



European Explosives Sector implementation of occupational standards

EUExImp - Background and Project Description

BACKGROUND

An understanding of explosives science and technology, and the competence to harness it, is central to maintaining Explosives capability, national security, and sustaining a competitive industry.

A consequence of eroding this competence is the increased likelihood of explosives accidents. These are often catastrophic as demonstrated by accidents in Nigeria, Russia, Toulouse and Enschede.

In addition to the serious loss of life there was the very significant damage to houses, domestic and industrial infrastructure and to the environment at a cost of many millions of euros.

There is a perception and some evidence that in Europe competence in this key technological area is being eroded. In several European nations a high proportion of the most experienced and knowledgeable personnel are retiring or nearing retirement. Urgent efforts are therefore underway in some European nations to replenish this expertise.

In the year 2003 KCEM started a European pilot project (EUExc@rt) to tackle this problem. A second project (EUExc@rt II) started in 2006.

A third project (EUExNet) was started in 2009 with partners from 10 European countries and one European organisation. The outcomes of these projects have been presented at a number of international conferences.

This project, EUExImp, was started in September 2014 and will aim to develop transnational partners understanding of how to implement the ESA NOS as human resource (HR) and management tools both at plant level and to develop existing training into a package that is transferable across organizational and national boundaries.

(cont. page 2)



From left: Tom Goodman, Charlie Adcock, Ingo Valgma, Teele Tuuna, Erik Nilsson, Viive Tuuna, José Gois, Jörg Rennert, António Rodrigues, Stefan Krol and Ken Cross. Photo from start-up meeting at Arlanda.

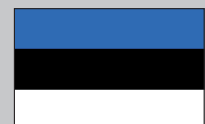
TABLE OF CONTENTS

- EUExImp, Background and Project Description	1-3
- Project Partners	4-8
- UNODA is using the occupational standards	9

The 7th International Conference and Workshop on Explosive Education and Certification of Skill will be held in Telford Shropshire, UK,

14th April 2016

More information can be found at www.euexc@rt.org.



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The EUEXImp project has three phases:

1. Preparation: which includes the creation of practical guidance and support on the implementation of the ESA NOS;
2. Implementation; which includes delivery of support and guidance materials;
3. Closure: which includes the development and distribution of a step by step implementation handbook including best practice and lessons learned as well as the production of guidance materials.

Project activities are related to the need of up-skilling the workforce in the European explosives sector and to ensure that the companies and stakeholders in the sector will maintain or develop their competitiveness to ensure the survival on the global market, prevent job losses and maintain a safe industry.

Project goals will comply with the Horizon 2020 targets to ensure that skills and qualifications can be more easily recognised, within and across national borders, as the project will focus on one specific sector on the European market, the explosives sector.

The restructuring of the industry, in general, have led to many changes, such as lower job growth and skills drain due to workers retirement. It has brought specific changes to the explosives sector related to education and training, where most training previously was organized as in-house training, now it is mainly provided by external education and training institutions. These providers need incentives to adapt their supply to better match industry demands, by the means of collaboration around education and training with industry partners.

The project aims therefore to develop support structures dedicated for education and training initiatives targeted for the industry. The target is twofold;

1. Implement selected key-roles from the occupational standards, specifically developed for the explosives sector in Europe, in five industry partner organisations in UK, Estonia, Portugal, Sweden and Germany and
2. To develop easy to use and easy to understand tutorial materials, such as a step-by step guidance material for process management and a handbook of good practice.

The standards, based on 13 key-roles, provide syste-

matic mechanisms to support: the design of criteria for, selection, training and assessment of new entrants, existing staff, staff appraisal and promotion, the identification of training needs, the specification of organizational human resource (HR) policies, the demonstration of a commitment to quality and investment in people, and the ability to comply with Industry Codes of Practice, and bench-marking tools.

Occupational Standards in Explosive Substances and Articles (build on the European framework EQF) have been developed for the whole industry – both civilian and military – by the UK's Standards Setting Body for Explosives, Munitions and Search Occupations (SSB for EMSO) and it is the desire of the EUExcert Association, through its previous three projects that they should be taken into use across the European explosives sector except where a partner nation has an equivalent system.

Previous EUExcert projects partners agreed to make use of the Occupational Standards, having been involved in the development of the concept of a universally recognised and accepted qualification or standard that could be carried by an explosives worker between companies and partner nations. These standards are based on the outcome of a methodical analysis of the roles and functions of people working within the industry.

