

Partnering, lean construction and health and safety work on the construction site

Co-players or opponents?

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PARTNERING, LEAN CONSTRUCTION AND HEALTH AND SAFETY WORK ON THE CONSTRUCTION SITE: CO-PLAYERS OR OPPONENTS?

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Each new construction project is organised with new clients, consultants and contractors every time. Planning and coordinating the construction process and the specific health and safety work on the construction site must therefore also be organised each time. In recent years, partnering and Lean Construction have been introduced as new forms of cooperation between the actors in construction. Simultaneously, new regulations have been implemented that place the responsibility for health and safety conditions on clients. Partnering and Lean Construction were studied with a focus on the importance of, and interaction with, health and safety on site. Production as well as health and safety are often perceived as two separate areas with different key actors and they are handled as two different management areas with their own embedded management problems. This despite, the fact that it has long been known that health and safety is dependent on the organisation and execution of production and that a familiar theme in the management of safety is to avoid a sidecar mode of production. The study applied theories on construction management and construction safety management. The research methods were based on trade analysis and studies of 5 building projects on site. The trade analysis was performed by interviewing focus groups. The construction sites were observed over a six-month period by applying the methods: Observation, documentation and interviews. It was concluded that 1) synergy between partnering and Lean Construction, and health and safety work can be achieved, 2) there has to be a driver to facilitate the interplay between the management areas, 3) all the actors can drive the process, 4) as drivers they have to handle context-dependent dilemmas.

KEYWORDS: Partnering, Lean Construction, Health & safety, Management, Construction site

INTRODUCTION

Since the 1940s, the leadership of the construction industry has been characterised by a planning rationality that has been based on an understanding of the construction process as a sequential phase model. Within this rationality, the various parties in construction were allocated permanent roles and responsibilities, and the relations between the parties were

regulated by contracts. The interaction between the parties was taken for granted and you did not question the "social order". With the new partnership models, including partnering and Lean Construction, which has emerged as a reaction to too many problems in construction (high number of conflicts, etc.), the structures and standards have been challenged, and with the new partnerships the conditions for the new social order are therefore set to be renegotiated between the parties (Gottlieb, 2010).

The Sidecar Effect of health and safety (H&S) work has long been a familiar phenomenon (*cf.* Jensen, 2002: 204). Sidecar location characterises a situation where safety is disconnected from the core performance and function in an isolated system – a situation that for years has been criticised for isolating the H&S work. By linking H&S work with the core contributions on site, H&S work can move away from the location as "sidecar".

This paper explores implications of bringing H&S work in play together with the new forms of partnerships. Three important lessons learned from the development project were:

- That the synergy between new forms of partnerships and H&S work on construction sites required that both management areas were prioritised.
- That to exploit the synergy to support the use of new forms of partnerships and H&S work, it requires the development of routines for interaction between production and H&S work.
- That there were a number of dilemmas that the various actors had to react to when they wanted to engage in the process.

The paper begins with a theoretical introduction to the new forms of cooperation and the work environment concept that were applied in the analysis. Construction projects are project-organised, which places special demands on the management of the construction process. Managing a construction project depends on how the parties interpret the construction process. The theoretical review therefore finishes with a description of the two dominant perspectives indicating two different ways of understanding the construction process.

Following the theoretical review, the methodological approach and its implications for the results will be discussed. Finally the empirical results of the study will be presented with a focus on the different actors in construction that can act as drivers for interaction between the new forms of cooperation and the work environment on site. There is a particular emphasis on describing the dilemmas that the actors faced due to the construction project's specific conditions in which new actors will meet each time a construction project is established.

THE THEORETICAL FRAMEWORK

Forms of cooperation as new partnerships

In the past 10-15 years, attention has been paid to human resources and organisational potential (*cf.* Dainty *et al.*, 2007). The ongoing unfavourable criticism of low productivity, a high number of failures, varying quality and cost overruns has led to the development of new concepts of cooperation with the aim of promoting learning and innovation through improved dialogue and cooperation between the stakeholders.

The objective of partnering is to increase productivity and quality by establishing common objectives between the parties in each construction project (Nyström, 2005). The key actors are, at the very least, client, consultant and contractor. This means that what makes partnering special is an early involvement of the contractor in the cooperation. Partnering is about creating a transparent business environment by establishing a partnership based on dialogue, trust and transparency and by creating an economic structure that supports the fact that the parties have common economic interests.

