



SAFETY SERVICES ORGANISATION

WHY COMPETENCIES ARE IMPORTANT

IATG 01.90

YOU TELL ME

- The nature of ammunition and explosives, with their potential for unplanned, violent reaction, makes it necessary to develop recommendations and guidelines for safe conventional ammunition management.
- The effective implementation of IATG [*or any formal, structured, OME Safety Management System*] requires well-trained and educated individuals with specialist knowledge.
- *[SQEP]*
- Source: [IATG 01.90 - Introduction](#)



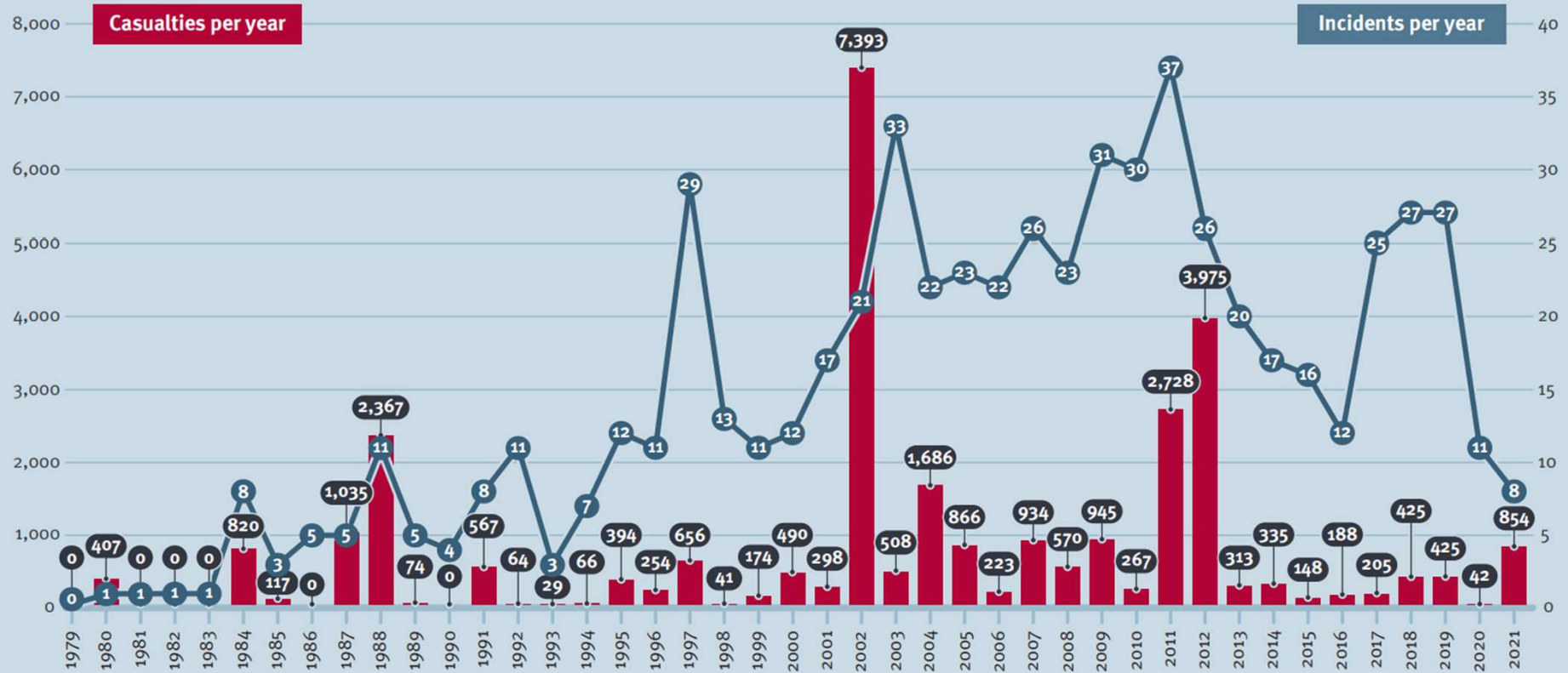
UEMS

Quick facts on unplanned explosions at munitions sites (UEMS)*

* Figures for 2021 include data up to 15 December.