This initiative grew out of an awareness that the current pool of personnel with explosives competence is shrinking, the measurement and assurance of competence is the norm in modern professions, legislation and regulation increasingly require employers to demonstrate a commitment to quality and effectiveness of their workforces, activities with perceived health and safety and public safety risks will be subject to increasingly stringent monitoring and regulation, the risk of losses and litigation renders inaction financially and morally unacceptable.

The previous projects EUExcert, EUExDL, EUExNet have all been funded by the European Union, by Leonardo da Vinci, the first and second by the national agency in Sweden (IPK) and the third by the European agency (EACEA). The activities in the previous projects have been conducted to meet the demands from the industry, and have mapped the number of employees in the sector, described relevant occupations in the sector and mapped existing education and training.

The incentives for project related activities have been to develop knowledge and tools to handle skills shor-

tage in order to respond to the lack of sufficient training, improve communication between the industry and education and training providers to match industry demand with supply (VET and FE institutions) and to improve recruitment practice and to develop safer working conditions in order to handle the age distribution by developing a European framework for competencies.

Previous mapping of the age distribution in the European explosives sector shows that more than 50 percent of the workers are 50 years and older and less than 10 percent of the workers are below 30 years of age. Partners from 12 member states and relevant stakeholders at national and European level, the civil and military sector, from academia, trade unions, sector specific associations, education providers etc., have been involved in previous projects.

In order to take the occupational standards to the next level, to go from a tool with little recognized practical value and yet needs to be tested and used by the industry partners, the project aims to give practical examples of how the occupational standards can be used at plant level to add value to their HR-processes and for other stakeholders.

The project is set up as a case study where five industry partners from five nations will implement selected key-roles from the occupational standards in tight collaboration with the five other partners in the project team, who all have previous experience of developing the standards.

The new project EUEXImp will focus on developing support structures, for the industry partners in their efforts to implement the occupational standards. The support will be provided by people from the project team supporting management and HR-staff at plant level during the entire process of implementing the occupational standards in their company.

The implementation process will be conducted in three phases, where each phase will develop learning outcomes that can be built into a tool for managing implementation processes. The three phases are:

1. Initiation of the process, identification of key roles for implementation and setting up a time plan.
2. Implement the selected key roles and standards in the company's HR-routines and processes.
3. Disseminate results and to evaluate the learning outcomes and document good practice.

The implementation process will be monitored and evaluated during the whole period in order to develop experience and knowledge into a step-by-step guidance material for further support of the implementation process. In addition the guidance material will be developed into a handbook in phase three to include good practice.

The purposes of the tools are to support future implementation processes in other companies and to develop easy to use manuals in order to increase the impact from the project. The manuals can be spread to others (companies and stakeholders) when they are available on the project website.

The project team will develop two intellectual outputs during the project period, number 1 is the Step-by-step guidance materials and number 2 is the Handbook which includes a revised form of the step-by-step guidance to include good practice. In order to develop these tool each partner will join a collective learning group, by sharing their experiences from the implementation process. The group will meet regularly at project meetings.

Other expected outcomes during the project period are a change of mind-sets among the project partners, managers and HR-staff. This will happen when the industry partners makes new experiences and discoveries during the project, leading them to changing their attitudes and minds about using occupational standards in their HR-processes.

By disseminating project activities, outcomes and intellectual outputs the project will reach out to other companies, stakeholders, education and training providers and employees and hopefully convince them of that the use of occupational standards can add value to HR-routines and processes and help them to develop a more strategic and systemic approach towards Human resource planning, recruitment, role definition, skills gaps analysis, competence planning and further education.

The project aims to show how the use of occupational standards can help managers and HR-staff to change their practices when mapping skills gaps and change how they communicate with VET-providers and FE- and HE- institutions when demanding company and employee specific education and training.

PROJECT PARTNERS

There are 5 participating countries in EUExImp: UK, Sweden, Portugal, Germany and Estonia.

Each country got two participants which are:

- Picrite and Event Horizon (UK),
- Saab Bofors Test Center and KCEM (Sweden),
- Universidade de Coimbra and GJR – Pirotecnia e Explosivos (Portugal),
- Dresdner Sprengschule and Maxam (Germany) and
- Voglers Eesti OÜ and Tallinn University of Technology, Department of Mining (Estonia).

KCEM is the project promotor.

