



# **NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR BLASTER**

**Department of Occupational Standards  
Ministry of Labour and Human Resources  
Thimphu, Bhutan.**





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## FOREWORD

The Department of Occupational Standards of the Ministry of Labour and Human Resources proudly presents National Occupational Skills Standards (OSSs) for Blaster as part of TVET reform initiative for improving the quality of Vocational Education and Training System in Bhutan. The standards represent the fruits of hard work and invaluable experiences gained by the department since its establishment in the latter half of 2003. The main aim of developing Occupational Skills Standards is to set up a well defined nationally recognized Vocational Qualification and Certification system that will help set a benchmark for the Technical Vocational Education and Training (VET) System in our country aligned to international best practices.

Occupational Skills Standards is one of the base pillars in the Bhutan Vocational Qualification Framework (BVQF) and is the first step in its implementation. The standards are developed to ensure that employees or vocational graduates possess and acquire the desired skills, knowledge and attitude required by industries and employers. In order to ensure this close match in supply and demand of skills, knowledge and attitude, standards have been developed in close consultation and partnership with industry experts and validated by the Technical Advisory Committees for the concerned economic sectors.

A vocational education and training system based on Occupational Skills Standards shall ensure that delivered training is of a high quality and relevant to the needs of the labour market. As a result, future TVET graduates will be better equipped to meet the need and expectations of industries and employers. This positive impact on the employability of TVET graduates will enhance the reputation of vocational education and training and make it attractive to school leavers.

While acknowledging the existing level of cooperation and collaboration, the ministry earnestly requests employers and training providers to extend the fullest support and cooperation in implementing the Occupational Skills Standards. The ultimate objective is to build a competent and productive national workforce that will contribute to the continued socio-economic progress of our country.

I gratefully acknowledge the valuable contributions made by experts from industries during the consultation, verification and validation processes of the standards. I look forward to improved engagement and active participation of the industry and employers in the development of a quality assured demand driven TVET system in the near future.

Dorji Wangdi

**Minister**

Ministry of Labour and Human Resources

## **INTRODUCTION**

### **A. Occupational Skills Standards (OSS)**

Occupational Skill Standards specify the skill, knowledge and attitudes applied to a particular occupation. Standards also specify the standards or criteria of performance of a competent worker and the various contexts in which work may take place. Standards provide explicit advice to assessors regarding the skill and knowledge to be demonstrated by candidates seeking formal recognition either following training or through work experience.

#### **Purpose of Occupational Skills Standards**

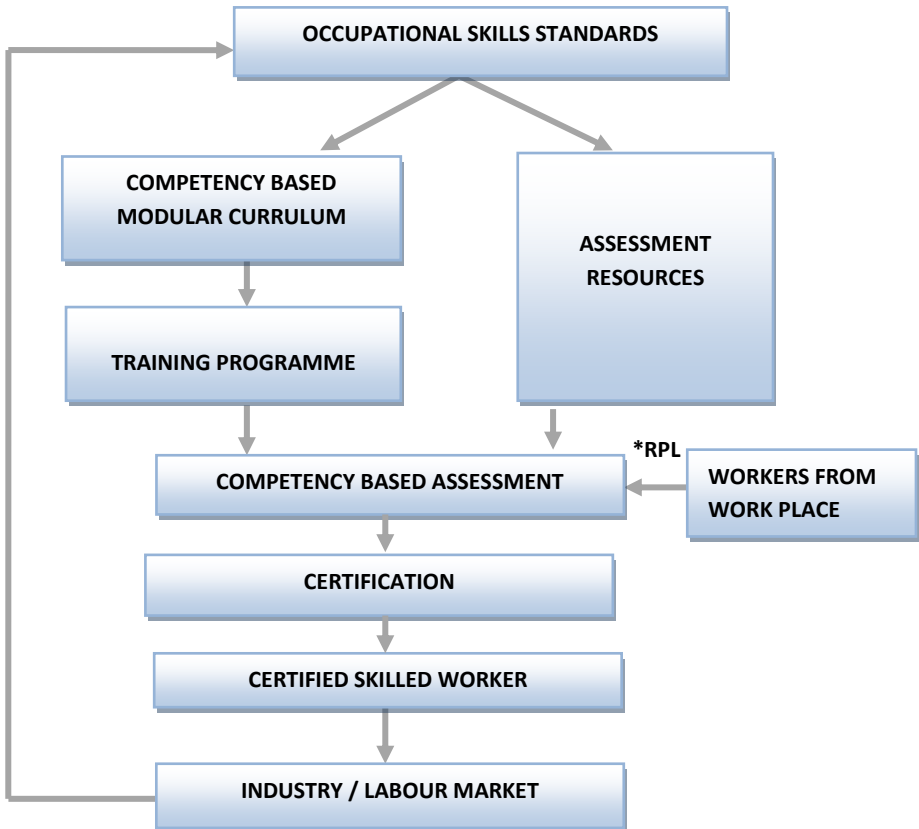
Skill Standards serve a number of purposes including:

