

Development of a Health Risk Management Maturity Index (HeRMMIn) as a Performance Leading Indicator within the Construction industry

Prepared by the **Health and Safety Laboratory**
for the Health and Safety Executive 2015

Development of a Health Risk Management Maturity Index (HeRMMIn) as a Performance Leading Indicator within the Construction industry

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Safety cultural maturity reflects an organisation's degree of readiness to tackle safety risks. Until recently, no equivalent model for occupational health (OH) had been developed. The current research aimed to develop an OH management maturity index for the construction industry and use the index to survey OH management maturity in the industry.

Index development entailed an initial evidence synthesis and subject expert consultation to establish the index's theoretical basis/scope. This identified the key constituents of OH maturity as: senior management commitment; continuous improvement; communication; fairness; learning; foresight and employee involvement. Knowledge of OH issues was the criterion for separating 5 levels of maturity from 'unknowing' to 'enlightened'. The index was piloted to assure reliability, validity and usability before conducting a main survey with the sector.

The survey results revealed good levels of OH maturity but must not be interpreted to imply that the sector is performing well already and there is no room for improvement. Maturity scores were significantly higher for those with access to an OH provider and a specific OH policy. Key areas important for improving OH culture maturity included: the role of Principal/Tier 1 contractors, the business case for OH management and the importance of visible senior management commitment to OH.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.

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First published 2015

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Acknowledgements

The authors wish to thank all those who assisted with this project. This includes; subject matter experts who participated in interviews and a workshop, sector contacts who helped to recruit and disseminate the pilot and full survey, all those who participated in the pilot and full survey and subject matter experts who provided comment on the solutions developed to accompany the OH maturity index.

KEY MESSAGES

- This index is the first phase of the project and provides the basis for the conceptual underpinning beliefs required for health risk management maturity. Further work will be undertaken to incorporate a 'practical' element into the matrix which will provide a 'real world' test of the aspirations and beliefs of the organisation in relation to maturity. The results of this study are likely to be relevant to future interventions with dutyholders on health matters.
- The index itself relies on a wholly truthful response in order for it to be useful to the user in gauging true maturity and indicating how this can be improved. During this research there may have been a tendency to respond in a manner expected by the regulator rather than in a self-challenging way. As a self-assessment and independent tool we might expect respondents to be more truthful as results would only be seen and used by themselves.
- **Good performance in OH risk management is possible and achievable within the construction sector. However this must not be interpreted as implying that the sector is performing well and that no improvement is necessary.**
- The majority of participant organisations generally demonstrated a high level of OH maturity. This is contrary to previous anecdotal and statistical evidence suggesting OH risk management in the construction sector as generally poor (e.g. HSE Annual Statistics Report 2010/2011). One potential reason for this apparent contradiction concerns the sample. This comprised self-selected participants recruited through existing membership to groups such as the Institute of Occupational Safety and Health (IOSH). Consequently it is possible that they were already good performers. Caution is therefore required in generalising the findings to the wider population of construction as a whole. This caveat however does not detract from the key finding - **good OH risk management is achievable.**
- **Given that the levels of performance reported in this survey are not consistent with other sources of evidence, examining the relationship between self-reported maturity levels and actual knowledge/practices may therefore be warranted as the next research step. This may take the form of targeted inspection.**
- Small and medium sized organisations (< 250 employees) are capable of achieving good OH management. The sample represented the breadth of organisation sizes. Consequently this means that a potential lack of resource should not necessarily preclude good performance.
- To date, OH culture maturity has not been fully considered as separate from safety culture maturity. However, challenges specific to OH such as the latency between exposure and harm and the visibility of the hazard may warrant that the two are separated out. Doing so should help enhance awareness and understanding of OH and encourage employers to integrate OH into their day-to-day activities. Giving OH specific consideration should also demonstrate that the standards of safety management achieved on site could be mirrored for health. Therefore, the index developed for the current project aims to build upon the 'Health like Safety' approach for the management of OH risks. It does so by ensuring that solutions are developed to address differences in the way that OH risks are perceived relevant to safety. The index and solutions also capture the breadth of physical and psychosocial issues underpinning OH.
- The full survey results found OH culture within the sample as predominantly mature, but there is room for improvement. Key areas that may be important for influencing OH

maturity were identified. These included: the key role of Principal and Tier 1 contractors in helping to foster good practice throughout their supply chain; raising awareness of and using the business case argument as a driver for good OH risk management and the importance of visible senior management commitment to OH. Although the ultimate aim is to integrate OH management with safety management, the importance of giving specific consideration to key distinctions between health and safety was identified. Specific areas that could be prioritised in any future efforts to improve OH management performance concerned increasing awareness/understanding of collective responsibility for OH and promoting a culture of fairness throughout the supply chain.

EXECUTIVE SUMMARY

BACKGROUND

Industry characteristics particular to the construction sector such as a complicated, diverse supply chain and transient workforce compounds the challenges industry face in effectively managing occupational health risks. Success in reducing safety-related injury and fatalities outstrip that achieved for occupational ill health (HSE Annual Statistics Report 2010/2011). Construction is no exception (HSE, 2011). The Construction Industry Advisory Committee (CONIAC) Health Risks Working Group was set up with the aim of improving the sector's Occupational Health (OH) performance in view of a growing recognition that there was little evidence or knowledge on the levels of duty holders' performance in understanding and implementing occupational health risk management¹ (HSE, 2011). Elucidating behavioural and organisational culture-related drivers, (e.g. knowledge, attitudes, risk perceptions, social norms and actual risk taking behaviour) that affect performance could provide a vehicle for improving OH risk management within the construction sector.

First formulated by the Keil Centre (HSE, 2000) safety cultural maturity reflects an organisation's degree of proactivity or readiness to effectively tackle safety risks, and is a composite of cultural and behavioural leading indicators that can drive safety performance. Until recently, no equivalent model for OH had been developed. Only one other measure of OH culture maturity (e.g. Tyers & Hicks, 2012) has been identified as specifically relevant for construction. Developing an OH maturity model and index for the sector could provide a means not only for improving awareness and risk management, but also for gauging how well the sector is tackling the OH challenges it faces, as distinct from safety. Such a survey would help the industry to understand where to target effort in raising the standard of OH risk management.

AIMS

There were two main aims to this research:

- i) To develop a user-centred OH management maturity index for the construction industry that indicates solutions for improving cultural maturity on behalf of HSE's construction division.
- ii) To use the index to survey actual OH management maturity in the industry and provide a breakdown according to key parameters such as organisational size, position in the supply chain and type of construction activity.

Solutions were also developed to guide maturity progression.

METHODOLOGY

Measure development entailed using an initial evidence synthesis and subject expert consultation to establish the index's theoretical basis and scope. The resultant framework was then populated to assure clear progression between stages of maturity. A suite of leading and lagging indicators were also identified for validation purposes. Piloting was then conducted to assure reliability, validity and measure usability prior to conducting the main survey. Customer consultation occurred throughout the project.

KEY FINDINGS

This index is the first phase of the project and provides the basis for the conceptual underpinning beliefs required for health risk management maturity. Further work will be undertaken to incorporate a 'practical' element into the matrix which will provide a 'real world'

¹ See Glossary for definition

test of the aspirations and beliefs of the organisation in relation to maturity. The results of this study are likely to be relevant to future interventions with dutyholders on health matters.

Evidence base

The evidence synthesis confirmed that OH culture has received substantially less attention than safety. One recent exception (e.g. Tyers & Hicks, 2012) is an OH maturity measure developed for the London Olympics. The content of this measure was based on the premise of encouraging construction companies to view OH as no more difficult to manage than safety. However this project revealed key distinctions between cultural and behavioural requirements for mature safety and health management that could affect companies' understanding of how they can be integrated based on current practices. Measuring OH maturity would need to take account of how difference in latency (between exposure and harm), perceptibility of risk (e.g. physical object versus airborne hazards), and causal attribution (e.g. work versus home-based risks) affect attitudes. Secondly, to promote a holistic approach to managing OH capable of addressing the full range of health issues that may affect construction workers, it was determined that the index content would need to read across traditional OH² issues (e.g. noise, Hand Arm Vibration Syndrome), common health problems and other wellbeing/wellness issues³. Thirdly, the index would need to accommodate OH challenges particular to the construction industry such as managing a diverse supply chain and transient workforce. The index also would need to be easy to understand, possible to complete within a manageable time frame and enable 'quick wins' in order to secure companies commitment to OH early on. Finally the index should be capable of accommodating potentially low levels of knowledge about OH within construction. As such the index can then be used as a vehicle for improving awareness/knowledge about OH in the sector.

Definition and Structure

An organisation with good OH maturity was identified as one where OH management is fully integrated into the wider management system, fully adopted throughout the supply chain, leaders are involved and workers are engaged. This research identified the key constituents or elements that make up Occupational Health Maturity as being: senior management commitment; continuous improvement; communication; fairness; learning; foresight and employee involvement. Knowledge of OH issues was used as the criteria for separating levels of maturity, moving from 'unknowing', to 'reactive', 'compliant', 'proactive' and 'enlightened'. Scoring was based on summing ratings given for each 'element' as well as providing an overall maturity score. Score ranges were developed to indicate which maturity level a given score fell.

Measure reliability and validity

The leading indicators that were identified as feasible for validating the maturity measure concerned exposure level monitoring (frequency and use of findings); controls review (frequency and use of findings) and utilisation of OH issues in senior management decision making. Attitudinal leading indicators were avoided due to their overlap with the content of the maturity measure. Lagging indicator data was also collected for sickness absence and RIDDOR reportable diseases. Following piloting, minor amendments were made to sentence length and content in order to enhance usability. In the main survey the index, internal consistency checks, inter-item and inter-scale correlations together with correlations between index element and overall scores with leading indicators demonstrated the index as possessing robust reliability and validity. This project was therefore successful in isolating occupational health maturity as a distinct construct and in producing a reliable OH maturity measure. Based on the sample used, it also isolated reliable leading indicators of OH risk management in construction.

² See Glossary for definition

³ See Glossary for definition

Current OH management maturity

The survey results revealed good levels of OH maturity, both for total maturity and for the individual building blocks (elements) of OH culture. Furthermore, the sample included many SMEs, countering the argument that good OH risk management is too costly and time consuming for SMEs. **The results must not be interpreted as the sector performing well already and that there is no room for improvement.** Results were contrary to other evidence sources e.g. ill health statistics and may warrant future research exploring the relationship between self-reported maturity levels and actual knowledge/practice. Also, the small self-selected sample used (N=252) may not have been representative; organisations may already be good performers. **Furthermore, the index itself relies on a wholly truthful response in order for it to be useful to the user in gauging true maturity and indicating how this can be improved. During this research there may have been a tendency to respond in a manner expected by the regulator rather than in a self-challenging way. As a self-assessment and independent tool we might expect respondents to be more truthful as results would only be seen and used by themselves.** However there is a clear message - **good levels of OH culture maturity are possible and achievable within the construction sector.** Nonetheless there is still room for improvement. Maturity scores were also found to be significantly higher for those with access to an OH provider and a specific OH policy (rather than one integrated with safety).

Solutions

A set of solutions aligned to the index to facilitate company progression towards a more mature state were developed. Improvements brought about by using the solutions can then be used to promote and reinforce continued consideration of OH. As the solutions reflect what HSE expects from a regulatory point of view they convey key messages about compliance⁴ and legal obligations. The solutions include ‘quick wins’, as well as actions to create sustainable improvement. Quick wins should aid improvements in the transient workforce commonplace within the construction sector. Expectations associated with using the solutions should however be managed so that users are not disappointed if instant results are not achieved.

ISSUES FOR CONSIDERATION

Progression: Areas identified as important to consider for improving OH culture maturity included; the key role of Principal and Tier 1 contractors in fostering good practice throughout their supply chain, the business case argument as a driver for good OH risk management and the importance of visible senior management commitment to OH. Specific elements of OH culture that industry could prioritise were; increasing awareness/understanding of collective responsibility for OH, promoting a culture of fairness and managing psychosocial risk/issues.

Parity with safety: This may apply even to those who performed well for OH in the current survey. Improving OH culture maturity so it is given equal status to safety may require specific consideration of key differences between health and safety e.g. latency, causality of harm. The drive to integrate health with safety should not preclude such considerations.

Acceptability: Involving stakeholders⁵ to develop the index and promote its use should ensure it integrates within businesses, is backed up by OH expertise, and generates benefits that reinforce its continued use. The provision of associated solutions should also help to gain acceptance/commitment to index use and ensure it is viewed by the sector as supported by HSE rather than a punitive measure. Finally, there is a need to provide the index in an electronic format that automatically generates results and associated solutions. This requirement is beyond the scope of the current project however could be considered by HSE when they decide how to take the OH index forward.

⁴ See Glossary for definition

⁵ See Glossary for definition

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1. INTRODUCTION

1.1 RESEARCH OVERVIEW

A widely cited plateau effect in safety management performance has long been attributed to residual behavioural-related risk factors that have not been successfully designed, engineered or managed out of the workplace (The Bradley Curve, Health and Safety Executive (HSE) Human Factors Briefing Note No. 7). It is these risk factors that form the focus of behavioural interventions that are applied to health and safety. However, success in reducing safety-related injury and fatalities outstrip that achieved for occupational ill health (HSE Annual Statistics Report 2010/2011). For example, 1.2 million workers suffered work-related illness compared with 200,000 reportable injuries during 2010/11.

Construction is no exception (HSE, 2011). The Construction Industry Advisory Committee (CONIAC) Health Risks Working Group was set up with a view to improving the sector's occupational health (OH) performance. They have suggested that there is little evidence or knowledge on the levels of duty holders' performance in understanding and implementing health risk management. Understanding behavioural and organisational culture-related drivers (e.g. knowledge, attitudes, risk perceptions, social norms and actual risk taking behaviour) that affect performance could provide a vehicle for improving OH management within the construction sector.

Challenges in tackling OH with the construction sector have traditionally been compounded by sector-specific characteristics such as a complicated and diverse supply chain and a transient workforce that makes it difficult to provide continuous and accessible OH provision (Lunt, Bates, Bennett & Hopkinson, 2008). However, it must be acknowledged that within construction, improvements have been seen e.g. within the Olympic Delivery Authority's (ODA) programme of work (Tyers & Hicks, 2011). Other clients, individual contractors and other bodies are also doing related work of merit, and have been for some time.

First formulated by the Keil Centre (HSE, 2000), safety cultural maturity reflects an organisation's degree of proactivity or readiness to effectively tackle safety risks. As such it can be regarded as a 'composite' of cultural and behavioural leading indicators that also conveys how each of those indicators may vary for each level of maturity (e.g. reactive, basic compliance or proactive). Until recently, no equivalent model for OH had been developed. One such measure was more recently developed for use on the Olympic Park (The Occupational Health Maturity Index (OHMM, Tyers & Hicks, 2011). Related measures include the ODA's behavioural maturity index and the Health and Safety Diagnostic tool that forms part of the HSE's Leadership and Worker Involvement Toolkit.

Developing an OH maturity model and associated index for surveying maturity levels for the construction industry could be done by drawing on the learning acquired from developing these related measures. In so doing, it could provide a means not only gauging how well the industry is tackling the challenges it faces with respect to OH but also for improving OH risk management by suggesting key indicators and motivators for successful prevention or control of these risks.

1.1.1 Policy background

Workplace ill health kills and ruins lives in the construction industry. In construction there are many dangers that can cause harm which require employers to eliminate, prevent or control the risk. Key risks are exposures to:

- Asbestos, dusts and chemicals which when breathed in cause respiratory problems e.g. cancers, occupational asthma, silicosis.
- Substances that cause skin problems e.g. dermatitis.
- Frequent loud noise causing noise induced hearing loss and tinnitus.
- Frequent or excessive use of vibrating tools leading to Hand Arm Vibration Syndrome (HAVS).
- Frequent or excessive manual handling of loads causing musculoskeletal (muscle and joint) problems.

It is possible and practical to carry out construction work without causing ill health. Risks to health can be managed by modifying the process to eliminate the risk, controlling and minimising exposure, and taking precautions to prevent adverse effects. Managing workplace health helps employers retain experienced and skilled workers and it helps employees to maintain productive employment. Occupational health management should be integrated with day to day business and should not work in isolation from safety management or other health checks or initiatives in place.

This current research fits with HSE's strategy of 'creating healthier, safer workplaces'. Currently we have little knowledge of industry standards for maturity of health risks management, apart from anecdotal evidence and health-related statistics which suggest that health risks management is generally poor and substantially worse than that for safety risks. By identifying the maturity of OH risk management in construction this research could suggest key indicators and motivators for successful prevention or control of these risks. These leading indicators can then be adopted for future monitoring, inspection and more effective targeting of activities in health risk management, thereby leading to a reduction in ill health and health-related fatalities.

1.1.2 Current regulation and guidance

Employers have legal duties regarding the management of OH risks (Health and Safety at Work Act, 1974; Management of Health and Safety at Work Regulations, 1999). From the enforcement perspective, managing health risks is no different from managing safety risks. Assessing hazards and using a hierarchy of controls are equally appropriate when applied to health risks.

Occupational health management should focus primarily on dealing with the OH health risks caused by workplace exposure to hazardous substances or activities. In situations where there remains a risk to health following a process of eliminating risks and implementing appropriate control measures there is a requirement by law to arrange for health surveillance⁶. There are general legal duties to provide health surveillance under overarching health and safety legislation (Management of Health and Safety at Work Regulations, 1999). There are also specific laws requiring periodic health surveillance such as Control of Substances Hazardous to Health Regulations 2002 (COSHH) Regulation 11 and other specific legislation e.g. Control of Noise at Work Regulations, 2005 which define what action needs to be taken at what exposure levels. Workers also have a right to be informed and need to understand the nature of the OH risks they are exposed to, how to control them, and why they are being asked to undergo any health checks. At some point employers may need the help of an OH health professional, occupational hygienist or ergonomist to enable the risks to be assessed and control measures to be identified. Key pieces of guidance relevant to managing OH include:

⁶ See Glossary for definition

- HSE advice on undertaking risk assessments; <http://www.hse.gov.uk/pubns/indg163.pdf>
- HSE advice on managing health risks in construction; <http://www.hse.gov.uk/construction/healthrisks>
- Guidance on finding an appropriate occupational health provider: <https://www.segohs.org/>

Recently, in advice to construction industry employers CONIAC's Health Risks Working Group⁷ defined the following terms:

Occupational Ill-Health refers to all health problems in the work environment. The term covers health problems workers bring to the workplace as well as health issues caused or aggravated by work. It covers serious and fatal diseases; physical effects on skin, breathing, hearing, mobility and functioning; and psychological effects such as on mental wellbeing. Effects may be immediate and visible but are more often unseen and take a long time to develop, so vigilance and monitoring can be key to identification. Some effects can be cured if diagnosed early, many can only be prevented from getting worse and some diseases are terminal.

Health Risk Management is preventing workers from suffering adverse effects on their health caused by their job, by avoiding or controlling risks through task and worker adaptation.

However, it is recognised that there is much confusion as to what '*occupational health*' actually means. Checking workers' health or helping workers tackle other lifestyle risks to their health is often referred to as '*occupational health*'. Whilst this is an aspect of OH management it is not a substitute for managing and controlling OH risks. There is great variety therefore in the way in which OH is understood, risks are managed, programmes are implemented and consequently OH standards. There is a need therefore within the construction sector to improve awareness of OH and support organisations throughout the supply chain to raise the standard of OH risk management.

1.2 AIMS

Undertaking this work should provide the industry a greater understanding of where to target its efforts in raising the standard of OH risk management. There were two aims to this research:

- To develop a user-centred OH management maturity index for the construction industry that indicates solutions for improving cultural maturity on behalf of the HSE's construction division
- To use the index to survey actual OH management maturity in the industry and provide a breakdown according to key parameters such as organisational size, position in the supply chain and type of construction activity.

1.3 OBJECTIVES

1.3.1 Index development

Index development was accomplished through the following objectives:

- Conducting a short **evidence synthesis** in order to update HSL's current evidence base on: maturity models; related measures developed by other agencies⁸; health risk management leading and lagging indicators for the construction industry and ways by which behavioural

⁷ Publication pending

⁸ (e.g. IES's Health Impact Assessment, Occupational Health Maturity Index and Behavioural Safety Maturity Index developed for ODA)

leading indicators may differ between different types of OH risks. The evidence synthesis resulted in (1) a definition and model of OH maturity that was used to steer the index development and (2) a draft framework demarcating stages and components of maturity for structuring the index content.

- Running an **expert workshop** in order to verify:
 - How challenges facing health risk management in the construction sector can be accommodated by the index.
 - Appropriate leading and lagging indicators against which the index can be correlated during piloting.
 - The impact that type of OH risk (e.g. silica, noise, HAVS) may have on behavioural leading indicators and ways by which that variation may be addressed by the index.
 - The acceptability of the framework derived from the first objective.
- **Populating** the index in light of the evidence synthesis and the expert workshop.
- **Piloting** the index on a purposive sample of construction companies across the supply chain and refining accordingly.

1.3.2 Survey

The survey of OH maturity in the UK construction sector was accomplished through the following objectives:

- **Electronically surveying** as broad a sample of the construction sector as possible that could be accessed by available email networks.
- **Analysing findings** and providing a breakdown according to key variables such as company size, supply chain position, construction activity, direct or contracted workforce.

1.4 ABOUT THIS REPORT

This report summarises the findings from research conducted to develop an OH maturity model and associated index for surveying maturity levels within the construction sector. The index provided a means not only for raising awareness/understanding of OH risk management, but also for gauging how well the sector is tackling the challenges it faces with respect to OH and where HSE and CONIAC can offer support to help improve standards.

2. METHODOLOGY

2.1 RESEARCH DESIGN

There were two main phases to this project, the first concerned index development and the second concerned the actual survey. The following description of the methodology is broken down for these two phases. Figure 1 summarises the methodological stages underpinning this research.

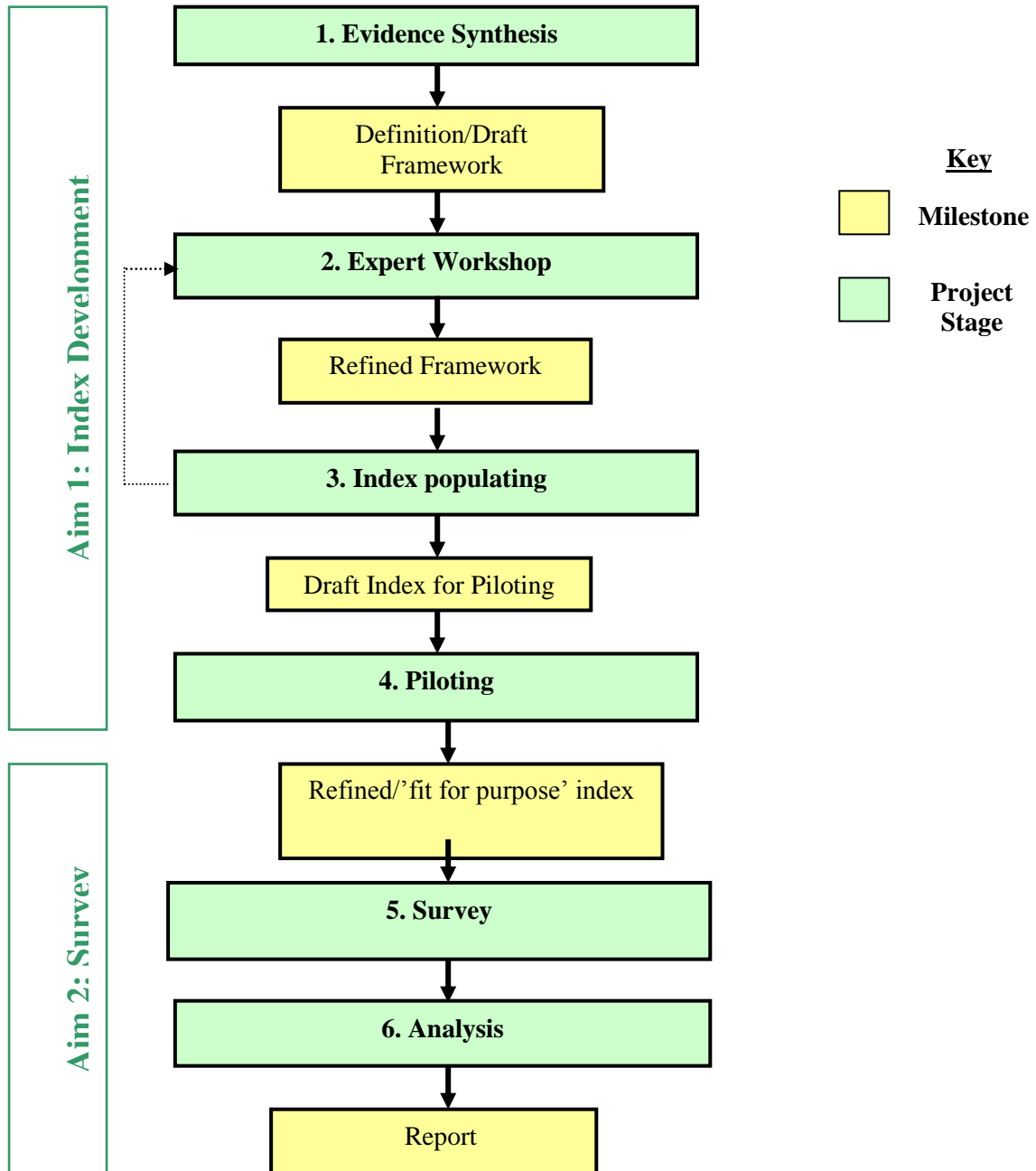


Figure 1. Methodology stages

2.2 INDEX AND SOLUTIONS DEVELOPMENT

A mixed methods design was used for developing the index and associated solutions that drew on a literature review, semi-structured interviews, a facilitated expert workshop and research team discussions. This resulted in a draft index that was then piloted to assure sufficient reliability and validity. Involving stakeholders in the index development should ensure it readily integrates within businesses, is backed up by OH expertise, and generates benefits that reinforce its continued use.

2.2.1 Evidence Synthesis: Literature review

A brief narrative literature review was conducted in order to capture any recent research on health and safety maturity models and related tools that may have to be developed. HSL researchers then used key messages extracted from the review to inform development of the maturity index. Full details of the literature review methodology may be found in [Appendix 1](#).

2.2.2 Evidence Synthesis: Semi-structured interviews

The literature review was supplemented by two semi-structured telephone interviews with researchers and practitioners involved in the development and implementation of ODA's Occupational and Health Maturity Index (OHMM) to capture any useful learning that could be garnered from its development process. Interview data was audio recorded and transcribed and then subjected to qualitative analysis. Full details of the interview methodology may be found in [Appendix 2](#).

2.2.3 Definition of OH maturity and development of a draft OH index

Findings from the literature review and interviews were then used as a basis for producing:

- i) A definition of OH maturity.
- ii) A model of OH maturity, which was then used as a draft framework to steer subsequent development of the OH index.

