty, and physically demanding.

Meanwhile, the most vulnerable workers are the operatives who work in predominantly dangerous positions (King, 1990). Most of these construction operatives are sub-contracted (Polat, 2016) and their operative attitudes toward H&S are often influenced by factors such as feelings, knowledge and experience, resources control, their integration in safety decision-making processes and their overall perception of the management disposition to H&S in construction projects (Basahel, 2021; Chigara and Smallwood, 2019). While management and organisational levels generally have safety instilled into their roles, sub-contracted operatives do not have as many incentives to behave safely (Hislop, 1999). Therefore, concentration on how to enhance the psychological attitudes of sub-contracted operatives should be the pinnacle of any safety improvement study, which will inevitably embellish a safer construction industry.

The Health and Safety at Work Act (HASAWA) was a huge turning point and caused a catalyst effect for other legal acts to evolve. A year later stemmed the formation of the Health and Safety Executives (Brett, 2002). As time has developed, and, regrettably, accidents still occurred, more actions to instil safe behaviour in subcontractors on construction site is needed. Despite additional regulations improving into the new millennium, there were still 40 deaths recorded from construction activities in 2019/2020 (HSE, 2020). Although, this represents a significant improvement, considering 106 construction sector deaths were recorded in 2000/2001 (Perry, 2003). However, there is a still need for increasing awareness of H&S ethics to provide a safe working environment and the possibility of keeping accidents on construction sites to a minimum.

Civitello (1998) understood construction stigmas and how change was needed to move safety past being another “buzzword”. He wanted to communicate the message across all sites, going forward into the new millennium. Unfortunately, more than 20 years later, the industry is still struggling to avoid this cliché. Clients and employers alike are under immense pressure to keep the workforce safe, but the responsibility is slowly pushing back onto individuals and not just the executive board at the top of the hierarchy. Although the board has a bigger influence over those ‘on the tools’ that are more likely to have or cause an accident, “workers must take care for their H&S and that of others who may be affected” (HSE, 2013). While most operatives recognise the benefits of H&S, unfortunately, there is still a lack of attention, conscientiousness, and commitment to effective safety training interventions leading to severe accidents (Harsini et al., 2020). The incentive for main contractors to comply with H&S standards comprises three components, which are economic, moral, and legal reasoning, but not all sub-contracted operatives are motivated to conform. Part of the issue is because the main contractor is still legally responsible for the H&S and actions of the subcontractors as stipulated in the Construction, Design and Management (CDM) Regulation 2015 even though the sub-contractor has to carry out their individual risk assessment (Chigara and Smallwood, 2019).

Some of the strategies that have failed in the past are mainly derived from management alone, and the operatives’ perspectives have not been incorporated into them. This could be the reason why they have not been successful because long-winded presentations, which safety managers are renowned for, do not appear to be the answer as Dalto (2015) points out they often become mundane and boring. Another solution is the Construction Skills Certification Scheme (CSCS) card system designed by the Construction Industry Training Board (CITB) in the UK to make operatives safer. CITB also rolled out, industry-wide, an additional one-day safety training course, but this has not proven a difference either. In fact, White (2013) discussed the HSE’s battle against safety card money-making schemes like CSCS. White (2013) argued that H&S procedures should be simplified and entail processes that add value in reducing ill health and accidents on sites, rather than generating information and paperwork for the sake of it.

The next stage is influencing changes in people to keep themselves from harm and safeguard the environment by engaging in safe practices on-site. Holt (2015) and Liy et al. (2016) proclaim that quality training and incorporation of creative incentives will encourage safe behaviour at work and thus leads to maintaining a safe establishment. The onus is being pressed further onto the sub-contractors to proactively adhere to safety objectives which would avert regular conflict with their main contractor. This, in turn, allows more time to be spent focusing on quality controls, cost reductions and programme-saving exercises rather than repeatedly disciplining safety infractions as Man Li and Poon (2013) explained.

