

European Explosives Sector implementation of occupational standards



The 8th International Conference and Workshop on Explosive Education and Certification of Skills

On 13-14 June this year, KCEM and the EUExc@rt Association organized the eighth International Conference and Workshop on Explosive Education and Certification of Competence.

The conference was held at Best Western Arlanda Hotellby, Arlanda and gathered participants from 11 countries. The conference was part of the EUExImp project.

The introductory speaker was Mark Hardman from Roxel UK. He described the importance of sharing experiences under the heading "Sharing Experience to Improve Our Competency in Safety". This presentation gave the basis for all the discussions at the conference.

Then the following presentations followed:

Denise Clarke: Benefits of Working to Explosives Standards and Qualifications

Stefan Krol: NOS as a management tool connected to ISO 170025

Viive Tuuna, Teele Tuuna: PECCS - Pan European Competency Certificate for Shot Firers

Jörg Rennert, Reimund Göder: Comparison and allocation of the existing professional standard in UK with the education requirement and safety standards in the production of explosives in Germany. Illustrated and presented by the (example) of the production of Mini Boosters

Tõnu Tomberg, Viive Tuuna, Teele Tuuna, Kristel Veersalu: Occupational Standards in Practice for Estonia

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Tom Goodman



Erik Nilsson and Ken Cross

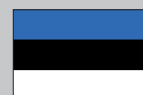
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The final outcome of the EUExImp project,

"Handbook for the Implementation of Occupational Standards in the Explosives Sector",

is published on the EUExc@rt webpage:
www.euexc@rt.org



Estonia



Germany



Portugal



Sweden



The United Kingdom

The 8th International Conference and Workshop on... (cont.)

Tom Goodman: Implementing NOS in the U.K. SFX industry's training program

Katherine Prizeman: UN SaferGuard Validation Process: Validating expertise to build national capacity (presented by Ken Cross)

José Gois, António Rodrigues: Are UK occupational standards on ESA capable of describing the goals of a medium-sized pyrotechnic company in Portugal?

Erik Nilsson: Education and Training in Sweden

Jackson Shaver: Quality Management National Occupational Standards (presented by Ken Cross)

Ken Cross: The Handbook for using occupational standards in organizations

In connection with the last presentation, the contents and layout of the manual were discussed. The handbook will, like presentations, be posted on the EUExcert website, <http://www.euexcert.org>.

Where next year's conference will be held is not yet decided yet but there is a great interest from the United States to arrange it.



Reimund Göder and Jörg Rennert



David Andersson and Lars Harald Lied

Portugal Achievements



Are UK occupational standards on ESA capable of describing the goals of a medium-sized pyrotechnic company in Portugal?

GJR. – Pirotecnia e Explosivos, SA, a Portuguese medium size company devoted to the manufacture of pyrotechnic articles and black powder and to the retail of explosives for civil use, was supported by the University of Coimbra and assisted by the UK company Picrite for the implementation of UK occupational standards for explosives and substances articles (ESA).

This process was undertaken within the EUEXIMP Erasmus+ European project and GJR has accepted to submit five employees of its staff (20% of total employees) to the assessment according the occupational standards.

These five employees assessed included the manager, the supervisor and three operators, all of them mainly devoted to the manufacturing of black powder for blasting ornamental rock. So, according to the occupational standards three role profiles (Manager, Supervisor and Operator) were designed with mandatory and optional

functions for each key-role in agreement with the needs of the company.

In accordance with occupational standards, the assessment is based on the construction of Portfolio for each candidate according its key role profile. Each Portfolio includes the:

- (1) Personal Details of the learner and of all participants and bodies in assessment process (assessor, awarding body, approved centre, centre manager and internal quality assurance),
- (2) List of Units for the standards selected,
- (3) Assessment Methods used for of each unit and
- (4) Evidence Matrix, where is marked the evidences achieved for each unit according the assessment methods used.

The assessment of individuals for vocational qualifications based on occupational standards can take many forms but the abiding principle is that the candidate's operational performance and underpinning knowledge

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ge are assessed in appropriate contexts. There are two principal processes for assessment against occupational standards: first, the direct observation of the candidate performance and knowledge in the workplace; second, the recognition or accreditation of prior experience and learning. The assessment methods include namely:

- (i) Observation,
- (ii) Questions (verbal & written),
- (iii) Product/process of evidence,
- (iv) Witness Testimony and
- (v) Simulation.