- Providing advice to curriculum developers about the skill and knowledge to be included in curriculum.
- Providing specifications to assessment resource developers about the skill, knowledge and attitudes within an occupation to be demonstrated by candidates.
- Providing advice to industry/employers about job functions, which in turn can be used for the development of job descriptions, performance appraisal systems and work flow analysis.

## B. Bhutan Vocational Qualification Framework (BVQF)

Bhutan Vocational Qualifications Framework is an agreed system of Assessing, Certifying and Monitoring nationally recognized qualifications for all learning in the TVET sector against national standards, in training institutions, in the workplace, in schools or anywhere where learning takes place.

### Components of the Bhutan Vocational Qualification Framework (BVQF)



\* RPL = Recognition of Prior Learning



## BVQF Levels

The Bhutan Vocational Qualification Framework has three levels classified based on the competency of the skilled workers. The three levels are:

- National Certificate Level 3 (NC III)
- National Certificate Level 2 (NC II)
- National Certificate Level 1 (NC I)

## BVQF Level Descriptors

The qualification levels are decided based on level descriptors. The detail of the qualification level descriptor is as follows:

### National Certificate Level 1

| Carry out processes that:  | Learning demand:   | Responsibilities which are applied:  |
|--|--|--|
| <ul style="list-style-type: none"><li>• Are narrow in range.</li><li>• Are established and familiar.</li><li>• Offer a clear choice of routine responses.</li><li>• Involve some prioritizing of tasks from known solutions.</li></ul> | <ul style="list-style-type: none"><li>• Basic operational knowledge and skill.</li><li>• Utilization of basic available information.</li><li>• Known solutions to familiar problems.</li><li>• Little generation of new ideas.</li></ul> | <ul style="list-style-type: none"><li>• In directed activity.</li><li>• Under general supervision and quality control.</li><li>• With some responsibility for quantity and quality.</li><li>• With no responsibility for guiding others.</li></ul> |

## National Certificate Level 2

| Carry out processes that:   | Learning demand:   | Responsibilities which are applied:   |
|---|--|---|
| <ul style="list-style-type: none"> <li>• Require a range of well developed skills.</li> <li>• Offer a significant choice of procedures requiring prioritization.</li> <li>• Are employed within a range of familiar context.</li> </ul> | <ul style="list-style-type: none"> <li>• Some relevant theoretical knowledge.</li> <li>• Interpretation of available information.</li> <li>• Discretion and judgments.</li> <li>• A range of known responses to familiar problems</li> </ul> | <ul style="list-style-type: none"> <li>• In directed activity with some autonomy.</li> <li>• Under general supervision and quality checking.</li> <li>• With significant responsibility for the quantity and quality of output.</li> <li>• With some possible responsibility for the output of others.</li> </ul> |

## National Certificate Level 3

| Carry out processes that:   | Learning demand:  | Responsibilities which are applied:  |
|---|---|--|
| <ul style="list-style-type: none"> <li>• Requires a wide range of technical or scholastic skills.</li> <li>• Offer a considerable choice of procedures requiring prioritization to achieve optimum outcomes.</li> <li>• Are employed in a variety of familiar and unfamiliar contexts.</li> </ul> | <ul style="list-style-type: none"> <li>• A broad knowledge base which incorporates some theoretical concepts.</li> <li>• Analytical interpretation of information.</li> <li>• Informed judgment.</li> <li>• A range of sometimes innovative responses to concrete but often unfamiliar problems.</li> </ul> | <ul style="list-style-type: none"> <li>• In self-directed activity.</li> <li>• Under broad guidance and evaluation.</li> <li>• With complete responsibility for quantity and quality of output.</li> <li>• With possible responsibility for the output of others.</li> </ul> |