The OH maturity model needed to capture the essence and multifaceted dimensions of OH culture. To meet this need a set of criteria by which to select elements to include in the model was developed. These criteria were that elements should:

- Be more **strongly aligned and specific to OH** rather than safety culture maturity. Whilst capturing similarities elements should also capture any key distinctions/differences between safety and OH maturity. This would ensure that the OH model and index add value to and are distinct from existing SC model/measures. Key differences captured included; Latency, Perceptibility of risk/harm, Causal attribution, Responsibility, Feedback and Foresight.
- Include traditional OH issues e.g. noise, Hand Arm Vibration Syndrome (HAVS) in addition to common health problems and wellbeing issues.
- Take account of the multiple and various contributors to healthy workplaces e.g. senior management commitment, continuous improvement, communication, competence, employee involvement and OH management.

The above criteria resulted in a list of all potential elements that OH could encompass. Elements were then grouped according to similarity into 6 'Building Blocks'. Full details of this initial development phase and the criteria for elements are described in [Appendix 3](#).

2.2.4 Iterative development (expert workshop and pilot study)

Once a draft framework was produced, continued development of the maturity index was an iterative process. This involved an expert workshop, pilot survey (examining reliability, validity and usability of a draft index) and research team discussions throughout.

The iterative process resulted in a maturity index with five levels of maturity being developed. Degree of proactivity distinguished the level of maturity. Maturity ranged from least mature 'Unknowing' through 'Reactive', 'Compliant', and 'Proactive' to the most mature level 'Enlightened'.

The pilot sample comprised 20 construction contractors and sub-contractors working on the Crossrail Project. This pilot sample was determined to provide sufficient representation of OH issues within construction to test the measure's scientific integrity.

For brevity, details of this iterative process are not explained here. However for the purpose of scientific rigour, full details of the methodology and results of this process may be found in [Appendix 4](#) (expert workshop) and [Appendix 5](#) (pilot study).

2.2.5 Solutions for progressing level of maturity

Following the pilot study a set of solutions aligned to the final version of the index were developed. These solutions aim to assist organisations who have completed the index to identify practical steps and actions for how they can progress through the levels of maturity. As for the index, findings from the literature review, expert interviews and workshop informed development of an initial set of solutions. The solutions were then iteratively developed via team meetings and email consultation with key individuals (HSE colleagues and OH professionals within construction) who were asked to comment upon the solutions. Solutions for each Building Block were developed by:

- Considering the distinctions between maturity levels for each element within the Building Block and identifying actions that would enable progression.
- Integrating the suggestions for good OH management practice that emerged from the literature review, expert interviews and workshop.
- Considering solutions for maturity level progression within previous work by HSL e.g. the OH audit tool and the Health and Safety Diagnostic Tool.

Solutions were kept as concise as possible to avoid information burden upon the end-user. Care was taken to ensure that whilst offering practical suggestions for actions to improve, the solutions avoided prescription. The aim was a set of solutions that permit flexibility, enabling the end-user to tailor solutions to their own organisations needs and available resource. Whilst developing the solutions the need for variation between the solutions and the index statements was apparent. The research team recognised that the assessment stage (index) can permit a degree of flexibility. Statements do not need to be rigidly aligned to legal compliance definitions as the index is assessing behavioural/cultural aspects of OH management; distinctions between maturity levels are based upon behavioural and cultural factors which are independent of what regulation requires. It is plausible to anticipate that organisations would start by managing OH risks/issues that are perceived as 'easier' to manage e.g. physical risks/issues as opposed to psychosocial risks/issues e.g. stress. Physical risks are more tangible

and therefore organisations are likely to consider them easier to manage and more likely to be enforced. Furthermore, the index needed to be realistic and grounded in industry practice otherwise respondents would be less likely to provide honest and valid responses. Forcing the higher moral ground within index assessment statements could lose the measure's sensitivity.

However the **solutions needed to reflect what HSE expect to see from a regulatory point of view and must align to and convey key messages about compliance and legal obligations.** Solutions needed to be clear that we expect compliance for all (physical and psychosocial) OH risks where there is a legal obligation from an earlier stage of maturity. Progression is then from managing all risks/harm prevention (for which employers have legal obligations) to proactively promoting a holistic wellbeing approach including e.g. resilience and health promotion.

Therefore the decision was taken that for more reactive cultures a focus on 'Traditional OH risks' was reasonable. The aim of these solutions is to improve performance for those organisations not yet at the Compliant level. At such a level of maturity getting 'Unknowing' duty holders to consider managing even 'Traditional OH risks' would be an improvement. In the Reactive to Compliant solutions the term **all OH risks/issues** refer to all OH risks/issues (physical and psychosocial) that employers have a legal duty in relation to. The Compliant to Proactive solutions are where employers will start to go beyond this, and these solutions refer to all **aspects** of OH which relates to a holistic approach to OH and wellbeing that includes the management of work-relevant OH risks (physical and psychosocial) and the promotion of positive outcomes such as improved morale arising from health promotion.

The research team were of the opinion that these differences between statements in the index and solutions are justified in order to accommodate their different purposes - a tool to assess that must be grounded in reality and a tool to develop maturity levels that must be grounded in legal compliance. This project has developed a scale of maturity that we need to recognise in the solutions and hopefully we can be realistic in aiming towards real progression in understanding. **A caveat to the solutions is that duty holders need to ensure they are achieving compliance with all relevant regulatory duties which supersede this document.**

2.3 SURVEY OF CONSTRUCTION SECTOR

The iterative development process (described above and in the appendices) resulted in the production of a final version of the OH maturity index (see [Appendix 6](#)). This index was then used to undertake an electronic quantitative survey of OH maturity in the construction sector (see [Appendix 7](#)).

2.3.1 Sampling procedure and data capture

Data was captured using an online questionnaire developed using the SNAP Surveys™ proprietary questionnaire software. The questionnaire comprised three distinct sections (Respondent demographic data, Maturity index questions, Leading and lagging indicators). Respondent organisations were primarily recruited via the Institute of Occupational Safety and Health (IOSH) using IOSH's Construction Group electronic newsletter. Organisations were also recruited via an e mail cascade invitation from several of the research team's contacts within the construction industry e.g. individuals within CONIAC and The Leadership and Worker Involvement Forum. Recruitment was directed at health and safety professionals. The online questionnaire was accessed via a hyperlink in the newsletter/invitation e mail and remained "live" for approximately 8 weeks. During this time reminders to complete the survey (every 2 weeks) were given. A total of 259 responses were received. Of these 259 responses 252 cases were then exported from the survey software into a spread sheet format initially and then into SPSS™ version 14 (7 cases had zero data i.e. respondents had submitted a blank questionnaire. All data management and statistical analysis were performed using SPSS.

3. RESULTS

3.1 LITERATURE REVIEW

A brief narrative literature review captured recent research on health and safety maturity models and related tools. Overall the literature review identified a paucity of literature directly relating to OH maturity. None of the literature identified specifically discussed differences between safety culture maturity and OH maturity. A brief summary of the key findings from this review may be found below. For a more detailed account of the literature review see [Appendix 1](#).

3.1.1 Cultural maturity

- Understanding of what cultural maturity means has not really developed since HSL last reviewed this topic in 2009.
- The literature review did not identify any novel models/approaches to safety culture maturity.
- A core group of models e.g. the Safety Culture Maturity Model (SCMM; Fleming, 2001) and Westrum's Typology of Organisational Communication Model, (2006) appear to be consistently and repeatedly used as a base to develop new models and measures of safety culture/climate.
- Such models depict safety culture in terms of levels of maturity (typically 5) and elements.

3.1.2 Occupational health culture maturity

- A recent overview of occupational safety and health (OSH) culture and available maturity models, measures and toolkits (EU-OSHA, 2011) focused predominately on safety climate measures, as these were the most prevalent.
- Whilst different research traditions recognise the mutual interaction between organisational culture and health, so far this has not yet resulted in theory or research-based health culture tool development.
- Whilst assessment approaches to safety culture could be applied to assessment of health culture there is a need to develop interventions, tools and instruments related specifically to organisational and OH culture.
- Recent innovations in measuring OH maturity (e.g. Tyers & Hicks, 2012) have focused on treating health like safety in order to demonstrate to employers that health is not difficult to manage. It aims to encourage contractors to see health risk management as part of their day-to-day activities and something that is simple to integrate with existing safety management.
- Whilst of merit this approach potentially overlooks any key distinctions between how safety and OH are perceived.

3.1.2 Occupational health culture maturity (continued)

- Work identified in the current literature review (e.g. Kristensen, Hasle, Pejtersen & Olesen, 2007; Tyers & Hicks, 2012) suggests that a healthy organisation is one where its culture, management, working climate and other business practices create an environment that promotes the health, effectiveness and performance of its employees.
- An organisation with good OH maturity will have an approach to OH management that is fully integrated into the wider management system, fully adopted throughout the supply chain, leaders are involved, and workers are engaged.

3.1.3 Leading and lagging indicators

- There are many potential leading/lagging indicator areas for OH that may be grouped according to:
 - Health and safety culture e.g. management commitment
 - Health and safety systems e.g. resources committed to OSH
 - Healthy and safe person e.g. risk awareness
 - Healthy and safe place e.g. risk controls in place
- Measures in this spectrum included: assessment of key performance indicators (KPIs) for OH management (e.g. health risk assessments, training, good practice), use of control measures (e.g. PPE), physical measurement of environment, exposure monitoring, health surveillance and RIDDOR data.

3.1.4 Challenges

- The literature review identified a number of potential challenges to overcome (e.g. EU-OSHA, 2011).
- Despite pockets of good practice there is often underreporting, a patchy awareness of legal requirements in relation to OH and a failure to implement established good practice.
- A significant number of employers are failing to recognise the extent, and cost of work-related ill health absences.
- The safety culture approach and related diagnostic tools have their origins in high-risk industries. It is therefore important to ensure that the index developed within the current project is applicable and relevant for the end user.
- The index must be sector-specific, linked to typical core activities and address specificities from certain target groups (e.g. sub-contracted workers).

3.2 EXPERT INTERVIEWS

The expert interviews highlighted the various elements required in driving OH forward through the development of an appropriate tool and the barriers and enablers to developing a measure of OH maturity. Key findings from these interviews may be found below. For a fuller summary of the interviews see [Appendix 2](#).

- According to the OHMM - the tool should, as far as possible, encourage OH to be perceived as no different than safety in terms of how it should be managed.
- Development should draw on previous work, be based on a definition of OH, ensure the tool's purpose and limitations are clearly specified and include a piloting phase.
- The tool should be easy to understand, possible to complete within a manageable time and have an evaluative component. It should be capable of accommodating potentially low levels of knowledge about OH within the construction industry.
- The tool's content should be unambiguous so as to avoid misinterpretation. As such the tool can then be used as a vehicle for improving knowledge about OH within the construction sector.
- The solutions generated by the tool should include 'quick wins', as well as sustainable solutions. Improvements brought about by using the tool can then be used to promote and reinforce its continued use. Quick wins would help achieve improvements in a transient workforce (common within construction) but expectations of benefits should be managed so that users are not disappointed if instant results are not achieved.
- Involving stakeholders (from all organisational levels) in the tool's development is important for gaining acceptance and commitment to the approach, particularly if it is pitched as an 'aid' rather than punitive.

3.3 PILOT SURVEY

The literature review and expert interview results, definition and model of OH developed (see [Appendix 3](#)) and expert workshop (see [Appendix 4](#)) resulted in a draft OH index used for a pilot survey.

Descriptive and inferential statistics were obtained from the survey data. Key findings from the survey were used to determine the index items' reliability, validity and usability and determine ways in which these could be improved ahead of the main survey. **Given the small sample size results were treated as indicative, rather than proof of the measure's psychometric properties.** The results indicated that the index items had good reliability and validity:

- There were significant correlations between items belonging to the same Building Block and that Building Block's overall score. This implies the index to have internal consistency and each Building Block to be a distinct construct. All building elements correlated significantly with the overall maturity score lending further evidence for the measure's overall coherence.

- Each Building Block and overall score (with the exception of ‘learning’) had an acceptable level of internal consistency. This generally implies that the index has good internal reliability.
- Significant correlations were found between OH items (e.g. questions about sickness absence) and index items. Of note was the significant correlation between senior management consideration and the overall maturity score and each Building Block score. This lends evidence for the measure’s validity.
- Results indicated that rewording of some index items as necessary e.g. for the ‘leadership’ Building Block no significant correlation was found between the elements. Some overlap would be expected if they shared a common construct. There may have been too many similarities between these elements and other Building Blocks elements. Item rewording was therefore conducted to ensure elements were more closely aligned to the construct of ‘leadership’.
- The usability questionnaire results indicated that the index had good usability and comprehensibility. Maturity levels, Building Blocks and elements were intuitive and simple to understand. It was felt that the index captured all relevant aspects of OH management in construction. Several comments were made however in terms of some of the statements being too lengthy and repetitive. This can be an artefact of maturity matrices (which build upon previous maturity levels and therefore require some repetition). Where possible (and being cautious to avoid impacting upon the validity and reliability of the index) improvements were made to the language/terminology of some statements.

Full details of the results of the pilot survey data may be found in [Appendix 5](#).

3.4 OCCUPATIONAL HEALTH MATURITY MODEL

The current research resulted in the development of a model of OH maturity. This model provides the framework underpinning the OH maturity index.

3.4.1 Elements of OH maturity

The OH maturity model developed consists of 18 elements which capture the essence and multifaceted dimensions of OH culture. Elements are grouped according to similarity into 6 ‘Building Blocks’; *Business beliefs, Fairness, Mindful, Collective responsibility, Leadership and Learning*. This model is presented below.

Building Block	Elements	In a mature organisation
<p>Business Beliefs Belief that ‘health is good for work’ and ‘work is good for health’.</p>	<ul style="list-style-type: none"> ○ Good health ↔ good business ○ OH risk management ○ OH is a core business value 	<p>It is recognised by all that ‘health is good for work’ and ‘work is good for health’.</p>
<p>Fairness Uniformity of support provided for health and wellbeing.</p>	<ul style="list-style-type: none"> ○ Accessibility to OH support (<i>see Glossary</i>) ○ Mutual trust ○ Fair treatment of all 	<p>Everyone’s health and wellbeing is supported irrespective of their health status and position in the supply chain.</p>
<p>Mindful Being vigilant and responsive to the full range of current and future OH issues</p>	<ul style="list-style-type: none"> ○ Foresight ○ Awareness of the range of OH issues ○ Responsiveness ○ Vigilance 	<p>Everyone is vigilant (aware) of the full range of current and future OH issues and manages these issues appropriately.</p>
<p>Collective responsibility Distribution of responsibility and control of OH between management and workforce.</p>	<ul style="list-style-type: none"> ○ Worker involvement ○ Shared responsibility (within organisation) ○ Involvement of all stakeholders throughout project lifecycle 	<p>There is universal recognition that the responsibility and management of OH is shared between managers and workers.</p>
<p>Leadership Competency and consistency in managing, leading and supervising OH.</p>	<ul style="list-style-type: none"> ○ Role modelling ○ Consistent decision making ○ Having and delivering on a vision for OH 	<p>All leaders are competent in managing OH and are consistent in what they say and do about its importance.</p>
<p>Learning Learning opportunities</p>	<ul style="list-style-type: none"> ○ Learning opportunities for workers ○ Organisational learning 	<p>Learning opportunities are available to everyone and continuous improvement takes place via organisational learning.</p>

3.5 OCCUPATIONAL HEALTH MATURITY INDEX

The OH maturity model illustrated above provided the framework underpinning the OH maturity index. Drawing on the literature, expert interviews, workshop findings and team discussions the decision was made that degree of proactivity would distinguish the level of OH culture maturity. Five levels of maturity were decided upon (progressing from the least mature ‘Unknowing’ to the most mature ‘Enlightened’). The maturity terms and definitions are detailed in Figure 2 below. Such terms and descriptions were decided upon on the rationale that they state clearly and succinctly what they refer to in layman’s language whilst being neutral and non-judgemental.

Level of Maturity	Description
Unknowing	“We just don’t know about it”
Reactive	“We’ll do it when we think we have an issue”
Compliant	“We do it because we know we have to”
Proactive	“We do it because we know we ought to”
Enlightened	“We do it because we know it’s worth our while”

Figure 2. Maturity level description

Statements were developed for each maturity level within each of the six Building Blocks/elements so that when completing the index organisations could select the statement that best applied to their current situation. An electronic version of the maturity index may be found at <https://www.hsl.gov.uk/surveys/maturityindex/maturityindexv.htm>. The paper version may be found in [Appendix 6](#).

3.6 SOLUTIONS FOR OH MATURITY INDEX

The solutions developed to accompany the OH index will be disseminated to industry by HSE following completion of this project.

3.7 MAIN SURVEY

The final stage of this project was to use the OH maturity index developed to conduct a large scale electronic survey of the construction sector. The questionnaire comprised three distinct sections:

- Part 1: Respondent demographic questions (questions numbered 1-8)
- Part 2: Maturity index questions
- Part 3: Leading and lagging indicator questions (consisting of 9 questions)

Key results of this survey are presented below. Full reporting of results may be found in [Appendix 7](#).

3.7.1 Missing Values

For Type of construction activity (Q no 4) and Type of OH risk (Q no 5) participants were presented with several categories and asked to select each category which applied to them (selecting as many as were relevant). However 159 and 232 respondents respectively did not select any category therefore missing values were extensive. Due the very high proportion of missing values for these questions a decision was taken to exclude these items (as opposed to cases) from the analysis.

3.7.2 Demographic data

The sample (N=252) had good representation across the range of small, medium and large organisations in the construction sector. The majority (approximately 62%) were Principal Contractors. Table 1 below presents a summary of the data for all the demographic items in the survey. A more comprehensive summary of the demographic data may be found in [Appendix 7](#).

Table 1. Summary of Demographic Factors

Item Description	Categories (Numerical Findings) and Total N/ Missing N
Organisation size (by number of employees)	Less than 5 (5.6%), 5 to 99 (37.7%), 100 to 249 (13.5%), 500 or more (27.0%) Total N = 252, Missing N = 0
Worker status	Directly employed (42.1%), Sub-contracted (3.6%), Both (54.4%) Total N = 252, Missing N = 0
Position in supply chain	Principal contractor (61.6%), Tier 1 (27.2%), Tier 2 (7.2%), Tier 3 (1.6%), Tier 4 (2.4%) Total N = 250, Missing N = 2
Do you have access to occupational health provision?	Yes (72.2%), No (27.8%) Total N = 252, Missing N = 0
Type of occupational health provision	External provider (76.9%), In-house (23.1%) Total N = 182, Missing N = 0
Is occupational health specifically considered in your organisation?	There is a separate OH policy (13.5%), OH is part of the H&S policy (57.4%), There is a formalised approach to OH management (18.3%), OH is not specifically considered (10.8%) Total N = 251, Missing N = 1
Location	South East (35.8%), South West (9.8%), Midlands (17.1%), North East (7.3%), North West (8.5%), Wales (3.3%), Scotland (13.0%), Ireland (5.3%) Total N = 246, Missing N = 6

3.7.3 Leading and Lagging indicators

Six leading indicator items and 3 lagging indicator items were incorporated into the questionnaire. These were primarily used to validate the index (see Section 3.7.3.3) however responses for these items were also subjected to further analysis. The results of these analyses are described below.

3.7.3.1 Summary of Leading Indicator Percentage Scores

Response options to the leading indicator questions were graded on a five point sliding scale, from 'Never' to 'less than 6 months' with the 'less than 6 months' option seen as most desirable from an occupational health perspective. One leading indicator item ('How frequently are OH risks/issues considered at senior management level in your organisation?') had slightly different response options to the other five items (in that no specific time scales were specified). Responses instead ranged from 'Never' to 'Frequently'.

Responses to the leading indicator questions showed an increasing score gradient in the desirable direction. The only exception was the response pattern to the question 'When did you last make improvements to working conditions as a consequence of reviewing your methods for reducing work-relevant stress, anxiety, depression and MSDs?'. The response pattern was more evenly spread across response options with 'Never', obtaining 24% and 'Less than 6 months ago' obtaining 26%. This may reflect that employers are finding psychosocial OH risks harder to manage than physical OH risks. Full details of the leading indicator scores may be found in [Appendix 7](#) (Section 5.7.13)

3.7.3.2 Summary of Lagging Indicator Percentage Scores

Close inspection of the response data for the lagging indicator items suggested potential pitfalls with the quality of the data. Given the free response nature of these questions, a number of respondents entered data that was clearly incorrect e.g. providing a percentage greater than 100 as the percentage of working time lost due to sickness over the course of a working year. Therefore, the quality of data may be suspect as respondents appeared to have had difficulty answering the lagging indicator questions.

Given issues with the quality of the data the research team agreed to delete clearly aberrant data for index validation purposes. Analysis was carried out on the data set according to the below criteria which excluded outliers; *the total number analysed for each question is in brackets.*

- Percentage of working time lost due to sickness related absence: delete all response data with a value greater than 10% (*number = 184*).
- Average number of working days lost per worker per year: delete all response data with a value greater than 10 days (*number = 165*).
- Incidence of RIDDOR reportable diseases: delete all response data with a value greater than 9 days (*number = 205*).

Many respondents included in the data set analysed reported both percentage of working time lost and average number of working days lost as zero. Consequently the mean scores for these items were relatively low (percentage of working time lost was 2.21 and an average of 1.9 days lost per worker per year). Full details of the lagging indicator scores may be found in [Appendix 7](#) (Section 5.7.13)

3.7.3.3 Psychometric properties of the leading and lagging indicators

Inferential statistics were conducted to determine the psychometric properties of the leading and lagging indicator items. The results indicated that leading items had good reliability and appeared to be measuring an underlying construct of OH. Lagging indicator data appeared less robust however.

- There were significant correlations between all leading indicators. The majority of correlation coefficients of a large effect size indicating a good degree of coherence between items. This implies internal consistency. A reliability analysis of the leading indicators using the Cronbach's Alpha internal reliability statistic found the combined leading indicators to have good levels of internal consistency.
- For the lagging indicators only one significant correlation was found between all the lagging indicators (between 'Incidence of RIDDOR reporting' and 'Percentage of working time lost due to sickness related absence'). Given the missing/excluded data and concerns over the quality of the remaining data the decision was taken that conducting a reliability analysis using Cronbach's Alpha would be inappropriate.

3.7.4 Psychometric properties of the index

Inferential statistics were conducted to determine the psychometric properties of the index items.

Reliability measures

- A reliability analysis of each of the building block sub-scales and of the maturity index total scale was carried using the Cronbach's Alpha internal reliability statistic (α). All sub-scales had either good or excellent levels of internal reliability (consistency), with the full scale having excellent internal consistency.

Correlations – Maturity Index Building Block Scales and Maturity Index Total Score

- There were significant correlations between items belonging to the same Building Block and that Building Block's overall score. This indicates a good degree of coherence between scale items.
- All Building Blocks correlated significantly with each other and with the overall maturity score. This suggests that both individually and in combination, the Building Block sub-scales and overall scale possess good levels of coherence and construct validity.

Validity Evidence

- There were significant positive correlations between **all** the individual leading indicators and **all** the Building Block sub-scales.
- There were significant positive correlations between **all** the individual leading indicators and the maturity index total score. The highest correlation coefficient was observed for the leading indicator 'How frequently are OH risks/issues considered at a Senior Management level'?

- Correlations between individual lagging indicators and maturity index total score showed an inconsistent pattern however, possibly an artefact of the poor quality data obtained for the lagging items. This questions the quality of the data collected under the lagging indicators. See [Appendix 7](#) for full details.
- The OH items comprising the leading and lagging indicators were totalled to produce two additional variables (**combined leading** and **combined lagging**) for the purpose of testing the validity of both the maturity index full scale and the Building Block sub-scales.
 - Significant positive correlations were found between maturity index total score/Building Block sub-scale scores and the combined leading indicators (as leading indicator score increased maturity level increased).
 - Significant negative correlations were found between maturity index total score/Building Block sub-scale scores and the combined lagging indicators (as lagging indicator score increased, reflecting poorer performance, maturity level decreased). No significant correlation was found between the Business beliefs Building Block and combined lagging indicators however. Smaller correlations with the lagging indicators may be a function of their weaker reliability.
 - The leading indicator sets of correlations provide statistically robust evidence of the validity of the maturity index measure, along with its sub-scales. The strength of the leading indicator correlation coefficients are higher than those of the corresponding lagging indicator, but this is to be expected given the greater variability of the lagging indicator data and the lesser sample size (due to the need to exclude obvious outliers).
 - Collectively, the maturity scales possesses good psychometric properties.

3.7.5 Maturity levels

The total maturity scores show that the majority of the sample achieved scores that categorised them as at least “Compliant” for OH maturity. The greatest number of respondents obtained the “Proactive” level of maturity, followed by “Compliant”, “Enlightened”, “Reactive” and “Unknowing”. This is depicted in Figure 3 below.

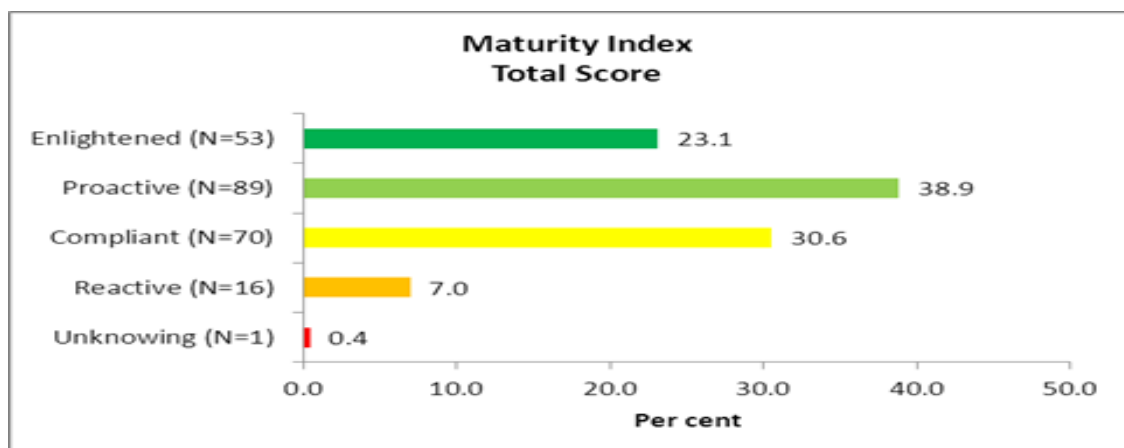


Figure 3. Maturity index total score

A similar pattern was observed for all the OH maturity index sub-scales (Building Blocks) scores, although there was some variation in the magnitude of the scores. This pattern was broken only on the Business Beliefs sub-scale, where more respondent organisations fall into the “Enlightened” rather the “Compliant” category. See [Appendix 7](#) for full figures illustrating these scores.

3.7.6 Total Maturity Score by Demographic Indicators

One way analysis of variance (ANOVA) tests were performed to determine whether differences in total maturity scores varied significantly with demographic factors. ANOVA tests allow the researcher to test the hypothesis that there is no statistically significant difference in scores between different groups of respondents. One way ANOVAs were performed to test whether or not total maturity score varied according to:

- Organisation size
- Position in supply chain
- Access to an occupational health provider
- Location of organisation
- How occupational health is considered in the organisation

Significant differences were detected in two of the five ANOVAs performed:

- Access to an OH provider: There was a significant difference in total maturity score between organisations with and without access to an OH provider. Maturity scores were significantly higher for those with access to an OH provider.
- How occupational health is considered in the organisation: There was a significant difference in total maturity score between organisations that have a separate OH policy compared to those where either OH is not specifically considered, there is a formalised approach to OH management or OH is considered part of health and safety policy. Maturity scores were significantly higher for those with a separate OH policy.