Faced with this framework, in order to allow an adequate assessment of GJR selected employees, the solution has been to qualify two Portuguese nationals, both with great experience in the industry and with excellent English language skills, as assessors.

The procedure for the two assessors to achieve the qualification was carried out by QinetiQ Qualifications Centre and was based on the understanding of the assessment methodology and their skills to prepare and conduct two partial assessments of two different employees of GJR.

The qualification of the two candidate assessors took five days. Two days were for the candidates to understand the theory elements that underpin the assessment methodology based on the occupational standards, two more days more were for the observation of the candidates during the preparation and conduction of two partial assessments and one day was for a professional discussion of each candidate with the instructor. During the qualification process each candidate assessor fulfilled a portfolio (with the key role profile set for assessor) with the assistance of the instructor.

In order to assure the maintenance and improvement of quality assessment, supporting the assessor and monitoring its performance, ensuring standardisation and to meet the external quality assurance requirements an ac-

credited internal verifier has followed the qualification process. The qualification process of the assessors was concluded with the submission of portfolios with the report of the instructor and internal verifier to the HSQ - Homeland Security Qualifications awarding body. Both candidate assessors were succeed and obtained the Open Awards Level 3 Award in Assessing Competence in the Work Environment (QCF).

The two new assessors were able to carry out the assessment of selected GJR employees and the company request the registration of the five candidates to HSQ Centre. One of the assessor carry out the assessment of the three Operators and the other assessor carry out the assessment of the Supervisor and the Manager. The qualification processes were carried out using the following steps:

- (1) preparation of the assessment plan,
- (2) analysis of organisational and technical archives produced in GJR connected to work and responsibilities of the staff to assess,
- (3) selection of the assessment methods for each of the units,
- (4) preparation of questions to the candidate, selection of the activities for observation, questions for witnesses, others,
- (5) explanation of the assessment procedure to the candidate and conduction the assessment for collection of evidences,
- (6) fulfilment of the portfolio and validation of all evidences achieved with the signatures of the candidate,
- (7) submission of the portfolio to the internal verifier for ensuring standardisation and to meet the external quality assurance requirements for the qualification process,
- (8) reply of internal verifier and
- (9) approval and issue of certificate.

The time required for the full assessment of each candidate managed by the assessor was 3 days. When a further candidate was assessed in the same key role, the number of days was reduced. With the increase of experience of the assessor, we expect a further reduction of this time.

(cont. page 4)



Use of Black Powder to granite extraction of ornamental rock



Use of hydraulic hammers to break ornamental granite rock



The five employees have achieved the certificate of the HSQ Centre and GJR has qualified the implementation of occupational standards for ESA a success and intend to enlarge this qualification process to all staff. The large spectrum of the occupational standards was a strength point for the implementation and allows the organisation of the jobs and vocational training.

As these certificates are not yet recognised by Portuguese authorities there exists a threat for the implementation in more companies of explosive sector. The dissemination of this project by AP3E – Portuguese Association of Studies and Engineering of Explosives will be important for the translation of the occupational standards and implementation.



Estonia Achievements



Tallinn University of Technology (TTU) was involved in EUExImp Project since 2014 and worked together in close co-operation with Voglers Eesti OÜ blasting company.

In the first stages of the project the role of TTU was mainly to support Voglers Case Study, but in development of the Project, we influenced our national legislation and regulations concerning blasting and explosives handling.

Experience gained from the EUExImp Project was used in the preparation of Estonian occupational standards in 2015 to 2016. In the main, we used the topics of existing UK standards and training courses for explosives handlers for specifying the tasks and educational and experience-based demands for explosives handlers.



Teete Tuuna, Explosives Safety Supervisor

In addition, we put some input from our experiences from EUExImp Project in our new Explosives Act and lower level national regulations.

TTU gained experience about the feasibility of successful implementation of the British occupational standards in Estonia. The British training system was very familiar, because this kind of training system works in Estonian Defence Forces.

Unfortunately we almost have no training system for civilian explosives handlers in Estonia.

Based on experience the University gained from participating in EUExImp project, TTU has taken the opportunity to elaborate a training system that is in compliance with EU requirements. At the moment, we are working-out and applying training courses and evaluation standards, merging continuous education with the training system of explosives handlers so that they are qualified to work across EU.