The purpose of Lean Construction is to optimise construction processes on site. Application of Lean Construction in Denmark is primarily related to the use of the "Last Planner System" which is a planning tool. The key actors are consultants and contractors, including construction managers and craftsmen. Today several sites use the Last Planner System to coordinate and plan the construction process.

Teams, autonomous groups, self-managing groups are all designations that cover roughly the same i.e. that tasks previously handled by managers are assigned to a group of employees. The purpose of autonomous groups is often to place responsibility and coordinating tasks with or as close to the performance of work as possible. It is debatable whether autonomous groups are new in construction or whether they have always existed with gang culture. The area has not earlier received a particularly much attention, but autonomous groups are beginning to emerge in association with Lean Construction, since experience suggests that the essential conditions for the use of Lean Construction involve the transfer of new skills and responsibilities to the craftsmen / gangs.

Many companies work with elements from several different forms or concepts of cooperation (e.g. Lean and Partnering) at the same time. When partnering is used as cooperation form between parties in a construction project the cooperation will be written into a contract. The application of Lean Construction can either be written into a contract, which will be the case if the use of Lean Construction is prompted by client demands, or be implemented in practice by the contractor. The application of autonomous groups and the degree of self-management are now embedded at the level of the individual contractor rather than as a concept that a whole site is organised around.

The H&S concept

The study was based on a working concept and on an understanding of H&S on the construction site as a result of:

- The physical work environment – i.e. the work environment impacts that the specific performance of the work could result in
- H&S work – i.e. systematic activities undertaken to understand and improve the work environment, for example safety meetings, work place assessment, Last Planner System and safety coordination
- The local H&S awareness (H&S culture) that determined what was locally accepted as negative influences at work, and what remedial and preventive measures, were given priority (Turner, 1991; Pidgeon, 1998).

On the construction site the substantive work was partly related to the individual craft-specific work processes and associated risks, and to the risks that might occur when the many disciplines working in parallel influenced each other's work environments.

H&S work will partly consist of implementing the above statutory systematic activities but may also include voluntary activities such systematic work environment management, audits, tool-box meetings, etc.

Safety culture plays a significant role on the construction site. On-site construction work takes place in physical environments that are constantly changing as the construction progresses. The work environment is therefore dependent on individual employees being able to assess the safety and exercise a high degree of self-control; a positive safety culture may help to guide employees in their daily safety practices on site (Rowlinson, 2004).

As for the local working understanding / safety culture there could be several (competing) local understandings present simultaneously on the construction site. This meant that there was no mutual agreement on whether the construction site working environment needed improvement or was at an acceptable standard.

Work efforts have long been dominated by a mindset of prevention through better planning partly reflected in the regulation of H&S work on the construction site. It has long been known that a good work environment on a construction site is dependent on both efficient H&S work and a positive safety culture. The problem with the safety culture so far has been to define and operationalize the concept in a way that facilitates its use as a tool in bettering the work environment on the constructions site.

The existing cultures on site may both support and complicate the use of new forms of cooperation and H&S work. At the same time the use of new forms of cooperation and H&S work may change culture on site. Good interaction between the use of new forms of cooperation and H&S work therefore necessitates that different parties are aware of the existing cultures, how cultures are affected across the cooperation and work environment and what impact the development of cultures has on future cooperation and work environment.

Management in construction

A key hypothesis in this study was that if both the H&S work and the safety culture must be supported in the developing and maintaining of a good work environment, this would make demands to the type management.

Strengthening the influence of the various employees on their own work (empowerment) is often discussed as a management strategy for the management of complex products and processes, many actors, fragmented processes and tasks, etc., which is precisely what characterise the construction sector (Dainty et al., 2002). The relevance of the strategy is further enhanced when using the new forms of cooperation, where parts of the contractual relationship between construction partners are replaced by partnerships with the expectation of cooperation and reciprocity. This relationship is between client, consultants and contractors but also between construction management and craftsmen.

Managing a construction project depends on how parties in a construction project interpret the construction process. This section introduces two dominant perspectives that indicate two different ways of understanding the construction process.

The first perspective was based on the phase model. Phase model of a construction project has long existed as an understanding of how a construction project evolves in phases and that the previous phases determine the subsequent phases. In this understanding the execution phase is a phase where design and planning is implemented as a plan. This understanding

helps to maintain an understanding of the construction phase as a phase, the sole objective of which is to follow an existing plan. Managerial challenges within this perspective will often be about developing better planning models.