4. ISSUES FOR CONSIDERATION

This project developed a user-centred OH management maturity index (and accompanying solutions for improving OH culture maturity) on behalf of the Health and Safety Executive's (HSE) Construction division. This index is the first phase of the project and provides the basis for the conceptual underpinning beliefs required for health risk management maturity. Further work will be undertaken to incorporate a 'practical' element into the matrix which will provide a 'real world' test of the aspirations and beliefs of the organisation in relation to maturity. The results of this study are likely to be relevant to future interventions with dutyholders on health matters.

The index was employed to survey actual OH management maturity in the construction industry and provides a breakdown according to key parameters such as organisational size, position in the supply chain and access to OH provision. **The survey demonstrated the index to be robust and have high levels of reliability and validity.** However, as the sample used in the current research was a small self-selected sample, **we must be cautious of generalising the findings of the current research to the wider population of the construction sector as a whole.** This caveat aside, several key issues for consideration emerged from the current project and these are discussed below.

4.1 HEALTH LIKE SAFETY?

This is a novel piece of research. To date, OH culture maturity has rarely been given specific consideration as a unique construct distinct from safety culture maturity. Recent innovations in measuring OH maturity (e.g. Tyers & Hicks, 2012) have focused on treating health like safety; intentionally measuring OH maturity in a similar way to safety. The rationale for such an approach is to promote visibility of OH, to encourage employers to integrate OH risk management into their business and safety management and to demonstrate that health is not difficult to manage e.g. levels of safety management achieved on site could be mirrored for health.

It is recognised that this is a valid approach with obvious merit. The ultimate aim is to encourage construction contractors to see OH risk management as part of their day-to-day activities, integrated with existing business and safety management and consistent throughout their supply chain. However, this research implies that there is a potential to overlook key distinctions between safety and OH maturity that can impact upon how health risks are managed relative to safety. Therefore, the index and solutions developed for the current project add value to and build upon, yet also represent a departure from this 'Health like Safety' approach. Careful consideration was given to accommodate key differences between health and safety e.g. latency, perceptibility of risk/harm, causal attribution, foresight and responsibility for health, in addition to capturing the breadth of physical and psychosocial OH issues (from traditional issues (e.g. noise, HAVS) to common health problems and wellbeing issues).

In terms of how construction organisations view the distinction between health and safety, the majority of the sample in the current survey reported giving specific consideration to OH. However few reported having a separate OH policy or a formalised approach to OH management. For the most part, consideration of OH was only as part of the H&S policy. This joined up approach – in which OH is integrated with health and safety management systems – is important for ensuring that OH is viewed as just as possible to manage/control on site as safety is. However, as discussed above, integrating health with safety without giving specific consideration to the unique complexities of OH risk management (e.g. latency) may be counterproductive.

Previous research and ill health statistics has suggested that performance for managing OH risks within the construction sector is not yet at the level of performance for managing safety risks (HSE, 2011). It is reasonable to assume that this disparity between performance for health and for safety may also apply to even those who performed well for OH in the current survey. OH culture maturity needs to be improved to be consistent with levels of safety culture maturity. This may initially require specific consideration of key differences between health and safety e.g. latency, causality of harm. The drive to integrate health with safety should not preclude such considerations. Supporting this view, the current survey demonstrated that having a separate OH policy or formal approach to OH was associated with higher levels of OH maturity.

4.2 CURRENT LEVEL OF MATURITY

The current research suggests that **good OH performance in the construction sector is possible and achievable**; the sample had an overall score for OH maturity in the Proactive level. There was also consistency in level of maturity across all six Building Blocks (representing the multifactorial aspects of OH maturity); across all Building Blocks mean maturity scores were also found to be in the Proactive level. These findings suggest that OH culture within the sample is reasonably mature (yet there is room for improvement). It must be acknowledged however that this result diverges from expectations based on previous research, anecdotal evidence and ill health statistics. Whilst we currently have little knowledge of industry standards for maturity of health risks management (a driver for this current research), anecdotal evidence and health-related statistics suggest that health risks management is generally poor and substantially worse than that for safety risks within construction (HSE, 2011). Therefore we must not interpret results of the current research as an indication that there is no need for improvement in OH standards within the construction sector. **Furthermore, given that the levels of performance reported in this survey are not consistent with other sources of evidence, examining the relationship between self-reported maturity levels and actual knowledge and practices may be warranted as the next research step. This may take the form of targeted inspection.**

We must also be cautious of generalising the findings of the current research to the population of the wider construction sector. The sample in this research is unlikely to be representative of the sector as a whole. They were a relatively small self-selected sample. However this size of sample should not detract from the strengths of this sample (e.g. the index was found to be reliable and valid, the survey included a broad range of company size/level in supply chain/location and the inclusion of Small to Medium Sized Enterprises (SMEs) demonstrated that being small should not prevent good OH performance). It is, however, reasonable to assume that as most respondents were members of IOSH or had contacts with groups such as CONIAC they were already motivated and engaged in improving health and safety performance. Furthermore, the majority of the sample reported having access to external OH provision. Consequently, they may be expected to be already aware of/understand OH risk management and be supported by their OH provider in OH management activities. Such potentially high performers could be assumed to be at more a mature level of OH management. Finally, response bias (where respondents answer in the manner they think the questioner wants them to answer rather than according to their true beliefs/behaviours e.g. Peer & Gamliel, 2011) may have affected the results of the current survey. This may particularly be the case for this survey which was conducted on behalf of HSE. The index itself relies on a wholly truthful response in order for it to be useful to the user in gauging true maturity and indicating how this can be improved. During this research there may have been a tendency to respond in a manner expected by the regulator rather than in a self-challenging way. As a self-assessment and independent tool we

might expect respondents to be more truthful as results would only be seen and used by themselves.

These caveats aside - a key point to note is that despite the perhaps unique challenges (e.g. complexity of supply chain, OH risks faced) this survey reflects good performance and what can be achieved by organisations that are engaged and proactive. It demonstrates that achieving high levels of OH maturity is possible within the construction sector. Furthermore, 54% per cent of the sample were SME organisations. The fact that SME organisations are reporting good levels of OH maturity precludes the argument that good OH management is linked to company size and that smaller organisations will not have the resource or time to manage OH effectively.

4.3 KEY AREAS TO INFLUENCE OH MATURITY

The results of the full survey allowed a number of key areas that may be important for influencing OH maturity to be identified. These are discussed below.

- Maturity scores were found to be significantly higher for those organisations with access to an OH provider and for those with a separate OH policy. This may be a result of a greater awareness of OH and support provided for managing OH issues. The important point illustrated by this finding however, as already discussed above, is that whilst integrating OH and safety management should be the ultimate aim, such integration must not preclude specific consideration of the key differences and unique complexities of OH risk management.
- With regard to position in supply chain, no significant differences in maturity levels were found according to position in the supply chain. However, the majority of participant organisations were either Principal or Tier 1 contractors. As the survey overall represented high levels of OH maturity this suggests that Principal and Tier 1 organisations are aware of and motivated to address and manage OH issues. Given their good performance such contractors could have a key role to play in helping to encourage and foster good practice throughout their supply chain by offering support and using their influence and persuasion to effect OH cultural change within the sector. Such support (e.g. disseminating knowledge and good practice, training etc.) is captured throughout the Building Blocks and associated solutions. **The importance of empowering Principal and Tier 1 contractors to provide supply chain support should be a key take home message of this research.** It is crucial that OH risk management activities promote shared learning and communication between organisation/suppliers (inter-organisation). Such support is imperative to creating a facilitating industry environment that promotes good OH management. Over time, in principle this should help culture change to permeate across the industry. Eventually, even those contractors who do not work for Principal and Tier 1 contractors will come into contact with good OH practices amongst other stakeholders. As a result they will become more receptive to good OH management as they learn more of it and habits spread. Adopting and applying the OH model/index and associated solutions should therefore be cascaded within the supply chain. The lead contractor should ensure a project wide approach, lead by example and support lower tier contractors to develop and implement OH provision and interventions to improve OH.
- In terms of individual Building Block scores it was noted that for the Business Beliefs score a larger percentage of respondent organisations were categorised as being ‘Enlightened’ compared to the other Building Blocks (however ‘Proactive’ was still the largest category

for Business Beliefs). As the sample overall was found to be at a high level of maturity this result suggests that organisations who are at high levels of OH maturity already recognise the business benefits of good OH risk management. Therefore, raising awareness of the business case and the benefits to be achieved from good OH risk management may be a potential driver for improving OH in the construction industry.

- Whilst the maturity level for the total score and for the individual Building Blocks demonstrated a fairly consistent pattern across the sample (most were found to be at least 'Proactive'), it is worthy of note that for the Fairness and Collective Responsibility Building Blocks maturity levels were slightly lower (mostly 'Compliant'). This suggests that these are potential areas to consider prioritising when targeting efforts in raising the standard of OH risk management. Lack of recognition that OH is a collective responsibility may be as a consequence of the interplay between home and work behaviours in relation to health conditions and the lines of responsibility for managing health not being as clearly delineated as they are for safety. The diverse and often transient workforce within the sector makes a culture of fairness for all, e.g. regardless of employment status and existing health conditions difficult to achieve. Principal and Tier 1 contractors again could have a key role to play in raising awareness and promoting a culture of collective responsibility and fairness throughout their supply chain.
- The current survey found strong significant correlations between the leading indicators and OH maturity. The leading indicators seemed to be measuring an underlying construct of OH and for the construction industry leading indicators may be the most effective as a reliable indicator of OH management performance. Amongst the leading indicators a specific finding of interest was how frequently OH risks/issues are considered at a senior management level. This showed the largest correlation with total maturity score. Such a finding supports the view that (as for safety) a visible commitment to OH management from senior management is a key driver in improving performance.
- Whilst responses to all the leading indicator questions showed an increasing score gradient in the desirable direction, the only exception was the response pattern to the question relating to improvements to working conditions as a consequence of reviewing methods for reducing work-relevant stress, anxiety, depression and MSDs. Responses to this question did not show the increasing score gradient and were more evenly spread across response options with 'Never', obtaining 24% and 'Less than 6 months ago' obtaining 26%. This finding indicates that construction organisations (even those who are high performers in OH risk management) find psychosocial risks/issues harder to deal with. It is to be anticipated that organisations start with OH risks/issues that are easier to manage e.g. physical risks/issues as opposed to the psychosocial risks/issues and wellbeing. These physical risks are more tangible and therefore organisations are likely to consider them easier to manage and more likely to be enforced. Therefore efforts to improve OH performance in the sector could focus on raising awareness/understanding of psychosocial issues and strategies to help organisations manage them effectively.
- Amongst the lagging indicators there was an inconsistent pattern in the data. This may have been an artefact of problems with the lagging indicator questions e.g. confusion over questions or inability to access the data required to answer them. Such difficulties may have led to what appeared to be a less robust data set. However, these problems aside, a key finding was that as maturity levels increased, sickness absence decreased. This finding was statistically significant and is important as it further supports the business case for good OH risk management.

- One final point of interest to note for the lagging indicators is also in relation to the sickness absence figures. The average number of days lost in the sample (1.93 days) was relatively low and a large proportion of the sample reported no lost time at all. This finding may be an indication of presenteeism (being at work when not well). This may be an issue particularly for sub-contracted construction workers who would receive no pay if absent from work. Presenteeism could potentially lead to safety issues if members of the workforce are unfit, in addition to the failure to identify, manage, treat and prevent OH conditions. Presenteeism, therefore, could be an important issue to address in the sector and one which could form the focus of any future interventions to improve OH management performance.
- Finally, in relation Type of Construction activity engaged in (e.g. Build, Demolition etc.) and Type of OH risk (Noise, HAVS etc.) the large amount of missing data for these questions prevented the ability to conduct any meaningful, robust statistical analyses. This is unfortunate as one aim of the current research was to explore potential differences in maturity levels according to these key parameters. It is possible that respondents did not answer because they did not understand the question or did not deal with these risks regularly. The researchers are of the opinion that these are still key parameters to explore and it may be pertinent for future research to attempt to do this.

4.4 SOLUTIONS

The current research developed a set of solutions to accompany the OH maturity index. The solutions were developed with feedback from subject matter experts, are aligned to the levels of maturity and can be used by organisations to put into place adjustments/interventions to improve their OH culture. A key issue to consider regarding the solutions is that whilst the assessment stage (index statements) can allow for considerable flexibility as the index is assessing behavioural and cultural aspects of OH management which are independent of what regulation requires, when it came to development of the solutions (and implementing what HSE expects to see from a regulatory point of view) the solutions must provide the legal standpoint. Therefore, the solutions have been specifically developed to align to and convey the right message about compliance and legal obligations. They do however permit flexibility. Solutions can be tailored to meet current level of OH culture maturity, resources and needs of the individual organisation. **A key message is that organisations must meet their legal obligations with respect to the management of OH, however, this should not be taken as the end point. The solutions aim to encourage organisations to continuously learn and improve and to foster and promote good OH risk management throughout their entire supply chain.**

4.5 FUTURE USE OF INDEX AND SOLUTIONS

A final issue to consider relates to the way in which the index and solutions developed in this research will be disseminated and used by the construction sector. The current research identified the key role that Principal and Tier 1 contractors could have in supporting and influencing their sub-contractors to improve OH performance. One way of using the index could therefore be for lead contractors to encourage their supply chain to use the index to assess their current level of OH performance and then mentor/assist their supply chain to implement the appropriate solutions. As discussed previously, such support is imperative to creating a facilitating industry environment that promotes good OH management.

A specific issue to be addressed, however, concerns the way in which respondents will score the index. Participants in the current research had to calculate their own score (for each Building Block and overall maturity). It was suggested that it would be simpler and quicker if scores are

calculated and provided automatically, together with signposting to the appropriate solutions. Presenting the index and solutions in this way would in turn encourage organisations to complete the index and act upon their score by applying the appropriate solutions. Automatic results may also mitigate response bias. This requirement was, however, beyond the scope of the current project (the software used to host the index did not support this capability). This issue should be considered by HSE when they decide how to take the OH index forward and the vehicle they use to make it available to the construction sector. **Finally, as discussed previously, supporting the index with some form of targeted inspection to examine the relationship between self-reported maturity levels and actual knowledge and practices may be warranted and could form the next research step.**

5. APPENDIX

5.1 APPENDIX 1: LITERATURE REVIEW SUMMARY

5.1.1 Method

A request was sent to HSE's Information Services to search formal databases (e.g. Web of Science, OSHROM) and grey literature derived from the Internet (e.g. ODA, IRS, Human Factor Consultancy websites) for the following terms in papers published from **2005** onward:

- Occupational Health (OH) Maturity
- Occupational Disease Maturity
- Safety Culture Maturity
- Differences between safety culture maturity and OH maturity
- Health risk management
- Leading indicators for occupational health
- Lagging indicators for occupational health
- Leading indicators for occupational disease
- Lagging indicators for occupational disease

In addition, rather than reviewing literature on safety culture maturity/measures which had already been reviewed by HSL, the Health and Safety Diagnostic Tool (HSDT) development research report (Bell et al., 2009) was used as a primary source. That is, the current review summarised this research report in two ways (the HSDT itself and also the key safety culture models/measures that had been reviewed to inform development of the HSDT). Therefore, only literature on safety culture maturity post HSDT development (from 2009 onward and not based on models/measures already reviewed) was considered for review.

Overall, the search revealed a paucity of relevant literature. Whilst the literature search identified 60 potentially relevant articles, a sift of abstracts, to remove duplication and eliminate articles not directly relevant to the research aims of the current project, resulted in a total of 19 articles being requested. An examination of the full copies of these articles identified that several were not relevant. Consequently, the final total of articles reviewed was 15 (this includes the HSDT report discussed in the previous paragraph).

5.1.2 Data extraction

A spreadsheet was created to extract data from the literature identified. Data were extracted according to the key categories relevant for the current project. Categories included e.g.

- Definition of maturity
- Stages of maturity
- Elements/factors that make up maturity
- Evidence of reliability and validity
- Context or industry to which applied
- Type of OH risk
- Health risk management leading and lagging indicators
- Differences between safety culture maturity and OH culture maturity
- Challenges to OH management in construction

Overall the literature review identified a paucity of literature directly relating to OH maturity. None of the literature identified specifically discussed differences between safety culture maturity and OH maturity. The data extraction spreadsheet was presented as an interim output

to the customers. To inform development of the maturity index, HSL researchers used key messages extracted from the review. These key messages are summarised below.

5.1.3 Safety culture maturity and models

An understanding of what cultural maturity means has not really developed since HSL last reviewed this topic in 2009 when developing the Health and Safety Diagnostic Tool (HSDT). The literature review did not identify any novel models/approaches to safety culture maturity. A core group of models e.g. the Safety Culture Maturity Model (SCMM; Fleming, 2001, as cited in Bell et al, 2009) and Westrum's Typology of Organisational Communication Model, (2006, as cited in Bell et al, 2009) appear to be consistently and repeatedly used as a base to develop new models and measures of safety culture/climate. Such models depict safety culture in terms of levels of maturity (typically 5) and elements.

A recent working paper provided an overview of occupational safety and health (OSH) culture and available maturity models, measures and toolkits (EU-OSHA, 2011). The paper however focused predominately on safety climate measures, as these were the most prevalent. The authors note that whilst different research traditions recognise the mutual interaction between organisational culture and health, so far this has not yet resulted in theory or research-based health culture tool development. Research has, for the most part, focused on cultural aspects linked to process and occupational safety (safety culture/climate). Conversely, the topic of organisational health culture has received less attention from research. Whilst the assessment approaches to safety culture could be applied to the assessment of health culture there is a need to develop interventions, tools and instruments related specifically to organisational and OH culture.

5.1.4 Tools/measures of OH maturity

There was a paucity of literature relating specifically to OH maturity and related models/measures. Recent innovations in measuring OH maturity were few. Only one recently developed measure specific to OH maturity was identified - the Occupational Health Maturity Index (OHMM; Tyers & Hicks, 2011). This measure was developed as part of an overall approach to managing OH within the construction industry (specifically on the Olympic Park and Village development). This measure focuses on treating health like safety, therefore intentionally measures OH maturity in a similar way to safety.

A key message/concept to underpin the approach to working with contractors on the Olympic Park was: 'health like safety'. The 'health like safety' approach aimed to develop indicators for health that brought OH and ill-health prevention strategies specifically onto the agenda of contractors. It was hoped that this, in turn, would promote the visibility of OH, such that the levels of safety management achieved on the site could be mirrored for OH. It aimed to encourage contractors to see health risk management as part of their day-to-day activities and something that was simple to integrate with existing safety management. Three underlying priorities for OH provision were:

- Ill-health prevention: limiting the impact of work on people's health
- Clinical health intervention: limiting the impact of a person's health on their work
- Health promotion: the use of the workplace environment to promote healthy behaviours.

In the OH service design these three elements linked together. Health promotion was seen as a key tool in promoting workplace, as well as general, health behaviours. Joint campaigns, for example on dust and smoking cessation, linked all three elements of the service together.

The Olympic Delivery Authority (ODA) produced a clear statement of their aspirations in the form of a Health, Safety and Environment (HS&E) Standard. The OHMM was aligned to this standard and adapted from the existing ODA Behavioural Safety Maturity Assessment Index. By modelling the OHMM on such existing safety culture index approaches that seem familiar to contractors, and by integrating OH with existing health and safety management activities, contractors were assumed to be more willing and able to implement it.

The purpose of the OHMM was to show, by a mixture of auditing and questioning both Tier 1 contractors and their sub-contractors, how far OH was integrated into the normal site health and safety and operational procedures. The system also showed how compliant contractors were with OH legal duties, systems and procedures. There were five levels of maturity defined: Infancy, Developing, Evident, Established and Integrated. In order to make an assessment occupational hygienists measured each Tier 1 contractor and their supply chains against the OHMM and categorised them depending on how well they performed on a number of measures related to three categories:

- OH focus on the worker,
- OH focus on the workplace
- OH focus on well-being.

However, this approach, whilst justified, potentially overlooks any key distinctions between safety and OH maturity.

5.1.5 Elements of OH maturity

Whilst the field has not necessarily progressed in recent years regarding clarity of what OH maturity is, related work identified in the current literature review suggests it may be a reflection of:

- Organisational social capital – trust, justice and cooperation. Studies from Denmark (Kristensen, Hasle, Pejtersen & Olesen, 2007) have demonstrated that a high level of social capital at a workplace will influence positively a number of factors such as staff turnover, absenteeism, productivity, output quality, customer satisfaction, job satisfaction, and the health and wellbeing of the employees. The concept of organisational social capital was suggested as useful for further exploration and inclusion when developing tools and materials to measure health culture. This could include incorporating elements within OH maturity measures that address trust, justice and cooperation.
- A good fit between employers and individual goals. A healthy organisation is one wherein its culture, management, working climate and other business practices create an environment that promotes the health, effectiveness and performance of its employees. Healthy organisations are able to balance economic performance goals with employee health and wellness goals (Enterprise for Health network, 2008).
- Integration and enablement. An organisation that has good OH maturity will have an approach to OH management that is fully integrated into the wider management system. Their approach should be fully adopted throughout the supply chain, leaders involved, and workers engaged (e.g. Tyers & Hicks, 2012).

The literature reviewed highlighted that when drafting the OH index for the current project there was a need to take account of the various contributors to healthy workplaces. A healthy workplace cannot be seen as involving either one factor or another, it is affected by societal, organisational and individual factors and all of these should be factored into any assessment (Kelloway & Day, 2005). These included: safety of the work environment, work-life balance, a culture of support, respect and fairness, employee involvement and development, work content

and characteristics and interpersonal relationships at work. These could influence OH, especially as the outcomes cut across entities, allowing:

- Individual outcomes – psychological, physiological, behavioural.
- Organisational outcomes – turnover, performance, customer satisfaction, the bottom line.
- Societal outcomes – national health-care costs, government programmes.

Based on this review the elements identified that make up OH culture maturity may include:

- Senior management commitment
- Continuous improvement
- Communication
- Competence
- Employee involvement
- Occupational health management.

5.1.6 Health risk management leading/lagging indicators

The varied and holistic nature of potential leading indicator areas for OH emerged from the literature review e.g. Rogers, Evans and Wright (HSE RR734, 2009). There is a spectrum of leading to lagging OH indicators that may be grouped according to:

- Health and safety culture e.g. management commitment
- Health and safety systems e.g. resources committed to OSH
- Healthy and safe person e.g. risk awareness
- Healthy and safe place e.g. risk controls in place

Measures in this spectrum include: assessment of key performance indicators (KPIs) for OH management (e.g. health risk assessments, training, good practice), measures of controls e.g. use of Personal Protective Equipment (PPE), physical measurement of environment, exposure monitoring, health surveillance and RIDDOR data.

More recently and specific to construction, the Health Impact Index (HII) was used on the Olympic Park as a form of leading/lagging indicator (Tyers & Hicks, 2012). A health impact was defined as an individual event that could cause any one occupational disease if the current working method is maintained e.g. exposure to excessive noise levels if no hearing protection is available. Health impacts included skin, noise and dust exposures.

5.1.7 Challenges to OH management in construction industry

The Olympic Park research (HSE, 2012) reported the key to good management of OH in the construction industry as engagement, enablement and assessment. Overall the current literature review identified a number of potential challenges to overcome. Despite pockets of good practice the literature identified that there is often underreporting, a patchy awareness of legal requirements in relation to OH and a failure to implement established good practice. A significant number of employers are failing to recognise the extent, and cost of work-related ill health absences.

The EU-OSHA (2011) paper raised some sector specific points. The paper argued that the safety culture approach and many related diagnostic tools have their origins in high-risk industries. Looking at OSH from a cultural viewpoint is most suitable and useful when all regulatory aspects and related risks are already addressed by the organisation in a systematic way. It was suggested that in order to increase and broaden the acceptance and use of culture assessment

tools, and to improve their application beyond the high-risk industries, more efforts should be undertaken to simplify and incorporate these tools into OSH management and organisational development standards. This could be done by making sector-specific assessment tools (and guidance), linking them to the typical core activities from the respective sectors and addressing specificities from certain target groups (e.g. part-time or migrant workers in the construction industry).

5.1.8 Maturity grid development

A final paper identified that is of relevance for the current project (Maier, Moultrie, & Clarkson, 2012) discussed the value of using maturity grids and presented guidance for developing new maturity grids (by suggesting parameters for a more rigorous approach to their development). Various recommendations were provided within this paper. These were taken into account when developing the maturity index for the current project. The authors suggested that in order to develop robust maturity grids four phases should be considered.

- **Planning:** decide upon and specify audience and aims, clarify scope of grid and define success criteria.
- **Development:** define the architecture of the grid e.g. process areas to be assessed, maturity levels to be assigned, cell descriptions to be formulated.
- **Evaluation:** The grid should be piloted with end users, difficulties and limitations addressed and the grid iteratively developed.
- **Maintenance:** Continued accuracy and relevance of grid will be ensured by maintenance. Maintenance may include keeping a results database e.g. for benchmarking.

5.2 APPENDIX 2: SEMI-STRUCTURED INTERVIEWS

Interviews were conducted with researchers / practitioners involved in the development and implementation of the Olympic Delivery Authority's (ODA) Occupational and Health Maturity Index (OHMM). They supplemented the literature review that was undertaken to assess the research published on health and safety maturity models and related tools. The OHMM is the only other tool identified by the literature review that has been developed for assessing OH maturity. These interviews were intended to capture lessons learnt from OHMM development, with view to assimilating these lessons into the design of the current tool where relevant.

5.2.1 Method

5.2.1.1 *Sample*

Two OH professionals instrumental to the development of the OHMM were interviewed. Since the OHMM was developed relatively recently (in the build-up to the 2012 Olympics), and is the only other similar tool identified from the literature review, practical insights obtained direct from its development were considered as important preparation for developing the 'new' OH maturity tool that was commissioned for this present research project. While the sample was small, it can be justified on the basis that qualitative research is less about generalisations, but focuses more on generating the required information under investigation (Marshall, 1996).

5.2.1.2 *Data Collection*

Semi-structured interviews were used to explore the knowledge, experience, views and perceptions of two Occupational Health (OH) professionals instrumental in the development of the OHMM. Using a qualitative approach allowed scope for exploring the rationale underpinning OHMM development as well as coverage of key topics. Topics comprised *tool development, occupational health risks, challenges*, and a final question to gauge the *Top Tips* when developing this type of index. The question set is included at the end of this appendix.

5.2.1.3 *Analysis*

Data were analysed using the Framework Analysis approach developed by the National Centre for Social Research (see Barnard et al., 2009; Ritchie and Lewis, 2003). This systematic approach to data management and interpretation follows various stages. These include 1) familiarisation with the data, 2) constructing a thematic framework, 3) summarising the data, 4) systematic ordering of the data and 5) interpretation. This method of data analysis allows the differences and similarities in the data to be identified as well as explaining any emergent patterns and findings (see Barnard et al., 2009).