UEMS: Incidents and consequences

Casualties of UEMS, 1979–2021: During the period January 1979 to December 2021, more than 30,000 casualties resulting from UEMS incidents were recorded. The highest number of casualties was recorded in 2002, mainly due to the devastating UEMS incident that occurred in Lagos, Nigeria. Similarly, the incident in Abadan, Turkmenistan, in 2011 and the one in Brazzaville, Republic of Congo, in 2012 contributed strongly to the spikes in 2011 and 2012.



UEMS

Casualties per year vs. incidents per year:** The main goal of dealing with UEMS is not to prevent incidents altogether—which is impossible—but to mitigate the consequences for the victims of these incidents.

** Comparing casualties per year with incidents per year shows that the numbers do not always correlate.



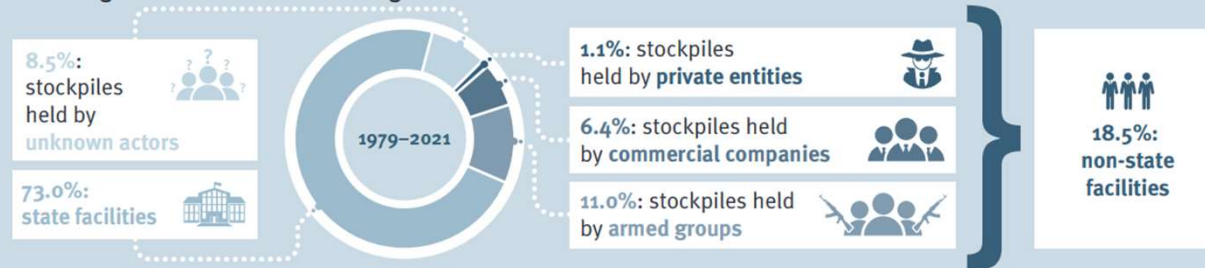
UEMS incidents with the largest number of casualties:***



1st	27/01/2002	Lagos, Nigeria	6,500
2nd	04/03/2012	Brazzaville, Republic of Congo	3,777
3rd	07/07/2011	Abadan, Turkmenistan	1,482
4th	22/04/2004	Ryongchon, North Korea	1,460
5th	10/04/1988	Rawalpindi, Pakistan	1,193
6th	04/06/1988	Arzamas, NIZ, Russian Federation	1,091
7th	21/12/1987	Alexandria, Egypt	1,006
8th	29/04/2009	Dar es Salaam, Tanzania	726
9th	07/03/2021	Bata, Equatorial Guinea	705
10th	22/03/2007	Malhazine, Mozambique	622

*** Sex-disaggregated numbers are not available for most of the incidents, although it is clear that women, men, boys, and girls were equally among the victims in most cases, given the fact that all of the incidents happened in heavily populated residential areas.

Percentage of UEMS incidents occurring in:



Total casualties of all UEMS incidents from January 1979 to December 2021

30,883

Number of casualties per decade

Decade	Number of casualties
1980s	4,820
1990s	2,245
2000s	13,913
2010s	9,009
2020s	896