Estonia Involvement in EUExImp



Department of Mining of Tallinn University of Technology conducts continuous and periodical monitoring of environmental effects (especially noise and seismic effect) of blasting in close co-operation with environmental and technical inspection agencies and also mining and blasting companies. The aim of the monitoring activities is to act as experts in solving cases of damage and disturbance and also to give recommendations for mining and blasting companies to change blasting parameters for diminishing the negative impacts of blasting.

Estonia is refreshing the Explosives Act that is controlling our explosives management. Current Explosives Act (from 2004) passed a lot of changes and it contains a lot of cancelled regulations and references to other legislative acts. The new Explosives Act will be completely harmonized with EU newest Directives and regulations, more clear, compact and better structured.

Professional qualification body for explosives handling and blasting in mining and demolishing is working since 2010 considering occupational qualification standards on EQF levels 3 to 5. The lowest standards Blaster level 3 and Blastmaster level 4 are being prepared to upgrade and the knowledge we are gaining from the EUExImp project can be easily used there.

Other qualification body's considering explosives are organized by Pyrotechnic Association (Pyrotechnician, level 3 to 5) and Estonian Mining Society (Mining engineer level 6 to 8). By the qualification standard for mining engineers a curricula is modified for bachelor and master studies in Department of Mining of Tallinn University of Technology. Explosives handling, drilling and blasting education, also courses for specialists has been regularly given in the Department of Mining since 1938.



Blasting in limestone quarry. Photo: Ingo Valgma

This year, two BSc theses concerning blasting and explosives handling were completed in the Department of Mining of TUT.

One BSc thesis (Ott Oisalu's "Possibilities of Short-Delay Blasting in Controlling of Oil Shale fractioning in Underground Mining") recommends possibilities of re-grouping of the delay groups for improving the quality of oil shale run of mine in underground mines.

The second BSc thesis (Marelle Paas-O'Brook's "Air shock wave prediction for possible emergencies (explosions) in explosives handling") analyses different air shock wave parameters (peak pressure and pulse) prediction methods for use in making more realistic risk analyses of explosives storage and transportation.

In addition to raising the qualified workforce in the field of explosive handling regular practical and scientific analyses considering the environmental influences such as vibration, noise and dust of blasting are being carried out by the Department of Mining TUT.

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Germany Involvement in EUExImp

Both the company MAXAM Deutschland GmbH and the Dresdner Sprengschule GmbH together are part of a European project (EUExImp) determining which skills employees in the explosives sector must possess.

EUExImp's objective is to implement occupational standards for the explosives sector thus making sure that employees possess the required knowledge and skills for working with explosives.

The present EUExImp project is a continuation of past EUExCert projects. As part of the EUExImp project, MAXAM Deutschland GmbH and Dresdner Sprengschule will look at the process of assembling mini boosters as an example investigating how the required occupational standards are ensured.

As a first step, all the process steps are analyzed and the required key roles and skills are determined that the respective employees must have. Based on these requirements, it is explained in a third step how the employees acquire the necessary knowledge.

As part of this project, MAXAM Deutschland GmbH analyses and revises the current manufacturing process while looking at the required knowledge and skills that the respective employees must possess.

Using the given example, Dresdner Sprengschule GmbH determines which course contents employees must be taught assuring that they are able to carry out the required tasks.



Joerg Rennert



Reimund Goeder

From our point of view, we see in the participation in this project firstly the possibility to check how far the occupational standards of UK will be fulfilled through the qualification requirements according to the German laws and regulations.

Furthermore, this study enables a detailed analysis of the current production process. The results can be used on the one hand in the further training of employees. In addition, they can be also used for the further technical development.

From the point of MAXAM this project offers the possibility to create and improve an internal system for review of current qualification standards of the employees in the various locations of the company. Because the MAXAM Company is an international company, this is a very interesting part of the project and also a motivation to be a partner in this project.

This is already the third opportunity for Dresdner Sprengschule GmbH to participate in a European project looking at the required qualifications as well as initial instruction and further training of employees working in the explosives sector.

Joerg Rennert and Reimund Goeder



Cartridging. Photo: Reimund Goeder



Portugal Involvement in EUExImp

Explosives sector in Portugal

Explosives sector in Portugal for civil uses includes explosives and pyrotechnics manufactures, retailers and users. This activity is regulated by disperse and old legislation with the exception of transpose directives.

The police is the main authority for the licensing and inspection of manufacturing, commerce and use. Nevertheless, there are others public agencies monitoring the environment impact, safety & work conditions and economic exchange in the sector.

