

Managing Competence for Safety-related Systems

To be published 2006

This guidance is issued by the Health and Safety Executive, the Institution of Electrical Engineers and the British Computer Society. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law where this is regulated by the Health and Safety Executive (HSE). HSE inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

Foreword

This guidance is applicable to the development and use of safety-related systems in all industry sectors. A safety-related system (as limited by the scope of this document) is a system whose correct operation is necessary for ensuring or maintaining safety. It uses electrical, electronic, and/or programmable electronic technologies and may include software and people. In general, safety-related systems can be classified as protective systems or continuous control systems.

The guidance is based on a number of high-level principles, with associated specific guidance on the practical realisation of those principles, encompassing information, explanation and examples. It is applicable to everyone whose decisions and work with safety-related systems can affect health and safety.

This draft for consultation is published through a partnership between the Health and Safety Executive, the Institution of Electrical Engineers and the British Computer Society.

We are now actively seeking your comments on this draft.

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To reach him no later than **28 February 2006**

When published, HSE inspectors will take into account the principles of this document when judging the adequacy of a duty holder's arrangements for competence management. This will take into account additional legislation and regulatory practice where applicable (see Legislative Background).

All companies should periodically review their arrangements and achievements in managing competence, and implement improvements as required. A review can start with any part of the competence management process. Well-managed companies will already be doing this, but this document provides a benchmark for such reviews.

Acknowledgements

The guidance provided in this draft for consultation is partially derived from a previous HSE publication for the railway industry, *Railway Safety Principles and Guidance Part 3 Section A: Developing and maintaining staff competence*. That document was produced by a working group of the Health and Safety Commission's Railway Industry Advisory Committee.

The publishers also thank Dr. Rodney May, of rodmayAssociates, for granting the right to base portions of the present guidance on extracts from the document '*Competency Management: Requirements, Guidance and Implementation*'.

Introduction

1 This guidance on competence is specific to the development and use of safety-related systems in all industry sectors. A safety-related system is a system whose correct operation is necessary for ensuring or maintaining safety. It uses electrical, electronic, and/or programmable electronic technologies and may include software and people. In general, safety-related systems can be classified as protective systems or continuous control systems. Examples range from a trip-switch which disconnects power from a press on close approach to moving parts, to the flight-control and engine management systems for a modern airplane.

2 Personnel concerned with managing competence include:

- those responsible for safety in an organisation,
- those responsible for setting up a new competence management system or evolving an existing competence management system (CMS),
- those responsible for operating an established CMS,
- those responsible for career development of staff in an organisation,
- staff in an organisation that are employed, or might be employed, on projects that require formal management of competence.

3 This guidance is aimed primarily at the first two groups of people - those who are responsible for managing and assuring the competence of individuals and teams that might have an impact on the functional safety of safety-related systems, during any phase of design, development, manufacturing, operation, maintenance or modification. It directly addresses as 'you' people with such responsibilities. Other readers will need to make allowance for this approach.

4 However, anyone with an interest in competence management will also find useful advice in this guidance. Directors and senior managers responsible for the overall policy of their organisation need to be aware of the general objectives and the benefits that may result from its use.

5 Staff who are working in an environment that requires formal assurance of competence, or who might in the future move into such an area, will gain insight into the reasons for the competence management processes, and an understanding of the expectations on them. [Appendix 2](#) provides additional guidance for the individual.

6 The guidance is relevant to organisations carrying out training, development and competence assessment; and will also be of interest to employee representatives, health and safety professionals, designers and other service providers.

7 While the focus of this guidance is the functional safety of safety-related systems, it is written with a view to broader application, and to be compatible with competence management systems with more general scope and with career development and professional development schemes.

Objectives

8 This guidance aims to:

- explain the main features of a competence management system (CMS), for all staff at all levels of responsibility within an organisation that work on safety-related systems, to enable the organisation to meet the UK legal requirements for competence for safety-related systems in general (i.e. without going into detail for any one particular industry sector);
- describe the purpose of each of these features and give guidance on how to set up and operate a CMS in a way that achieves these and is efficient, effective, minimises administrative overhead, and can be audited efficiently.

Background

9 For many years there has been a trend towards improved functional safety of safety-related systems such as traffic lights, vehicle engine management, medical devices, industrial process plant, aircraft flight control, and many other applications in many sectors.

10 New technologies, and particularly programmable systems, have enabled such systems to function more effectively, while enabling more sophisticated solutions to safety issues. At the same time, the new technology has brought its own challenges – particularly increased design complexity. This has thrown the spotlight on the role of staff engaged in the design, development, maintenance and use of these safety-related systems. The achievement of sufficiently low levels of risk is critically dependent on individual and team competence.

11 In parallel, the pace of change in industry continues to accelerate, with frequent restructuring and much movement of staff between roles, between companies and even between sectors. Ever newer technology continues to be deployed, requiring new skills. Even if new staff possess these skills, they may be unfamiliar with the organisational culture in which they are to be exercised, and specifically the safety culture. The long term familiarity of managers with the capabilities of their staff can no longer be assumed, so increasingly organisations need to establish competence management systems in order to satisfy themselves, their customers and regulators that their staff are competent for the tasks they are assigned to.

12 Standards makers have recognised the growing importance of competence. For example, in the latest committee draft [Ref. 1] of the international standard on '*Functional safety of electrical/electronic/programmable electronic safety-related systems*' (IEC 61508), the requirement for staff competence is upgraded from a recommendation to a mandatory requirement for compliance.

13 The form of this guidance is based on that of an earlier railway-specific HSE publication, the '*Railway Safety Principles and Guidance Part 3 Section A: Developing and maintaining staff competence*' ([Ref. 2]). The basic principles of that publication were already written so as to be applicable more widely than to just the railway industry. However, the principles have been significantly restructured and recast to cater for the competence of professional design and development staff, and to recognise a context of continual change. When fully published, this revision will have taken account of cross-sector consultation within HSE, with industry, and with professional institutions.

Competence

14 Competence plays a very important role in controlling health and safety risks. Risk control systems rely on a complex mix of hardware (e.g. automatic guards and trips), software (e.g. traffic monitoring on road networks), human factors (e.g. safety culture) and safety management systems. The role of people in controlling risks is central to the present guidance. While this is important in normal situations, it is vital in abnormal and emergency situations.

15 The *'Hazard Forum Guidelines'* [Ref. 3] state that, for a person to be competent, they need "qualifications, experience, and qualities appropriate to their duties". These include:

- "such training as would ensure acquisition of the necessary knowledge of the field for the tasks which they are required to perform
- adequate knowledge of the hazards and failures of the equipment for which they are responsible
- knowledge and understanding of the working practices used in the organisation for which they work
- the ability to communicate effectively with their peers, with any staff working under their supervision, and with their supervisors
- an appreciation of their own limitations and constraints, whether of knowledge, experience, facilities, resources, etc., and a willingness to point these out."

16 In addition, the Hazard Forum Guidelines expect that professional engineers with responsibility for design or for supervision of operators should have:

- "a detailed working knowledge of all statutory provisions, approved codes of practice, other codes of practice, guidance material and other information relevant to their work; an awareness of legislation and practices, other than these, which might affect their work; and a general knowledge of working practices in other establishments of a similar type
- an awareness of current developments in the field in which they work."

17 Competence involves much more than technical training, including attitude and behaviour as well as experience and knowledge of the application domain.

18 The possession of competence will not in itself guarantee safety. It can never guarantee that any particular task is performed properly, since that depends on the correct application of that competence in the particular circumstances. However, it will reduce risk and improve the predictability of good performance.

19 Competence might be transferable from one work situation to another, but the extent to which this is possible depends very much on the *context* in which apparently similar competence is required. At one extreme, such as making wiring connections in accordance with a wiring diagram, they may be very largely transferable. Such competence can readily be assessed and certified. At the other extreme, the extent of the knowledge and ability that is transferable may be very limited. For example, an individual who may possess the knowledge and ability to develop computer software for a vehicle engine management system may not have the knowledge and ability needed to develop the software for computer-based suspension.

20 A competence management system developed in accordance with this guidance should enable staff to fulfil responsibilities and to perform activities to recognised standards of competence on a regular basis, in order to

- meet the organisation's business objectives
- satisfy legal and regulatory requirements
- enable the organisation to meet contractual commitments.

21 The purpose of a competence management system is to control in a logical and integrated manner a set of activities within the organisation that will assure competent performance in work. The aim is to ensure that individuals are clear about the competence expected of them, that they have received appropriate training, development and assessment, that they have appropriate experience, and that they maintain or improve their competence over time. Training and development seeks to establish and extend the required competence for the individual or team, sufficient to allow individuals or teams to safely carry out their work and to undertake new work.

22 To assure an effective and consistent standard of competence in individuals and teams requires a process of continuous improvement, shown diagrammatically in Figure 1. When people begin to acquire competence for a new task, or begin progressing to a higher level of competence, they will be unaware, at least to some extent, of what they can and cannot do. Through training and development activities, they will first become aware of their limitations and then overcome those limitations to become competent. Gradually, their work becomes second nature, and they become well practised even in situations that they encounter less often. In effect, people reach a level of almost automatic performance to a high standard.

23 The danger is that, without realising it, people can again become unaware of their limitations, whether because of developments 'outside' – such as the introduction of new 'best practice' or new technologies – or because of a drift to bad habits in routine work. It is to avoid this – or to detect it and redress it - that monitoring and assessment of performance is required at the individual level, and verification, audit and review is needed at the system level.

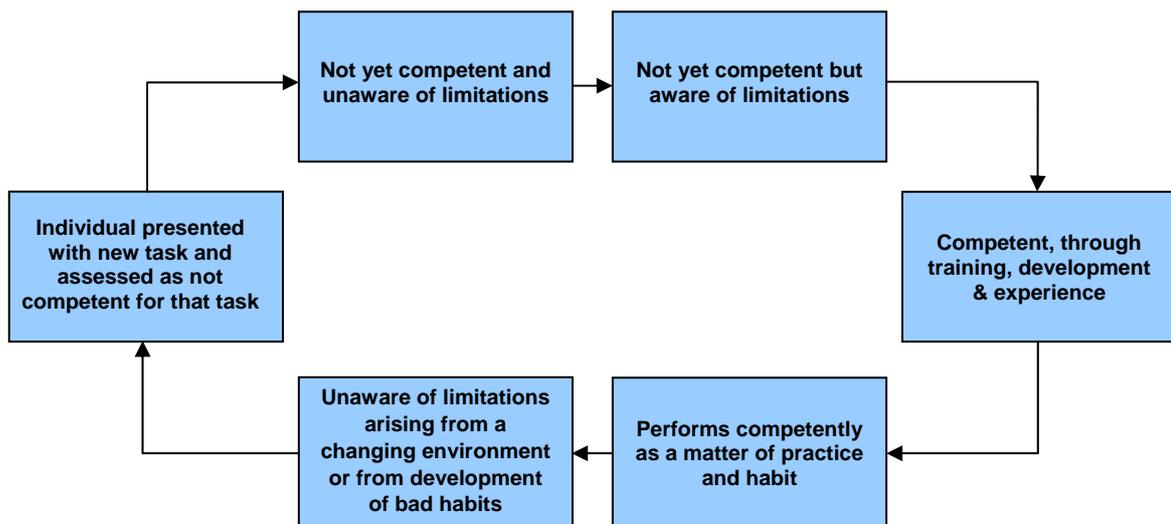


Figure 1: Competence stages for the individual

Fitness

24 The intrinsic competence of staff can be compromised by poor physical, medical or mental fitness. While this document provides no further guidance, organisations are nevertheless expected to have systems in place to monitor staff fitness – as it might affect risks – and be alert and responsive to potential problems. They should ensure that any doctors they may use that are responsible for judging fitness are themselves professionally competent as appropriate.

Principles

25 In this guidance, the key objectives of a competence management system are presented in the form of 15 'principles'. Specific guidance is then provided on practical ways to realise those principles.

26 This guidance is applicable to all staff whose work activities involve safety-related systems that may have an impact on health and/or safety. It should be applied to the competence of staff at all levels of the organisation – not just those who are directly involved in development, maintenance or use, but also to those who manage the competence management system, and to those managers whose main contribution to health and safety is decision making about financial and commercial matters. Through their competence (or otherwise) they will all affect the health and safety of the workforce, the public and themselves.

Legislative background

27 The Health and Safety at Work etc Act 1974 (HSW Act) places general duties on employers and the self-employed to ensure that employees and others who may be affected by the work of their undertaking, are not, so far as is reasonably practicable, exposed to risks to their health and safety. In particular this includes the provision of safe systems of work, supervision and training.

28 The Management of Health and Safety at Work Regulations 1999 (MHSW Regulations) require employers to undertake a suitable and sufficient assessment of the risk that their activities present to their employees and others, including contractors and the public. Measures developed from such a risk assessment need to encompass training, knowledge and experience. Employers should also appoint a 'competent person' (as defined in the MHSW Regulations) to help them comply with the statutory provisions. This guidance is underpinned by the requirements for risk assessment derived from the MHSW Regulations. [See Ref. 4]

29 There is a legal duty on employers to consult safety representatives appointed by a recognised trade union (under the Safety Representatives and Safety Committees Regulations 1977), and a commitment under the Health and Safety (Consultation with Employees) Regulations 1996 for employers to consult employees who are not represented by a trade union safety representative, on matters relevant to their health and safety.

30 For a summary of other health and safety regulations that contain requirements for competence see [Appendix 3](#).

31 Some sectors, such as Medical Devices, have their own product legislation and associated regulation. In the nuclear sector, License Condition 12 contains specific detailed requirements.

32 If you operate internationally, you may have to comply with the laws of other countries. In Europe, although each member state will have its own legislation, the requirements within sectors are generally harmonized under a European Directive. These directives comprise agreements between European Member States to enact National legislation on certain types of products. They specify certain 'Essential Safety Requirements' that will include controls on safety, performance, specification, design, manufacture and packaging. Usually, there will be an expectation that a harmonized standard will be followed. For example, the European Medical Device Directive (93/42/EEC) requires application of the European standard for risk analysis (EN 1441). This in turn requires "*identification of all potential hazards and the estimation and analysis of the associated risks*".

Industry standards

33 Where legal duties are expressed in general terms, such as in the HSW Act, these may be determined for particular circumstances through reference to accepted good practice, often represented in international, European, national and industry standards and associated published guidance.

34 IEC 61508, Functional safety of electrical/electronic/programmable electronic safety-related systems, is an important international standard in this regard [Refs. 5 and 6]. It requires that *“All persons involved in any overall, E/E/PES or software safety lifecycle activity, including management activities, should have the appropriate training, technical knowledge, experience and qualifications relevant to the specific duties they have to perform.”* In addition, it requires that competence be documented and assessed. Other related sector standards (such as IEC 61511) similarly require competence.

35 The guidance in this present document is intended to help your organisation to establish a competence management system that will enable you to meet such requirements.

Outline of this guidance

Continuous improvement

36 A competence management system is structured like most management systems. In this guidance we identify 5 'phases' for a CMS - planning, design, introduction, operation and review. For each phase we suggest one or more 'principles' and associated guidance that define key safety objectives for that phase. These principles should guide the relevant competence management activities. There are 15 such principles, in all.