5.2.2 Results

The analysis resulted in the emergence of three themes and their associated sub-themes. These main themes were:

- 1) The **development approach** to be taken for progressing the design of the tool's content.
- 2) The target audience's **knowledge** of OH issues.
- 3) **Securing buy-in** including using stakeholder involvement with a view to securing their 'buy-in'.

5.2.2.1 *Development approach*

This section looks at the different factors that should be considered when developing a maturity measure. It involves three sub-themes: i) Process, ii) Focus and iii) Solutions

i) Process

This sub-theme raised quite a few issues on those factors that are required in ensuring that a systematic and dynamic process was followed when developing the tool. These included *building on previous work*, as shown in the quote below:

“I mean we did do that, we, I don’t know if you’re aware, we started off with HSL’s question set and then added a few questions on environmental health to it.”⁹

Having a clear definition on which to base the tool was also highlighted in order to overcome differing interpretations of what OH means.

“I think the first thing we need to do is come up with a definition that everybody can relate to, that addresses all the aspects of occupational health and that make a difference in the future. So I think it’s still, the term itself means different things to different people.”

In addition, participants highlighted developing a clear structure as essential in the development process. This sets in place what the purpose of the tool is, what is expected by all parties using the tool, its limitations, and the focus of its content:

“A maturity index whether it’s on safety or health on its own is only a measurement tool and the bottom line is you’ve got to make real improvements to the way people address health in the work, you know, in the workplace setting, that piece about RAMS¹⁰ and the use of RAMS for health is really important.”

Other important elements of the development process that emerged was to keep it simple; to pilot it so that its contents could be adjusted as required and to keep its completion to a *manageable time* in order to *control and manage the completion process*.

ii) Focus

This sub-theme highlighted the importance of keeping the development process focussed. Participants noted unfailingly that the process should have a *consistent approach to both elements* of health and safety:

“And I think that that’s one of the issues that we were trying to grapple with was to make health like safety, as I say and how people think about health in the same way as safety so whenever a safety issue was raised or a safety initiative was created, it was the occupational hygiene team on the Park [sic] were always trying to make, you know, add a health one in there, you know, let’s do a health example and let’s

⁹ The text in italics that is enclosed within quotation marks relates to verbatim comments from the participants.

¹⁰ Risk Analysis Management Systems

talk about a health lead indicator, let's talk about Occupational Health Maturity, that sort of thing, rather than see it as isolated with the main of doctors and nurses operating from a medical centre somewhere in, somewhere else if you like."

Moreover, the focus has to incorporate both the *workplace* as well as the individual and any necessary *policies that should be put in place*.

iii) Solutions Criteria

This theme indicated criteria to consider when generating solutions for enabling an organisation to progress their OH maturity. *Any measures recommended by the tool should be easy, and produce improvements that reinforced the tool's added value:*

"At the Park it was, you know, it was very well accepted. The individual results were challenged sometimes, but then obviously when we ran [it] each year and once organisations could see how they were improving and we were able to align improvements with very tangible action-oriented programmes there was, you know, it was successful and a number of them have taken them to other projects, which is brilliant."

Although it was noted that it *takes time to see outcomes* or benefits, a *defined outcome should be outlined* and *different ways should be explored* to get the best outcome. However, the participants did state that their *tool was one that could be viewed as 'live and active' and as such should be seen as a participatory indicator rather than one that is outcome focussed*.

Despite defining the outcomes, there are times when *instant results* can be created but these should be accepted within the context, such as with slips and trips, as noted:

"...safety happens immediately, slips, trips falls [are] easily measurable..."

Conversely, creating 'quick wins' or instant results, can be complicated by the *poor visibility* of OH issues of any potential adverse or positive outcomes that could occur with occupational health-related conditions as stated:

"...the difference with occupational health is what we call the slow accidents that things can take a lot of time to develop so it's [sic] not as visible as safety and that's what makes a big difference with the understand [sic] and appreciation of individuals and companies as to why it's important."

Overall, the tool should also generate solutions that are sustainable.

"Yes. You also, you also run the risk of organisations thinking that what you're doing is, you know, this is a new initiative that will, you know, will exist today and won't be here tomorrow. We wanted something that was sustainable because obviously the (site mentioned) was all about legacy."

"We wanted it to be sustainable anyway to protect people's health in the future."

5.2.2.2 *Understanding / Communication*

This second theme raised the aspects of the knowledge base that should be considered when developing the tool. This theme realised two sub-themes: i) *current knowledge*, ii) and *developing understanding / comprehension*.

i) *Current Knowledge*

The knowledge sub-theme showed the importance of *taking into account variations in industry's knowledge of occupational health when designing the tool*:

“there were lots of very small, certainly SME and micro organisations coming onto the Park whose....understanding of occupational health was very limited.”

Lack of *knowledge of occupational health* was one of the issues that the participants noted that they encountered:

“Problem is lack of knowledge in occupational health compared to safety, and health [is] often missed out in [the] health and safety piece.”

“I think possibly that last point there; that the industry, when you talk about occupational health, the industry still think [sic] primarily about the health of the individual worker and occupational health maturity is about the organisation rather than individuals within it. I think that getting that message across I think it quite important and would be quite challenging for you.”

The importance of managing variations in how the index's content may be viewed was raised by the participants:

“make sure that how people interpret the levels is really clear, because if you're not careful what one person interprets as being sufficient to meet that standard, might not be what you intended it to be.”

Occupational health was also highlighted as being perceived as on the periphery of day-to-day operations within the construction industry:

“I think generally I think Occupational Health is often perceived as something that operates in isolation to day-to-day operations within businesses, not just in construction but in all sectors.”

ii) *Understanding / comprehension*

The understanding and comprehension sub-theme illustrated the importance of *assessing as well as increasing the understanding*, to finding the *best ways to transfer information*, as shown:

“There are various stages people go through from sort of an understanding to compliance, so they are actually, you know complying with everything they're suppose [sic] to be doing legally right through to as I say world leading where

they're very proactive and it goes right through the supply chain as well and painting those pictures of what each stage looks like."

5.2.2.3 **Securing 'Buy In'**

The third theme had three sub-themes, namely i) *stakeholder involvement* ii) *positive approach* and iii) *Resources*.

i) Stakeholder involvement

The first sub-theme under this theme showed the importance of the *ability to engage with the required resource*, e.g. key persons who could add to the process

"So I think that engagement with the SHEL¹¹ team was key for us."

This element in turn allowed the promotion of the process because workers

"actually want to do their best and you know we've only been met with positives, you know people really want to make a difference in such [sic] safety and that's been, over the five years I've been in construction that's got better and better and better and health is the new safe thing and they want to do something about this, and this is what it's saying about helping them to improve."

In particular, the *involvement of senior staff* in the process emerged as critical:

"...everything that we did we did through the leadership team, the Safety Health & Environmental Leadership Team or So we were lucky enough to be discussing our ideas at a very senior level with the Tier 1 contractors because the SHEL group was made up from the most senior project managers and project directors, rather than a team of Occupational Health and Safety professionals."

Using organisations with *experience made a difference*, as shown:

"At the Park it was, you know, it was very well accepted. The individual results were challenged sometimes, but then obviously when we ran each year and once organisations could see how they were improving and we were able to align improvements with very tangible action-oriented programmes there was, you know, it was successful and a number of them have taken them to other projects, which is brilliant."

Those involved also had to be *willing to try a new process*:

"I think only because it was new, it was a, let's try this and see how it went. I think that was the main thing and getting that understanding of why we were doing it and how it would help them..."

¹¹ SHEL^T = Safety Health & Environmental Leadership Team

“when once properly briefed and involved in the process I’ve never come across anybody in the construction industry not willing to engage in something that they believe could be helpful.”

ii) Positive Approach

Promoting the tool as a positive aid (the carrot), rather than the penalty (the stick) emerged as important for securing ‘buy-in’ to the tool. As one participant stated:

“... as I say for them to see it, as an aid rather than a stick, if we’d gone in there and punish, you know they felt they were being punished and this was a tick box and an audit I don’t think they would have been so compliant and helpful. So I think that’s the most important thing that it’s got to be seen as a positive tool, rather than a big stick to hit them with.”

“...it’s much more beneficial that it’s by carrot rather than stick so you’re helping people to understand what good looks like, rather than forcing them [sic] just as a tick box exercise.”

iii) Support

Ability to *provide support*, so the organisations would realise that they had the required assistance when they went through the process was also identified as important to engendering buy-in to the tool

“As I say it was going and talking to them and making them realise we were trying to help them and showing them the little steps that they could do that would make a big difference, like having a policy in place that people understood and understood the health risks etc. And being there to, I think you know, so we didn’t just say here we are, get on with it, it’s here we are, let’s see what we can improve and you know and we were available to ask questions and help them to get there.”

5.2.3 Conclusion

These interviews highlighted the various elements that are required in driving OH forward through the development of an appropriate tool. Key messages for tool development are highlighted below.

- According to the OHMM developers, the tool should, as far as possible, encourage OH to be perceived as no different than safety in terms of how it should be managed.
- Development should draw on previous work, be based on a definition of OH, ensure the tool's purpose and limitations are clearly specified and include a piloting phase.
- The tool should be easy to understand, be possible to complete within a manageable time and have an evaluative component. It should be capable of accommodating potentially low levels of knowledge about OH within the construction industry. The tool's content should be unambiguous so as to avoid misinterpretation. As such the tool can then be used as a vehicle for improving knowledge about OH within the construction sector.
- The solutions generated by the tool should include 'quick wins', as well as solutions that create sustainable solutions. Improvements brought about by using the tool can then be used to promote and reinforce its continued use. Expectations over its benefits should, however, be managed so that its users are not disappointed if instant results are not achieved. Quick wins, would, however, help achieve improvements in a transient workforce as is common place within the construction sector.
- Involving stakeholders (from all organisational levels) in the tool's development is important for gaining acceptance and commitment to the approach, particularly if it is: pitched as an 'aid' rather than punitive; readily integrates within the business; can be backed up by OH expertise, and generates benefits that reinforce its continued use.

5.2.4 Interview Schedule

Instructions for interviewer

- Who we are - State name (as interviewer).
- Why we are here - HSL is conducting this interview on behalf of HSE.
- Background – HSL has been commissioned by HSE to develop and pilot a user centred OH management maturity index for the construction sector. This maturity index will also indicate solutions for improving OH cultural maturity.
- Aim - The overall aim of this project is to develop and pilot an OH maturity model. This interview aims to update HSL's current evidence base on OH maturity models and related measures developed by other agencies e.g. the ODA's Occupational Health Maturity Index (OHMM). The interview will supplement the information we have already gathered in a brief literature review. The information that you provide today will be used to help HSL develop a definition and model of OH maturity and to steer the development of a framework for the OH management maturity index.
- Plan for the session –
 - o Should take between 45 minutes to one hour.
 - o Open questions related specifically to the aims of the project, namely:
 - o Challenges surrounding OH management in the construction industry?
 - o How can we group different types of OH risk e.g. silica, HAVS?
 - o Suitable leading and lagging indicators for OH maturity?
 - o Lessons that can be learned from previous work e.g. developing the OHMM?

Explain how we gather views – explain that we would prefer if the interview is audio recorded – obtain consent. Recording ensures views are captured and avoids the use of a note taker.

What we will do with the data

- Data will be transcribed by an external company and is done to ensure all of the views are captured completely and accurately. All transcripts will be anonymised to remove any contact names.
- Prepare reports that do not identify individual participants or organisations.
- Data will be kept secure on the HSL computer network.
- Any questions?

Note: These questions serve as a guide for items to enquire and probe among participants. The intention is not to ask verbatim each specific question. Rather, the major items in each section should be investigated/ probed for additional details based on participants' responses to the major questions.

Introduction

1. Name, role?
2. Brief overview of participant's background e.g. current/previous experience in this field?

Tool development

3. How would you define/describe OH maturity? i.e. has your team developed/used a specific definition/description for this term? N.B this may also be linked to 'performance'. We recognise that safety professionals often equate changes in incident statistics with a lowering/raising of standards and safety maturity is extrapolated accordingly.
4. In your opinion what is the relationship between OH maturity and safety culture maturity?
Prompt: How can we contrast OH and SC maturity – what are the key differences and similarities? Are there differences in what is needed to gain OH and SC maturity? What are the differences in how it occurs in practice? Can we compare broad concepts e.g. in terms of having a certain level of maturity?
5. Can you tell me about the development process for the Occupational Health Maturity Index? *Prompt e.g. rationale/theory behind your approach, method you employed, did you base it on any specific model/tools/research of safety culture/OH maturity, why etc?*
6. How/why did you decide upon the stages/levels and components of maturity in your model?
7. How did you test usability? *Prompt: Did you undertake pilot studies, how, who with?*
8. How did you assess reliability and validity of the OHMM?

Occupational health risks

9. We intend to correlate our index with key leading and lagging indicators of health risk management in the construction sector. In your opinion:
 - What would be appropriate leading indicators (indicators that measure the current situation that might affect future performance i.e. proactive – taken to prevent the occurrence of an accident, incident or ill-health case) e.g. access to accredited OH provision?
 - What would be appropriate lagging indicators (indicators that measure outcomes that have resulted from past actions i.e. reactive – taken after an accident, incident or ill-health case)?
10. Do you think there are ways in which behavioural leading indicators may differ between different types of OH risks? *Prompt: Does the index need to differentiate different types of health risks? How would you suggest we do this?*
11. In your opinion how could the variations between different types of OH risk (e.g. dermal, respiratory, noise, HAVS) be accommodated/captured by the index? What about psychosocial risks (common health problems e.g. stress, anxiety, depression and MSDs)?

Prompt: how can we group the different types of OH risk to reflect or assist different levels of maturity associated with different types of health risk?

Challenges

12. In your opinion, what are the challenges surrounding OH management in the construction sector? *Prompt: E.g. transient workforces, supply chain, type of activity etc.*
13. Did you face any specific challenges when developing the OHMM? How did you overcome them?
14. How do you think we could accommodate these challenges in the index we are developing?

Final question

15. What would you say are the Top Tips for developing an index of this kind? *Prompt: Key learning points, what issues do we need to ensure we address etc...*

Close

Is there anything else anyone would like to add? Thank participants for their time. Recap on what will happen with the data. [Transcribed, put together with others' responses, report made available to public, not identified]. Provide contact details if they need anything further.

5.3 APPENDIX 3: DEFINITION OF OH MATURITY AND DEVELOPMENT OF AN OH MODEL AND DRAFT OH INDEX

5.3.1 Definition of terms

For the first draft OH maturity index the research team defined OH culture and OH maturity as:

- **OH culture** represents the organisation’s shared core values, beliefs, behaviours, traditions and history with respect to OH.
- **OH maturity** is a reflection of the extent of proactivity that an organisation and employees have in managing their health risks and wellbeing issues at work. For the purposes of measurement OH should be considered as relating to both the organisational and individual level.

5.3.2 Development of the OH maturity model and draft OH index

HSL researchers used a consensus based decision-making approach to develop an OH maturity model and OH maturity index. Initially the research team collectively examined the key findings of the literature review and expert interviews (see [Appendix 1](#) and [Appendix 2](#) of this report). Previous work by HSL in this field (developing the Health and Safety Diagnostic Tool (HSDT), OH climate tool, Common Health Problems Toolkit and the Health and Wellbeing Needs Assessment) was also considered. Based upon this work the research team made a series of iterative decisions in terms of elements to be captured within the model and levels of maturity within the index. These are described below.

5.3.2.1 Levels of OH Maturity

It was agreed that the degree of proactivity would distinguish the level of maturity. Initially the researchers considered having three levels of maturity. It was suggested that three levels would permit a clear distinction between the levels, avoid arbitrary distinctions and ultimately would make the index more user friendly. However, following in-depth discussion the decision was made to have five levels (this is consistent with other measures e.g. the Safety Climate Maturity Measure, the Health and Safety Diagnostic Tool) and would give more sensitivity, especially for scoring purposes).

It was further decided to use the same definitions for levels of maturity as in the HSDT. That is maturity levels will range from least mature (Starting Block) to most mature (Winning Post). The rationale being that this measure is already being used in the construction industry. Figure 1 below illustrates the maturity levels and their description.

Level of Maturity	Description
Starting Blocks	“Unless I get caught I’m not worried”
Getting Going	“I’ll worry about it when it happens”
Walking	“I do it because I have to”
Running	“I do it because I want to”
Sprinting	“I do it without thinking”

Figure 1. Maturity levels and the descriptions.

5.3.2.2 Elements of OH maturity

The index needed to focus on measuring the dimensions of OH culture by which changes in maturity can be tracked and which are distinct from other OH leading indicators relating to 'systems', 'person' and 'place'. It was therefore decided that leading/lagging indicators that fall under the concept of 'culture' would inform the content (elements) of the maturity measure. Leading indicators related to the concepts of 'systems', 'person' and 'place' would be used to correlate the OH maturity index with and validate it. **The index also needed to capture any key distinctions/differences between safety and OH maturity.** The researchers discussed and documented such key differences as:

- Latency - for safety the consequences are often immediate and usually obvious. For OH they are usually latent and often not obvious.
- Perceptibility - safety hazards and harm are more obvious and immediate than for health. For health the harm can be cumulative. For that reason it may be easier to overlook/ignore.
- Causal attribution - for safety the causes can be more clearly aligned with work. For health causes can overlap with actions outside of the workplace e.g. smoking, poor lifestyle.
- Responsibility - aligned to causal attribution (above point). The responsibility for employers is much clearer cut for safety compared with health e.g. due to the ambiguity of the causes of health issues.
- Feedback - more immediate feedback for efficacy of safety controls, lack of immediate feedback for health controls. This applies to both response (belief the controls will work) and self (belief they have the right skill/knowledge to use the control) efficacy
- Foresight - organisations and individuals need to be more informed and have foresight in managing health due to the more diverse and long-term range of OH issues.
- Benefits - the same control can provide more benefits for health (e.g. wearing RPE can prevent asthma, silicosis, cancer etc.) compared to maybe only one safety benefit (e.g. using fall arrest harness preventing a fall).
- Costs - employers can be more easily prosecuted for safety than for health issues.
- Managing OH - OH is harder to manage with a transient workforce than safety is.

Based upon their discussions the researchers then decided upon a set of criteria by which to select elements of OH maturity to include in the OH model and OH index. These criteria were:

- Elements will be more strongly aligned and specific to OH rather than safety culture maturity so that the measure adds value to and is distinct from existing safety culture measures. This indicated a departure point from previous work in this field e.g. the ODA's OHMM.
- Elements will read across traditional OH issues (e.g. noise, HAVS) in addition to common health problems and wellbeing issues.
- Elements will take account of the various contributors to healthy workplaces (as identified from the literature review, expert interviews and previous work) e.g.
 - Senior management commitment
 - Continuous improvement
 - Communication
 - Competence
 - Employee involvement
 - Occupational health management.

In line with the above criteria the research team then drafted a list of elements that they considered OH to encompass. Two lead researchers then reviewed this list to ensure that it captured all potential elements that may be relevant to managing OH. The researchers then systematically worked through each element in turn to ensure that the key differences between managing OH and safety (e.g. issues surrounding latency, perception of harm etc.) were relevant to these elements.

Elements were then grouped according to similarity into five ‘Building Blocks’. Via several iterations the research team came up with a definition for each of the five Building Blocks.

- Initially the researchers defined what they would expect the Building Block to look like in a mature organisation,
- A succinct description for each Building Block was then drafted.

Table 1 below shows this first draft of Building Blocks and descriptions.

Table 1. First draft of Building Blocks and descriptions.

Building Block	What this would look like in a mature organisation	Description
Business Beliefs	It is recognised by all that ‘health is good for work’ and ‘work is good for health’.	Belief that ‘health is good for work’ and ‘work is good for health’.
Fairness	Everyone’s health and wellbeing is supported irrespective of their health status and position in the supply chain.	Uniformity of support provided for health and wellbeing.
Collective Mindfulness	Everyone is mindful (aware) of the full range of current and future OH issues and manages these issues appropriately.	Mindfulness and responsiveness to the full range of current and future OH issues.
Dual responsibility	Universal recognition that the responsibility and management of OH is shared between managers and workers.	Distribution of responsibility and control of OH between management and workforce.
Leadership	All leaders are competent in managing OH and are consistent in what they say and do about its importance.	Competency and consistency in managing and leading OH.

5.3.2.3 Scoring system

In order to facilitate use of the measure as a survey administered via the online survey tool SNAP, it was decided that the index would have a numerical scoring system for each element (1-5 where 1 is low maturity, 5 is high). The overall maturity score would be calculated by totalling the element scores (a mean of the element scores would be skewed potentially as it was anticipated that an organisations may perform better/worse on specific elements). The overall maturity score would then be banded into an overall level of maturity e.g. 1-5 would be Starting Blocks, 6-10 would be Getting Going etc.

5.3.2.4 Statements of maturity

It was decided that a series of statements (one statement for each of the 5 levels of maturity within a Building Block) would be provided in the index. For **each** of the Building Blocks users

(e.g. duty holders, H&S managers) would be asked to tick the statement that best applies to their company. They would tick only **one statement for each Building Block**.

In order to develop these statements the researchers considered how each Building Block (and the sub-elements it contains) would be expected to vary according to maturity. For the purpose of the first draft index the researchers focused on determining the **least (Starting Blocks)** and **most (Sprinting)** mature levels. It was proposed initially that the criteria for variation in maturity of the elements within the building blocks may involve:

- All of the time *versus* none of the time
- Everybody *versus* nobody
- No OH issues considered *versus* all OH issues (including wellbeing and common health problems).

5.3.2.5 How to differentiate OH culture

It was hypothesised that the key differences between OH and safety e.g. latency may permit OH culture to be differentiated according to physical or psychosocial hazard as the root cause. In order to explore this hypothesis, the researchers constructed a table to cross check the key OH and safety differences against three hazard types: Safety, Health (e.g. noise, HAVS) and Psychosocial (e.g. stress, MSD).

However, having worked through these differences and the three hazard types it became apparent that this would not be an efficient or reliable way of exploring the relationship between hazard type and OH culture¹². Therefore it was decided to:

- Explore the relationship between hazard group (dermal, HAVS, noise, psychosocial etc.) and overall maturity score.
- Explore the relationship between characteristics of the organisation (in-house OH provider, type of work, type of workforce etc.) and overall maturity score.

¹² One possible way for differentiating OH risks is according to whether (a) conditions are life threatening (e.g. certain respiratory and dermal conditions but not MSDs or noise), and (b) whether psychosocial hazards (e.g. stress, MSDs) or physical hazards (e.g. respiratory, dermal, noise) are the root cause.

5.4 APPENDIX 4: EXPERT WORKSHOP

The preliminary work described in [Appendix 3](#) was ‘reality checked’ at an expert workshop held at HSL on the 8th October 2012.

5.4.1 Participants

In total 13 delegates participated in the half-day workshop. In addition to the two HSE customers for this project workshop delegates were drawn from a cross section of expertise. The following individuals wished to be acknowledged for their contribution:

- Jane Coombs – Constructing Better Health – (OH standards body)
- Caroline Burke – Murphy Group - (OH provider)
- Stephen Williams – Highways Agency (Client)
- James Christian – Bechtel/Crossrail integrated team (Client).
- Kieth Strachan – Pyeroy (Principal Contractor)
- Alex Vaughan – DSJV (Principal Contractor)
- Simon Millward – Thomas Vale (Principal Contractor)
- Phil Reilly – Local Authority
- Caroline Haslam – Miller Homes (Small Contractor)
- Nick Muir – Raymond Brown Group (Principal Contractor)

Prior to the workshop delegates were given pre-workshop material. This included a word document detailing the levels, elements and statements of OH maturity that the research team had developed so far and a table of leading and lagging indicators that the OH index may potentially be correlated with. A brief explanation of the rationale for decisions made was also included in this document. Delegates were asked to read and consider the information provided and to come prepared to discuss/challenge this at the workshop.

The workshop aimed to capture views, experience and opinions in a systemic way via a series of group exercises. Details of the group exercises and a summary of the key discussions they produced are presented below.

5.4.2 Workshop results

The workshop began by asking delegates to consider the draft definitions of OH culture and OH maturity and to comment upon their acceptability and suggest amendments. Overall the delegates agreed with the draft definitions. Only a few additional suggestions were made. These were:

- To include wellbeing within the overall definition of OH culture.
- As a means of raising awareness / improving understanding provide a clear definition of what is meant by OH e.g. what OH encompasses.
- To include leadership within the definition of OH culture.
- To include a reference to OH vision as driving the culture.
- Delegates pointed out it would be possible for an organisation to address wellbeing issues whilst failing to address the basics (minimum legal requirements for OH). Therefore it was suggested that the definition of OH maturity states the need to comply with minimum legal requirements.

Following the discussions about OH culture and maturity definitions delegates took part in four group exercises. These exercises are detailed below.

- **Exercise 1: Challenges to OH management in construction**

This exercise aimed to capture views and opinions of the challenges to OH management in the construction sector that the index would need to accommodate. Delegates were presented with the potential challenges and asked to comment on whether this list was accurate and complete (e.g. what other challenges (if any) should the OH maturity index accommodate?).

- Transience (e.g. changing workforce, use of contractors, sub-contractors)
- Multicultural workforce
- Access to OH
- Complex supply chains
- Production pressures
- Site complexity (complex and dynamic work sites)
- Lack of standards/training/consistency

Overall delegates agreed with the challenges to OH management as identified by HSL. They did however suggest several other challenges to be considered:

- Delegates were of the opinion that within the construction industry there is lack of understanding / awareness of what is meant by OH and what it encompasses e.g. a lack of appreciation that it is more than just health surveillance.
- OH is often viewed as a Human Resources (HR) function rather than a health and safety function. Consequently there may be lack of accountability, responsibility and alignment between the management of health and the management of safety within some construction organisations.
- The often lengthy and varied life cycle of construction projects e.g. from design through to manufacture of materials, build and maintenance was cited as a potential challenge to managing OH. For effective OH management all stakeholders need to be accountable and take ownership of OH issues.
- Related to transience it was highlighted that contracted workers may only be on a site for a few days before moving to another site. Such sites may have no OH provision at all or OH provision may vary substantially in practices / quality between sites. It is therefore difficult to identify individuals with OH issues and difficult to provide a consistent OH service.
- It was suggested that within the construction industry there are many sub-cultures (e.g. macho culture, immigrant workforce) which have a poor tradition of accessing OH care. This may be further exacerbated by a failure / lack of access to even basic medical care by such cultures e.g. General Practitioner services.
- Delegates were of the opinion that the nature of payment for contracted work led to a fear / reluctance by employees to access OH services or to report OH conditions in order to avoid losing wages.

- **Exercise 2: ‘Reality check’ the index**

The aim of this exercise was to ‘Reality check’ the OH model and draft OH maturity index that had been developed. Collectively as a group delegates were asked to consider the usability and comprehensibility of the levels of maturity, the Building Blocks, their constituent elements and the statements. Key points that emerged from this exercise are provided below.