The training of practical explosives handlers is somehow insufficient in Estonia - we have a evaluation/examination system (procedures), but our training courses are currently not standardised enough.

Currently TTU is working on the integration of our EUExImp experiences into the curriculum of mining engineering in Tallinn University of Technology. This is expected to enable us to carry out training of explosives handlers according to the needs of the Estonian mining industry and which can be exported with our graduates who work around the world.

BACKGROUND

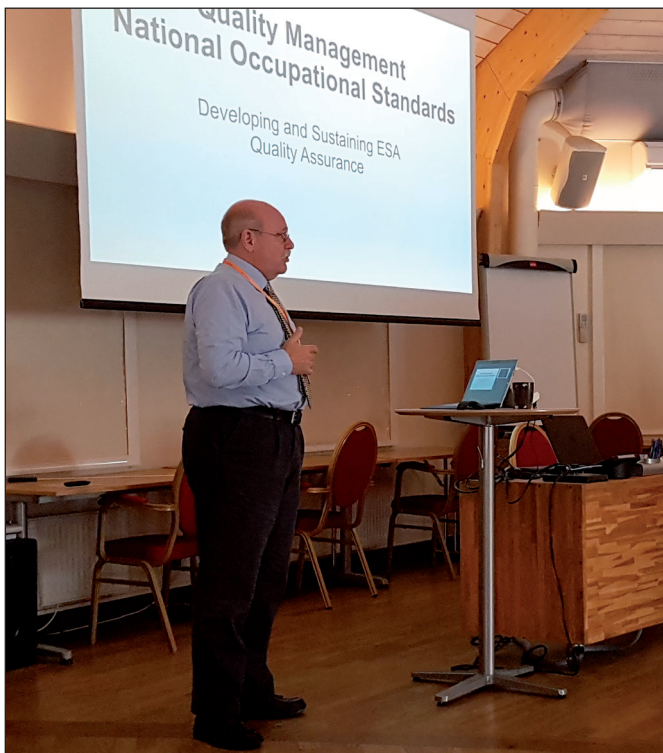
Event Horizon is an engineering company that specialises in the use of explosive materials. We have extensive experience in a wide range of fields including; aerospace, defence, explosive ordnance disposal (EOD), demolition, salvage and special effects.

They provide 'Institute of Explosives Engineers' (IExpE) and 'Broadcasting Entertainment Cinematograph and Technicians Union' (BECTU) endorsed explosives safety training to the UK film industry. The completion of this training enables an individual to progress their career through the Joint Industry Grading Scheme (JIGS).

All course tutors are members of IExpE and have many years' experience both in the film industry and the explosives industry. A full filmography can be seen at the company website (www.precisionenergetics.co.uk). Event Horizon also runs and teaches the current IExpE course.

From discussions with Event Horizon management and the council of the IExpE, it was clear that the courses met the long-standing requirements of the industry but they had evolved over time in order to meet new requirements but they had never been subject to any formal systematic approach to training design.

The initial course of instruction, also known as 'Part 1' or 'Basic' was required to provide sufficient knowledge and skills for the successful trainee to be able to work safely under close supervision on a film or TV production set.



Ken Cross

The BECTU grading scheme then required the trainee to record a set amount of time on differing productions before applying for re-grading as technicians and eventually as senior technicians and taking the so-called 'Institute Course' which, in conjunction with their proven experience and an additional suite of written examinations, would enable them to apply for membership of IExpE and also for further re-grading as a Supervisor.

In outline, Event Horizon's sub-project has the following elements:

- Define BECTU's requirements for qualifications and IExpE Membership.
- Work with IExpE to map their membership criteria to NOS
- Map the Event Horizon Basic Course to NOS
- Map the 'Institute Course' to NOS
- Create a new BECTU Stage 1 and Stage 2 suite of qualifications based on NOS and the requirements
- Identify any spin-off or additional qualifications that might be useful to EH and/or BECTU
- Consider creating EH as an HSQ Centre
 - Assessors
 - Internal Verifier

Capture the challenges and solutions as a case study and good practice guide for a chapter of the EUExImp 'intellectual output' manual/guidance note.

REQUIREMENTS DEFINITION

Event Horizon has worked with BECTU for many years and many members of their staff are members of the union in their own right. As such, and having delivered the so-called Part 1 course, they were aware of the SkillSet occupational standards for special effects

After a short introductory session on how to map the course to the Standards, Event Horizon went on to identify not only which of the Standards are covered in their current training but also whether they covered it as either 'knowledge' or 'performance' in keeping with the Standards.

