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Citation for final published version:

Walters, David 2009. Supply chains and the best practice in the management of health and safety at sea. Presented at: Seafarers International Research Centre Symposium 2009, Seafarers International Research Centre Symposium Proceedings (2009). Cardiff, UK: Seafarers International Research Centre, pp. 47-74.

Publishers page:

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Supply chains and best practice in the management of health and safety at sea

David Walters

Abstract

This paper explores the role of supply chains in influencing health and safety management. It draws on a recent review of research findings on the subject more generally and considers their relevance to managing health and safety in the maritime industry.

The paper outlines findings concerning the direct and indirect effects of supply chain business strategies on health and safety arrangements and outcomes. While it reveals a remarkable lack of systematic and rigorous evidence on the way in which the internal dynamics of supply chains impact on health and safety management and performance, it suggests that the broad thrust of the literature points to the negative impact of these strategies on the health and safety of many of the workers involved. At the same time it identifies some strategies that target supply chains as a focus for improving arrangements for health and safety in modern business practice. The paper discusses these in terms of their effectiveness, and coverage and considers the drivers behind their implementation.

Although most of the research that has considered supply chain management and health and safety is focused on economic sectors other than the maritime industry, this paper argues that many related findings can be applied to the industry and are relevant to understandings of the way in which the current organisation of work in the maritime industry impacts on health and safety

The study on which the paper is based was funded by the Institution of Occupational Safety and Health (IOSH) and undertaken jointly by Cardiff and Oxford Brookes Universities.

Introduction

Traditional approaches to improving the work environment and protecting the health and safety of workers have relied on the development, implementation and operation of employers' legal duties located within the framework of law governing relations between employers and their employees. Such requirements often originate in discourse involving economic actors representing the interests labour and capital,

mediated by political processes, leading to legislative standards and arrangements to seek compliance with them through the intervention of state regulatory inspection agencies. However, current approaches to achieving best practice in occupational health and safety have developed against a background of quite fundamental change in the structure and organisation of work and its regulatory, political and economic contexts. Such change as has come to characterise the so called ‘new economy’ globally. The maritime industry is widely regarded as a sector in which (for a host of reasons to do with its economic structure and organisation, its global reach and the limitations of both international regulation and organised labour) the impact of these changes is comparatively advanced.

In this scenario, established norms that influence the way in which health and safety management is conducted across a whole range of economic sectors are acknowledged to no longer hold sway in the same ways they did when traditional approaches to its governance and regulation were developed. Instead, where these approaches are seen to have failed, or to be no longer relevant, business practices and market regulation are increasingly seen as containing the appropriate drivers to stimulate and sustain best practice on health and safety at work. Business relationships operating within supply chains are an example frequently cited as possessing such capacity. Here again, while such features are common to many economic sectors, the maritime industry is in many ways an extreme case. In this paper I examine the evidence for the role of supply chains in health and safety and the claims made for it, with a particular focus on their relevance to improving health and safety management practices in the maritime industry.

To do so, it is first important to establish what I mean by supply chains and their effects and secondly why they are especially significant at the present time. Having done this, I consider the effects of an increased business focus on supply chains for the health and safety of the workers involved — in the maritime industry and elsewhere. In this part of the paper I outline some findings of a recent review of the research literature on supply chains and health and safety – considering both positive and negative effects — before turning to examine the implications of these findings for the future of health and safety at sea.

What are supply chains and why are they so important for health and safety management at the present time?

Supply chains describe business relationships in which goods and services are produced, bought and sold, and increasingly, the logistics necessary to maximise the flow of these processes. They cover simple transactions between buyers and suppliers as well as complex arrangements in which there may be multiple links in supply chains. Most business organisations are likely to be located within a nexus of buying and supplying relationships for goods and services that may be quite different in character according to the nature of the goods or services involved. They will, therefore, be likely to be involved in multiple supply chains and engage at different levels within each.

This has pretty much always been the case, but current business and organisational practices have served to increase the importance of supply chains to business strategy as well as within national and global economies. A range of wider economic and regulatory factors have also influenced the evolution of these practices, including developments in information technology and logistics, neo-liberal economic, political and regulatory strategies, and the related withdrawal of the state from command and control regulation, reduced power and influence of organised labour, weakening of the traditional employer-employee contractual relationship, and the increasing prominence of so-called 'porous organisations' and flexible work patterns (See for example, Kersley et al 2006, Millward et al 1992, Wiggins 2002, Colling 2005). Conceptually, these changes can be viewed as comprising developments that have served to make outsourcing more feasible for organisations and those that have driven it in 'business terms'.

At the general level, a central feature of the growing importance of supply chains in the production and delivery of goods and services, and hence the outsourcing on which this growth has been built, is the way in which it has involved a move by organisations to place less reliance on 'management through hierarchy'. In effect, this growth has encompassed a move towards the wider adoption of decentred and fragmented forms of management control that are more directly based on, and informed by, market logics and dynamics.

