

SUBCONTRACTING VERSUS HEALTH AND SAFETY: AN INVERSE RELATIONSHIP

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ABSTRACT

The construction industry has an unenviable reputation of being one of the worst industries in the UK in respect of health and safety (H&S) performance. Among other factors, research points to subcontractors' safety behaviour (hence subcontracting) as one of the factors influencing safety performance on construction sites. With 80% of construction work in the UK being subcontracted, clearly it has become imperative to investigate this inverse H&S-subcontracting relationship. This situation is exacerbated by the increasing complexity of construction technologies which inevitably implies that specialisation will grow and consequently there would be even more subcontracting. Through a critique of the literature on H&S and procurement in the UK, it is shown that this state of affairs is attributable inter alia to the lack of adequate resources among small contractors to enable them invest in H&S, the differences in safety cultures between main and subcontractors and the less familiarity of subcontracted personnel with the inherent safety issues of all site activities due to their specialisations. Indeed it is argued further that this is compounded by the limited time spent on site, a lack of interest in the overall project and the impact of their activities on other operations on site. Beyond creating awareness of the inverse H&S-subcontracting relationship and the key drivers of this phenomenon, critical research questions arising from this phenomenon are examined, setting the premise for research work to expound on the reasons for this relationship and also identify best practice measures to be adopted to mitigate the negative impact of subcontracting.

Keywords: Construction industry, Health and safety, Subcontracting

INTRODUCTION

Research literature indicates that subcontracting grew significantly over the 1970s and 1980s and continues to be practised in several countries (ILO, 2001). It is evident that, in spite of the numerous economic benefits, subcontracting has adverse industrial relations effects on wages, working conditions, bargaining and unions (ILO, 2001; Chiang, 2009). In highlighting the diminution of employment conditions arising from this practice, researchers have identified a parallel link to occupational health and safety and the construction industry has not been left unscathed (Ankrah, 2007; Yung, 2009). As a prelude to a wider study into the inverse subcontracting-H&S relationship, this paper begins by surveying the literature on subcontracting within and outside of the UK construction industry, the aim being to explore its evolution, the rationale for its practice and its association with adverse occupational health and safety outcomes. It then goes further to highlight from the literature the causes of the inverse subcontracting-H&S relationship within the UK construction industry and through a critique points out the scope that still exists for further research by putting forth the emerging research question.

SUBCONTRACTING

Over the last three decades labour markets of several countries including the United Kingdom have undergone significant changes. Notably, the traditional model of long term employment relation between an employer and employee has been supplemented by a variety of forms such as self employment, casual/temporary, part-time and contract/subcontract employment (ILO, 2001; Mayhew and Quinlan, 2001; LFS, 2004). The growth in 'non-standard' or 'atypical' forms of work such as subcontracting was driven by a mixture of economic priorities, technological and regulatory shifts, and increased product market uncertainty which led to management requirements for a more flexible and inexpensive workforce (Hunter *et al.*, 1993). This finding was also corroborated by Bielenski *et al.*(1993; 1999) and more recently by Chiang (2009).

In examining the rationales for the use of subcontracting, literature indicates that the main influencing factors are:

- the ability to fine-tune labour flexibility;
- the ability to rapidly meet changing product market demands;
- the ability to externalise less rewarding and dangerous activities;
- the ability to bargain down labour cost;
- to encourage quicker completion of tasks;
- the transference of financial risk; and
- the avoidance of workers' compensation cost.

(Mayhew and Quinlan, 1997; ILO, 2001; Wong and So, 2002; Chiang, 2009)

Subcontracting is a secondary arrangement to contracting out which generally is the practice where an organisation (public or private) enters into a formal agreement with another for the provision of a particular good or service, with the contractor then being considered as the supplier in the procurement process (Ascher, 1997). Subcontracting, then is defined as the process of subletting the performance of tasks which often affects the employment status of the workers doing the tasks as well as the manner in which those tasks are performed, the structure of control at the workplace and the patterns of regulation (Mayhew and Quinlan, 1997).