An enormous effort has gone into convincing principal contractors and designers about their duties under H&S laws (Hughes and Ferrett, 2016). Conversely, there has not been an exploration into convincing sub-contractors of the value of being safety conscious and the reasons behind it. Even the clients through CDM

(2015) have had their liability increased as highlighted by Summerhayes (2016), but there is still a much-needed development for the rest of the supply chain, including sub-contracted operatives. Regardless of the legal infraction to an individual, the cost of a serious incident could send most companies bankrupt, which would impact the sub-contracted operatives directly. Although, it is an established procedure in tendering that sub-contractors submit a safe system of work with their tender bid but failure to follow fair and transparent procedures, which often happen in the public sector led to inappropriate risk assessment which causes serious H&S issues on-site (Patel et al., 2021). As such, the whole supply chain should be on board, not only for ethical reasoning but to protect their equity and enhance the health and safety performance of sub-contractors.

Consequently, this study aims to suggest strategies to change current safety behaviour among sub-contracted operatives. The study fulfils its aim through the following objectives:

1. To explore the measures for stimulating safety behaviour in construction generally
2. To develop strategies for influencing safety practices among sub-contracted operatives

In addition to the introductory comments present here in section 1.0. Section 2.0 provides theoretical insights into the study by presenting a review of extant literature. The section is then followed by a methodology chapter, which explains and justifies the approaches to data collection and analysis (section 3.0). In sections 4.0 and 5.0, a discussion of the findings and the implication of the findings were presented before the study culminates in aconclusion in section 6.0.

2.0 Literature Review

There is a concern with the link between the subcontractors' attitudes and their behaviours towards H&S within the Construction Industry across the UK. The attitude which is a psychological construct and state of well-being of the sub-contractor operatives determines their commitment toward safety behaviour such as compliance with safety rules and procedures (IOSH, 2016; Harsini et al., 2020). Meanwhile, there have been numerous studies from the main contractor's point of view but seldom reviews from the sub-contracted operative's perspective. Overall, sub-contractor operatives' intention to act safely can be unstable under a negative persona (Xu et al., 2021). This section reviews the extant literature on health and safety and the strategies to enhance subcontractors' behaviours and attitudes towards safety in the UK construction industry.

2.1 Health and Safety in the Construction Industry

H&S is considered one of the most important factors in working on construction sites. A site must deliver on time, to budget, to a high standard, and safely. Management and main contractors normally have robust

safety programs with safety policies because they can see the benefits of maintaining a safe site but not all the sub-contracted operatives do (Dale et al., 2021). HSE (2020) reported that a significant number of accidents are reportedly caused by the inappropriate behaviour of sub-contracted operatives, so if their behaviour is improved, then the management efforts towards safe practices on site will be complemented. This will ensure avoiding costly accidents on construction projects because fatal accidents and ill health have financial, legal, social, and reputational implications (Oswald et al., 2020).

The time, cost and quality triangle reveal that construction businesses with lower accident records are more profitable (Asanka and Ranasinghe, 2015). This should be additional motivation to the sub-contractors to focus on precautionary measures to avoid accidents rather than trying to reduce the impact after the incidents. The measures should look beyond the physical motivations of a subcontractor but instead into specific behavioural interventions that aim at improving sub-contracted operative behaviour like training, interactive inductions, communication with the workforce, marketing campaigns with graphic posters, realistic goal setting and subcontractor involvement (Mohajeri et al., 2022). The most effective way to implement change would be to use a combination of guidance and consequences giving operatives more responsibility and showing them the repercussion of an accident by making it personal. The construction site safety comprehensive guide (CITBGE700) provides authoritative information on current construction health, safety and environment legislation, guidance and good practice which has positively influenced the behaviour of operators on construction sites.

Operatives should see the benefit of preventing accidents for themselves and their colleagues, but often the statistics alone are not enough to make a difference (Guo et al., 2018). However, most people going to work to earn a living react more to seeing the cost of an accident. HSE (2020) suggests that the economic cost of workplace accidents in the UK across all industries in 2018/19 was £ 16.2bn, and about £1.2 bn (8%) of that are from the construction industry.

