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Title: Mitigating the health and safety influence of subcontracting in construction: The approach of main contractors

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Abstract

Subcontracting is noted for its adverse health and safety (H&S) influence in construction. Using interviews with five of the top 20 UK contractors and one medium-sized contractor, this study explored how main contractors manage the H&S influence of subcontracting with a focus on their in-house measures. Some in-house measures found are: restricting the layers of subcontractors on projects; working with a regular chain of subcontractors; implementing a H&S reward scheme for subcontractors; and insisting on non-working subcontractor foremen who have direct responsibility for the safety of workers in their trade. These measures appear to be influenced by clients, industry peer groups, and the moral justification for occupational H&S, and they offer inter-organisational learning opportunities for contractors in devising measures to mitigate the H&S influence of subcontracting. These findings should also allay concerns that removing some of the legislative hurdles in connection with on-going red tape debate will result in poorer H&S.

Keywords: Health and safety; Construction; Procurement; Subcontracting

1. Introduction

Undoubtedly subcontracting has economic benefits for which reason it is practised in construction (Dainty *et al.*, 2001). Despite its benefits, subcontracting also has an adverse influence on health and safety (H&S) which continues to persist in the construction industry (Mayhew and Quinlan, 1997; Loosemore and Andonakis, 2007; Yung, 2009). Given the increasing specialisation in the construction industry and consequent growth of subcontracting this adverse influence could worsen and this creates the need for measures which have far reaching mitigation effect on this adverse phenomenon. In the United Kingdom (UK), the most influential driver of H&S improvement is the legal framework

(Bomel Limited, 2007) within which specific regulations, particularly the Construction (Design and Management) Regulations 2007 (CDM 2007), offer some mitigation against the factors responsible for the H&S influence of subcontracting (Manu *et al.*, 2009). Arguably, given the persistence of subcontracting related H&S challenges, in striving for H&S excellence as captured by headlines such as "*One death is too many*" (Donaghy, 2009), there is a responsibility on contractors to go beyond compliance with regulatory requirements to proactively develop and implement measures that will prevent adverse H&S outcomes that derive from subcontracting. Aside the regulatory requirements, there is however a dearth of insight as to the in-house measures/practices implemented by main contractors (i.e. the employers of subcontractors) to address this phenomenon. Seeking to shed light on this grey area, with the wider aim of providing inter-organisational learning opportunities for contractors, this research embarked on an inquiry into *how* main contractors manage the adverse H&S influence of subcontracting with a particular focus on their own in-house H&S practices. In the sections that follow, a review of literature on the H&S influence of subcontracting in construction is presented. The review highlights the growth in subcontracting together with its drivers, reports from several industries and countries which emphasise that subcontracting adversely affects H&S, and the factors responsible for the H&S influence of subcontracting. The review points to the persistence of the H&S influence of subcontracting in the UK construction industry despite the existence of regulations which have some potential to mitigate this phenomenon. With this background, a research question is posed initiating empirical investigation into the in-house practices/measures of main contractors implemented to address the H&S influence of subcontracting with the intention of gaining some perspective as to other mechanisms which could complement the mitigation offered by the regulations. The research methodology adopted for the investigation, in this case a qualitative inquiry, together with arguments in support of the methodology is

presented. The findings emerging from the study are subsequently presented and discussed followed by possible implications of the findings and concluding remarks.

2. Subcontracting and occupational H&S

In several countries including the UK, over the last three decades, there has been a significant growth in non-traditional modes of employment such as self employment, casual/temporary, part-time and contract/subcontract employment (ILO, 1997; Mayhew and Quinlan, 2001; LFS, 2004). The growth in these forms of employment has been driven by economic priorities, technological and regulatory shifts, and increased product market uncertainty (Bielenski, 1999; Chiang, 2009). Like other non-traditional modes of employment, subcontracting is practiced for several reasons amongst which 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)

Mayhew *et al*. (1997) define subcontracting 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". In construction, subcontracting has for some time been an integral part of the industry (Stinchcombe, 1959 ; Eccles, 1981 ; Lai, 2000) where it typically involves the subletting of the execution of a section(s) of a project to a contractor(s) who in

most cases is a specialist in that section(s) of work. In the UK over 90% of construction companies are micro to small organisations and a majority of them obtain work as subcontractors, therefore forming an important group in the construction industry supply chain (Kheni *et al.*, 2005; ONS, 2011). Earlier reports also estimate 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)) and this further underscores the economic importance of subcontracting in construction. In spite of its economic benefits, subcontracting 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). Subcontracting also has adverse effects on occupational health and safety (ILO, 2001; Chiang, 2009). Subcontracting is a payment-by-results system where payment is based on the amount of work done rather than the period of time spent on the worksite. Returns are therefore enhanced by the quick completion of task, resulting in subcontractors pushing themselves hard, working excessive hours, or side stepping safety where it impedes production (Mayhew *et al.*, 1997).

