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**Project:** **PARARI conference Brisbane, Australia**

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**Paper:** **UK Explosives Competence-based Qualifications**

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## Introduction

Established in 2000 to develop National Occupational Standards<sup>1</sup> and National Vocational Qualifications (NVQs) for those involved in munition clearance (ie bomb disposal – both EOD and IEDD) and search activities, the Standards Setting Body for Explosives, Munitions and Search Occupations (SSB for EMSO) then went on to specify the competence of those who work with explosives. These became known as the Explosive Substances and Articles (ESA) standards. This work is described in more detail in the PARARI paper for 2009<sup>2</sup>

The work was developed by senior representatives of those organizations involved in ESA activities including the Ministry of Defence (MoD), Army, Royal Navy, Royal Air Force, Dstl, QinetiQ, AWE, Leaffield Engineering and MBDA.

### ***ESA standards***

The key outcomes of the project were:

- an occupational map ie a descriptive report of the industry, its size and composition; skills and training

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<sup>1</sup> Referred to here simply as "standards"

<sup>2</sup> This can be downloaded from: [http://www.deniseclarke.co.uk/news\\_review.html](http://www.deniseclarke.co.uk/news_review.html)

issues; roles employed; numbers employed and other notable related issues;

- a functional map which describes all the explosives-specific functions carried out in the explosives industry and the most common generic functions;
- a suite of around 450 standards (of which around 260 are explosives-specific), describing the measures by which someone's performance would be measured (*performance criteria*), descriptions of the parameters of competent performance (*contexts*) and the critical minimum knowledge and understanding (*knowledge requirements*) needed to fulfil the performance criteria and contexts – all written as outcomes;
- a total of 35 qualifications designs (including subsequent developments) at levels 1 – 4 (effectively, basic support, operator, supervisor/technician and operational manager).

UK Health and Safety legislation states that people working with explosives *shall be competent* but this has not been defined until the ESA standards were developed.

In July 2009, the MoD published a requirement to demonstrate competence against the ESA standards where an article is any equipment containing explosives. This applies to all people working with or responsible for ordnance, munitions and explosives. Specifically, it says:

*The competence of those working in Weapons, Ordnance, Munitions or Explosives (WOME) shall be demonstrated against the standards of best practice set by the sector; these are the National Occupational Standards (NOS) for Explosives Substances and Articles (ESA).*

The Health and Safety Executive (HSE) has also stated that, when carrying out inspections, it will review the competence of personnel against the ESA standards. We anticipate that the development of competence when working with explosives will become increasingly important in the UK. This can be done by working to standards. Assurance of competence can be achieved through the award of competence-based qualifications that provide external, independent validation of internally assessed competence.

## Coverage of the ESA standards

The ESA standards cover the use of explosives in the following areas:

- Research, design and development
- Safety management
- Test and evaluation
- Manufacture
- Maintenance
- Procurement
- Storage
- Transport
- Facilities management
- Entertainment
- Logistic disposal
- Munition clearance and search
- Semi-generic supporting activities.

## What is "competence"?

The UK has adopted the Mansfield and Matthews model of competence when developing National Occupational Standards ie:

*competence is the ability to perform consistently to occupational standards*

The relationship between the ESA standards and other performance-related specifications can be described by the following model:

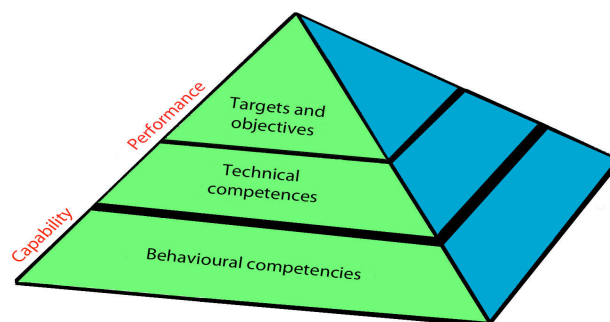


Diagram 1

There are three drivers to performance: targets and objectives, technical competences and behavioural competencies. The pyramid explains the relationship between these. Targets and objectives are agreed at performance appraisals and state the quantified annual expectations of staff. These will probably change every year ie these are annuals.