The main causes of all these accidents can be strongly linked back to an unsafe act, unsafe working conditions or tools, lack of proper work plan and failure of management commitment to proper supervision (Liy et al., 2016; Oswald et al., 2020). Although, considerable efforts have been made in recent years through compulsory approval of work plans on construction sites. This has then ensured that works are been properly planned, supervised, and carried out under proper working conditions and tools. However, there are still significantly higher fatal accidents in the construction sector in the UK, about 36% of the total fatalities across all sectors in 2019/2020 (HSE, 2020).

One of the reasons that accidents rates have not been significantly declining further since around 2012/2013, according to HSE, could be due to lack of change amongst the operatives and new included statistics of occupational health which are not emphasised before 2012/2103 in the UK (HSE, 2018). Although the 111 fatalities recorded in 2019/2020 (HSE, 2020) shows a considerable improvement in comparison to the 1980s

when fatalities averaged 500 people a year. Still, the recent flatline over the 6 years (2012-2018) makes it hard to distinguish whether advancements are being made to prevent accidents in the UK construction industry. However, the obvious thing is that poor safety conditions and performance are consequences of individual behaviour as well as organisational and group factors (Basahel, 2021). Meanwhile, lots of work has been done at the organisation and group level to improve health and safety which birthed the Construction Regulations 2015 (Huth, 2016). The CDM regulations placed specific duties on clients, designers, and contractors, to plan their approach to health and safety. However, there is a clear gap in understanding what motivates the safety behaviour of the operators who are the ones to execute the plan on-site. Therefore, this paper aims to understand the strategies that will enhance operative safety behaviours on UK construction sites.

2.2. Safety Behaviour and Attitude in Construction

The Institution of Occupational Safety and Health (IOSH, 2015) iterated that safety culture consists of shared values and beliefs to produce H&S behavioural standards. Walker (2007) discusses experiments that have previously questioned individual worker motivations and rational behaviour. He derives that humans are complex beings with multiple motives and are driven by sentiments and feelings because they are members of social groups exhibiting self-interests. He discourages threatening punishment techniques and recommends alternative reward tactics to positively impact the attitude and behaviour of workers on certain issues such as health and safety. In addition, Basahel (2021) examines the causal effects of leadership behaviour and attitudes on safety compliance and participation on construction sites. The work briefly considers the behavioural aspect of the workforce but also examines the influence of organisational behaviour and management systems. The study concludes that operatives have a direct influence on conformity, but indirectly the management can affect compliance levels. As such, Basahel (2021) submitted that management should encourage regular assessment of effective leadership and attitudes and develop motivation and knowledge among employees to improve organisations' safety-related behaviour performance.

According to Fuller et al. (2022), one of the top ten factors causing accidents on construction sites, is decision-making and increasing scrutiny in the decision-making process of sub-contractor in the UK construction sector, which in turn, influences their health and safety performance. An earlier study by IOSH (2015) considered a zero-blame culture by the management to influence sub-contracted operative decisions which may change their attitude and behaviour. The motivation is that H&S failures should be reported without fear of retribution and should even be rewarded or encouraged. However, for this to happen, IOSH admits a clear line must be drawn “between acceptable and unacceptable, reckless behaviour” (IOSH, 2015 pp. 10). If blame must be attributed, it should not undermine the reporting culture. Another solution suggested was safety champions or a substitution test to help develop consistency and fight complacency.

The only downside to this report is the case studies were generally carried out on utility plants rather than live construction sites.

Musonda and Smallwood (2008) report on H&S awareness and implementation in Botswana is relevant because it investigates the behavioural side but is too enthralled on stakeholder participation and socioeconomic environment which is less focused on the sub-contractors. Similarly, operatives' behaviour was the focus of a Qatari study by Ajayi et al. (2021), which established that poor behavioural safety was to be blamed for a large number of accidents and fatalities on the Qatari mega projects. Additionally, the regional barrier is that the Botswana Construction Industry and that of Qatar are entirely different to the UK as a result of cultural environment and legislative provisions. However, the key submission from Musonda and Smallwood (2008) and Ajayi et al. (2021) work is that considerations for the individual culture, behaviour and organisational context are essential in ensuring positive outcomes for safe practice on construction sites. Their findings are strongly supported by Sherratt (2013), Choi and Lee (2017) and Mohajeri et al. (2022) making the same recommendation towards achieving 'Zero Target' safety programmes in the UK construction industry.