Levels of OH maturity

In general delegates were of the opinion that five levels of maturity were appropriate; however there was some suggestion that there could be six levels. The segmentation and colour coding

was considered to be intuitive and easy to follow. It was proposed that such a format would already be familiar and acceptable to many organisations within the supply chain (e.g. five levels are traditionally used in measures of maturity e.g. safety culture measures). Several delegates expressed concern about the use of red as the least mature level, however it was accepted that despite possible negative connotations this format is widely used and a familiar colour coding for maturity levels.

There was recognition that given the diversity of contractors within the supply chain (Principal, 2nd, 3rd & 4th tier) it is to be anticipated that contractors will have differing levels of OH maturity. Therefore the requirement for a maturity index that takes the supply chain on a journey (encouraging development and a step change improvement in OH up to a top level that is an aspiration, yet achievable) was recognised. The suggestion was made that maturity levels should highlight collective responsibility of supply chain (We not I) and could develop from mitigating / limiting harm up to the most mature level of going above and beyond e.g. improving health and wellbeing. An example given was that maturity should improve from ‘*We do it because we know we have to*’ to ‘*We do it because we want to improve and we know the benefits*’.

In general delegates were in agreement that consistency with the HSDT maturity levels was appropriate. It was however commented that a key challenge to OH management is a lack of knowledge / awareness about what OH is and what it encompasses. Therefore rather than the running metaphor for maturity used in the HSDT, a more appropriate metaphor for OH maturity was suggested as knowledge. It was felt that this would draw out the importance of awareness, knowledge and understanding of OH issues for all within the supply chain.

Building Blocks

Delegates were asked for their opinion on the Building Blocks, their descriptions and constituent elements. Overall the Building Blocks were well received. They were recognised as representing the key components of OH maturity and capturing the differences between managing health and managing safety. Each Building Block was then reviewed separately in turn. Delegates made several suggestions for amendment to some of the Building Blocks and also suggested the inclusion of an additional building block. Key points are detailed in Box 1 below.

- Within the ‘Business Beliefs’ Block the point was made that any reference to ‘*accommodating individuals with health needs*’ should be worded exercising caution. E.g. there are legal requirements for employers to make adjustments (where reasonable and practicable) to accommodate individuals with substantial long-term health conditions.
- It was suggested that ‘Business Beliefs’ should also address the issue of degenerative conditions and the need to consider adjustments in the future.
- With regard to the Prioritisation element of the ‘Business Belief’ Block several delegates were of the opinion that as priorities change over time, prioritisation of OH should be regarded as a consistent core value / habit, as opposed to attaching a level of priority to it.
- The point was made that OH care is also about access to good controls for OH, not just about access to OH providers and this should be evident within the Building Blocks. Substituting the phrase ‘OH provider’ for ‘OH care/support’ was therefore suggested.
- Related to the Trust element of the ‘Fairness’ Building Block the suggestion was made to add in statements relating to mutual trust e.g. the organisation trusting the employee (not just the employee trusting the organisation).
- In relation to the ‘Fairness’ Building Block questions were raised as to how this building block would accommodate **all** individuals e.g. those who have failed safety critical medicals (e.g. when on medication for temporary conditions that would prevent them operating machinery / driving or those with HAVS who should not be using vibrating tools). Statements which have the caveat of ‘*where possible and with due regard to legal requirements*’ should therefore be added.
- Relating to the ‘Collective Mindfulness’ Building Block and the Foresight element, it was pointed out that employers have very little influence over the design or manufacture of materials and controls. Therefore the inclusion of statements relating to stakeholders from design and manufacture through to project completion was important.
- It was suggested that ‘Collective Mindfulness’ should also include statements relating to the need for constant vigilance, recognising the OH risks for the tasks and challenging and checking that OH risks have not changed.
- With regard to the ‘Dual Responsibility’ Building Block it was suggested that in order to reflect the variety of stakeholders with responsibility for OH e.g. designers, manufacturers, employers and employees, this Building Block should be called ‘Collective Responsibility’. Elements relating to design and development, reporting of OH issues, using OH controls were also suggested for inclusion into this Building Block.
- Finally, it was suggested that a Building Block relating to knowledge sharing, learning and continuous communication about OH issues be included. This Building Block relates to educating employees and a commitment to industry learning e.g. identifying good practice and disseminating learning throughout the industry.

Box 1. Key points for Building Blocks

Statements of maturity

Overall, delegates were of the opinion that the draft statements of maturity were appropriate. No obvious issues or concerns were raised with regard to their suitability. In order to accommodate the heterogeneity of the supply chain and provide a set of standards that are achievable by all, it was recognised that the statements must be generic in nature and could not be too prescriptive (N.B. some aspects of OH legislative requirements will dictate the need for prescription however). The need to complement and accommodate systems already in place within organisations was highlighted. Consequently, delegates recognised that statements must be presented in such a way to provide a level of prescription whilst permitting organisations’ flexibility in determining what is practical / works best for them.

Comprehensibility of index

With regard to whether or not the index would be easy to understand and suitable for the end user (construction SME duty holders, H&S/OH manager) delegates highlighted that the language was too technical in places. For example, concern was expressed about the suitability and acceptability of terms such as ‘Collective Mindfulness’ and ‘Interdependency’. The research team took on board these comments and following the workshop changed many of the terms and language used throughout the index to make it more suitable for SMEs.

- **Exercise 3: Leading and Lagging Indicators**

The aim of this exercise was to identify the leading and lagging indicators it would be most appropriate to validate the OH maturity index against. Delegates were asked to review a list of commonly used leading / lagging indicators and to discuss if these indicators were realistic, used and collected in the industry and appropriate to correlate the index with. They were also asked if different types of OH risk have an impact on these indicators and how the index could address such variation.

Overall there was a general opinion that the collection of robust leading and lagging indicator data by construction SMEs was limited / scarce. Indicators were not considered to be collected in a consistent manner and the opinion was that some SMEs would not be collecting even basic indicator data e.g. sickness absence data.

With regard to leading / lagging indicators and types of OH risk there was a general agreement that there may be differences according to the type of risk e.g. the more traditional OH risks (e.g. noise, HAVS) versus the psychosocial risks (stress, MSD). It was felt that asking questions that could be relevant for the spectrum of OH risks could accommodate this difference.

Delegates suggested a number of possible indicators to correlate the OH index with. Whilst there were many valuable suggestions the researchers need to be cognisant of not overburdening participants with a lengthy series of questions at the end of the OH maturity survey. Careful consideration was needed to select questions with the most value / relevance. Furthermore, it must be noted that the majority of indicators suggested were qualitative in nature e.g. questions to ask duty holders surrounding the quality of OH care / provision. Given that the OH index will be scored numerically there is a need for quantitative data to correlate the index against. Some of the questions presented in Box 2 below could lend themselves to numerical data.

Leading indicators:

- What is the % of revenue that you spend on OH resource?
- What is your spend on OH in terms of £ per head of employee?
- When was the last time you reviewed your control measure for the following risks: e.g. noise, HAVS, MSD's etc.?
- Do you have exposure survey monitoring? What methods do you use e.g. air monitoring.
- Have you reviewed your method of control / equipment used for the following OH risks (e.g. noise, HAVS, MSD's etc) and what changes have you made?
- What training do you provide for high OH risk areas?
- Do you have an OH programme, what risks does it cover (e.g. noise, HAVS, MSDs etc.)?
- Who is responsible for OH management?
- What is the number of employees referred to OH?
- What % of employees has access to OH?
- What is the OH provision arrangement for directly employed versus sub-contracted?
- How do you feedback / report OH results?
- Have you run any OH campaigns, for what OH risks?
- Are you aware of HSE campaigns for OH risks e.g. silica reduction campaign?
- What are your responsibilities for OH record keeping?

Lagging indicators:

- RIDDOR data (N.B given the anticipated changes to RIDDOR collection of this may not be a relevant lagging indicator to use).
- Sickness absence data.
- Near misses for OH issues e.g. unprotected exposure to risk (e.g. exposure to noise).
- What is the incidence of different OH conditions in your organisation?

Box 2. Possible questions for leading and lagging indicators**• Exercise 4: Good Practice**

In addition to providing a measure of OH maturity the index will indicate solutions / actions to improve maturity. The final workshop exercise therefore sought to identify relevant solutions by asking delegates to discuss existing good practice in managing OH and to consider what more could be done. Suggestions for solutions included:

- A need to raise awareness and promote knowledge / understanding of OH issues (risks and controls). For example:
 - It was suggested that a culture change was needed and this could be facilitated by providing information about OH issues to all potential stakeholders within construction (e.g. designers, architects, manufacturers, employers and employees). Using the education life span e.g. school / apprenticeships / college / university was suggested as an appropriate vehicle to do this.
 - Signposting employers and employees to key sources of information e.g. Industry standards, Accredited OH services, Constructing Better Health, and knowledge sharing portals etc.
 - Use of dedicated working groups, supply chain events and dedicated campaigns e.g. HAVS week, Better Backs campaigns, skin cancer road shows etc.
 - Improve individual's awareness of signs and symptoms e.g. providing employees with mini health checks and specialised clinics e.g. skin clinics.
 - Morning safety briefs should include OH.

- Provide targeted training i) for different stakeholder groups e.g. designers, manufacturers, employers and employees ii) for different OH risks.
- Have mechanisms in place to feedback to designers/manufacturers e.g. investigation results where design has been found to be an issue (the continuing use of 30kg loads and the associated manual handling risk was cited as an example).
- Have proactive OH. For example:
 - Take OH professionals into the field (on site) when / where work is going on. This would not only improve OH visibility to employers and employees and could encourage uptake but would also aid OH professionals' understanding of the issues faced on site.
 - Encourage early identification of OH issues by encouraging individuals to think about their health status e.g. provide them with self-check lists for OH issues and health competency / fit for work cards.
- Build OH into the life of a project. For example:
 - Build OH standards into contracts.
 - There was an opinion that contractors may sometimes remove / reduce OH costs when costing projects in order to secure a successful bid. Bid / tender processes should therefore be set up in such a way that OH costs cannot be removed.
 - Have pre-contract award meetings that discuss how OH will be managed and at the kick off meetings and throughout the project have meetings with stakeholders to specifically consider OH issues.
- Make clear the links with OH and productivity to encourage senior management buy-in. For example:
 - Provide cost benefit analysis case studies.

5.4.3 Post workshop development of the index

Following the workshop the HSL research team held several meetings. The first meeting was immediately after the workshop and served to conduct a top-level analysis of the workshop output and to identify key points that emerged (as detailed above). Subsequent team meetings took into consideration these key points and were used to iteratively amend the draft model and index and complete the task of populating the index. The rationale behind key decisions was documented within sequential working copies of the index as the team developed it. The definitions of OH culture/maturity developed as a result of this iterative process are presented below. The rationale behind key technical decisions taken during this iterative process is also presented below.

5.4.3.1 Definitions of OH culture/maturity

Taking into account the workshop discussion the definitions of OH culture and maturity were amended to state:

- **OH culture** represents the organisation's core values and shared beliefs, behaviours, traditions, leadership and vision with respect to health and wellbeing at work.
- **OH maturity** reflects not only the need to comply with minimum legal requirements. It is a reflection of the extent of proactivity that an organisation and employees have in managing the risks and their health and wellbeing at work.
- For the purposes of measurement, OH relates to both OH at the organisational and individual level and refers to physical, psychological and social functioning in the workplace.

5.4.3.2 Maturity Levels

Delegates within the workshop had been of the opinion that five levels of maturity were appropriate; however there was some suggestion that there could be six levels. Following due consideration the research team made a final decision to base the index upon five levels of maturity. It was felt that five levels were familiar and widely used within industry and that six levels would provide too superficial a level of sensitivity.

In line with the workshop discussions it was decided to base the maturity levels upon terms and descriptions that reflect understanding and stages of knowledge acquisition. To do this the research team first considered knowledge terms that they had used in previous HSL work e.g. a project which investigated knowledge levels and RPE use (Bell, Vaughan & Hopkinson, 2010¹³). The team also conducted a brief internet search of terms used to describe stages of knowledge e.g. sources of knowledge in objectivism. Drawing on the workshop output and iterative discussions the decision was made to use the maturity terms and definitions presented in Figure 2 below.

Level of Maturity	Description
Unknowing	“We just don’t know about it”
Unconsidered (or Reactive)	“We’ll do it when we think we have an issue”
Conforming (or Compliant or Amenable)	“We do it because we know we have to”
Considered (or Responsible or Proactive)	“We do it because we know we ought to”
Enlightened	“We do it because we know it’s worth our while”

Figure 2: Maturity terms and their descriptions

Such terms and descriptions were decided upon on the rationale that they state clearly and succinctly what they refer to in lay man’s language whilst being neutral and non-judgemental. This draft was sent to the HSE customers to obtain their comments/suggestions and to reach a final decision. Where there were two or three possible names for the level of maturity e.g. Unconsidered *or* Reactive it was decided to test these names within the pilot.

5.4.3.3 Building Blocks

As for the maturity levels the building blocks, their constituent elements and statements were iteratively developed within the team meetings. Key decisions taken during the HSL team meetings included:

- Delegates suggested renaming the Building Block ‘Collective Mindfulness’. The researchers settled on the concept of mindfulness and decided to call this Building Block ‘Mindful’.

¹³ Factors influencing the implementation of RPE programmes in the workplace. HSE RR798

- The delegates had suggested the inclusion of a Building Block to be called ‘Knowledge’. This suggestion was taken on board however the team made the decision to call this additional Building Block ‘Learning’ as this is a more active term and reflects the behaviours around knowledge acquisition.
- It was decided that the criteria for variation in maturity within a Building Block may vary according to which is relevant for that specific block/constituent element. Therefore it was decided to involve levels of specificity from any of the following where relevant:
 - Knowledge of the legal, business and moral case.
 - All of the time *versus* none of the time.
 - Everybody *versus* nobody (to include leadership, supervisors and workers).
 - Type of OH issue e.g. no OH issues considered *versus* all OH issues (including wellbeing and common health problems).

The final stage of development involved a meeting between the HSE customers and the HSL project team. During this meeting the draft model and populated draft index were reviewed in depth (one Building Block and associated elements and statements at a time). Any amendments deemed necessary (and the rationale) were documented within the working copy of the index. Overall no substantive amendments were required. The majority of amendments were minor changes to the terminology and language used in order to make the index statements more consistent throughout and user friendly. Key decisions included:

- It was recognised that there is often a lot of confusion within industry about what is meant by OH. Therefore there was a need for the index to provide a clear statement of what is meant by OH and what responsibilities individuals have. This was developed by the project team.
 - At the front end of the index participants are given a very brief description of OH (the statement was purposely kept brief to avoid biasing responses when participants completed the index).
 - Once they have completed the index participants are then given a further more detailed definition of OH.
- It was decided to remove the ‘Accommodating individuals with OH limitations’ element in the Business Beliefs building block. This element was considered to have negative connotations and not in line with the positive focus on OH that the HSE customers wish to portray.
- The ‘OH risk management’ element was moved into the Business Beliefs Building Block. This was considered to be a crucial element that should be placed up front within the index.
- The ‘Good health \Leftrightarrow Good business’ and the ‘OH is a core business value’ elements were identified as being similar. However the decision was made to retain both these elements for the pilot as it would give an additional check of internal consistency.
- Following the pilot the possibility of including an element focusing on asset management and viewing the health of workers as a business asset should be considered.
- The ‘Fair treatment of all’ element within the Fairness Building Block was considered to be repetitious and focused on negative aspects of OH (health limitations¹⁴). A decision was made to retain this element for the pilot but to review feedback specifically for this element with the possibility of removing it if the feedback was unfavourable.
- The ‘Constant Vigilance’ element within the Mindful Building Block was renamed ‘Vigilance’ and the statements changed to reflect systems in place e.g. reporting systems that could be used to facilitate vigilance.
- Finally, due to repetition one element each within the Leadership and Learning Building Blocks was removed.

¹⁴ See Glossary for definition

Following this final revision the draft index was converted into a questionnaire format using the electronic survey method SNAP. The project team also gave careful consideration (drawing on the workshop suggestions) to select leading and lagging indicator questions with the most value / relevance. These questions were included at the end of the draft index.

The draft index was then piloted with an opportunistic sample within the construction supply chain. Details of the pilot are presented in [Appendix 5](#).

5.5 APPENDIX 5: PILOT STUDY

5.5.1 Aim

The index (survey part 2) together with sample descriptors (part 1) and OH items (part 3) were piloted to determine ways by which their reliability, validity and usability could be improved ahead of the main survey.

5.5.2 Sample

The pilot sample comprised construction contractors and sub-contractors working on the Crossrail Project. This pilot sample was determined to provide sufficient representation of OH (OH) issues within construction to test the measure's scientific integrity. Questionnaires were distributed electronically. Twenty companies responded. Eighteen surveys were originally sent out; the two additional responses were from companies that had been forwarded the survey.

5.5.3 Statistical analysis

Pilot data was analysed by:

- Producing descriptive statistics as an indicator of sample representation.
- 'Eyeballing' the data set to get an initial impression of any 'weak points' (e.g. response inconsistencies and missing data) in the data set.
- Determining the number of missing values for each item as indication of difficulties participants may have found in answering them.
- Correlating *items* within the index, particularly focusing on examining the correlations between items belonging to the same scale (Building Block) as way of exploring the index's internal coherence.
- Correlating index sub-scale scores (or Building Blocks) and overall score as way as exploring coherence.
- Correlating OH items to determine the potential for a common underlying construct.
- Correlating each of OH items with index sub-scales and overall indication of criterion validity.
- Running Cronbach Alphas on index sub-scales and overall score, again, as indication of the measure's reliability in terms of internal consistency.

Key findings were used as a steer on potential improvements to the index content. Given the small sample size, they were treated as indicative rather than proof of the measure's psychometric properties.

5.5.3.1 Results

Sample

The majority (n=17) of the pilot sample had more than 500 employees. None were between 5 and 100 staff in size. The majority's (n=16) workforce also comprised both directly employed and sub-contracted staff. Three organisations directly employed all their workers. The majority (n=19) used OH providers of which 16 were externally sourced. The response options for questions 2 to 5 require amendment so that they accurately reflect paper options.

Missing values: Assessing the number of missing values per item revealed none for sample description questions (part 1). Of the index items (part 2) most items were answered by all 20 participants. The main exception was 'learning opportunities' as part of the learning Building Block. This had three missing responses. From the OH items (part 3) missing data was found for the lagging indicators, notably; lost time to sickness absence (n=10 missing), average number of working days lost (n=8) and RIDDOR incidence (n=4).

Index correlations

Item correlations: Examination of the correlations between items belonging to the same scale or Building Block revealed significant correlations between items belonging to the same Building Block and with that Building Block's overall score. This implies the index to have internal consistency and each Building Block to be distinct constructs.

However, under leadership, no significant correlation was found between coherence (between decisions and behavior) and coherence across decisions ($r=0.27$, $p>0.05$, $n=20$, one-tailed test). Some overlap would be expected if they shared a common construct. Item wording may therefore need to be reviewed.

Building block and Overall Score Correlation: All building elements correlated significantly with the overall score. This lends further evidence for the measure's overall coherence.

OH items' correlations

Correlating the OH items under part 3 revealed significant correlations between average number of working days lost and lost time to sickness absence, as would be expected ($r=0.82$, $p<0.01$, $n=9$, two tailed test). There was one other significant correlation between the frequency by which control methods were reviewed and frequency by which senior management consider OH issues ($r=0.48$, $p<0.05$, $n=19$, two tailed test). However, there was a wider range in the number of participants responding to these items ($n=10 - 19$). While more correlations would lend confidence to there being a shared underlying construct, the number of respondents answering these items needs to be greater for making a clear decision on which of these items should be removed, if any.

Correlations between OH items and index

No significant correlations were found to exist between index Building Blocks or the index's overall score and the average number of working days lost, frequency of monitoring or frequency by which controls were reviewed. Significant correlations were however found between lost time to sickness absence and 'collective responsibility' ($r=0.79$, $p<0.05$, $n=10$, two tailed test), 'mindfulness' scores ($r=0.74$, $p<0.05$, $n=10$, two tailed test), and 'fairness' scores ($r=0.66$, $p<0.05$, $n=10$, two tailed test) as well as between the review of controls and leadership scores ($r=0.42$, $p<0.05$, $n=19$, two tailed test) and mindfulness scores ($r=0.48$, $p<0.05$, $n=19$,

two tailed test). Of note is the significant correlation between senior management consideration and the overall maturity score as well as each of the Building Blocks. Whilst these correlations lend the measure some apparent validity, the lack of consistent correlations again implies that the OH items do not necessarily reflect a common underlying construct. Senior management consideration of OH issues may be most strongly associated with maturity.

Internal Reliability Test of Index Items and OH items

With the exception of the learning Building Block, Cronbach Alpha values ($\alpha = 0.635$), each of the matrices and overall score had an acceptable level of internal consistency ($\alpha > 0.7$). This generally implies that, by and large, the index has good internal reliability. These checks will need to be repeated in the main analysis to ensure this remains the case.

5.5.4 Recommendations for Survey Refinements

5.5.4.1 Part 1:

The following adjustments need to be made for part 1.

- Ensure that the full response sets are provided for question 4 (construction activity) and question 5 (type of OH risk).
- For question 1, make it clear whether employees refer to those that are directly employed.
- Consider converting question 2 into drop down boxes so that the percentage of directly employed or sub-contracted staff can be selected.
- Specify the term 'regularly' for construction activity and OH risks or provide frequency options for hazard groups.

5.5.4.2 Part 2:

- Due to missing values and borderline internal consistency values, review the elements under the 'learning' Building Block, for example, by placing emphasis on the use of learning opportunities.
- Due to absence of significant inter-item correlation, review the wording of coherence (between decisions and behavior) and coherence (across decisions). Ensure that they 'step up' maturity in a consistent pattern.
- Add items asking whether the results of monitoring activity (of exposures or controls) are used in the decision making process.

5.5.4.3 Part 3:

- Due to a high correlation between OH items and the frequency by which senior management consider OH issues, create additional items for frequency of exposure and control monitoring that asks whether results were used in subsequent decision making. Use of findings rather than conducting monitoring might be more closely linked with maturity.
- Review the wording under the elements concerning 'decision making coherence' that are part of the 'leadership' Building Block to increase their theoretical distinction.

- Consider a ‘red herring’ as a test of social desirability.

5.5.4.4 Recommendations for the main analysis

- Conduct data management; check the impact of missing values and outliers.
- Re-run the psychometrics to re-check index reliability and validity.
- Explore correlations between OH items to test for an underlying OH construct of factors (e.g. through correlations, Cronbach analysis).¹⁵
- Produce sample descriptives.
- Produce index descriptives.
- Break down index scores and sub-element values for each of the part 1 descriptives. Use inferential statistics to test for significant differences where appropriate.

5.5.5 Usability questionnaire

A brief usability questionnaire was developed by the HSL project team. This questionnaire aimed to focus on issues of comprehensibility, usability and acceptability of the draft OH maturity index. After completing the OH maturity index participants were asked to complete the usability questionnaire, answering all questions honestly and as fully as possible and giving reasons for their answers. For each question participants were also asked to provide suggestions for possible improvements to the index.

5.5.5.1 Analysis

The free text data obtained from all participants was collated within a spread sheet and analysed according to an analytical framework based upon the question set.

Analysis of the data permitted the identification of key points and necessary amendments to the OH maturity index. Amendments were made where several participants mentioned the same issue or if the research team considered the change necessary in order to improve the usability and acceptability of the index. The latter was determined via conversations and email correspondence between the project team. Key points that emerged from this analysis are detailed below.

5.5.5.2 Results

Instructions for use

In general participants found the instructions on who should complete the OH index and how to use it to be clear and easy to understand. Opinions on clarity ranged from ‘quite clear’ to ‘very clear’. A minor point for improvement was to put the questionnaire in a bigger font.

¹⁵ Factor analysis could also be undertaken to explore this, but would be contingent on budget constraints.

Demographic/ company background questions

Overall, most participants were of the opinion that demographic questions and the questions about the background of their company were easy to complete and relevant to construction companies. One participant did suggest broadening the categories used e.g. to add a category for Tunnelling and Underground Construction. Another participant suggested that the questions may not be as relevant for managing contractors with very few directly employed construction workers.

Index structure

Participants were generally of the opinion that the structure of the index, the language and terminology used was clear, simple, and easy to use and understand. Many participants gave very positive comments e.g. that the index was ‘excellent’, ‘well laid out’ and recognised the ‘continual improvement’ aspect. However several participants did comment that the index could be made clearer in places e.g. some statements could be shortened, language could be simpler and one participant stated that it was ‘very repetitive’. Suggested improvement included the use of drop down fields to drill down detail to specific questions.

Building Blocks and Elements

The Building blocks and their elements were generally found to be easy to understand. Participants felt the Building blocks were ‘clear’ and ‘straightforward’ and covered aspects relevant for managing OH in the construction industry e.g. *“I think this covers most if not all aspects”*. However, one suggestion was for a greater focus on stress and fatigue as OH risks and it was suggested that working hours and driving (including commuting) should be considered. Several participants also suggested that the Building Blocks could be improved by clarifying and shortening the element statements and using simpler ‘plain English’.

The statements within each element were generally considered relevant and easy to understand. One participant commented that whilst the statements were clear they could have ‘delved more into the differences between site and head office’. Generally the distinctions between statements were felt to be adequate. However a few participants commented that some statements did seem similar e.g. *‘sometimes the difference between ‘critical to the business’ and ‘legal requirement’ is open to interpretation because they frequently mean the same thing’*.

Participants were asked within the questionnaire to answer questions specifically for each Building Block in turn and consider whether any specific Blocks/elements/statements should be changed / removed. However all participants gave generic answers applicable to all of the six Building Blocks and their associated elements and statements. No suggestions were made to remove any particular elements or Building Blocks.

Scoring

The scoring system was found to be simple, very easy and clear to understand and use by all participants. Other than suggesting that the scoring was done automatically on the computer no suggestions for improvement were made.

In general participants found the maturity levels to be very easy to understand and no suggestions for improvement were given. In respect of the terms for each maturity level e.g. Unknowing, Unconsidered etc. of those participants that commented the majority preferred the terms in brackets particularly the term Reactive.

Leading and Lagging questions

Regarding the leading and lagging questions e.g. on cost spent on OH etc., several participants commented that these questions would be useful for benchmarking. However, whilst most

participants found these questions easy and straightforward (if the data was available to them) there were issues raised. Particular issues regarded the sickness absence questions. It was felt that for many SME organisations these may be difficult to answer. It was commented that with the exception of reportable disease most sickness management records are not specific to work-related ill health and it is therefore very difficult to capture work-related ill health from normal sickness illness reporting. It was also commented that some of the data is not available to managing contractors who will have little ability to quantify time lost by their supply chain due to OH issues/sickness/general absence. It was commented that some of the questions were not relevant for organisations with a diverse workforce in other areas of businesses that are not defined as construction. The necessity of these questions was questioned by one participant and it was also suggested that they could be seen as prying questions for HSE to act upon and organisations would therefore be put off answering them. Suggestions to improve these questions were to give participants time and warning that they need to source the data and also to give examples of what exactly is required.