Retrospective evidence from a range of several industries in several countries demonstrates that the adverse H&S influence of subcontracting is no recent phenomenon. Research by Harrison *et al.* (1989; 1993) in Australia linked subcontracting to high incidence of fatalities amongst workers in the transport, communication and agriculture industries. Subsequent reports by Toscon and Windau (1994) and United States Bureau of Labor Statistic (USBLS) (1995), both in the USA; Blank *et al.* (1995) in Sweden; and Mayhew *et al.* (1997) in Australia similarly associated subcontracting with adverse OHS outcomes in industries such as mining, agriculture and transportation. Relatively recent studies also indicate that this situation is not dissimilar to what pertains in the construction industry. In several countries such as Spain, Malaysia, Philippines, Poland, Hong Kong, and China, the adverse H&S

influence of subcontracting has been noted in the construction industry (Byrne and van der Meer, 2001; ILO, 2001; Wong and So, 2002; Chiang, 2009; Yung, 2009). Similarly in the UK construction industry subcontracting has over the years been persistently found to have harmful H&S consequences (HSE, 1978; Horbury and Hope, 1999; Hide *et al.*, 2003; Ankrah, 2007; Brace *et al.*, 2009; Donaghy, 2009) clearly emphasising the need for concerted efforts to address this phenomenon. Clearly, any efforts aimed at achieving this would have to focus on addressing the factors responsible for this phenomenon and some of these have been reported in literature as:

1. Fragmentation of the construction organisation into 'islands' or self-centred decision-making units with conflicting interests (Hsieh, 1998).
2. Ambiguity about responsibilities and unclear work relationships resulting from subcontracting relationships (Mayhew and Quinlan, 1997; Horbury and Hope, 1999; Hide *et al.*, 2003).
3. Inadequate communication and teamwork among contractors arising from workforce fragmentation (Mayhew and Quinlan, 1997; Horbury and Hope, 1999; Hide *et al.*, 2003).
4. Less familiarity of subcontract personnel with the inherent safety issues of site activities which is further 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 (Hill and Ainsworth, 2001).
5. Differences in safety cultures between main contractors and subcontractors (Hide *et al.*, 2003; Ankrah, 2007).

As noted by Bomel Limited (2007) from a study on the effectiveness of the CDM 1994 involving the use of influence network analysis, the H&S legislation is the most influential environmental influence on H&S in the UK construction industry. In that regard, the CDM

2007 has particularly been noted as offering mitigation against the above issues responsible for the adverse H&S influence of subcontracting (cf. Manu *et al.*, 2009). Manu *et al.* (2009) for instance gave a critical examination of specific provisions and features of the CDM 2007 (i.e. competence assessment, training and induction, co-ordination and cooperation, and clear delineation of duties for contractors) which have the ability to address the above listed causative factors of the adverse H&S influence of subcontracting. In spite of this, the reporting of the H&S influence of subcontracting still persists in the UK construction industry (cf. Brace *et al.*, 2009; Donaghy, 2009). For instance as part of a UK government inquiry into underlying causes of fatal accidents in construction, Brace *et al.* (2009) through the use of interviews with a wide range of construction industry stakeholders from within and outside the UK reported subcontracting and multi-layer subcontracting as being a contributing factor. Arguably, this signals that the mitigation offered by the CDM 2007 is insufficient. This argument is supported by others such as Abdullah *et al.* (2009) who also contend that generally legislation alone is inadequate in addressing H&S problems. In the spirit of striving for H&S excellence, the identification of other measures/practices which can complement the mitigation offered by the CDM 2007 provisions is thus warranted.

However, studies which have reported on the H&S implications of subcontracting have mainly highlighted its adverse effects, the causative factors and regulatory mitigation measures (cf. Mayhew and Quinlan, 1997; Horbury and Hope, 1999; Hide *et al.*, 2003; Ankrah, 2007; Brace *et al.*, 2009, Donaghy, 2009; Manu *et al.*, 2011). There has thus been a diminutive look at contractors' in-house safety management measures/practices for subcontracting (cf. Horbury and Hope, 1999). For instance, Horbury and Hope (1999) based on a review of H&S literature suggested a generic framework for the mamagement of (sub)contractors by their employer. The framework, however recommends four main measures/practices which are similar to regulatory requirements within the CDM 2007 (e.g.

the need for training for subcontractor workers, the need for work method statement, and also for consultation with subcontractors). There is therefore justification for research to explore contractors' in-house safety management measures/practices for subcontracting which can complement the mitigation offered by the CDM 2007 provisions. Indeed the identification of such measures/practices could provide useful organisational learning opportunities among contractors which Brace *et al*. (2009) reports to be lacking. To this end, the following research question was thus posed for investigation:

How do main contractors manage the adverse H&S influence of subcontracting in terms of their own in-house practices?