Subcontracting in the construction industry

Subcontracting has for some time been an integral part of the construction industry (Stinchcombe, 1959; Eccles, 1981; Lai, 2000). In construction, it usually is the subletting of the execution of a section(s) of an entire project(s) to a contractor(s) who in most cases is a specialist in those works to be executed. This generally takes the form of domestic subcontracting where a principal/main contractor appoints a subcontractor(s), or nominated subcontracting where the project client/clients' representative(s) appoints a subcontractor(s). In construction project procurement, subcontracting is also seen in management contracting (Kwakye, 1997; Harris *et al.*, 2006).

Construction employment trends in Great Britain indicate a progressive increase in self-employment from 1998 to 2007(ONS, 2008). This growth gives indication of the prevalence of subcontracting in the industry. This situation is marked to increase as construction technologies become more specialized and the organizations which carry out those technologies also specialize into subcontracting organizations. Self employment and subcontracting contribute to the proliferation of small production/employment units (Mayhew and Quinlan, 1997; ONS, 2008). Micro and small construction companies constitute over 90% of construction companies in Great Britain, and majority of them obtain work as subcontractors, therefore forming an important group in the supply chain in the UK construction sector (Kheni *et al.*, 2005; ONS, 2008;). Earlier research also indicates that 80% of construction work undertaken by UK main contractors is subcontracted ((Saad and Jones, 1998) cited in Thorpe *et al.*(2003) and Kheni *et al.* (2005)).

OCCUPATIONAL HEALTH AND SAFETY OUTCOMES OF SUBCONTRACTING

In spite of the economic benefits derived from subcontracting, the practice has negative consequences including weakening of bargaining power, non-payment of workers, under-development of human resource skills and loss of job security (ILO, 2001; Chiang, 2009).

Evidently, subcontracting also has adverse effects on occupational health and safety (ILO, 2001; Chiang, 2009). Subcontracting is typically a payment-by-results system where payment is based

on the amount of work completed rather than the period of time spent on the worksite. Thus returns are enhanced by the completion of tasks in the shortest possible time, leading to subcontractors pushing themselves hard, working excessive hours, or cutting corners in regard to safety where it impedes production (Mayhew *et al.*, 1997). Pressures to complete a job quickly may be increased where intense competition amongst subcontractors drives down the price of services performed. Work intensification results as the subcontractor's profit must be derived from working harder and longer resulting in occupational health and safety (OHS) outcomes such as fatigue, stress, burn-out and failure or delays in seeking treatment for work-related injuries (Mayhew *et al.*, 1997).

Retrospective evidence from several industries in several countries indicated that there was a high incidence of injuries and fatalities among subcontractors and self-employed. Research by Harrison *et al.* (1989; 1993) in Australia linked subcontracting and self-employment to high incidence of fatalities amongst workers in the transport, communication and agriculture industries. Subsequent reports by Toscon and Windau (1994) and USBL (1995), both in the USA; Blank *et al.* (1995), in Sweden; and Mayhew and Quinlan (1997), in Australia similarly associated subcontracting with adverse OHS outcomes in industries such as mining, agriculture and transportation.

In the UK a similar situation exists. For instance, health and safety statistics indicate that the rate of fatal injury to self-employed in the agriculture industry from 1992/93 to 2007/08 (HSE, 2007a; 2009) has been approximately twice that of employee. This suggests that the self-employed (a category embracing subcontractors) have a fatality rate of approximately twice that of employees. Evidently, this inverse subcontracting-H&S relationship pervades the construction industry world wide (ILO, 2001).

Occupational health and safety outcomes of subcontracting in the construction industry

As previously mentioned, subcontracting results in the proliferation of small production/employing units and it is reported by McVitties *et al.* (1997) of the Canadian construction industry that SMEs have a higher frequency of injury than large firms. This is consistent with the findings of Fabiano *et al.* (2004), in the Italian construction industry and Jannadi and Al-Sudairi (1998), in the Saudi Arabian construction industry. In other countries such as Spain, Malaysia, Philippines, Poland, Hong Kong and China, subcontracting has similarly been associated with adverse H&S outcomes in the construction industry (Byrne and van der Meer, 2001; ILO, 2001; Wong and So, 2002; Yung, 2009).