Supply chains and health and safety in maritime transport

In this scenario transport industries occupy a particularly significant position. On the one hand they, like many business organisations in other sectors, have sought to maximise their business advantage by manipulating features of supply chains to improve their profitability, efficiency and market position. On the other, they are also a key element in providing the logistics efficiencies that have helped make the focus on supply chains attractive to business in the first place.

Both these factors impact on health and safety. The first, as in other sectors, has especially involved a shift to greater use of outsourced labour supply in transport. In road transport for example, studies of accidents have drawn attention to the link between unsafe driving and work patterns imposed upon drivers through sub-contracting in the industry (Belzer 1994; Belzer 2000, Braver et al 1999, Mayhew and Quinlan 2006, Johnstone et al 2006). Negative health and safety effects of fragmentation and contracting out are not confined to the private sector, but feature in the public sector too as Danish research on bus drivers has shown (Netterstrom and Hansen 2000, Hasle 2007). Similarly, in rail transport there have been several major accidents, resulting in significant loss of life, that have been linked to multi-contracting in the supply of services. Less well known, is the toll of injury and fatalities suffered by the railway workers caught up in such changes of business practice (Baldry 2006).

However, maritime transport represents perhaps the most extreme example of a fragmented relationship between labour supply and company operation in transport. Here, the last two decades have witnessed major changes in both the nature of the labour force, its relationship with the ownership of ships and the way in which work in the industry is organised. Even though the largest share of ownership of the industry remains within the so-called 'embedded maritime states' of Europe and North America, its labour force does not. As is well known, the large majority of the more than one million seafarers working on merchant ships worldwide now comes from a small number of southern hemisphere countries such as the Philippines, India and China and from former communist Eastern Europe. They are recruited through crewing agencies on short-term contracts and work on ships managed by ship

management companies (Alderton et al 2004). This is a vivid illustration of a labour supply chain, in which the outsourcing allows buyers to contract labour at favourable prices and thereby reduce costs and raise their profitability. But the working conditions experienced by this outsourced and largely non-unionised labour force are extreme by land-based standards, involving long working hours, shift work and intensive work patterns as well as serious physical hazards (Bloor et al 2000, Nielsen and Roberts 1999). At the same time, the organisation of the labour process for seafarers has changed profoundly, with simultaneous drives towards work intensification through the employment of smaller crews and the operation of faster ships. A response to this shift in labour supply is found in requirements for seafarers to be in possession of particular qualifications in an effort to ensure standards of competence in the new, outsourced labour force. However as Bloor and Sampson (forthcoming) have vividly demonstrated in their study of training provision and off-shoring, the possibility for abusing this system is considerable

The maritime industry even better illustrates the effects of the second aspect of increased business focus on supply — the emphasis on logistics. Key to the success of supply chain management is speed and efficiency in transportation. The central role of merchant shipping in the logistics of global supply chains has meant that to increase profitability, as well as the above changes, the containerisation of goods has taken place on a fairly widespread scale in relation to the transportation of non-bulk dry cargoes. This has led to profound changes in operating practices and the redesign (and relocation) of ports to achieve shorter times spent in loading and unloading cargoes (DeSombre 2006, Kahveci and Nichols 2006, ILO 2001). Arguably the consequences of these changes are seen in the way in which occupational mortality and morbidity rates for seafaring remain among the highest for all occupations (Roberts 2000, Roberts and Marlow 2005). They are further seen in the high incidence of shipping incidents ascribed to seafarer fatigue, and the range of psychosocial health effects caused by working patterns and the social isolation experienced among seafarers, both at sea and in modern port facilities (ILO/WHO 1996, Wadsworth et al 2006).

Chartering arrangements further demonstrate the way in which a business focus on supply chain management helps to disrupt the legally constituted relationship between

employer and employee, on which, as in other industries, most approaches to the safety management of ships are based, with results that sometimes lead to serious incidents to ships and threaten the safety of seafarers. For example, as Sampson (2008) describes in her analysis of the effects of the direct relationship between a charterer and the captain of a ship (*Kodima*) involved in a major incident at sea, how direct pressures from charterers can lead captains to undertake actions that are against their professional judgement. How frequently the commercial interests of charterers, which demand a speedy delivery of goods, feature in the underlying causes of such major incidents is not known and would be worthy of further investigation. However the essential point here is that it represents a situation typical of the growth in 'porous organisations' in which buyers are able to deal directly with the employees of the company with which they have commercial contracts and, in so doing, impose demands on them that are based on these commercial interests. This circumvents a legal relationship determined in the contract of employment, which is the basis for employer responsibilities for health and safety and the primary driver for health and safety management at sea as elsewhere. Such situations therefore undermine the theoretical protection for seafarers provided by these responsibilities and the systems they engender, make the implementation of systematic approaches to health and safety management more difficult to achieve in practice and increase the vulnerability of seafarers.