Number of UEMS incidents from January 1979 to December 2021

636

Average yearly incidents per decade

Decade	Average yearly incidents
1980s	4
1990s	11
2000s	23
2010s	24
2020s	10

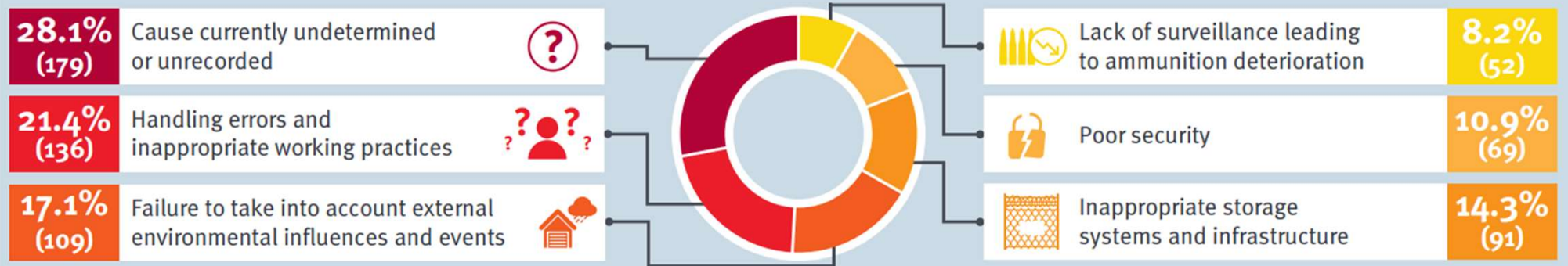
AN AVERAGE OF 718 DEATHS AND INJURIES PER YEAR HAVE BEEN RECORDED 1979–2021



UEMS

UEMS: Main causes

Improper physical security and stockpile management (PSSM) practices increase the probability of UEMS occurring. During the period examined (1979–2021) the main causes behind UEMS incidents were:



RAF FAULD 27 NOV 1944

- 3500-4000T Ordnance (mostly aircraft bombs)
- ≈70 dead
- 'Hanbury Crater' 307m diameter, 30m deep
- Several buildings, including a complete farm destroyed to 1300m (4.9ha)
- Nearby 450,00 cubic metre reservoir destroyed
 - Consequent damage to lime and gypsum works
- Causes:
 - insufficient oversight
 - inexperienced workers
 - wrong tool



LAGOS, NIGERIA – JANUARY 2002

- Catastrophic explosions at the Ikeja ammunition depot in the centre of Lagos, and the resulting panic which caused as many as 600 people to drown in a canal as they fled during the night, resulted in more than 1,100 deaths, and 5,000 injured. The accident displaced 20,000 people and destroyed much of the northern part of Lagos
- Cause – fire in a market which spread to the ammunition depot
- Poor condition of munitions stored



NAVAL BASE, CYPRUS – JULY 2011

- On July 11, 2011, 98 shipping containers holding propellant etc at the Evangelos Florakis naval base on Cyprus exploded.
- The blast killed 13 people and injured 61 others.
- Additionally, the blast damaged the Vasiliko Power Plant, causing widespread rolling power outages
- The containers had been sitting out in the open for more than two years, where they were subject to the hot Mediterranean climate



TERMS AND DEFINITIONS

- COMPETENCE - ability of an individual to do the job properly.
- COMPETENCY - the related knowledge, skills, abilities, attributes and behavioural traits of an individual.
- STANDARD - a documented agreement containing technical specifications or other precise criteria to be used consistently as rules, guidelines, or definitions of characteristics to ensure that materials, products, processes and services are fit for their purpose.
- [IATG 01.90 Section 3](#)
- SQEP – Suitably Qualified and Experienced Person



TRAINING $\neq$ COMPETENCE(Y)

- Training does not guarantee ability to safely and successfully perform in an explosives environment
- Time in post does not necessarily mean they are safe, efficient and up to date
- => Vocational qualifications and assessments are used alongside theoretical/formal/academic qualifications



STANDARDS

- There are no international standards, and very few national standards, that lay down exactly what competences are required for the various roles within an ammunition management system.
- Although many nations have formal military technical training for conventional ammunition stockpile management, the development of which will have utilized a Training Needs Analysis to determine the syllabus, this does not necessarily result *in* competency and is more qualification based.
- SO...



