

BRIDGING THE HSE RISK MANAGEMENT COMPETENCE GAP

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ABSTRACT

The demands on health, safety and environment (HSE) risk management professionals have never been so high. Regulators are requiring more formal demonstration that HSE risks are being properly controlled. Companies are operating in progressively more harsh and hazardous environments in the pursuit of future resources. There is frequent improving of industry HSE standards to meet the expectations of the many stakeholders.

Yet HSE risk management is relatively new compared to other professions and there is no 'fast track' way of bringing new professionals into the industry, unlike mature professions such as civil engineering and accountancy. Therefore those organisations that develop programmes delivering competent HSE risk management professionals are more likely to benefit from better risk-informed decisions than those organisations that simply recruit new personnel and expect them to provide good advice.

This paper suggests an approach to HSE risk management learning which delivers a competent professional by combining the positive aspects of:

- training, with practical experience of applying risk management techniques in the real-world;
- formal assessment of competence and qualification; and
- understanding of industry-specific issues.

INTRODUCTION

In her recent speech^[1] to the International Institute of Risk and Safety Management (IIRSM) in London, the Chair of the UK Health and Safety Executive, Judith Hackitt CBE, acknowledged the role that Health, Safety and Environment (HSE) risk professionals play and talked about the need to ensure that everyone is competent to play their part in assessing and managing risk.

In an ideal world, employers would have access to competent, sensible advice from internal and/or external professional advisors so that risks are properly managed and unproductive measures and paperwork are not pursued.

In practice the reality is sometimes that an organisation's HSE risk manager may be 'drowning' in a sea of procedures and changing legislative demands, overloaded by responsibilities to provide HSE training and monitor HSE in the workplace, or overwhelmed by technical calculations and large, formal, impenetrable reports delivered by 'experts'.

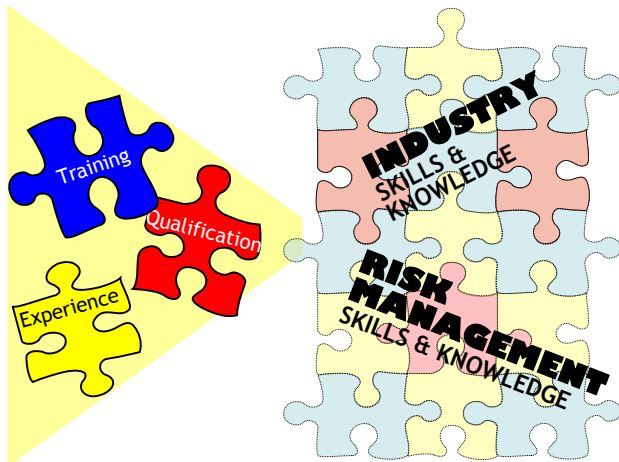
By providing a fully resourced, competent HSE risk management workforce, industry can hopefully avoid this. If individuals are confident of their judgement, they are in a position to apply their knowledge and skills effectively. Good decisions will be made and the organisation will benefit from an improved HSE performance, increased efficiency and enhanced confidence of all stakeholders.

This sentiment was echoed at a recent meeting of the UK's Institute of Risk Management^[2], which concluded that *"whilst there is plenty of guidance and well developed tools and techniques for implementing good practice risk management systems, ultimately decisions are made by people. Consequently there is increasing interest in how we determine whether or not those individuals are competent to make those decisions. In particular we need to distinguish between being 'competent' and being 'qualified'. Demonstrating competence should be more than just pointing to a certificate on the wall"*.

WHAT IS THE COMPETENCE GAP?

A fully competent individual has gained knowledge and skills through a combination of training, qualification and experience. In the field of HSE risk management, the knowledge and skills of an individual need to cover the industry of application, as well as the theory and application of technical risk management techniques (Figure 1).

Figure 1: Components of Risk Management Competence



An HSE risk management professional may be proficient at applying risk management tools, but, through a lack of training or experience, may not have a good understanding of the industry within which he or she works.

Alternatively, an individual may have many years' experience of working in the offshore oil and gas production industry for example, but, through a lack of training, may not understand fully a particular risk management concept.

Another example may be where an individual has a background in engineering design but has now moved into an operations role; they may be proficient at managing HSE risk through introducing hardware design changes but may not be confident or competent at reducing risk at a live operating facility involving procedures and personnel.