The logistics revolution that has enabled the 'efficiency successes' of supply chains management in the maritime sector has not only had a profound impact on the structure and organisation of the life and work of seafarers but also on that of dockworkers and related labour (Bonacich and Wilson 2008).

While some dockworkers and their trade unions (such as those on the West Coast of the US) have managed to hold onto a favourable labour market position in the logistics revolution, it is evident that this has not been the achievement of all dockworkers. Even where it has been the case, it has by no means prevented the considerable job-losses that have accompanied the port redesign and relocation that has occurred on a major scale in North America, Europe and elsewhere in recent decades. Moreover, such redesign has led, not only to changes to facilitate

containerisation, but also to widespread change in port design generally, with specialist terminals for handling oil, chemicals and other cargoes.

What all these developments have in common is a focus on speed, efficiency and economy in the carriage of cargo. Their results have had major implications for the dockside labour force, with a significant reduction in the number of workers involved, destruction of docklands social communities and, for those fortunate enough to be retained in work, relocation of workplaces to ‘transport hubs’, sometimes considerable distances away from previous worksites and major changes in the nature and level of intensification of the work involved. As a result, with a much reduced labour force and technological development, the overall incidence of harm from the hard physical labour associated with the work of loading and unloading ships could be anticipated to have reduced in scale. But as is evident from the incidence of major and fatal accidents, in fact, the work remains hazardous and the occurrence of serious and fatal injuries continues to be a problem – as does the hidden health effects of all these changes on the populations affected by them.

For seafarers too, the redesign and relocation of ports adds not only to the intensification of work but also to social isolation, as they are no longer able to enjoy the extent of shore leave that was once the norm, nor are many of the ports in which their ships berth found near the centre of cities today. The result is a further contribution to the institutionalised and isolated lifestyles of seafarers, which has been noted to contribute to poor mortality and morbidity outcomes.

Wider evidence of the impact of supply chains on health and safety at work

While the maritime industry represents a fairly extreme case, none of these examples from maritime transport are particularly surprising if the wider literature on the consequences of the business focus on supply chains is considered. In their recent review of over 250 studies, Walters and James (2009) found they pointed overwhelmingly to poorer working conditions, seen as ‘indirect’ consequences of supply chain management arising, in the main, from the manipulation of price and delivery conditions by those in powerful market positions within supply chains, and from the complex and fragmented webs of relations between contractors and

subcontractors, also often the product of outsourcing, who are engaged at the same worksites.

They report studies from a host of industries including construction, chemicals, motor manufacturing, telecommunications, the nuclear industry, food production and processing, textiles and footwear (as well as the studies in the various branches of transport already mentioned). Insofar as evidence on the health and safety effects of supply chains was identified in these studies they noted that it took three main forms:

- Analyses which explore, conceptually and on the basis of secondary evidence, the *potential for outsourcing, and hence supply chains, to have adverse health and safety effects;*
- Empirical findings which shed light on the propensity for workers employed in sub-contracting organisations, or on types of employment commonly associated with the growing use of outsourcing, *to experience work-related ill health and injuries;*
- Empirical explorations of *the way* in which the operation of supply chains in particular sectoral settings impacts on the working conditions of those who work for supplier organisations.

These sources of evidence, both individually and in combination, provided considerable support for the view that the dynamics of supply chains frequently lead to adverse health and safety effects. They also show how these effects are intimately connected to the way in which such dynamics serve to exert downward cost pressures on suppliers, thereby leading them to adopt more intensified and casualised employment regimes, and, more generally, act to engender poorer quality, and more fragmented, health and safety management arrangements.

For example greater control by market and related mechanisms in recent decades has led to significant changes affecting work organisation including restructuring/downsizing by large private and public sector employers and consequent effects on work intensity via changes to staffing levels/workloads, multi-tasking, increased hours of work/presenteeism and unpaid overtime, decline in the proportion

of the workforce in full-time permanent employment (especially for males) and increased part-time, temporary, fixed term and leased (agency) work, elaborate national/international supply chains and growing use of (multi-tiered) subcontractors and agency workers. Outsourcing in the private and public sector has led to growth of self-employment, growth in micro businesses and in the number of small business employers. Subcontracting/franchising as well as use of IT has facilitated the growth (sometimes re-emergence) of home-based work, remote, transient (such as short term call centres) & telework. There are further associations with increases in multiple job-holding — often associated with part-time and temporary work (Louie et al 2006).