STANDARDS

- UK created a set of National Occupational Standards for Explosive Substances and Articles (ESA NOS)
 - Adopted by EUExcert as 'best practice' as part of the wider EU ERASMUS programme for education, training, youth and sport.
 - NOS ESA also comply, with the principles of the European Credit System for Vocational Education and Training (ECVET)
 - IATG personnel competences are based on this 'best practice'
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- NB1 – see also [HSE Publication L150](#)
 - NB2 – see also [DSA 03.OME Part 2 Chapter 1 Section 3.10](#)



WHAT IS AN OCCUPATIONAL STANDARD?

- An Occupational Standard is a statement of the standards of performance individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding.
- They are developed for employers by employers through the relevant Sector Skills Council or Standards Setting Organisation



ESA7.3-PUT EXPLOSIVE SUBSTANCES AND/OR ARTICLES INTO STORAGE

Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety, environmental and other relevant regulations, legislation and guidelines
- P2 confirm that the transit, staging and storage locations are suitable

Knowledge and understanding

You need to know and understand:

- K1 the health, safety and environmental and other statutory legislation, regulations and safe working practices and procedures governing explosives, and their implications for your area of work
- K2 the relevance of personal protective equipment (PPE)

Additional Information

Glossary

- 1 Items: in good order; suspect or damaged
- 2 Storage requirements: volume; accessibility; ease of identification

<http://nos.ukces.org.uk/PublishedNos/COGESA7.3.pdf#search=explosive%20substances%20and%20articles>



ADVANTAGES OF OCCUPATIONAL STANDARDS

- Structured
- Comprehensive
- Realistic
- Externally accredited = guarantee of quality



STANDARDS

- There are regional competency standards for explosive ordnance disposal (EOD) available:
 - Test and Evaluation Protocol 09.30/01/2014 Version 1.0 dated 30 October 2014 Explosive Ordnance Disposal (EOD) Competency Standards