Statistics in the UK construction industry indicate a similar trend. Fatal accidents by employer size and site size from 2000/01 to 2007/08 indicate that there are more fatalities among micro to small contractors and small sites-which are also dominated by micro and small contractors (HSE, 2009). Although small construction companies employ 36% of the construction workforce, they account for 67% of fatalities amongst workers on construction sites (HSE, 2007b). They are therefore responsible for a disproportionately large number of fatal injuries. Although the Health and Safety Executive (HSE) does not collect data on major injuries according to the size of company or project, there is usually a close correlation between the number of fatal and major injury accidents (HSE, 2007b). Research by Mayhew and Quinlan (1997), HSL (1999), Loughborough University and UMIST (2003) and Ankrah (2007) also acknowledge the adverse H&S outcomes due to subcontracting in the UK construction industry.

Causes of the inverse subcontracting-H&S relationship in the UK construction industry

In order to redress the inverse subcontracting-H&S relationship, it is critical to understand the causative factors. Literature indicates the following enumerated factors:

1. The proliferation of smaller production/employing units which lack the resources to invest in occupational health and safety hence resulting in adverse H&S outcomes on projects where they are engaged (Mayhew and Quinlan, 1997; HSL, 1999). This is in agreement with the findings of McVitties *et al.* (1997), Champoux *et al.* (2003) and Fabiano *et al.* (2004) in their studies of firm size and occupational health and safety outcomes in other construction industries. Research by Chiang (2009) in the Hong Kong construction industry also highlighted this factor.

2. Fierce competition for contracts among subcontractors resulting in unreasonable cost minimisation in order to win contracts at the expense of due consideration to H&S (Mayhew and Quinlan, 1997; HSL, 1999; Loughborough University and UMIST, 2003). Fabiano *et al* (2004) in their study also mentioned that small firms often make the saving on safety measures one factor of competition and survival on the market.
3. Ambiguity about responsibilities and unclear work relationships arising from complex subcontracting relationships on site (Mayhew and Quinlan, 1997; HSL, 1999; Loughborough University and UMIST, 2003).
4. Inadequate communication and teamwork and the intense competition among contractors arising from fragmentation of the workforce on site (Mayhew and Quinlan, 1997; HSL, 1999; Loughborough University and UMIST, 2003).
5. Inadequate regulatory control: for instance the underperformance of the CDM 1994 and the inadequate H&S inspectors to enforce legislative requirements (Mayhew and Quinlan, 1997; HSE, 2007b; Mathiason, 2008).
6. Less familiarity of subcontract personnel with the inherent safety issues of all site activities ((Maurno, 1992) cited in (HSL, 1999), (Hill and Ainsworth, 2001)). This situation is exacerbated by the transient nature of construction projects and even more so by the brief periods spent by subcontractors on site within those transient project durations.
7. Differences in safety cultures between main contractors and subcontractors (Loughborough University and UMIST, 2003; Ankrah, 2007; Ankrah *et al.*, 2007), with Loughborough University and UMIST (2003) highlighting that subcontractors have a poor safety culture thus accounting for poor safety performance on projects where they are engaged.

The factors listed above and the sources from which they have been extracted clearly demonstrate that the inverse subcontracting-H&S relationship has been the subject of much research. More importantly, they provide an opportunity to critically evaluate the effectiveness of measures that have been developed to minimise adverse H&S outcomes within the industry in response to these underlying causative factors.

Mitigating the adverse H&S outcomes of subcontracting

From the influence network for health and safety in construction illustrated over (Figure 1) , Bomel Limited (2007) points out that the regulatory influence is the most significant environmental level influence on construction health and safety compared to the other environmental level influences such as the market (which is the driver of subcontracting).