Such findings are not exclusive to small firms and apply equally or even more so in the case of precarious forms of employment such as result from the supply of labour through employment agencies, through labour leasing or through subcontracting, Quinlan et al (2001) reviewed nearly 100 studies that had used indices such as injury rates, sickness absence rates, occurrence of cardiovascular disease, and knowledge of legal rights and responsibilities in OHS, as well as subjective measures of health outcomes. Nearly 80 per cent found an association between the type of employment in question and adverse health outcomes. In a more recent review that updated and applied more robust selection methods and quality criteria to the studies reviewed, the same authors confirmed these earlier findings and OHS was found to have been adversely affected in an even larger majority of relevant studies (Quinlan and Bohle 2008). Quinlan and his colleagues (2001) have argued that the economic pressures and reward systems encountered in these forms of employment result in poorer health and safety outcomes than might be anticipated in more traditional employment arrangements, leading them to comment that in ‘any organisation where outsourcing has become common, OHS standards deteriorate...’ (Mayhew et al 1996).

There are at least four sets of compelling reasons why the net aggregate effect of outsourcing are likely to be adverse that are generally supported by evidence from research literature. First, much of the externalisation of work activities has gone to smaller organisations, which possess less adequate and sophisticated systems of risk management than their larger counterparts and for which there is now substantial evidence that both health and safety management and performance is poorer than in their larger counterparts (Nichols 1997, Eurostat 2002, Nichols et al 1995, Cully et al

1990, Stevens 1999, Walters 2001, 2008). Second, problems arise with regard to the co-ordination of such management in situations where sub-contractor and temporary staff work in physical proximity to in-house personnel. Third, inter-organisational contracting can have a detrimental impact on conventional channels for the representation of the interests of workers. (Johnstone et al 2006, Walters and Nichols 2007). Finally, associated commercial contracts can limit the ability of those organisations engaged in the supply of labour or the provision of manufacturing and other services to invest in preventive health and safety measures for example, in a British study of health and safety in small firms, owner/managers reported how their ability to invest in health and safety was limited by the narrow profit margins that they were operating under as a result of the contract prices demanded by larger clients (Vickers et al 2003).

Evidence from a number of studies further suggests that the co-ordination of risk management is problematic in sub-contracting and labour outsourcing because overall management control and responsibilities are more diffused in these situations (Wright 1986, Wright 1994, Baldry 2006, Cullen 2001, Uff 2000, Loos and Le Deaut 2002). There is also some evidence to show that the direct and indirect effects that buyers have on suppliers can lead them, in turn, to seek similar changes within their own suppliers. There would, however, seem to have been surprisingly little detailed research undertaken which sheds light on these 'second tier', or 'downstream' effects, either generally or specifically in relation to health and safety elements (Scarborough 2000, Turnbull et al 1993).

There is also a considerable body of evidence relating the development of the kinds of work insecurity, intensification and flexibility typical of the results of supply chain pressures, to a variety of adverse health and health related outcomes, including increased incidence of cardiovascular disease, burnout and depression, (Kivimaki 2000) Ferrie et al 2002) and to poor workplace safety outcomes (Thebaud Mony 1999, Rousseau and Libuser 1997, Benach et al 2002, Blank 1995, Allan 2002). Factors associated with these poor health and safety outcomes again include greater job insecurity, poorer pay, lowered access to training among precarious workers, less control over working time, which in turn contributes to lack of knowledge and awareness of safety issues and complaints about lack of voice (Aronson et al 2002,

Draca and Green 2004, Feldman et al 1995, Bohle et al 2004, Walters and Nichols 2007).

Another way of looking at the impact of these structural changes in employment is to examine their influence on the achievement of a 'positive safety culture' by organisations. Research suggests that such a culture requires good communication, trust, the presence of OHS feedback systems and shared perceptions of commitment to OHS. Following an extensive review of the theoretical and empirical evidence of the likely effects of changing employment relationships on safety attitudes and behaviours and their implications for organisational safety culture, Clarke (2003: 49) argues:

An overview of the evidence suggests that organisational restructuring may damage the mutual trust between core workers and managers, undermining the existing safety culture. Furthermore adding contingent and contract employees to the workforce threatens the integrity of the safety culture by further eroding the trust of core employees.

In summary then, the vast majority of studies in which the effects of supply chain business orientations on health and safety have been studied demonstrate poor health and safety outcomes and a constellation of structural and organisational reasons why they occur. While this work has been undertaken predominantly in land-based economic sectors, it strongly supports the findings of the much more limited studies on the maritime industry reported earlier and suggests that, if more detailed and robust studies were undertaken in the sector, they would be most likely to expose similar details of poor health and safety outcomes and similar reasons for them.