37 We now outline the phases and their principles:

Phase 1: Plan the CMS

The requirements for the system are established in Phase 1, starting with identifying the business activities that require demonstration of competence to ensure safety ([Principle 1](#)).

Phase 2: Design the CMS

The design phase addresses two major topics – selecting or specifying a suite of competence standards that span all the activities identified in Phase 1 ([Principle 2](#)), and designing the processes of the CMS ([Principle 3](#)).

Phase 3: Introduce the CMS

[Principle 4](#) sets out how to introduce a new CMS into the organisation in a way that minimises disturbance and inefficiency.

Phase 4: Operate the CMS

This phase includes the major processes of the day-to-day operation of the CMS, from recruiting staff ([Principle 5](#)); allocating all staff to specific activities ([Principle 6](#)); monitoring their competence ([Principle 7](#)); assessing their competence ([Principle 8](#)); responding to any failure to perform competently ([Principle 9](#)); to continuous development of competence ([Principle 10](#)). In addition, this phase addresses managing the competence of suppliers ([Principle 11](#)); managing CMS information ([Principle 12](#)) and monitoring and managing both internal and external change ([Principle 13](#)).

Phase 5: Audit and review the CMS

Verification and audit ([Principle 14](#)) checks whether the CMS is operating as planned. Senior management should additionally review the whole system ([Principle 15](#)) and feed back the results of this and the verification and audit into any necessary reconsideration of the other principles.

38 These phases and principles are presented in [Figure 2](#), below, in the form of a process that should lead to continual improvement in competence management. Each phase and principle is colour-coded to facilitate navigation through the remainder of the document.

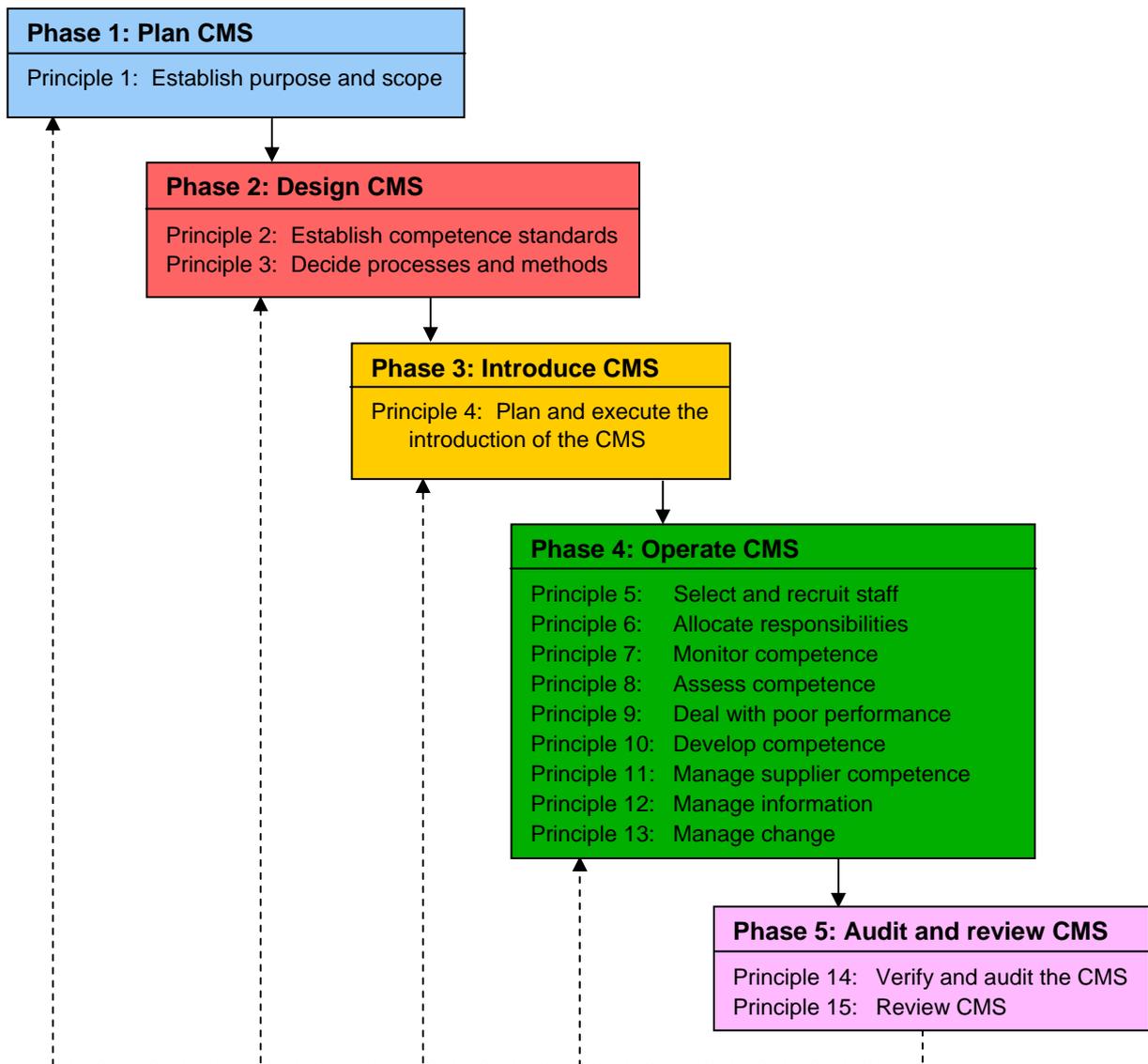


Figure 2: The phases & principles of a continuously improving competence management system

How to use this guidance

39 For each principle, guidance is given on how to realise that principle, and some of the things to consider in doing that. Sources of further information are given where appropriate.

40 The guidance is not intended to prescribe a way to establish the CMS so that it satisfies the principle. Rather it is intended to stimulate you to establish your own set of considerations for you to address, building on and perhaps modifying those that are offered here. Some examples are given to illustrate the guidance.

41 The considerations in the guidance for each principle are not presented in priority order, and it is possible that not all of the guidance will be relevant to all organisations in all circumstances. You should decide which are applicable in your own organisation, and the importance you should attach to each.

Getting started

42 While the names of the phases may imply a simple progression through the phases, from Phase 1 'Plan' to Phase 5 'Audit and Review', the guidance has been written so it can be used starting from any point.

43 If your organisation already operates a competence management system, then you might start by comparing your CMS for conformance with the principles given in this document. It may be best to start with the principles associated with the 'Operate CMS' phase, since that is where the CMS has most direct impact on the way that your staff do their work.

44 Even if you do not have a formal competence management system at present, you may well already have management processes for staff appraisal, and for assigning staff to particular tasks, however informal those processes may be. You could therefore start, in the spirit of continuous improvement, by documenting what you do, and then comparing that with the appropriate principles in this guidance.

45 You could, in parallel, begin the process of identifying your requirements for competence management, in accordance with Principle 1.

46 There are other sources of information and other organisations to help you, identified in the text and in the appendices.

47 There are also consultants that specialise in the design of management systems, and of competence management system in particular. You might also draw on the expertise and experience of consultants in organisational change management.

Overview of the Phases and Principles

48 This table may be used as an index to the principles and their guidance in the remainder of this document.

PHASE 1 <i>Plan CMS</i>	<u>PRINCIPLE 1</u>	Establish the purpose and scope of the CMS Identify the areas of operation relating to functional safety of safety-related systems that require formal management of competence, and define the scope accordingly.
PHASE 2 <i>Design CMS</i>	<u>PRINCIPLE 2</u>	Establish the competence standards to be used in the CMS Select or develop a suite of competence standards to span the organisation's activities within the defined scope.
	<u>PRINCIPLE 3</u>	Decide the processes and methods of the CMS Establish processes, procedures and methods so that the CMS consistently ensures that all activities within scope are performed by competent staff.
PHASE 3 <i>Introduce CMS</i>	<u>PRINCIPLE 4</u>	Introduce the CMS Plan and execute the introduction of the CMS in a way that is efficient, that causes no undue disturbance to the execution of existing tasks, and that carries the support of staff.
PHASE 4 <i>Operate CMS</i>	<u>PRINCIPLE 5</u>	Select and recruit staff Select internally, and recruit externally, staff with an appropriate and demonstrable competence profile.
	<u>PRINCIPLE 6</u>	Allocate responsibilities Establish control processes to ensure that staff and contractors only undertake work for which they are competent.
	<u>PRINCIPLE 7</u>	Monitor competence Monitor the competence of staff to ensure that they perform competently or, if not, initiate appropriate corrective actions.
	<u>PRINCIPLE 8</u>	Assess competence Assess the competence of staff to ensure that their competence is appropriate for their planned work and that it is being developed appropriately.
	<u>PRINCIPLE 9</u>	Deal with failure to perform competently Respond to any failure to perform competently in such a way that the impact on safety is minimised.
	<u>PRINCIPLE 10</u>	Develop competence Maintain and extend staff competence.
	<u>PRINCIPLE 11</u>	Manage supplier competence Make arrangements to ensure that subcontracted or outsourced work is subject to competence management at least as rigorous as your own.
	<u>PRINCIPLE 12</u>	Manage information on the operation of the CMS Maintain information about the operation of the CMS so that you can demonstrate that all activities within scope are performed by suitably competent staff.
PHASE 5 <i>Audit and review CMS</i>	<u>PRINCIPLE 13</u>	Manage change Monitor the external environment and the internal operation of the organisation to determine any implications for the CMS.
	<u>PRINCIPLE 14</u>	Verify and audit the CMS Verify and audit the competence management system.
	<u>PRINCIPLE 15</u>	Review CMS Undertake management reviews of the CMS, to give confidence in its continuing suitability, adequacy and effectiveness.

PHASE ONE: Plan CMS

Principle 1: Establish the purpose and scope of the CMS

PRINCIPLE

Identify the areas of operation of your organisation relating to functional safety of safety-related systems for which you must manage competence in a formal way, and also those areas that you want to include within the scope of the CMS for efficient competence management. Establish the full range of requirements that you must meet to satisfy relevant legislation and standards.

GUIDANCE

Identify competence needs

49 You should thoroughly analyse and describe what your organisation does so as to get a complete overview of your actual and potential needs for competence management. While you may have a clear 'mission statement', this is unlikely to capture the full richness of all your organisation's activities. You should describe what you do – and what you intend to do in future - in a way that indicates the full range of types of competence that you require for your organisation to do its job professionally – from filing of reports, through equipment maintenance, to design of a safety management plan. You could start by analysing your organisation by the different operating units you have, different departments, the different customers you have, or the different types of contract you typically undertake.

50 Note that some of your work activities will be necessary to ensure the safety of your own staff, some may be necessary to ensure the safety of the general public, and some may be necessary to ensure any products you contribute towards are sufficiently safe for use by others. All these activities should be included in the CMS.

51 Your customers may also, as part of their CMS, need to manage the competence of their suppliers, including your own organisation. If so, you should consider the interface between your own CMS and theirs. How will you be able with your CMS to satisfy your customers' requirements (perhaps differing for customer to customer) for their CMS? [Principle 11](#) gives guidance on managing supplier competence: this may inform your own approach as a supplier.

52 Then you should identify which parts of your organisation must satisfy which requirements for managing the competence of your staff. Such requirements may stem from legislation, from standards specified in contracts, or from standards or procedures your organisation has chosen to adopt. Controls will include a requirement to identify hazards, estimate risks, and mitigate those risks. While mitigation of risks may involve design features, it also includes the use of competent staff in all phases of design, development, manufacturing and operation.

Manage the diversity of competence requirements

53 If you have a diversity of national and sectoral requirements for competence management, you should consider whether you should maintain different 'subschemes' or whether you can be more efficient by having a common scheme based on a 'best of breed' set of requirements.

Establish the relationship between necessary competence management and desirable competence management

54 You may wish to have a scheme that recognises and captures the competence of all members of your staff. This could motivate your staff to develop their competence. It could reduce the ‘learning curve’ for staff moving into a regime where there are formal competence requirements. It could give you more flexibility in allocating staff. But it is not necessary to have an all-encompassing ‘formal’ CMS. You can, if you wish, assess and manage the competence of your staff with varying degrees of formality. The guidance in the present document is targeted at organisations that must meet legal or contractual competence requirements, and be able to provide formal evidence that they have done so.

55 You should consider ‘future-proofing’ your CMS. Even if there is no formal requirement now on some parts of your business, you should consider whether emerging and likely future standardisation is likely to affect your areas of operation.

Check against health and safety management policy and procedures

56 Ensure that the CMS is compatible with your overall organisational policy for health and safety management, and that its processes are compatible with and integrated with those for health and safety management.

Publicise your approach to competence management

57 Having identified the areas of your operation that require some degree of formal competence management, or that you feel should anyway be included in the scope of your competence management system, you should now establish some means to clearly explain to your staff – and to external assessors if they are likely to be involved – the areas of your business that will be within the scope of the CMS, why they are, and how your staff will be affected by it.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for planning a competence management system.

PHASE TWO: Design CMS

Principle 2: Establish the competence standards to be used in the CMS

PRINCIPLE

Select or develop a suite of competence standards that covers all activities within the scope of the CMS. These standards should be sufficient to allow a demonstration to customers, assessors and regulators that all staff are competent to perform the tasks allocated to them.

GUIDANCE

58 You should establish a suite of competence standards to span the various roles you expect staff to perform and all activities that could directly or indirectly affect functional safety, including management, and including operation of the CMS. The standards should be specified at a level of granularity that minimises the burden on both staff and the organisation as staff change roles (and as the roles themselves change).

59 You may find it easier to structure your competence standards and to achieve modularity if you establish a 'competence model' that relates organisational activities, staff roles, and competence standards. [Appendix 1](#) explains this concept further and provides an example competence model.

60 The success of a CMS will be largely dictated by the quality of the competence standards. Selecting or developing a suitable suite is extremely important for the efficient and effective operation of the CMS. It is also an intellectually demanding task that should not be underestimated.

Maximise portability of standards

61 It is in the interests of both staff and employers for standards to be 'portable'. That is to say that when you are considering recruiting someone from elsewhere – either in the same organisation or from outside – and the competence of that person has already been assessed in their existing position, you will be able to understand the relevance and appropriateness of that competence to your own needs, without having to assess the person against your own entirely different standards. (Though once employed, it is likely that they will be assessed, in accordance with [Principle 5](#) and [Principle 8](#), fairly early in their new position.)

62 It is not to say that the new staff member can be deployed without additional supervision while adjusting to their new context – however senior they may be. There may be many subtle differences between nominally the same competence applied in different contexts.

The importance of 'context'

63 By separating the core principles of **competence standards** from their **context**, a limited set of common competence standards can be applied universally in many industry sectors, applications, technologies, and regulatory environments. (See [Appendix 1](#)) An assessment of an individual's competence will then need to capture the actual context (of sector, application area, technology, etc.) in which the general competence standards have been demonstrated. [Principle 8](#) expands on 'context' as it applies to an assessment.

Aim for modularity

64 The roles that staff perform and the activities of organisations are not, in general, standardised across industry. Given the wide range of capabilities of different individuals, and the wide range of ways that organisations structure their work, standards tailored to the specific activities that particular individuals undertake in any one organisation are unlikely to be appropriate for different individuals, or to survive changes in technology or work processes. Nor would they meet the requirement for portability. In consequence, you should consider a modular scheme of competence standards in which each individual will have a suite of competence ‘components’. (See [Appendix 1](#).)