3. Methodology

The research had an interpretive focus given that the research question concerns meaning. Such a focus favours the use of a qualitative inquiry which Fellows and Lui (2008) indicate is suitable for seeking meaning and as such appropriate for answering questions relating to "why" and "how". Qualitative inquiry has been strongly advocated for construction management research by Seymour and Rooke (1995) and Rooke *et al.* (1997), and with specific reference to construction H&S studies, qualitative research has also been used. Hare *et al.* (2006) for instance explored the integration of H&S with pre-construction planning using focus group interviews and Gherardi *et al.* (1998) also investigated causes of construction accident using interviews. Following the precedent set by other construction H&S studies regarding the use of interviews in qualitative inquiries, interviews, in particular semi-structured interviews were adopted for the study.

3.1 Design of interviews

The interviews questions were designed to probe the overall H&S management system of contractors, the H&S measures they implement on projects, and their experiences of the

H&S consequences of subcontracting with the intention of eliciting the measures/practices implemented to manage these consequences. Although the focus of the study was the in-house practices of the contractors, no direct questions concerning that or the causative factors of the H&S influence of subcontracting mentioned in literature were posed and that was to encourage the respondents to rather focus on what they felt was important to them. For instance, a key question that was posed was: Do you see/realise any influence of subcontracting in accident occurrence? This question brought to the fore the H&S issues surrounding subcontracting and provided opportunity to probe further based on the responses and to elicit the measures implemented to manage the H&S influence of subcontracting.

3.2 Selection of contractors

In order to explore *how* main contractors manage the H&S influence of subcontracting it was important to place such contractors at the heart of the study. As micro to small contractors usually obtain work as subcontractors it was considered appropriate to rather target medium to large contractors who are more likely to operate as main contractors on projects. Using the UK Kompass online directory, 50 medium to large UK contractors were randomly selected and invited to take part in the study. Learning from previous studies that obtaining participation in H&S research in UK is difficult due to the legalities surrounding H&S (cf. Gibb *et al.*, 2002) it was deemed necessary to also approach contacts in industry to help with obtaining participation in the study. In all, the participation of 6 medium to large contractors was obtained, 5 of which are among the top 20 UK contractors. As contractor personnel in construction management roles (e.g. H&S managers, project managers, construction managers, and site managers) are more likely to be aware of the H&S issues surrounding subcontracting such personnel within the contractor organisations were targeted for interviewing. The interviews were audio-taped and averagely they took an hour. As some of

the interviews were conducted on project sites, there was an opportunity for site observation to be undertaken as well. Out of the six investigated companies, site observations were possible for four of them. Although the observations were not the main source of data, they enriched the interview data by buttressing the contractors' commitment to H&S as well as some of the H&S practices mentioned in the interviews. The observations were logged in a field note book.

3.3 Analysis

To assist with the data analysis, a 5 step process based on Creswell's (2009) guide for qualitative data analysis was used. These steps are: transcribing of the audio interviews (i.e. verbatim transcription); organising and preparing the transcripts; iterative re-reading of the transcripts; coding of the transcripts; and generating themes. Colour coding using a combination of emerging codes (i.e. inductive analysis) and predetermined codes (i.e. deductive analysis) based on the literature (cf. Creswell, 2009) was applied. The iterative re-reading and coding of the transcripts yielded profound understanding of the points made by the interviewees and resulted in the extracting of issues and generation of themes relating to the H&S influence of subcontracting and *how* the contractors manage this influence.

4. Findings

The findings are presented below under three themes: *the H&S influence of subcontracting; implemented measures stemming from regulatory requirements; and in-house practices/measures.* The profile of the 6 contractors showing their size, nature and scope of operation, their extent of use of subcontractors, and the designation of the interviewees is shown in Table 1. The 5 large contractors have each won several national H&S awards such as The Royal Society for the Prevention of Accidents (RoSPA) awards in recognition of excellence in H&S performance. The companies thus represent a useful reference point that

could offer inter-organisational learning opportunities in terms of H&S management practices.