A glass half full? — Harnessing supply chain management to improve health and safety

Despite this somewhat gloomy scenario, in some of the studies reviewed by Walters and James (2009), there is an acknowledgement that the economic relations involved may, in certain circumstances, lend support to improved health and safety arrangements for individuals or organisations in dependent relationships within supply chains. This is as a result of the ability of powerful supply chain actors to

require their suppliers to adopt certain specified policies and practices. It is these so called ‘direct effects’ that seem to have caught the attention of national regulators and policy-makers who are faced with developing strategies for achieving and maintaining compliance with health and safety standards and protecting workers in a rapidly changing economy. As a result, the supposed positive role of supply chains has become increasingly prominent in policy rhetoric concerning ways of reaching, supporting and sustaining good health and safety practice within small firms, among contractors and subcontractors, and in relation to the safe use of hazardous substances and machinery — especially within neo-liberal economic and regulatory constructs. They also feature quite extensively in public relations pronouncements concerning corporate social responsibility and fair-trading arrangements, especially among companies engaged in global trading.

Given their prominence and their clear attractiveness to policy-makers in current economic and regulatory scenarios – it is important ask what is the evidence for these claims, what are the drivers of good practice and — in relation to the particular focus of the present paper – what is the relevance of the answers to these questions for the maritime industry.

Attempts to improve health and safety management within supplier organisations vary in terms of their form and foci, but broadly encompass, procurement strategies that use health and safety standards to select contractors, certification schemes aimed at ensuring the competencies of contracting organisations and those working for them, and the imposition of requirements relating to the more general management of health and safety, including the utilisation of risk assessment and communication within multi-contractor/subcontractor work sites. They differ in terms of their level of operation, with some operating on an industry/sector basis, and others at the level of individual contracting organisations or, as in the case of construction, individual projects.

In general, systematic evidence regarding the impact of these types of initiatives is weak. Walters and James (2009) nevertheless identified a limited number of examples where there had been positive effects on standards of health and safety management and performance. None of this evidence comes directly from the maritime industry.

Indeed it is mostly restricted to cases in construction, in road transport, food production and in the textiles and footwear industries. Nevertheless it describes situations for which there are analogous cases in the maritime industry and which therefore suggest scope for further investigation. Essentially, these situations can be described under five main headings, each of which is briefly summarised below.

Procurement strategies: In theory, the power wielded by the purchaser of goods or services allows client/customers opportunities to influence improvement in health and safety management among suppliers. There is some evidence to indicate that procurement approaches used to improve health and safety arrangements by large construction concerns during major projects meet with some success. For example, during the building of the major land works supporting the land/sea link between Denmark and southern Sweden in the 1990s, evidence showed that initiatives on health and safety requirements in procurement helped to reduce the incidence of occupational accidents (EU OSHA 2000). Similar findings were reported in relation to the building of Terminal 5 at Heathrow Airport (Ewing 2006). They were prominent in the construction of the facilities for the Sydney Olympics – where, Government, business and trade unions agreed to collaborate to achieve a number shared objectives including ‘the highest possible standards of health and safety’ leading to an exemplary performance (Webb 2001) and are currently in use by the Olympic Development Authority for the London Olympics (Waterman 2009)

However, other research on procurement practices in construction for example, suggests that the achievement of such influence is far from the norm the industry. Findings of a survey by Davies Langdon (2007) for instance showed that while clients set contractual requirements on health and safety in the procurement of services, they were less engaged with efforts to monitor compliance or undertake post-completion review of such arrangements. In other words, opportunities to monitor and improve supply chain influence were being overlooked— despite its comparatively tight regulation the UK.

Research literature on selection issues in the procurement of contractors in construction more generally suggests that health and safety, while present, is not prominent. Findings in an early study (Hatush and Skitmore 1997) indicated that the

most common criteria considered by procurers during the prequalification and bid process were ‘those pertaining to financial soundness, technical ability, management capability, *and the health and safety performance of contractors*’ (my italics). Most studies, however, show that quality record, contractor experience and company reputation are the most influential criteria, with tender price exerting the most significant influence (Jennings and Holt 1998), while one study on the procurement and management of small building works suggested that the CDM Regulations in the UK had ‘left ambiguities, primarily through specified exclusions to application, through which health and safety responsibilities may be downplayed or even simply disregarded’ (Griffith and Phillips 2001).

Beyond the construction industry, the role of procurement in requiring improved health and safety from suppliers is cited in a number of accounts. For example, the European Agency for Safety and Health provides an account of the practices in the main electricity producing and distributing company in Belgium, where health and safety requirements are applied both to the procurement of labour and products (EU OSHA, 2000:94-99). This appears to be aided by the presence of national contractor certification systems in Belgium that enable the company to choose appropriately experienced contractors.

Consideration of health and safety in procurement strategies is also occasionally found in relation to products, such as with hazardous substances (Walters 2008) and in the hire of power tools in construction (Ponting 2008).