However, in addition to achieving specific targets and objectives, people need to maintain the organization's good practice in what they *do*: in other words, they need to achieve the requirements of technical competences. The technical competences describe what people do in their jobs and the standards they should maintain continuously. These are sometimes also known as *functional competences* or *standards*. These are the ESA standards. These quality expectations are permanent – ie they are perennials.

In order to help achieve their targets and objectives and maintain the required quality expectations, people also need to exhibit certain personal qualities – what people *are* ie behavioural competencies (also often known as *personal qualities*). For example, if you are a sales assistant, it would be helpful to develop the quality of *customer focus*. To continue the gardening analogy, the behavioural competencies are the compost that helps the annuals and perennials grow and bloom.

## The uses of standards

Standards lie at the heart of all HR processes. There are in fact many possible uses of standards in a range of HR processes as described by the diagram below.

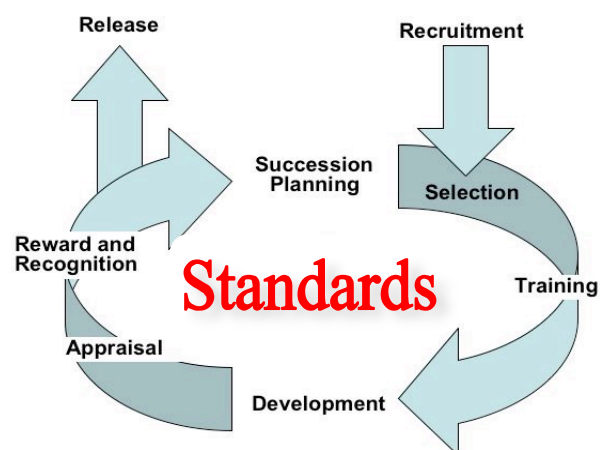


Diagram 2

By describing what an organization expects of its staff, standards can be used for many different purposes such as:

- recruitment and selection - eg job adverts, interview aide memoires, job descriptions, role profiles;
- appraisal – standards amplify an organization’s expectations; appraisals can be more objective & evidence-based;
- training needs analysis – through self-assessment, development discussions, 360° feedback, Personal Development Plans, audits of team strengths & development needs;
- training syllabus design – based on the requirements of the standards;
- career management – eg career maps, career planning tools;
- succession planning – systematic approaches to talent management based on an organization’s analysis of development needs;
- demonstration of a commitment to known quality standards, investment in people and the ability to comply with legislation, regulation and codes of practice;

... and many more specific applications within each part of the HR cycle.

## **Qualifications and Credit Framework (QCF)**

The UK national qualifications framework has been replaced by the QCF. The components of QCF qualifications are known as *units of assessment*. The units can accredit knowledge, competence or a combination of both. They are written as learning outcomes and assessment criteria – ie their format is completely different from the format of National Occupational Standards. The units each have a level which is constant and they bear credit values which are based on learning time (1 credit = 10 hours learning time).

The units are all entered onto a national database which you can find at: <http://register.ofqual.gov.uk>. The units must be accompanied by Rules of Combination (RoC) which specify how credit from which units achieved may count towards a qualification. Qualifications are described by their size – Award (1 – 12 Credits); Certificates (13 – 36 Credits) and Diplomas (37 credits +). There are 9 levels within the QCF. Thus, there can be an Award, Certificate and Diploma at any or all levels from Entry level to level 8.

For a quick reference of the different levels within the QCF, see diagram 3 below.



Diagram 3

For full details of how all UK qualifications fit together, please see diagram 4 below.