## **PURPOSE**

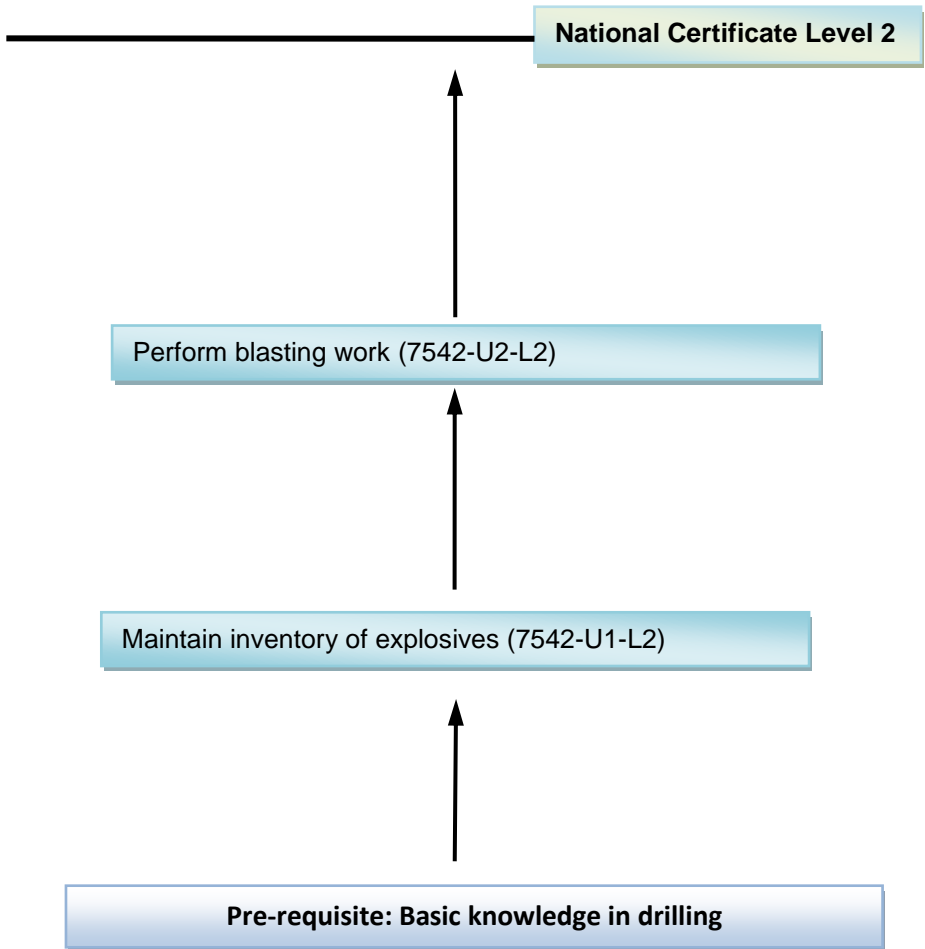
This suite of two qualifications is designed for people interested in a career as Blaster.

The first requirement for the career as blaster is basic knowledge in drilling. These are pre-requisite for further qualification. The only qualification is National Certificate in Blaster operator Level 2 and it comprises two units of Occupational Skills Standards that covers the essential knowledge and skills required of blaster including maintaining inventory of explosives and performing blasting. This qualification prepares people for entry into the higher National Certificate qualifications

The National Certificate Level 2 currently the only qualifications for blasters and includes the industry specific Occupational Skills Standards. The candidate with these qualifications can work as skilled blaster at the work place.

A diagram of the qualification pathway provided by these two National Certificates follows.

## PACKAGING OF QUALIFICATION FOR BLASTER



## **CODING USED FOR OCCUPATIONAL SKILLS STANDARDS**

The coding and classification system developed in Bhutan is logical, easy to use, and also aligned with international best practises. The Bhutanese coding and classification system is based on the International Standard Classification of Occupations, 2008 (ISCO-08) developed by the International Labour Organisation (ILO).

The coding of the occupational skills standards forms the basis of the identification code for the Vocational Education and Training Management Information System (VET – MIS) both in terms of economic sector identification and that of the individual standard.