4.1 The H&S influence of subcontracting

All the contractors use subcontractors for the physical execution of the entire works they do but provide the site management personnel to manage the operations of the subcontractors. Depending on the scope of a project, the site management personnel could include project manager/director, site manager, construction manager, quantity surveyor, and health and safety manager. There was a general acknowledgement by the contractors that subcontracting has an adverse influence on H&S. For instance the interviewee for Contractor B (a H&S manager) commented that, *"One of the big challenges for the industry is the subcontract culture… it is not unheard of for a team to turn up on site and they don't even know who we are because they've been contracted by somebody who has been contracted by somebody…So there is communication issue straight away."* Despite its influence on H&S, it was noted (as quoted below) that perhaps, the industry cannot do without subcontracting because it is not economically viable to have directly employed labour.

> *"If everybody worked for us it would be much easier to control but commercially that is probably not a viable way to work these days and that's why everybody has gone to subcontracting."*(Contractor B - H&S Manager)

A number of issues/problems associated with subcontracting were identified as being responsible for its adverse H&S influence. These included communication problems, competence issues especially in multi-layer subcontracting, interest of subcontractors in making their profit with less commitment to H&S, and unfamiliarity of subcontractors with the H&S practices of main contractors. Commenting on these some interviewees for instance mentioned that:

> *"With sub-sub-subcontracting, you give someone a contract and they give it to someone else and they give it to someone else to the point where people turn up on site and they don't know who they are working for because they are far down the chain. That's kind of scary in terms of have they read the method statement, risk assessment, etc. Are they qualified, are they competent, do they have experience doing this?"* (Contractor F - Construction Manager)

> *"Because they work for themselves and not for our company, all they want is just to earn their money."* (Contractor E - Site Manager)

As a means of addressing these issues, the contractors implement H&S measures/practices as part of their overall H&S management system. These measures consist of those that stem from regulatory requirements, in particular the CDM 2007 and those measures that are the contractors' own in-house measures/practices.

4.2 Measures stemming from regulatory requirements

From the interviews, the identified measures/practices which stem from regulatory requirements are presented in Table 2. These are: undertaking competence assessment for subcontractors; ensuring the preparation of risk assessment by subcontractors for their works; conducting H&S training and induction for subcontractor workers; co-operation with subcontractors; and consultation with the subcontractor workers/representatives on health, safety and welfare matters. As shown by Table 2, all six contractors implement these measures.

When appointing subcontractors to work on projects, all the contractors ensure that subcontractors (as organisations and their operatives) have the needed competence for carrying out the works. Among the criteria used by the contractors for ensuring competence are experience, qualification, and industry H&S certification. Also before their subcontractors commence the execution of works on site, the contractors require that the subcontractors provide risk assessments (and method statements based on the risk

assessments) which they vet and agree with the subcontractors. Another regulatory requirement adhered to by the contractors is the provision of H&S induction and training for subcontractors. These are to provide the subcontractors with information about site risks, precautions and rules. As a way of consulting with subcontractor workers on health, safety and welfare matters, the contractors hold regular meetings with subcontractors to discuss H&S. The frequency of the meetings ranges from daily to monthly. From the site observations (which was only possible for Contractors A, B, C, and E), it was noted that these contractors had site offices for H&S induction, training and meetings. Contractor A's site in particular had an office dedicated solely for H&S induction and training in which were a projector equipment, H&S posters, notices, booklets and leaflets. Power point presentations and H&S videos are used as part of the induction and training and as an improvement over this, Contractor C has recently produced their videos in other foreign languages to assist migrant workers.

4.3 In-house practices/measures

In addition to the above regulatory measures, the contractors were also found to implement some in-house measures/practices to further enhance their management of the H&S influence of subcontracting. These measures are presented in Table 3. As shown in Table 3, two of the identified practices/measures are common to all the six contractors (i.e. restricting the layers/tier of subcontractors on projects; and keeping a regular chain of subcontractors). The contractors try to restrict the layers of subcontractors by insisting that their subcontractors do not further sublet works. This is to prevent multi-layer/tier subcontracting of which one interviewee mentioned that even clients are not very pleased with. Where it is not possible to restrict the levels of subcontracting for some reasons (e.g. where a subcontractor does not/can not provide all the services needed within a work package), the

contractors do a competence check on the other layers of sub-contractors to also ascertain their suitability for the works. To illustrate, the interviewee for Contractor D (a H&S manager) gave an example of an on-going large project where their Mechanical and Electrical (M&E) subcontractor (i.e. the 1st tier subcontractor) will sublet the fire alarm installation to another subcontractor (i.e. the 2nd tier subcontractor). With this arrangement the interviewee mentioned that the M&E subcontractor will have to inform them that they will be subletting the fire installation so that in addition to the competence check that will be undertaken by the M&E subcontractor they will also check the competence of the fire alarm subcontractor.