COMPETENCE MODEL

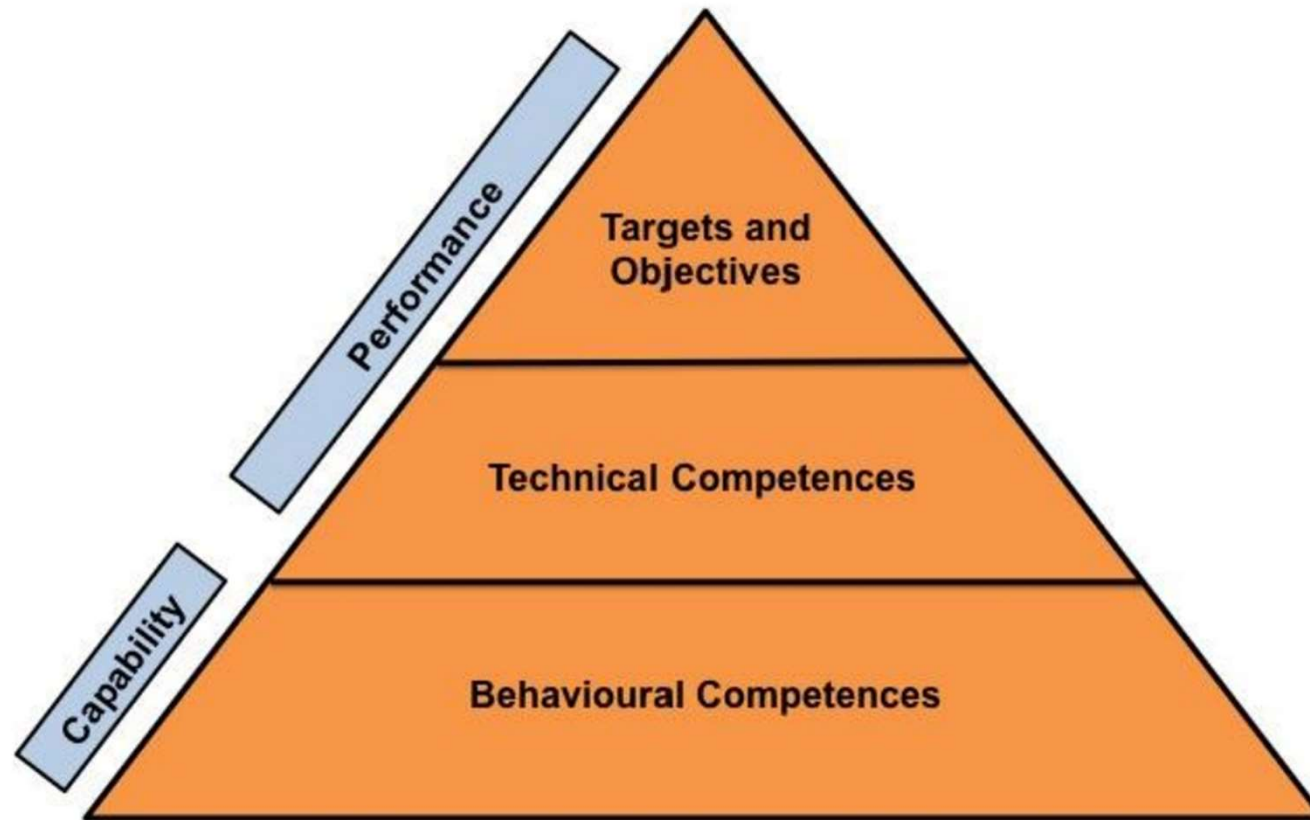


Figure 1: Competence Model



AIM OF TECHNICAL COMPETENCES

- a) **provide agreed competences** that may be used by organizations engaged in the stockpile management of conventional ammunition;
- b) assist in developing a **commonality of approach** across the international community;
- c) **provide objective criteria** to assist organizations in the recruitment of appropriately qualified and experienced personnel;
- d) provide a **benchmark for the development** of conventional ammunition stockpile management training;
- e) **contribute towards a reduction of accidents** during conventional ammunition stockpile management processes; and
- f) contribute towards the **maintenance and enhancement of safety** during conventional ammunition stockpile management.



STOCKPILE MANAGEMENT PERSONNEL

LEVEL	Category	Role
1	Ammunition Handler	Assist in the handling and movement of ammunition and explosive substances and articles during issue, receipt, storage and distribution.
2A	Ammunition Processor	Inspect, maintain and repair ammunition or other explosive substances and articles.
2B	Ammunition Accountant	Accurately account for ammunition and explosive substances and articles.
3	Ammunition Supervisor	Supervise the issue, receipt, storage, distribution and maintenance and disposal of ammunition and explosive substances and articles.
4	Ammunition Manager	Manage the storage, issue, receipt, distribution, maintenance and stockpile management of ammunition and explosive substances and articles.
5	Ammunition Inspector	Develop, implement and audit the policy and technical instructions for all aspects of the stockpile management of ammunition and explosive substances and articles.
6	Ammunition Regulator	Develop national policy and technical instructions for all aspects of the stockpile management of ammunition and explosive substances and articles. ¹⁴

Table 1: Categories of ammunition personnel



ASSESSMENT - GENERAL

- Determination of an individual's theoretical knowledge
- Translation of this knowledge into effective and efficient activity in the workplace
- Multiple types of evidence may be required
- Suitably qualified and accredited assessors, who are occupationally competent themselves in ammunition management, shall be used to assess an individual's competence.
- Institutions should analyse assessors (IQA) and the assessment process itself (EQA) to avoid bias



VOCATIONAL QUALIFICATIONS

- Outcome-based
 - Knowledge
 - Performance
- Evidence
- Assessment
- Verification
- EQF/QCF vs (N)VQ vs bespoke
- Training providers' role