Previously, Langford (2000) used a model to frame the responses from 126 directly employed workers from 10 construction companies in the UK, which is a good number to form a solid hypothesis. Their analysis found 12 technical factors linking attitudes to safety management. In addition, there are other numerous literature resources from all over the globe, which cover the matter of safety and even cultural behaviours and attitudes to an extent. However, the inconsistency in the attitude of different operators makes it difficult to establish consistent safety management practises (Namian et al., 2022). Also, foreign differences in culture can impact safety behaviour as Rowlinson (2004) elucidates traditional construction methods could affect the use of safety gears, and some local cultures could frustrate the site management team. For instance, as Hong Kong and China's safety standards vary massively in comparison to the UK, Rowlinson (2004) goes on to explain how many construction safety managers have attempted to westernise the rest of the world and failed. Langford (2000) and more recently Fuller et al., (2022) agreed that the differences in individualism and perceptions as "societal cultural differences" can make a significant impact on safety in construction projects. In the UK specifically, numerous construction projects frequently operate with multi-national workforces, utilizing migrant workers to provide both skilled and unskilled labour (Oswald et al., 2018). While language and communication issue has been the identified obvious barrier against H&S on UK construction site, there is no evidence of a focused study examining the cultural connotations of these multi-national workforces on the performance of H&S in the UK construction industry. Therefore, a study such as the one presents here that specifically focuses on the UK sub-contracted operatives is essential to understand the strategies that will enhance safety attitudes and behaviour among the sub-contracted operatives.

3.0. Research Method

A sequential exploratory mixed method was used for this study to discover the operatives' views on site safety. The approach combines the advantages of qualitative and quantitative methods for robust and comprehensive analysis, allowing the result of the exploratory research to be used for further explanatory study (Creswell, 2014). The initial qualitative data collection was carried out by on-site observation and personal interviewing of random subcontractors to discover the potential strategies that can make a difference to their decision to behave safely or unsafely on the construction site. The data collected from the initial exploratory study in the first phase of the study provided input for the subsequent stage of questionnaire administration. This method is known as exploratory sequential, where quantitative research follows the qualitative phase (Creswell, 2014).

3.1. Qualitative data collection and analysis

Interview through convenient and snowball sampling was chosen as a means of collecting qualitative data as it is deemed the most suitable approach to collecting data in such a chaotic situation with many interruptions as construction (Merriam, 1998; Elliot and Hamid, 2017). The convenient and snowball samplings help to establish variables for measuring constructs of the questionnaire that was later administered to a larger audience which allows for the generalisation of the research findings. The study started by interviewing five (5) randomly selected respondents who are operatives with trade-focused backgrounds on UK construction sites. The samples were selected based on the willingness of the participants (convenient sampling), the only constraints that were imposed at the selection stage were that supervisors or managers were not interviewed. Thereafter, additional seven (7) respondents were interviewed through the recommendation of the previous respondents who helped in encouraging the new participants (snowball sampling). The interview was stopped after the 12^{th} interview base on the concept of saturation (Saunders et al., 2018) as no new information or themes are observed in the responses. In total, twelve (12) respondents, including two (2) painters, three (3) electricians, three (3) plumbers and one (1) of each scaffolder, tiler, bricklayer, and plant operator were interviewed for a period ranging between 20 minutes and 30 minutes on UK construction sites.

The interview was unstructured, with open questions based around strategies for entrenching safety behaviours among sub-contracted operatives. This unstructured interview allowed the respondents to provide answers in their own words, which then provide the basis for the topics included in the questionnaire at the later stage. The interviews were recorded with the respondent's permission and were later transcribed to allow data analysis. Thematic analysis was selected as the means of qualitative data analysis, as it enables the emergence of factors that subsequently served as input for the questionnaire. As recommended by Braun and Clarke (2006), the analysis follows a systematic procedure, starting from data familiarisation, through initial coding, theme searching, and themes review to theme definition and naming. Working through the interviews twice with a more systematic approach, allows coding to take place as part of the thematic analysis (Braun et al., 2017). The co-occurrence of repeated ideas, particular phrases and configuration of

words can be analysed through the keyword-in-context method (Guest et al., 2012). Table 1 shows the details of the emerging themes and how they were processed to identify relevant factors that were subsequently included in the questionnaire.