Generally since the beginning of the 20th century, regulations have been put in place to control activities and address specific problems on construction sites (HSL, 1999). The construction regulations of 1961 and 1966 which were made under the Factories Acts of 1937, 1948 and 1961 primarily provided H&S control of activities (HSL, 1999). They however did not provide guidance on health and safety management which according to the influence network is the most significant strategy level influence (Bomel Limited, 2007). In 1974, the Health and Safety at Work etc Act (HSWA) 1974 was introduced to provide a comprehensive and integrated single piece of legislation dealing with the health and safety of people at work and the protection of the public from work activities (Hughes and Ferrett, 2008). The radical difference between the HSWA 1974 and all preceding Health and safety legislation is the emphasis the Act places on individuals and their duties rather than on the place of work (Joyce, 2001). The HSWA 1974 represents a key progression in the enhancement of H&S in that rather than the prescriptive approach which was adopted by the preceding legislations, the Act is based on principles designed to bring about a greater awareness of the problems associated with H&S issues (Joyce, 2001).The Act also established the Health and Safety Commission and Health and Safety Executive, which recently under the Legislative Reform (Health and Safety Executive) Order 2008, have been merged into a unitary body called the Health and Safety Executive. Regulatory proposals from the HSE (formerly

the HSC) to the Secretary of State are enacted into law by the UK Parliament for implementation. Through this legal arrangement several construction H&S regulations among others have emerged from the HSWA 1974 all with the aim of mitigating adverse H&S outcomes on construction projects. One such key construction H&S regulation made under the HSWA 1974 which touched on the H&S issues of subcontracting as part of a broad health and safety framework, with a focus on management is the Construction (Design and Management) Regulations 1994 (CDM 1994). Prior to the CDM 1994, the H&S regulation that spearheaded H&S management at work places (including construction sites) was The Management of Health and Safety at Work Regulations 1992 which was subsequently amended under The Management of Health and Safety at Work (Amendment) Regulations 1994 and finally revoked by The Management of Health and Safety at Work Regulations 1999.

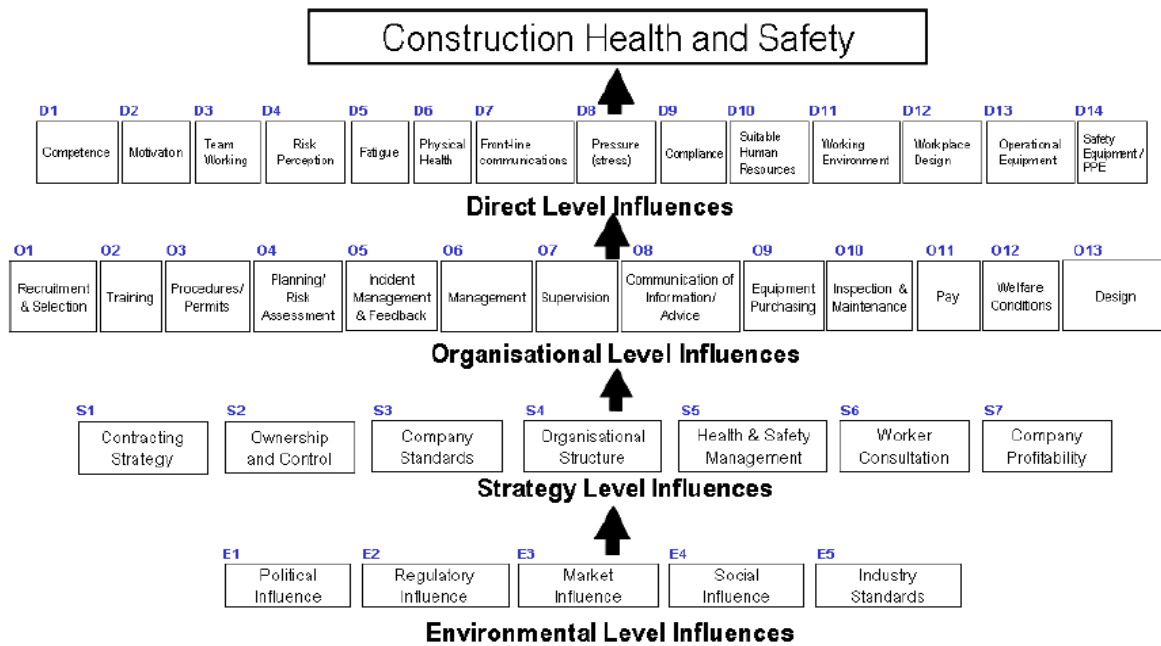


Figure 1: Influence network for health and safety in construction (Bomel Limited, 2007).