Definition and optimisation of roles

65 While roles of staff are not generally standardised, you can nevertheless simplify competence management by specifying a suite of roles typically performed by your staff. You can start by identifying the various roles necessary to undertake the activities that you decided (in [Principle 1](#)) to be within the scope of the CMS.

66 While there might possibly be a one-to-one match of such roles to the work undertaken by individual members of staff, this is not usual for many staff. Often a person will perform several roles. Nor is there likely to be a one-to-one mapping between roles and organisational activities; you are unlikely to define your activities to such a fine level of detail. Instead, a typical activity is likely to employ a collection of roles, often undertaken by a team rather than an individual.

67 Defining roles and mapping them to the way you run your business also provides an opportunity for business improvement. It provides a complementary viewpoint to the mapping of business processes for the delivery of goods and services. As with business process mapping, role mapping gives a basis for refinement, evolution and continuing improvement.

Different types of competence

68 Ensure that your competence standards include all types of competence needed. The full range includes:

- *technical skills*; for example, hazard analysis, report writing
- *behavioural skills*; for example, personal integrity, interpersonal skills, problem solving, attention to detail
- *underpinning knowledge*; for example, a person performing a hazard identification needs knowledge of the particular application to be able to identify the likely hazards that exist
- *underpinning understanding*; for example, it is unlikely that somebody could establish risk tolerability levels for a particular problem without an understanding of the principles of safety and risk

69 For example, a competence standard for ‘Hazard Identification’ might require that a person has a mixture of technical skills and underpinning knowledge, such as:

“Identifies hazards and hazardous events, including contributory and aggravating factors, for normal and degraded modes of operation through:

- *formation of a suitable hazard identification team (where appropriate)*
- *consideration of factors which could affect the operational environment and system performance*
- *use of appropriate historical information sources and hazard identification techniques.”*

70 Whereas a competence standard for ‘Decision making’ might require that a person has the particular behavioural skill:

“Uncovers the key facts associated with a situation and communicates a firm, rational decision based on an analysis of those key facts.”

Competence standards for managers of the CMS

71 The managers operating the CMS should themselves be competent to do this and this competence should be fully included at every stage of the CMS. Select or develop competence standards for the activities that the managers operating the competence management system are being asked to undertake.

72 It is important that those who have a role in managing the system are kept up to date. Otherwise, there is a real danger they will rely on their own experience from when they did similar work and miss changes in working methods and behavioural expectations.

Ensure that the competence standards allow clear-cut assessment

73 The first and foremost requirement of a competence standard is that it should be possible to assess whether someone possesses the competence expressed in the standard.

74 In establishing your set of standards, you should bear in mind the requirement for clear-cut assessment. It is important that staff are not subjected to inconsistent assessment by different assessors.

75 Both to assist assessors and to help achieve consistency, you should provide some guidance on how an individual should be assessed against each competence standard. The guidance should indicate what an individual should have done to be able to claim that they have particular competence. Ideally, all competence should be demonstrable by the provision of suitable documentary evidence and the guidance should indicate the kind of evidence that is acceptable. However, it is more difficult to find documentary evidence of competence standards concerned with behavioural skills and understanding than with technical skills and knowledge.

Reuse competence standards, where possible

76 Reusing existing standards facilitates portability. And sharing a competence model and perhaps competence standards with customers and suppliers will simplify meeting your customers' requirements and ensuring that your suppliers meet yours.

77 Rather than devising new standards specifically for your own needs and the scope of your CMS, you might:

- select standards from existing available standards (such as those in 'Safety Competence and Commitment')
- edit existing standards to tailor them to your own needs.

78 Companies should aim to select competence standards that are nationally recognised.

79 In many situations it is likely that reused standards will have to be tailored to the particular context of an organisation and how it chooses to run its business. Nevertheless, to facilitate common understanding of competence requirements, and to enable portability of competence assessment, these standards should be developed to a structure and quality similar to those of nationally recognised standards.

Validate competence standards

80 Once selected, standards of competence should be validated before use. Even pre-existing standards should be validated for your specific context. One approach is a self assessment of a standard by a person generally acknowledged to be highly competent within the scope of the standard, followed by a critical review with others; another approach is to perform a 'mock assessment' of staff with well-understood competence by staff both with and without assessment experience, to identify any scope for inconsistent interpretation of the standard.

FURTHER INFORMATION

81 The examples of competence standards given in this principle are drawn from ‘*Safety Competence and Commitment*’ [Ref. 7], which contains many such examples produced by the IEE and the BCS, in collaboration with the HSE.

82 Other standards available include: standards for assessors and verifiers (e.g. from Employment National Training Organisation); for personnel work including selection and recruitment (e.g. from the Institute of Personnel and Development, and from Employment NTO); for health and safety (e.g. from Employment NTO); and for auditing (e.g. from the Institute of Quality Assurance).

Please suggest possible sources of further information that might assist those responsible for choosing or defining competence standards.

Principle 3: Decide the processes and methods of the CMS

PRINCIPLE

Establish processes, procedures and methods so that the competence management system consistently ensures that all activities within its scope are performed by competent staff.

GUIDANCE

Maintain efficiency

83 It is important that integration of competence management into the organisation's business processes should be done in a way that does not lead to the operation of the CMS being perceived as a burden. Design of the CMS should be approached as a means to achieve organisational success.

84 The CMS is likely to have requirements similar to those for other management systems, for example, quality or safety management. The processes and procedures of the CMS should therefore be consistent with arrangements for the existing management systems in your organisation and, for even greater efficiency, the systems may share some processes.

85 For instance, a CMS includes the systematic assessment of the capability of staff in their assigned roles ([Principle 8](#)). There may therefore be an opportunity to simplify your annual appraisal system, and make it more effective, while giving your staff a more consistent and coherent set of expectations and a framework for their personal development.

86 Moreover, competence development ([Principle 10](#)) within the CMS addresses at least some requirements of engineering institutions' professional development schemes. You should therefore harmonise the processes of the CMS and such schemes and combine procedures wherever possible. In this way your competence development processes may satisfy the requirements of a professional development scheme without any additional overhead.

87 In general, there are two opportunities for consistency with other management systems:

- i.) avoid creating a new procedure, by modifying an existing procedure that can satisfy a CMS requirement. For example, use an existing procedure for the audit of both management systems; and
- ii.) adopt an existing format for a management procedure. Specifically, companies accredited to ISO 9001 are likely to have a standard template and structure for management system procedures.

Establish objectives

88 Having identified the scope of the CMS ([Principle 1](#)), you should establish – or at least estimate – the intended 'reach' of the system with regard, for instance, to the number of staff whose competence you will assess on an ongoing basis and, in bursts, for particular projects.

89 Then you will be able to decide what is to be achieved, in terms of measurable results and objectives, as targets for the processes of the CMS.

Define competence-related processes

90 You should specify the processes of the CMS in a clear and unambiguous way so as to describe how all the activities needed for the operation of the competence management system will be carried out, and the objectives of the CMS achieved. Well-defined processes will provide:

- transparency to all users;
- consistent application of the processes, and
- a basis for planning an audit of the CMS.

91 The major features of each process are already indicated under the other *principles* of this guidance. However, these should be translated into more specific processes and procedures suitable for your own organisation.

92 The CMS processes should be defined in sufficient detail to achieve consistent interpretation and application.

93 They should also be defined in a way that that progress through the processes can be monitored for specific instances, such as the application of the assessment process in the case of a particular individual on a particular occasion. This will facilitate auditing of the CMS, particularly in the case of incident analysis.

94 You should ensure that the procedures, work instructions and methods of your CMS embody current good practice. This may be defined by national and professional standards.

Define roles and responsibilities

95 You should decide on the roles required for those operating the competence management system, and the responsibilities of those that will perform those roles. And you should ensure that the purpose of each role and the associated responsibilities are understood by the job-holders.

Establish the approach to be taken with outside suppliers

96 [Principle 11](#) of the present document indicates some of the issues to be addressed in the management of competence of your suppliers' staff, and some of the options to consider.

97 You should establish processes and procedures for each type of supplier that you envisage using – such as contractors, out-sourced service providers, agency staff or self-employed personnel. Even when you have established a range of processes and procedures covering each type, it is likely that they will need to be tailored to inter-operate effectively, and with minimum burden, with the corresponding processes and procedures of particular suppliers.

98 You should also establish a process that will enable the CMS to capture the emergence of new supplier relationships and changing relationships – perhaps as part of contract management – that may require amendments to your choice of working processes and their tailoring to specific circumstances. Such a situation might arise if, for example, a supplier decided to subcontract out some of their work, or if a supplier were taken over by another organisation.

Communications

99 Good communications are crucial for the effective operation of a competence management system. Processes are required to ensure effective communication of key information between all those operating the system and between those operating the system and the staff affected by it. Communication channels may need to be established, especially for those not directly employed. Channels of communication should be designed to ensure rapid flow of information between all those involved in the system with clear standards for what and when defined information is to be communicated.

Establish an information management system

100 [Principle 12](#) offers guidance on record-keeping and information management. You should devise information management processes and procedures that enable information required by the CMS and gained through its operation to be obtained, to be held securely and in confidence (taking into account the requirements of the Data Protection Act), and to be available to appropriate personnel as required for the CMS to operate effectively. The methods and processes for managing competence information should be easily understandable and open, and should provide a clear audit trail to facilitate retrospective analysis of the operation of the CMS ([Principle 14](#)).

Manage changing requirements

101 Establish processes to capture changing competence requirements. These are likely to involve activities in other processes of your organisation – such as processes concerned with contract management to capture new and changing customer requirements – and regular monitoring of external sources of change, such as changing legislation. (See also [Principle 13](#))

Establish and maintain CMS resources

102 The implementation of the CMS will need effective planning and sufficient resources (people, time, materials, computational capability, etc.) and budget. Establish processes to monitor and maintain appropriate and adequate resourcing.

FURTHER INFORMATION

103 Guidance on quality management systems is provided by ISO9001:2000 Quality management systems [Ref. 8].

104 The Qualifications and Curriculum Authority publish booklets of guidance and checklists for good practice.

105 Benchmarking is a method for identifying and developing good practice, and further guidance on this can be found in *'Health and safety benchmarking: Improving together'* [Ref. 9].

Please suggest possible sources of further information that might assist those responsible for defining CMS processes.

PHASE THREE: Introduce CMS

Principle 4: Introduce the CMS

PRINCIPLE

Plan and execute the introduction of the CMS in a way that is efficient, that causes no undue disturbance to the execution of existing tasks, and that carries the support of staff.

GUIDANCE

106 It is unlikely that any organisation will design the whole of its CMS in advance of implementing some parts of it. An evolutionary approach is more likely and more realistic. You should not, therefore, think of this principle in terms of a monolithic process that is executed once only. There will inevitably be iteration between the activities associated with implementing the CMS and the activities associated with its ongoing design, operation and maintenance. The activities for this principle, described below, need not be executed as sequential steps, although you should begin by appointing a 'Responsible Person'.

Appoint Responsible Person

107 Your organisation should first nominate a 'Responsible Person' with the necessary competence and senior authority to manage the CMS effectively. A prerequisite for the role of Responsible Person is knowledge of the functional safety management strategy of the organisation and how the organisation organises its staff and its work.

Risk analysis

108 You should undertake an analysis of your organisation's activities to determine:

- what activities are performed by the organisation, or are likely to be performed in future, that are necessary to ensure safety or could affect safety if they are not carried out correctly
- which staff currently perform these activities
- which other staff should be included in the CMS for organisational efficiency and flexibility (by, for instance, easing potential movement of staff from work that is not covered by the CMS to work that is).

109 You are likely to have begun this process in order to establish the scope of the proposed CMS in accordance with [Principle 1](#). However, in accordance with this principle, you need to identify not just what types of staff you have doing what types of activities, but which actual staff are undertaking which actual activities. The results of this analysis should be documented and maintained.

Gap analysis

110 To inform your strategy for implementation (and design) you should attempt to map the proposed CMS, even in outline form, to your organisation, so as to identify where you have existing organisational structures, people, processes and infrastructure that can be adapted to implement parts of the CMS, and those areas where you do not. For instance, your existing recruitment process may already have most of the elements necessary to meet the requirements of [Principle 5](#) (Select and recruit staff), and most of the infrastructure to support it, and may require little more than the introduction of competence standards ([Principle 2](#)) and an assessment process ([Principle 8](#)). On the other hand, your staff may be unfamiliar with the concept of maintaining evidence of the demonstration of competence, as required for assessment, and your organisation may have no infrastructure to enable them to do this efficiently and effectively.

111 If the gap analysis reveals any organisational obstacles to the organisation meeting its safety objectives, the Responsible Person should facilitate their resolution.

Integration of the CMS with other management systems

112 The benefit of integrating the CMS within your organisation's existing structure and with your organisation's existing management systems, such as ISO 9000, TQM, etc., is emphasised throughout this guidance. Effective integration will substantially increase the likelihood of a successful introduction.

Develop a strategy for implementation

113 As indicated above, a 'big bang' introduction of your CMS, in which you introduce a suite of new, predefined standards and processes to your staff, is inadvisable and unlikely to work in practice. You probably will not even have established all the standards and processes of your CMS, before introducing some elements of the CMS to your organisation.

114 You could start by bringing some of the existing organisational processes under the wing of the CMS. You are likely, for example, to have existing training and development schemes. The processes for selecting appropriate courses for individuals can be formalised, and a record-keeping system established before the competence standards have been decided. (Though you should try to avoid introducing systems that need significant re-work later, since this may confuse and frustrate your staff.)

115 You could also extend and refine existing management processes to address the needs of the CMS. For example, you might introduce review procedures ([Principle 15](#)) by creating a new kind of management review involving the Responsible Person, and setting up a task team that reports to it. This team could define and revise the strategy for introduction of the CMS, and monitor its progress.

116 To facilitate the approach of gradual process alteration and introduction, you might consider the 'capability maturity model' [Ref. 10]. This is a phased approach that leads an organisation from a situation in which processes are not documented at all, to one where they are well-documented and continuously improving.

117 You might consider bringing into your organisation one or more people with experience of running a CMS, to advise on the design of the CMS and on its introduction, and perhaps to design some of it themselves. They need not necessarily be consultants, as commonly understood; they could be seconded from customers, suppliers, or from companies working in related fields with which you would not have a problem of confidentiality or competition.

Select assessors

118 The availability of assessors may become a bottleneck, once competence standards have been decided and the assessment process defined. You should think early about selecting, recruiting or hiring assessors that are competent themselves both to perform competence assessment and to advise on training and other professional development needs. In addition to specific technical competence, assessors should be competent to the level required by NVQ D33 (see Ref. 4, Section 4) or equivalent. You should establish and maintain a database of competent assessors, indicating their specific competence.

Introduce administrative support

119 You should devise administrative support, particularly computer-based systems, both to enable management of the CMS and to help your staff. For example, to support staff in maintaining evidence for competence assessment, you might need to introduce a library and record-keeping system for documents that support their claim. (See also [Principle 12.](#))

Communicate

120 However much you may try to avoid the CMS being a burden on the organisation as a whole or on individual staff, it is likely to be perceived as such – or even as a threat – by at least some staff.