In all these cases, the competence gap arises when there is a mismatch between an individual's knowledge and skills and the judgements they are required to make as part of their role.

HSE risk management roles span a broad spectrum (Figure 2), from overseeing HSE management in the workplace and controlling the exposure of individual workers, to building HSE risk management into the design of a plant or piece of equipment, to making informed, risk-based decisions about company strategy and management of multi-million dollar projects with the potential for far-reaching impacts and societal effects. Risk management professionals can be called upon to make an enormous variety of judgements.

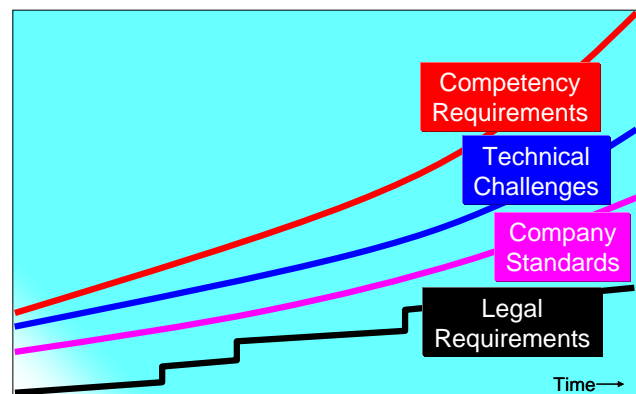
Figure 2: Spectrum of Risk Management Roles



INDUSTRY DEMANDS

The nature of the oil, gas and petrochemical industry is also leading to increasing pressure being placed on individuals to make the right decision at the right time. A combination of increasingly complex legal requirements (which generally arise as a consequence of catastrophic accidents), frequent 'raising of the bar' in company standards, and operating in progressively more harsh and hazardous environments in the pursuit of future resources, means that demands on decision makers and risk managers have never been so high (Figure 3).

Figure 3: Increasing Requirement for Competent Decisions



Ensuring compliance with prescriptive HSE legislation is generally accepted as the minimum standard to achieve. Indeed many regulators worldwide have moved beyond this to a 'goal-setting' regime rather than a prescriptive 'tick the box' regime, and require operators to formally demonstrate control of all hazards via effective management systems and documented formal assessments.

Furthermore, many countries do not have a well-developed regulatory regime and therefore multinational oil companies set their own high standards which they must meet wherever they operate around the world. Meeting these standards is far from easy – it needs to take into account the views and concerns of those stakeholders affected, and tends to require the documented consideration of improvement options, both implemented and discarded.

As an example of one of the many technical challenges facing the industry, exploiting oil and gas fields with high levels of contaminants such as hydrogen sulphide ('sour gas') is essential to meet the demand of the world's growing energy needs. Indeed, some of the world's largest new projects are developing sour gas reservoirs, such as those in the north east corner of the Caspian Sea and in the deserts of Oman. Hydrogen sulphide poses a formidable challenge – not only are the effects of an inadvertent release far more harmful than conventional gas, hydrogen sulphide itself makes a leak far more likely due to its corrosive effects on pipework and valves. The industry is tackling these issues head-on to ensure that all risks are reduced and controlled to acceptable levels. Ultimate success depends on competent HSE risk management.

BRIDGING THE GAP WITH TRAINING

There is a wealth of industry-specific HSE risk management training available to fill the gaps in an individual's knowledge.

Technical Training

Training in how to apply risk management techniques is essential. Technical training courses can teach specific risk management procedures, models and methods, and include copyrighted training courses, where companies have developed or adopted a particular version of a risk management tool and provide training under license to promote the technique.

However, problems may arise where the taught techniques are not appropriate to the individual's role or workplace. For example, a provider may be brought in by head office to deliver exactly the same training in a given technique across all operating sites of a multinational organisation, irrespective of the differences between the operating sites and any location-specific issues.

Such off-the-shelf training may not fit the reality in the field:

- The practitioners may find themselves faced with a risk management reporting tool which requires them to complete non-applicable but mandatory fields in a computer-based form before they can file their HSE statistics returns.
- A job safety assessment procedure or permit form may be overly complex and there may be only one trained, authorised signatory on site at any one time, so the system falls into disuse or misuse and becomes a 'tick the box' exercise rather than an exercise in true HSE risk management.
- A risk matrix may be structured such that thresholds for more detailed, formal assessments or independent incident investigations are pitched at too low a level. As a result it may require so many assessments or investigations in any one year that HSE risk management professionals become increasingly tied-up in trying to meet the demands placed on them by the poorly thought out procedures.