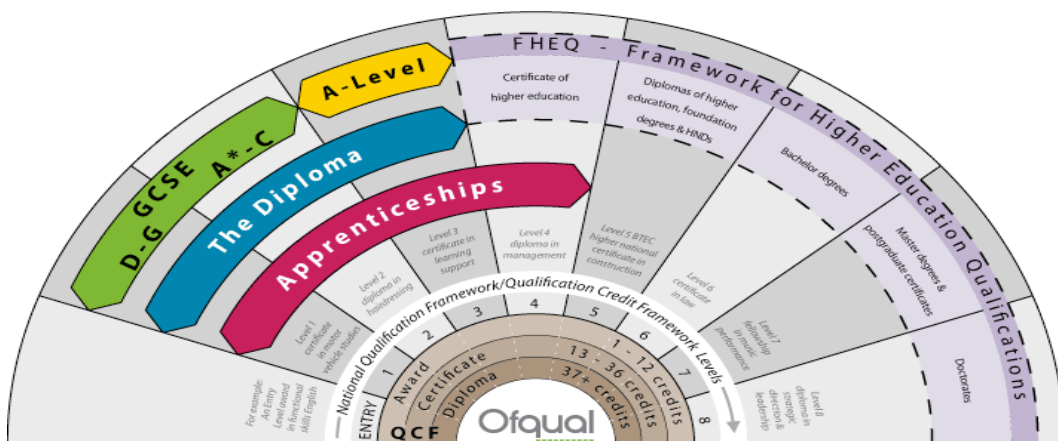


Diagram 4

A radical innovation of the QCF is that for the first time, employers can become awarding bodies in their own right, design and award their own qualifications. Those that have gone down this route in the UK include MoD, airline Flybe, Network Rail and the UK division of global restaurant chain McDonalds.

## **HSQ's explosives vocational qualifications**

HSQ offers three different types of vocational qualification:

- Qualifications and Credit Framework (QCF) Awards, Certificates and Diplomas (ie nationally regulated qualifications);
- industry recognized vocational qualifications;
- Bespoke qualifications.

These are described in more detail below.

### ***HSQ's QCF qualifications***

We have developed the following nationally regulated, QCF qualifications:

- Movement of Explosives - for those who transport explosives manually, using equipment or vehicles but who are not required to hold an ADR licence;
- Defence Range Safety - for those who manage the safety of defence ranges (applicable to managing safety on military training ranges and defence trials, evaluation, research and proofing ranges);
- Munition Clearance and Search - we have begun the process of converting the ESA standards into QCF-compliant format and have now gained national accreditation of these qualifications which accredit the competence of a range of different roles and levels of personnel working in munition clearance and search functions.

### ***HSQ's industry-recognized vocational qualifications***

Our industry-recognized vocational qualifications are all built on nationally accredited ESA standards. They comprise a number of standards and are written in terms of the competence needed for a particular function which is measured by achieving the performance criteria; specifications of the critical minimum knowledge and understanding needed to fulfil the performance criteria and descriptions of the parameters of competent performance – the “contexts”.

They involve an occupationally competent, qualified assessor to assess the candidate and they require internal and external verification of assessment processes. Note that assessors and internal verifiers are employees of the organization but external

verifiers as HSQ appointees. Thus, independent, objective validation of internal assessment is achieved.

Evidence must be current, valid, complete, authentic, sufficient and auditable, and is obtained by:

- direct observation of the candidate;
- photographic, audio, video or other electronic recording of candidate activity;
- the presentation of work produced by the candidate;
- previous recorded achievement;
- questioning the candidate to assess the underpinning knowledge and understanding and/or to authenticate the validity of other evidence.