EQF QUALIFICATIONS FRAMEWORK

EQF Level	Knowledge	Skills	Competence
	In the context of EQF, knowledge is described as <i>theoretical and/or factual</i> .	In the context of EQF, skills are described as <i>cognitive</i> (involving the use of logical, intuitive and creative thinking), and <i>practical</i> (involving manual dexterity and the use of methods, materials, tools and instruments)	In the context of EQF, competence is described in terms of <i>responsibility and autonomy</i> .
Level 1	Basic general knowledge	Basic skills required to carry out simple tasks	Work or study under direct supervision in a structured context
Level 2	Basic factual knowledge of a field of work or study	Basic cognitive and practical skills required to use relevant information in order to carry out tasks and to solve routine problems using simple rules and tools	Work or study under supervision with some autonomy
Level 3	Knowledge of facts, principles, processes and general concepts, in a field of work or study	A range of cognitive and practical skills required to accomplish tasks and solve problems by selecting and applying basic methods, tools, materials and information	Take responsibility for completion of tasks in work or study; adapt own behaviour to circumstances in solving problems
Level 4	Factual and theoretical knowledge in broad contexts within a field of work or study	A range of cognitive and practical skills required to generate solutions to specific problems in a field of work or study	Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities
Level 5 ⁽¹⁾	Comprehensive, specialised, factual and theoretical knowledge within a field of work or study and an awareness of the boundaries of that knowledge	A comprehensive range of cognitive and practical skills required to develop creative solutions to abstract problems	Exercise management and supervision in contexts of work or study activities where there is unpredictable change; review and develop performance of self and others
Level 6 ⁽²⁾	Advanced knowledge of a field of work or study, involving a critical understanding of theories and principles	Advanced skills, demonstrating mastery and innovation, required to solve complex and unpredictable problems in a specialised field of work or study	Manage complex technical or professional activities or projects, taking responsibility for decision-making in unpredictable work or study contexts; take responsibility for managing professional development of individuals and groups
Level 7 ⁽³⁾	Highly specialised knowledge, some of which is at the forefront of knowledge in a field of work or study, as the basis for original thinking and/or research Critical awareness of knowledge issues in a field and at the interface between different fields	Specialised problem-solving skills required in research and/or innovation in order to develop new knowledge and procedures and to integrate knowledge from different fields	Manage and transform work or study contexts that are complex, unpredictable and require new strategic approaches; take responsibility for contributing to professional knowledge and practice and/or for reviewing the strategic performance of teams
Level 8 ⁽⁴⁾	Knowledge at the most advanced frontier of a field of work or study and at the interface between fields	The most advanced and specialised skills and techniques, including synthesis and evaluation, required to solve critical problems in research and/or innovation and to extend and redefine existing knowledge or professional practice	Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research