Table 1: *Samples of how the factors emerged from thematic analysis.*

In addition to the findings from the interview, relevant factors from extant literature were also identified and included to develop a holistic research instrument for quantitative data collection (See Table 2).

Table 2: *Strategies for entrenching safety behaviours among sub-contracted operatives as established from qualitative studies.*

3.2. Quantitative data collection

In line with the procedure for exploratory sequential mixed method research by Creswell (2014), the findings from the exploratory literature review and qualitative interviews were used to develop a questionnaire that was subsequently administered to a large audience. The questionnaire was specifically chosen in this case, as it allows the use of the same pre-designed research instrument for a large audience for generalisation of the research findings. A written questionnaire was administered through a self-administered and face-to-face approach instead of online as most of the targeted audience are less digitally literate. Questionnaires were dropped for the operatives in their respective randomly selected construction sites across the UK regions and were later picked up to avoid influencing the respondents. Data were then manually entered into a database for further analysis. Regardless of targeting the respondents in their work environment, mingling with the right work base allowed for a more accurate data sample. From the questionnaire, there was a mix of trade persons from plasterers, bricklayers, tilers, roofers, dryliners, plumbers, labourers, electricians to plant operators, avoiding a generalisation of the same role with 13 variations in total. Overall, 115 respondents, as shown in Table 3, completed the questionnaire.

Table 3: *Overview of the Respondents*

3.3. Quantitative Data Analysis

The quantitative data collected through the questionnaire were analysed using reliability and exploratory factor analysis as discussed below.

3.3.1 Reliability Analysis

This study carried out reliability analysis and exploratory factor analysis using the SPSS IBM Statistics version 24. The reliability analysis was carried out to evaluate the credibility of the data and to delete the factors that will not contribute to the overall reliability of the data, as recommended by Nunnally and Bernstein (2017). In this study, the estimated Cronbach Alpha coefficient is 0.933 and this is deemed an excellent Cronbach Alpha coefficient because Bryman and Cramer (2006) specified that the Cronbach Alpha coefficient should be 0.8 or above as a rule of thumb. However, Field (2013) suggests a further analysis called ‘‘Cronbach Alpha if item deleted’’ should be estimated to determine the factors that are not contributing to the overall reliability of the data. In the analysis presented here, three items (i.e., MS10, MS13 and MS30 with “Cronbach Alpha if item deleted” as 0.934) were removed from the strategies and theremaining data were then used for factor analysis. Table 4 shows the Cronbach Alpha coefficients along with the results of factor analyses.

Table 4: *Findings from the reliability analysis and factor analysis for the mitigating strategies.*

3.3.2. Exploratory Factor Analysis

As demonstrated in the study of Dauda and Ajayi (2022), exploratory factor analysis involves three processes, which are an evaluation of the data suitability, factor extraction and factor rotation The suitability of the data was evaluated through Kaiser-Meyer-Olkin (KMO) which requires sampling adequacy above 0.5, and Bartlett’s test of sphericity with a value below 0.05 (Tabachnick and Fidell, 2001; Field, 2013). Using SPSS version 24, the data collected for measuring strategies to enhance positive safety behaviours were confirmed to be suitable for factor analysis as the factor yielded values of 0.846 and 2.3E-121 for the KMO and Bartlett’s test of sphericity, respectively. The high values of Bartlett’s test coefficient closer to 1.0 than 0.50 (0.846) generally indicate that the factor analysis is useful with the data collected in this study (IBM, 2016).