121 You should communicate:

- your intentions, the reasons and the benefits to staff and to the organisation;
- your strategy;
- timescales;
- who is affected and when; and
- also, any downside.

122 Integrity in introducing the CMS is critical to ensuring it will be treated with respect and operated in line with its objectives.

FURTHER INFORMATION

123 The Carnegie Mellon Software Engineering Institute has been a major source of innovation in process improvement in software engineering. In recent years the concept has been extended well beyond software engineering, and an international standard on generic process assessment - ISO/IEC 15504 – is under development. The Institute provides extensive guidance on process improvement, based on the concept of a maturity model of an organisation being gradually transformed from 'initial' through to 'optimising' [Ref. 10].

Please suggest possible sources of further information that might assist those responsible for defining CMS processes.

PHASE FOUR: Operate the CMS

Principle 5: Select and recruit staff

PRINCIPLE

Select internally, and recruit externally, staff for potential employment on activities within the scope of the CMS, so that they will have an appropriate and demonstrable competence profile for allocation to the kind of tasks typically undertaken by the organisation.

GUIDANCE

124 This principle is primarily concerned with the selection of personnel for long-term employment on a range of activities. Though their immediate job might be known, future assignments may not be. The assignment of personnel to specific jobs is addressed by [Principle 6](#) (Allocate responsibilities).

125 In general, personnel will be selected to resource the business needs of your organisation by:

- identifying a person from elsewhere within the organisation who is both suitable and available;
- recruiting a new member of staff; or
- employing freelance or agency personnel. Note that this is different from outsourcing an activity to an external supplier, to which [Principle 11](#) (Manage supplier competence) applies.

Establish competence requirements

126 You should identify the relevant experience, skills and knowledge required for candidates to qualify them for recruitment. They may or may not have performed similar work previously. Many skills are transferable to a new job, and often knowledge gained from one job can be used in another, even if the jobs are not identical. The recruitment and selection process should seek to strike a balance between selecting staff with precisely the right profile for present needs and accepting a less perfect match but thereby broadening the opportunities for staff, widening the pool to draw from, and enriching the corporate profile.

Use competence standards during selection and recruitment

127 It is not generally possible to know precisely the activities in which a new recruit will be expected to participate, unless you are recruiting for a very specific role. Indeed, part of the process of recruitment is to gain information that will enable you to decide not only whether a potential recruit should be employed by your organisation, but to which activities they might contribute.

128 Moreover, unless you are prepared to run a more in-depth interview and assessment (see below) where the candidate brings evidence of competence of previous work done (which may be difficult due to confidentiality of employer and client information) then you will not be able to assess the competence of the individual in full accordance with [Principle 8](#) (Assess competence).

129 Methods for assessment of potential recruits in the absence of full competence assessment include questionnaires, application forms, worked test examples, and interviews. A structured interview, with a common set of questions, can be used to compare candidates. For some tasks, such as where the ability to learn, follow rules or make decisions are a crucial factor, it may be appropriate to test a candidate's aptitude and mental abilities. There are many different methods for this, but whatever assessment methods are chosen, they need to be reliable, validated and consistently and ethically applied.

130 However, your staff responsible for recruitment should be aware of the content of the potentially applicable competence standards. They should at least informally assess the candidate against these standards, even if supporting documentary evidence is not available. If the present or previous employers of a candidate have operated their own CMS, then the candidate may be able to offer evidence of satisfying their competence standards. However, even if their CMS arrangements are similar to your own, it is vital to establish the context of that competence (see [Principle 8](#) and an explanation of 'context' in [Appendix 1](#)).

131 If a candidate lacks competence in some areas they may still be suitable if the recruitment staff are sure that the candidate possesses the ability to develop the necessary competence within the necessary timescales and that the organisation has the resources to enable this.

Formal assessment against competence standards – during selection or recruitment

132 If your organisation is selecting or recruiting staff for specific safety-related activities, you may consider formal assessment against your competence standards.

133 This might take the form of an assessment identical to those you undertake for staff already employed or it might be varied so as to accommodate difficulties in making the primary evidence available. You may, for instance, introduce written and/or practical tests in order to add to the 'evidence' that will form the basis of the assessment. In some jobs, selection and recruitment can be assisted by the candidate working alongside a member of staff for a day or two. The candidate can experience the work and working environment, while the member of staff can observe the candidate. Obviously this is much easier to arrange if the candidate is considering transfer from another part of the same organisation. Assessment centres that specialise in using a range of assessment methods can also be used to determine the suitability of an individual candidate or groups of candidates.

Formal assessment against competence standards – after selection or recruitment

134 Making a change of personnel – including introducing new personnel – is potentially a hazard. In all cases, you should seek assurance that the people selected are competent to discharge their duties, so that a hazardous event to the business or to the wider community will not occur.

135 Management of personnel who are selected or recruited should be such that the activities of the organisation are not compromised while an in-depth assessment of competence is completed and any necessary actions taken.

136 If an in-depth assessment has been performed prior to recruitment, then formal assessment upon employment may not be necessary, but if it has not, you should consider doing this soon after employment (in accordance with [Principle 8](#)) so as to establish a 'competence profile' for the individual that will assist you in assigning them to activities, and enable you to establish, with the recruit, an initial competence development plan (see [Principle 10](#)).

137 If an assessment shows a lack of competence in some areas, appropriate management arrangements should be made such that the likelihood of a hazardous event is tolerably low while the individual undertakes the necessary training and development.

138 You should also establish a policy and procedures to ensure that an appropriate level of supervision is provided for experienced safety professionals that you have recruited to operate in environments that are unfamiliar to them.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for selecting and recruiting competent staff.

Principle 6: Allocate responsibilities

PRINCIPLE

Establish control processes to ensure that staff and contractors undertake only work that they are competent to do.

GUIDANCE

139 Allocate responsibilities for work activities within the scope of the CMS to the appropriate personnel, in such a way that the personnel are competent to undertake those activities and that they are able to accept the associated responsibilities.

140 To achieve this, line managers should be aware of the range of activities that their staff and contractors are currently assessed as competent to carry out, the competence profiles of their staff, and the context (application domain, criticality, applicable standards, etc) in which the work will take place (see [Appendix 1](#)).

Make staff aware of the activities that they are competent to carry out

141 You should make sure that individual members of staff, and their line managers, are aware of the standards of competence that they have achieved and therefore the work activities for which they are considered competent.

142 Staff should be made aware of the importance of carrying out only those activities for which they have been assessed as (currently) competent ([Principle 8](#)). Where appropriate they should have certificates to support this and they should also be provided with relevant identification. They should also be aware of the activities for which they have only qualified competence and that they should undertake only with supervision.

Assign staff only to work for which they are competent

143 When planning work and allocating resources for activities, your organisation should assign only staff, including those from supplier companies (see [Principle 11](#)), who are currently competent to carry out the work. This applies to all staff, from designers of continuous control safety systems to operators of plant control consoles.

144 You should not ask staff to carry out work for which they have not been assessed as competent.

Empower staff to refuse to carry out activities for which they are not competent

145 Although staff should not be asked to carry out an activity for which they have not been assessed as competent or where they will not be adequately supervised, such a request can still arise for a number of reasons – because of a mistake, because no one else is available, because there is no supervisor available, or because of an emergency. In such cases the person receiving the request should be able to refuse to do the work. The management of your organisation should accept the person's judgement that they are not competent to undertake the activity, with no detriment to the individual member of staff.

146 Likewise, staff should be actively discouraged from finding work for themselves (within the scope of the CMS) for which they have not been assessed as competent.

Provide appropriate supervision

147 Staff will usually need practical experience to become competent. Where staff are not yet competent they should be supervised. It is particularly important to compare the context (see [Principle 8](#) and [Appendix 1](#)) of competence previously attained with the context of a proposed new assignment, in order to determine the relevance of existing competence. Where the context differs, you should arrange appropriate supervision and decide a date to review the need for supervision. This applies to staff at all levels of seniority. It is particularly important when assigning work to newly recruited staff.

148 The supervisor should control the activities undertaken, check that the activities have either been carried out correctly or ensure that any necessary corrective action is taken, and report any competence development needs revealed during the activities. The supervisor should take overall responsibility for the work.

Create teams

149 Teams are frequently used to carry out a range of activities. The competence make up of a team will depend on the mix of competence of the individual members of the team, and also on how well they work together as a team. When putting teams together you – and the team members – should be clear about the range of competence that is required of all team members, the types of particular competence that are required of only certain team members, and who is responsible for supervising those with only qualified competence. The nature of the competence mix of the team may place limitations on what the team may do.

150 The competence of the team leader is vital for ensuring good relationships within the team and that each member of the team communicates effectively. Proper and effective communication within and between teams is essential and some behavioural competence standards are likely to be particularly relevant when drawing up requirements for teams (see [Principle 2](#)).

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for matching the competence of staff to their allocated tasks.

Principle 7: Monitor competence

PRINCIPLE

Monitor the competence of staff to ensure that they perform competently or, if not, initiate appropriate corrective actions.

GUIDANCE

151 While staff will, in accordance with [Principle 5](#) and [Principle 6](#), have been recruited and assigned to tasks that they are competent to undertake, your CMS should support them and you in seeking to ensure that their competence is maintained and that it is applied in practice.

152 You should avoid staff being expected to work on allocated tasks beyond the period of validity of their most recent assessment of competence for those tasks.

153 However, even when staff do possess the appropriate competence for the tasks to which they have been assigned, most activities undertaken by personnel, including adherence to management systems, are susceptible to occasional non-compliance. This is usually not malicious, but due to the fallibilities of personnel or some inherent fault in the CMS. Your CMS should therefore enable you to detect and respond when competence has not been maintained or when staff have not applied their competence appropriately.

Establish mechanisms for monitoring competence

154 There are both proactive and reactive approaches available to you for monitoring competence and its application:

- Regular assessment and re-assessment of competence ([Principle 8](#)).
- Self-assessment by individual members of staff (see also [Appendix 2](#)).
- During regular supervision, the supervisor or line-manager can reflect on whether the work done reflects possession of the expected competence.
- Appraisal and performance reviews may reveal potential problems: you should, taking proper account of ethical considerations, establish means to feed such information into the CMS.
- Analysis of staff records for accidents, injuries and incidents can indicate that an individual is having difficulty in continuing to work to the expected standard of competence.

155 Often, though, indications of inappropriate performance emerge in less formal settings, such as:

- recognition by the individual or by colleagues of a loss of previous competence (e.g. skill or knowledge that has been lost since the most recent assessment)
- observations by colleagues of repeated mistakes, even if they are corrected
- a perceived lack of commitment (perhaps through recognition of low morale or motivation, an unhelpful attitude, or recurring rule violation).

156 The CMS should have mechanisms to capture such indications and react to them. You should enable individual members of staff to confide their own concerns about their performance. While ensuring that your staff behave ethically, you should consider establishing a means for staff to express their concerns, in a noncontentious and nonconfrontational way, about the performance of others and about the organisation's safety culture.

157 When considering the mechanisms to put in place in order to monitor competence, consider also how, apart from regular assessment, substandard performance of senior management teams may be recognised.

158 Ensure that in your enquiries you act ethically and within the procedures established by your organisation to avoid accusations of constructive dismissal and to avoid stimulating an industrial dispute. (Such procedures are normally outside the scope of the CMS.)

159 In summary, to monitor competence you should have procedures in place both to formally assess the competence of staff and to capture and react to evidence that either competence has been lost, or that it is not being applied or has not been applied appropriately.

Schedule assessment of competence

160 Typically, formal assessment of competence should take place at least every 3-5 years, although other staff management activities, such as project assignment, may trigger an assessment sooner than this. Younger members of staff may also require more frequent assessment to recognise and give credit for the rapid increase in competence that they are likely to experience during their early career development.

161 There needs to be a balance between the rigour of assessment (in terms of nature and frequency), the cost (in terms of time and trouble), and the risks that are being managed through the activities of your staff.

Arrange necessary unscheduled assessment of competence

162 In addition to scheduled assessment of competence, assessment might be triggered by:

- changes in technology, in working practices, in legislation, in standards, in business practice, in expectations of customers and of the public, and in changes in corporate culture and the consequent expectations of employees (see [Principle 13](#)).
- the need to reconsider, after an incident (not necessarily involving your own organisation), your organisation's approach to competence management.
- re-engagement of an individual in activities requiring compliance with particular competence standards after a period involved in other activities.
- concerns about the performance of an individual or a team.

163 If staff are involved in an incident, all of their competence related to the incident and its control should be assessed. The effort spent on this assessment should, though, be proportionate to the risk exposed by the incident.

Respond to evidence of failure to perform competently

164 If any of the monitoring mechanisms of your CMS, such as those indicated above (under 'Establish mechanisms ...'), indicate that some individual or team has not been performing competently, then you should initiate actions to remedy any work done incorrectly so far, and prevent further non-competent performance. [Principle 9](#) expands upon what is necessary to respond appropriately.

Encourage and enable staff to gather evidence of competence

165 The most persuasive indication that an individual possesses particular competence is documentary evidence that they have demonstrated that competence during the performance of a task in the recent past. You should therefore encourage and help your staff to accumulate and track evidence of their competence as they go about their day-to-day business. This will help them in their scheduled competence assessments, and it will help them to respond to any questions about their competence that may arise in the course of their work.

166 You can help your staff to collect evidence of their competence by providing support within your information management system (see [Principle 12](#)). This should enable your staff to maintain the evidence that they have performed competently, and it provides a sound basis for their competence development. Apart from records of competence assessment, you could provide record-keeping support for many forms of evidence, including some of those suggested in [Principle 8](#):

- assignment and/or project records
- records of workplace observation
- competence tests
- witness testimony

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for monitoring competent performance.

Principle 8: Assess competence

PRINCIPLE

Assess the competence of staff to ensure that their competence is appropriate for their planned work and that it is continuously developed to meet both their own needs and the organisation's needs.

GUIDANCE

167 Assessment of competence entails a detailed consideration of whether an individual meets an agreed set of competence standards and the level of competence that the individual possesses for each competence standard (if you include the concept of 'level' in your organisation's competence model - see [Appendix 1](#)).

168 Given the potential sensitivity of the results of an assessment, you should define a formal process to ensure that every assessment is fair and comprehensive. Following this process should help to guarantee the probity of your assessments.

Brief the person to be assessed

169 Before the assessment meeting you should agree with the individual which safety-related competence standards he or she will be assessed against; when the assessment will take place; and the context for the assessment. (See below and [Appendix 1](#) for a discussion of context.) Typically, a range of competence standards will apply and the purpose of the assessment will be to establish a competence profile for the individual. (Also see [Appendix 1](#))

170 The individual should identify the evidence available in the corporate information system that can support their claim to be competent. The better prepared the individual, the more efficient and effective the assessment meeting will be. (However, as indicated in [Principle 7](#), you should provide corporate support for the individual to encourage and help them to identify the appropriate evidence.)

171 You should also brief the individual on how the scheme fits into your organisation, including any staff appraisal process, and on how the competence assessment may affect their current job, for instance, by indicating potential career development paths, or by indicating their unsuitability for presently assigned activities, which may imply either competence development or reassignment to more suitable duties.

