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## **What about the workers? — Experiences of arrangements for safety and health in global container terminals**

### **Competing interest statement**

None of the authors have any competing interests to declare.

### **Abstract**

Container terminals are normally exclusively involved with the transport of containerised goods. They now exist everywhere and have redesigned dock-work to increase productivity and efficiencies in the handling of goods, making physical handling by dock-workers increasingly redundant. Conventional wisdom suggests that arrangements for the safety and health of those who remain in employment are generally improved in comparison with past conditions. Yet, reliable evidence of the effects of work on the occupational safety and health (OSH) of these workers is scarce. This paper is based on research which examined the OSH experiences of workers involved with operational tasks in terminals operated by global network terminal (GNT) companies in four countries situated in Asia-Pacific and Europe. It explored these experiences along with the respondents' perceptions concerning the effectiveness of arrangements made to manage their OSH risks, and compared findings between countries. The research demonstrated a significant gap between managers' understandings of the operation of arrangements for OSH and the perceptions and experiences of workers, both in relation to OSH outcomes and the effectiveness of the OSH arrangements. This was especially evident for work-related ill-health, workers' representation and consultation on OSH, and in the differences in the experience of all these between directly employed workers and those employed by contractors. The paper discusses the implications for improved OSH arrangements and outcomes.

**Keywords:** Container terminals; dock-work; health, safety; workers

### **Introduction**

An emblematic feature of economic globalisation has been the transformation in the speed and efficiencies of transport of goods by sea since the advent of 'the box'. Containerisation has made a substantial contribution to current patterns of both global production and trade by facilitating the speedy transportation of goods from sites of production to far distant markets. These effects have helped prompt the development of a new generation of ports in which changes in ownership and operation help to create a global network of nodes and hubs in 'super-highways' for maritime and land transport over which goods travel from producers to markets in increased quantities, and at speeds and efficiencies unimagined until recent decades.

The transformation of dock-work that has occurred as part of these changes is well documented (e.g. Rodrigue and Notteboom, 2011; Bonacich and Wilson, 2008). One of its key features has been a substantial reduction in employment in ports as various forms of mechanisation, engineering and systems design have rendered the role of human agency in

the physical handling of goods substantially redundant. Container terminals are once again emblematic of these changes. They are purpose built or substantially adapted and act virtually exclusively to transport containers. They exist in practically all countries engaged with the dispatch or receipt of goods by sea, or with the transfer of these goods from one sea route to another. They are increasingly operated by large global companies that often have interests, not only in the ports they operate, but also in other elements of the logistics of transportation. And it is especially within these terminals that the most obvious features of the ownership and design of dock-work to increase productivity and efficiencies in the handling of goods are evident and on-going. But what of the workers who operate these activities and make the efficiencies achieved in these ports possible? How do they experience the organisation of their work and employment within these terminals and what are their perceptions of its effects on their safety, health and well-being?

It was to address these questions that the research reported in this paper was undertaken. The work arose from concerns expressed by the International Transport Workers' Federation (ITF) about the safety and health of workers in global container terminals. The independent study that resulted was funded partly by the ITF and partly by the Institution of Occupational Safety and Health (IOSH). It explored evidence for these concerns as well as the contexts that help determine OSH practices and their outcomes (Walters and Wadsworth 2016). A previous paper compared some of these contextual determinants of practice and outcomes in two of the countries in which the terminals studied were situated by exploring differences in their regulatory and labour relations aspects (Wadsworth et al 2015)). A further paper addresses these contextual elements for all of the terminals and countries included in the study (Walters and Wadsworth 2019). However, the present account is concerned with findings that focus on the experiences of the workers participating in the study and their understandings of the effectiveness of arrangements to manage and support their safety, health and welfare. It compares these experiences in different national settings and identifies a substantial gap between them and the aims and understandings of both corporate and terminal management concerning the arrangements made for safe and healthy work and the welfare of *all* workers within the terminals globally. It discusses this gap particularly in relation to the implications of the organisation of work and employment in the terminals and poses further questions concerning the relevance and appropriateness of current managerial strategies on OSH for addressing workers' experiences.

### ***Limited evidence on safety, health and welfare in container terminals***

Conventional wisdom would anticipate that the arrangements and outcomes for the safety and health of dock-workers that remain in employment in the redesigned ports handling containerised goods would likely be generally improved in comparison with past conditions. This has been argued to be the case in the literature (Sisson, 2012). And this idea is supported by company level data, which suggest reducing occurrence in many terminals. However, such data do not make clear how far such reduction is the result of fewer dock-workers being exposed to risk as a consequence of reduced employment in operational tasks. Moreover, as our own study clearly showed, the comparability and quality of company data are severely limited by variations in reporting practices from terminals in different parts of the world (Walters and Wadsworth 2016).

Information on the burden of work-related ill-health is even more unreliable. It is well known, for example, that there a number of forms of work-related ill-health associated with dock-work, including in particular, musculo-skeletal disorders (MSD), whole body vibration effects, noise-induced hearing-loss and accidental intoxication from exposure to noxious chemical and biological agents. All these were commonly found in previous generations of dock-work, but the extent to which work in container terminals has contributed to reducing their incidence is not clear, nor is the extent of new forms of occupational ill-health that might arise from this work. However, the detailed study of trends in accident data in an Italian port by Fabiano et al (2010), suggests that the employment and organisational changes that accompany containerisation may have given rise to new or increased risks of injury and ill-health for at least some of the current forms of work undertaken in these terminals. Support for such conclusions is also found in the large body of evidence on the OSH consequences of these changes in other sectors, which links work intensification created by a much reduced workforce, its casualisation and the use of agency and contractor employment alongside workers who were directly employed, with poorer OSH outcomes (Quinlan et al, 2001; Quinlan and Bohle, 2008; Weil, 2014). Studies in other sectors also show that working to intensified production demands and tight delivery schedules, as is common in the loading and unloading of ships, may contribute to raised levels of psycho-socially created ill-health such as stress and fatigue which, as well as making workers sick, also leads to conditions in which there are heightened risks of accidents (Quinlan and Bohle, 2008).

