

Health and safety in a shifting landscape

Programme report

Report submitted to the IOSH Research Committee

Published in 2016

IOSH, the Chartered body for safety and health professionals, is committed to evidence-based practice in workplace safety and health. We maintain a Research for Public Benefit Fund to support research, lead debate and inspire innovation as part of our work as a thought leader in safety and health.

Our five-year research programme, *Health and Safety in a Changing World*, set out to explore the landscape of occupational safety and health and its implications for developing solutions that provide effective protection for workers and their communities.

In this document, you'll find a summary of the programme, led by Professor Robert Dingwall, and the research we commissioned from the Institute of Occupational Medicine and the Universities of Nottingham, Loughborough, Cranfield, Reading and Portsmouth. You'll find the full details in the book *Health and safety in a changing world*, which is published by Taylor & Francis in late 2016 (ISBN 978 113 822 521 3).

IOSH would like to thank Professor Robert Dingwall, who prepared this report, and all the organisations and individuals who supported the programme.

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Introduction

This report summarises the work of the research programme *Health and safety in a changing world*, commissioned by IOSH and carried out between 2010 and 2015 by teams from the Institute of Occupational Medicine, Loughborough University, Cranfield University and the Universities of Nottingham, Reading and Portsmouth under the direction of Professor Robert Dingwall of Dingwall Enterprises Ltd. It has been supported by the IOSH research and development team, particularly Luise Vassie, Jane White and Mary Ogungbeje.

The first part of the report describes the development of the programme and the formulation of its final brief. This was the basis of the calls for proposals and the commissioning decisions. The second and third parts of the report summarise and synthesise the main findings of the research teams: further detail and specific supporting evidence can be found in the separate research reports. The final section discusses the potential implications for IOSH and the profession that it represents. The programme teams were not asked to make recommendations for action, so the conclusions take the form of points for consideration in strategic discussions.

1. Background

The initial brief for the IOSH research programme envisaged its core questions as: “What are the determinants of successful OSH interventions in the present and future world of work and how can these be improved?” The programme’s aim would be “to investigate, with a view to improving OSH practice, the development of optimal ways to formulate valid, efficient and effective interventions and their underlying determinants, including approaches to evaluating the validity of the information about risk on which the intervention is based, to improve occupational safety and health.”

The first task of the Programme Director, Professor Robert Dingwall, was to develop a call for proposals that would operationalise the programme brief. This was also an opportunity to respond to some of the changes in the context of OSH policy and practice since the brief had first been agreed. One of the most important of these was the outcome of the 2010 General Election with the arrival of a government that was more sceptical of the value of OSH regulation. This had shifted the terms of debate from one where ‘better regulation’ could be informed by the evaluation of various social and economic technologies, as envisaged in 2008, to one where the very principle of OSH interventions was challenged as an unreasonable burden on business and a stimulus to a ‘compensation culture’. Over the same period, the Health and Safety Executive (HSE) had also begun to undertake work on some of the new technologies of regulation, such as behavioural economics or ‘nudging’.

The original brief was reformulated to focus more on the evolving health and safety system and the place of OSH practitioners within this. Under the title *Health and safety in a changing world*, it would give particular attention to the OSH profession’s relationship with knowledge and expertise in informing interventions, about its ability to use this knowledge in practice, particularly in influencing line management and working practice, and about the response of both employers and employees to a less rule-oriented style of working. This was summarised in two broad areas of work:

1. *An investigation of the place of OSH practitioners in the changing health and safety system, in interaction with other influences on workplace health and safety, including the production and reputational concerns of employers, the liability concerns of insurers, and the representative concerns of unions, where workplaces are unionised.* Does the new system tend to marginalise OSH practitioners? How do relationships change if regulations are less central? Is there a demand for rules rather than expertise? Does private regulation by insurers substitute for public regulation by governments? How qualified are other actors to deal with OSH issues? Does OSH compliance tend to

become symbolic rather than real? How do OSH issues get addressed in the 'new economy' where networks are tending to replace organisations?

2. *An investigation of the use of evidence by OSH professionals in their practice.* What do they regard as authoritative sources? How do they access these? How do they keep their knowledge current? How do they translate their knowledge to line managers or consultancy clients? How far is their contribution to decision-making purely technical and how far does it extend to explaining or justifying interventions in economic, managerial or ethical terms? How far are they aware of and engaged in the search for alternatives to traditional 'command and control' styles of intervention? What do OSH practitioners need to know to function effectively in the changing health and safety system?

The first of these recast the idea of 'determinants of successful OSH interventions' to place these within a broader social, economic and cultural context, responding to the change in political climate. The second developed the idea of 'evaluating the validity of information' to link more explicitly with the growing body of research on knowledge and its management in organisations. Together, these changes introduced a more strategic dimension to the programme, with greater weight given to its policy aspects and to its ability to serve IOSH as a thought leader and influencer – on behalf of its members and in delivering the public benefit requirements of its charitable status.

This was accepted as the basis for the call for proposals. The following three topics were specified:

- a) *OSH knowledge and its management.* This project had two elements.
 - i. Is there a coherent knowledge base for OSH interventions? This would be a literature-based study, reviewing the knowledge landscape potentially relevant to OSH practice, identifying its main components and asking whether they can be assembled in an organised fashion as a basis for use by participants in the OSH system such as enterprise managers, worker representatives, OSH practitioners and civil society groups. It would consider the impact of what is known about knowledge transfer or technology transfer from studies in other domains for the movement of knowledge within OSH networks.
 - ii. How is knowledge currently used in OSH practice and how could this be improved? This would be an empirical study exploring the movement of knowledge into the practice of different participants within the OSH system. How do the various actors engage with OSH challenges and what evidence do they use to help with this? How do they decide what counts as valid knowledge? How is access to this knowledge distributed? What facilitates or obstructs knowledge flows to different actors? What contribution do OSH practitioners make to developing new knowledge for their own, or more general, use? How is knowledge used to negotiate outcomes or trade-offs between the goals of

different actors, particularly those related to enterprise success or profitability, in such a way as to promote or impede positive OSH outcomes?

This study would build on the preliminary review to explore the ecosystem of occupational and other groups involved in OSH issues, to examine their inter-relationships and to identify areas of possible improvement. It could investigate competing definitions of risk and consider how disagreements or conflicts are resolved, and the extent to which this is based on appeals to evidence or to compliance with rules.

Proposers were particularly asked to consider the appropriateness of professionalising strategies in the OSH system and the relevance of traditional models of professions and the power derived from their relationship to expert knowledge in contrast with more recent models that have stressed technical expertise rather than generalised authority. They were also encouraged to give appropriate consideration to the role of non-professional actors and to the challenges of exercising professional influence in the restructured work environment.

- b) *The balance between public and private sources of OSH regulation.* An important part of the changing landscape of regulation has been the professed goal of moving away from detailed regulation by public agencies, such as the HSE, in order to create more space for creative problem-solving by enterprises. While there remains a societal expectation that OSH outcomes will not be compromised, participants in the system are supposedly being given more space to develop their own, locally adapted, strategies for achieving these outcomes.

It might, however, be argued that the result has been to create a vacuum that has actually been filled by various private interests, whose influences may be less visible but no less constraining of adaptive behaviour, particularly for small and medium-sized enterprises (SMEs) with limited resources to negotiate or shop around. The problems created for local actors may then be harder to address, precisely because private bodies may be harder to call publicly to account for their actions.