In other cases, training may be delivered but not followed through with assessment and checking of competence, so the trainees may go on to mis-apply the technique, as a result of misunderstanding or a lack of complete knowledge of the subtleties and potential pitfalls. This is particularly likely where training budgets are tight, time allowed for delivering and attending training is limited and training is provided in a one-off 'hit' without any follow-up.

Competent individuals need to be able to understand and apply risk management techniques, but also need to be able to accurately and confidently interpret the results. 'Spoon feeding' of information on a short training course, trying to cram in as much as possible without the requirement to critically analyse and research information, is an inefficient use of the training budget because it may not deliver competent personnel.

Training in technical risk management methods can also sometimes promote the method concerned as the 'new wonder drug', a solution to all the organisation's HSE risk management problems. Old, tried and tested processes may be abandoned in favour of the new system.

It is certainly not always the case that complicated and quantitative processes are better. As technical individuals in a technical industry, we all recognise that we can have a tendency to dive straight into defining detailed solutions before we have fully assessed the nature and significance of the problem. Quantitative risk management techniques can exacerbate this by drawing the individual into focusing on the detail and numbers and encouraging a 'turning the handle' approach. The danger is that intensive, widespread training in such a technique potentially blinds the trainees to the big picture and an obvious, practical solution.

Furthermore, techniques involving lots of numbers can appear to be objective when in fact there are many judgements throughout the analysis. Blindly believing in a calculated absolute value of risk is a far too common occurrence in industry. People take comfort in numbers, but quantitative models are not a substitute for good judgement.

A competent risk management professional will know when it is appropriate to draw on their own judgement and apply a common sense and proportionate approach^[1], and recognise when further, more detailed analysis is required.

Academic Training

At the other end of the spectrum, there are broader courses covering entire risk management concepts and detailed theory rather than just a single technique or tool. These training courses are generally longer-term, spanning a number of months or even years and usually involve a formal post-graduate qualification such as a Diploma or MSc.

While such training can deliver a solid grounding in the underlying theories and concepts, they can sometimes be overly classroom based, with a tendency to focus on abstract or theoretical examples. They may be far removed from the industry-specific day-to-day realities of the individual's risk management function, which can be anywhere on a broad spectrum of risk management activities (Figure 2), and can sometimes be less concerned with application in the real world. There may also be an understandable tendency for academic institutions to focus on new, emerging concepts and techniques rather than current good practice in industry.

Some academic institutions providing risk management qualifications team with relevant industrial organisations in an attempt to overcome this problem. However such collaborations tend to involve the industry funding academic research in return for access to the research results and academics' knowledge, rather than provision of teaching to industry employees.

BRIDGING THE GAP – TAILORING THE TRAINING TO FIT

Most companies have their own standards, which although they might be rooted in international, national and industry standards, are bespoke to their culture, organisation, equipment and operations. So 'one size fits all' training is not always appropriate.

Instead, effective training must address real risks which are relevant to the organisation and the individual, rather than focusing on trivial or irrelevant theoretical examples, and should make use, wherever possible, of actual company procedures and standards.

The balance between lecturing and practical exercises is also important. Not only do exercises introduce variety, make the training more stimulating and more likely to be retained by the student, they also illustrate how HSE risk management techniques are applied in practice, as well as common pitfalls. In order to adequately bridge the competence gap, training must therefore provide sufficient practical, hands-on experience of HSE risk management techniques. Ideally the exercises should be based around real-life examples from the trainees' work place.

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BRIDGING THE GAP – IS QUALIFICATION NECESSARY?

If training is teamed with assessment of performance and gaining a qualification, employers are assured that their staff will actively participate in the training course and gain measurable skills from attending the training. Individuals receive a recognised qualification which demonstrates and contributes towards professional development.

Usually, particularly for short courses in specific techniques, training is provided without rigorous assessment to test understanding and skill. Participants may, at most, receive a certificate of attendance.