Select an assessor

172 The competence of assessors is important for the successful operation of a CMS and you should have competence standards specifically for assessors (see [Principle 2](#)). You should define how you will select appropriate assessors for each individual. This should take into account the knowledge and expertise of the assessor, and the relationship of the assessor to the individual (to ensure fairness and probity).

Changes in expectation – explicit and implicit

173 Assessment should take account of changes in competence requirements since previous competence assessment – especially changes that might have triggered reassessment (see above). Depending on the specific competence standard, such changes might have been reflected in the competence standard itself, or, more usually, in how it should be interpreted. In either case, both the individual being assessed and the assessors need to be aware of and adapt to such a change.

174 Before carrying out an assessment, any modifications to the relevant competence standards and other requirements should be identified. Those being assessed should already have been briefed on these changes, and any necessary top-up development carried out.

Use relevant evidence

175 When examining relevant experience the assessor should distinguish what has actually been carried out by the individual from what has been performed with, or by, other members of the project team.

176 Where documentary workplace records are not available or do not show sufficient involvement of the individual, the assessor can allow other forms of evidence at their discretion, such as:

- assignment and/or project records
- records of workplace observation
- records of competence tests
- witness testimony
- performance in an interview.

177 In the absence of records that indicate previous demonstration of competence in a work situation, the assessor should seek alternative evidence, such as:

- a demonstration that the individual would be able to perform competently in a hypothetical situation
- a demonstration of understanding by the individual being able to answer questions concerning the required competence, based on past experience
- evidence of having received appropriate training for a particular competence.

178 The assessor should also check whether the individual has failed to perform as expected against earlier competence assessments (see [Principle 9](#)).

Identify the context

179 Any given competence standard will usually be applicable to a range of industrial scenarios. For instance, the same standard could apply in developing software for SIL 2 PLC shutdown systems or for SIL 4 engine management systems, despite there being significant differences between these two activities. Someone who has been assessed as an expert in safe software realisation for one of these applications will not necessarily be as competent in the same kind of activity for the other.

180 It is therefore important that an assessment captures both the general competence standard that has been attained and the context in which that competence has been acquired and demonstrated. Future assignments can then take into account any differences between the new and old contexts.

181 Context information includes industry sector, application, organisational standard practices, technology, safety integrity level, applicable standards in use in the particular working environment, and the maturity of the organisation's safety culture. For example, automatic pilots and landing-gear control are both produced in the avionics sector, with similar technical standards, but require quite different competence. A safety culture can be particularly difficult to describe, but it is worth trying to capture as it will affect how easily competence of individual members of staff can be reapplied when they move to other parts of the organisation or to other organisations. Context includes both formal attributes, such as operation of quality management schemes and personnel development schemes, and less tangible attributes such as ethical attitudes and management style. (See also [Appendix 1](#) for a further discussion of context.)

Produce an action plan

182 The assessor should agree with the individual appropriate actions to maintain and develop their competence. This should include the individual's development needs for their present jobs, for any anticipated changes in the work environment, and for career development. Appropriate actions might include gaining experience of a new application domain or technique, or training for potential future duties.

183 To assess competence for abnormal situations, emergencies and other infrequent events, you may need to use different methods from those required for normal situations. Competence in these situations is very important, yet these situations are, by definition, rarely encountered. It will be difficult or impossible to test this competence in normal situations, and even if a relevant situation does occur, it may be impractical to monitor the performance of staff in these circumstances. Alternative techniques include group exercises, training videos, exercises in the industrial environment, use of simulators, computer based training and variants, practical demonstrations and table top exercises. Note that it is not just operators and maintenance staff who require their competence to be assessed for such situations: commissioning engineers and on-site designers are also affected.

Record the results

184 The assessor should record the results of the assessment, including:

- the competence standards that the assessor judges the individual has complied with
- the context of that compliance
- any restrictions, such as the need for supervision
- the action plan (typically this will affect the personal development plan – see [Principle 10](#))
- any deviations from the normal specified process for individual assessment
- the period of validity of the assessment, after which the individual should not continue to work on activities requiring the assessed competence
- the name of the assessor

185 This record should be kept by the organisation that carried out the assessment, and also be made available to anyone who needs to see it (see [Principle 12](#)). These records are important in allowing the system to be audited (see [Principle 14](#)).

186 In addition, a record of the assessment should be given to the person along with any certificate, licence or 'authority to work'. This record should list at least the activity, the competence standard achieved, the name of the assessor(s) and the expiry date. The document should be adequately validated to prevent fraudulent use.

187 You should communicate the results of the assessment to the appropriate team leaders and managers in your organisation and, if appropriate, to your client organisation. Team leaders and line managers in particular need to be aware of any need to encourage competence development for the individual beyond that needed for their presently assigned tasks. Rapid communication of assessment results is especially important if a person has failed to demonstrate all the competence required for activities to which they are currently assigned.

Make use of self-assessment

188 To maximise efficiency, you should make as much use as possible of self-assessment. This is not a substitute for formal assessment, but it can help an individual identify early on their needs for competence development, and it can also improve the efficiency of formal assessment.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for assessing staff competence.

Principle 9: Deal with failure to perform competently

PRINCIPLE

Respond to any failure to perform competently in such a way that the impact on safety is minimised and so that the effect on the organisation is tolerable.

GUIDANCE

Find reasons for failure to perform competently

189 If you become aware that an individual has not performed with the expected competence, then you should determine whether this arises from a failure by just the individual or throughout a team. Possible causes of substandard performance could include:

- organisational culture
- team relationships
- other circumstances that affect the work environment
- an individual's personal situation
- failure of the CMS to enable correct assessment and assignment of staff.

190 Your analysis should consider each of the following possibilities, and allow for them acting in combination:

Organisational culture

The perceived culture of your organisation can contribute to substandard performance. For instance, an individual may feel pressurised to complete a job by 'cutting corners'. Also, perversely, a good safety record can lead to complacency in a team.

Team relationships

Poor team working, through either poor leadership of the team or poor communications within the team, can compromise individual performance. Poor inter-personal relationships at work, e.g. between team-members or between one or more team-members and the team-leader, can also have this effect and can also generally lower morale and impair the local safety culture of the organisation.

Other circumstances that affect the work environment

There are many other factors that can adversely affect performance, such as the actions of other staff, suppliers, customers or the public; defects in equipment; extreme weather conditions; and unavailability in the infrastructure – transport, telecommunications, and so on. Such factors can be distracting and cause lack of concentration and lower morale.

Personal situation

There are numerous personal reasons that could contribute to inappropriate performance, perhaps temporary but with significant influence in the short term. They include illness; stress from work; fatigue from long or night shifts; emotional problems, such as splitting up with a partner; death or illness in the family; financial problems; and reactions to stressful events, such as witnessing an accident; and changes in health and fitness.

Failure of the CMS

A failure of the CMS could lead to staff carrying out activities for which they should not be expected to possess the necessary competence. There may be omissions or deficiencies in previous assessments ([Principle 8](#)). The standards themselves ([Principle 2](#)) may be unclear. The allocation process ([Principle 6](#)) may mismatch the job to the person or it may fail to recognise the need for supervision. Such failures require analysis to determine whether the processes or the people are at fault, and to propose appropriate remedial action.

191 Many cases of inappropriate performance could in principle be blamed on failure of the CMS. Attitudes to 'cutting corners' should have been recognised in assessment against required behavioural competence standards, as should poor leadership and communication skills. Appropriate strategies for coping with stressful factors, should have been built into training and development, lack of confidence or experience, such as a first experience of a 'real' infrequent event by a newly qualified member of staff, should have been addressed by supervision.

192 However, many of these may be temporary lapses that the CMS could not reasonably be expected to detect through the regular assessment processes. Only if there is concern that there has been a long-lasting deterioration in competence should you need to reassess the individual in accordance with [Principle 8](#). Otherwise you should consider restoring competence through measures to fit the specific causes that you have identified in the analysis.

Restore competence

193 If you find evidence of inappropriate performance and you believe that the cause has arisen from a loss of competence since previous assessment – perhaps through lack of exposure to a particular context since then – then you should decide whether the person is suitable for further training and development, taking into account the situation and the nature of the substandard performance. Where the person is considered to be suitable for a development programme, you should implement the programme, followed by reassessment.

194 With regard to organisational culture, although your organisation should not support 'cutting corners' or taking unnecessary risks, staff may react to a perceived pressure to give higher priority to time than to safety. In a similar way, those working for your suppliers may perceive and respond to pressure from you as the client. You need to take care that the expected standards are clearly understood and followed in practice and that you do not send out 'mixed messages'.

195 If substandard performance has resulted from personal reasons, which reveal themselves in poor morale or general lack of commitment, an interview with a line manager, personnel manager, counsellor or doctor may be required to identify the underlying causes and help the person to resolve the problem.

196 Internal factors causing distraction or stress might be addressed by changes in procedures, but may, like external factors, require either or both of additional development in order to cope better, and changes to procedures to reduce exposure to the problematic factors.

197 Team problems are particularly difficult to address. Both individual and group counselling may be brought to bear, but in the extreme case, it may be necessary to remove members from the team and reassign them elsewhere, or even disband the team altogether and form a new team.

Adjust the monitoring of the individual or team

198 Where a programme to restore competence has been put in place, monitoring of the individual or team may need to be more frequent for a while. Where relevant, the area of the specific activity where there has been inappropriate performance should be targeted and scrutinised more closely. Planned assessments may need to be more frequent, with informal monitoring (e.g. day-to-day observation by a supervisor), remote monitoring (e.g. using recordings of activities), and unannounced checks. Lessons should be learned from this for others who may have similar difficulties and, where necessary, changes made to the training and development aspects of the CMS. (See also [Principle 14](#) and [Principle 15](#).)

Remove the individual from the type of activity

199 Where an individual is found to be working below the standard expected on a particular activity, that person may need to be removed immediately from that type of activity. In the case of an operator this might be requested by the controller of site safety; in the case of a commissioning engineer, by the trials manager. However, unless there is a serious attitudinal problem, it may be possible to deal with the situation by providing greater supervision. The decision to remove someone will depend on the context (e.g. internal or external factors, team working or personal reasons) and the level of seriousness (e.g. a minor problem can be addressed on the spot but a more serious problem may require longer term action, perhaps leading to a reassessment of their competence). Any removal is likely to be short term, and should be accompanied by an analysis of the underlying causes, and remedial action.

200 However, if local remedial action is considered to be ineffective, or if reassessment shows that the person is not yet sufficiently competent, or if it was decided that local remedial action is not sufficient yet the person is not suitable for a development programme, then that person should be regarded as being no longer suitable for carrying out the activity, and some forms of redeployment should be considered. Ultimately, termination of employment may be necessary.

Update records of competence

201 Where a person has been removed from the workplace because they were working below the expected standard of competence, then the organisational records of competence should be amended to show this. Any relevant certificates of competence carried by the person should also be withdrawn. Any relevant 'authority to work' certification allowing the person to undertake the specific activity should be formally withdrawn as well.

202 If it is determined that the CMS had failed to support the correct assessment or assignment of the individual, so that the expected competence standard was not appropriate for the combination of task and individual, then it should be made clear to the individual, and made clear in the records, that no stigma is attached to individual.

Learn lessons

203 While the cause of the instance of substandard performance may not have been attributed to failure of the CMS, and may have been a short-term lapse that has been redressed by local remedial actions, you should nevertheless seek to learn lessons for the CMS. Suggestions for improvement to the CMS should be fed into the management review process ([Principle 15](#)).

FURTHER INFORMATION

204 Further guidance on management of noncompliance is provided by ISO 9001:2000 Quality management systems – Requirements [Ref. 8].

Please suggest possible sources of further information that might assist those responsible for managing non-compliant performance.

Principle 10: Develop competence

PRINCIPLE

Maintain and extend the competence of staff in accordance with appropriate competence standards.

GUIDANCE

205 A set of development needs for an individual will be identified as part of the recruitment process (see [Principle 5](#)), or as a consequence of a job assignment (see [Principle 6](#)) or a competence assessment (see [Principle 8](#)). In general, these needs should be encapsulated in a personal development plan.

206 Training and development should be linked to assessment so that staff can increase their recognised competence, broadening the range of activities they are able to carry out and hence enriching their career prospects.

207 The amount and nature of training and development each person needs will depend on their initial competence and the nature of the activities being undertaken. However, it is usually possible to devise core training and development programmes to meet a substantial part of development needs. These programmes may be common across a whole industry sector or more specific to individual companies.

Establish a personal competence development plan

208 For each member of staff that you wish to include within the scope of your CMS, you should develop, maintain and implement a personal competence development plan for that individual to gain additional competence. Depending on the breadth of scope of your CMS, this may form part of a more broadly-based personal development plan that also addresses issues that are not within the scope of the CMS.

209 The personal competence development plan should include:

- the objectives of the proposed action(s), with regard to how they will affect competence;
- description, in outline, of the proposed actions;
- the approximate timing of the proposed actions;
- the present status of the actions;
- the planned and actual outcomes of the actions.

210 You should establish a schedule to regularly review and, if necessary, update the development plan. It should, at least, be updated on the completion of any action and following any assessment or reassessment of competence.

211 The professional engineering institutions generally operate professional development schemes that require the equivalent of a personal development plan. You should consider linking staff development to an appropriate scheme.

Establish a training and development programme

212 A structured training and development programme in your organisation will help you to identify appropriate actions for an individual's personal competence development plan. In general, the programme will not consist of a fixed set of training actions for all members of staff. Instead it will be a source of training and development activities, from which the appropriate mix of actions can be selected to suit the needs of each individual. However, you may also find it useful to provide some common training for all members of your staff, or for all members of certain teams.

213 The acquisition of relevant experience is particularly important, since actual work done usually provides the most persuasive evidence that the relevant competence has been achieved (see [Principle 8](#)). An individual's training and development actions should therefore include opportunities for on-the-job training and acquisition of appropriate experience.

214 In some fields, for example systems design, such opportunities may not be consistently available, so the individual or his manager will need to discuss his or her development needs frequently with appropriate personnel, such as project managers, to ensure a wide and up to date range of options. An alternative, when opportunities for appropriate development within your own organization are rare, might be to obtain the necessary competence through a secondment, perhaps to a client or a supplier. If there are problems of competition this could be in a different sector (in which case you will need to redress the difference in context on the return to your own organisation). You might consider setting up 'job swap' schemes with other organisations that have similar needs.

215 Many activities and events occur infrequently, and your development programme should contain refresher training for these to help maintain competence. Refresher training should also be seen as an opportunity for repeating key messages. This will apply equally to existing, new and modified competence standards. It cannot be assumed that existing staff will be competent to carry out activities to a new or modified standard; all staff will usually require some additional briefing, development and competence assessment when they take on new activities.

Identify the individual development necessary to attain the required level of competence

216 Typically, the processes of recruitment, assignment, or assessment will have identified the need for maintenance of competence or acquisition of additional competence. You should now translate these needs into actual, specific, scheduled and budgeted activities.

217 The development methods that you should adopt should be tailored to each individual, since the extent and nature of the development required will depend on many factors, including the type of work, the previous experience, and the present ability and availability of the person.