Keeping a regular chain of subcontractors also emerged as being a very useful measure not only in terms of H&S but also in terms of ensuring quality. This is because, by the contractors using the same subcontractors, the subcontractors tend to get used to the contractors' H&S practices, processes, procedures, and requirements. Also the assurance of repeat business helps to enhance the subcontractors' commitment to quality and H&S. To manage their pool of subcontractors, Contractor B for instance has a supply chain management system which has three levels of subcontractor preference: the basic level, the preferred level and then the strategic level which is the highest level. When a subcontractor is initially approved, the subcontractor gets onto the basic level and then progresses based on certain criteria to the strategic level. Contractor B's preference is to work with those subcontractors who are either at the preferred level or the strategic level. However, the interviewee hinted that some projects present certain constraints which introduce difficulties in keeping to their chain of subcontractors. Examples of those constraints are where a project is located in an area with no preferred or strategic subcontractor, and also where as

part of a contract agreement with a client (usually in the case of local authorities), they are restricted to using only subcontractors from within the project locality.

In addition to the above practices, Contractor C operates a H&S reward scheme for their subcontractors. This scheme is deemed useful by the contractor in enhancing subcontractor's interest and commitment to H&S. As part of the scheme, all their subcontractors are put on a league table where the subcontractors are awarded points or have points deducted based on their H&S performance. Again as part of the reward scheme, every month one subcontractor supervisor from across the entire company is rewarded for having shown good H&S behaviour and ideas. In addition to this reward, the supervisor's employer (i.e. the subcontractor) is also awarded points on the league table. Along side the reward scheme, the contractor also operates what they describe as a "yellow card and red card system" on site where the yellow card is given as warning for minor H&S breaches (which implies additional H&S induction and also being fined) and the red card is given for severe H&S breaches by subcontractor workers (which implies being kicked off the site and also being suspended from working on all other sites for a period).

Contractor B also insists on a non-working subcontractor foreman/supervisor for each subcontractor on a project. This foreman is directly responsible for the safety of the workers in that trade and this enables the contractor to closely monitor the H&S of the subcontractor workers.

5. Discussion of Findings

The sole use of subcontractors for the physical execution of works by the investigated contractors means that a considerable portion of the value of works undertaken by the contractors goes to subcontractors. Contractor A for instance estimates that about 70% of the

money they spend as a business goes to subcontractors and suppliers. Subcontractors are therefore an important part of the contractors' supply chain.

The unanimous recognition by the contractors that subcontracting has an adverse influence on H&S once again echoes the finding of earlier studies (cf. Ankrah, 2007; Chiang, 2009; Brace *et al.*, 2009). The practice of subcontracting for its economic benefits suggests the inevitability of subcontracting in construction. This also suggests that a reasonable approach for dealing with the H&S influence of subcontracting will not be to advocate stopping subcontracting but rather to implement measures that will tackle the H&S issues/problems responsible for its adverse H&S influence. The H&S issues that were identified as being responsible for the adverse H&S influence of subcontracting are consistent with earlier reports (cf. Hsieh, 1998; Hide *et al.*, 2003; Ankrah, 2007) and as noted by Manu *et al.* (2009) efforts aimed at addressing the adverse influence of subcontracting would have to be geared towards addressing these issues.

The contractors implement measures required by the CDM 2007 which offer some mitigation against the issues/problems responsible for the adverse influence of subcontracting. In addition, there are also a range of measures that derive from their own commitment to high standards of health and safety performance. By restricting the levels/tiers of subcontracting, the contractors are able to minimise fragmentation of the workforce and by so doing are able to manage better, competence, communication, commitment, teamwork, as well as supervision. Limiting the tiers of subcontracting also helps to ensure clarity of on-site working relationships. As noted in several reports (cf. Wong and So, 2002; Brace *et al.*, 2009; Tam *et al.*, 2011) multi-layer subcontracting is common place within the construction industry and it also has a negative impact on cost, time and quality (Tam *et al.*, 2011). Addressing multi-layer subcontracting has been a challenge. In

Hong Kong for instance, there have been past debates concerning the legal restriction of the layers of subcontracting in construction (cf. Wong and So, 2002). Whereas some argued for legislation to restrict multi-layer subcontracting on the basis of ensuring better safety performance, others also argued against such legislative restriction on the basis of avoiding an interference with the market value of subcontracting (cf. Wong and So, 2002). Recent work by Tam *et al.* (2011) however indicates that the call to restrict the layers of multi-tier subcontracting is far from over. Although there is no legislation in the UK which restricts multi-layer subcontracting, it appears from the evidence gathered that some contractors have found it necessary and useful to impose such restrictions by themselves, and in situations where they are unable to, they take further steps to manage the inherent H&S problem of workforce fragmentation.