These studies in other sectors further show that these developments challenge OSH management by undermining organisational supports for good practice such as the operation of communication arrangements; co-ordination and control; and worker participation (Weil, 2014). But, with the exception of Fabiano and his colleagues (2010), there has been little empirical study of the impact of these issues on the health and safety of terminal workers.

Overall, the evidence of 'what works' in improving dock-workers' experience of safety and health in container terminals is scant. Research literature on the safety and health practices and outcomes in these ports is limited and mostly focuses on technical and engineering design issues or mathematical modelling of techniques of risk analysis in specific ports (Chlomoudis et al, 2016; Mabrouki et al, 2014; Yang et al, 2010). Recent reviews of this literature, while pointing to its use of various abstract methods for modelling quantitative risk analysis in the design and operation of terminal activities, also show that such an approach does not engage with the lived work experiences of terminal workers (Pallis, 2017; Parra et al, 2018). Other published research has focused on issues of safety culture and leadership, but this tends to reflect interests in the behavioural approaches to safety predominant in the management of the industry and pays scant attention to their organisational contexts or outcomes (Shang and Lu, 2009) or the experience of the workers who are subjected to them.

## **Materials and Methods**

Following a review of the research literature, a mixed-methods approach was used to study container terminals in four countries in Europe and Asia-Pacific (Walters and Wadsorth

2016). Confidentiality agreements and ethical approvals prevent us from naming the companies operating the terminals studied, the terminals themselves, and one of the four countries. However, three of countries – Australia, Belgium and a second north western European country – were high-income countries with relatively long histories of both regulation and the presence of institutions for labour relations in dock-work. The fourth country, India, was a low- to middle-income country where, although regulation and arrangements for the representation of organised labour were present in the terminals studied, they were less well developed. The study on which this paper draws was mainly focussed on terminals operated by four of the largest GNTs in the world, although it also included two operated by national companies. To simplify and enhance comparability, this account is limited to data from GNT-operated terminals.

The wider study collected data at the global/corporate, national and terminal levels. The first two of these involved semi-structured face-to-face interviews, as well as requests for OSH performance data and strategic approaches to OSH management and governance. However, the main focus of the findings described here is data collected at the terminal level. This focus reflects two factors. First, and in keeping with findings from other sectors, the OSH performance data that were made available to us were limited, inconsistent and as a result impossible to reliably compare across terminals and countries (Walters and Wadsworth 2016). And second, our intention was to add to the existing literature by collecting and describing the experiences of dock-workers themselves, which findings from research in other sectors suggests may not be fully reflected in standard safety performance data. To this end, in addition to administering a survey of the OSH experiences of the operational workforce, semi-structured face-to-face interviews were carried out with managers responsible for key areas of the terminal operations as well as those dealing with OSH, with workers involved in key operational activities and with their trade union representatives.

All research instruments were designed in accordance with the ethical standards required by Cardiff University and used the appropriate language for each country and region, taking account of local terminology and arrangements. They covered: respondents' demographics, employment characteristics and working conditions; OSH performance, outcomes and experiences in terms of both safety and health; OSH management, including safety practices and working arrangements; and arrangements for the representation, consultation and participation of workers. In the questionnaire (Walters and Wadsworth 2016), these areas were presented in four sections: You and Your Job<sup>1</sup>; Your Safety<sup>2</sup>; Your Health<sup>3</sup>; and Health

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<sup>1</sup> Covering: demographics (age, gender, job title and work area, length of employment), employment characteristics (direct or indirect employment, shift patterns, pay, holiday entitlement etc.) and working conditions (job security, work intensity, welfare facilities etc.).

<sup>2</sup> Covering: safety experiences (such as provision of information and training, perceived risks, involvement in near misses and accidents resulting in injury, reporting such experiences etc.).

<sup>3</sup> Covering: health experiences (such as experience of work-related ill-health, reporting such experiences, etc.).

and Safety Management<sup>4</sup> (further details of which are provided in the Results section below).

Researchers visited each terminal to carry out fieldwork over several days. Numbers of workers participating in the study varied with the size of the terminal. The data collection strategy targeted achieving completed questionnaire from 15% to 50% of workers involved with operational activity in each case. The overall return was 30% of the workforce, representing 86% of the target, and ranged from 8% to 65% of the workforce (29% to 140% of the target) across the terminals. Returns, therefore, came close to the targets in most instances, and significantly exceeded them occasionally. Only in one case were returns substantially short of the target because of limited co-operation from the terminal management. Where possible, questionnaires were administered to workers in groups during their breaks or at the start/end of a shift under the supervision of at least one researcher. When this was either not possible or permitted, other approaches were used, including research team members and/or workers' representatives administering them to individuals and organising their completion off-site and out of work-time.

A diary survey, completed before the start of each shift, was used to collect the day-to-day experiences of a limited number of operational workers over a normal set of shifts. Ten diaries were aimed to be returned from each of two groups of workers (by job type) per terminal.

A set of themes were used to code qualitative results and they were analysed using NVIVO. Using SPSS, chi-square, ANOVA and binary backward stepwise logistic regression were used for the analysis of quantitative results. Both the qualitative and quantitative analyses aimed to allow exploration of the experience of OSH management and performance, and to compare them by country, economy and groups of workers (by job and employment types). For the quantitative data, composite measures of safety outcomes, health outcomes, OSH management arrangements and working conditions were created to allow comparisons along continua of these sets of experiences (Appendix Table A1). This approach follows earlier occupational research (e.g. van Stolk et al, 2012) and is designed to reflect real word experience. These measures were also split at the median to allow comparison of those with high and low levels of each set of experiences.