The former was identified by whether or not the topic was assessed in the current end-of-course examination and the latter would be considered as fully mapped if it was tested practically during the training.

BECTU executive agreed that the new qualification structure and supporting qualifications would be suitable for their use.

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MAPPING

The first stage in designing the new qualifications scheme was to create role profiles for each grade, as agreed with BECTU. The grades covered in this role profiling activity were:

- Trainee (this is a formal grade in the BECTU system, although as an individual progresses he/she might be awarded sub-grades of 'Assistant Technician' or 'Engineer' to allow them to be paid a higher rate and to give the customer a better feel for the individual's experience.)

- Technician
- Senior Technician
- Supervisor
-

Event Horizon and BECTU requested that the three grades of BECTU qualification should be aligned with the grades of IExpE membership.

BECTU GRADE	IExpE GRADE
Trainee	Student
Technician	Technical Member Associate (for those already in IExpE before 31 Dec 15)
Senior Technician	Member
Supervisor	Member Fellow




THE NEW QUALIFICATIONS

Event Horizon met the awarding organisation, Homeland Security Qualifications (HSQ), because it is the awarding organisation that creates, manages and awards qualifications in order to maintain impartial governance and rigour in the system. This principle applies whether the qualifications are national, industry-standard or bespoke for a particular organisation.

We had an idea of what we wanted but were concerned about the sheer volume of individual Standards in each Role Profile that we had created. The role profile for the Technician grade includes over a hundred individual Standards in eleven key roles. Clearly this was going to be unmanageable and place an unfair burden on candidates and assessors.

Fortunately, HSQ has dealt with this situation on many occasions and they were able to advise on how to whittle down the number of Standards in a qualification that remains relevant to the industry and individual while ensuring the core competence of the individual and maintaining the required quality.

As it happens, HSQ had designed qualifications for the use of explosives in the entertainment industry some years ago, in concert with stage and film pyrotechnicians and civil war re-enactors, but none of which had been taken up as a formal qualification. Our design session with HSQ therefore became a lot easier as it then required us to update the qualifications into QCF format, ensuring that the critical, core needs of BECTU and the wider SFX community were still met.

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HOMELAND SECURITY QUALIFICATIONS	HOMELAND SECURITY QUALIFICATIONS	HOMELAND SECURITY QUALIFICATIONS
CANDIDATE PACK	CANDIDATE PACK	CANDIDATE PACK
HSQ L2 CERTIFICATE IN THE USE OF EXPLOSIVES IN THE ENTERTAINMENT INDUSTRY	HSQ L3 DIPLOMA IN THE USE OF EXPLOSIVES IN THE ENTERTAINMENT INDUSTRY	HSQ L4 DIPLOMA IN THE USE OF EXPLOSIVES IN THE ENTERTAINMENT INDUSTRY
HSQ code: Q10-C2-003	HSQ code: Q10-D3-002	HSQ code: Q10-D4-001
23 May 2016	23 May 2016	23 May 2016

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Using the process outlined in the 'Step-by-Step Guide to Implementing Occupational Standards', which is available as a separate document, we followed the 'Which document is available? ... Programme ...' route shown in the flow chart (below).

Having the course material, course design and a copy of the Candidate Pack for each of the qualifications meant that we could relatively easily identify which Units and elements of units should be included in the course and which would be better suited to being assessed using Witness Testimony as evidence.