Use of index

Finally, participants were asked if they and other SMEs in the construction industry would use the OH index. Despite the index being generally well received and the opinions that it would be clear and easy to use (if alterations to the language were made e.g. simplified, shorter statements) there was a mixed response to anticipated use. Some participants were of the opinion that they and others would use it as it would present a reliable reflection of how they and their supply chain manage OH. For others, however, future use was felt to very much depend upon the individual organisation and may be unlikely.

Barriers to use included one participant's suggestion that the index largely duplicates other embedded maturity matrices. It was also suggested that the subjective nature of the questions meant that the value arising depends largely on the awareness and objectivity of the user. Therefore those with the greatest opportunity for improvement are likely to get the least out of it. Another participant stated they would not use the index as within their organisation '*we know where we are and at what level we will operate at*'. It was also commented that OH must be part of a sustainable business and not the pinnacle of what organisations do, therefore wanting to achieve improvement in this area may be unlikely in the current economic climate. In broad terms a lack of time, cost, business case and resources for OH were the biggest barriers noted. It was also suggested that index completion could become a tick box exercise rather than reflecting what organisations actually do. Finally, one participant suggested that there could be suspicion of the data being captured by other agencies.

Suggestions to overcome barriers to use included a need for the perceived benefit of using the index and managing OH (in terms of practicable action within the control of the user to reduce risk) outweighing the perceived cost. There is a need for SMEs to buy in to the index and recognise that it may be useful for their operatives. On a more user-friendly note, automated scoring with a link to some form of graphical representation of results; simplifying the questions; the opportunity to tailor questions to specific tasks; and including questions on stress and driving/commute to work were suggested improvements.

Effectiveness of index

Participants were asked how effective they felt the index would be in assessing levels of OH maturity. Comments ranged from it being a '*massive step forward and extremely beneficial*' to a '*basic outline of the maturity level in SME's*' and a '*starting point*'. It was further commented that the index would be very helpful and give SMEs a clear indication of where they are and where they need to work to. However participants commented that whilst the index is fundamentally sound it would need improving e.g. simplified. For those who were of the

opinion that the index would not be effective in assessing OH maturity the reasons included most construction SMEs having very poor OH provision and level of resource for improvement. It was suggested that the effectiveness will only be as good as the adoption by SMEs and that unfortunately this is still driven by threat of enforcement action coupled with civil action. Suggestions to improve effectiveness included allowing the option for more tailoring of the index for individual organisations, being more specific in the questions about behaviours of managers, supervisors or operatives and providing more education about the business case (using examples) to sell the investment required by SMEs.

Additional features

Finally participants were asked what additional features to the OH index they would like to see. Participants commented they would like an option to save the results and compare graphically at the next review point. More emphasis on the less traditional aspects of OH e.g. disability, mental health, wellbeing, fatigue, legal requirements and what makes a healthy work environment were sought e.g. it was commented that most SMEs know very little about their legal obligations on OH so would need lots of examples to make the correct choices. Finally, more examples to allow organisations to benchmark themselves were also requested.

5.5.6 Conclusions from the pilot study

Pilot data indicates the OH maturity index to generally have good reliability, in terms of internal consistency. Reliability may be improved further through rewording of the elements falling within the ‘learning’ building block. Correlation patterns between maturity levels and OH items and within OH items are currently too inconsistent to indicate whether all OH items tap into a common underlying construct reflecting good OH management. A clearer picture may emerge in the larger survey, but in the pilot data these items are too patchy to justify removal of these items. Rather, additional items should be added that capture how findings from monitoring exposure and control effectiveness are used. The presence of significant positive correlations between maturity levels and senior management consideration of OH issues lends confidence to the index’s validity.

5.5.7 Index Refinements

Based upon the findings of the statistical analysis and the usability questionnaire no substantive changes were identified as being required to the index. However, several minor amendments were made. These included:

- Very minor changes made to language throughout index.
- Changes were made to the Learning Building Block to make organisational learning and worker learning refer to learning opportunities as opposed to actual learning.
- Two of the names of the elements in the Leadership Building Block were changed (to Role Modelling and Consistent Decision Making) to make the elements more distinct and to eliminate any confusion by the end-user.
- A change was made to the definition of OH risks/issues to separate out risks from harm more clearly and make the definition more consistent with how risks are expressed in the statements. Emphasis was also drawn to work relevant conditions – conditions that are caused outside work yet still fall under the umbrella of OH because they are still work relevant.

5.6 APPENDIX 6: HEALTH RISK MANAGEMENT MATURITY INDEX

What does Occupational Health management mean?

Employers have a legal responsibility to look after their employees. Occupational health management should focus primarily on dealing with the occupational health risks caused by workplace exposure to hazardous substances or activities.

This index will help you to identify how you manage occupational health by assessing your overall occupational health culture maturity. From this you should be able to work out ways to improve occupational health standards on your site in a way that will maximise your overall productivity.

Instructions for Use

This index should be **completed by the person responsible for health and safety in your company** e.g. Company owner/Director, Health and Safety Manger.

It is recommended that you use this index no more than **once every 12 months** so that you can identify any changes that have occurred more accurately.

Your data is confidential. It will be stored anonymously and collated amongst data from all participants from which you and your organisation will not be able to be identified. No one other than HSL researchers will have access to your raw data.

Part 1

Please answer the questions below to provide a background to your company. For each question please select the relevant box (e.g.)

Q1. How many employees (directly employed) does your company have?

5-100 100-250 250-500 500+

Q2. Are your workers:

Directly employed Sub-contracted Both

Q3. Position in supply chain:

Principal contractor Tier 1 Tier 2 Tier 3 Tier 4

Q4. What types of construction activity is your company regularly (e.g. at least every 2 months) engaged in? Please select all that apply.

Demolition/site clearance Design Build Structures
Groundworks Mechanical/Electrical Tunnelling/Underground construction

Q5. What types of OH risks does your company regularly (e.g. at least every 2 months) have to manage?

Noise HAVS Respiratory Dermal Musculoskeletal Stress

Q6. Do you have access to an Occupational Health provider?

Yes No

If yes, is your OH provision from an:

External provider In-house provider

Q7. Is Occupational Health specifically considered in your organisation? In what way?

There is a separate OH policy	<input type="checkbox"/>	OH is part of the H&S policy	<input type="checkbox"/>
There is a formalised approach to OH management	<input type="checkbox"/>	OH is not specifically considered	<input type="checkbox"/>

Q8. What is the location of your company?

South East	<input type="checkbox"/>	South West	<input type="checkbox"/>	Midlands	<input type="checkbox"/>	North East	<input type="checkbox"/>	North West	<input type="checkbox"/>
Wales	<input type="checkbox"/>	Scotland	<input type="checkbox"/>	Ireland	<input type="checkbox"/>				

Part 2

Please look at the index below and follow these steps:

1. Consider each of the 6 Building Blocks (left hand column) in turn.
2. If necessary, refer to the Definition of Terms for clarification of terms used within statements.
3. For **each** building block element (middle column) select (circle or tick) the statement in the right hand column that best applies to your company. Select only **1 statement for each element**.
4. Do not deliberate over your choice. Choose the **statement** that is instantly most closely aligned, **generally applies** and reflects your **current situation**. This index will be of the most use to you if you answer **honestly**.

Building Block (description)	Elements	Statements: Which of the following applies to your company?
<p align="center">Business Beliefs</p> <p>(Belief that 'health is good for work' and 'work is good for health'.)</p>	<p align="center">Good health ↔ good business</p>	<p>A. Employers/leadership do not recognise that good health↔good business. They do not recognise that looking after all aspects of workers health makes good financial, legal and moral sense.</p> <p>B. Employers/leadership only recognises the importance of looking after workers health if it impacts upon the business.</p> <p>C. Employers/leadership act on legal obligations for traditional OH issues. Financial and moral benefits aren't recognised.</p> <p>D. Employers/leadership recognise that they ought to look after all aspects of workers health because it's the right thing to do.</p> <p>E. Employers/leadership recognise that good health↔good business. They recognise that continuously investing in all aspects of workers health (including wellbeing) makes good legal, financial, and moral sense.</p>
	<p align="center">OH risk management</p>	<p>A. No one manages OH risks.</p> <p>B. OH risks are only managed when they become critical to business interests.</p> <p>C. Only traditional OH risks are proactively managed.</p> <p>D. All stakeholders are involved in proactively managing traditional OH risks.</p> <p>E. All stakeholders are involved in proactively managing all types of OH risks.</p>
	<p align="center">OH is a core business value</p>	<p>A. Employers/leadership do not consider OH issues when making business decisions.</p> <p>B. Employers/leadership only consider OH issues in business decisions when they become critical to business interests.</p> <p>C. Employers/leadership only consider legal obligations for managing traditional OH issues when making business decisions. Financial and moral benefits aren't recognised.</p> <p>D. Employers/leadership recognise that they ought to consider all aspects of workers health when making business decisions because it is the right thing to do.</p> <p>E. Safety, health and productivity are core business values of equal status. The organisation continually invests in managing all aspects of OH issues (including wellbeing).</p>

Fairness (Uniformity of support provided for health and wellbeing)	Accessibility to OH support	A. No-one (including sub-contractors and temporary workers, where appropriate) knows how and when to access OH support. B. Only the Principal contractor's workforce knows how and when to access OH support for traditional OH issues. C. Principal and sub-contractors know how and when to access OH support for traditional OH issues. D. Principal and sub-contractors know how and when to access good quality OH support for all OH issues. E. Everyone (including sub-contractors and temporary workers, where appropriate) know how and when and feel comfortable accessing good quality OH support for all OH issues.
	Mutual trust	A. No-one trusts that any of the decisions taken are in the best interests of either the organisation or the workforce. B. Workers do not trust employers/leadership to take decisions that are in their best interests. C. Workers trust their employers/leadership to take decisions that are in their best interests where the legal obligations are clear. D. Workers trust employers/leadership to take decisions that are in their best interests for all OH risks/issues. E. There is two-way trust. Employers/leadership and workers trust each other to take decisions that are in the best interests of all.
	Fair treatment of all	A. Individuals with health limitation are excluded without due consideration. B. Individuals with physical health limitations are treated fairly providing there is no impact upon business interests. C. Individuals with physical health limitations are always treated fairly (<i>where practicable and with due regard to legal requirements</i>). D. Individuals with physical health limitations and wellbeing issues are always treated fairly (<i>where practicable and with due regard to legal requirements</i>). E. Individuals with physical health limitations and wellbeing issues are treated fairly throughout the supply chain (<i>where practicable and with due regard to legal requirements</i>). This applies to whether they are directly employed or sub-contracted and temporary staff.

<p style="text-align: center;">Mindful</p> <p>(Being vigilant and responsive to the full range of current and future OH issues)</p>	Foresight	<p>A. There is no anticipation of the potential impact of any changes on OH.</p> <p>B. Changes that affect OH risks/issues are only considered when it becomes critical to business interests.</p> <p>C. Changes that affect OH risks/issues are anticipated only at the project outset and where there are clear legal obligations.</p> <p>D. Changes that affect OH risks/issues are anticipated throughout the project lifecycle (e.g. planning, design, build and maintenance).</p> <p>E. Changes that affect OH risk/issues are anticipated by all stakeholders throughout the project lifecycle (e.g. planning, design, build and maintenance) are considered.</p>
	Awareness of the range of OH issues (including degenerative conditions)	<p>A. No-one considers any aspect of OH.</p> <p>B. Employers/leadership only consider traditional aspects of OH when it becomes critical to business interests.</p> <p>C. Employers/leadership consider traditional OH issues only because of a clear legal obligation.</p> <p>D. Employers/leadership consider the wider range of OH risks/issues (spanning traditional OH and wellbeing issues).</p> <p>E. Employers/leadership and workers consider the full range of OH risks/issues (spanning traditional OH and wellbeing issues).</p>
	Responsiveness	<p>A. No-one responds to OH risks/issues and concerns.</p> <p>B. Employers/leadership only respond and act on OH risks/issues and concerns when they become critical to business interests.</p> <p>C. Employers/leadership only respond and act on concerns arising from traditional OH risks/issues.</p> <p>D. Employers/leadership respond and act on concerns arising from all OH risks/issues.</p> <p>E. Everyone responds and acts on concerns arising from all OH issues.</p>
	Vigilance	<p>A. No one looks out for potential OH threats and challenges. No systems to enable vigilance are in place.</p> <p>B. Employers/leadership only look out for potential OH threats and challenges when they become critical to business interests. Systems to enable vigilance (e.g. reporting/near miss recording) are used on an ad hoc basis.</p> <p>C. Employers/leadership continuously look out for potential threats and challenges. Systems to enable vigilance (e.g. reporting/near miss recording) are used only for traditional OH risks/issues.</p> <p>D. Employers/leadership continuously look out for potential threats and challenges. Systems to enable vigilance (e.g. reporting/near miss recording) are used for all OH risks/issues.</p> <p>E. Everyone continuously looks out for potential OH threats and challenges. Systems to enable vigilance (e.g. reporting/near miss recording) and continuous improvement are in place and used on a regular basis for all OH risks/issues.</p>

<p>Collective Responsibility (Distribution of responsibility and control of OH between management and workforce)</p>	<p>Worker Involvement</p>	<p>A. Workers are not involved in contributing to any decisions. B. Employers/leadership take decisions on all aspects of business because they don't understand the importance of worker involvement. C. Employers/leadership keep workers informed of business decisions that they need to know. D. Employers/leadership use ideas from workers when making business decisions. E. Workers are fully involved in decisions on a range of business matters that are relevant to them.</p>
	<p>Shared responsibility (within your organisation)</p>	<p>A. No-one considers themselves responsible for their own or others OH. B. Employers/leadership only become aware of their responsibility for workers OH when it becomes critical to business interests. C. Employers/leadership only take responsibility for workers OH where there is a clear legal obligation. D. Employers/leadership consistently take responsibility for all aspects of OH. E. Everyone take responsibility for their own and others OH.</p>
	<p>Involvement of all stakeholders throughout project life cycle</p>	<p>A. The OH approach used only applies to directly employed staff. B. The OH approach only involves other stakeholders when it becomes critical to business interests. C. Other stakeholders are only involved in the OH approach when legal issue arise concerning workers OH. D. All stakeholders are involved in developing the OH approach at project outset. E. Throughout a project lifecycle all stakeholders have input into and benefit from an organisations OH approach.</p>

<p>Leadership</p> <p>(Competency and consistency in managing, leading and supervising OH)</p>	<p>Role modelling</p>	<p>A. Employers/leadership do not say anything about OH.</p> <p>B. Employers/leadership talk about OH but are only consistent between what they say and what they do when it becomes critical to business interests.</p> <p>C. Employers/leadership are only consistent between what they say and what they do about workers health for traditional OH risks/issues.</p> <p>D. Employers/leadership are consistent between what they say and what they do about workers health for all types of OH risks/issues.</p> <p>E. Employers/leadership are consistent between what they say and what they do about their own health as well as workers health for all types of OH risks/issues.</p>
	<p>Consistent decision making</p>	<p>A. Traditional OH risks/issues are not factored into any other types of decisions outside health and safety.</p> <p>B. Traditional OH risks/issues are only factored into other types of decisions (e.g. operational, health and safety, quality, environmental, and human resource) when it becomes critical to business interests.</p> <p>C. Traditional OH risks/issues are only factored into other types of decisions (e.g. operational, health and safety, quality, environmental, and human resource) where there is a clear legal obligation.</p> <p>D. Traditional OH risks/issues are factored in to all decisions made (e.g. operational, health and safety, quality, environmental, and human resource).</p> <p>E. All types of OH risks/issues are factored in to all decisions made (e.g. operational, health and safety, quality, environmental, and human resource).</p>
	<p>Having and delivering on a vision for OH</p>	<p>A. No type of vision or objectives for OH exists.</p> <p>B. An untested vision and/or objectives for OH have been developed so that the organisation ‘looks good’.</p> <p>C. A vision and/or objectives are used that applies to traditional OH risks/issues</p> <p>D. A vision for all types of OH risks/issues is used and reviewed</p> <p>E. A vision for all types of OH risks/issues is actively used and reviewed and is part of the organisations’ overall vision.</p>

Learning (Learning opportunities)	Learning opportunities for workers	<ul style="list-style-type: none"> A. No learning opportunities for workers are provided on any aspect of OH. B. Formal learning opportunities about OH are only provided when it becomes critical to business need. C. Formal learning opportunities are only provided for traditional OH risks/issues. D. Formal learning opportunities are provided for all types of OH risks/issues. E. Learning about all types of OH risks/issues is seen as part of the daily routine. It occurs through formal and informal routes.
	Organisational learning	<ul style="list-style-type: none"> A. No attempts are made by the organisation to learn about any OH risk/issue. B. The organisation only attempts to learn about OH risks/issues when they become critical to business interests. C. The organisation only attempts to learn about OH risks/issues when clear legal issues arise. D. The organisation attempts to learn about all types of OH risks/issues. The organisation uses formal systems (e.g. reporting systems) to be vigilant and this enables learning. E. Creating opportunities to learn about all types of OH risks/issues is seen by the organisation as part of the daily routine and continuous improvement. Learning occurs through constant vigilance and the use of formal and informal learning routes.

Thank you for completing the index. Important points about occupational health management for you to be aware of are:

Employers have a legal responsibility to look after their employees. Occupational health management should focus primarily on dealing with the occupational health risks caused by workplace exposure to hazardous substances or activities.

Workplace ill health is preventable. Managing health risks is no different from managing safety risks. Assessing hazards and using a hierarchy of controls are equally appropriate when applied to health risks. It is possible and practical to carry out construction work without causing ill health. Risks to health can be managed by modifying the process to eliminate the risk, controlling and minimising exposure, and taking precautions to prevent adverse effects.

Occupational health management should be integrated with day to day business and should not work in isolation from safety management or other health checks or initiatives you have in place. Checking workers' health or helping workers tackle other lifestyle risks to their health is not a substitute for managing and controlling health risks.

Managing workplace health helps employers retain experienced and skilled workers, and it helps employees to maintain productive employment.

Definition of Terms (included in electronic version of index as a pop up box accessed from start of questionnaire completion and throughout)

Occupational Health Management refers to: preventing workers from suffering adverse effects on their health caused by their job, by avoiding or controlling risks through task and worker adaptation.

Compliance refers to: the minimum standards to achieve to ensure you are complying with the relevant legal duties. You will need to understand what your legal duties are in the role that you fulfil, the risks to your workers and ensure you are fully aware of what the particular standards are that you need to meet.

Occupational Ill-Health refers to: all health problems in the work environment. The term covers health problems workers bring to the workplace as well as health issues caused or aggravated by work. It covers serious and fatal diseases; physical effects on skin, breathing, hearing, mobility and functioning; and psychological effects such as on mental wellbeing. Effects may be immediate and visible but are more often unseen and take a long time to develop.

Health limitations: refers to any health problem/condition that may impact/limit the individual's ability to carry out their usual day to activities at work.

Traditional OH risks: refers to well established physical risks where there is a long understanding of the link between these risks and OH in your sector/workplace and legislation/guidance is in place for managing these risks (e.g. respiratory, dermal, inhaled, ingested, noise, and HAVS).

All OH risks/issues refers to: the full spectrum of Occupational Health (OH) risks/issues ranging from traditional OH risks/issues (e.g. respiratory, dermal, noise, HAVS) through to wellbeing risks/issues that can give rise to stress, anxiety, depression and MSD's or positive outcomes such as improved morale, happiness and job satisfaction arising from health promotion. Conditions that are not caused by work can still be work relevant and fall under the umbrella of occupational health because they can impact upon ability to carry out work. This can include degenerative conditions such as e.g. Multiple Sclerosis, Parkinson's.

OH support refers to: either in-house or external OH support that is provided to staff. This may be through formal services or via line management support. Good quality OH support should cover both proactive and reactive management of all aspects of OH (see previous definition for all OH issues/risks). OH support should be integrated with your existing business and safety management systems.

Health Surveillance: is a statutory risk based system of ongoing health checks required when workers are exposed to hazardous substances or activities that may cause them harm. It helps employers to regularly monitor and check for early signs of work-related ill health in these employees.

Good health ↔ Good business: this short hand statement is used to mean Good health equals Good business and vice versa.

Stakeholders refers to: those internally and externally who have a vested interest or are affected by the OH and wellbeing of a workforce (e.g. employer, leaders, workers, principal contractors, main contractors, sub-contractors, temporary workers, designers, architects, product/equipment manufacturers/suppliers, insurers).

Workers refers to: all individuals directly employed by your company. You may have duties towards sub-contracted and temporary workers.

The project lifecycle refers to: all stages of a construction project from outset to completion (e.g. planning, design, build, maintenance and temporary works).

Organisational learning refers to: the effective processing, interpretation of, and response to, information from both inside and outside the organisation. Organisational learning shows commitment to improvement and allows employees to actively participate in the continuous improvement process.

Formal learning refers to: structured mechanisms for providing information, knowledge and skills in relation to OH issues/risks. This may include a variety of methods e.g. induction courses, toolbox talks, classroom sessions, on-site training sessions etc.

Informal learning refers to: the provision of information, knowledge and skills in relation to OH issues/risks in an informal or ad hoc manner e.g. unplanned discussions about OH, peer to peer discussions and informal coaching/mentoring etc.

Regular refers to: activities that are undertaken at least once every 2 months.

Part 3

Please answer the following questions.

For the following questions select only one box

When did you last monitor to check (in any way) the exposure levels of any of the OH hazards that could affect your workforce and are controlled e.g. noise, dusts, gases, fumes, hand arm vibration.

Never More than 2 years ago Between 1 and 2 years ago

Between 6 and 12 months ago Less than 6 months ago

When did you last use the findings from monitoring (in any way) the exposure levels of any of the OH hazards (e.g. noise, dusts, gases, fumes, hand arm vibration) that could affect your workforce in your decision making.

Never More than 2 years ago Between 1 and 2 years ago

Between 6 and 12 months ago Less than 6 months ago

How frequently are OH risks/issues considered at a senior management level in your organisation?

Never Rarely Occasionally (e.g. following RIDDOR report)
Often e.g. standing item on board meetings Frequently e.g. in between meetings

When did you last review your control methods for any of the OH hazards that could affect your workforce?

Never More than 2 years ago Between 1 and 2 years ago
Between 6 and 12 months ago Less than 6 months ago

When did you last make improvements to working conditions as a consequence of reviewing your control methods for any of the OH hazards that could affect your workforce (e.g. noise, dusts, gases, fumes, hand arm vibration)?

Never More than 2 years ago Between 1 and 2 years ago
Between 6 and 12 months ago Less than 6 months ago

When did you last make improvements to working conditions as a consequence of reviewing your methods for reducing work-relevant stress, anxiety, depression and MSDs.

Never	<input type="text"/>	More than 2 years ago	<input type="text"/>	Between 1 and 2 years ago	<input type="text"/>
Between 6 and 12 months ago	<input type="text"/>	Less than 6 months ago	<input type="text"/>		

For the following questions please enter the relevant number into the box provided.

During the last working year (2011/2012) what percentage of working time was lost due to work related sickness absence?

What is the average number of working days lost per worker per year? (N.B. This applies to 2011/2012)

What is your incidence of RIDDOR reportable diseases? (N.B. This applies to 2011/2012)

5.7 APPENDIX 7: MAIN SURVEY RESULTS

5.7.1 Descriptive statistics

5.7.1.1 Demographic data

The sample (N=252) had good representation across the range of small, medium and large organisations. This is illustrated in Figure 3 below.

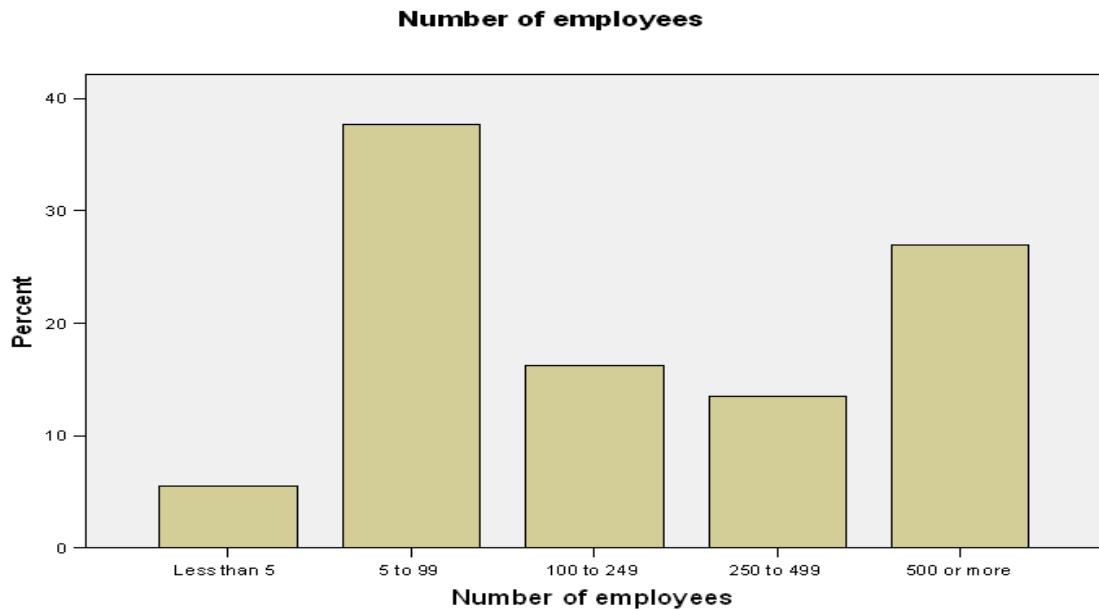


Figure 3. Percentage of sample according to number of employees in organisation

Workers tended to be either directly employed, or a mix of directly employed and sub-contracted. Only a small minority (4%) reported a sub-contracted only workforce. Worker status is illustrated in Figure 4 below.



Figure 4. Percentage of sample according to worker status

The majority of respondents (88.8 per cent) represent either principal contractor or Tier 1 organisations. This is illustrated in Figure 5 below.

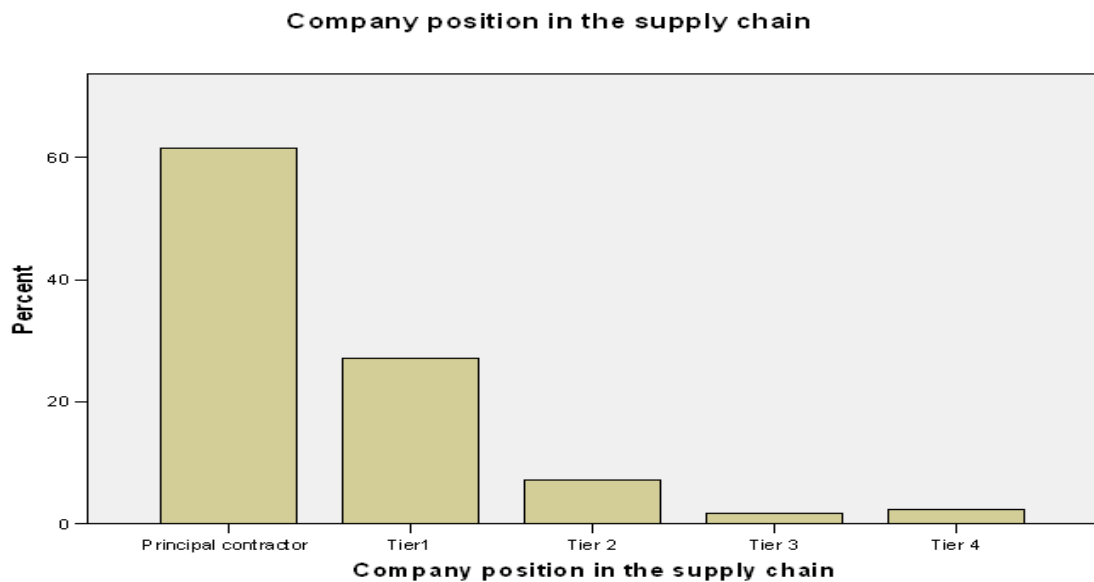


Figure 5. Percentage of sample according position in supply chain.