Insurers have been identified in some contexts as filling this role, with their policy requirements expanding on or 'gold-plating' OSH regulation. Standard-setting bodies may also take on this role, particularly where purchasers require compliance with their protocols as a condition of participation in a supply chain. Some NGOs may use threats of litigation or reputational damage to similar effect. Although probably less significant than in the past, projects should recognise the potential contributions of trades unions and collective agreements as influences on working practices. There could be a role for

international comparisons, although it was not expected that international fieldwork would be funded.

The project would investigate the sources of authority within the changing OSH landscape and the degree to which actors are indeed being granted space to devise locally-relevant strategies for achieving OSH goals or are simply finding themselves constrained in different ways. What are the external constraints that need to be managed by local OSH system actors and how are they changing with the industrial structure?

- c) *The local impact of the changing safety and health system.* This project would focus particularly on the management of OSH issues in organisations participating in networked systems of production or service delivery. Many of these would be SMEs, although this would not be a prerequisite for a choice of cases. However, proposers were invited to consider comparing sectors like construction, where networked forms of organisation involving sub-contractors and agency workers have a long history, and those where this is relatively new, such as the railway industry.

The focus of the study would be on understanding who does what about OSH issues on the basis of what evidence – and on how these various activities collectively generate a particular set of OSH outcomes. In some respects, this project is a mirror image of the project on public and private regulation – what do people do within these external constraints, rather than looking at how these constraints are generated. This might be approached through a focus on risk, considering how local actors define this and how they balance the risk of adverse OSH events against the risks of lost production and failure to meet contractual requirements or of reputational damage, whether externally or within the production network.

Proposers were also invited to consider the capacity of these local systems to deal with a more creative approach to OSH challenges or whether they are, in effect, protesting against public regulation but mechanically turning to private substitutes rather than taking advantage of greater flexibility.

After consideration of 14 proposals, contracts were offered to teams from the Institute of Occupational Medicine (project a), the University of Nottingham (b) and Loughborough University (c) for work to start in the autumn of 2011.

Approximately half the programme budget had been retained in order to support a second round of projects. The brief for this was developed in the course of 2012. Reflecting the

evolution of the programme and the emerging findings of the first round of projects, the description of the task was further focussed.

The programme was designed to investigate the consequences of the changes that had taken place in the social and institutional context of OSH, with the restructuring of British industry and its workforce, the development of a degree of cultural antipathy to perceived over-regulation, and the attempt to promote an approach to workplace safety based on risk rather than on hazard. New approaches to OSH practice were needed, reflecting the evolution of more networked forms of organisation, the greater professionalism required to operate knowledge-based rather than rule-based assessments and interventions, and the need to secure public legitimacy for OSH as an endeavour.

Three particular gaps were identified and projects were designed to fill these.

- d) *Leadership and safety.* The movement away from traditional hierarchical bureaucracies as a mode of corporate organisation has created new challenges for OSH practitioners in integrating health and safety with other aspects of line management, particularly with the movement towards more flexible modes of regulation. It has been suggested that OSH practice will increasingly operate on a more professional model, advising business on how to achieve health and safety outcomes through the application of expert knowledge rather than by a more 'enforcement-oriented' approach of identifying relevant regulations and defining compliance.

The first three projects were funded to describe this knowledge and to examine how it might be accessed and used. However, this knowledge will need to be translated into action within workplaces, in ways that engage both line managers and workers, whether directly employed or as contractors or agency staff. This raises a set of issues around the changing nature of leadership in organisations, around engagement with health and safety agendas and around the preservation of knowledge and experience in less stable environments.

Proposals were invited to examine how OSH practitioners are, or are not, acting as leaders on safety issues within contemporary UK organisations. They would describe how leadership is evolving, possibly through a range of case studies that examine diverse forms of leadership, from charismatic or transformational through to distributed. Where does the health and safety agenda fit within these approaches? Under what conditions can OSH practitioners act as effective advocates, persuading both managers and workforces of the value of their knowledge and expertise? Can they act as boundary-spanners to accelerate organisational learning from a generic pool of OSH knowledge? How can they ensure that OSH experiences become embedded in

organisational memory so that avoidable errors are not repeated? Since this brief was written, it has become clear that it will also be relevant to the leadership agenda being set by ISO 45001, which is currently the subject of consultation and is expected to be published formally early in 2017.

- e) *SMEs and access to OSH expertise.* Particular concern has been expressed about the relationship between SMEs, including micro-businesses, and OSH requirements, as reflected in the Löfstedt Report. Limitations of scale and resources make it difficult to develop appropriate expertise, which leaves these organisations dependent on external sources of information and guidance. It has been suggested that the result leads to costly over-compliance, so-called 'gold-plating', as consultants seek to protect themselves against possible liability issues. However, it is also possible that some of the problems reported by this sector reflect cultural, rather than structural, barriers and a wider hostility to intervention in what are perceived as personal and private concerns of owner-managers and their particular relationship to their staff.

Proposals were invited for a project to investigate the perceptions of OSH issues among SMEs, including micro-businesses, to define their present sources of guidance, to examine the relationship between those sources and the knowledge base being defined by the IOM project, and to consider other barriers to access that may derive from the values and attitudes of owner-managers.

- f) *The changing legitimacy of health and safety at work.* Scholars of regulation have developed the concept of the 'social licence to operate', which expresses the idea that corporations depend for their success on their ability to satisfy the wider public of their good citizenship rather than merely minimal compliance with statutory requirements. It is arguable that the same may be true of professional groups, like safety practitioners. One way of considering the current challenges to health and safety practice is to suggest that its social licence has been compromised by the rise of a view that it is over-zealous and lacks common sense in its interpretation. This has not always been the case as evidenced by the wave of expansion in the 1960s, when the Offices, Shops and Railway Premises Act 1963 was seen to epitomise the extension of protection from traditional manufacturing environments into the service sector, and 1970s, when existing agencies and legislation were consolidated by the landmark Health and Safety at Work Act 1974. How is it that public and political perceptions have come to change so radically in the last 50 years?

Proposals were invited for a project that would examine public and political attitudes to health and safety at work from 1960 until the present. This would probably involve extensive work on media archives, examining changes in coverage, and records of

parliamentary debates, to examine the language in which issues are debated, and evidence from studies of the public.

The specific data on public values and attitudes to health and safety at work may be limited and proposers were invited to look more generally at evidence of possible changes in the public understanding and acceptance of risk over this period. Has the social licence to operate been compromised more by changes in the social environment than in the legal framework and operating practices of those involved? This project was unlikely to require original data collection beyond archival, documentary and literature searching, although proposers were invited to consider including oral history interviews or focus groups with key stakeholders from the earlier part of the period. If included, the proposers were asked to specify how these would be archived for future research use.

Contracts were awarded to Cranfield University (d), Loughborough University (e) and the Universities of Reading and Portsmouth (f), with a separate element to be carried out by the University of Nottingham.

The final formulation of the core question for the programme is: *How can OSH policy and practice best adapt to recent and current changes in their social and institutional context, from the restructuring of British industry and its workforce, the development of a degree of cultural antipathy to perceived over-regulation, and the promotion of approaches to workplace safety based on risk rather than on hazard?*

Although this may look rather different from the original formulation in 2008–09, it is essentially a restatement of the core concerns in ways that reflect the engagement of researchers introducing the language of contemporary social science work on the same issues. The determinants of effective interventions are now examined through the prism of the ‘social licence to operate’, with its emphasis on the legitimacy and acceptability of OSH-related actions as a precondition for effectiveness. Organisations, at any scale, and individuals will only engage positively with the OSH agenda to the extent that it is seen to be right, reasonable and proper.