HSQ's industry recognized vocational qualifications are immediately available in the following areas:

- Explosives safety management and/or advice/and/or regulation (L4)
- Test and Evaluation Management of ESA (L4)
- Test and Evaluation Supervision of ESA (L3)
- Test and Evaluation Operations of ESA (L2)
- Explosives Maintenance Operations (L2)
- Explosives Storage Management (L4)
- Explosives Storage Supervision (L3)
- Explosives Storage Operations (L2)
- Explosives Road Supervision (L3)
- Explosives Road Transport Operations (L2)
- ESA Disposal Management (L4)
- ESA Disposal Supervision/Operations (L3)
- ESA Disposal Operations (L2)
- Planning and Management of Munition Clearance Operations (L4)
- Planning and Management of Specified Target Search Operations (L4)
- Supervisory Management of Munition Clearance and/or Specified Targets Search Operations (L3)

- Search for and Disposal of Munitions (L3)
- Search for Munitions and/or Specified Targets (L3)
- Contribute to the Search and/or Disposal Function (L2)
- Provide Support for Search or Munition Clearance Operations (L1)
- General Explosives Operations (L2).

### ***Bespoke qualifications***

Unlike NVQs and QCF qualifications, bespoke qualifications are not part of a national framework and cannot be used for exemption from, say, college entrance requirements. However, for some employers and groups of employers, such awards are a useful tool for the selection, training and advancement of personnel and, where employers are in a collaborative community, may have credibility amongst them all, providing transferable skills records.

Bespoke qualifications may be linked to National Occupational Standards or national qualifications and are likely to recognize approved in-house training, role profile matching or other records of experience, skills and knowledge in employment.

### **QinetiQ: a case study**

QinetiQ wished to provide auditable assurance of the competence of its personnel who work with explosives. In addition, QinetiQ's training system specified training requirements but no detailed specification of training content existed. A more robust, auditable system of training was therefore sought that would prove competence. Consequently, QinetiQ decided to implement Homeland Security Qualifications' (HSQ) vocational qualifications that are built on the ESA standards and which accredit the competence of those who work with explosives as this would provide the sought-after robustness and an audit trail that would prove the compliance of QinetiQ's staff with the ESA standards.

QinetiQ first identified its target candidates for the industry-recognized explosives qualifications that were to be delivered ie:

- Safety Management (levels 3 & 4);
- Test & Evaluation (levels 2, 3 & 4);
- Storage (levels 2, 3 & 4);
- Transport (levels 2 & 3);

- Disposal (levels 2, 3 & 4);
- Munitions Search (level 2);
- General Explosives Operations (level 2).

QinetiQ's next task was to train the identified Assessors and Internal Verifiers upon whom success of the scheme would depend. For around 500 candidates in all QinetiQ's sites across the whole of the UK, this involved training 4 Internal Verifiers and 11 Assessors. The experiences described below have come about through the delivery of assessor and verifier training and the business benefits that have arisen have similarly come about through this initial preparatory process - ie even before the qualifications have been implemented.

## **Business benefits**

### ***... to the business ...***

- role profiles have been created for people who work with explosives which have been mapped to the ESA NOS. These will be embedded in QinetiQ's HR system so that, in future, people will be appraised against them annually as the qualifications' assessment specifications are seen as amplifying QinetiQ's expectations;
- through the implementation of qualifications that measure the competence of the explosives workforce, QinetiQ now has a demonstrably proven, competent and safe workforce. It also has evidence of workers' limitations and identified training needs which has informed the development of targeted training plans which in turn has led to better use of resources when commissioning training;
- the implementation of the qualifications has led to the formalization of a common standard of technical knowledge and expertise among supervisors and managers who may have arrived in their current positions by various routes;
- by encouraging supervisors and managers to get more closely involved in day to day operations, this has increased their knowledge of explosives-related processes and facilitated a system for continuous improvement to safety, processes, quality and standards;
- as business practices are enhanced and the workforce works to consistent processes and standards, there has already been a reduction in re-work;

- many of QinetiQ's UK sites have evolved from different starting points and ownership structures which has led to variations of practice. The introduction of HSQ's qualifications has begun to bring together business practices to a common standard and modus operandi. This has also led to a reduction in the amount of re-learning and re-certification that was needed when people transferred from one site to another;
- a culture of quality-assured competence is growing;