The CDM 1994 which came into force against the background of high accident incidence rates during the 1980's (the period around which subcontracting also grew significantly) provided a framework for H&S management in construction (HSE, 1996). The CDM 1994, with an emphasis on team work created specific roles for clients, planning supervisors, designers, principal contractors, and contractors with the common aim of achieving adequate levels of health and safety during construction (HSE, 1996). The CDM 1994 however underperformed in terms of competence assessment, fostering team work, and clarification of duties (Wright, 2003; HSE, 2006; Bomel Limited, 2007) all of which are issues pertinent to subcontracting and have H&S implications. Under the Construction (Design and Management) (Amendment) Regulations 2000, the CDM 1994 was amended. The amendment was however not in response to its underperformance. In 2007, the underperformance of the CDM 1994 finally yielded the Construction (Design and Management) Regulations 2007 (CDM 2007) which seeks to address the shortfalls of the CDM 1994 so as to achieve improved levels of H&S in Construction.

Also, as a complement to the regulatory framework, the HSL (1999) in a study of the impact of procurement and contracting on health and safety in the construction industry and other industries, developed a generic model for the H&S management of contractors. The model emphasizes the linkage of four main points as necessary in the management function:

- the health and safety policies of both the host employer and contractor in combination with the work method statement should form the basis for the development of a site specific framework for management;

- training needs should be clearly identified and acted on, particularly where there is unfamiliarity with the site or process and also where a contractor is being used for the first time in the host company;
- the need for empowerment of individuals, giving authority, for example, to stop unsafe acts and enforce disciplinary procedures; and
- the establishment of communication links between the host company and the contracting organisation, including the provision of a forum where contract employees may raise health and safety concerns.

It is important to note that the CDM 2007 with its aim of integrating H&S into the management of construction projects comprehensively embodies the above requirements of the generic model (HSC, 2007). The CDM 2007 thus represents a critical mitigating force against the adverse H&S outcomes of subcontracting.

IMPLICATIONS FOR FURTHER RESEARCH

It is startling to note that in spite of all the mitigating efforts, the reports of this inverse relationship have persisted over the years (see for instance HSL (1999), HSE (2009), Ankrah *et al.* (2007) and Donaghy (2009)). Anecdotal evidence, recent statistics and research reports continue to link subcontracting to adverse H&S outcomes. Although recent statistics show improvement in construction H&S, safety experts have also been quick to point out that the improvement could be linked to the recession which has resulted in a downturn in construction activity (Hoyle, 2009). Notwithstanding this disputable improvement, it is significant to note that the 2008/09 provisional rate and number of fatal injuries for the construction industry self-employed (a category embracing subcontractors and also inundated by micro and small size construction firms) exceeds that of 2007/08, the period when the CDM 2007 came into force (HSE, 2009). The recent Donaghy report (Donaghy, 2009) on the underlying causes of construction fatal accidents has also mentioned the adverse health and safety implications of subcontracting. Although these do not necessarily point to a failure of the CDM 2007 (as a critical mitigating force), justifiably, questions regarding its practical on-site effectiveness in redressing this inverse relationship could be raised.

A fundamental research question arising from the above context is the question of the extent to which the CDM 2007 effectively addresses this inverse relationship on projects, particularly projects where complex subcontracting relationships exist and projects where the supply chain is constituted in the main by micro to SMEs. To answer this query it is crucial to identify and map out the regulatory provisions of the CDM 2007 that potentially mitigate the causative factors of the inverse relationship and also lay out an outline for evaluating the effectiveness of the identified mitigating regulatory provisions.