Within this macro-level framework, other projects in the programme examine specific challenges to intervene, drawing on an emerging research literature about knowledge within organisations – how it is located, how it is accessed, how it is translated from experts to generalist users, how it informs practice, and so on. As such, it contributes to thinking about a future for OSH practice that does not depend upon a detailed knowledge of regulations so much as distinctive and recognised expertise in a valued field that can be applied in flexible and creative ways to achieve a desired goal of improving occupational safety and health.

While this has less to say about specific interventions than might originally have been expected, it sets out the conditions within which practitioners should be able to develop locally-appropriate actions, responding to particular challenges through their general knowledge and understanding rather than fitting the challenges to prior templates. These micro-level initiatives parallel those at the macro level in a concern for legitimacy and acceptability among those involved. Effectiveness and efficiency will contribute to this but do not fully account for it.

2. The social licence to operate

Regulation policy-making has traditionally assumed that firms develop their approaches towards issues like health and safety primarily to comply with legislation and avoid sanctions. The 'social licence to operate' perspective developed in the light of evidence that, in practice, contemporary firms may be required to go beyond their strict legal obligations, to meet societal expectations and avoid activities that societies (or influential elements within them) deem unacceptable.¹ If they do not take sufficient account of these wider concerns, they are likely to incur a variety of reputational and other costs that make it more difficult to do business. Another way of putting this is to say that firms' actions may lose legitimacy if they are not perceived to be 'desirable, proper or appropriate', even if they are legal.

The same is also true of regulators. A regulatory agency can only use its powers to the extent that it can mobilise the social, economic and cultural resources to act. Coercive enforcement actions, for example, are costly in economic terms. Both failures and successes may be judged negatively by a wider audience, depending on their perceived proportionality and consistency with other values. Either outcome may lead to a re-evaluation of the agency's legitimacy and changes in its legal powers or to the funds allocated to its work. Regulators and firms operate within the same complex social and institutional system, which shapes their possibilities for action, whether through law or through other means.

If we want to understand the determinants of the outcomes of OSH interventions, then, we need to understand the social and institutional systems within which they are located and how these shape the choices and actions that are available to particular individuals or organisations at particular times. This understanding necessarily has a historical dimension: social scientists sometimes talk about 'path dependence', the extent to which previous decisions constrain the options available in the here-and-now.

Two of the projects in the programme explored different aspects of the systems within which OSH is embedded. The University of Nottingham team focussed on the regulatory history and the engagement of contemporary stakeholders in the processes shaping public policy and actions in relation to health and safety. The Reading/Portsmouth team looked in greater detail at developments since the early 1960s and the changing legitimacy of OSH interventions. Their project was supplemented by further work from the Nottingham team, examining available evidence from public opinion surveys about OSH issues. In combination, these projects describe 'how we got here from there and what this means for where we can go next'.

OSH, as we often understand it today, is very much the product of a particular historical period. Prior to the industrial revolution, workplaces were generally small-scale and technologies relatively simple, with the exception of a few enterprises closely associated with the military, like naval dockyards and cannon foundries. From the late 18th century onwards, an increasing proportion of British workers came to be employed in manufacturing and industrial production. Their workplaces grew in size, while technologies became more complex and introduced new health hazards. In the second half of the 20th century, the structure of industry changed again: mass production moved to newly-industrialising countries and the United Kingdom came to be dominated by service work and light industries, often serving specialised markets from relatively small production units. These sectors were thought to be relatively low-hazard by comparison with traditional heavy industries like coalmining, steel-making or shipbuilding, although the Cranfield University project, discussed later, suggests that this assumption is less straightforward than it seems.

Nevertheless, as an object of public policy, OSH concerns originated in an era dominated by large-scale industrial production, with low levels of automation, and a workforce with limited education and resources, although capable of organising for collective action. Employers varied greatly in their engagement with OSH. Some were relatively supportive of regulation, either to avoid being undercut by less scrupulous rivals or because worker health and safety had implications for customer health and safety. Others regarded regulation as an unnecessary burden and an unjustified interference with freedom of contract.

Although the extension of health and safety legislation, enforced by inspection, is often told as a simple story of historical progress, there has always been a degree of tension between competing views of the role of the state, the liberty of workers and the rights of owners or employers. The balance has shifted from time to time, particularly where the absence or weakness of regulation has been blamed for high-profile accidents or injuries, but there was never a Golden Age when OSH was universally accepted in expansive terms.

Many of the current issues in OSH policy and practice can be traced to the struggle to adapt institutions and practices designed for a society dominated by one mode of production to a society dominated by another. This process began in the 1960s, when the Offices, Shops and Railway Premises Act 1963 extended the 19th century model of regulation to a wide range of service sector work. Although there had been some previous regulation of the retail sector, particularly in restricting opening hours and guaranteeing time off, the 1963 Act brought over one million workplaces into a system developed to deal with quite different types of employment. With the obvious exception of the nationalised rail industry, many of these were small and medium-sized businesses who had traditionally considered themselves to be low-hazard environments or where OSH issues were thought to be straightforward matters of self-protection by skilled and knowledgeable workers.

This major expansion of intervention accentuated the problems that were emerging with the traditional 19th century approach, based on 'hard law', specific prescriptions for behaviour inscribed in statute and backed by inspection and sanctions. Despite legislative consolidation in the Factories Act 1961, OSH practice was based on a patchwork of regulations and inspectorates that had grown up in an *ad hoc* fashion in response to particular problems in particular industries. It locked OSH into a specific structure of industry and production technologies with limited inspection resources committed to predictable and routine schedules of workplace visits. The lack of resources meant that enforcement powers were rarely used and the system was widely criticised for failing to challenge either employers or workers about unsafe practices – the Reading/Portsmouth project discusses the example of asbestos, for example, where unions seem to have concentrated on getting extra money for 'dirty work' rather than eliminating exposures that had been a cause of concern since the 1930s. Another example might have been the coke industry in the 1970s and its slow introduction of new respirator technologies.

In 1970, the then Labour Government set up a committee chaired by Lord Robens, a former trade unionist and Labour MP who was chair of the nationalised coal industry. This committee had a bipartisan and expert membership, reflecting the corporatist approaches adopted by all leading political actors in the 1960s. Within this model, which owed much to the successful example of post-war German economic reconstruction, industrial policy and practice would be based on a tripartite collaboration between state, unions and employers. Health and safety was seen to be an area within which this model could be progressed, on the basis of an assumed unity of interest. This contrasted with, for example, proposals for worker engagement with decisions about company finances, investment and strategy, which were resisted by both employers and unions as departures from their traditionally adversarial relationships. The assumed unity of interest meant that detailed regulation could be replaced by more flexible 'soft law' instruments such as codes of practice and voluntary standards developed through partnership working by stakeholders in particular industries. The potential advantages of this approach were greater speed and flexibility in responses to changes in industrial organisation and production technologies, and greater legitimacy from stakeholder 'buy-in' and the use of recognised expertise.

Primary legislation, in contrast, was inevitably slower, more ponderous and vulnerable to disruption by extraneous factors. A single, unified, inspectorate would facilitate these partnerships and adopt a more risk-based approach to enforcement, concentrating on those enterprises that were slow to accept that a positive approach to health and safety was a defining characteristic of good management. The inspectorate would also, to some extent, serve as a proxy for ensuring public as well as employee protection.