Nine terminals operated by GNT operators were included in the study. Overall, 1619 dock-workers returned completed questionnaires and 111 completed a diary. One-hundred and sixty-two participants were interviewed (see Walters and Wadsworth 2016 for details).

Nearly all survey respondents were male (1505, 98%), and most were aged between 20 and 50 (20<30: 458, 29%; 30<40: 420, 26%; 40<50: 420, 26%), reflecting the age and gender balances among the workers and managers in the terminals studied. About two thirds (931, 60%) were directly employed. Most participants had been in their job for between one and 15 years (1<5 years: 411, 26%; 5<10 years: 453, 28%; 10<15 years: 313, 20%). Most worked in roles involving crane and/or horizontal transport (598, 37%) (quayside or on the vessel

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<sup>4</sup> Covering: OSH management arrangements, policies and practices (such as provision of PPE and training, awareness of and access to OSH policy and procedure documents, consultation, representation and involvement in OSH management, etc.).

(lashing and/or receiving and delivery): 415, 26%; maintenance or other roles: 181, 11%; jobs combining lashing with driving: 419, 26%).

## Results

In this section, in accordance with the structure of our survey, we begin with some findings concerning workers' experience of work organisation and working conditions, then examine their reported perceptions of safety, health and welfare outcomes, before turning to their impressions of the effectiveness of OSH arrangements. We then present a brief analysis of associations between the findings through which further light is thrown on the determinants of the OSH-related experiences in the terminals.

### *The experience of work*

Responses to the 'You and your job' section of the survey indicated that workers had concerns about their working conditions and about the way their work was organised and arranged, and that there were substantial differences in these experiences by country<sup>5</sup> (Table 1). For example, approximately half or more (42% to 63%) reported that: they experienced high work intensity; were discontented with their basic pay; dissatisfied with the provision made for their welfare; worked shifts of 10 or more hours; the fit between their working hours and other commitments was poor; they were not satisfied with their working conditions; experienced poor job security; and they had no scheduled breaks during a shift. On each of these measures, the highest proportions of dissatisfied workers were found in the terminals in India.

*Table 1: Working conditions by country*

|   |                       | Belgium | Australia | European country 2 | India | ALL |
|---|-----------------------|---------|-----------|--------------------|-------|-----|
| <b>SHIFT PATTERN</b>                      | Irregular             | 12%     | 34%       | 17%                | 6%    | 13% |
| <b>SPLIT SHIFTS</b>                       | Occasional or regular | 6%      | 27%       | 8%                 | 13%   | 12% |
| <b>NIGHT-WORK</b>                         | Occasional or regular | 15%     | 93%       | 94%                | 90%   | 76% |
| <b>SHIFT LENGTH</b>                       | 10 hours or longer    | 2%      | 9%        | 99%                | 68%   | 49% |
| <b>BREAKS</b>                             | None scheduled        | 12%     | 4%        | 27%                | 71%   | 42% |
| <b>PAID HOLIDAY ENTITLEMENT</b>           | None                  | 1%      | 1%        | 0%                 | 20%   | 10% |
| <b>WORKING HOURS FIT WITH COMMITMENTS</b> | Poor                  | 11%     | 48%       | 21%                | 74%   | 48% |
| <b>JOB SECURITY</b>                       | Poor                  | 16%     | 57%       | 14%                | 66%   | 45% |
| <b>CONTENTMENT WITH BASIC PAY</b>         | Low                   | 23%     | 18%       | 18%                | 86%   | 52% |
| <b>STAFFING FOR TARGET</b>                | Poor                  | 12%     | 28%       | 43%                | 46%   | 35% |

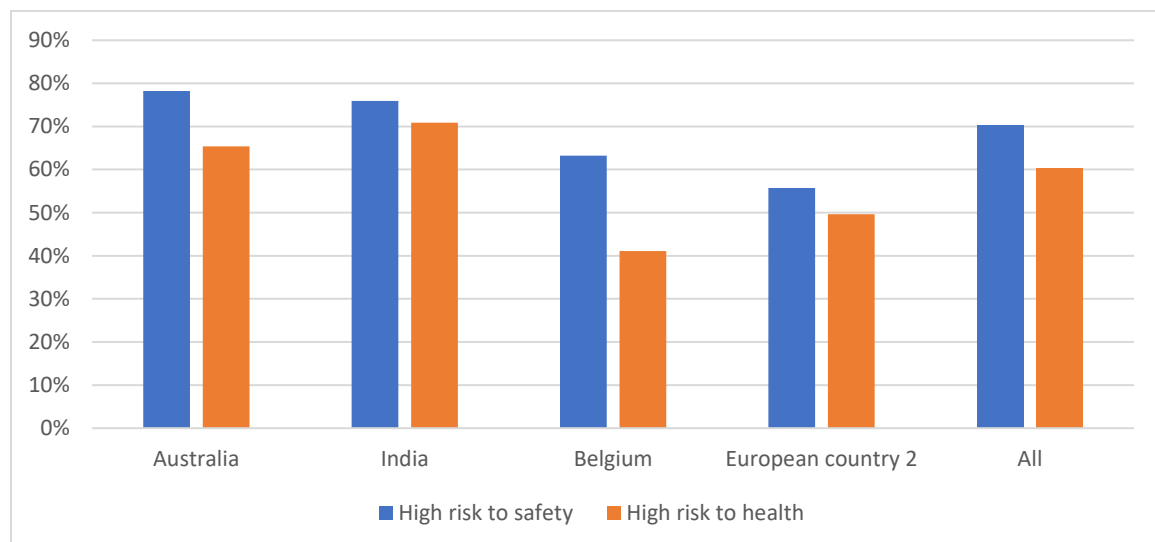
<sup>5</sup> Irregular shifts:  $\chi^2=115.66$ , 3df,  $p<0.0001$ ; split shift: 61.91, 3df,  $p<0.0001$ ; night-work: 786.92, 3df,  $p<0.0001$ ; shift length: 814.71, 3df,  $p<0.0001$ ; breaks: 558.38, 3df,  $p<0.0001$ ; paid holiday entitlement: 164.83, 3df,  $p<0.0001$ ; working hours fit with commitments: 480.31, 3df,  $p<0.0001$ ; job security: 371.16, 3df,  $p<0.0001$ ; contentment with basic pay: 697.24, 3df,  $p<0.0001$ ; staffing for targets: 130.27, 3df,  $p<0.0001$ ; work intensity: 31.10, 3df,  $p<0.0001$ ; satisfaction with working conditions: 358.35, 3df,  $p<0.0001$ ; satisfaction with welfare conditions: 394.93, 3df,  $p<0.0001$ .