Certification, competency and supply chains: If customers are required to assume some responsibility for choosing contractors from among those qualified and competent to undertake work safely and without risk to the health, it follows that they need information to make appropriate choices. This requirement has stimulated the development of certification systems covering both organisational and individual health and safety competencies of contractors. For example, the Dutch *Sicherheits Certifikat Contractoren* (SCC Certificate) used in several EU countries is an example of supply chain leverage on contractors to evaluate and certify their OSH and environment management systems. It is intended as a means to demonstrate that a contractor works in compliance with fundamental statutory requirements. Significant improvement has been reported as a result of its development (EU OSHA 2002). But

detailed evaluation of the underlying factors influencing its implementation, operation and outcomes appears lacking.

In the UK, where similar responsibilities are also the case under the CDM Regulations, their downside has also become increasingly evident, especially in relation to the over-bureaucratisation of supply chain management. Carpenter (2006) for example, provides details of a dozen schemes that are available for assuring individual competencies and more than twice this number for assuring organisational OHS competence. Not surprisingly, his report's recommendations concerns ways of standardising these approaches, echoing similar findings from others, such as the Better Regulation Unit, which warns of the growth of multiple schemes, and the confusion of, bureaucratic burden upon contractors (Better Regulation Unit 2008). Nevertheless, there is no sign of the recommended rationalisation occurring.

Inspection, auditing and monitoring: The importance of the inspection, auditing or monitoring of suppliers' performance in accordance with procurement criteria is identified in several of the above accounts. It also features generally in accounts of supply chain management influence. Two aspects are particularly pertinent, the first being the indication that buyers frequently do not follow through with adequate monitoring arrangements and the second, that when they do, they are often over-bureaucratic. Two HSE research reports that examined health and safety in supply chains in three sectors, food processing, health services and private events organising (Partnership Sourcing Ltd 2003) and on client/contractor relationships in six different economic sectors (Partnership Sourcing Ltd 2006) comment on the tight control — including regular audit and inspection — by supermarket chains in relation to food hygiene and note the obvious business reasons why this is so. But they further note the absence of similar messages in relation to health and safety, thus echoing more in-depth research into food retail supply chains (see James and Lloyd 2008).

Supply chains and other aspects of health and safety management systems: In Germany VW-Audi offers specific support for the management of the hazardous substances it supplies to about 2,600 small contractual car-dealers and garages, About 2,500 different chemical products are available under the VW-Audi label, the use of which is prescribed by VW-Audi. There is no published evaluation of the impact of

this support, but anecdotal observations suggest dealers and garages rely on it (Sul 2005 in Walters 2008). A reason given for this dependency is that the dealers and garages are obliged to comply with the quality management system of the company and this compliance is checked during annual audits. It is a good example of very close and contractually determined association between a large buyer and economically dependent dealers and garages allowing the latter little choice but to comply in order to retain business.

The chemical industry utilises supply chains to promote its programmes like Responsible Care and Product Stewardship, which concern the sound management of safety, health and the environmental effects of products. This necessitates co-operation between dealers and users and is intended to offer an early warning system for safety, health or environmental risks relating to a product, allowing problems to be tackled in good time. In theory it should lead to increased trust between suppliers and customers and greater confidence throughout the whole product chain, as well as acting as a motor for continuous innovation that will enable incorporation both of new regulatory and market developments. Limited evaluation of these programmes, has suggested they are successful within the industry itself, but there remains uncertainty concerning their reach, for example, to users outside the tight relationships within the industry (Walters 2008:143). Generally, work on the nature of inter-organisational relationships within the chemicals industry has highlighted the extent of integration that exists here and how it is governed by both the structure and the nature of the economic relations between customers and suppliers within the industry, the ways in which the development trust is supported in these relations and the role of individual 'boundary spanning' agents in maintaining co-operative practices between organisations (see Marchington et al 2005: 135-156).

This is an important point. The research literature on management more generally, when regarding supply chain relationships and the factors which influence them, draws a distinction between relations that are more transactional, and primarily cost-based, and those which are more collaborative and incorporate a greater degree of financial mutuality (Espino-Rodriguez and Padron-Robaino 2006). Strongly cost-based supply chain relationships have adverse implications for the employment conditions applying to those employed by lower level suppliers (Hunter et al 1996,

Scarborough 2000, Wright and Lund 2003). As James and Lloyd (2008) show, such conditions so negatively affected can include health and safety.

The wider literature also indicates that the existence of a substantial degree of trust between the contracting parties is crucial to the establishment of collaborative types of arrangements and that this is most likely to exist where a good deal of mutual dependency and risk sharing exists, and where power is relatively evenly distributed. It further notes that there are contexts within which those at higher levels within a supply chain may choose to impose employment-related conditions on to suppliers lower down them as a result of 'quality' considerations; such as concerning the qualifications of staff and the training that they should receive (Swart and Kinnie 2003, Kinnie and Parsons 2004). These are potentially beneficial in terms of health and safety but adverse implications can also arise — especially if these conditions are imposed on suppliers at the same time as strongly cost-based contracting practices (Beaumont et al 1996).