Once the suitability of the data was confirmed, the data were extracted using Principal Component Analysis (PCA), which requires an Eigen Value of 1 (Field, 2013). The final stage, factor rotation, was conducted through the varimax method, which restructures the factors to enable groupings. When the factors have been extracted, it is then possible to the extent to which the variables are loaded into the factor, as the factor rotation put maximum loading onto the axis (Field, 2013). As recommended by Tabachnick and Fidell (2001), the factor group that has only one variable and those variables that loaded significantly into more than one component group were removed from the data. Factors were then labelled based on the commonalities between the variables that make up the different components. Table 4 shows the result of the

factor analysis, showing the factor loading, eigenvalue and percentage of variance for each group. The extracted total variance is 63.015% which isabove the 50% threshold that Merenda (1997) suggests as the rule of thumb. In summary, the analysis produced five different categories for strategies for entrenching safety behaviours among sub-contracted operatives as labelled below:

i. Management Enforcement
ii. Operative Engagement and Motivation
iii. Commendations and Rewards
iv. Site Safety Targets
v. Leadership Style and Motivation

4.0 Discussion

The findings of the exploratory factor analysis produced five groups of strategies to improve the subcontracted operative's behaviour and are discussed as follows:

4.1 Management Enforcement

Management plays a huge part in H&S on construction sites as they must enforce the law and ensure that a site runs efficiently from start to finish. The finding from this study corroborated this with the management enforcement group being the highest factor with a variance of 24.213% and an eigenvalue of 10.411. The first two measures under this category mentioned management inductions as an effective way of entrenching positive safety behaviour. Main contractors providing more thorough inductions and making inductions more interactive and engaging would show positive management enforcement and perhaps reduce accidents occurring on construction sites. This finding is strongly supported by earlier evidence revealing that approximately 50% of Construction Industry deaths affected people that have been on the site for less than 30 days most of whom are people with a low level of safety awareness (Hislop, 1999; Yılmaz, 2021). Hence, the more management can do upfront, the more beneficial it will be to create a safer industry for operatives.

Legislation fits under 'Management Enforcement' because item M25 'legislative enforcement' needs to be instilled into everyone, and management influences to do so. Although this was barely considered during the interview, it has one of the highest loading factors from the questionnaire. Pointing out the limitations of legal and contractual influences has so far been less successful with subcontractors. The HASAWA does not overlook the importance that individuals play in safety, as nearly all accidents are attributable to human failure. Often, reference is made to the main contractor or sub-contractor, but legal duties fall on all employees and those most likely to cause or have an accident are the workers or operatives (Chigara and Smallwood, 2019). The legal duties quoted from HASAWA section 7 explain that employees must take care of themselves and others who may be affected by their acts or omissions and must cooperate with their employer. The study also highlights that making safety personal to the workforce will prevent it from

becoming a tiresome paperwork exercise and more of a second-nature approach as some of the other component factors conclude.

4.2 Operative Engagement and Motivation

Operatives need to feel involved to partake in proper safety practices which could be the reason why this group achieved a total variance of 18.249% and an eigenvalue of 7.847 as it will drive strategies going forward within H&S on construction sites. The phrase "ask do not tell" is echoed in numerous motivational literature, Oliver-Taylor (1993) dissects that consultation and communication with the workforce allow all employees to voice their opinions and therefore are more likely to follow guidelines if they are involved in the process rather than following strict orders. In agreement, the findings of Mohajeri et al. (2022) highlighted that operative participation and involvement in safety decision-making can be crucial to maintaining the status quo on site, boosting morale, and increasing interest in the ongoing safety policy or changes. In this study, MS36 and MS37 are very similar because safety topic videos and safety information posters use similar tactics to grab an operative's attention. Using photographic signage is useful because a picture can tell 1000 words, looking at photos allows operatives to take in more information than much writing and can provide a more exciting way of learning. Both items had higher factor loadings to strengthen this point. Also, the human brain can become idle and cause complacency in the workplace. Nobody can think of safety all day long, but that is why messages need to be to the point and have bold statements so that workers can keep them in mind throughout the day and throughout an entire project to avoid complacency (Schwatka and Roasecrance, 2016).