The second perspective was based on an understanding that a site will be constantly changing. As construction progresses, the physical surroundings are constantly changing. This means that construction management and craftsmen during the construction process must always be ready to respond quickly to changes in the environment. In addition to building development, changes may be due to changes in terms for example design changes, weather conditions, unexpected events such as pollution, etc. Managerial challenges in this perspective is the handling of the large uncertainties associated with the process and to support the employees themselves are able to constantly assess and react in the situation on site.

On construction sites you will often find combinations of the two management models and the theoretical issue of this paper was not whether one or the other model was right, but where the appropriate interface was between the two models.

OBJECTIVES AND METHOD

Objectives

The aim of the project was to investigate:

1. What kind of impact would new concepts of partnerships have on H&S work in construction?
2. Could the development and implementation of the new concepts be planned in ways that would also promote good H&S conditions?
3. What role could H&S play in the readjustment of construction?

Research methods

The project was a qualitative development project designed as an iterative sequence, in which each phase is a precondition for the next phase, with ongoing adjustments and corrections of the field of study, methods and results. The project and method used consisted of the following main phases:

1. Preparation, gathering and systematisation of existing experience with the implementation and utilisation of new concepts of cooperation (Literature study)
2. Gathering of experience of new cooperation concepts and H&S at the construction industry level (Focus group interviews with different actors in the construction industry)
3. Gathering of examples of practice with new cooperation concepts and H&S on the construction-site level (Interviews with different actors on site, observations and data collection in five ongoing construction projects)
4. Intervention on construction sites; integration of H&S work in the new concepts of cooperation (Test on five construction project over a one-year period)
5. Analysis of the experiences gathered and development of a guideline of recommendations.

RESEARCH RESULTS

Synergy between H&S and new forms of cooperation

H&S work and Partnering

H&S work could exploit that partnering established a common forum already in the design phase. This created the possibility that parties could jointly discuss - not only technical construction issues, but also the work environment - opportunities and problems, so that the project was planned to get the most effective and safe project implementation.

The early dialogue, the setting of common goals and the ensuing dialogue engendered by common objectives were key elements in the discussion of how partnering could contribute to a common focus on H&S and create new opportunities in the area.

Conversely, H&S work activities and H&S actors could contribute to a better planning in a partnering project, so it could proceed without unnecessary stops due to unforeseen H&S problems. H&S actors will have an eye for how planned processes might be used more flexibly, for example by incorporating means to facilitate the work or where for reasons of the work environment it would be necessary to change / move the planned processes, so that the impacts were minimized. H&S stakeholders could also point out how a process might be planned more appropriately, so that workers were exposed to less noise, less vibration, avoided the use of filtering respirators, etc. and thus not be subject to the time limits that otherwise apply to for how long the work can be performed according to workplace legislation.

H&S work and Lean Construction

In connection with the systematic H&S work working conditions will often be identified where solutions should be found. In the process planning, solutions could often be found to H&S conditions and the solutions could be operationalized. Some of the solutions would also help to improve the production process. Lean Construction and the formal H&S work could support each other. Experience suggested that for example input from the Last Plan System and work place assessment in the early process planning could prevent poor working posture when handling building materials by early planning of scaffolding, and improved logistics. Experience suggested that input from the current H&S work (safety rounds, safety meetings, etc.) to Last Plan System meetings, could support for example clean-up that fences were in order and coordination of the different trade groups' work. In that sense, using the Last Planner System could realise new ways to integrate safety aspects as early as at the planning and coordination stages of production.

Partnerships and conflicting interests

Work environment efforts were organised on the basis of an A and B side, i. e. the premise was that there might be conflicts of interest between the A and B side in relation to working conditions. Partnerships provided for an understanding of common interests between various parties and it could mean that the dual relationship stepped into the background throughout the organisation among both managers and workers.

Depending on management culture and gang culture, observation showed that different relationships could develop between construction management and craftsmen in connection with the implementation of Lean Construction. Two examples were:

- a negotiation culture characterised by "us and them" with focus on control

– a culture of partnership characterised by "us" with focus on self-management

The relationship between construction management and craftsmen influenced the culture that was developed and maintained on site and might also have had a spill-over effect on construction-site safety culture.