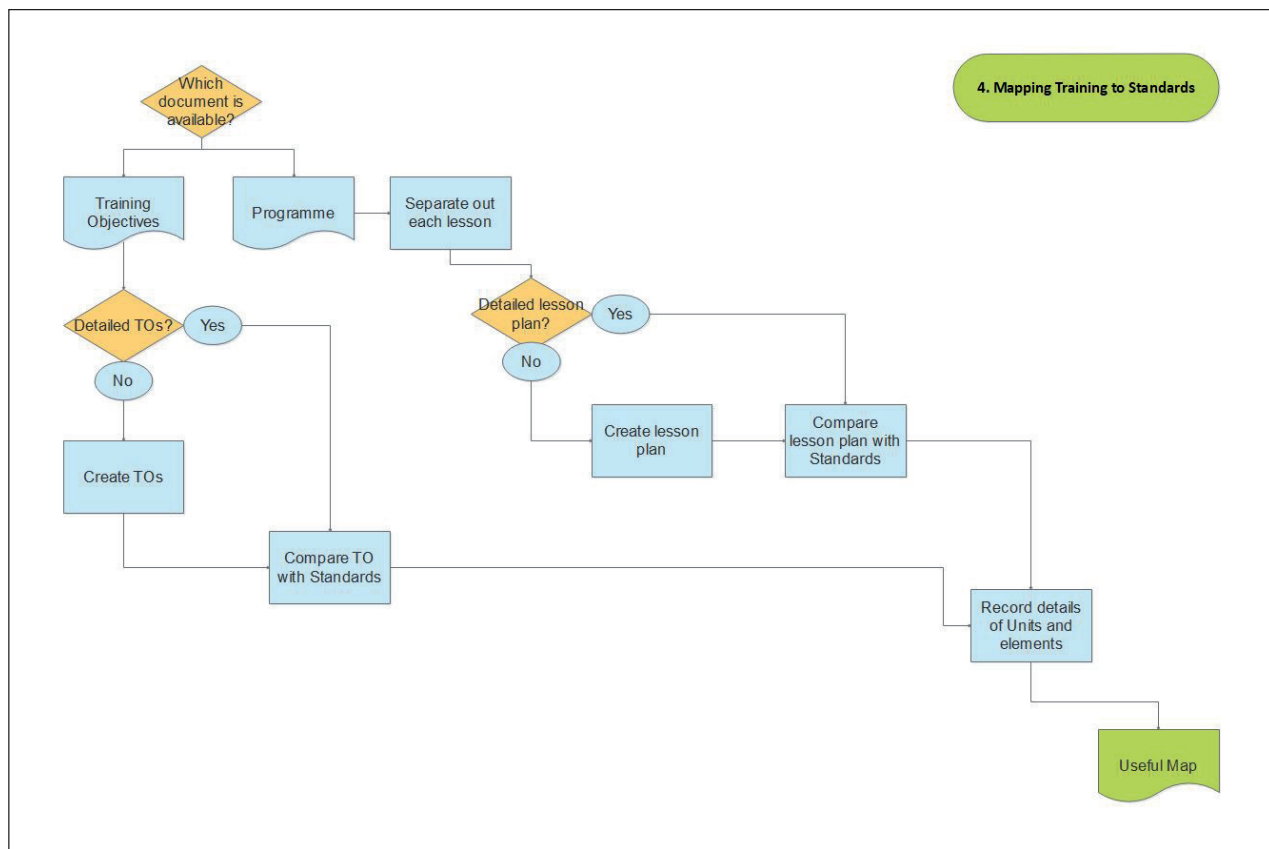
ACCIDENTAL OUTCOMES FROM THE PROJECT

The owner of Event Horizon recognised during the first year of the project that the drive towards demonstrable competence within the SFX community, coupled with the professionalisation of the SFX courses they deliver, provided an opportunity for the company to step further into the training, assessment and qualification arena.

In July 2015, Event Horizon entered into dialogue with Homeland Security Qualifications, the awarding organisation for vocational qualifications in the explosives, munitions and search occupations, with a view to becoming an HSQ Qualifications Centre.

This development provides Event Horizon with a better understanding of the occupational standards, looking at them from a quality assurance viewpoint to ensure that there is consistency in the assessment of candidates, i.e. the application of the Standards in the training and workplace environment.

Setting up a qualifications centre also required the formal training and qualification of sufficient assessors and internal quality assurance (also known as internal verification (IV)) to enable the company to assess candidates on the various courses and also their workplace evidence as they continue towards completion of their own qualifications following training.



VOCATIONAL STANDARDS

In the content of the EUExImp project, which is financed and supported by the EU Erasmus Program, it was investigated how far the UK standards of the professional qualification for employees working with explosives is applicable in Germany. In a further step, should be investigated how it can be ensured that those standards will be fulfilled by the employees in each department.

For answering this question both partners, Maxam Germany and Dresdner Sprengschule, chose the production of mini booster „RIOPRIME 25“. At first the whole production process was analysed and the workspaces were worked through.

Secondly, they found out all requirements for the employees that are resulting from the workspaces. Based on the requirements regarding knowledge, abilities and skills they could compare the results to the requirements in the UK.