### **Coding the individual occupational skills standards**

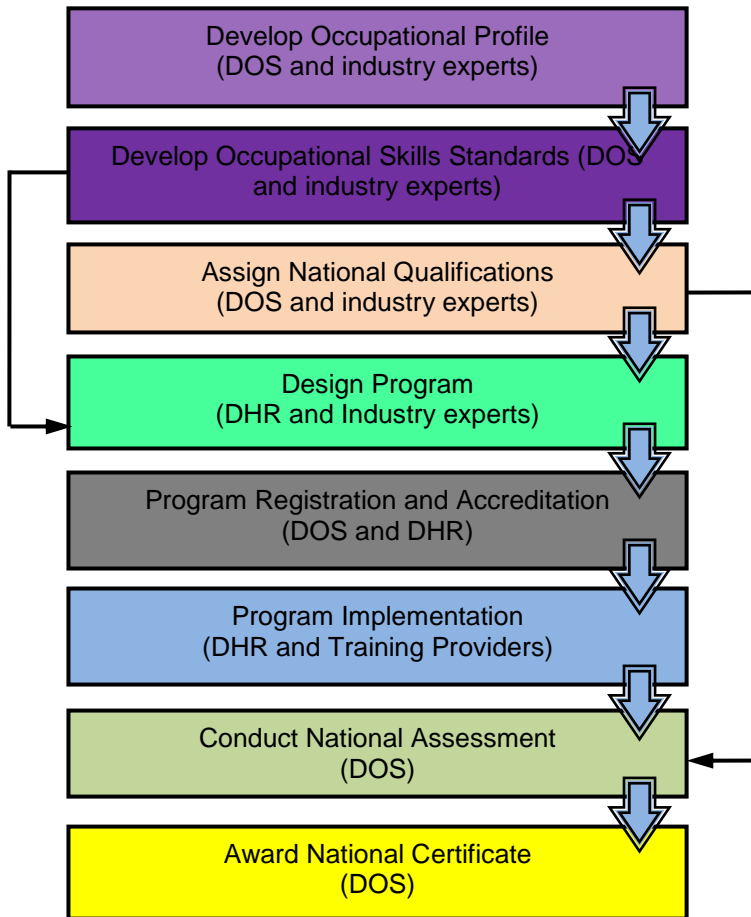
Coding the individual skills standard has a multiple purpose:

- to identify the level,
- to identify to which qualification the standard belongs,
- to identify in which order the standard is clustered within the qualification

A job can include a number of competencies described in the Occupational Skills Standards.

To illustrate with an example (7542-U1-L1), the ILO assigns the code 7542 to the occupation shotfirers and blasters. Therefore, in the Bhutan's context, the occupation blaster has been assigned the code 7542 in the National Coding System. The first unit is assigned the code U1, the first Unit of Occupational Skills Standard is designated the code 7542 U1. Levels are assigned the code L and follow a logical progression from the National Certificate Level 1 (NC I) to the National Certificate Level 3 (NC III). Therefore the National Certificate Level 3 is assigned the code L3.

## Implementation and operational procedures for Occupational Skills Standard (OSS)



### Key:

MoLHR – Ministry of Labour and Human Resources

DHR – Department of Human Resources

DOS – Department of Occupational Standards

## **NATIONAL OCCUPATIONAL SKILLS STANDARDS FOR BLASTER**

**Validation date** : 30<sup>th</sup> November, 2011.

**Endorsement date** : 15<sup>th</sup> December, 2011.

**Date of Review** : 15<sup>th</sup> December, 2014 (max. 3 years).

### **Technical Advisory Committee (TAC) members for the Construction Sector involved in the validation of OSS:**

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2. Karma Loday (TAC Member Secretary), Chief Programme Officer, Standards and Qualification Division (SQD), Department of Occupational Standards, MoLHR, Thimphu.
3. Tshering Wangdi B, Chief Engineer, Department of Roads, Ministry of Works and Human Settlement, Thimphu.
4. Mahendra Chhetri, Promotor, Himalayan Engineering and Management Consultancy, Thimphu.
5. Palden Dendup, Head, Standard Division, Bhutan Standard Bureau, Ministry of Works and Human Settlement, Thimphu.
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8. Karma, Chief Programme Officer, Training and Professional Services Division, Department of Human Resources, Ministry of Labour and Human Resources (MoLHR), Thimphu

## **Subject experts involved during the consultative workshop of Blaster OSS:**

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3. Sherab Tharchen, Lhaki Cement Private Limited, Gomtu.
4. Gopal Gurung, Jigme Mining Corporation, Gomtu.
5. Sanga Dorji, Lhaki Cement Private Limited, Gomtu.
6. Kul Bdr. Mongar, Bhutan Marbles and Minerals Limited, Jemina.
7. Jas Bdr. Mongar, Bhutan Aggregate Stone Factory, Jemina.

## **Development group (Facilitator):**

Tshewang, Engineer, Department of Occupational Standards (DOS), MoLHR, Thimphu.