Negotiating culture could inhibit the solution of health problems when productivity and good working solutions converged but could also underpin a discussion of working conditions when the areas were opposed to each other.

Partnerships can increase productivity and good solutions for the work environment when the areas converged, but inhibit the solution of safety problems when the areas were opposed to each other.

One should therefore be aware whether there are safety aspects that could usefully be resolved within the community when negotiating culture is dominant and, conversely, whether there are safety issues that might disappear when the partnership culture is dominant.

All Actors can drive the process

In the following the relevant actors are presented.

Client requirement and craftsmen responses

In Denmark, clients are assigned greater responsibility for H&S on construction sites through regulation, including a requirement to appoint a safety coordinator with the function of coordinating the crossover H&S work between the various trade groups on site. This has led to several clients having started to formulate demands to contractors' work environment.

Despite the fact that production and the work environment usually were handled as two separate management areas, the craftsmen often perceive production and the work environment as two sides of same coin. It was therefore appropriate to create space for managing the work environment related to the partnership concepts. Several craftsmen in the construction projects expressed it like this: "When you perform an activity, you consider which method should be used to achieve a good result and the impact of the methods on H&S". When there was a "positive safety culture", it might help to promote that considerations of safety were taken seriously and given priority in the craftsmen's work behaviour and, conversely, a "negative safety culture" helped to promote a work behaviour that took chances.

The separation between production and the work environment, which existed in the organisation of the sites and the tools to address the areas, was not necessarily found among the craftsmen. This could have implications for how craftsmen experienced requirements for the work environment. Requirements might be perceived as the regulation of behaviour. Depending on the context, work requirements could serve as drivers for the development of safer behaviour, but they could also become barriers.

If the craftsmen did not see a purpose in certain work environment requirements, the craftsmen might perceive requirements as rules that make life more difficult and in the worst cases they could make the workflow more risky. At the same time very restrictive requirements that craftsmen did not see the justification of could result in a perception by the craftsmen that they were not being respected. This could lead to backlash, where the craftsmen disclaimed responsibility, since they felt that they were not consulted.

It could therefore be important in relation to the work environment requirements to consider:

- Whether the craftsmen on site are competent or whether they are characterised by for example unskilled labour, lack of experience, influenced by different standards than traditional Danish ones?
- Whether the safety culture is positive or negative?
- How the craftsmen perceive the requirements; whether the requirements are perceived as reasonable and legitimate or not?
- What the requirements are and how they should be disseminated to support the development of an appropriate work-behaviour on the actual site?

Lean Construction supports the craftsmen' joint coordination and planning across the trade groups. Since working conditions are perceived as an integral part of planning, it will be perceived by many as "natural" to include prevention of safety problems that can arise across the trade groups in the joint coordination and planning.

If working conditions on the construction site across the trade groups must be prevented, it would therefore be important to include craftsmen in the dialogue about how working conditions across the trade groups' activities might best ensure that their skills and knowledge of work processes and work environment could be incorporated in designing the construction site safety conditions.

Safety coordinator

The contractors' use of Lean Construction and the clients' use of a safety coordinator were intended to optimise and improve the interfaces between contractors as a way to achieve a better production flow and a better work environment. The building process and work environment on construction sites are dependent on contractors knowing their subjects and their work environment, including how they manage workflows responsibly in terms of the work environment. On the one hand the planning of construction processes and coordination of H&S work on construction sites were about coordinating the different disciplines working on site at the same time, and on the other hand about respect and support of the trade groups' own efforts. If the safety coordinator was unaware of the interface between the contractors' employer liability and the responsibility of the client, it could create confusion about the roles and responsibilities of those involved.

Construction managers were often safety coordinators in connection with the execution of total and head enterprises, while consultants were often safety coordinators in trade contracts. When the safety coordinator service for example in relation with major construction projects was undertaken by independent consultants, the service was defined as special services with its own budget. If the safety coordinator service was performed in parallel with other consultancy services or construction services, it would often be a part of the other services and not made independent as a special service with an autonomous budget. It might be considered whether the visibility of the safety coordinator service at the same time could highlight the client's priority of the task and support the prioritisation and legitimisation of time spent on executing the task for both consultants and construction managers, when construction projects were pressed on time schedule.