In terms of higher level qualifications, there are very few institutions offering first degrees (e.g. BSc, BEng) in HSE risk management and this is why, traditionally, many HSE risk management professionals have developed their skills through experience and on-the-job practice. Furthermore, as discussed above, where formal qualifications are provided for academic courses and higher degrees, they can test theory but may be far removed from practical realities and not relevant to the individual's day-to-day HSE risk management decisions. Qualification can test understanding and competence, but it is of most use when based on real-life examples.

Some individuals may possess an internationally recognised risk management qualification, but, depending on the nature of the training provided and learning undertaken to gain that qualification, and the situations they face and decisions they must make as part of their role, their competence may still be lacking. It is important that the qualification demonstrates real competence in practice and is not just a measure of how well the individual was able to recall the information delivered to him or her during the training course^[1].

BRIDGING THE GAP – UNDERSTANDING INDUSTRY- SPECIFIC TECHNICAL ISSUES

Proficiency in risk management techniques and a thorough understanding of concepts stands the HSE risk management professional in good stead, but must be complemented by at least a working knowledge of the technical issues facing the specific industry. Without this knowledge, hazards may be overlooked, preventive and mitigatory measures may be missed or defeated, and risks may not be controlled to as low as reasonably practicable levels.

In the UK, the government is attempting to bridge this gap by establishing the National Skills Academy (NSA) Network^[3]. NSAs are employer-led centres of training excellence, whose mission is to create a world-class workforce by delivering the skills that employers need in each sector of the economy. NSAs range from purpose-built training centres to online courses tailored to the needs of each sector.

Crucially, NSAs are led by employers who work with government and training providers to shape the training and qualifications required to compete in the global market place. This is the first time that business leaders have taken control of the design and delivery of learning in their industry. Over time the government intends to have an NSA in every major sector of the economy.

Lord Young, Parliamentary Under Secretary of State for Business, Innovation and Skills, summed up the government's strategy: *"In the current economic climate, when businesses are struggling, it is especially important for employers to invest in skills and training. The National Skills Academy network is led by employers and enables them to focus on developing the key skills needed in each industry to help drive it forward."*

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CASE STUDY

So how can the positive aspects of training, qualification and understanding of industry-specific technical issues be integrated into a structured training programme that meets the business needs of an organisation?

As an example, Risktec was recently approached by a government regulator for nuclear power site licensing to help develop a bespoke training programme for recruits who, while experienced in their own respective industries, were not sufficiently skilled in nuclear safety regulation. Competence of these personnel is essential for maintaining the confidence of the public and nuclear site operators, and for interacting effectively with international associations.

The project comprises three phases (Figure 4); at the time of writing only Phase 1 is complete. The feasibility study explored the options available for building the customised training programme. The pilot programme will deliver the training to the first tranche of students and is expected to be followed by subsequent deliveries to further students.

Figure 4: Case Study



The feasibility study reviewed the regulator's documentation, the International Atomic Energy Authority (IAEA) competency framework^[4], the background of the proposed students and information about how more established nuclear regulators operate in other countries. This information generated a gap analysis for each of the proposed students and enabled the training requirements to be identified.

The proposed bespoke training programme consists of three components (Figure 5):

1. A modular training programme providing a solid grounding in HSE risk management principles and techniques, with a good mix of lectures and practical hands-on exercises using real-world case studies relevant to the nuclear regulatory role, combined with a formal assessment of competence and a Masters level qualification. *[Details of Risktec's structured programme of accredited risk and safety management modules are provided at the end of this paper].*
2. Training courses to provide a foundation in the principles, technical issues, legal requirements and regulatory aspects of the nuclear industry; and
3. Work experience at nuclear power sites to provide an opportunity to put the training into practice, shadow experienced professionals in similar roles and interact with a range of industry personnel.

Figure 5: Building Blocks of Bespoke Training Programme



It is intended that the students gain a formal, recognised HSE risk management qualification, relevant knowledge of nuclear technology and regulatory topics, contact with industry practitioners and site experience.

KEY BENEFITS

There are many benefits to both the student and the client company from a structured training programme that combines the positive aspects of training, qualification and understanding of industry-specific technical issues.