|   |      |     |     |     |     |     |
|---|------|-----|-----|-----|-----|-----|
| <b>WORK INTENSITY</b>                       | High | 64% | 50% | 56% | 68% | 63% |
| <b>SATISFACTION WITH WORKING CONDITIONS</b> | Low  | 14% | 50% | 27% | 70% | 48% |
| <b>SATISFACTION WITH WELFARE CONDITIONS</b> | Low  | 15% | 32% | 41% | 74% | 50% |

**Perceptions of safety, health and welfare outcomes**

For the ‘Your Safety’ and ‘Your Health’ sections of the survey, overall, 70% felt there was a high risk to their safety and 60% a high risk to their health. These proportions varied significantly by country ( $\chi^2 = 51.46, 3df, p < 0.0001$  and  $103.41, 3df, p < 0.0001$ ) (Figure 1). Perceptions of high risk to safety and to health were most common in the terminals in India and Australia, but even in the European countries over 40% and 55% felt that their health and safety were at high risk.

Figure 1: High risk to safety and health by country`



A third (33%) of the respondents indicated they had experienced an injury in the previous year. Most commonly these had been the result of slip/trip/fall incidents and body strains/manual handling (36% and 29% of those injured). Rates varied from 43% and 37% in Belgium and the second European country to 38% and 24% in Australia and India ( $\chi^2 = 47.55, 3df, p < 0.0001$ ). Although most (83%) reported these incidents to their employer, this too varied by country (from 93% and 86% in Belgium and the second European country to 89% and 71% in Australia and India;  $\chi^2 = 33.99, 3df, p < 0.0001$ ).

Almost two-thirds (60%) experienced near misses. Among these over a quarter (27%) had experienced five or more in the last 12 months. They most frequently included vehicle collisions and slip/trip/fall (46% and 28%). More than half (57%) said their most recent near miss had been reported. Near misses were more common in the Asia-Pacific countries (67% and 65% compared with 57% and 43% in Europe;  $\chi^2 = 41.73, 3df, p < 0.0001$ ). Those from the



Belgian terminals were least likely to report their near miss (46% compared to 54% in the second Europe country, 60% in India and 62% in Australia;  $\chi^2=10.44$ , 3df,  $p=0.02$ ). This suggests that harmful or potentially harmful incidents were a common occurrence, which was also supported by the diary surveys. On average, over four shifts consecutively, 6% per shift reported involvement in incidents where they had been injured, while 27% experienced a near miss (ranges 4-9% and 20-32%).

In terms of health and welfare, overall between about a third (MSD) and three-quarters (high physical fatigue) reported problems (Table 2). Respondents from India had the highest rates of high stress and physical and mental fatigue, those from terminals in India and those in the second European country reported the highest rates of MSD, while respondents from the second European country also reported the highest rates of work-related illness (high stress:  $\chi^2=258.40$ , 3df,  $p<0.0001$ ; high physical fatigue: 173.12, 3df,  $p<0.0001$ ; high mental fatigue: 78.57, 3df,  $p<0.0001$ ; MSD: 11.23, 3df,  $p=0.01$ ; work-related illness: 70.25, 3df,  $p<0.0001$ ).

Table2: Health and welfare experiences by country

|                       | Australia | India | Belgium | European country 2 | ALL |
|-----------------------|-----------|-------|---------|--------------------|-----|
| High physical fatigue | 73%       | 85%   | 48%     | 75%                | 73% |
| High mental fatigue   | 60%       | 74%   | 48%     | 65%                | 65% |
| High stress           | 39%       | 81%   | 48%     | 35%                | 60% |
| Work-related illness  | 46%       | 32%   | 46%     | 61%                | 41% |
| MSD                   | 21%       | 32%   | 28%     | 31%                | 30% |

Most of the respondents who reported MSDs (88%) had experienced more than one occurrence during the last 12 months, and 23% had 20 or more such occurrences. Just under half (45%) said they reported the most recent occurrence. Eighty-five percent of respondents who indicated they had experienced an illness related to their work claimed they had experienced more than one in the last 12 months. Thirty-seven percent reported having experienced 5 or more; while 45% said the most recent of these had been reported to their employer. The most frequent of these work-related illnesses were muscle pain/ache (46%) and fatigue/tiredness (38%). Also quite commonly experienced were stress/anxiety/depression, stomach/gastric and cold/flu/respiratory illness (28%, 25% and 24% respectively).

### ***The effectiveness of OSH arrangements***

Responses in the 'Health and Safety Management' section of the questionnaires indicated that experiences of the arrangements for managing risks to health and safety showed substantial levels of concern as well as variation by the countries in which the terminals

were situated<sup>6</sup> (Table 3). For example, overall 70% reported that they had no OSH representative, or where they did it was difficult to access the representative. This varied from 37% in Belgium, where there was an especially high trade union density and well-established institutional arrangements for industrial relations, to 85% in India, where there was weak unionisation and limited establishment of institutions of labour relations.