The education of the professionals in this area is mainly the compulsory school. Only the explosives manufactures and the construction and civil engineering companies have high school staff in the board and technical activities. Vocational training courses are only for candidates to the exam for shotfire license.

Portuguese occupational standards in explosives

In Portugal, the National Qualifications Framework (NQF) reproduce the skills acquired through education, training and processes based on the Recognition, Validation and Certification of Competences (RVCC). The education plan to achieve skills include primary, secondary and higher education.

The National Agency for Qualifications (ANQ) created in July 2007 promote the implementation of policies to support and ensure the development of certification systems for the RVCC. The education and training based on the RVCC procedure allows people to obtain the recognition of skills and get an academic or professional certificate. This procedure is complex and involves three steps:

- I. Recognition;
- II. Validation and
- III. Certification.

The National Qualifications Catalogue (CNQ) describing all professions is been updated regularly by the assistance of sectoral councils on employment and skills. The Portuguese Occupational Classification (CNQ) issued in 2010 refers only two professions related to explosives sector: the fireworks operator and the shotfire.



António Rodrigues, José Gois, Fernando Rodrigues and Ken Cross Company meeting in Portugal, October 2015. Photo: José Gois.

Portuguese partners: UC and GJR

G.J.R. – Pirotecnic e Explosivos, SA is a manufacture company for pyrotechnic articles and black powder and a retailer of explosives. This medium size company with more than 100 years has 20 employees.

The University of Coimbra (UC) is one of the oldest universities in Europe with over seven centuries. The Laboratory of Energetics and Detonics (LE-DAP) built in 1990 has been the main support for experimental research on explosives, pyrotechnics and propellants. Teachers and researchers from Mechanical, Chemistry and Geology & Mines departments of the university use this facility for teaching and researching.

Main goal for Portuguese partners in the project

Test the procedure for the implementation of occupational standards on explosives. It is expected to change the culture and national practices, develop knowledge, and share experience. Five persons of the staff devoted to black powder manufacturing will be involved in the project from GJR's company.

José Gois and António Rodrigues





Sweden Involvement in EUExImp

Since more than 25 years ago major structural changes have been taken place in the Swedish Explosives industries. The changes lead to forming of new companies, new owners and down-seizing of the industry.

About 15 years ago it was quite clear that many experienced people would retire during the next 10 to 15 years.

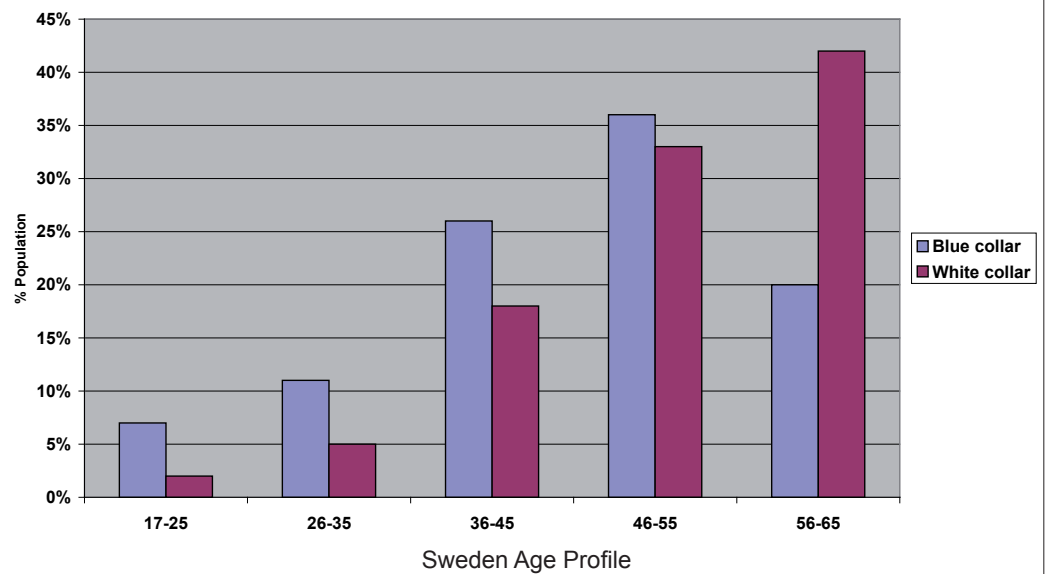
Professor Ian G. Wallace, Cranfield University in Shrivenham, described a situation in UK which was similar to the Swedish situation.