The Robens approach received strong bipartisan support – the Health and Safety at Work etc Act 1974 followed its recommendations very closely and was a minority Labour government measure that reintroduced a Conservative Bill that had fallen with the dissolution of Parliament and a General Election. However, as the Reading/Portsmouth report makes clear, its implementation ran into considerable resistance within the civil service and the inspectorates. The scale of organisational and cultural change required by the Robens model seems to have been under-estimated and opposition clearly persisted over a longer period than might have been expected: HSE leaders were still concerned about this well into the 1980s.

Moreover, implementation took place against a background of economic difficulties and a movement away from the corporatist thinking of the 1960s. The rapid decline of large-scale manufacturing industry was accompanied by a matching decline in trade union membership. This shifted the risk profile of British industry and the ability of both employers and workers to engage in the kind of soft law production that Robens had envisaged. The unified inspectorate acquired new duties in terms of public protection without corresponding mechanisms for public engagement, which left it out of step with wider demands for personalisation and participation in shaping public services. Its generalist approach also seemed to be insufficient for dealing with some particularly high-hazard sectors and specialised inspectorates were subsequently reinvented for offshore oil and gas installations, the nuclear industry and for the railways.

Both reports also underline the growing role of European legislation in this area. Of particular interest is the evidence of the way in which UK ministers of the late 1980s and early 1990s were willing to trade extended European competence in health and safety against opt-outs in other areas of policy-making. While, from a European perspective, a common approach to workplace health and safety is fundamental to creating a single market with uniform business overheads, this has clearly created legitimacy problems. The European dimension has not been embraced with any enthusiasm by key actors – and is regarded as an example of over-reach and lack of accountability by some. There are also important differences in the legal, enforcement and risk cultures, which have not been fully worked through.

Nevertheless, both reports also underline the degree of UK influence on EU developments, particularly in the last decade, where the European Commission itself has rowed back from a hard law regulatory agenda in favour of more flexible soft law instruments of co-ordination. Most of this is, however, relatively invisible to the wider public, as the Reading/Portsmouth focus groups found.

The survey data reviewed by the Nottingham team suggest a greater visibility for European legislation, although there is a mixed picture in that respondents tend to be positive about the

outcomes while being negative about the source. The team were able to identify 58 relevant surveys going back to the early 1990s. (Older material may exist in the archives of market research or opinion polling companies but informants in that business note that this is usually proprietary information and that a good deal has been lost in the course of restructuring within this sector since the 1960s.) More generally, UK respondents are very positive about their level of information about the risks associated with their job and broadly satisfied with their engagement with risk assessment and management. There is, though, some evidence that managers are less sensitive to new, or newly-acknowledged, risks in health and work-related stress. Respondents had a high degree of trust in the inspectorate, although the team note that this may be compromised by the prevalence of regulatory myths and by the shrinkage of the inspectorate's resources.

They also draw attention to the need to interpret these survey results with some care, given the evidence that respondents may answer questions without fully understanding their technical or legislative basis. It might also be added that there is always some risk of response bias in surveys of this kind, where it is clear what would constitute a socially acceptable answer to key questions. On the other hand, most of these surveys were carried out by reputable social research organisations with experience in question design and the results are consistent between independent samples.

The Nottingham team worked with their stakeholder groups to define the key elements of an optimal environment for future OSH practice, in its widest sense, resulting in the following list.

- Evidence-based, proportionate and strong regulations which are enforced
- Strong, adequately resourced, independent, transparent and competent regulators
- The need to elicit a wider range of stakeholder views (e.g. sector associations, trade associations, trade unions, professional associations, etc.) during consultation
- A responsive multi-level (i.e. preventive, proactive, consistent and flexible) policy approach which adapts to changes in the business landscape
- Competent, open leadership and empowerment and education of management, which facilitates a responsible strong top-down culture
- Integration of OSH into business thinking and active championing by business (i.e. OSH seen as enabler)
- Active involvement, engagement of workforce (not just consultation – behavioural and intellectual buy-in)
- Access to competent and verifiable OSH support (e.g. guidance, information and advice)
- More celebration of OSH successes and the promotion of positive messages to the public

- Flexible OSH communication plans which are tailored for different audiences (e.g. policy-makers, practitioners, the general public)

The Reading/Portsmouth team, however, lay out some of the barriers to this. In particular, they note the following:

- An over-reaction to regulatory myths and opinion as a basis of policy-making, without regard to the fundamentally positive public attitudes, which are more stable. When people are asked to envisage the deregulation of their own workplace, they are much less critical of OSH interventions.
- A failure to take advantage of the flexibility offered by the post-Robens approach to regulation. They note the continuing demand for rules, prescriptions and checklists by employers, especially at smaller scales, rather than the use of expertise and judgement. Some of this may be driven by insurers and by fear of litigation, although the 'compensation culture' seems to be as big a myth as 'elf n'safety'.
- A failure to advertise the achievements of UK negotiators in influencing European approaches to regulation by encouraging more flexible and stakeholder-led approaches.
- A failure to replace the traditional heavy industries with new 'leader firms', where well-resourced and expert safety departments can demonstrate the benefits of regulation and lead the development of soft law tools rooted in improved methods of working and risk management.
- A concern that the 'public good' nature of OSH may be undermined by increasing commercialisation, such as the HSE Fees for Intervention (FFI) regime and the expansion of OSH consultancy work.

3. Knowledge and action in organisations

If the OSH profession is to be fit for purpose within a very different system of industrial organisation and production technology, it will need to rethink its own modes of organisation and action. The various projects hint at a vision of OSH practice as something that is mainstreamed within workplaces rather than being seen as a bolt-on. OSH professionals would become problem-solvers, using their access to expertise in human and technical systems within development and production teams. This model presents them as facilitators rather than as shadow regulators, coming late to projects and simply reading regulations to line managers or other professionals. In this way, OSH practice would adapt to the speed and flexibility required for competitive innovation, while OSH professionals remained guardians of the outcomes in terms of minimising both hazards and risks to workers.

The second group of projects within the programme focussed on the challenges involved in this style of practice. The Institute of Occupational Medicine (IOM) examined the knowledge base for professional practice and its usability by practitioners. Loughborough University carried out two projects on OSH practice within networked systems of production, with a particular emphasis on the challenges presented by small and medium-sized enterprises. Cranfield University investigated the issues raised by the notion of safety leadership, what it would take to bring about actions oriented to OSH outcomes, particularly in supposedly low-hazard environments.

OSH knowledge and its translation into practice

One dimension of many regulatory myths is an implicit or explicit allegation that OSH interventions are contrary to common sense and lack any real evidence base that might justify them. This led to unreasonable, unrealistic and heavy-handed actions that were disproportionate to any benefits that could be achieved. The first task identified in commissioning the programme, then, was to identify what knowledge was relevant to the changing practice environment and the hazards that it presented. Was there a real evidence base for practice? From this, attention moved to investigating how accessible this evidence base might be. Could users, both OSH professionals and managers with OSH roles, really develop their practice on the most valid and current information or was this locked away? Did they have to depend on outdated knowledge from earlier training courses, *ad hoc* experiences or professional gossip? How smoothly did knowledge move from research into practice?

The IOM research identified over 300 online sources of OSH knowledge in the UK alone. The information providers had relatively little idea about how their material was actually

being used, other than counting accesses, in general or to particular topics. The 'professional' model might imply direct engagement with basic research on topics relevant to OSH practice.