As previously mentioned, the benefits of using the same subcontractors goes even beyond H&S. Using the same subcontractors helps to build trust, achieve quality assurance, and it also gives assurance of repeat business (cf. Brabazon *et al.*, 2000). Using the same subcontractors enables the contractors to minimise workforce fragmentation in terms of the H&S practices and H&S commitment of the workforce. Brabazon *et al.* (2000) reported that companies who work constantly with the same set of contractors/sub-contractors tend to have better health and safety performance. Contractor A for instance mentioned that they have very close long-term working relationship with their supply chain organisations and by that they (i.e. their supply chain organisations) know their values, they know their people, and they know their H&S requirements very well. Overall, working with a regular chain of subcontractors enables the contractors to minimise differences in workforce safety culture which arises from subcontracting. Although using a regular chain of subcontractors may be a common practice in construction, this finding has shown that contractors' intention to

mitigate the adverse H&S influence of subcontracting is one of the rationales for this practice.

As shown by previous studies that productivity payment/reward schemes could have adverse H&S consequences as production tends to be prioritised over safety (cf. Langford *et al.*, 2000), in contrast, reward schemes based on H&S performance could have positive H&S consequences (cf. Simonet and Wilde, 1997; Langford *et al.*, 2000). The reward scheme implemented by Contractor C for its subcontractors buttresses this as it is considered a useful means by which the contractor obtains and enhances H&S involvement and commitment from subcontractors who, at least in the perception of the investigated contractors, tend to be less interested in H&S.

Immediate supervision has been noted as being essential to good H&S (cf. Haslam *et al.*, 2005; Lingard *et al.*, 2010) and Contractor B insisting on a non-working subcontractor foreman (for each subcontractor on a project) who has direct responsibility for the safety of the workers in their trade goes to demonstrate their understanding of this. In a broader perspective, the in-house H&S practices/measures implemented by the contractors can be seen as evidence of an extra commitment on their part to promote H&S. This commitment can be linked to influences such as the feeling of a moral obligation for ensuring the safety of workers; pressure from peer groups; and pressure from clients. These were evident from comments made by some of the interviewees some of which are given below.

> *"…The question was why we needed a H&S management system in the first place. It is due to external drivers: legislation, peer pressures, client expectations, etc. H&S performance is a critical requirement for us winning work nowadays…Everybody who comes to work is entitled to go home*

in the same frame of safety and health they came to work in." (Contractor A - Civil engineer/director)

"If you walk around this site, you'll realise they're all working very hard, they're all happy and I think a happy workforce leads to good safety, good quality, and they make some money, and they'll all go out from here to their homes, and wives, and kids safe. That's the thing. We want them to go home safely so we keep telling them, we want you to go home safely tonight". (Contractor B - Project Manager)

Regarding pressure from peer groups, all the Contractors are either members of or have their sites registered with a UK non-government construction industry scheme (i.e. The Considerate Constructor Scheme) which has a keen focus on improving H&S in construction. Such membership together with the other influences has thus been influential in the contractors' implementing measures beyond the regulatory requirements. In modern construction where there is increasing concern for corporate social responsibility (cf. Jones *et al.*, 2006; Petrovic-Lazarevic, 2008; Barthorpe, 2010; Liu *et al.*, 2011), efforts by clients, safety conscious industry groups, and society as a whole (represented by the moral argument for ensuring occupational H&S) certainly have far reaching positive impact on H&S improvement and these can not be overlooked in the steps towards achieving excellence in construction H&S.

6. Implications of findings

As noted by the interviewee for Contractor A (Civil engineer/director), the sharing of knowledge on H&S practices is useful in promoting a safe construction industry. In view of that, Contractor A shares videos of their H&S excellence programme with their peer contractors as well as their clients. As shown from the findings, the contractors implement similar as well as different in-house measures and thus implying the existence of some scope for inter-organisational learning. In the broader perspective, the insight into the in-house measures/practices therefore provides inter-organisational learning opportunities for

contractors, especially the medium and large ones. Medium and large UK contractors could thus adopt or adapt these measures into their organisations to help mitigate the H&S influence of subcontracting. Given that the adverse impact of subcontracting is a global construction concern (cf. ILO, 2001) and some of the investigated contractors' operation extend beyond the UK, the in-house practices could similarly offer learning opportunity for medium and large contractors in other countries.