The consensus of communication is that words only account for 7% of what is received during communication, 38% is the tone used and 55% is body language. Therefore, it is essential to ensure that safety messages are spread and well communicated via proper engagement throughout the site to have success among the sub-contractor operatives. Hence why visual aids, watching realistic videos and meaningful safety talks can help bring home that information. Miller's theory that peoples are not able to retain more than seven pieces of information in their memory minus or plus two items add to this argument that more engagement should be done to clarify safety information and make it easier to remember (Cowan, 2015). Gray (1992) also states that the average construction worker is only productive for 40% of the time due to flitting between activities. When operatives are put under pressure or feel in a rush, their attitudes change and this is often when accidents occur (Xu et al., 2021). This could be why the interview and questionnaire both identified inspirational speakers, who have previously been injured, urging operatives to behave safely as one of the best motivations for improving safety behaviour.

4.3 Commendations and Rewards

Commendations and Rewards achieved 8.221% with an eigenvalue of 3.525, although the interview seemed to overture rewards as the best motivation over punishments. An easier tactic might be to introduce a safety

employee of the month as an ego boost because this is generally better than nagging where an operative will shut off (Leathley, 2016). Offering time in lieu of an extra day holiday for coming up with good safety incentives or consistent, safe behaviour was considered a commendable reward and was reiterated by Ahmed and Faheem (2021) that incentive and penalty (I/P) programs are commonly used to increase employees' safety good behaviour.

4.4 Site Safety Targets

This component had an eigenvalue of 2.812 and a total variance percentage of 6.540%, but a lot of the additional hand-written safety perception comments on the questionnaire did include having 'Site Safety Targets' in some instances on construction sites as healthy competition. Although some participants involved in the interview had witnessed the results or benefits from site safety targets, others could not foresee it being a success. Many of the interviewees could see goal setting as a positive strategy to improve the safety culture. The safety target approach has become an increasingly important approach to safety management among large contractors in the UK (Sherrat, 2015). This study confirms that such zero-target safety management is an effective way of enhancing safety behaviour among operatives as it becomes entrenched in all activities and employees' goals, thereby eventually avoiding reminders from supervisors or management.

4.5 Leadership Style and Motivation

Following on from the managerial components, having strong leadership to follow is vital for the operative's motivation. This was identified as a significant factor from the thematic analysis, further supporting the need for good leadership as inspiration. Although this component ranked the lowest with an eigenvalue of 2.491 and a percentage of 5.792%, it continues to be a competent strategy for operatives to improve site safety. The interviews concurrently mentioned management and leadership styles as a method of improving attitudes towards safety behaviour, reinforcing that good leadership is one of the best motivators. Biggs (1992) and, more recently, Mohajeri et al. (2022) emphasise the importance of a manager's style being approachable and allowing two-way communication because failure to communicate at a site level has shown a continuation of many errors on building sites. Another factor relating to communication is jargon within construction, which causes a lot of misconceptions. Within the safety, the sub-contracted operatives must understand instructions; otherwise, this could lead to harmful consequences.

5.0. Implications of findings on construction sites safety

While the literature is rife with strategies for enhancing safety on construction sites with main focus on principal contractors, no previous study has specifically focussed on the sub-contracted operatives and how measures could be put in place to motivate safety behaviour among sub-contracting operatives even though, few studies have recommended that. For instance, Getuli et al. (2021) suggested that construction safety training could be more effective through the involvement of the end-users, most of whom are sub-

contractors. Similarly, Zhang et al. (2021) highlighted that critical influencing factors in construction safety are subcontractor-related factors. Hence, the main contribution of this study is responding to this gap of lack of safety research from the sub-contracted operatives' perspective.