However, the range of expertise required by OSH professionals, unless they were employed in very specialised roles, meant that their capacity to benefit from basic research was quite limited. Although this was often behind paywalls in scientific journals, the time costs in searching for the information, evaluating it and translating it into contextually-relevant advice or actions, were prohibitive. The solution was to rely on intermediaries who scanned the primary research and rendered it into packages that could form a basis for action with clients. A small number of these, notably HSE and IOSH, were highly trusted but much of the focus was on the perceived practicality of the content. This is in some tension with the observations from the Reading/Portsmouth project about the disadvantages of rule-oriented approaches. It seems that it is not just enterprise managers who are looking for simple prescriptions rather than flexibility, but also their OSH advisers, partly as a practical solution to the range of things that they might be expected to know about.

The IOM team adopted a diffusion of innovations approach, based on the work of Rogers (1983) to explore the movement of knowledge into the organisations that OSH professionals worked in or with.² There is a substantial research literature within this field but it has had little previous application to OSH, with the exception of work supported by the Canadian Institutes of Health Research on Knowledge Networks. The diffusion of innovations approach recognises the differences in orientation between researchers and practitioners. While researchers are directed towards discovery, adopt a neutral stance towards possible actions and deal with a limited number of variables, practitioners are trying to solve immediate problems on the basis of tacit knowledge and experience within the context of a complex system with multiple variables.

There are several ways to bridge these divergent approaches. One is to involve practitioners more closely alongside researchers in the knowledge development process, which the IOM attempted in their own work. Another focusses on the role of knowledge brokers, people occupying roles that can face in both directions and adapt research-based knowledge in ways that make it useful for practitioners. Some of this function is performed by the intermediary bodies discussed above, but the IOM team also highlight the role of specialists within larger companies, who develop extensive personal networks that enable them to assemble expert knowledge as and when required. This is, in effect, a form of distributed cognition, where successful performance of a task depends on pooling the knowledge and skills of many individuals rather than resting with a single person.

The problem that the IOM team identify is that this system only works well for people in larger companies, or who have previously had extensive experience with such companies and can preserve their relationships after they have left. With a few exceptions, smaller companies do not have the resources to sustain specialist expertise or undertake extensive searches for knowledge, let alone assess its value when located. If they have an external OSH consultant, that person may also be relatively isolated and have an intermittent or one-off relationship with the company rather than being a long-term partner who is regularly contributing to the development and strategic thinking within the business. The main exception is in companies closely related to the health sector, where most professionals are taught the skills of finding and assessing relevant evidence. The picture is much patchier with respect to other sectors or OSH professionals from other backgrounds.

Another way of looking at this in the knowledge management literature is by considering what is known as the absorptive capacity of the company, namely its ability to take new knowledge on board and make use of it. Research has established that companies need a certain prior level of engagement and in-house expertise to be able effectively to incorporate new thinking. Again, this points to the advantages that may accrue to larger businesses with specialist personnel and an active commitment to high OSH standards. Even where smaller firms are willing to make a similar commitment, they may struggle to integrate new developments into their existing processes because of a lack of in-house expertise. This is also potentially an issue for their advisers, given that OSH professionals tend to come from a diverse variety of backgrounds – a construction engineer is not necessarily also an expert on organic chemicals or human factors.

In some respects, the IOM study itself provided an example of this problem. Despite extensive efforts to engage smaller businesses, or their representative organisations, in the creation of knowledge about knowledge management, the IOM team struggled to achieve any useful level of participation. They were not alone in this – the Loughborough University team had similar problems. However, this experience does point to an important policy issue. SME representatives frequently complain in rather general terms about the burdensome nature of OSH regulation. Nevertheless, these projects had great difficulty in achieving sufficient co-operation to investigate and document these complaints in order to understand what reforms might be helpful to achieve good OSH outcomes in less onerous ways. Larger organisations saw legitimacy value in participating and had staffing resources that made it possible for them to do so. This issue will be considered further in discussing the Loughborough projects.

Managing OSH in the new industrial structures

The IOM project flowed neatly into the two projects carried out by Loughborough University: indeed the fit was close enough for joint publications and future work to be planned. The

Loughborough projects focussed on the management of OSH issues in two contexts that had come to the fore with the decline of the traditional, high-hazard industries historically associated with OSH regulation. Neither of these had received much previous attention from researchers, so the projects required a great deal of theoretical and methodological innovation. Both were based mainly on qualitative methods, including interviews, participant observation and visual ethnography, which are particularly suited to exploratory work on new areas of inquiry.

The first project examined networked organisations. These replace traditional forms of vertical integration and line management by assemblages of workers collaborating on a service or production process but employed by independent companies. This may involve working across different sites and even countries, as in the supply chain for many supermarket products or fashion items, or workers may be brought together on a single site. Their collaboration rests on a basis of contractual or quasi-contractual devices between companies of different sizes. It has been suggested that these relationships may provide an alternative to traditional forms of regulation and enforcement as the larger firms in the chain transfer knowledge and enforce quality standards to preserve their own social licence to operate. Upstream failures, including OSH, may compromise the reputation of downstream partners: the impact of labour conditions in clothing manufacturing plant in developing countries on consumer views of retailers in developed countries might be an example.

The second project investigated SMEs, which represent a growing sector of employment in the UK economy and which are thought to have particular difficulty in absorbing OSH requirements. In fact this turned out to be less straightforward than anticipated. There is no consistent, standard definition of an SME, and companies with 500 employees are very different from companies with five employees. The Loughborough team have undertaken some important and innovative work in trying to clarify the point at which an SME ceases to be a small version of a big company and becomes something qualitatively different, which might require adaptation of a generic OSH regime. Indeed, the work involved in this clarification has very wide potential significance for public policy in relation to SMEs beyond the specific implications for OSH.

The networked organisation project selected three sectors as case studies: construction, health care and logistics. These contrast on a number of dimensions, including durability, complexity and relationships with clients or users. The SME study eventually involved 179 businesses operating mainly in the same three sectors, but the sample was extended to include other firms, principally in mining, agriculture, retail and hospitality work.

Taken together, these studies underline the way in which more flexible organisational models are accompanied by more flexible approaches to OSH, which are not necessarily

well-supported by conventional OSH thinking. While the rule-oriented approach of large, vertically-integrated firms could be replicated in some contexts, notably construction and mining, this was much harder to operate in contexts where line management involved the co-ordination of workers from different companies or with a degree of autonomy from their personal experience or expertise. This approach could be sustained to some extent where there was a clear structure of lead and sub-contractors, which is common in construction, and the lead company could impose site rules on others.

For some small companies, this was a source of trickle-down knowledge about emerging hazards and ways to deal with them. Others were just irritated and chose not to work on such sites. However, in many contexts, management was diffused and workers were expected to take a good deal of personal responsibility for self-protection. This was not necessarily a matter of management indifference. In very small companies, the 'family' nature of the business culture might make owners reluctant to press long-term employees to work in different ways or to instruct them on how to deal with new hazards. In other contexts, management was at a distance: home delivery teams, for example, frequently had to work out safety issues for themselves as they confronted the configurations of particular properties and the demands or expectations of the residents.

These projects, particularly through their ethnographic components, drew attention to the high degree of successful improvisation that goes on in many workplaces as those performing the task carry out their own assessments of risk and devise strategies for dealing with this. Traditionally, this has been seen as a problem for OSH regimes, which rely on employees following instructions without deviation. This model does not work well in contexts where workers are better educated, more empowered and less directly supervised than would once have been the case. There are, of course, some particular high-hazard, high-risk environments where OSH expectations do require close attention to prescriptive, rules but there are relatively few of these – and even there it is desirable for workers to be able to identify when the rules are failing to deal with a specific challenge.