It was decided to join forces and an application to the Commission, the Leonardo da Vinci programme, was written.

In 2003 a pilot project started with funding from the Commission. This project had besides from UK and Sweden also partners from Finland, Italy and Norway. The project was very successful and was followed by two other projects which widened the scope and had more European partners.

EUExImp will use the outcomes of the earlier projects and try to implement the UK standards. In other words, from the “drawing board” to the “work shop”.

Sweden Age Profile



The Swedish partner BTC will try to implement the standards in an existing human resource (HR) management tool. This process has so far been very successful and we hope that outcomes and experiences can be presented next spring.

Stefan Krol and Erik Nilsson



Stefan Krol and Ken Cross in action. Photo: Erik Nilsson.



UK Involvement in EUExImp

The Institute of Explosives Engineers joined with KCEM in 2014 to make a proposal for a project to implement the occupational standards in the home nations of some of the partners from the EUExcert Association.

The really serious work began with a visit to UK by some Swedish organisations, most notably the president and senior management from KCEM, Saab Bofors Test Center and LTE AB. The UK side was supported by IExpE, QinetiQ, MPQC, HSQ, Cranfield University, AVCTS, BAE Systems, ISSEE, Cogent and the HSE.

Shortly afterwards, it was agreed that the project was feasible and KCEM and IExpE began the process of writing the bid for Erasmus+ funding. Thankfully, we had the services of an experienced bid writing team in Hanne Randle and Erik Nilsson. The scope and scale of the project was decided fairly early and the concept of the project was “to implement the occupational standards, by involving industry partners”.

The standards underpin nationally- or industry-recognised qualifications and can be used as a tool for recruitment, selection, advertising, mapping skills needs and gap analysis, based on identified needs in each company.

The idea is to teach the managers and HR-personnel to use the occupational standards as a flexible management tool in their daily HR-operations. Organisation management will learn how to handle recruitment needs and skills shortage and how to present results from mapping procedures.



From the film Spectre. Photo: Event Horizon

These exact company and individual needs can easily be communicated to in-house training units or to external VET- providers, resulting in company based and efficient training. As the occupational standards are based on the EQF-system each individuals learning outcomes can be assessed and accredited according to the ECVET system.

That led to the Institute seeking a UK Industry partner and Event Horizon came to the fore.

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

At the point when the bid was successful, clarification was received that IExpE would not be able to draw down Erasmus+ funds for its representative because the Institute has an all-volunteer council and the funds are only available for paid staff. At this crucial point, the Institute sought organisations that might take on the role and they selected PICRITE Ltd. Following some swift footwork by KCEM and the Swedish authority, the change of partner was agreed and the project moves forward.

The intention of the UK sub-project remains to align the training and qualifications Event Horizon offers to both the BECTU grading scheme and the IExpE membership grades. To that end, the UK sub-project has involved Event Horizon and PICRITE working with BECTU and the Institute of Explosives Engineers to understand the standards, suggest developments for the explosives SFX grading scheme, create role profiles for the SFX grades and the next stage is to develop the qualifications and associated training and assessment.

Ken Cross & Tom Goodman

The United Nations Office for Disarmament Affairs (UNODA) is using the occupational standards in a new International Ammunition Technical Guidelines module 01.90 – Ammunition management staff competences, which can be found at <http://www.un.org/disarmament/un-safeguard/guide-lines/>

EUExcert and EUExImp are cited in the introduction to the module:

“There are no international standards that lay down exactly what competences are required for the various roles within an ammunition management system.

There was a project within the European Union, EUExcert, (2003 – 2013) which aimed to establish a stable fundament and framework for vocational education of people in the European explosives sector.

In parallel, the UK was also examining the development of competency standards for use in the explosives sector. The UK work has resulted in a set of National Occupational Standards for Explosive Substances and Articles.

These were adopted by EUExcert as ‘best practice’ and are now being rolled out across the European explosives industry under the EUExImp project, which is part of the wider EU ERASMUS programme for education, training, youth and sport.

It therefore makes sense that the IATG personnel competences are based on this ‘best practice’ work.”



From left: Ingo Valgma, António Rodrigues, Jörg Rennert, Erik Nilsson, Viive Tuuna, Stefan Krol, Teele Tuuna, Reimund Goeder, Ken Cross and José Gois. Partner meeting in Portugal, September 2015.