218 Development through practical experience – perhaps supervised – is important if a person is to move from the completion of a training course to attain the level of competence required to carry out the activity reliably. This is the case whether the task is manual or cerebral – an operator or a systems designer. A programme of supervised, structured development will provide exposure to different conditions that will probably be experienced on a regular basis, even though the individual has not encountered them before (e.g. overnight working for an operator, or different systems architectures and different hardware for a software programmer).

219 A person may be placed with a skilled team – even perhaps in another organisation – to gain experience in carrying out some activities. Some staff may benefit from a mentor with whom they can discuss problems in confidence, and this is expected in some professional development schemes. Any supervisor should be competent to supervise effectively and to make judgements on the performance of any individual that they supervise.

Recognise and anticipate changing circumstances

220 Additional training, development, and assessment of competence are likely to be required as part of the introduction of new processes, new hardware, new business rules, etc. In order to prepare for your staff to undertake new activities requiring additional competence, you should reappraise your development programmes (see above).

Train the managers of the CMS

221 You should establish the training and development needs of the managers who operate the competence management system to ensure that their competence and assessments are kept up to date. This is a continuing activity, but becomes more important when there are changes or additions to the competence standards, activities or CMS managers.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for developing staff competence.

Principle 11: Manage supplier competence

PRINCIPLE

Make arrangements to ensure that subcontracted or outsourced work is subject to competence management at least as rigorous as your own.

GUIDANCE

Clarify responsibility

222 Your organisation is responsible for safety within the scope of your assigned activities, irrespective of the human resources you use – whether your own staff, contractors and subcontractors that you employ, out-sourced service providers, agency staff or freelance personnel.

Select an appropriate mechanism for supplier competence management

223 There are three options for handling the competence of staff other than your own staff. You may:

- i.) treat these people in the same way as you do your own staff: include them in your own competence management system and apply all the same processes.
- ii.) gain assurance from the supplier that the staff that they employ are competent for the tasks to which they are assigned. An assessment of personnel at a particular point in time is usually inadequate, as changes may occur in both personnel and the roles they are expected to perform. You should therefore ensure that the competence of the supplier's staff is managed in a system that is at least as rigorous as your own. The supplier's CMS could even be operated by a separate third party.
- iii.) delegate some competence management activities to the supplier, resulting in a combination of options (i) and (ii) above.

Verify and keep records of supplier competence management

224 You should verify and audit any competence management actions of the supplier yourself, as you are ultimately responsible for the competence of all the staff engaged in your activities. This is particularly important when there are chains of contracts and subcontracts.

225 You should consider keeping copies of individuals' competence records.

Make contractual provision

226 The contract between your own organisation and a supplier of any kind should define who is responsible for managing competence, and your rights to verify the operation of that system. You should review and update these aspects, to take account of experience and changing circumstances, as part of your normal contract monitoring process.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for managing the competent performance of suppliers.

Principle 12: Manage information on the operation of the CMS

PRINCIPLE

Maintain, securely and accessibly, accurate information about the operation of the CMS in sufficient detail to be able to demonstrate that staff allocated to the various activities within the scope of the CMS are and were competent to perform those tasks.

GUIDANCE

227 Maintenance of information should be seen not as a burden, but as a means to help manage the organisation effectively and efficiently. It is also a means to facilitate the demonstration of satisfactory operation of the CMS, whether for your own internal peace of mind, for publicity purposes, for proposals for work, for audit by yourselves, a customer, or a regulator, or in an investigation into an incident.

Keep records

228 The information that you should keep and manage includes:

- records of the definition of the CMS itself: the competence standards, procedures, and so on
- records of the competence standards satisfied by personnel, both as determined at the time of competence assessments and all other reports relating to competence arising from the work of each individual within the scope of the CMS.
- records of the development plans of personnel
- records that enable tracking of the execution of the processes of the CMS (in effect, 'work flow' information) – both the history and the current status.
- records of the monitoring of effectiveness of the operation of the CMS – and particularly information arising from Audit ([Principle 14](#)) and Review ([Principle 15](#)).

229 To be more specific, records should include at least the following information:

- Records of competence
 - each type of activity that the person has been assessed as competent to carry out;
 - the standard achieved;
 - name(s) of assessor(s); and
 - the expiry date of the validity of the assessment (which may be reflected in the expiry date of a certificate or licence of competence).
- Records of assessment
 - the assessment report, made at the time of the assessment;
 - the competence standards achieved;
 - the 'context' of the assessment (see Principle 8 and Appendix 1);
 - a record of any certificate or licence issued;
 - name of assessor(s);
 - assessment locations and events;
 - methods of assessment;
 - mismatch between present competence and requirements of work that your organisation is undertaking, and actions taken to rectify them;
 - records of training and development, and any further planned; and
 - date for the next assessment.

230 You can facilitate competence assessment, where staff are able to use evidence that they have the necessary capabilities and experience to be considered competent, by ensuring that your records of work done and training are filed and are accessible to yourselves and (under appropriate controls) to the individual. (See also [Appendix 2](#).)

231 A personal log book (used as a record of competencies and activities carried out) can assist in the assessment of some staff. This may be required in some assessment schemes (e.g. the Institution of Railway Signal Engineers uses a 'licensing log book'). Access may also be necessary to those records when following up events.

232 In addition, you may keep records of other information pertaining to the competence of staff, such as details of any accidents, incidents, and indications of poor performance.

Analyse information

233 Information management is not just record-keeping. Your organisation should analyse the information and review the analyses so as to understand the present status of the CMS, to indicate deviations from planned performance, and to indicate trends. Such analyses can be used to provide measures of the effectiveness of your organisation's competence management.

234 These analyses should themselves be held in the information management system.

Use information effectively

235 One of the main benefits of the operation of a CMS is the availability of detailed information on all personnel included within the scope of a CMS, to enable more effective management decisions.

236 CMS information enables the organisation to:

- assemble teams so that the tasks involving more than one person can be discharged competently;
- ensure personnel have the appropriate level of supervision to undertake their assigned roles;
- help personnel to plan their competence development;
- identify trends in both the need for different kinds of competence and the extent of your organisation's corporate capability to satisfy this need;
- identify areas of weakness, and thereby
 - inform the recruitment strategy of the organisation;
 - inform the career development strategy of the organisation;
- monitor – and demonstrate – the effectiveness of operation of the CMS.

Make information accessible

237 Records associated with particular staff are personal and confidential so only authorised access should be allowed. Those authorised to have access to staff records should include those managing the competence management system, and the line manager and personnel manager for each individual. In addition, you may need to provide access to any organisation to whom you may have a responsibility, in the same way that you may require access to the information of your suppliers. HSE inspectors (by virtue of Section 20 of the Health and Safety at Work Act 1974) and others with authority should have access to the competence records of relevant staff.

238 In some industries and contractual situations it may be appropriate to agree limits for the time between a request for information and the information being provided. This may depend on the information required, for example whether it is basic competence records or additional records such as of assessment, aptitude or significant events.

239 When a member of staff moves from one part of a organisation to another part of the same organisation (i.e. changes jobs) or is recruited by another organisation (i.e. changes employers) to carry out similar work, the recruiters will need to assure themselves that the recruit is suitable and competent to carry out their activities (see [Principle 5](#)). Typically this will mean undertaking some form of assessment. Checking past records of competence, assessments and significant events will facilitate this process. So when staff move within or between organisations, they should be allowed to take with them any certificates of competence or licences issued to them. You should also be prepared to confirm claims of competence by former employees when they are required to provide evidence of competence for their future employers.

Provide identification for the employee

240 In some industries, the law (for instance, in the railway sector, the Railways (Safety Critical Work) Regulations 1994) or local operating standards and procedures may require particular classes of employees to carry a means of identification to ensure that only appropriately competent and authorised staff may have access to work areas, information, or equipment. The generation and safekeeping of such means of identification may be considered to be part of the CMS, and even if not, it is part of the remit of the CMS to ensure that any information concerning competence associated with such identification is maintained in a valid state.

Control versions of information

241 You should establish a configuration management policy for your information and decide on the procedures you will adopt to implement that policy.

242 You should identify which records might change over time and how you will ensure that your staff (and perhaps customers, suppliers or third parties) will use the most recent information and that different versions cannot be muddled.

243 In doing this, you should include consideration of how to maintain version control over the definition of the design and operation of the CMS itself.

244 If you already have configuration management procedures for other information in your organisation, you might consider using those same – or similar – procedures for your CMS.

Keep information for a sufficient length of time

245 The length of time for retaining records can be difficult to determine. As a general rule records of competence and the detailed records of assessment should be kept for a period at least as long as twice the normal period between assessments. I.e., for an organisation that normally assesses a competence every three years, the detailed records of the assessment should be kept for six years.

246 However, since incidents might raise questions about work done many years before the occurrence of the incident, you should make provision for much longer-term storage.

247 Generally, log books should be collected from departing staff and archived securely, in case they may be needed for incident analysis.

Store information securely

248 The method of recording information on competence should be accurate, reliable, enable easy access by authorised persons, and open to audit. Records may be held on a computer or be paper based. If the CMS information is held on a database, obtaining rapid and accurate management information and analysing it is likely to be easier and much more efficient, though maintaining its integrity and security requires specialist expertise.

249 However the information is held, your storage and access mechanisms should ensure confidentiality and maintain the integrity of the information in the face of potential interference with the information, whether accidental or malicious. You should be able to verify that the information that you hold is genuine. You should consider maintaining multiple copies of information, perhaps on separate sites, for resilience to fire, flood, or other physical damage, and resilience against computer breakdown.

250 You should ensure appropriate registration to satisfy the needs of the Data Protection Act, and ensure that your procedures for managing information comply with the requirements of that Act.

251 In some cases a document may be issued to the individuals assessed as competent. This may be in the form of a certificate or licence. Staff should keep these documents safely. They may need to show them to be allowed to perform their activities (see above concerning identification). Staff should be allowed to keep certificates etc if they move to another organisation (see above concerning access to information). However, you should have a mechanism to revoke such documents in the case of loss or fraud, and you should maintain a database of such documents so that your own organisation or a third party can check the validity of such documents.

FURTHER INFORMATION

252 'Survive' is the leading forum for information exchange on business continuity management – see <http://www.survive.com/>

253 ISO 9001:2000 contains guidance on data storage and on measurement and monitoring [Ref. 8].

Please suggest possible sources of further information that might assist those responsible for managing critical corporate information.

Principle 13: Manage change

PRINCIPLE

Monitor the external environment and the internal operation of the organisation to determine whether there are implications for the CMS, and if so to stimulate either direct revision of the CMS, or a review of the CMS (Principle 15) to determine whether change is required in the CMS and if so what form it should take.

GUIDANCE

254 You should have an active system to monitor changes that affect either the appropriateness of the competence of staff or the competence needs of your organisation. Typically, change will affect both at the same time.

Monitor external and internal sources of change

255 External sources of change include changes in legislation, whether new legislation, changes in existing legislation, or revised interpretation or revised guidance on existing legislation, new standards and changes in standards, and new contracts or changes in the scope of existing contracts. Incident analyses (not necessarily of incidents involving your organisation) are likely to lead to lessons learnt, with implications for competence standards and for the operation of competence management systems.

256 Internal sources include changes in an individual's responsibilities, changes in arrangements for supervision; changes in the reporting chain for communications; changes in team structure, and changes in accountability. Large scale changes in organisational structure arising from internal restructuring or from mergers, takeovers, sell-offs or outsourcing can trigger all of these and more. The way that their roles and responsibilities are affected by change should be explained clearly to staff.

257 Changes in structure, in personnel, and in contractual relationships can have significant impact on organisational culture. You should monitor morale however indirectly since, while an individual may possess appropriate 'behavioural' competence (see [Principle 2](#)), morale has a significant affect on the exercise of such competence – i.e. on actual behaviour.

258 Changes in techniques, tools – especially software tools – and equipment will require new, appropriate competence standards and assessment processes and may require different structures of individual responsibilities. For example, the integration of automatic circuit layout and automatic manufacture, while removing human error in the translation between stages, can also remove the verification stage based on visual inspection of the layout. Another example is the introduction of smart transmitters in process control, which requires new understanding of their failure modes, as well as of the benefits they offer in functionality.

Assess the impact of change

259 You should have processes so that, having recognised or anticipated change that should affect necessary competence of your staff or the operation of the CMS, you are able to determine the impact and decide on an appropriate response. You should consider the extent of the analysis of the impact that you should undertake. You may decide that it can be handled by a simple immediate revision to a competence standard or procedure, say; or you may seek to gain more insight into the necessary response you should make by means of a snap audit ([Principle 14](#)); by consideration of the change in a forthcoming scheduled review of the CMS ([Principle 15](#)); or by instigating a full scale review of the CMS outside the regular schedule.

260 As part of the impact analysis, you should assess the impact on your organisation's current allocation of staff from the perspective of both whether staff still have, on paper, appropriate competence for their assigned tasks, and whether, even if that is the case, reassessment is required. This latter circumstance may, for instance, arise from realisation, as part of an incident analysis, of weaknesses in the operation of then CMS, rather than in the competence standards themselves.

Consider knock-on effects

261 If competence standards are to be altered as a consequence of change, then you may need to update details of the assessment processes ([Principle 8](#)) to match.

262 You should also consider whether immediate refreshment training and development is required or whether updating can be achieved gradually.

Communicate

263 You should keep staff, including contractor's staff, up to date about any changes in the requirements for activities that they are involved in. This could involve changes to an individual's knowledge or skills, changes to working methods or procedures, the introduction of new standards into contractual conditions, etc. You can use a variety of methods to keep staff up to date, including safety briefings, 'toolbox talks', on-the-job instruction and training, feedback from emergencies, and possibly attendance on courses or lectures. You should update competence in a structured way, perhaps making use of formal 'continuing professional development'.

264 If the changes and their impacts are extensive, then you should plan briefings to inform staff and to convey the importance of the changes. At all briefings, management should ensure staff understand the information given to them, and that staff can obtain further clarification as required. The following subjects are likely to be most beneficial in these meetings:

- new and revised standards and legislation;
- lessons learned from accidents, incidents, statistical trends and management information systems;
- new and revised contractual arrangements;
- new technology and revised techniques;
- temporary procedures to deal with abnormal situations;
- modified competence standards; and
- modifications to the processes of the competence management system.

265 You may need to inform not only staff, but customers, external assessors and regulators, of any changes in operation of the CMS, depending on the industry and individual circumstances.

FURTHER INFORMATION

Please suggest possible sources of further information that might assist those responsible for change monitoring and management.

PHASE FIVE: Audit and review the CMS

Principle 14: Verify and audit the CMS

PRINCIPLE

Verify and audit the competence management system sufficiently frequently to give confidence – internally and externally – that it is operating as intended and that staff are competent to perform the tasks that they have been allocated. Identify potential improvements and stimulate appropriate remedial action if weaknesses are found in its operation.

GUIDANCE

266 To maintain the integrity of the competence management system, its operation should be checked regularly against the design intentions ([Principles 1, 2 and 3](#)), and improvements made when needed.

Verify and audit

267 A distinction is drawn here between verification and audit. Audit is the term applied here to a regular, formal, but infrequent (typically annual) check of the operation of whole of the CMS. Verification may be a more frequent, less wide-ranging, and less formal check of some element(s) of the CMS – for instance, of the allocation and monitoring processes - to determine whether staff do indeed have appropriate competence for the tasks they are undertaking, and that they are applying their competence effectively.