Both projects point to the importance of tacit learning, of workers' sensitivity to their own physical and other limits and to the intrinsic benefits of studying, and learning from, 'work-arounds' rather than trying to ban them. These bottom-up approaches may be better supported by developing a role for OSH specialists as educators and consultants to the whole workforce, whether this is in the direct training of workers in how to carry out risk assessments within their local sphere of practice or in helping line managers or work co-ordinators to provide such training. Both projects, however, also point to the problem of workers who are disconnected from these opportunities to learn and share experience, either because they are employed on an agency basis or because of barriers of language and culture – these categories often overlap, of course.

This is equally an issue for many micro or, as the team suggests, nano businesses, employing five or fewer workers, who can find themselves very much cut off from both formal and informal sources of OSH knowledge, unless they happen to be members of a trade association with active interests in OSH or can maintain network connections from previous employment. At this scale, there could also be a struggle to understand and absorb OSH risk information, which often seemed to be designed to be read by specialists working within larger organisations. However, this kind of simplification needs to be set against the problems of checklist approaches identified by other projects in the programme.

These findings balance the accepted model of knowledge flow used by the IOM project, in identifying the importance of capturing the knowledge that exists or is developed within the workplace, at whatever level. Part of the skill of OSH professionals is to mediate between these different kinds of expertise and to combine them in developing working practices that are both intrinsically safe and likely to be implemented by those involved. They also need to support line managers in the skills of facilitating good quality *in situ* dynamic risk assessments.

The projects also suggest that previous OSH thinking may not have given sufficient recognition to the moral dimension of many OSH roles. The study of SMEs, in particular, underlines the 'family' nature of relationships between employers and employees, or business partners, at this scale. Like all families, this can be both a strength and weakness: a sense of moral obligation may lead workers to take inappropriate risks as much as lead owners or managers to make additional investments in protection. However, this also seems to be an element of larger networks.

Key players want to avoid the reputational damage, and the implications for their social licence, that may arise from a record of apparent indifference to hazards and poor risk management. Being seen to act in a moral way may eventually become a driver for acting in a moral way. While there will always be rogue employers who will only be influenced by the risk of sanctions, it is arguable that the threat of shaming may be more important for many businesses, particularly at smaller scales. This would also be consistent with contemporary thinking in criminology on the potential of restitutive or restorative justice.³ That approach has found that certain types of crime and offender may be better managed by a combination of public shaming and opportunities to make amends through apologies and compensatory actions acceptable to victims. While offenders are still morally censured, they are simultaneously offered a route to rehabilitation and reintegration with the community.

The Loughborough work tends to suggest that many SMEs would like to do OSH well but are frustrated by their own lack of expertise, and the difficulty of obtaining this from consultants

in a way that is helpful to them. As a result, both they, and their consultants, find themselves working within simplistic frameworks of rules, which may impose substantial costs in compliance but seem ill-adapted to the business that is being regulated. The policy challenge is to build on the motivation to achieve a safe and health working environment while facilitating more creative ways to bring this about. This may involve focussing more on the desired outcome rather than on any specific route by which it may be achieved.

Understanding leadership

The issues about management and improvisation raised by the Loughborough work were also addressed by the Cranfield project. Although the term 'safety leadership' has come into widespread use within the OSH community, this did not seem to have been linked with the growing body of empirical and theoretical work on leadership that had been created by researchers studying organisations. The first task for the Cranfield team was, then, a systematic review of the published literature on safety leadership and comparison of this with the wider body of scholarship on leadership in general.

Safety leadership proved to be an ill-defined concept. In its origins, it formed part of a command-and-control model that was increasingly discredited as a basis for effective organisations. Although it had evolved somewhat subsequently, the concept retained an individualistic orientation, without much consideration of what it took to get people to follow the leader: leadership is an interaction within a system of social relationships, not a fixed attribute of a role.

In one direction, the result had been a bland assertion that everyone was a safety leader – which created the risk that no-one would lead and everyone would assume it was someone else's responsibility! In another, the identification of specific safety leaders or champions tended to turn safety into an activity for specialists rather than an integral part of the everyday life of the workplace, as the Loughborough project also underlined. This did not mean that there was no place for specialists as advisers or consultants with expert knowledge but it did question the assumption that safety as a goal could be managed separately from management towards other organisational goals.

Relatively little attention had been given to contemporary thinking about more plural or distributed forms of leadership, where this was seen as a more collective activity, shared within a team as particular problems or challenges arose. As the authors note, this is particularly relevant in the large number of relatively low-hazard environments presented by the economies of developed countries, where team working is common. Leadership is seen in a more dynamic way, responding flexibly and adaptively to hazards as they arise. Again, this echoes many of the findings from the Loughborough work. Leadership may be more a

matter of reflective practice in the moment than of generic rules and policies transmitted from head office without regard to local contingencies.

From this review, the Cranfield project then developed a series of empirical investigations to explore how, in practice, leadership worked in four organisations that might be considered to be low-hazard. In practice, they question whether this is such a simple classification. This is not their example, but a retail environment might be thought to be low-hazard until a heavy mirror falls onto a child's head and crushes his skull. As they do note, similar numbers of deaths occur annually on UK roads, or as a result of medical errors in UK hospitals, to the 9/11 terrorist attacks in the USA. However, roads, hospitals and offices would normally be placed in quite different categories of hazard. The data set eventually included 143 interviews with employees of two large retail chains, a global logistics company and a local hotel. Twenty-eight of the participants also kept an audio diary for two weeks to record moments in their working day when safety issues arose and to document how these were managed. Finally, employees in four stores operated by the retail chains were surveyed to explore the impact of social networks on leadership and knowledge flow.

The findings underlined the extent to which safety management in these environments was a very local issue, where relatively junior staff had the primary responsibility for identifying and managing hazards. Although company management could create a context through their standards and guidance notes, this was important mainly as a signal about the value attached to safety outcomes rather than being directly applicable in practice. Hazards were typically local and contingent, deriving from the vagaries of store design, location and clientele.

However, there was little accumulation of knowledge about hazards, management and prevention. As the audio diaries showed, problems were typically fixed on the spot and the workers moved on to the next task. Near-miss reporting significantly understated the incidence of hazards so that organisational learning was limited. As a result, similar incidents could recur and pass largely unnoticed.

However, it was clear that employees approached safety in a positive fashion. They were committed to their own protection, to the protection of co-workers and to the protection of customers. If anyone identified a hazard, they were likely to take some leadership action in managing it. What they were less good at was following through with action intended to anticipate and prevent the recurrence of the hazard in their own or other sites. The project also identified the risk that marginal workers would be less engaged in sharing knowledge about hazards.

The social network analysis, although on a limited scale, was useful in identifying workers, often part-time or temporary, who were not well-integrated with the rest of the workgroup and

who might not have access to the tacit knowledge that both the Loughborough and IOM projects have also shown to be important to safe working. Each of the stores where the method was used had an identifiable core of workers, supervisors and local managers who were densely linked, but it was also possible to identify other workers who might be described as semi-detached. This approach usefully complements the Loughborough findings on diversity and transience: it may seem self-evident that a construction site with a large number of workers who do not have English as a first language and are employed through agencies may have a problem with enrolling them in an effective safety regime. The Cranfield work shows that such issues may be equally salient in an apparently homogeneous workforce, where some members are less integrated than others for reasons that may not appear immediately obvious.