Mitigating regulatory provisions and features of the CDM 2007

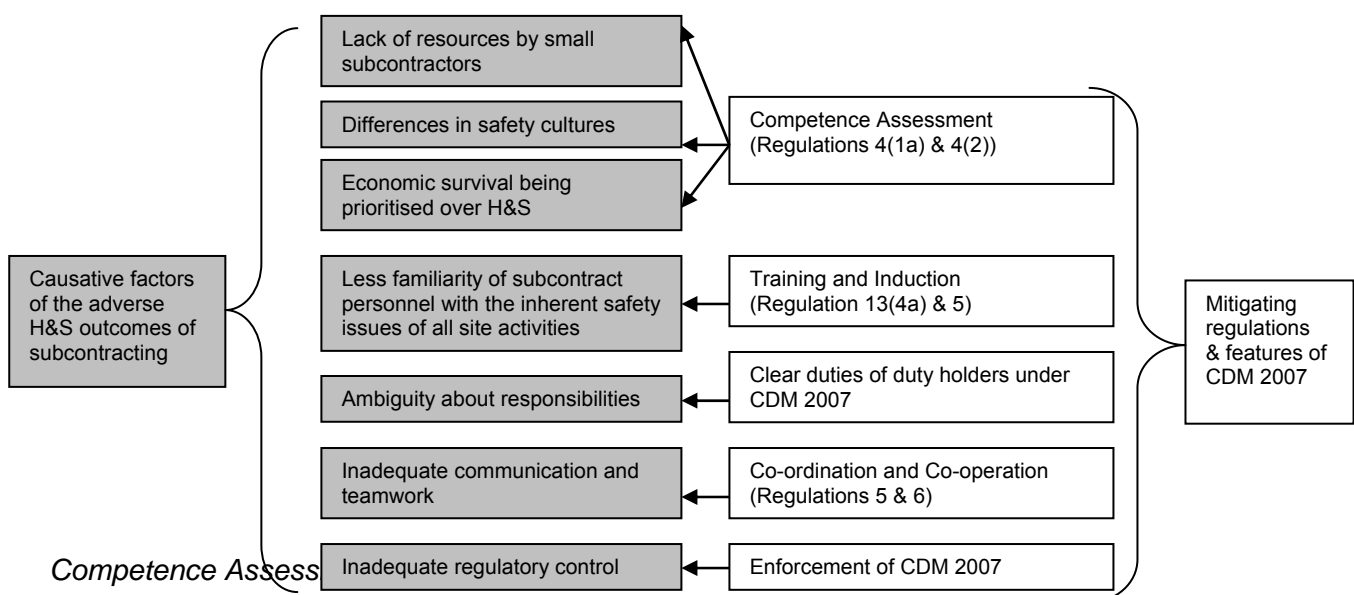


Figure 2. Mitigating regulations and features of the CDM 2007.

A critical review of the CDM 2007 reveals the following potentially mitigating regulatory provisions illustrated above in figure 2.

Formal competence assessment has long been a feature of the construction industry (The Consultancy Company, 1997). Under the CDM 2007 Regulations 4(1a) & 4(2), the requirement for competence assessment continues to be enforced. From the previously mentioned influence network (Figure 1), competence and risk perception are ranked as the most significant direct level influences on construction H&S (Bomel Limited, 2007). The workshop discussions leading to the development of the influence network revealed that competence varies widely across the industry. Size of organization and type of profession were considered to be the key differentiators, with large companies and more technical professions showing higher levels of competence on average (Bomel Limited, 2007). This implies that averagely micro and small construction companies (majority of which obtain work as subcontractors) comparatively show lower levels of competence. This is worsened by the often unregulated subcontracting chain by the principal contractor or client (jzcarpenter limited, 2006). With competence being a direct level influence on construction H&S it is only consequential that construction companies employing up to 15 workers (i.e. micro to small construction companies) account for 67% of all fatalities amongst workers on construction sites (HSE, 2007). Regulating the subcontracting chain through effective competence assessment could mitigate the causative factors of lack of resources by small subcontractors, difference in safety cultures and economic survival being priorities over H&S. Through effective competence assessment of the subcontracting chain, a form of a H&S minimum acceptable threshold requirement, relative to the needs of projects and proportionate to the risks, size and complexity of the construction works will be set. This will thus create a leveled playing field during tendering by subcontractors, where no subcontractor will have an undue competitive advantage in terms of under pricing for H&S. Through adequate pricing for H&S, subcontractors could be better placed to invest in H&S. Investing into and implementing H&S management will eventually yield improvement in their H&S cultures as H&S culture embodies H&S management (HSL, 2002; Hughes and Ferrett, 2008).