The key benefits to the student include:

- Receipt of a formal qualification from a recognised institution
- Demonstration of competence rather than just attendance at training
- Specific learning, where case studies are directly related to the place of work, which reduces the self-study burden
- Pathways through modules are tailored to individual needs

The key benefits for the client company include:

- More skilled resource with formal qualification, and greater staff retention
- Relevant learning, by embedding the company message in material and tailoring case studies and methods
- Up-to-date learning delivered by active risk practitioners
- Modular approach maximizes flexibility
- Effective use of training budget through structured training that meets business needs

CONCLUSIONS

HSE risk management is relatively new compared to other professions and has been shaped over the years by catastrophic accidents resulting in multiple fatalities, widespread environmental effects and extensive societal impact. As the industry matures, the aim should be to prevent future accidents by learning lessons from the past and employing competent HSE risk management individuals.

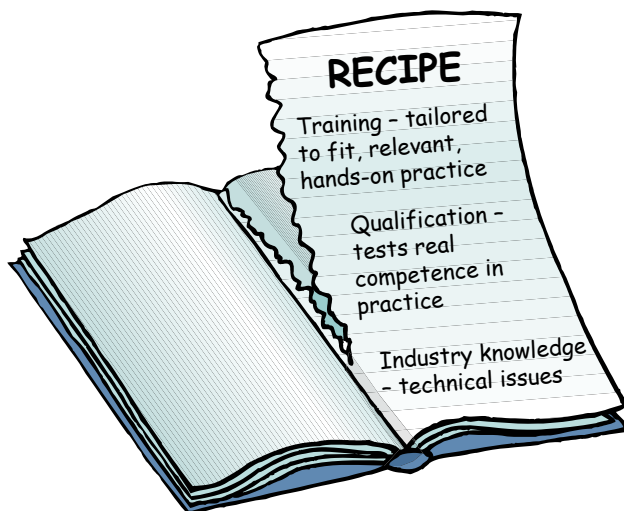
The role of these individuals is to confidently provide advice to help the organisation take the right decisions at the right time, keeping an open mind without being blinded by pre-conceptions; to apply appropriate risk management techniques and accurately interpret the results, and, above all, draw on their own judgement and apply common sense.

An appropriate approach to training is likely to contain:

- practical hands-on experience of risk management techniques;
- case studies which are relevant to the individual and based in the real-world;
- assessment of competence and not just testing of information recall; and
- understanding of industry- and technology-specific issues.

Such an approach can 'fast track' the process of delivering competent risk management individuals to the industry and thereby help to create a mature HSE risk management organisation (Figure 6).

Figure 6: Recipe for Bridging the Competence Gap



REFERENCES

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RISKTEC'S ACCREDITED TRAINING IN RISK AND SAFETY MANAGEMENT

Risktec provides a structured programme of accredited risk management modules leading to formal post-graduate qualifications. Courses are delivered directly to clients by practising consultants in the relevant industry. The courses were developed in partnership with Liverpool John Moores University (LJMU) in the UK.

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ACCREDITED TRAINING IN RISK AND SAFETY MANAGEMENT

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- Risk Reduction & ALARP
- Health, Safety & Environment (HSE) Mgmt Systems

Optional Modules Choose one

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- Risk Control Systems & Performance
- Safety/HSE Cases
- Competency Mgmt, Culture & Behaviour

Key features of programme:

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- Programme can be delivered at client's premises and timing is flexible
- Qualification can be supplemented with industry technology courses and practical site experience
- Modules can be delivered as PgCert, PgDip or MSc programme, stand-alone for CPD points or without assessment
- For MSc programme, Research Methods and 11 other modules must be completed prior to starting the Project



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- Human Factors in Design & Operations
- Oil and Gas Lifecycle Hazards & Risks
- Nuclear Lifecycle Hazards & Risks
- Rail Industry Hazards & Risks

Management Systems and Implementation

- Safety/HSE Cases
- Accident Investigation & Analysis
- Emergency Response Planning
- Workplace Safety

Assurance and Improvement

- Performance Monitoring, Auditing & Mgmt Review
- Competency Mgmt, Culture & Behaviour

Risk-Based Decision Making

- Risk Control Systems & Performance
- QRA for Oil & Gas & Process Industries
- Oil & Gas & Process Industry Risk Studies
- PSA in Nuclear Industries
- Rail Safety Analysis
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Other Training Courses

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- Company Security Officer
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