268 The nature, level of independence, extent and frequency of such verification and audit needs to be proportional to the risks controlled by the competence management system, the likely failure of such controls, and the results of previous verification and audit. The frequency of verification and audit may be increased temporarily if there are a number of changes being made to the system or where performance indicators show deterioration. The frequency may be reduced later, as the system improves and becomes more stable.

Plan verification

269 You should plan a programme or schedule of verification to check the use of appropriate competence standards, methods of assessment, and the consistent use of the procedures and work instructions developed for the competence management system. Typically this will be done via a methodical programme that gradually sample-checks all the processes of the CMS, but may also include random spot-checks, or may concentrate on specific features of the CMS where you have concerns.

270 Normally, internal independent verification is sufficient but with high-risk activities it may be appropriate to supplement it with independent verification. This can often be undertaken from within the organisation (e.g. from another department). However, for high-risk activities it may be more appropriate to seek external verification. You might consider establishing a mutual verification arrangement with trusted peer organisations operating in the same or a similar sector, so that independence can be achieved without compromising confidentiality.

Plan audits

271 You should schedule audits of the operation of the whole competence management system, including the competence of the managers operating the system.

272 Audit of the competence management system will look at the system as a whole, checking on the effectiveness and efficiency of the system, including a check on the up-to-date competence of those managing and operating the system and those managing CMS information.

273 The audit should take account of relevant standards for the performance of audits. Ideally the audit will be carried out by an auditor external to the organisation, but familiar with systems for competence assessment. External auditors should be suitably qualified. The audit may be carried out by the awarding bodies for the nationally recognised standards as part of their external verification process, in line with qualifications and curriculum authority guidelines.

274 In its simplest form an audit will check whether the 'planned arrangements' (the processes) of your organisation are being followed as specified. But it is important to recognise that a deviation from a planned arrangement could be because the arrangement itself is not appropriate and needs to be revised. This decision should not be taken in the audit itself but in the follow-up actions. However, audits as expected in, for instance, the ISO9000:2000 series do not focus on planned arrangements but rather on your own business requirements, on your customers expectations, and on continual improvement.

Follow-up

275 Both verification and audit will typically identify potential for improvement of the CMS. Appropriate, timed responses should be agreed (with the external parties where they have been involved) and follow-up verification planned. Both verification and audit processes are themselves subject to verification and audit.

Maintain records

276 Record the plans for verification and audit actions, traces of their execution, the outcomes, and the follow-up in the information management systems of the CMS ([Principle 12](#)).

Harmonise with other management audits

277 The internal audits of the CMS should be consistent with and, where possible, integrated with existing audit arrangements for other managements systems. Most companies will have a quality management system, perhaps meeting the requirements of an international standard such as ISO 9001. Some companies might also have a safety management system. All such systems typically have a requirement for audits or their equivalent. As a CMS is conceptually no different from other management systems, it is logical to have a single integrated audit process where feasible.

278 If your organisation is subject to external audit (e.g. by customers) then you should consider whether it is also possible to integrate that with your internal audit requirements. However, you should not rely on audits performed for third parties: you should satisfy yourself that your CMS is operating satisfactorily.

FURTHER INFORMATION

279 The British Standard, *Guidelines for auditing quality systems*, [Ref. 11 and Ref. 12] includes general guidance on various aspects of the performance of audits, including the audit process itself, as well as qualification criteria for auditors and the management of audit programmes.

280 Guidance on internal audits is provided in ISO 9001:2000 Quality management systems – Requirements [Ref. 8].

Please suggest possible sources of further information that might assist those responsible for auditing corporate management systems.

Principle 15: Review CMS

PRINCIPLE

Undertake, at planned times, a regular management review of the competence management system to give confidence, internally and externally, of its continuing suitability, adequacy and effectiveness. Such review should also be undertaken if required as a response to noncompliance (Principle 9) or to change (Principle 13).

GUIDANCE

Arrange reviews

281 Appropriate senior management, including the person responsible for operation of the CMS, should regularly review the operation of the competency scheme to decide on any improvements and corrective and improvement actions.

282 Schedule management reviews of the CMS at regular intervals – at least annually. The aim should be to ensure the continuing suitability, adequacy and effectiveness of the CMS.

283 The focus of the review should be on continual improvement rather than mere compliance with existing standards. The review should assess performance of the overall system against agreed standards, key performance indicators, industry trends (if known) and recommendations resulting from verification and audit. A judgement should be made on whether the CMS objectives have been achieved and, where appropriate and agreed, recommendations for improvements should be implemented.

Seek continual improvement

284 Most organisations recognise the importance of process improvement if they want to become and remain competitive. Improvement of the CMS should similarly present business opportunities for the organisation.

285 Implementation of a management review is an essential activity in a programme of continuous process improvement. A properly conducted management review should ensure that the performance of the CMS is examined systematically, and actions to correct deficiencies and implement improvements identified and implemented.

286 Actions arising from a management review can be viewed as reactive or proactive. Reactive actions tend to arise from issues of noncompliance, for example, as a result of verification. Addressing issues only in a reactive way is likely to maintain the current state and overlook opportunities for process improvements.

287 A properly conducted management review will adopt a proactive viewpoint, looking for opportunities to continuously improve the contribution of personnel and hence the competitiveness of the organisation and the career prospects and general well-being of staff.

Gather data

- 288** As a minimum, the inputs to the management review should include data on:
- assessments of competence;
 - management of subcontractors;
 - management of noncompliance;
 - management of change;
 - safety performance data;
 - resourcing requirements (and any resourcing problems);
 - analysis of management information;
 - CMS verification and audit, especially recommendations for change of the CMS.

289 Analysis of the safety performance data for your organisation can play an important part in the review. This should include an analysis of a range of key performance indicators that can be traced back to the influence of staff competence. Since, ideally, there will be little real incident data available, you should monitor and review measures of precursors to incidents such as noncritical mistakes and errors in, for instance, safety systems design, that are picked up by systems tests later in the development process. A root cause analysis of accidents, incidents and precursors may indicate inadequate levels of competence and therefore weaknesses in the CMS.

290 You should attempt to identify sources of industry-wide data to compare to your own organisation's performance. Accident, injury and incident (including near miss) reports made available by other organisations provide a valuable benchmark to assess your own organisation against. You might even consider establishing benchmarking arrangements across departments within your own organisation, or with other peer-organisations.

291 Available data will vary across industry, but may include: health and safety incidents; staff turnover; the number of staff identified as working below standard or requiring a development programme; and feedback during assessment.

Feedback

292 When the review has been completed, the results and recommendations should be fed back into the relevant parts of the CMS, leading to a systematic and regular updating and improvement of the competence management system. The changes that the review process recommends should be well managed and communicated to all involved. The aim of the feedback is to ensure that everyone is kept up-to-date and thus improve the competence management system itself and ensure that competence in your organisation is being maintained and updated effectively. You may also need to make changes to current safety cases.

- 293** As a minimum, the outputs from the management review should include any changes to the:
- scope of the CMS;
 - optimisation of organisational roles;
 - standards of competence;
 - CMS process;
 - staff requirements;
 - allocation of responsibilities;
 - development of competence; and
 - arrangements with subcontractors.

Implement results

294 The managers involved in operating the competence management system should implement the agreed recommendations for changes to the CMS resulting from the review. The introduction of changes should be monitored, and amendments agreed as required, to ensure recommendations are implemented appropriately and within acceptable timescales. It is important to ensure effective communication at all levels of those managing the competence management system and also among the personnel within the scope of the CMS whose competence is assessed, so that changes are fully understood. The development of such changes of course leads to amendments to [Principles 1](#) and [Principle 2](#) and then throughout the system.

Keep records

295 The planning of management reviews, traces of their execution, the outcomes, and the follow-up should all be recorded in the information management systems of the CMS ([Principle 12](#)).

Seek efficiency

296 Management reviews of the CMS should be consistent, and where desirable integrated with, existing arrangements for management reviews of other management systems in your organisation, such as that required for a quality management system under ISO 9001.

FURTHER INFORMATION

297 Guidance on continuous improvement of 'capability maturity' is provided by the Carnegie Mellon Software Engineering Institute [Ref. 10].

298 Guidance on continual improvement is also provided in ISO 9001:2000 Quality management systems – Requirements [Ref. 8].

299 Sources of benchmarking data include, for instance, HMRI's Statistics and Annual report and London Underground's Safety performance reports.

Please suggest possible sources of further information that might assist those responsible for managing corporate reviews.

Appendix 1 A competence model

A1.1 A 'competence model' sets out the relationships between the various concepts used in the management of competence. A competence model explains, for instance, the relationships between competence standards, organisational activities, and individual roles.

A1.2 While each organisation is free to choose its own competence model, designing your own competence model is not simple. Even understanding existing competence models may be difficult. However, in the long run it is usually easier to accept the complication of establishing some kind of competence model, so as to provide a consistent framework for your competence standards, than to develop competence standards in the absence of such a framework, leaving the complications to emerge later.

A1.3 Figures 3 and 4 below illustrate one competence model. This is a generalisation and simplification of the model used in "*Safety, Competency & Commitment – Competency Guidelines for Safety-related System Practitioners*" [Ref. 7].

A1.4 In the following explanation of this model, the terms that have a specific meaning for the purpose of the model – such as **task** - are printed in **bold italic**. When other terms, such as 'activity' appear in plain text, they are being used in a very general 'everyday' sense.

THE ORGANISATIONAL PERSPECTIVE

A1.5 The activities that an organisation performs can be viewed in a variety of ways – as a hierarchy, or as a network of interconnected processes, for instance. But generally members of staff work either individually or in teams to fulfil some well-understood **function** – such as '*Procurement*', '*Software design*', or '*Instrumentation testing*'. Some functions might be quite static, single departments in an organisation – such as 'goods inward'. Others in, for example, a project-based organisation might have several instances as distinct teams – '*Software integration*', for instance - within the various project teams.

A1.6 **Functions** comprise **tasks**. Tasks that form part of '*Procurement*', for example, might include '*Incorporating safety requirements into an invitation to tender*' and '*Auditing suppliers*'. In this competence model, such a **task** is the smallest unit of activity for which there would be a **competence standard**.

A1.7 A **competence standard** for a **task** might express an expectation of some *technical skill* appropriate to the task, but there will also, in general, be competence standards that encapsulate expectations of *behavioural skills*, such as team working; *knowledge*, of the risks in a particular application domain, for instance; and *underpinning understanding*, of the relative merits of HAZOPS and FTA, for instance.

A1.8 To summarise thus far, for each **function**, comprising a set of **tasks**, there will be a set of **competence standards**. (See Figure 3.)

LEVELS OF COMPETENCE and COMPETENCE PROFILES

A1.9 While the competence to wire a 13-amp plug correctly may be quite binary – one can or one cannot do it properly – '*Auditing suppliers*' might be performed with varying degrees of competence.

A1.10 In the *Safety, Competence & Commitment* model this is addressed by introducing the concept of '**levels**' of competence. For each of the competence standards, both those that are task-related and those that are function-related, three levels of competence are recognised: '**Supervised practitioner**', '**Practitioner**', and '**Expert**'. These terms are self-explanatory. A person who does not yet possess sufficient competence to be considered a '**Supervised practitioner**' is termed a '**Trainee**' with regard to that particular competence standard.

A1.11 Individuals will therefore not be either competent or not: they will have a **competence profile** with differing levels of expertise with respect to different competence standards.

A1.12 Three levels of competence for each competence standard are probably sufficient. Increasing the number of levels usually increases the difficulty of judging which level of competence a person possesses.

A1.13 The concept of **level** can be extended to the **function**, so that an individual can be considered to be, for instance, a **supervised practitioner** in the *procurement* function or an **expert at hazard analysis** (or perhaps both). Each will require definition of the criteria to be satisfied. These could be specific profiles, with fixed levels for each profile in order to be considered a practitioner, say, in the relevant function. But it is more likely to look something like:

“A practitioner in this function should have, as a minimum, practitioner-level competence at least in ‘team-working’ and ‘knowledge of safety-related standards’, and practitioner-level in 6 out of the other 9 competence standards, with no level in any competence below supervised practitioner.”

THE STAFF PERSPECTIVE

A1.14 Each individual contributes to a **function** by performing a **role**. Each **role** requires at least a minimum **profile** of competence. The **role** is therefore specified in terms of the different **levels** of competence required for the **competence standards** associated with the function. This might be done in terms of specific profiles, with **levels** set for each **competence standard** associated with the **function**. Alternatively, if **levels** have been established for each **function** (see preceding section) it might be done by specifying such a **level** for the **function**.

A1.15 For simplicity, each individual in this model is presumed to have a single **job**. Frequently, though, an individual might contribute to more than one **function**, performing different **roles** on each of them, satisfying the different competence requirements for each role.

A1.16 In general, functions are performed by teams of individuals, and each member of the team is unlikely to undertake all the tasks that make up their function. Whoever puts together the team for each function should therefore specify the individual roles and the combination of roles required for the organisation to perform the function adequately, and should select staff with appropriate **competence profiles** that at least meet the requirements of the defined **roles**.

CONTEXT

A1.17 By separating the core principles of **competence standards** from their **context**, a limited set of common competence standards can be applied universally in many industry sectors, applications, technologies, and regulatory environments.

A1.18 Consider, for instance, a typical **competence standard** for ‘hardware test specification’.

A1.19 In principle, one might specify quite separate competence standards for all the different ...

- types of hardware that may require test specification – smart transmitter, PLC, bespoke logic, ...
- facets of a test specification – functionality, test coverage requirements, environmental conditions, ...
- application domains, with their particular operating environments and regulatory requirements - offshore oil-rig, school-crossing traffic lights, ...

- levels of responsibility that an individual might take – a new and junior member of a team, a senior staff member with full accountability, ...
- levels of expertise required in different circumstances.

A1.20 The immediate consequence of this approach would be that almost every organisation and even every project would have their own very specific competence standards matched to their own context at a particular point in time. The next consequence would be that an assessment of competence in one context would be quite unusable in another. That is to say that if an individual had been assessed as being competent in some role in, say, avionics – such as the design of flight control systems – then no benefit could be derived from that if the individual were to be considered for a role in the design of the control system for aircraft landing-gear. The two *are* different, and it would be entirely wrong to suggest that competence in one domain implies competence in the other. But it is almost certainly the case that some of the competence in one domain will be transferable to the other.

A1.21 The recommended alternative is to separate, in the definition of competence standards, generic principles of competence requirements from the context of the application of those principles.

A1.22 This approach requires that in an assessment of an individual's competence the assessor:

- interprets the (generic) competence standards in the particular context of the individual's current work, and
- captures that context (sector, application area, technology, etc.) for which the individual has demonstrated that they have satisfied the generic competence standards.

A1.23 This applies to both assessment of existing staff and assessment of recruits (internal or external). In the former case, capturing of the context is an investment in the future: in the latter case it is necessary to check how pertinent previous competence assessments of the recruit are to the intended deployment of that recruit.