Like this and with a lot of help from Ken Cross it was possible to create a detailed comparison of the UK standards and the requirements for the work places in the manufacturing process of the mini booster „RIOPRIME 25“. A very high agreement of 90 % could be observed.

In the second part of the question, with regard to ensuring the necessary qualification of the employees of the respective work places, we investigated to what extent the required courses in Germany communicate these qualifications. For this the Dresdner Sprengschule analysed the course contents.

Results showed that all courses developed by the Dresdner Sprengschule communicate all necessary qualifications.

As a last step, we will investigate how the last few missing points can be realised regarding the UK standards. In the process of regular review of operating instructions as well as statutory provisions, it will be ensured that the still missing UK standards will also be fulfilled.

In conclusion, we have demonstrated that the existing training system in Germany maps well to the UK National Occupational Standards. It should be noted that the courses that must be completed are based on state recognition, which makes sure that the communicated qualifications are recognized everywhere in Germany. This results in a flexible range of opportunities for employees whose qualification is based on this system.



Labelling of mini booster



Filling process of mini booster

BACKGROUND

Bofors Test Center's (BTC) core business is testing of products containing explosive substances. BTC has access to a large field of operations (approx. 100 km²) with six permanent test sites available.

All these sites have well-developed infrastructure such as advanced anti-shrapnel cover for personnel and equipment. Should these sites not fulfil a customer's particular requirements, BTC has a number of mobile solutions for setting up a temporary test site within or outside our facility.

With our large areas of land, recording equipment and filming capabilities we have great scope for testing almost anything. We are certified to ISO 9000 and ISO 14000. Being a test centre, it is logical to take the next step, certifying towards ISO 17025.

One of the key issues lacking today is a system to verify the personal skills and competences of our employees. One possible solution is to implement the occupational standards and BTC participation in this project aims to examine these possibilities. A certification according to standard ISO 17025 means a greater opportunity to market the products and services on both the civil and defence market.

TESTING THE EFFECTIVENESS OF THE CHANGES OR POTENTIAL FOR CHANGE

Looking back at why BTC participated in the EUExImp project: SAFETY comes first and the company wanted to see whether it could improve that.

BTC has ISO 9000 and 14000 but some customers are starting to talk about the need to use ISO17025: "Accredited Lab". BTC's concern was that if ONE test centre were to go that way, all others would have to follow. It would be an absolute customer requirement.

BTC has rigorous calibrating routines, and works in very defined processes. The only thing that is missing is a quality definition of the workforce competences and the skills. "Our guys know what is required and what they do, but how can we prove that?" The question was therefore, "Can we use NOS as a management tool", or can we use this method for ISO 17025?

BTC decided that although the method used for the test run of the explosives skills is good, and it works with support from the existing system Competera, the explosives area is not where we need to place our effort. The method works and we have determined that in some cases it might be possible to use existing NOS standards from other areas, or at least partly.

As an example, the V0 radar is complex enough to start with, yet it is one of the simplest tools that only measures the initial speed of a projectile. We have 5 of them, and 8 guys who can operate them. At least 2 are in use every day. The first steps will be to analyse the competences and skills it takes to operate such a radar and deliver reliable data. The structure is there in Competera, and there is a place to put the requirements.

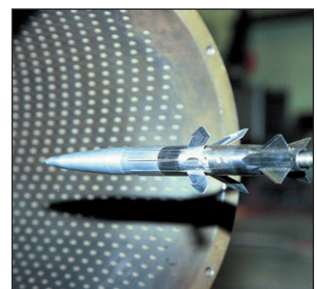
ROLLING OUT THE NEW DESIGN

BTC has decided not to implement the NOS in the explosives skills and competences all over the company. Due to the multi-role workforce such a step would take significant time and effort. The gain in safety and in other areas does not correspond with the effort needed. However, the method will be used when an ISO 17025 CERTIFICATE is the market requirement.

UNEXPECTED OUTCOMES

One of the unexpected outcomes of the project was the realisation that one could apply the principles of the Standards to other, non-explosives staff. In the case of BTC this will include their instrumentation staff, e.g. high-speed photography and measurement engineers:

- Obtain or set standards in terms of context/scope/conditions; performance criteria; knowledge requirements.
- Include the Standards in the role profile for the individual.
- Include the Standards in the competence management system.
- Assess the individuals against the Standards



Testing of ammunition