4. Conclusions and discussion

Each of the separate project reports presents its own set of conclusions. The objective here is to bring these conclusions together in a more general summary and synthesis around a number of core themes and to suggest points that the health and safety profession, may wish to take up in strategic discussions. Before doing so, it is perhaps worth underlining the programme's success in commissioning research teams using cutting-edge social science methods, such as visual ethnography, audio diaries, and social network analysis, and the best contemporary thinking on innovation, knowledge management and leadership.

Although this may not be independently verifiable until there is a full record of peer-reviewed scholarly publication over the next few years, the scientific quality of the work should not be in doubt. The programme has also been successful in mixing established health and safety researchers, particularly at the Institute of Occupational Medicine, Loughborough and Nottingham, with new participants, in the wider interdisciplinary collaboration at Loughborough and the groups at Cranfield and Reading/Portsmouth.

The conclusions have been grouped under three headings: about the profession's mission, about its expertise and about the enactment of that expertise.

Clarity of mission

IOSH positions itself as an international leader in the accreditation of health and safety professionals and as an advocate for continuing improvements in societal responses to health and safety issues. This might include innovations in the management of well-recognised challenges or the development of solutions to the problems posed by new and emerging technologies. However, the projects, particularly those from Nottingham and Reading/Portsmouth, identified a number of ways in which this mission might not be adequately articulated.

1. As an initial reviewer commented, it is not clear where health features in the conclusions from the project reports, summarised here. In part, this reflects the choice of case studies, which tended to under-represent organisations dealing with recognised chemical or biological hazards, or where mental health issues like workplace stress have been explicitly acknowledged. On the other hand, considering the organisations that were studied, we might ask, for example: when a logistics firm is concerned about musculoskeletal injuries to its employees, does this count as safety or health? The former might focus on the short-term impact, while the other looks to the long-term consequences of muscle or joint damage from inappropriate handling of heavy items.

While it might not be appropriate to think of a shift to talk in terms of worker 'well-being', there may be a place for the profession to become more positively engaged with the fitness of workers across a lifetime of employment as well as considering the immediate risks of their present work site, which always risks a more negative image.

2. The critical political, citizen and media response to “elf ‘n safety” seems to be much more concerned with what might be described as *public* rather than *workplace* issues. The Nottingham and Reading/Portsmouth work suggests that citizens are more supportive of interventions to promote safe working than of those in places where they feel able, or entitled, to make their own risk assessments. This is not to say that the citizens are correct but it does raise questions about the overlapping, but possibly distinct, missions of protecting the public and protecting employees.
3. A corollary of the previous point is that citizens seem to respond rather differently to “elf ‘n safety” as a general phenomenon than as something that would impinge on their own working conditions. This may suggest that the most effective response to attempts to reduce levels of protection would be to emphasise their personal implications. This is not about ‘workers in general going home safely’ but about ‘you going home safely’. More formally, this involves engaging with attitudes to health and safety interventions, which tend to be positive, than opinions, which tend to be more negative. This would be consistent with current psychological thinking about effective persuasion.
4. A notable feature of the Nottingham and Reading/Portsmouth reports is the apparently limited range of alliances established by health and safety organisations and the opportunities for a wider engagement with civil society, particularly in partnership with local branches. This contrasts, for example, with the great efforts made by the NHS and the health professions to develop public and patient involvement in their research, policy development and governance. Should the health and safety profession engage with a wider audience, for example, patient or disease advocacy groups or with SME networks?
5. Both the Nottingham and Reading/Portsmouth reports draw attention to the importance of the perceived disinterest of OSH experts. This is also touched on in the IOM and Loughborough reports. Clearly, OSH professionals face many challenges in relation to actual, potential and perceived conflicts of interest. Whether directly employed or acting as consultants, OSH professionals are pulled between the economic considerations of different kinds of enterprise, and possibly their own business interests, and their mission to protect the health and safety of workers at all levels. These are not simple oppositions: investments in safety may improve profitability by reducing interruptions to production, for example. At the same time, there seems to be some evidence of a

concern, particularly among SMEs, that the economic interests of OSH professionals may lead to 'gold plating' recommendations which impose costs that are disproportionate to the risks. (It may also be that SME owners under-estimate the economic and emotional costs of an accident to a small 'family' or 'family-like' organisation.) The reports do not suggest that this concern is widely shared – and it would not be unique to the OSH profession. However, it may be a business risk for OSH professionals in terms of their social licence to operate.

6. The Nottingham team supplemented some of their work with an explicit comparison to the context of OSH practice in the Netherlands. This was helpful in bringing out the extent to which some of the challenges facing the OSH profession are quite widely shared rather than being peculiar to the specific institutional and cultural environment in the UK. Improving, international engagement with the OSH community may help to enlarge debate on strategic and policy options. It is also different from outreach. It is, rather, using an understanding of the relationship between OSH and society under different conditions to reflect on what makes societies more or less responsive to OSH as an issue for public concern, and the direction that this takes. More technically, it is about understanding the OSH profession's social licence in different countries, the ways in which the lessons can or cannot be transferred, and, perhaps more ambitiously, the extent to which this licence can be reframed in transnational terms to constitute a global benchmark for challenging national institutions, cultures and practices. This is, in effect, what some NGOs have sought to do in industries like fashion and textiles, where they have attempted to set a global floor for production environments and their associated risks, like dust, fire or chemical exposures.

Expertise

Issues around the OSH profession's knowledge and its management were addressed primarily by the projects from the Institute of Occupational Medicine (IOM) and Loughborough University, although they also emerged in the work from Cranfield University.

1. The IOM report, in particular, draws attention to the very diverse knowledge base drawn upon by the OSH profession, and the wide range of sources that practitioners may use to inform their practice. To the extent that new scientific and engineering knowledge is taken up within the profession, this seems to come through various intermediaries or 'knowledge brokers' rather than directly from its creators. Other science-based professions, like pharmacy, have attempted to deal with this issue by encouraging closer partnerships between local branches and university departments, although this may be less easy to achieve for a field like OSH, where the knowledge base does not map neatly onto individual disciplines.

This raises important questions about whether the best and most up-to-date knowledge is getting to the right people or whether this process depends on more contingent factors that do not contribute to the authority with which practitioners can speak. Is their knowledge base unduly dependent on a basic degree or professional training from decades earlier? Is it vulnerable to the adoption of faddish thinking which has not been robustly tested?

The problem is partially resolved by the particular position of highly-trusted sources, like the HSE and IOSH. However, it is not clear how far this trust rests on their historical reputation, their perceived independence of vested interests, or their transparency in a process of scanning for new knowledge or emerging issues and responding to this input through a quality assured process.

Institutions of this kind also tend to be reluctant to engage in knowledge contests, which may leave the field open for more self-interested providers to supply knowledge that is slanted to their advantage. An example – not taken from the programme reports – might be some of the innovations inspired by popular versions of neuroscience, which have little credibility among established scientists working in the field.^{4,5} If the OSH profession cannot point to a clear scientific basis for its recommendations, whether to particular workplaces or to society more generally, its credibility will always be open to question, whether in the form of informed scepticism or cultural ridicule.