Training and Induction

CDM 2007 Regulations 13(4a) & 5 places the legal requirement on contractors to conduct the necessary training and induction for their workers. This provision in the CDM 2007 once effectively done should mitigate the causative factor of the less or unfamiliarity of subcontract personnel with the inherent H&S issues of site activities.

Co-ordination and Co-operation

Regulations 5 & 6 of the CDM 2007 impose on all duty holders including contractors the requirement for co-ordination and co-operation. Effective co-ordination and co-operation among contractors implies the need for effective communication and these together engender and enhance teamwork (Dickinson and McIntyre, 1997; Baiden, 2006). The co-ordination and co-operation requirement could therefore mitigate the problem of inadequate communication and teamwork arising from fragmentation of the workforce due to subcontracting.

Clear Duties of Contractors

The CDM 2007 delineates clear duties for contractors and other duty holders for the management of H&S throughout construction projects, from the design concept onwards (HSC, 2007). The adequacy of this feature of the CDM 2007 should potentially mitigate the causative factor of unclear H&S responsibilities arising from complex on-site subcontracting relationships.

Enforcement of CDM 2007

Following several discussions and research which revealed the underperformance of the CDM 1994, the CDM 2007 was introduced to rectify those shortfalls in order to achieve improved H&S in construction. The improvements/changes reflected in the CDM 2007 buttressed by its effective enforcement on all project sites (small and large) by the HSE inspectors and the local authorities should contribute to mitigating the adverse H&S outcomes of subcontracting.

Having outlined the potentially mitigating regulations of the CDM 2007 for each of the causative factors it is also essential to lay out an outline for evaluating the effectiveness of their on-site implementation.

Outline for evaluation of effectiveness

Figure 3 illustrates a proposed simplified outline for evaluating the effectiveness of the mitigating regulations.