However, overall over half reported the absence of good practice on eight of the 12 measures included in the survey; and in most cases, the highest proportions reporting the lack of a good practice OSH management arrangement were those working either in India or Belgium<sup>7</sup>. Furthermore, comparison with data from other sources indicates our survey respondents reported greater levels of perceived risks and poor OSH outcomes than workers generally report. For example, data from the 6<sup>th</sup> European Working Conditions Survey (EUROFOUND, 2015) show that, among male respondents in European workplaces, only 27% felt their health or safety were at risk because of work and just 10% said they were not at all or not very well informed about health and safety risks related to their job. The latter compares to 32% of our respondents who felt they were not well informed (1/2 on a scale from 1 (not at all well informed) to 5 (very well informed)) by their employer about the health and safety risks related to their job – which again varied by country from 22% and 16% in the European countries to 40% and 39% in Australia and India ( $\chi^2=71.34$ , 3df,  $p<0.0001$ ).

Overall, 40% felt the risks they faced to their safety were ineffectively covered by the OSH management arrangements in their terminal, while 48% felt that the risks they faced to their health were ineffectively covered. Again, there were significant differences by country ( $\chi^2=213.77$ , 3df,  $p<0.0001$  and  $232.62$ , 3df,  $p<0.0001$ ) (Figure 2). Concerns about ineffective safety and health management were most common among respondents in India. However, it was also clear both that there were significant levels of concern about ineffective arrangements in all countries, and that more respondents were concerned about ineffective health management than about ineffective safety management, regardless of country.

Table 3: OSH management experiences by country

|                     |  | Belgium | European country 2 | Australia | India | ALL |
|---------------------|--|---------|--------------------|-----------|-------|-----|
| STAFFING FOR SAFETY | Frequently insufficient                        | 11%     | 28%                | 25%       | 42%   | 31% |
| INDUCTION TRAINING  | None provided                                  | 7%      | 0%                 | 3%        | 8%    | 6%  |
| PPE                 | Some or all replacement costs taken from wages | 11%     | 1%                 | 1%        | 33%   | 19% |

<sup>6</sup> Staffing for safety:  $\chi^2=116.69$ , 3df,  $p<0.0001$ ; induction training: 24.53, 3df,  $p<0.0001$ ; PPE: 203.73, 3df,  $p<0.0001$ ; on-going training: 89.06, 3df,  $p<0.0001$ ; access to written H&S policy: 382.22, 3df,  $p<0.0001$ ; access to written H&S standard procedures: 468.74, 3df,  $p<0.0001$ ; written long/irregular hours policy: 93.27, 3df,  $p<0.0001$ ; written stress policy: 87.37, 3df,  $p<0.0001$ ; risk assessment: 56.08, 3df,  $p<0.0001$ ; consultation: 84.22, 3df,  $p<0.0001$ ; health and safety committee: 573.78, 3df,  $p<0.0001$ ; health and safety representative: 292.49, 3df,  $p<0.0001$ .

<sup>7</sup> This may be a reflection of the employment arrangements and practices in the terminals in Belgium, where arrangements made at terminal level elsewhere in our case studies are instead made at the port level. This may have resulted in respondents here interpreting questions differently to those elsewhere.

|   |  |     |     |     |     |     |
|---|--|-----|-----|-----|-----|-----|
| ONGOING TRAINING                          | None provided  | 8%  | <1% | 5%  | 20% | 12% |
| ACCESS TO WRITTEN H&S POLICY              | None or don't know   | 76% | 10% | 30% | 72% | 58% |
| ACCESS TO WRITTEN H&S STANDARD PROCEDURES | None or don't know   | 75% | 14% | 36% | 83% | 64% |
| WRITTEN LONG/IRREGULAR HOURS POLICY       | None or don't know   | 90% | 59% | 78% | 82% | 80% |
| WRITTEN STRESS POLICY                     | None or don't know   | 94% | 70% | 83% | 90% | 87% |
| RISK ASSESSMENT                           | No risk assessment or no worker involvement in risk assessment         | 90% | 66% | 73% | 82% | 80% |
| CONSULTATION                              | None (new procedures introduced without warning or worker involvement) | 74% | 53% | 51% | 77% | 69% |
| HEALTH AND SAFETY COMMITTEE               | None or don't know   | 62% | 24% | 8%  | 86% | 60% |
| HEALTH AND SAFETY REPRESENTATIVE          | None or difficult to access  | 77% | 37% | 43% | 85% | 70% |