2. The Loughborough projects draw attention to the need for a more dynamic and interactive approach to the application of OSH knowledge. While this needs to have a strong scientific basis, its application requires a partnership with the workers who will implement it. The Loughborough research points out that these workers also have a knowledge of their own which is a potential resource rather than an obstacle to good practice. Worker-led solutions to OSH hazards may be better suited to dynamic work environments.

'Work-arounds' should not necessarily be dismissed but understood as practical attempts to solve problems from which specialists can learn. They are not necessarily correct solutions in a technical or scientific sense, but they can help towards a better definition of the problems and be built on for improvement rather than sanctioned. The specialist role for the OSH professional may sometimes be to train workers to be skilled improvisers or to consult them on how best to use knowledge in practice rather than to write specific operational rules. Dynamic OSH practice can use formal and informal knowledge in flexible and sometimes improvised combinations to achieve safe outcomes.

The Cranfield work underlines the disconnection between wider thinking about leadership in organisations and the specific, and rather confused, literature on 'safety leadership'. It has been difficult to locate information about the precise wording in drafts of the forthcoming ISO 45001 but there may be issues about how far this standard will be consistent with contemporary thinking about leadership. Will the standard actually institutionalise command-and-control versions that are less effective than the distributed models that the Cranfield study has documented?

Cranfield's work also echoes the Loughborough findings about the embeddedness of OSH problem-solving in the everyday work of many organisations. Although it may be important to have advocacy for OSH as a dimension of organisational performance at a senior level, the operational achievement of OSH outcomes rests mainly on the local decisions of workers and supervisors. OSH practice needs to think about how to engage with these and to encourage *in situ* leadership to identify problems, remedy them and, in particular, institutionalise the learning. The study puts a great deal of emphasis on how problem-solving is often *ad hoc* and the knowledge gained is not retained and accumulated. At the same time, it should be remembered that the study was asked to focus on low-hazard workplaces and that high-hazard sites may need more formalised processes.

What both Loughborough and Cranfield studies underline is that the formal, rule-oriented approaches that may have been important for traditional extractive and heavy industries are not a good fit for many contemporary workplaces. Even in high-hazard environments, there are serious questions about whether rule-following and an emphasis on process may compromise OSH outcomes if workers are not able to raise concerns at points where the process seems to be failing. No protocol can cope with all possible circumstances of its enactment.

3. All of these reports, in different ways, raise questions about the skillset of the OSH profession. The IOM note the limited use of knowledge traditionally provided by the social sciences on the skills of working in organisations, communicating information, and engaging or persuading others in some collaborative action. The Cranfield and Loughborough studies point to the relevance of such skills in modern work environments, where OSH professionals cannot rely on the authority of rules or status but need to work in problem-solving teams, to communicate their distinctive expertise, and to engage colleagues throughout a workplace in the aspiration to achieve positive outcomes for health and safety, both short and long term.

Dissemination

One reader of an earlier draft suggested that the picture of contemporary organisations presented by the reports tended to marginalise OSH practitioners. However, that reader also saw that the reports offered tools for practitioners to develop the ways in which they were perceived and used by organisations. Arguably, the future OSH professional will be more of a consultant or coach to workgroups or project teams, assisting proactively with problem solving rather than simply mapping processes against rules. Dynamic work environments may require a greater emphasis on health and safety as outcomes than on specific means of achieving them.

In some circumstances, there may be a clear argument for rules – governing flying hours for pilots, for example – but, in many cases, the challenge is to design health and safety into workflows from the start rather than to think about fixing them at the end. This moves the role upstream, to preventing casualties, rather than downstream, patching up after adverse events have happened. This may also require a more differentiated profession that explicitly acknowledges some distribution of expert knowledge among its members. The future role of an OSH professional may involve both the application of their own expertise and recognition of when complementary expertise is required. An OSH professional on a team may serve as both a team expert and as a knowledge broker, knowing who to call when a particular type of problem emerges. This would be a familiar model in many other professions but has not been explicitly developed within the OSH profession.

1. The Reading/Portsmouth and Loughborough work, in particular, note the vacancy that has developed in the OSH landscape as a result of changing industrial structures. The large-scale heavy industrial companies that could sustain proportionately large OSH departments have largely disappeared, although their legacy remains potent. These 'leader industries' had the resources to develop models of OSH practice that were highly influential on policy, education and legislation. They were often dealing with high-hazard environments – mines, steelworks, railways – and, historically, their organisational models owed a great deal to traditional military thinking on organisation.^{6,7} Military doctrine has moved on.⁸ To the extent that these leader industries survive at all, they have often adopted replaced vertical forms of organisation with more dispersed and networked structures – UK railways are the classic example – where resources and expertise are distributed throughout the network without the advantages of scale that were previously available.

The reports ask where new leader industries are to be found. The models that they are identifying are large, and highly visible, infrastructure projects. Lead contractors may be under reputational pressure to minimise health and safety risks, as a dimension of their social licence to carry out such works. This has created incentives to develop thinking

on safety, to invest in research or, at least, knowledge acquisition, and to engage sub-contractors, as network members, in pursuit of the same goals. The sub-contractors benefit from the knowledge transfer and can take this to other workplaces, which may not operate on the same scale.

There are parallels here in other industries, like retail, hospitality or logistics, particularly where franchising models are used. However, these networks do not reach everywhere, and some sub-contractors refuse to engage with them precisely because they resist what they see as the lead contractor's over-reach into matters that are not their concern. The result, as the IOM and Loughborough projects bring out, is that a large number of smaller businesses are essentially disconnected from communities of practice that might strengthen their OSH capacity. The same may be true of their professional OSH advisers: some formerly worked for leader companies and retain informal connections that can be used for advice and updating, but many others do not have access to comparable social networks.

2. Both the Loughborough and the Cranfield projects note that one corollary of a dynamic work environment may be a more transient and ethnically, culturally and linguistically diverse workforce. These workers are often disconnected from the informal knowledge that promotes safe working among core employees and do not have the same opportunity to build knowledge through practice. They present a greater risk not only to themselves but also to core employees (and the wider public) unless these structural barriers to knowledge flow are explicitly addressed. This risk is not necessarily managed by formal inductions.

These marginalised workers may also be unable to exert leadership when risks arise because of their inability to invoke social network ties in order to generate appropriate action. OSH professionals face a challenge in terms of supporting local supervisors and managers in engaging with these workers, whose motivations may be more instrumental and less committed to the promotion of positive health and safety outcomes as intrinsically worthwhile. The transient nature of this part of a firm's workforce may negate both management authority and peer pressure as incentives for good practice.

3. Both Loughborough and Cranfield point to the extent to which effective safety management is likely to be best achieved by scenario-based training rather than rule-based training. This approach encourages workers to focus on outcomes rather than on procedures, so that their capacity to analyse risks and improvise solutions is developed rather than simply following rules even when these are not relevant or are leading to an unsafe outcome. Managers should minimise attempts to control things that do not need

to be controlled. At the same time, workers must expect to be accountable for their OSH decisions. Accountability, however, should be an opportunity for learning to make better assessments in the future rather than the basis of sanctions, unless it is evident that an action has not been based on proper reflection.

IOSH's investment in the research programme *Health and safety in a changing world* has delivered a rich resource for strategic thinking and discussion within the OSH profession. In particular, it offers a deep analysis of the changing institutional contexts of work and employment, the evolution of management thinking and practices, and the emerging place of OSH within this. This analysis should prompt wide reflections on the fitness for purpose of established approaches to education, training and professional development, on the relationship between OSH professionals, managers and workers, and on the means of renewing the profession's social licence to operate.

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