Construction managers

Implementation of Lean Construction by the contractors reflected a desire for greater involvement of craftsmen in the ongoing planning of the construction site as a way to improve planning and strengthen coordination between the contractors. This might challenge the existing construction manager that must take on a new role in the division of labour between the craftsmen and construction managers.

When companies chose to focus on concepts that supported and enhanced the employees' own resources as management strategy, it was rarely easy. Typical barriers might include (Forman et al, 2001):

- Disaffection of the middle managers' role in the new organisation due to an unclear definition of the role.
- Lack of provision of new skills of middle managers that would be necessary if middle managers were to perform their new role.

From several sides it was stressed that these barriers could be further emphasised in the construction sector, unlike other industries because of distance, both geographically and in local understandings between the company and the construction site (Bryman, 2005).

Construction managers played a central role in the interaction between production and the work environment. In connection with the implementation and use of Lean Construction and prioritising the work environment, it could therefore be necessary for the construction manager to define, develop and sustain a construction leadership that would be able meet the new challenges, for example:

- Handle the oversight and management of plans
- Can delegate responsibility and influence to the craftsmen, and be process manager for meetings etc.
- Can help with solutions to problems that go beyond craftsmen' competence when it is needed
- Have an eye for the need for informal coordination between meetings and the support of craftsmen when needed
- Takes H&S seriously

Additional challenges for the construction manager were that each project required balancing of the relationship between management based on "planning, direction and control" and "process management". Plans, management and control could promote the production, when craftsmen were not competent, but inhibit production when craftsmen were competent.

There could be several ways for the contractor to support the process. Lessons learnt from a construction site showed that construction managers with a background in the craft could be good facilitators in the process because they knew both the world of craftsmen and the world of construction management. This role could be prioritised by the contractor if he started to make the role visible and give it value. Lessons learnt from a second site showed that a clear division between construction managers, foremen and craftsmen could facilitate the process. On the construction site the foremen had the responsibility for using the Last Planner System,

and the construction manager only entered the process when it was necessary for example in relation to major changes.

The contractor's department for the work environment

At several medium-sized and large contractors, it was common to have staff functions within the company. Several contractors employed both H&S workers and employees working with the development and introduction of new production concepts, including Lean Construction. Staff functions were the link between the company and the construction projects.

Staff functions typically had three functions in relation to the actions they performed:

- Development of frameworks / concepts for construction projects.
- Resource support for construction projects
- Compiling of lessons learned from construction projects and ongoing evaluation in relation to the given area, including potential changes.

In connection with implementation of Lean Construction, it was relevant to consider how the interaction between the contractor's Lean Construction concept and H&S work should be. By coordination of procedures in the ongoing planning of construction processes and in the safety management system, activities could be coordinated already in the early planning and thus ensure that both the production needs and work environment were considered.

Documentation was an important element of safety management systems. Increased demand for documentation was further strengthened by external requirements to the documentation of its safety efforts at the site from both the Labour Inspectorate and the client. Documentation might increase oversight and provide a basis for new strategies by the contractor and thus help to solve H&S problems, but at the same time increased demand for documentation from the construction sites could take time from problem solving of H&S conditions on site. Departments of H&S must therefore be mindful of this balance.

When the demand for documentation increased, there was a tendency that the interaction between the H&S department and the construction managers was enhanced at the expense of the interaction with the H&S organisation on site. In this connection it could be relevant to distinguish between the contractor's safety organisation, which was fixed, and the site safety organisation, which was temporary, as it was established and only acting during the execution phase. This meant that for every new construction project, cooperation between the department of H&S and the H&S organisation on the construction site had to be established. In the interplay between the construction site's H&S work and Lean Construction activities, the work environment could be incorporated into planning through cooperation between site managers, H&S organisation and the safety coordinator. There might therefore be a particular challenge for the department of H&S to support and retain a well-functioning H&S organisation on site. A successful H&S organisation on site may contribute to qualifying the H&S work on site and provided important input to Lean Construction activities, and at the same time a well-functioning H&S organisation could help develop local understanding of the work environment on site.

Safety organisation

The safety organisation has one function only on construction sites and that is to keep the focus on H&S and undertake the systematic H&S work with the construction management and the safety coordinator. Hvid (2003) indicates that in the development of partnerships

those aspects of the work environment where there convergence is promoted, while other H&S issues risk being forgotten. A challenge for the safety organisation is, on the one hand, to maintain the H&S work with focus on working conditions and, on the other hand, to exploit the potential of Lean Construction to promote the work environment. The safety organisation should therefore consider the H&S issues that could usefully be addressed and resolved under the auspices of Lean Construction and the H&S problems that have to be addressed in other connections for example the contractor's department of H&S.