Although these measures offer learning opportunities, the extent of their adoption or adaptation will have to be weighed against certain considerations. For instance the resource implications in terms of cost, time and human resource involved in their implementation and monitoring will have to be given much consideration especially in the case of medium-sized contractors who have limited resources compared to large contractors. Also factors such as size and complexity of projects as well as other project characteristics could play an important role in implementing such in-house measures. For example with the use of non-working foremen for each subcontractor work package or trade, whereas this may be viable on a large project involving several subcontract work packages, on small projects a single or a few foremen may be enough to oversee multiple trades or subcontractors. For a system like the reward scheme involving league tables, a good balance will be required between rewards for good H&S behaviour and the punitive measures for H&S breaches as the main objective is to encourage positive H&S. In terms of the punitive measures, to avoid subcontractors concealing accidents/injuries and near misses which will undermine learning from incidents, punitive measures especially for accidents/injuries may have to be avoided.

As drawn from this study and also reported elsewhere (cf. Hughes and Ferrett, 2008; Lingard *et al.*, 2009) the significance of clients, industry peer-groups, and society to H&S improvement in construction should not be underestimated but should continuously be

heralded. In particular, clients ought to be increasingly educated about their role in promoting safety and the importance of being proactive in that role. Contractors also stand to benefit from being members of industry peer-groups which have a focus on promoting H&S. Also, the further commitment by the contractors to promote H&S, which appears not to be driven by legislation, has wider implications for occupational H&S in respect of the ongoing debate on the H&S red tape challenge within the UK (cf. Löfstedt, 2011). This study provides evidence that should allay fears that removing some legislative snags will somehow lead to poorer H&S performance.

7. Conclusions and future research

In addition to implementing the CDM 2007 regulatory requirements, some contractors have complementary in-house H&S measures which they also implement to address the H&S influence of subcontracting. Among such measures are: restricting the layers/tiers of subcontractors on projects; working with a regular chain of subcontractors; implementing a H&S reward scheme for subcontractors; and insisting on non-working subcontractor foremen with direct responsibility for the safety of workers. Implementing these measures reflects an extra commitment by the contractors to promote H&S and they appear to be driven by external influences such as the moral argument for H&S; pressure from peer groups; and pressure from clients. In the wider context of occupational H&S in UK these findings are significant as they provide evidence that should help allay unease that removing some H&S legislative hurdles in connection with the red tape debate will lead to a decline in H&S performance.

The in-house measures also provide some learning opportunities for other medium to large contractors who often sublet work packages and as such could be adapted by these contractors to suit their operations in efforts to address the H&S influence of subcontracting

on projects. The extent of adaptation of such measures would need weighing against factors such as the cost and time implications, the human resource required for their operation and the characteristics of the projects on which the measures are intended. As also shown from this study, external influences other than H&S legislation can enhance contractors' commitment to H&S and therefore the significance of such influences to promoting excellence in H&S should not be underestimated.

This study however has a number of limitations which need mentioning. Firstly, as the study involved six organisations, the identified in-house measures do not reflect the practices of all UK contractors. As previously alluded to, H&S is a sensitive subject in the UK due to its legal nature and this makes obtaining participation in H&S research difficult. In view of this terrain, having obtained the participation of 6 organisations (5 of whom are among UK's top 20 contractors) who provided information on their H&S management was quite reasonable. Given also that the study did not aim to make generalisation but rather to provide insight as to some existing main contractors' safety management practices for subcontracting, this limitation is of little consequence. This is strengthened by the fact that the focus of qualitative inquiry lies in the provision of rich insights in explaining a phenomenon, event or process as opposed to making generalisations (Fellows and Lui, 2008; Creswell, 2009) and hence the relatively small sample sizes employed in qualitative studies (cf. Easterby-Smith *et al.*, 2002, Laryea and Hughes, 2008, Choudhry and Fang, 2008, Baiden and Price, 2011).

Secondly, it was not possible to fully explore the breadth of measures implemented by the contractors and as such the reported in-house measures are not exhaustive. In fact some interviewees hinted that it would be time consuming covering into detail the range of measures they implement. One interviewee even suggested a later site visit to observe their H&S induction for subcontractors. As a result of the inability to fully explore their measures,

it was not possible to interrogate into greater depth the implications of implementing those measures such as cost implications and any challenges involved in the operation of the measures. It was also not possible to independently verify the extent to which implementation of the measures has yielded H&S improvement, although from the contractors perspective the measures are useful in promoting H&S. Despite the absence of such verification, the 5 large contractors having received several industry H&S awards in recognition of H&S excellence gives some credence to the contractors' assertion as the awards are an attestation to the effectiveness of their H&S management practices which include the reported in-house measures. Nonetheless, these limitations reveal fertile grounds for further studies regarding this subject area and in that regard a longitudinal case-study approach involving multiple methods of data collection (e.g. interview, observation and documentary analysis) will be useful in unearthing further empirical realities.