***... to supervisors and managers ...***

- supervisors and managers do not all share the same background, training, experience and expertise. By using the ESA standards and qualifications' assessment specifications, supervisors and managers are developing a more detailed understanding on technical issues eg resource allocation, process methods, safety and standards. Reductions in mistakes and re-work are expected as a result;
- previously, in a climate of economic difficulty and recent redundancies, workers were concerned about voicing their concerns about work processes. However, as supervisors and managers have held confidential reviews of individuals' performance, people now feel more confident about expressing their concerns and making suggestions for improvements;
- by providing objective evidence of competence in the appraisal process, the use of the qualifications' assessment specifications has reduced the "horns and haloes" effect of other performance review processes that are not built upon observed evidence;
- supervisors and managers have already noticed a difference in the candidates' performance as they now have a detailed focus for their attention, provided by the qualifications' assessment specifications;
- traditionally, there has been a perception among workers that the only valuable training was that which was delivered through a training course. However, there has been an increasing recognition by workers that training can be delivered in many ways, particularly when it comes to developing skills;
- new tools for HR and an updated concept of the quality assurance of personnel and processes;

**...to workers (ie candidates)...**

- by comparing what they do with QinetiQ's Standard Operating Procedures (SoPs), workers have identified gaps in their knowledge for which they have asked for more training which in turn is helping to create greater robustness of training - both in terms of the delivery and content;
- as workers now have sight of the qualifications' assessment specifications at higher levels than their own roles, they are now able to take an informed view as to what is required to progress to higher levels. This will in turn help to inform QinetiQ's career management and succession plans;
- in discussion with their supervisors, workers have questioned why procedures have been traditionally carried out in a particular way and have made suggestions for improvements to processes and, as a result, greater efficiency, quality and safety has been achieved;
- improved communications between workers and their supervisors has come about as a result of private one-to-one discussions about individuals' performance when measured against the qualifications' assessment specifications. This in turn has led to greater clarity of expectations, greater trust and enhanced levels of self-esteem and confidence which has led to improvements in morale and motivation;
- workers now have the confidence to discuss control systems for managing explosives processes so already, there is evidence that people are looking beyond their immediate activities to spot the potential for improvements to the robustness of systems;
- workers acknowledge the investment that the company has made in their training, development and the accreditation of their competence and skills. The fear that qualified people will leave the company has proved untrue: as the achievement of a qualification has introduced a note of stability, people are content to remain in an environment where they feel that their contribution is valued.

In short, QinetiQ's experience has been that the implementation of these qualifications provides a vehicle to unequivocal communication, a shared, consistent understanding of the company's expectations and standards and a reduction in the

scope for variation of interpretation of SoPs. By embedding this degree of detail, high quality standards of work, safety and best practice will be built into everyday work.

Already, even before the qualifications have been implemented, tangible business benefits have been identified which are directly attributable to the qualifications. For example, workers have been able to use the qualifications' assessment specifications as process audit tools and question the clarity and currency of work instructions. This has led to suggestions for business improvement. QinetiQ anticipates more opportunities for business improvement as HSQ's qualifications are rolled out across all UK sites.

## Summary

In summary, there are many significant benefits to assuring the competence of people against objective and detailed descriptions of competence. The achievement of explosives qualifications not only provides proof of competence but, if embedded in HR systems, provides organizations with systematic processes for capacity-building (both knowledge and competence) and the better targeting of resources, quality enhancement, risk avoidance, collaborative working and gaining a competitive edge.

Homeland Security Qualifications has started delivering explosives-related vocational qualifications in the UK. We plan to continue expanding the range of our offering and our client base, both at home and abroad.

UK regulators are taking an increasing interest in the explosives area to the point of seeking assurance that organizational policies meet competence requirements. The award of independently validated, competence-based vocational qualifications provides such assurance.

Denise Clarke

13 July 2011