CONCLUSIONS

The results showed that synergy can be achieved between partnering and Lean Construction, and H&S work. There has to be a driver to facilitate the interplay between management areas, and it seemed that all the actors could drive the process. Because construction projects are project-organised, the context, the actors and the actors' interaction will be new each time. This means that every time the actors want to drive the interplay between new partnerships models and H&S, they cannot use routines but have to handle dilemmas which are context-dependent.

The dilemmas for the different actors shown in this paper were:

Client: Client demands can act as drivers, but they can also be barriers for developing safety behaviour on site

Safety coordinator: Coordination may visualise simplicity/interaction when interfaces are clear but may cause confusion when interfaces are pressed

Construction manager: Plans, management and control can promote the production, when craftsmen are not competent, but inhibit production when craftsmen are competent

Department of H&S: Documentation may increase oversight and provide a basis for new strategies by the contractor and thus help to solve H&S problems but at the same time increased demand for documentation from the construction sites can take time from problem solving of H&S conditions on site.

Safety organisation: In the development of partnerships those converging aspects of H&S are promoted, while other H&S issues risk to be forgotten.

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REFERENCES

- Bryman, A, Dainty, A; Price, A, Soetanto, R and King, N (2005) Employee perceptions of empowerment, *Employee Relations*, **27**(4) 354-368.
- Dainty, A.R.J., Bryman, A and Price. A.D.F. (2002) Empowerment within the UK construction sector, *Leadership & Organization Development Journal*, **23**(6) 333-342.

Dainty, A., Green, S. and Bagilhole, B. (2007) People and culture in construction. Contexts and challenges, in: Dainty, A., Green, S. and Bagilhole, B. (eds.) *People and culture in construction. A reader*, Oxon: Taylor & Francis, 3-25.

Forman, M and Joergensen, MS (2001) The social shaping of the Participation of Employees in Environmental Work within Enterprises - Experiences from a Danish Context. *Technology Analysis & Strategic Management*, **13**(1), 71-90.

Green, S.D. (1999) The Dark Side of Lean Construction: Exploitation and Ideology. *Proceedings IGLC-7, 26-28 July 1999*, University of California, Berkeley, CA, USA 21-32.

Gottlieb, S. C. (2010) *The constitution of partnering, a Foucauldian analysis of dispositives, space, and order in Danish construction*. Denmark. DTU Management Engineering,

Holt G D, Love, P E D and Jawahar Nesan, L (2000) Employee empowerment in construction: an implementation model for process improvement, *Team Performance Management: An international Journal*, **6**(3/4) 47-51.

Howell G and Ballard G (1999) Bringing Light to the Dark side of Lean Construction, *Proceedings IGLC-7, 26-28 July 1999*, University of California, Berkeley, CA, USA 33-38.

Hvid, H.S. (2003) Dilemmaer knyttet til medarbejderdeltagelse i partnerskaber, *Tidsskrift for Arbejdsliv*, **5**(2), 7-26

Jensen, P.L. (2002) Assessing Assessment: The Danish Experience of Worker Participation in Risk Assessment, *Economic and Industrial Democracy*, **23**, 201-227.

Kreiner, K (2002) Tacit knowledge management: the role of artifacts, *Journal of Knowledge Management*, **6**(2), 112-123.

Lingard, H and Rowlinson, S (2005) *Occupational health and safety in construction project management*. London: Spon Press

Nyström, J. (2005) The definition of partnering as a Wittgenstein family resemblance concept, *Construction Management & Economics*, **23**(5), 473-481.

Peckitt, S J, Glendon, A I and Booth, R T (2004) Societal influences on safety culture in the construction industry. In: S. Rowlinson (eds) *Construction safety management systems*. London: Spon Press.

Pidgeon, N. (1998). Safety culture: key theoretical issues. *Work and Stress* **12**(3).

Rowlinson, S (2004) Overview of Construction Site Safety Issues. In: S. Rowlinson (eds) *Construction safety management systems*. London: Spon Press

Turner, B.A. (1991): The development of a safety culture. *Chemistry and Industry*, 1 April 1991.