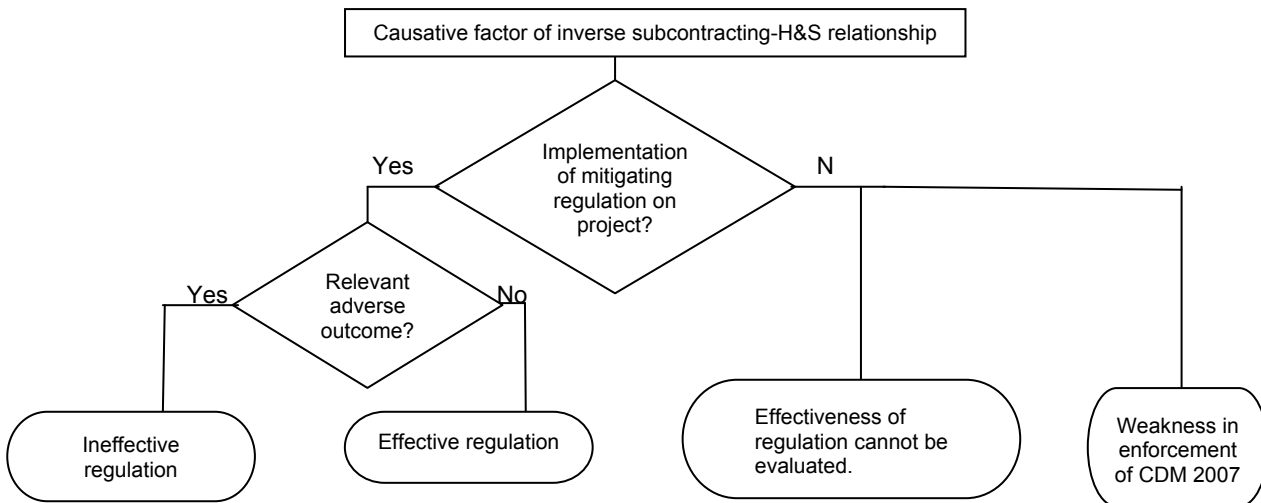


Figure 3: Outline for evaluation of effectiveness.

For each causative factor, the effectiveness of the corresponding mitigating regulation will be assessed as illustrated in the outline. The CDM 2007 Approved Code of Practice (ACOP), titled, “Managing Health and Safety in Construction”, provides practical guidelines for complying with the duties set out in the regulations. The guidelines also represent minimum requirements to be adhered to in complying with the regulations. Any adopted alternative implementation method should therefore be equally effective or better than that recommended by the ACOP as stated in the Health and Safety at Work etc Act 1974. The ACOP thus constitutes a good basis for determining whether or not a mitigating regulation is implemented or complied with. The evaluation of the on-site effectiveness of a mitigating regulation in addressing a corresponding causative factor will be based on the H&S outcomes as the ultimate aim of the CDM 2007 Regulations like other H&S regulations is to achieve improved H&S outcomes (HSC, 2007). The occurrence of a relevant adverse outcome(s) in spite of the implementation of a mitigating regulation would imply that the regulation is not adequately effective in addressing the corresponding causative factor. Conversely, the non-occurrence of a relevant adverse outcome following the implementation of a mitigating regulation would imply an effective mitigating regulation.

A mitigating regulation would be considered not implemented if the ACOP for that regulation is not complied with and also if no equivalent or better alternative method is implemented in compliance with the regulation. In such a case, the effectiveness of the mitigating regulation can not be evaluated. Such a case would also constitute a non-compliance with the CDM 2007 and that could be linked to a weakness in the enforcement of the CDM 2007. However, the non-occurrence of an adverse outcome following the non-compliance with a mitigating regulation would imply that whatever alternative method that may have been implemented could possibly be an effectively adequate mitigating measure. Such a measure would then be the subject of further investigation to establish its suitability and effectiveness as a mitigating measure. Where there is a relevant adverse H&S occurrence(s) in the case of non-compliance with a mitigating regulation, then whatever alternative method that may have been implemented would be considered ineffective. Having laid out the potentially mitigating provisions of the CDM 2007 and the evaluation outline the challenge then is to apply the outline on projects to assess the effective of the mitigating regulations of CDM 2007. Clearly, such a investigation carried out through an applied industrial

research, as suggested by Gilbertson (2008) in his assessment of the CDM 2007, will be very helpful in that, even as the CDM 2007 is still in its early periods of implementation, the research will before long aid in identifying possible limitations of the CDM 2007 in addressing the H&S problems associated with subcontracting.

CONCLUSION

The consensus of research findings and statistics, identified through the review of subcontracting and H&S indicates that subcontracting results in adverse H&S outcomes: a situation which also prevails in the UK construction industry with severe ramifications. Beyond highlighting the existence of this relationship in the UK construction industry, the causes/reasons for the relationship have been put forth by researchers and efforts also made to address it. However, unfortunately, the tide has generally remained unturned as this relationship continues to linger in the UK construction industry. It will blatantly be a great disservice to the UK construction industry if it is assumed that the CDM 2007 is definitely up to its task and therefore ignore the urgency and need to conduct industrial research to assess the extent to which the CDM 2007 provisions address this relationship practically on projects. The key research question emerging from the critique is a clear indication of the knowledge gap which forms substantial justification for further industrial research to address this inverse relationship. Such research will help significantly in the quest to improve H&S performance in the UK construction industry and even beyond.

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