Infrastructural support: There is also evidence that not only are the direct relationships between suppliers/users, customers/suppliers important locations for leverage to improve health and safety but that related organisations in their business environment may also be useful in this respect – as is the case described by Walters (2008), where a German paint suppliers' association provides important supporting leverage to achieve the safe use of hazardous substances. This illustrates a further precondition likely to be important for the success of supply chain initiatives on health and safety. A well-established feature of German industry is its strong (and regulated) sectoral infrastructure. As Walters (2008) has argued, it is this feature that supports the inter-organisational arrangements for health and safety that are often apparent at sectoral level in Germany. In looser organisational contexts such as in the UK it is unlikely that such infrastructural support will be the norm.

To sum up then, it seems that intervention in supply chain management to support health and safety *can* work under certain circumstances. However, three features emerge from this overview. First is the sense that the evidence of this is limited because very few initiatives have been subject to any rigorous evaluative scrutiny. Second is that despite this, the various examples corroborate one another in terms of

the ubiquitous presence of internal ‘regulatory’ arrangements whereby dependent actors in supply chains are, in one way or another, subjected to processes of supervision and control. The third striking feature of these accounts is that they seldom offer much inkling as to *why* the dominant players chose to take these initiatives to promote and support health and safety management amongst their suppliers in the first place and *what* it is that drives them to maintain the scrutiny most accounts deem necessary for their success.

To answer this question Walters and James (2009) found it necessary to turn to literature on global supply chains and fair trading standards. Here, while drivers such as increased profitability and business efficiency, company reputational risk, and corporate social responsibility agendas, as well as compliance with regulatory requirements, are frequently cited by the heads of global supply chains as reasons why they subscribe to and promote fair labour standards, it is equally clear that awareness of the benefits of exerting such influence is not necessarily automatic on the part of the organisations concerned.

A more comprehensive reading of the literature on market regulation — and especially that on global supply chains — suggests that a striking feature of this environment concerns the involvement of a range of actors, structures and procedures beyond the immediate supply relationship, that act — or have acted — in concert to prompt and sustain the desired effects concerning improved working conditions for vulnerable workers at the end of the chain. For example in the global food, garment and footwear industries, the business case for supply chain controls to improve health and safety conditions in the supplying farms and factories of the southern hemisphere, does not emerge directly from the improvement of the health of the workers concerned— or even from the possible increased efficiency and quality achieved by this improvement. Rather, it comes from the potential for improvement in the public image of the client and the consequent selling potential of its ‘labels’ in northern hemisphere markets, which are otherwise threatened by bad publicity associated with exposure of poor conditions of labour in its supply chain.

Such threats to business and the freedom of capital emerge from the effects of the concerted efforts of networks of social interest groups, organised labour, regulators,

media and so on. They are further sustained by alignments of mutual interests among trades unions, non-governmental organisations, labour inspectors, consumer and community action groups and others seeking to represent the interests of exploited workers, in negotiation and consultation with representatives of the companies at the heads of the supply chains concerned.

The 'ethical trading partnerships' that result from such relations are further supported by various international bodies such as the ILO, WHO, donor agencies and NGOs and also enjoy a degree of arms-length approval from associated governmental bodies. The consequences are seen, for example in the more than 1000 corporate codes detailing labour conditions for corporate suppliers estimated in a World Bank (2000) survey and the 98 per cent of the world's largest 500 companies that are reported to have a code of ethics or similar (Wilson and Gribben 2000). They are also found in the flagship partnerships such as that between multi-national car manufacturer, Volkswagen AG, the ILO and the German aid agency GTZ aimed at the development of an international guideline for OSH and supply chain management (Fromman 2008, Kristjansdottir 2007). But as Rodriguez-Garavito (2003) puts it, the stimulus for their development is found in the efforts of interest groups to expose the abuses of labour conditions for workers at the base of global supply chains and spur the formation of transnational advocacy networks:

‘...aimed at re-establishing the link, blurred by global outsourcing, between brands and retailers in the North and workers in supplier factories in the South.’

Analysis of these interventions has led to the emergence of a theoretical literature in which they are regarded as part of a new form of global economic regulation which increasingly occupies the space between the perceived failure of state regulation and that of the market to achieve such ends in supply relations (see for example the work of Jessop (2002) Braithwaite and Drahos (2000) O'Rourke (2003), Weil and Mallo (2007) and others).