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Table 1: Profile of construction companies

Contractor	Size (number of employees & approximate turn over)	Nature of operation	Scope of operation	Extent of subcontracting on projects	Designation of interviewees
A	> 250 employees > £500 million	Building and civil engineering	International	*High	Civil engineer/director & project manager
B	> 250 employees > £500 million	Building and civil engineering	International	*High	Project manager & H&S manager
C	> 250 employees > £500 million	Building and civil engineering	National	*High	Senior site manager
D	> 250 employees > £500 million	Building and civil engineering	International	*High	H&S manager
E	100 -110 employees £50 - £55 million	Building and civil engineering	National	*High	H&S manager & site manager
F	> 250 employees > £500 million	Building and civil engineering	International	*High	Construction manager

* All construction works on projects are subletted

Table 2: Measures stemming from regulatory requirements

Measures	**Regulations**	**Contractors implementing measure**	**Sample comment on measure**
H&S training and induction for subcontractor workers.	CDM 2007 Regulation 22(2)(a)(b).	A, B, C, D, E & F	*"They [i.e. the subcontractors] are all inducted before they start work on site. We explain the rules and regulations on site and we make sure everyone is safe."* (Contractor E - H&S manager)
Co-operation with subcontractors.	CDM 2007 Regulation 5.	A, B, C, D, E & F	*"I always tell our guys and the subcontractors that it's not them and us…It's a big team. It's a big family here and I've done that successfully over the years. It is team work. You got to make them feel part of the team and that they are doing something."* (Contactor B - Project Manager)
Consultation with subcontractor workers/representatives on health, safety and welfare matters.	CDM 2007 Regulation 24(b).	A, B, C, D, E & F	*"We have daily informal meetings with all the site safety supervisors [i.e. subcontractor supervisors]. This is not minuted. We discuss the activities for the day and the H&S issues. Monthly, we have a formal H&S meeting with all our subcontractors which is minuted".* (Contractor C – Senior Site Manager)
Undertaking competence assessment for subcontractors.	CDM 2007 Regulation 4(1)(a).	A, B, C, D, E & F	*"We have competence requirements for all our contractors. They have to have certain accreditation to be in our supply chain in the first place."* (Contractor D - H&S manager)
Ensuring the preparation of risk assessment by subcontractors for their works.	CDM 2007 Regulation 4(b)(1) and 19(2) which are rooted in the Management of Health and Safety at Work Regulations 1999 Regulation 3(1).	A, B, C, D, E & F	*"Risk assessments and method statements must be in place. When I do a director H&S tour, I'll take 4 or 5 particular activities on the job, and I'll ask for the method statement, risk assessment…"* (Contractor A - Civil engineer/director)

Table 3: Contractors' in-house practices

In-house measures	**Contractors implementing in-house measure**	**Sample comment on in-house measure**
Restricting the layers/tiers of subcontractors on projects.	A, B, C, D, E & F	*"Sub-sub-subcontracting can influence accident occurrence because the sub-sub-subcontractor would not buy into the H&S culture of the main contractor and we do request that our supply chain do not sub-let and sub-let and sub-let because this bloke down here [i.e. the subcontractor at the bottom] when he gets to site I don't know him. So in my opinion, that [i.e. several sub-letting] will be prone to incidents. As part of the supply chain management, we vet all our subcontractors and tell them not to be sub-letting their works."* (Contractor B - Project manager)
Keeping a regular chain of subcontractors.	A, B, C, D, E & F	*"With subcontractors, we tend to keep the same subcontractors- plasterers, roofers, etc. For instance we've got a brick layer on this site who has also worked for 20 years. He's a subcontractor and he's gotten used to how we work-methods of working- and we try to keep them."* (Contractor E - Site manager)
A H&S reward scheme for subcontractors.	C	*"Each subcontractor has a site safety supervisor …. Every month each site nominates one of these supervisors for having shown good safety behaviour, practice, and good ideas. His company then receives points as a reward for good H&S and the guy himself receives £50 worth of vouchers for Tesco"* (Contractor C - Senior site manager)
A non-working subcontractor foreman/supervisor for each subcontractor trade.	B	*"We always insist on a non-working foreman for every subcontractor and he (i.e. the foreman) actually becomes a supervisor for that trade. We've got 5 staff here on the field and we monitor the progress, and H&S. So in addition to the 5 of us, if we've 12 or 15 subcontractors on board, that would mean an additional 12 or 15 supervisors in the field. So we're spreading the load massively and there are more eyes on the field constantly watching H&S."* (Contractor B – Project manager)