Figure 2: Ineffective safety and health management by country

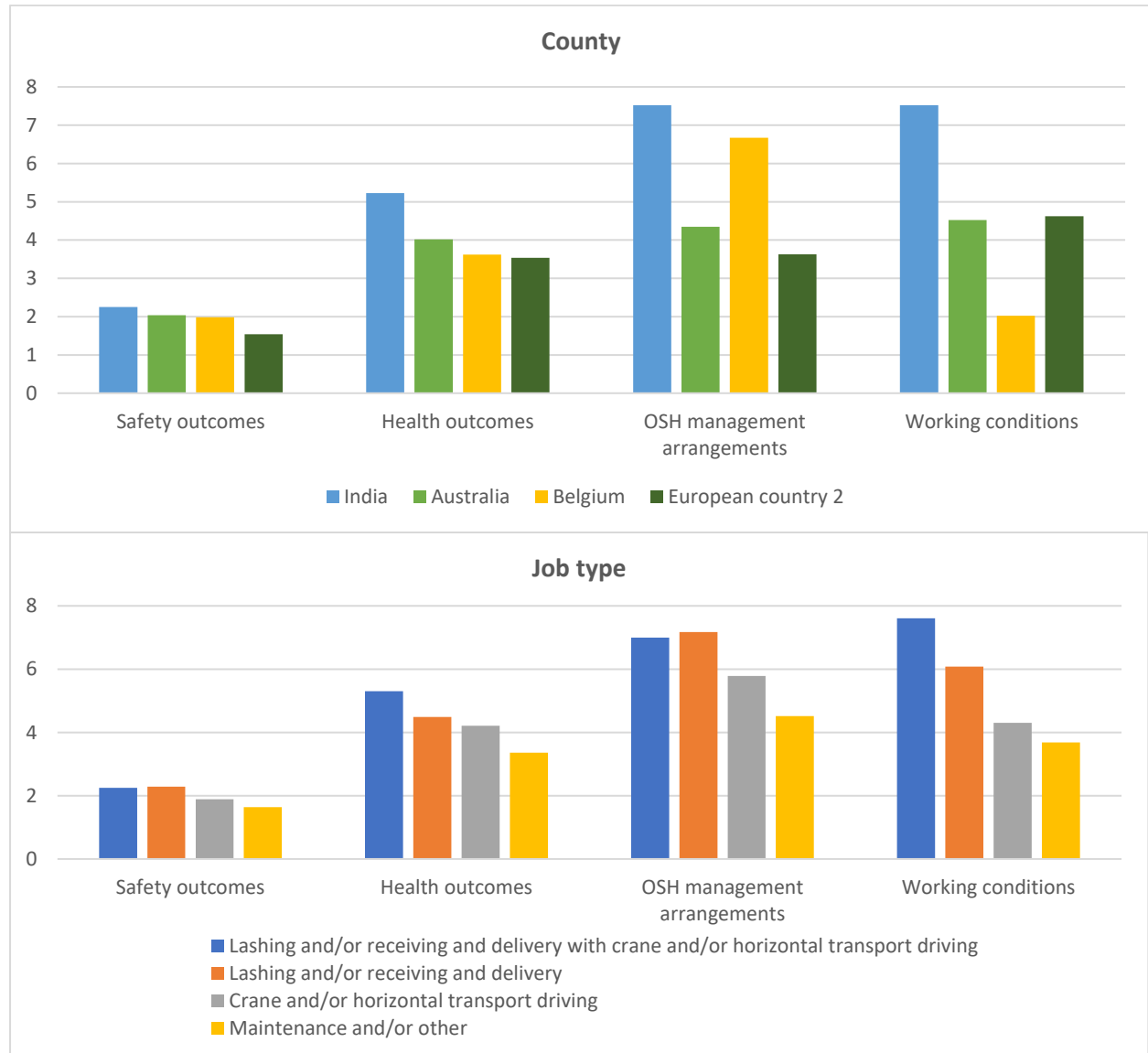


### ***Effects of the organisation of work and employment on arrangements for OSH management and their outcomes***

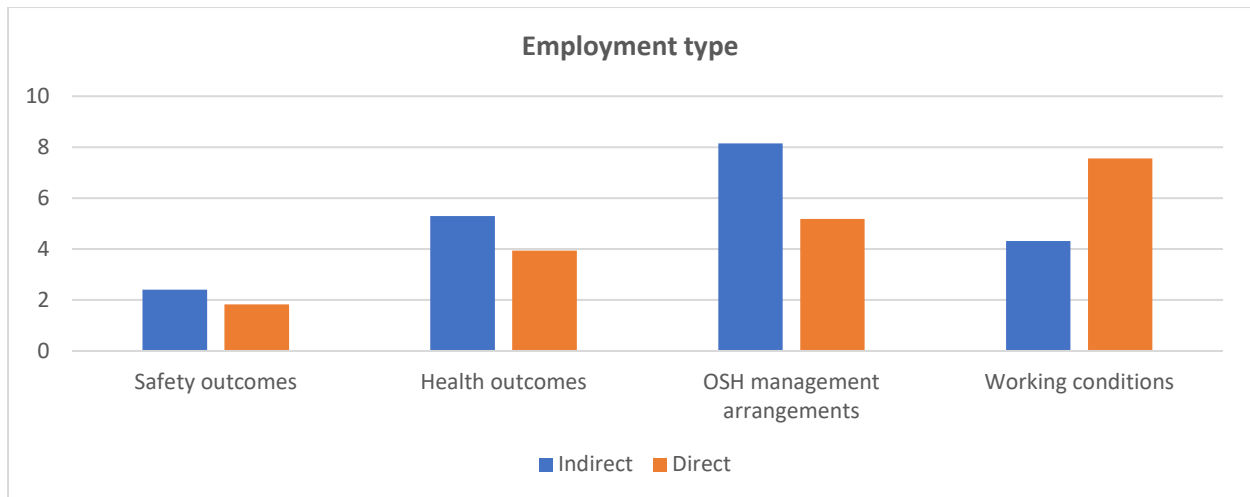
Composite scores of the measures on working conditions, OSH management arrangements, safety outcomes and health outcomes were used to reflect workers' overall workplace experiences. In each case, higher scores indicated poorer experiences. The highest mean scores on all four scales were found in the terminals in India and among those whose jobs involved lashing (Figure 3). Mean scores were also higher among those who were indirectly

employed than among those who were directly employed on all but the working conditions measures.<sup>8</sup>

Figure 3: Working conditions, OSH management arrangements, safety outcomes and health outcomes by country, job and employment type (mean)



<sup>8</sup> Differences by area of employment, job type and employment type: Safety outcomes -  $F=23.33$  (3df)  $p<0.0001$ ,  $F=20.61$  (3df)  $p<0.0001$ ,  $F=92.24$  (1df)  $p<0.0001$ ; Health outcomes -  $F=75.87$  (3df)  $p<0.0001$ ,  $F=39.23$  (3df)  $p<0.0001$ ,  $F=152.42$  (1df)  $p<0.0001$ ; OSH management arrangements -  $F=178.61$  (3df)  $p<0.0001$ ,  $F=44.09$  (3df)  $p<0.0001$ ,  $F=414.60$  (1df)  $p<0.0001$ ; Working conditions -  $F=427.89$  (3df)  $p<0.0001$ ,  $F=138.39$  (3df)  $p<0.0001$ ,  $F=468.20$  (1df)  $p<0.0001$ . Those in Belgium working on a day hire basis were categorised as indirectly employed, which may account for the latter difference.