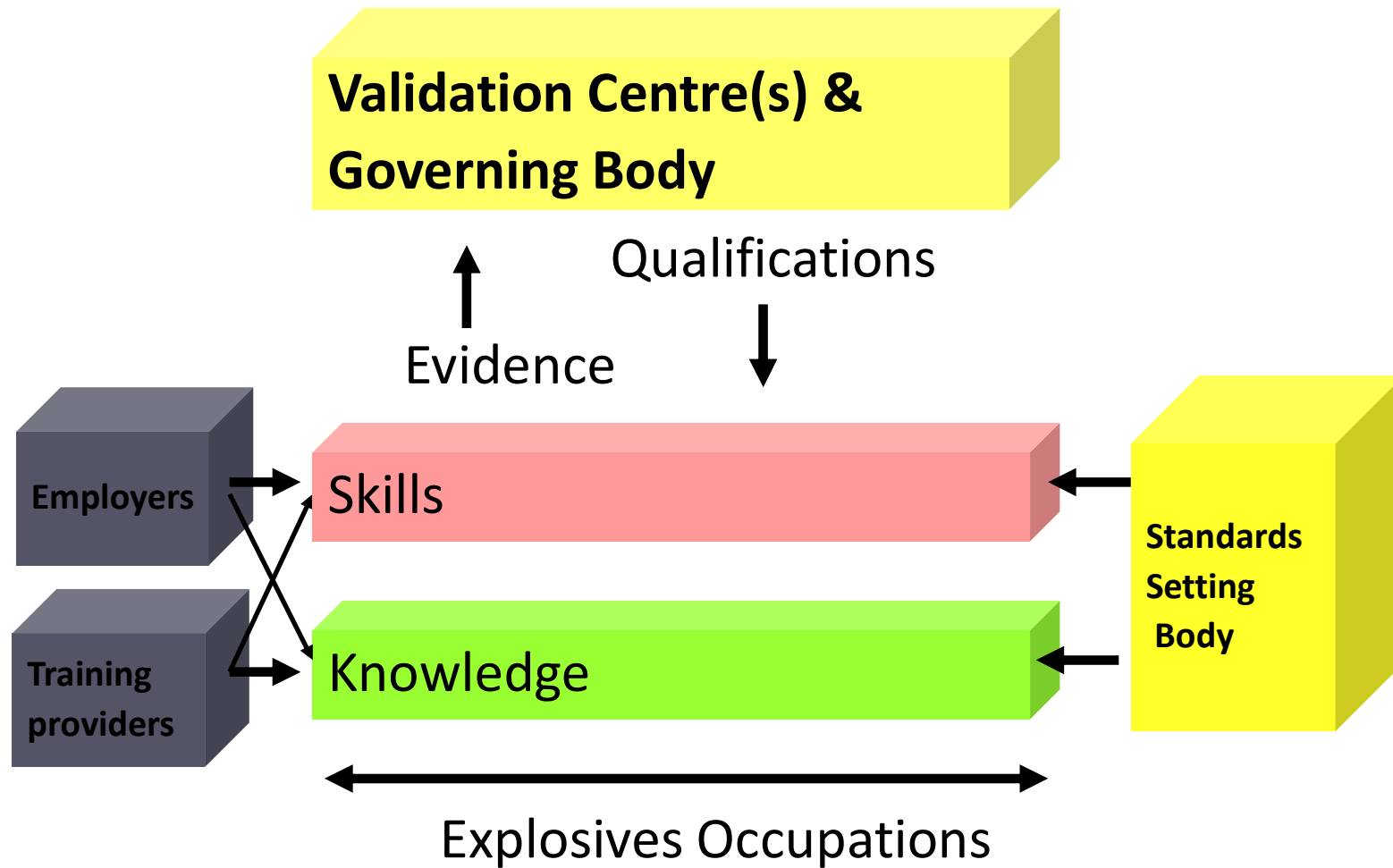


ASSESSMENT/VALIDATION

- Suitably qualified and experienced assessors
 - Knowledgeable and current in the subject
 - Trained to assess people in the workplace
 - Know the Standards
 - Know the qualifications
- Standardisation of assessment



UK MODEL



PRIOR EXPERIENCE AND LEARNING

- Many extant qualifications have required individuals to previously demonstrate competence in conventional ammunition stockpile management.
- Annex M lists recognised qualifications
- qualifications may be added to this list at any time after:
 - a. mapping to the relevant NOS for ESA; and
 - b. clearance by the IATG Technical Review Board (TRB)/Strategic Coordination Group (SCG).



KEY ROLES

- 1 - Research, Design and Development
- 2 - Safety Management
- 3 - Test and Evaluation
- 4 – Manufacture
- 5 - Maintenance (Inspection, Repair, Surveillance and Proof)
- 6 – Procurement
- 7 – Storage
- 8 – Transport
- 9 - Explosive Facilities Management
- 10 - Other Applications (SFX)
- 11 – Disposal
- 12 - Munition Clearance and Search
- 13 – Generic
- [ISSEE database of NOS](#)



STRUCTURE OF NOS

- [National Occupational Standards](#)
- Overview
- Performance Criteria
 - You must be able to...
- Knowledge and Understanding
 - You must know and understand...
- Scope/Range
- Example: [ESA 13.16 Manage Explosives Safely](#)





SAFETY SERVICES ORGANISATION