Almost three quarters of the sample (72 per cent) reported having access to an occupational health provider, and of these three quarters the majority (n = 140) access this provision through external occupational health providers. This is illustrated in Figure 6 below.

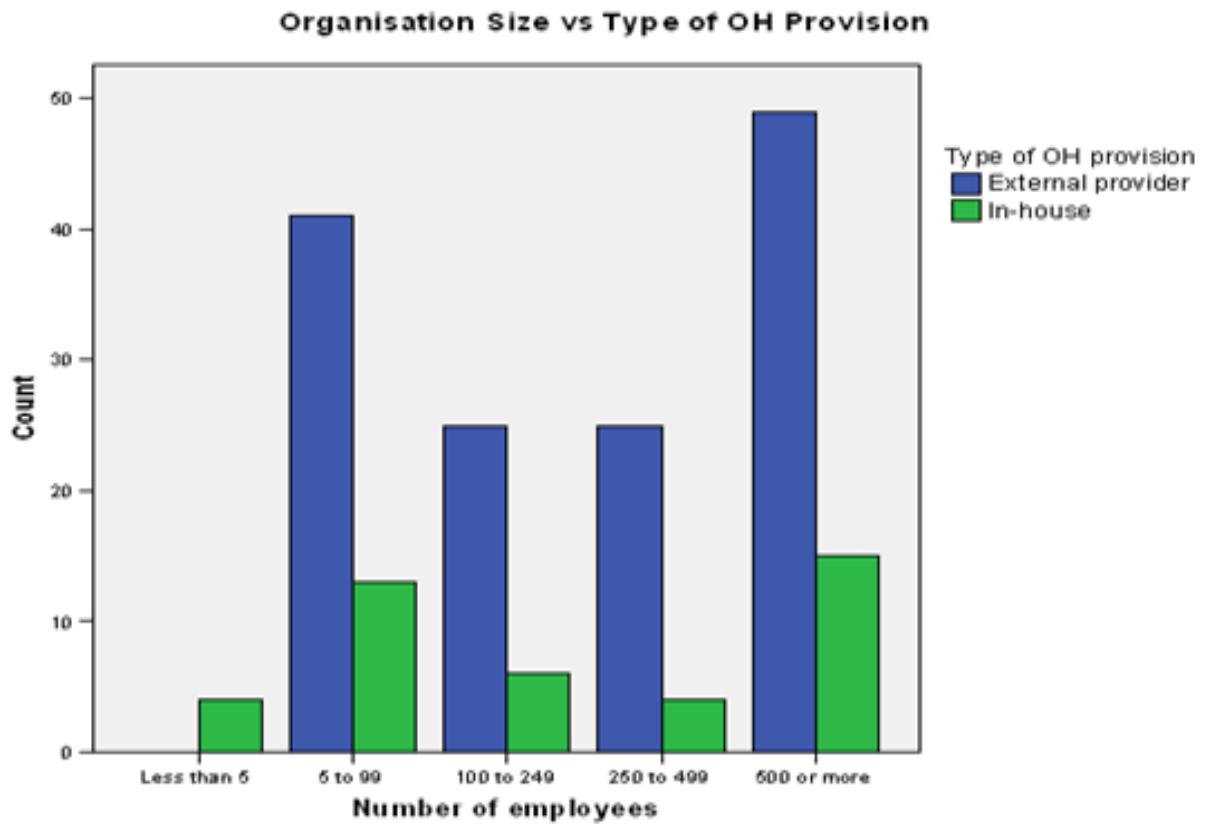


Figure 6. Sample according to organisations size and type of OH provision.

The majority of respondents who reported having access to an OH provider were Principal and Tier 1 contractors. This is illustrated in Figure 7 below.

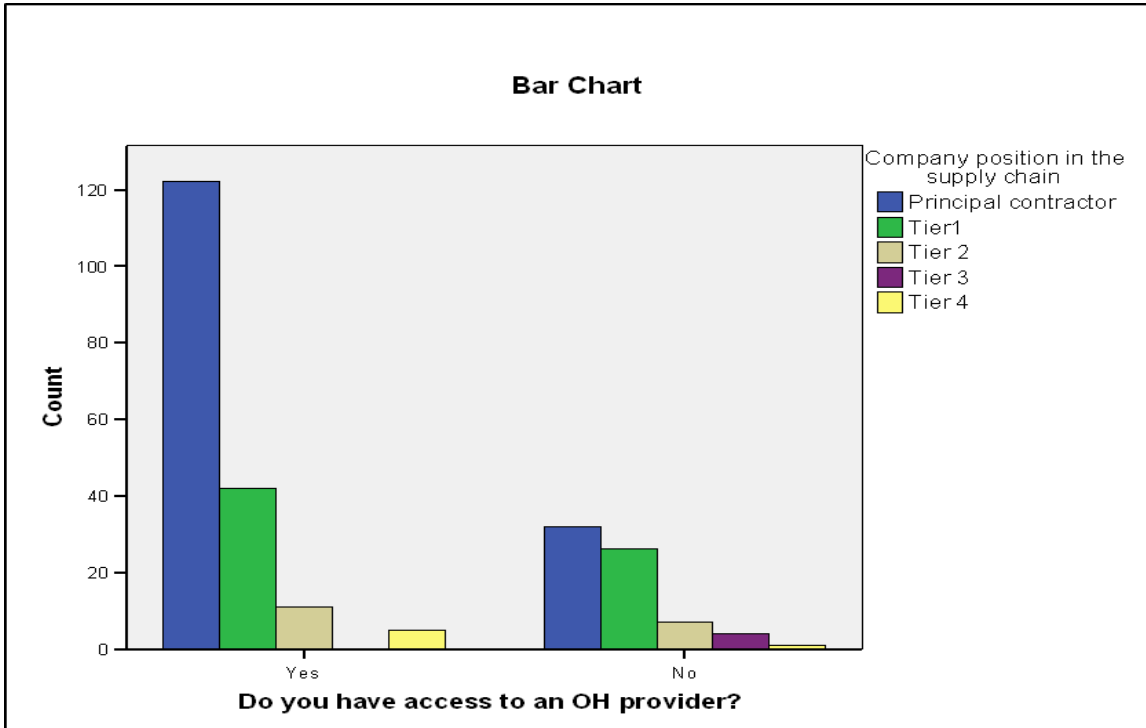


Figure 7. Access to OH provider according to position in supply chain.

The majority of respondents specifically considered OH in their organisation with only 11% stating it was not considered specifically. When OH was considered for 57% this was as part of the H&S policy, 13% of respondents had a separate OH policy and 18% reported a formalised approach to OH management. This is illustrated in Figure 8 below.

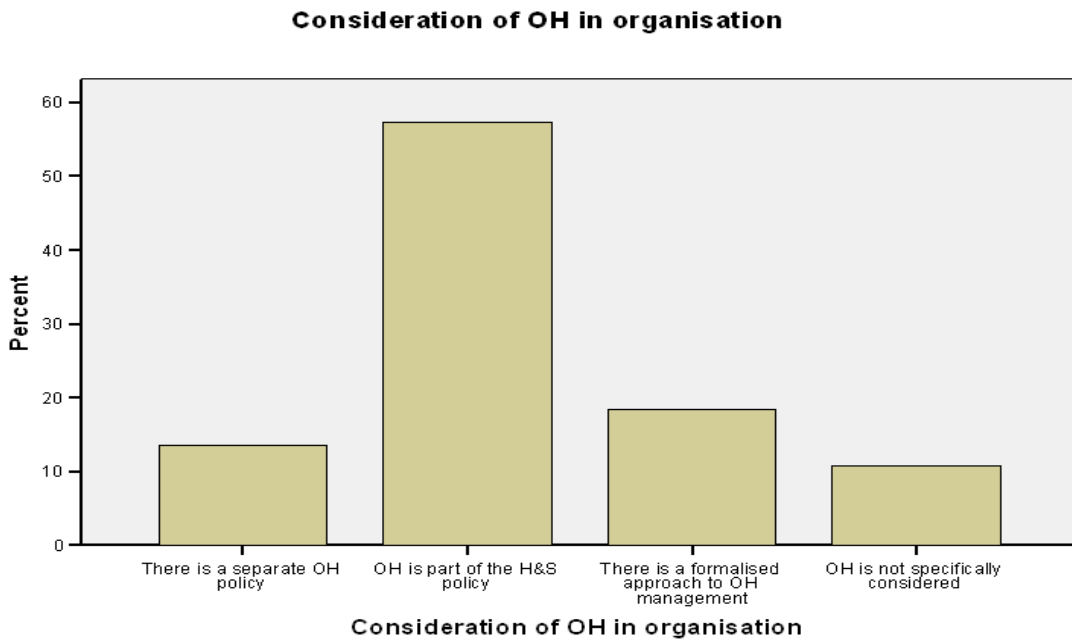


Figure 8. Sample according to the consideration of OH in organisation

Organisations located in the South East of the UK represented the largest proportion of the sample (36%). The remaining 64% were distributed throughout all areas of the UK with Wales representing the smallest proportion (3%). This is illustrated in Figure 9 below.

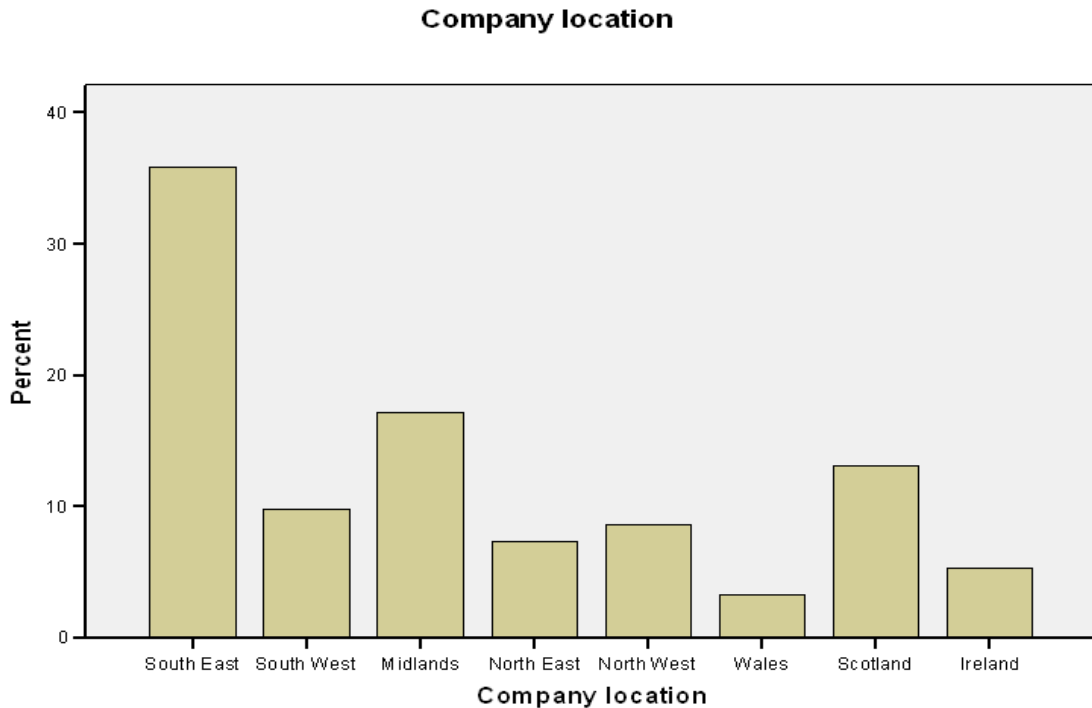


Figure 9. Sample according to geographical location.

In relation to Type of Construction activity engaged in (e.g. Build, Demolition etc.) and Type of OH risk (Noise, HAVS etc.), the large amount of missing data for these questions precluded the ability to conduct any meaningful and robust analyses.

5.7.1.2 Maturity levels

Mean scores for total maturity and maturity according to Building Block are shown in Table 2 below.

Table 2. Mean scores for total maturity and for maturity according to Building Block.

	N	Mean	Standard deviation	Minimum	Maximum
Business beliefs	250	10.6	3.1	3	15
Fairness	246	10.1	2.9	3	15
Mindful	248	13.2	3.7	4	20
Collective responsibility	247	9.7	2.8	3	15
Leadership	246	9.5	3.2	3	15
Learning	245	6.7	1.9	2	10
Total score	229	59.5	15.9	18	90

The total maturity scores show that the majority of the sample achieved scores that categorised them as at least “Compliant” for OH maturity. The greatest number of respondents obtained the “Proactive” level of maturity, followed by “Compliant”, “Enlightened”, “Reactive” and “Unknowing”. This is depicted in Figure 10 below.

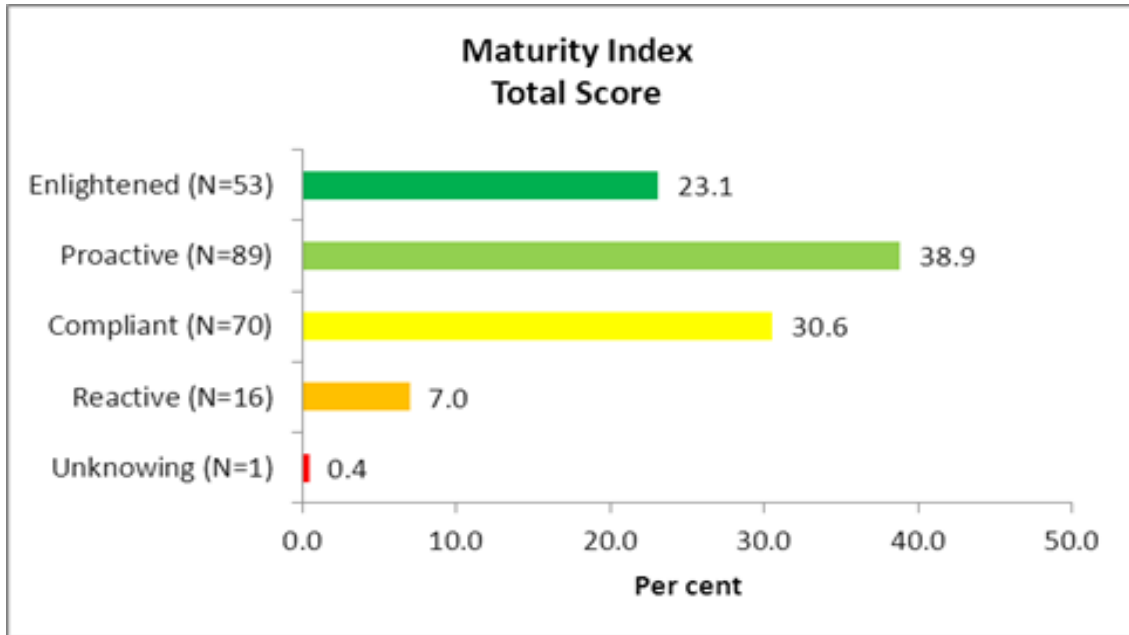


Figure 10. Total maturity score for the sample

A similar pattern was observed for all the OH maturity index sub-scales (Building Blocks) scores, although there was some variation in the magnitude of the scores. This pattern was broken only on the Business Beliefs sub-scale, where more respondent organisations fall into the “Enlightened” rather the “Compliant” category. Scores for each Building Block are presented in Figures 11 - 16 below.

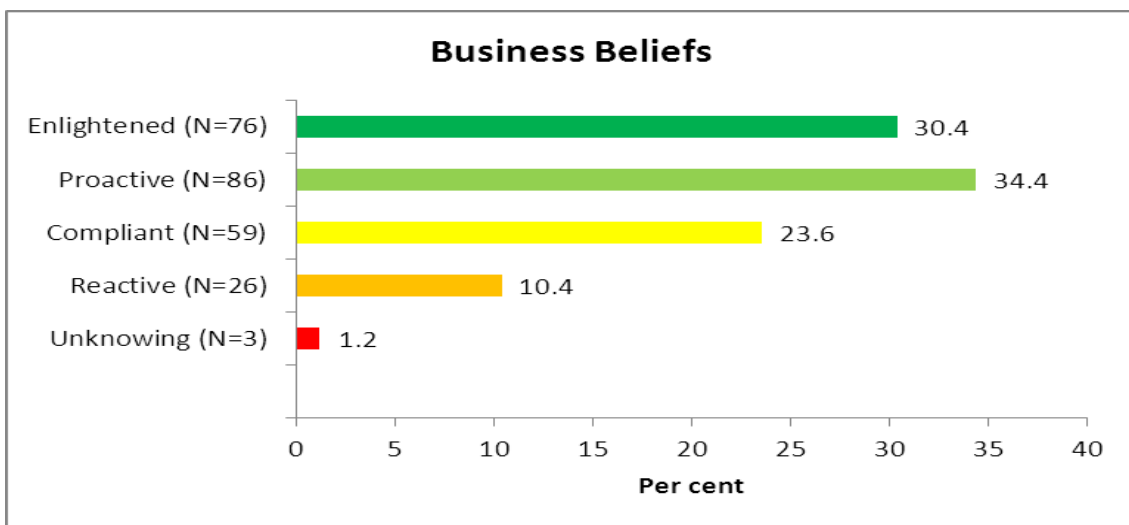


Figure 11. Business Beliefs scores

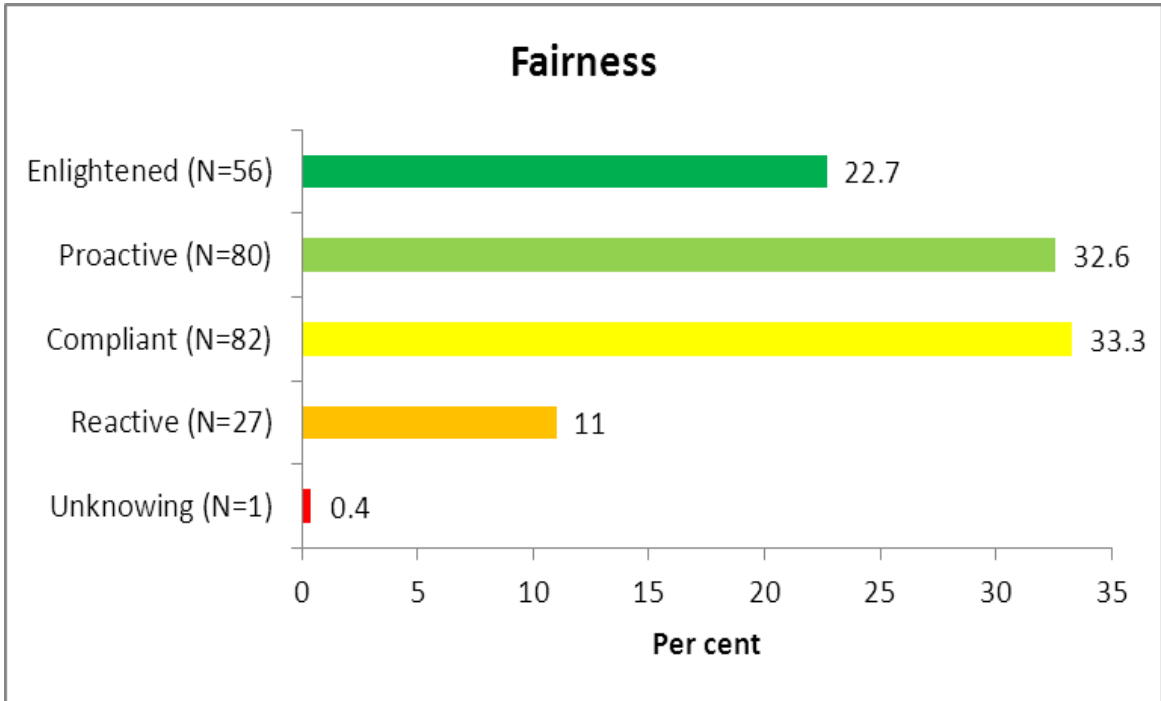


Figure 12. Fairness scores

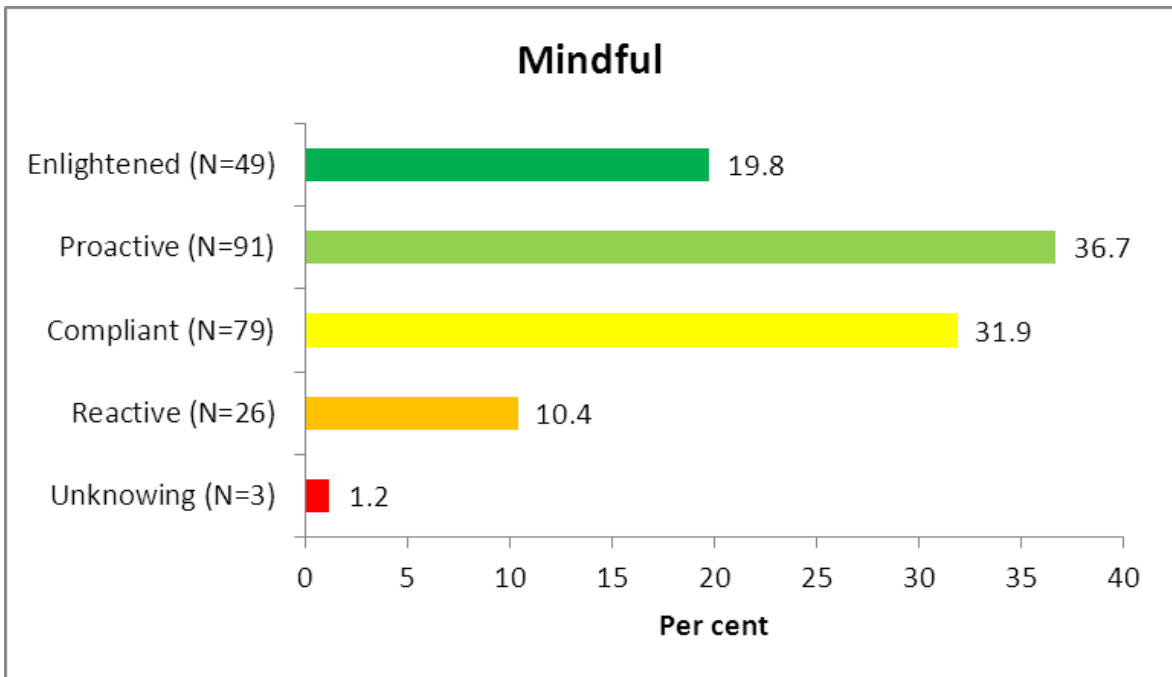


Figure 13. Mindful scores

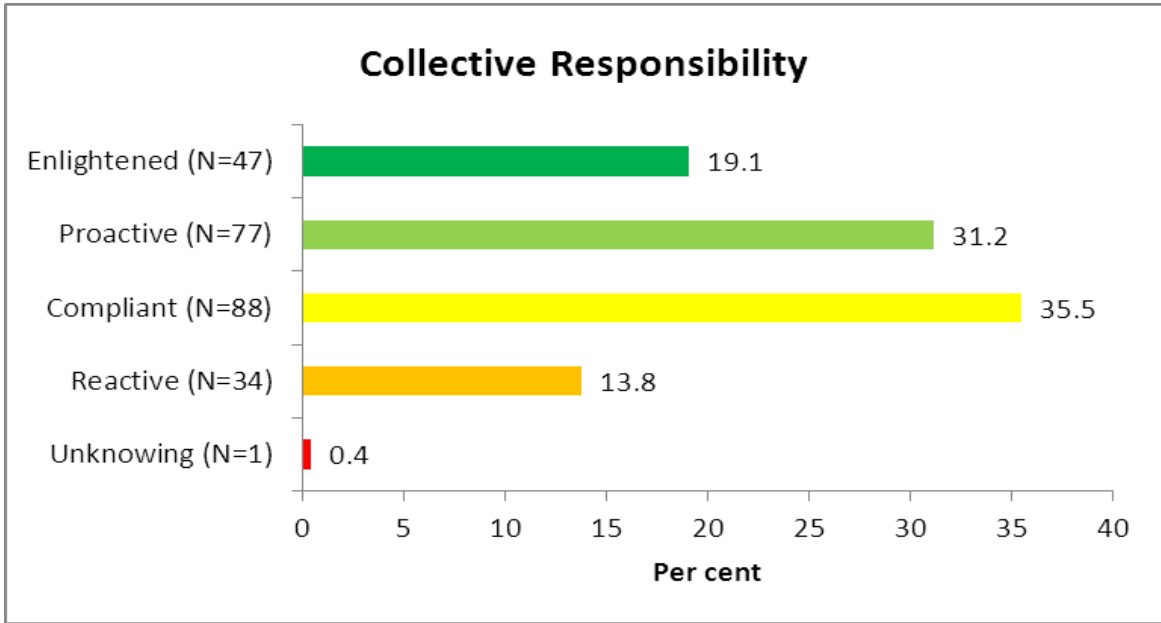


Figure 14. Collective Responsibility scores

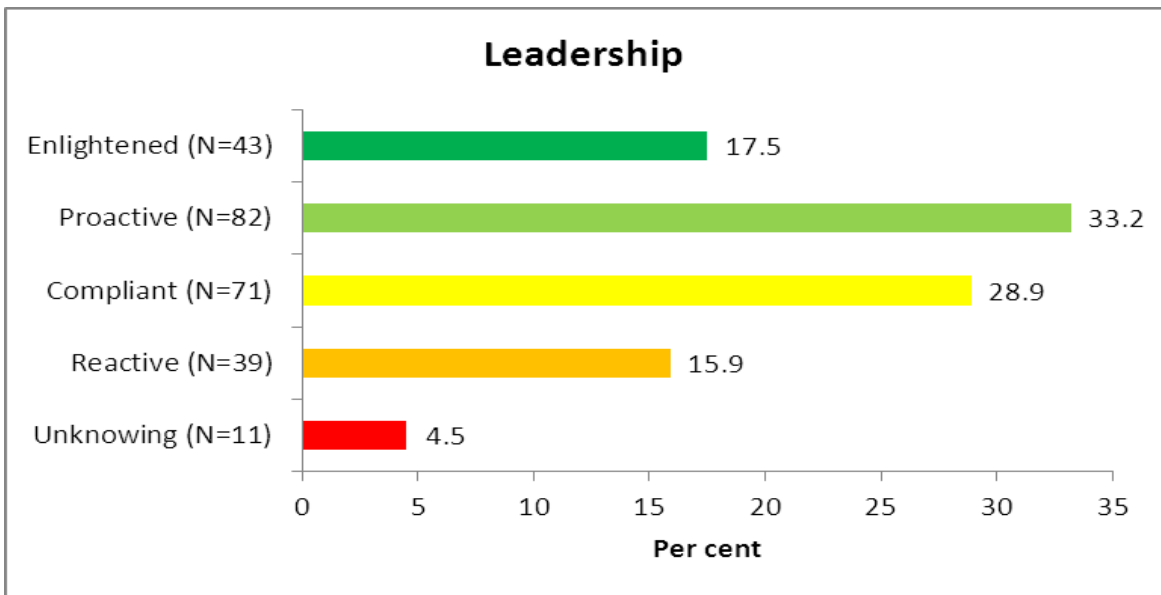


Figure 15. Leadership scores

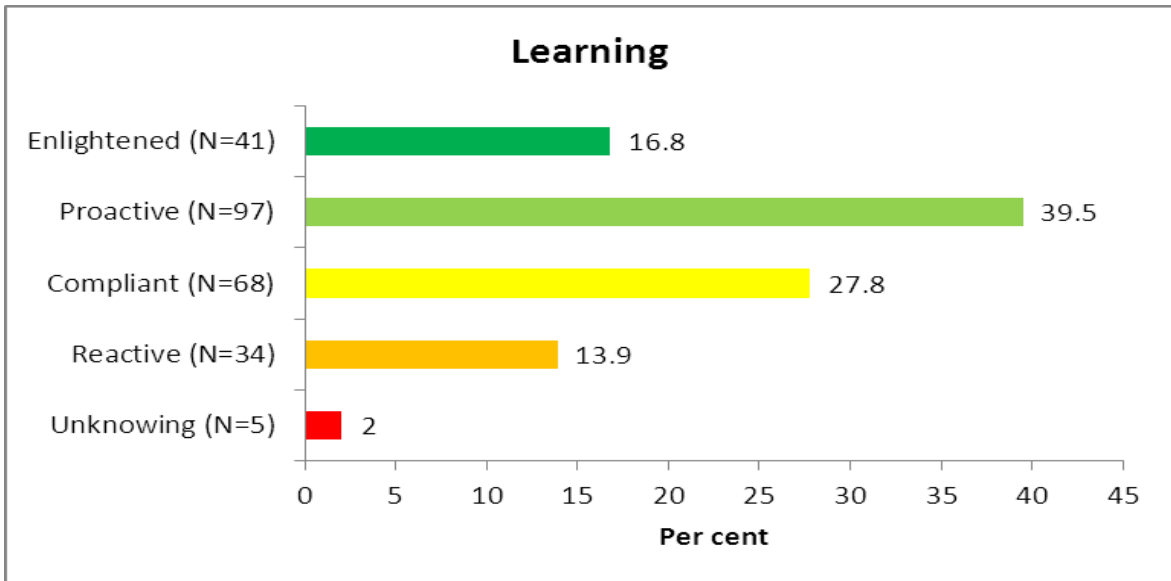


Figure 16. Learning scores

5.7.1.3 Leading and Lagging indicators

In addition to the maturity index and demographic items, six leading indicator items and three lagging indicator items were incorporated into the questionnaire. These were primarily used to validate the index, however responses for these items were also subjected to further analysis. The results of these analyses are described below.