Logistic regression was used to consider these associations further, controlling for age and experience (Appendix Table A2). This indicated independent associations in relation to:

- Employment type
  - Those in indirect employment were more likely to report high levels of poor safety outcomes, health outcomes, weak OSH management arrangements and poor working conditions than those in direct employment
- Job type
  - Those in maintenance or other work were least likely to report high levels of poor safety outcomes, health outcomes, OSH management arrangements and poor working conditions. While those whose work involved in lashing (particularly when combined with driving) were most likely to report poor OSH arrangements and outcomes
- Country
  - Those working in terminals in India were most likely to report high levels of poor safety<sup>9</sup> and health outcomes, weak OSH management arrangements<sup>10</sup> and poor working conditions

This suggests that, overall, the workplace OSH experiences of those in indirect employment, especially in jobs involving lashing and in the low-income country, were poorer than those of the other workers in our survey.

### ***Summary of workers' experiences of safety, health, welfare and working conditions***

In short, the perceptions and experiences of operational workers in all the container terminals studied give rise to concern about the risks to safety, health and welfare from their work and the arrangements made to manage them. While it is acknowledged that these findings are based on workers' subjective assessment of their experience, we would argue that they nonetheless present a valid account of risks and OSH arrangements as experienced by those who work with them. Several features stand out. Firstly, the extent of the risks and consequent harm experienced is considerably greater than might be anticipated from company data. Secondly, the sources of risks and nature of harm reported

<sup>9</sup> Not significantly different to the OR for Belgium – see Appendix Table A2.

<sup>10</sup> Not significantly different to the OR for Belgium – see Appendix Table A2.

most prominently are those strongly associated with the organisation of work and employment. Following from this, there are significant differences between the experiences of workers directly employed by the terminal operators compared with those employed by contractors. Thirdly, from the evidence of virtually all of the measures employed in the survey, workers in the terminals situated in India experienced worse OSH outcomes and weaker OSH arrangements than those in terminals in advanced market economies in both Europe and Asia-Pacific — and the quayside contract workers in the former terminals were especially thus affected.

## **Discussion**

These findings present a disturbing picture and suggest caution is warranted in making assumptions concerning the contribution of containerisation to enhancing the safety and health of dock-workers. Even more disturbingly, they further suggest that the measures to manage safety and health put in place by the large global operating companies that participated in this study are failing to address the causes of many of the workers' concerns about their safety, health and welfare, while also failing to reach the increasing proportion of these workers who are indirectly employed in the terminals. The global study, on which this paper draws, examined managerial strategies and arrangements for safety and health at both the corporate and terminal levels (Walters and Wadsworth 2019). There is insufficient space here to explore these measures in detail. However, interviews with senior personnel with responsibility for OSH demonstrated that a similar corporate approach to their OSH strategies and arrangements was adopted by all the GNTs. The effects of international and national voluntary standards on OSH management were evident in this approach. And while there was some local discretion at the terminal level, essentially all the terminal operators followed the broad approach of their corporate organisation.

This included adoption of corporate strategies featuring commitments to arrangements for safety and health widely considered to be good practice, and generally found in large organisations — such as those that aim to address risks systematically, through undertaking risk assessment to inform the introduction of engineering or administrative controls for improving safety in the place of work, its materials and technology and the processes with which work is undertaken. Corporate and terminal managers said that safety management systems at terminals focused on continuous improvement, and information collection and dissemination, aimed at monitoring performance and achieving timely interventions where necessary. A high-profile, board-room level commitment to 'zero harm', in operational practice was claimed to be achieved with the aid of an organisational 'vision' of achieving high performance and continuous improvement in health and safety outcomes, delivered through a focus on improving safety culture, safety and health competence through, for example, OSH training and skills development and the adoption of performance targets for health and safety, while accountability for OSH was promoted both among workers and managers.

Company data on reported work-related harm provided an incomplete picture of their effects, and meaningful comparative analysis was impossible. Nevertheless, some of its features are worth mentioning. These data suggest a falling injury rate as measured by routinely collected data on lost-time injuries. However, these reported injury rates indicated

huge variation between the terminals located in high-income market economies in Asia-Pacific and Europe and those in India, which suggested massive underreporting in the latter rather than superior OSH performance. Despite this underreporting, company data also showed that injury rates were substantially higher for the indirectly employed workforce than for those directly employed.

Safety and health arrangements in the terminals aimed for separation of workers and machinery. This was thought to have been largely achieved in the physical design of the terminals and operationalised through surveillance of workers' behaviour. Various approaches were used, including encouraging workers to report unsafe behaviour of colleagues and various forms of accountability for transgressors. The Safety (and Environment) Departments usually serviced these arrangements, as well as providing advice, training and in some cases participating in surveillance. This behaviour-oriented approach was strongly evident in all the terminal level OSH management arrangements and, generally, terminal managers believed these arrangements to be 'fit for purpose', as did those with specialist responsibilities for health and safety.