Figure 3: Competence Model (1) - Organisational perspective

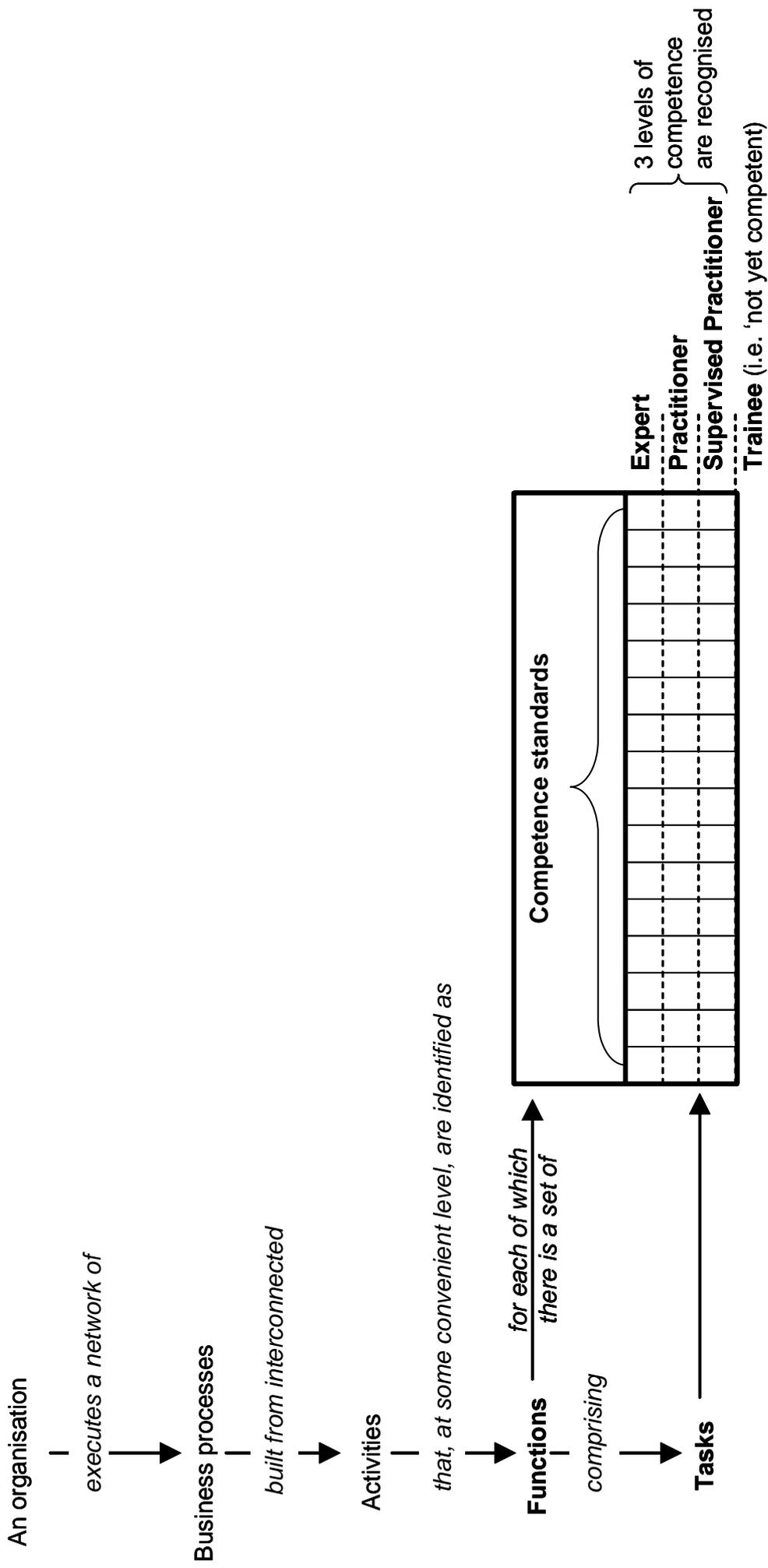
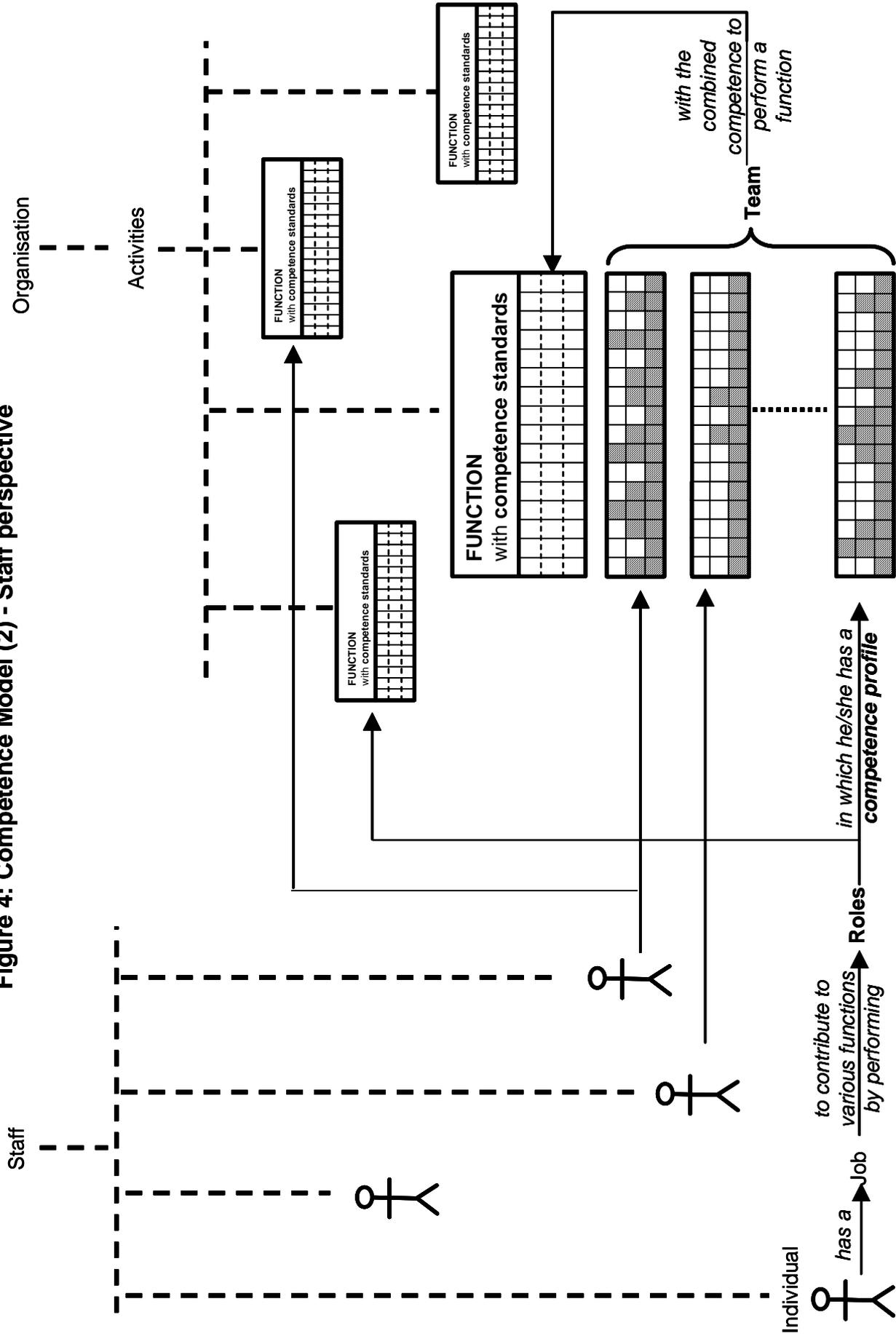


Figure 4: Competence Model (2) - Staff perspective



Appendix 2 Guidance for the individual

A2.1 While this document has been developed primarily for those responsible for safety management or for managing competence in an organisation, the application of this guidance will clearly have an impact on you, the individual employee. It will clarify the expectations on you and it will help your career development.

A2.2 While your organisation might attempt to ensure the quality of your work by checks, supervision, inspections, testing, and so on, these techniques can only sample the full set of activities of the staff in any organisation. Safe performance depends primarily on the competent performance of the individual – on *your* competence and that of your colleagues. This is being recognised in many sectors and, as a consequence, requirements for staff to be competent are being incorporated in industrial standards and in legislation. [Appendix 3](#) indicates some examples.

A2.3 You can help both yourself and your organisation by understanding and preparing for this increased focus on your competence.

Find out what is expected

A2.4 Just what are the requirements for competence for the type of work that you do? In principle this should have been explained in your induction or training, but if your organisation does not yet have a fully operating competence management system then new requirements may have been introduced without your having been made aware. Or have you perhaps been promoted or otherwise taken on more responsibility?

A2.5 Does your trade organisation or professional institution have a code of conduct that requires you to be competent and to refuse to do work for which you are not competent?

A2.6 Apart from a general requirement to be competent, are there specific competence standards defined for people in your type of work? [Appendix 1](#) gives an indication of the various types of standard that you might find.

Make assessment easier

A2.7 Most assessment of competence is ‘evidence-based’. That is to say that an assessment of your competence is likely to be based on a review of the evidence that you accumulate, during your work and during any training, to show what experience you have, what capabilities you have acquired, and any tests that you may have undertaken. These can then be compared with the expectations of the competence standards for your present or prospective work.

A2.8 Your employer may help you by maintaining records in a corporate information system, but you can help yourself by maintaining a record, perhaps in a log-book, of the work and training that you have undertaken, and an indication of the nature of the evidence that exists to substantiate this and where that evidence is held.

A2.9 You can even facilitate assessment by undertaking a self-assessment of your own competence against the competence standards for you work, in advance of the formal assessment.

Identify your own career development needs

A2.10 Consider where you want to go in your present job and in your career more generally. Find out what the competence requirements and competence standards are for the kinds of roles that you would like to take on. Consider what training you will need and how you might get the necessary experience. You will then be well-prepared when you come to plan your personal development – whether this happens after an assessment of your

competence, or after a routine staff appraisal, or when considering switching jobs (whether within your present organisation or in a move to another).

Gain the credit and get the benefits

A2.11 One of the benefits of a competence management system is that you get formal recognition of the competence you possess. Apart from certificates and licenses, your organisation will have records of your competence and its development, and of the evidence from the workplace of your competent performance.

A2.12 Moreover, a modular scheme of competence standards, such as that indicated in [Appendix 1](#), even facilitates 'portability' of competence recognition across industrial sectors, making it much easier for you to transfer to another sector in future.

A2.13 However, because of their confidentiality, it is unlikely that you will be able to take, for instance, technical designs that you have produced to another employer. Normally, even log-books are held by your employer when you move to another organisation: apart from reasons of confidentiality, again, the organisation may have to retrospectively provide evidence that their work was performed by competent staff. You may therefore find it helpful to retain a duplicate record of just your competence evidence, 'sanitised' to exclude confidential information, so that you can in future back up your claims to possess particular competence. ([Principle 12](#) contains the expectation that your existing employer will confirm the validity of any claim to competence that you may make in future employment.)

Appendix 3 Regulations containing competence requirements

A3.1 Listed here are several regulations that contain requirements concerning competence for health and safety that could apply to safety-related systems, depending on their function and industrial setting. The list provides a guide only and should not be considered as exhaustive.

A3.2 For further details consult the published regulations and, where available, the relevant approved code of practice.

- Provision and use of Work Equipment Regulations 1998
- The Control of Major Accident Hazards Regulations 1999
- The Offshore (Safety Case) Regulations 1992
- The Offshore Installations (Prevention of Fire and Explosion, and Emergency Response) Regulations 1995
- Quarries Regulations 1999
- Railways (Safety Case) Regulations 2000
- The Railways (Safety Critical Work) Regulations 1994
- The Control of Substances Hazardous to Health 1999 (COSHH)
- The Health and Safety (Display Screen Equipment) Regulations 1992
- The Ionising Radiation Regulations 1999
- The Noise at Work Regulations 1989
- The Lifting Operations and Lifting Equipment Regulations 1998
- The Electricity at Work Regulations 1989
- Offshore Installations and Wells (Design and Construction, etc) Regulations 1996
- The Construction (Design and Management) Regulations 1994
- The Diving at Work Regulations 1997

Appendix 4 Useful organisations

Please suggest organisations that might be able to help those introducing or operating a competence management system in any way. This could include:

- *sources of reference material (such as standards bodies and regulatory organisations)*
- *sources of guidance on how to comply with requirements (such as those same bodies, but also professional institutions and trade associations)*
- *sources of training or development of competence.*

References

- 1 IEC 61508 Ed.2 CD, Parts 1 to 4, *Functional safety of electrical/electronic/programmable electronic safety-related systems*: committee drafts available from the British Standards Institution with references DPC 05/30143452, DPC 05/30143456, DPC 05/30143460 and DPC 05/30143464
- 2 *Railway safety principles and guidance: Part 3 Section A Developing and maintaining staff competence* HSG197 HSE Books 2002 ISBN 0 7176 1732 7
- 3 *Safety-related systems: Guidance for engineers* (Issue 2, 2002) The Hazards Forum, ISBN 0 9525 103 0 8
- 4 *Management of health and safety at work: Management of Health and Safety at Work Regulations 1999: Approved Code of Practice and guidance* L21 HSE Books 2000 ISBN 0 7176 2488 9
- 5 BS EN 61508, Parts 0 to 7, *Functional safety of electrical/electronic/programmable electronic safety-related systems*, British Standards Institution
- 6 *The Functional Safety Zone* (An area of the website of the International Electrotechnical Commission providing guidance on functional safety and the application of IEC 61508 and related standards). http://www.iec.ch/zone/fsafety/fsafety_entry.htm
- 7 *Safety, Competency and Commitment: Competence Guidelines for Safety-related System Practitioners*, Institution of Electrical Engineers: 1999. Institution of Electrical Engineers. ISBN 0 85296 787 X
- 8 *ISO Standards Compendium ISO 9000 - Quality management* (10th edition), International Standards Organization ISBN 92-67-10381-4 (paper) and ISBN 92-67-01142-1 (CD-ROM).
- 9 *Health and safety benchmarking: Improving together: Guidance for those interested in applying benchmarking to health and safety* INDG301 HSE Books 1999 ISBN 0 7176 2494 3
- 10 *Capability Maturity Model Integration* A key resource for capability maturity is the Carnegie Mellon SEI web-site: <http://www.sei.cmu.edu/cmmi/general/general.html#info>
- 11 *Guidelines for quality and/or environmental management systems auditing ISO 19011: 2002*, International Standards Organization. ISBN : 0 580 40556 7
- 12 *Auditing the ISO 19011 Way*. Nigel Carter, publ. British Standards Institution. ISBN 0 580 41428 0

Please suggest suitable resources that might be referenced in this document to help those introducing or operating a competence management system to understand either the requirements or how they might fulfil the requirements.

Bibliography

Out of Control: Why control systems go wrong and how to prevent failure, (2nd edn.) HSE Books ISBN 0 7176 2192 8

Successful health and safety management HSG65 Second Edition HSE Books 1997 ISBN 0 7176 1276 7

Reducing error and influencing behaviour HSG48 Second Edition HSE Books 1999 ISBN 0 7176 2452 8

Please suggest additional background reading on safety management that is pertinent to the subject of competence management.