Leading Indicator Scores

Response options to the leading indicator questions were graded on a five point sliding scale, from 'Never' to 'less than 6 months' with the 'less than 6 months' option seen as most desirable from an occupational health perspective. One leading indicator item ('How frequently are OH risks/issues considered at senior management level in your organisation?') had slightly different response options to the other five items (in that no specific time scales were specified). Responses instead ranged from 'Never' to 'Frequently'.

Responses to the leading indicator questions showed an increasing score gradient in the desirable direction. The only exception was the response pattern to the question 'When did you last make improvements to working conditions as a consequence of reviewing your methods for reducing work-relevant stress, anxiety, depression and MSDs?' Responses to this question did not show this increasing score gradient. The response pattern was more evenly spread across response options with 'Never', obtaining 24% and 'Less than 6 months ago' obtaining 26%. A summary of the results can be found in Figure 17 below.

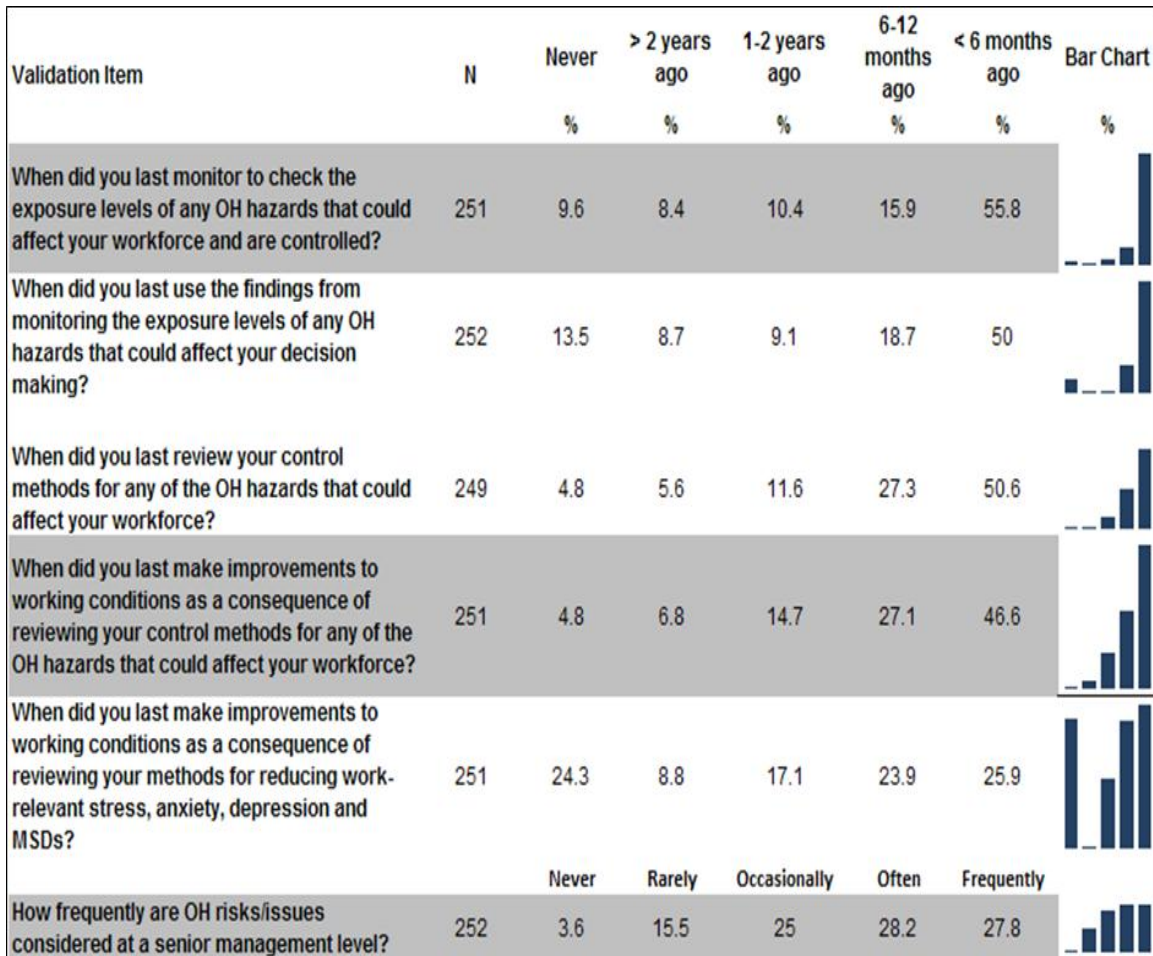


Figure 17. Responses to leading indicator questions

Lagging Indicator Scores

Close inspection of the response data for the lagging indicator items revealed problems with the quality of the data. Given the free response nature of these questions, a number of respondents entered data that was clearly incorrect e.g. providing a percentage greater than 100 as the percentage of working time lost due to sickness over the course of a working year. Given issues with the quality of the data the research team agreed to delete clearly aberrant data according to the following criteria:

- Percentage of working time lost due to sickness-related absence: delete all response data with a value greater than 10%.
- Average number of working days lost per worker per year: delete all response data with a value greater than 10 days.
- Incidence of RIDDOR reportable diseases: delete all response data with a value greater than 9 days.

Analysis was carried out on the data set with outliers excluded. Many respondents included in the data set analysed reported both percentage of working time lost and average number of working days lost as zero and the mean scores for these items were relatively low e.g. an average of 1.9 days lost per worker per year. The lagging indicator scores obtained are illustrated in Table 3 below.

Table 3. Responses to lagging indicator questions

	N	Mean	Standard deviation	Minimum	Maximum
Percentage of working time lost due to sickness related absence	184	2.21	2.8	0	10
Average number of working days lost per worker per year	165	1.93	2.4	0	10
Incidence of RIDDOR reportable diseases 2011/2012	205	0.45	1.4	0	9

The distribution of scores for each lagging indicator was noted to be inconsistent. The adjusted data sets for average number of working days lost and RIDDOR reportable diseases illustrated zero as the most common value, and the distribution of scores tailed off markedly with increasing values. The data for the percentage of working time lost appeared much more random however, suggesting caution about using the lagging data for validation purposes.

Psychometric properties of the leading and lagging indicators

Inferential statistics were conducted to determine the psychometric properties of the leading and lagging indicator items. The results indicated that the leading items had good reliability and appeared to be measuring an underlying construct of OH. The lagging indicator data appeared less robust however.

- There were significant correlations ($p < 0.01$ level) between all leading indicators. The majority of correlation coefficients were greater than 0.5 indicating a good degree of coherence between items. This implies internal consistency.
- A reliability analysis of the leading indicators using the Cronbach's Alpha internal reliability statistic found the combined leading indicators to have good ($\alpha > 0.7$) levels of internal consistency.
- For the lagging indicators only one significant correlation (at the 0.05) level was found between all the lagging indicators. This was between 'Incidence of RIDDOR reporting' and 'Percentage of working time lost due to sickness related absence'.
- Given concerns over the quality of the lagging indicator data (e.g. many missing values and extreme outliers) the decision was taken that conducting a reliability analysis using Cronbach's Alpha would be inappropriate. The lagging indicator findings may be due to problems with data as discussed previously. The researchers excluded considerable data that was clearly aberrant and the quality of the remaining data may be suspect as respondents appeared to have had difficulty answering the lagging indicator questions.

5.7.1.4 Psychometric properties of the index

Inferential statistics were conducted to determine the psychometric properties of the index items. The results indicated that the items had good reliability and validity.

Reliability measures

- A reliability analysis of each of the Building Block sub-scales and of the maturity index total scale was carried using the Cronbach's Alpha internal reliability statistic. All sub-scales had either good ($\alpha > 0.7$) or excellent ($\alpha > 0.9$) levels of internal reliability (consistency), with the full scale having excellent internal consistency ($\alpha = 0.97$). Table 4 below illustrates this.

Table 4. Mean scores and Cronbach's Alpha for each Building Block and overall maturity.

Scale	N	Mean Score	Cronbach's Alpha
Business Beliefs	250	10.58	0.854
Fairness	246	10.08	0.785
Mindful	248	13.21	0.909
Collective Responsibility	247	9.69	0.821
Leadership	246	9.55	0.907
Learning	245	6.68	0.836
Maturity Index Full Scale	229	59.51	0.967

• Correlations – Maturity Index Building Block Scales and Maturity Index Total Score

There were significant correlations ($r > 0.5$, $p < 0.01$) between items belonging to the same Building Block and that Building Block’s overall score. According to Cohen (1988) correlation coefficients larger than 0.5 are classified as large (Cohen, 1988). All Building Blocks correlated significantly with each other and with the overall maturity score ($r > 0.69$, $p < 0.01$). This suggests that both individually and in combination, the Building Block sub-scales and overall scale possess good levels of coherence and construct validity. The correlation results are illustrated in Figure 18 below.

Correlations - Building Block Total Sub-Scale Scores and Maturity Index Total Score

		Business Beliefs	Fairness	Mindful	Collective Responsibility	Leadership	Learning	Total score
Business Beliefs	Pearson Correlation	1	.775**	.859**	.752**	.826**	.727**	.914**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	250	245	247	246	245	244	229
Fairness	Pearson Correlation	.775**	1	.815**	.794**	.784**	.692**	.887**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	245	246	243	242	241	240	229
Mindful	Pearson Correlation	.859**	.815**	1	.800**	.882**	.791**	.950**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	247	243	248	244	243	242	229
CollectiveResponsibility	Pearson Correlation	.752**	.794**	.800**	1	.787**	.750**	.896**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	246	242	244	247	243	241	229
Leadership	Pearson Correlation	.826**	.784**	.882**	.787**	1	.783**	.935**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	245	241	243	243	246	241	229
Learning	Pearson Correlation	.727**	.692**	.791**	.750**	.783**	1	.855**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	244	240	242	241	241	245	229
Total score	Pearson Correlation	.914**	.887**	.950**	.896**	.935**	.855**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	229	229	229	229	229	229	229

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 18. Correlation results for Building Blocks and total score

Validity Evidence

- There were significant positive correlations ($p > 0.01$,) between **all** the individual leading indicators and **all** the Building Block sub-scales.
- There were significant positive correlations ($p > 0.01$ level) between all the individual leading indicators and the maturity index total score. The highest correlation coefficient ($r=0.67$) was observed for the leading indicator ‘How frequently are OH risks/issues considered at a Senior Management level’?

- There were significant negative correlations between two of the lagging indicators and some of the Building Block sub-scales.
 - ‘Percentage of working time lost due to sickness related absence’ correlated with Business Beliefs ($r=-0.19$, $p<0.01$, $N=18$), Learning and Leadership ($r=-0.18$, $p<0.007$, $N=180$).
 - ‘Average number of working days lost per worker per year’ correlated with Collective Responsibility ($r=-0.18$, $p<0.01$, $N=168$) and Leadership ($r=-0.17$, $p<0.05$, $N=168$).
- Correlations between individual lagging indicators and maturity index total score showed an inconsistent pattern, possibly an artefact of the poor quality data obtained for the lagging items. This questions the quality of the data collected under the lagging indicators.
 - There was a significant negative correlation ($r=-0.142$, $p> 0.05$, $N=165$) between ‘Percentage of working time lost due to sickness related absence’ and the maturity index total score.
 - ‘Average number of working days lost per worker per year’ showed a significant positive correlation ($r=0.14$, $p> 0.05$, $N=154$) with maturity index total score.
- The items comprising the leading and lagging indicators were totalled to produce two additional variables (combined leading and combined lagging) for the purpose of testing the validity of both the maturity index full scale and the building block sub-scales.
- Significant positive correlations ($r>0.5$, $p<0.01$) were found between maturity index total score/building block sub-scale scores and the combined leading indicators (as leading indicator score increased maturity level increased). These correlation results are illustrated in Table 5 below.

Table 5. Correlations between combined leading indicators and Building Block/total index scores

		Business Beliefs	Fairness	Mindful	Collective Responsibility	Leadership	Learning	Total Score
Combined leading indicator score	Pearson Correlation	0.569	0.517	0.584	0.483	0.550	0.540	0.590
	Sig	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	N	244	240	242	241	241	239	224

- Significant negative correlations ($r < 0.3$, $0.001 < p < 0.05$) were found between maturity index total score/building block sub-scale scores and the combined lagging indicators (as lagging indicator score increased, reflecting poorer performance, maturity level decreased). Correlation coefficients were small, reflecting small effect size. No significant correlation was found between the Business beliefs Building Block and combined lagging indicators. Smaller correlations with the lagging indicators may be a function of their weaker reliability. These correlation results are illustrated below in Table 6.

Table 6. Correlations between combined lagging indicators and building block/total scale scores

		Business Beliefs	Fairness	Mindful	Collective Responsibility	Leadership	Learning	Total Score
Combined leading indicator score	Pearson Correlation	-0.110	-0.223	-0.218	-0.306	-0.230	-0.215	-0.208
	Sig	Not sig	< 0.01	< 0.01	< 0.01	< 0.01	< 0.05	< 0.05
	N	147	145	145	145	144	143	131

- The leading indicator sets of correlations provide statistically robust evidence of the validity of the maturity index measure, along with its sub-scales. The strength of the leading indicator correlation coefficients are higher than those of the corresponding lagging indicator, but this is to be expected given the greater variability of the lagging indicator data and the lesser sample size (due to the need to exclude obvious outliers).

5.7.1.5 Total Maturity Score by Demographic Indicators

One way analysis of variance (ANOVA) tests were performed to determine whether differences in total maturity scores varied significantly with demographic factors. ANOVA tests allow the researcher to test the hypothesis that there is no statistically significant difference in scores between different groups of respondents. One way ANOVAs were performed to test whether or not total maturity score varied according to:

- o Organisation size
- o Position in supply chain
- o Access to an occupational health provider
- o Location of organisation
- o How occupational health is considered in the organisation

Significant differences were detected in two of the five ANOVAs performed:

- Access to an OH provider: There was a significant difference in total maturity score between organisations with and without access to an OH provider, $F(2,227) = 32.3$, $p < 0.01$. As illustrated in Figure 19 below, maturity scores were significantly higher for those with access to an OH provider.

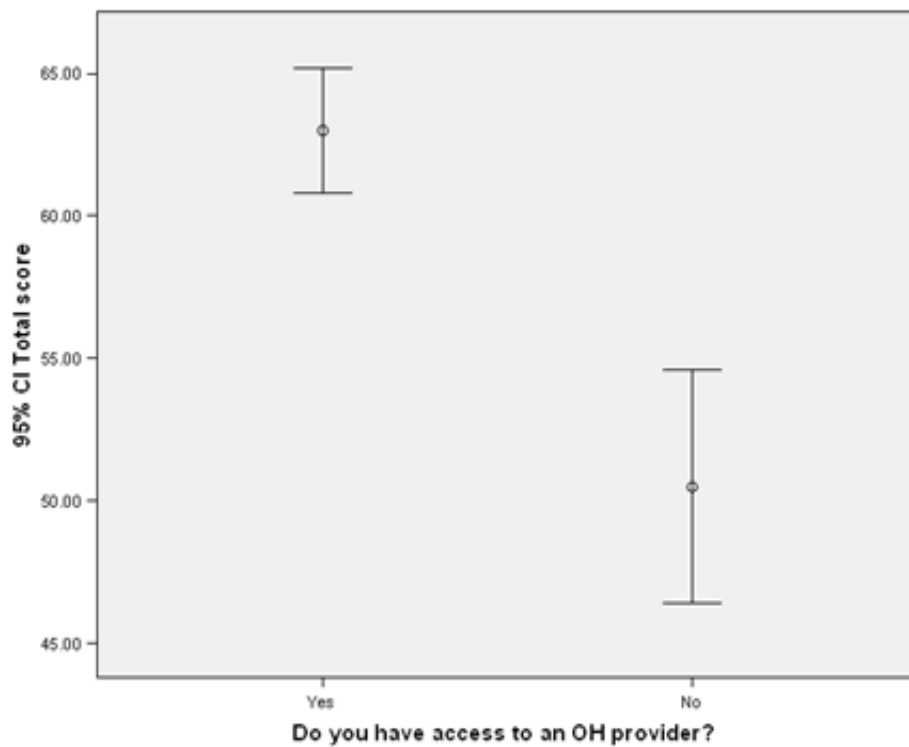


Figure 19. One way analysis of variance (ANOVA) result for total maturity score according to access to an OH provider.

- How occupational health is considered in the organisation: There was a significant difference in total maturity score between organisations that have a separate OH policy compared to those where either OH is not specifically considered, there is a formalised approach to OH management or OH is considered part of health and safety policy, $F(3,224) = 16.1$, $p < 0.01$. As illustrated in Figure 20 below, maturity scores were significantly higher for those with a separate OH policy.

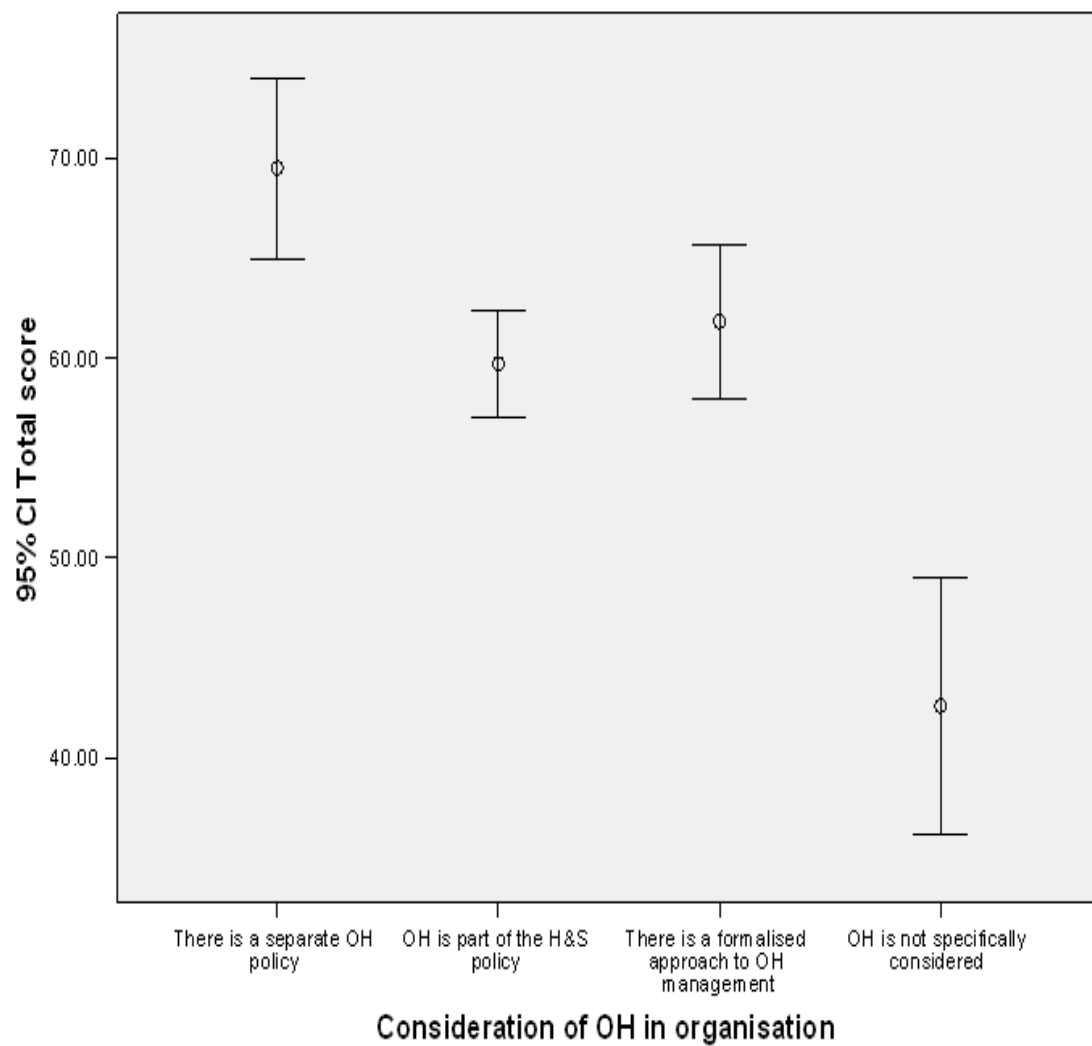


Figure 20. One way analysis of variance (ANOVA) result for total maturity score according to consideration of OH in organisation.

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7. GLOSSARY

Common health problems/wellbeing issues:

CHPs are the categories of health complaints that occur most frequently across the population. They are typified by symptoms more than pathology, and tend to be recurrent in nature. Collectively they account for most loss of productivity, sickness absence, care seeking and health-related benefit claims. CHPs have several key features:

- Their ubiquity is consistently reported by multiple players: workers, employers and medical practitioners.
- They involve the report (e.g. to line manager, company occupational health, GP, or other healthcare provider) of one or more symptoms, yet in most instances there is limited objective evidence of injury, disease or impairment.
- Management of symptomatic episodes should be achievable and long-term problems are not inevitable.
- Evidence for occupational causation is contentious, inconsistent, or lacking, leading to ongoing debate. However, CHPs may temporarily reduce the person's ability to work: that is, they may be work-relevant but are not usually solely due to work.
- In occupational terms, the consequences are more important than any (assumed) pathology: with the right support, most people can remain active and stay at work or achieve early and sustained return from sickness absence.

Compliance refers to: the minimum standards to achieve to ensure you are complying with the relevant legal duties. You will need to understand what your legal duties are in the role that you fulfil, the risks to your workers and ensure you are fully aware of what the particular standards are that you need to meet.

Health Surveillance: is a statutory risk based system of ongoing health checks required when workers are exposed to hazardous substances or activities that may cause them harm. It helps employers to regularly monitor and check for early signs of work-related ill health in these employees.

Occupational Health Risk Management refers to: preventing workers from suffering adverse effects on their health caused by their job, by avoiding or controlling risks through task and worker adaptation.

OH support refers to: either in-house or external OH support that is provided to staff. This may be through formal services or via line management support. Good quality OH support should cover both proactive and reactive management of all aspects of OH (see previous definition for all OH issues/risks). OH support should be integrated with your existing business and safety management systems.

Stakeholders refers to: those internally and externally who have a vested interest or are affected by the OH and wellbeing of a workforce (e.g. employer, leaders, workers, principal contractors, main contractors, sub-contractors, temporary workers, designers, architects, product/equipment manufacturers/suppliers, insurers).

Traditional OH issues/risks: refers to well established physical risks where there is a long understanding of the link between these risks and OH in your sector/workplace and legislation/guidance is in place for managing these risks (e.g. respiratory, dermal, inhaled, ingested, noise, and HAVS).

Wellness issues: In this context wellness refers to positive wellbeing outcomes such as morale, resilience, happiness and job satisfactions, and activities such as health and promotion. All and are necessary for boosting wellbeing over and above the prevention of harm or stress.

Development of a Health Risk Management Maturity Index (HeRMMIn) as a Performance Leading Indicator within the Construction industry

Safety cultural maturity reflects an organisation's degree of readiness to tackle safety risks. Until recently, no equivalent model for occupational health (OH) had been developed. The current research aimed to develop an OH management maturity index for the construction industry and use the index to survey OH management maturity in the industry.

Index development entailed an initial evidence synthesis and subject expert consultation to establish the index's theoretical basis/scope. This identified the key constituents of OH maturity as: senior management commitment; continuous improvement; communication; fairness; learning; foresight and employee involvement. Knowledge of OH issues was the criterion for separating 5 levels of maturity from 'unknowing' to 'enlightened'. The index was piloted to assure reliability, validity and usability before conducting a main survey with the sector.

The survey results revealed good levels of OH maturity but must not be interpreted to imply that the sector is performing well already and there is no room for improvement. Maturity scores were significantly higher for those with access to an OH provider and a specific OH policy. Key areas important for improving OH culture maturity included: the role of Principal/Tier 1 contractors, the business case for OH management and the importance of visible senior management commitment to OH.

This report and the work it describes were funded by the Health and Safety Executive (HSE). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect HSE policy.