Corporate level leadership in achieving the objective of 'zero harm' appeared to have made an impact on the aims and aspirations of terminal level OSH management evident, for example, in the ways in which they emphasised the aim of zero lost-time injuries and, the systematic reporting and investigating of incidents, including those with high potential of harm, even if no harm had resulted. However, interviews confirmed that in practice it was unusual for such inquiry to address more than proximal causes, and it generally focused on individual human error or unsafe behaviours rather than possible underlying organisational or situational causes. This may have been because managers believed that as long as the paper-based specifications of their systems for safety management were followed, such incidents could not occur – therefore the incident in question must have resulted from workers failing to do so – a belief which was reinforced by corporate focus on changing workers' behaviours to improve safety culture. These approaches were especially pronounced in the terminals in India, where managers and their advisers emphasised the promotion of a 'safety culture', that was framed within a strongly unitary perception of the nature of workplace relations (Fox, 1974).

### **Conclusions – mind the gap?**

In conclusion, there is clearly a substantial gap between the perceptions of corporate and terminal management concerning the effectiveness of their arrangements for safety and health in the terminals they operate and those of the workers employed in them. The gap was evident in relation to several key elements of OSH management and its outcomes. Firstly, survey results suggested far higher levels of work-related harm experienced by respondents than might be anticipated from company measures. They further suggested that experience of various forms of work-related ill-health associated with terminal work was significant, but largely missed by OSH arrangements that in practice tend to focus predominantly on behavioural safety.

Secondly, they indicate a strong sense of workers' dissatisfaction with both the style and focus of these arrangements. This was further supported by evidence from many detailed

interviews with workers and their representatives. While they acknowledged that approaches to OSH in the terminals were a significant presence, they repeatedly pointed out that these approaches failed to address the causes of much of their experience of ill-health, which they largely ascribed to the way in which their work and employment was organised. They also indicated that the prevalent behaviour-based approaches to OSH increased their feelings of job insecurity, limited discretion and were punitive in cases of non-compliance — this was especially so in accounts from workers and their representatives in the terminals in the low-income country. Moreover, some respondents questioned the motives behind such methods which they perceived to ignore consequences for OSH created by production- and profit-orientated drivers of work and employment in the terminals, and which they saw as responsible for the high levels of fatigue, stress and MSD identified in the survey.

Thirdly, the findings showed that these experiences varied both by location and type of employment. A previous paper has argued that the determinants of such situational variation can be found in the different regulatory, economic and industrial relations contexts experienced in different countries (Wadsworth et al 2015). That account compared and contrasted the operation of arrangements for worker representation and consultation on safety and health in terminals in India with that in Australia. It ascribed the differences it identified to the more highly developed and mature regulatory and industrial relations structures and processes evident in the latter country. The present account includes terminals in two further countries in Europe and also widens the focus to consider the total OSH experience of workers. Nevertheless, it finds essentially the same thing. That is, it would appear that the development and resilience of national infrastructures and requirements on OSH are powerful determinants of both OSH practice and its outcomes in all the terminals studied and the ability of organised labour to use these to effectively moderate corporate practice is also important. An obvious limitation of the present paper is that there is insufficient space to present both the analysis of workers' experiences and at the same time offer a sufficiently in-depth analysis of wider contextual determinants defined by the location of the terminals. The choice to focus on the former in the present paper was deliberate, but it is acknowledged this implies a weakness. As indicated in the Introduction, this is addressed in a subsequent account (Walters and Wadsworth 2019).

Fourthly, the study clearly shows directly employed workers fare better than those indirectly employed on virtually all the measures of safety and health. We have already pointed out that reasons for this are well-described in the literature. They are essentially twofold. It is well-established that outsourcing the costs of labour to contractors often means outsourcing them to organisations with even less capacity to bear these costs than that of the outsourcing organisation and since competition to win such contracts is often driven by price and delivery considerations, the challenges for successful tenders to deliver their OSH claims are considerable. Secondly, there is a large body of research that points to the difficulties with effective communication of managerial requirements in large complex worksites with multiple employers, such as those found in terminals in which a substantial amount of operational activity is undertaken by contractors. Given this situation, surprisingly, we found relatively limited development of corporate strategies to address it, such as those nowadays increasingly commonplace in such situations (see for example James et al 2015).



So, none of this should be particularly surprising. However, it suggests a cautionary message for approaches to managing OSH, such as those currently favoured by corporate actors like the terminal operators in the present study, as well as by many national and international bodies representing the views and interests of OSH practitioners, managers, regulators and policy-makers. These approaches are, in Alan Fox's (1974) classic terms, informed by an essentially unitary framing of work relations. They rely heavily on the bureaucratisation of procedures to ensure compliance with rules and requirements and prescriptive means to achieve OSH performance targets originally derived at corporate levels.

However, such approaches, firstly have many features that fail to provide the supports fundamental to engender and sustain the trust argued to be necessary to ensure they function as intended. There are several OSH specific studies that demonstrate this (e.g. Gunningham and Sinclair, 2012; Sampson et al, 2019; as well as Hopkin's (2005) and Frick's (2011) accounts of the limitations of behaviour-based safety systems). Secondly, and following Lukes' (1974) analysis of power, they rely on forms of organisational power to help set and control the agendas and contexts in which they are operated. Thirdly, as Quinlan (2014) has observed in relation to mining, such behaviourally orientated ways of conceptualising the governance of improvement in workplace health and safety are attractive to corporate leaders and managers. By focusing on changing workers' behaviour (although managers' behaviour may also be included) they forestall any need to examine OSH effects of corporate decisions on production, finance, or on the ways in which they organise work and employment to maximise productivity and profit. These perspectives are seldom acknowledged in analyses of OSH arrangements undertaken from either the corporate or OSH practitioner standpoint. But the evidence of the way their consequences are experienced and understood from the workers' standpoint would suggest that this is an omission that needs to be corrected before the gap between corporate and managerial strategies on OSH and the lived experience of workers is likely to be bridged.

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