Investigating the health and safety improvement strategies from the perspectives of sub-contracted operatives in an industry that relies heavily on sub-contracting gives clear insights into positive measures for addressing health and safety concerns in the construction industry. For instance, actively engaging the sub-contracting operatives in the design and development of safety training resources as deduced from the finding of this study would ensure the effectiveness of the training resources. This finding is corroborated by the earlier submission of Li et al. (2022) which identified preventive action in the form of safety training for relevant workers and subcontractors as the most important safety enhancement strategy. Directly focussing on sub-contracted operatives, as uniquely carried out in this study, uncovered some key factors for motivating behavioural safety among the operatives. One of such findings, as highlighted by the study, is the level of motivation and safety awareness that could be reinforced by the training facilitated by those with past experience of accidents on construction sites. In such situation, safety training resources that are tailored towards sub-contracted operatives, use of appropriate jargon and terminologies that align with educational standards of the operatives, and case study scenarios of people with experience of site accidents would be sufficient in motivating safety behaviour among the subcontracted operatives.

Adopting the findings of this study by encouraging the involvement of subcontracted operatives in safety training, site safety policy formulation and its subsequent implementation will make significant improvements to safety issues on construction sites. This finding implies that subcontractor operatives are more willing to uphold safety guidelines that are born out of proper coordination and collaboration among the stakeholders including the subcontractors. This is in line with the position of Xu et al. (2021) and Mohajeri et al. (2022) which suggested that complications and safety failures happen on construction sites due to a lack of proper safety engagements between the involved participants.

Thus, implementing the measures recommended in this study would ensure that safety trainings are appropriately tailored, messages are adequately passed to those that are mainly at risk of accidents and operatives are positively motivated. This has the tendency of reducing training costs, mitigating accidents and subsequently reducing the cost of construction, and also informing the main contractor on the performance of H&S on construction sites.

6.0. Conclusion

The study explored measures for engendering safety behaviour in construction and suggested strategies for influencing safety behavioural practices among subcontracted operatives. The study employed exploratory sequential mixed method research, involving interviews and exploratory literature review at the first stage,

which served as input for the questionnaire at the later stage of the study. The finding of this study is about strategies for influencing safety behavioural practices among subcontracted operatives. This study recommended that all clients and designers should take their responsibility seriously to reduce the number of unsafe tasks, main contractors to provide a safer environment and sub-contractors to ensure all the necessary control measures and equipment are in place to carry out construction activities safely. Also, management enforcement is hugely recommended as different management styles, good or bad, can vastly determine whether operatives behave safely because they might be deterred from listening to management if their persona is unapproachable. Good listening skills from the senior team might persuade a worker to take on board safety instructions. It is essential that management suit the needs of all different learning styles to make operatives think more positively about safety, especially if they were an optimist or theorist.

Moreover, main contractors should provide more thorough, interactive, and engaging inductions to try to influence the sub-contracted operatives at an earlier stage on site. Ensuring disciplinary procedures, re-inductions and warning systems are also recommended to provide useful measures throughout a project to keep on top of operatives. Enforcing PPE, legislation, contracts, and stricter consequences are all strategies management should adopt to improve operative's behaviour. Finally, a high standard of welfare can also give an excellent first impression and set operatives off to the best start on a construction site. This also links in with 'Operative Engagement and Motivation' which stems mainly from management. 'Commendations and Rewards' as well as site safety targets are brilliant measures for improving sub-contracted operatives' attitudes and behaviour towards an improved health and safety culture.

This study has been able to explore the measures for entrenching positive behaviour among the operatives in the UK construction site. The respondents were mainly operatives with a trade-focused background in the UK. As such, the findings and recommendations were specifically based on the perspective of the operatives on the UK construction site but not from managers' and site supervisors' points of view. However, it is important to point out that the main limitation of this study is the relatively small sample size and the constraints to the UK construction sites. Albeit this limitation, this study still contributes to significant issues of safety on construction sites by increasing awareness on the need to focus safety policies and programmes on sub-contracted operatives who are majorly affected by accidents.

The practical implication of this study is the identification of the sub-contracted operatives' safety concerns that require attention to improve their safety behaviour towards implementation of safety strategies on construction sites which will ultimately improve safety performance in the construction sector. Future studies could explore the difference in the perception of operatives in different countries and/or occupations. Also, the influence of years of experience, age, and location of respondents, among other factors on safety behaviour on construction sites could be investigated in future. A further study could also explicitly investigate whether witnessing an incident or not could implicate a worker's mindset towards safety behaviour.

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