This is not only something that applies in the global relations between labour and capital but as Arup et al (2006), Heckscher (2006) and others have noted, it also has

resonance much closer to home. As the power of organised labour to confront capital has been weakened by changes in the structure and organisation of production, other forms of social resistance have emerged within civil society. Often isolated, ephemeral and issue specific, their impact is usually limited, but occasionally, and especially when they act in concert they are able to mount a more formidable challenge and force business organisations to modify their commercial strategies. Thus, in some of the examples of direct supply chain effects on health and safety management previously cited, the high profile of the activities involved — such as for instance, in the construction of facilities to host major sporting events or to build new airports — has meant that trades unions, environmentalist groups, victim support groups and others have been able to operate alongside state inspection agencies and persuade the heads of supply chains in the businesses involved to implement more rigorous health and safety standards in order to offset the reputational risks associated with very public evidence of the fatalities that could otherwise be anticipated on the construction sites in question. Thus, the significance for trades unions in influencing the terms under which the construction of sports stadiums and the like takes place, is that it results from their potential to act in concert with others to draw attention to the damaging effects on large contractor company reputations in such high profile situations, rather than stemming solely from their power in labour relations on construction sites.

These observations are especially pertinent in relation to the potentially positive role of supply chains in the maritime industry. It is to this we turn by way of conclusion.

Conclusions: the relevance to the maritime industry

At sea — as in other economic sectors — the predominant impact of increased business focus on supply chains is to worsen the conditions of labour (and hence health and safety) for seafarers, both because of the significance of current outsourcing and off-shoring strategies and because of the key position of the industry in terms of global supply chain logistics. However, there are also a number of supply chain based business strategies currently employed in the industry, that are analogous to those found to be helpful in promoting good health and safety management practices in other sectors. Based on the understanding of the wider supply chain

literature, I have argued that structural determinants of the nature of the business relationship in question — for example, the extent to which they are collaborative, trust-based and longer term, where the business interests of both parties are seen to be served well and where the risks to suppliers posed by their non-compliance are perceived by them to be high — are significant factors that help to determine the extent to which it may be possible for buyers to influence the health and safety practices of their suppliers, as are the institutional and regulatory contexts of the business relationship in question. This I would suggest, applies in the maritime industry as much as it does elsewhere.

For example, a combination of procurement and rigorous monitoring/ inspection in relation to the operation of health and safety management systems is already imposed on large parts of the tanker industry that operate under contract to ‘oil majors’. As economically powerful purchasers of the services of tanker companies, the oil majors at the head of oil transportation supply chains are in a strong position to dictate health and safety management standards to their suppliers. Anecdotal evidence suggests that this is what they do, and moreover, they inspect and monitor compliance quite rigorously, with the result that their demands are prioritised and implemented by the shipping companies involved. That they bother do so is also easily explained, by their high profile and the reputational risks to their business that are threatened by ship incidents that might arise from poor safety management.

Other parallels potentially exist with direct supply chain effects found in other industries. For example, certification processes adopted in the industry, whether they address the competency of individuals, the health and safety management practices of companies or the standards required for ship operation all have parallels with certification practices in land based industries in which supply chain leverage has been used to improve implementation. This is not to say that such practices necessarily have the same effects at sea, but rather to suggest that it could be useful to evaluate them in these terms in order to understand ways in which they might be made more effective. Equally, there are dangers within these practices. Over-bureaucratisation, ineffective or inappropriate monitoring and inspection, victim blaming, falsification of records and other fraudulent practices are all frequent subjects of anecdotal accounts of what goes wrong with some of these procedures

when they are applied at sea. Again, this suggests a better understanding of the preconditions for their successful operation might be useful.

A further point concerns the role of infrastructural support. As demonstrated in land-based scenarios, strategies to improve health and safety management that utilise supply chains to do so, work best in longer term, trust based business relationships located within supportive infrastructures. Such support potentially exists within the maritime industry in the many groups and associations representing the maritime trade. However, it may not be recognised as such and its potential may not be effectively harnessed. Similarly there is a strong message here concerning the potential for concerted actions from social actors concerned with the safety and well-being of seafarers including trades unions, charitable organisations, seafarers' welfare groups, NGOs, as well as environmentalist groups and international bodies such as the ILO and IMO.

Finally, one might ask why should we be bothered about all this? The answer would seem to lie in the fact that despite improvement, current mortality and morbidity records demonstrate that the maritime industry remains among the most dangerous economic sectors in which to work. Most health and safety analysts would agree that such dangers arise not only from the risks of the sea itself but also from the way in which work is conducted and as such, they are largely preventable. At the same time, the industry has moved a long way from the reach of conventional regulation and presents an enormous challenge to traditional command and control approaches to achieve this prevention, protect workers and improve health and safety. In this scenario, approaches that utilise other drivers that may exist within, and around, the business relationships that occur in the industry are obviously useful. If they can be shown to be effective and if what makes them effective can be better understood, it might help to improve their application and evaluate the potential to transfer them to other parts of the industry. This would seem to suggest important lessons for a host of stakeholders in the maritime industry, lessons that could be gleaned from further research in this field.

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