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| Perform blasting work            | <ol style="list-style-type: none"><li>1. Prepare for work</li><li>2. Carry out blasting work</li><li>3. Complete the work</li></ol> | 18          |

**BLASTER  
OCCUPATIONAL SKILLS STANDARDS  
FOR  
NATIONAL CERTIFICATE LEVEL 2 (NC 2)**

| <b>UNIT TITLE</b>                | <b>ELEMENTS OF COMPETENCE</b>   | <b>PAGE</b> |
|----------------------------------|---|-------------|
| Maintain inventory of explosives | <ol style="list-style-type: none"><li>1. Prepare for purchase</li><li>2. Receive and store the purchases</li></ol>                  | 15          |
| Perform blasting work            | <ol style="list-style-type: none"><li>1. Prepare for work</li><li>2. Carry out blasting work</li><li>3. Complete the work</li></ol> | 18          |

**UNIT TITLE** : **Maintain inventory of explosives**

**DESCRIPTOR** : This unit covers the competencies required to carry out purchase, receive and storing of explosive materials ensuring safety at all times of operation following correct procedures.

**CODE** : **7542-U1-L2**

| <b>ELEMENTS OF COMPETENCE</b>   | <b>PERFORMANCE CRITERIA</b>   |
|---------------------------------|---|
| 1. Prepare for purchase.        | 1.1 Estimate the quantity of <b>materials</b> and <b>explosives</b> required as per the job requirements.<br><br>1.2 Prepare and submit necessary forms and submit to procurement / purchase section as per the establishment policy and procedures.  |
| 2. Receive and store purchases. | 2.1 Select and use <b>PPE</b> as per the job requirements.<br><br>2.2 Check the quantity and expiry date of explosives and materials received in comparison with requisition slips as per the establishment policy and procedures.<br><br>2.3 Store received explosives and materials at secured place in accordance with explosive act.<br><br>2.4 Prepare and update the stock register as per the establishment policy and procedures. |

| <b>RANGE STATEMENT</b>   |
|--|
| <b>PPE may include but not limited to:</b> <ul style="list-style-type: none"><li>• Helmet</li><li>• Goggles</li><li>• Mask</li><li>• Safety shoes</li><li>• Gloves</li><li>• Company dress</li></ul> |

**Materials may include but not limited to:**

- Fine jute

**Explosives may include but not limited to:**

- Ordinary detonators
- Detonating cord
- Prilled ammonium nitrate
- Safety fuse
- Power gel

**ASSESSMENT GUIDE****Form of assessment**

- Continuous assessment together with collected evidence of performance will be used.
- Evidence of the performance shall be based on practical demonstration.
- Knowledge can be accessed through diagrams, in writing or orally (viva-voce).

**Assessment context**

- Competency may be assessed in the actual work place or in a simulated workplace setting.

**Assessment condition**

- The candidate shall have access to all required tools, equipment, materials and documents.
- The candidate must complete the assessment in industry accepted time frame.

**Critical aspects**

- Demonstrate compliance with safety regulation applicable to work site operation.
- Demonstrate compliance with safe storage and handling of explosives.

| UNDERPINNING KNOWLEDGE  | UNDERPINNING SKILLS  |
|---|--|
| <ul style="list-style-type: none"> <li>• Occupational Health and Safety (OHS) Regulations</li> <li>• Basic First Aid</li> <li>• Types and uses of personal protective equipment</li> <li>• Familiarity with manufacturer's operation manuals</li> <li>• Positive work values</li> <li>• Basic literacy &amp; numeracy</li> <li>• Classification of detonators and explosives</li> <li>• Types and size of power gels</li> <li>• Environment act</li> <li>• Explosive rules</li> </ul> | <ul style="list-style-type: none"> <li>• Accessing, interpreting and applying technical / manufacturer's operation manual, information and instructions</li> <li>• Safe use of tools and equipment</li> <li>• Team Work</li> <li>• Communication</li> <li>• Interpersonal relationship</li> <li>• Problem solving</li> </ul> |

**UNIT TITLE** : **Perform blasting work**

**DESCRIPTOR** : This unit covers the competencies required to prepare and carry out blasting work and also to complete it, ensuring safety at all times of operation.

**CODE** : **7542-U2-L2**

| <b>ELEMENTS OF COMPETENCE</b> | <b>PERFORMANCE CRITERIA</b>   |
|-------------------------------|---|
| 1. Prepare for work.          | <p>1.1 Identify and collect required <b>tools, materials</b> and <b>explosives</b> in accordance with establishment policy and procedures.</p> <p>1.2 Identify and collect <b>PPE</b> as per the job requirements.</p> <p>1.3 Prepare and place <b>safety signs</b> around the blasting area to alert of danger zones in accordance with job requirements.</p> <p>1.4 Examine blast area to determine amount and kind of explosive needed and to ensure safety prior to detonation as per the job requirements.</p> <p>1.5 Prepare <b>drilling plan</b> as per the job requirements.</p> <p>1.6 Prepare blasting materials as per job requirements following manufacturer's procedures.</p> <p>1.7 Store tools and equipment safely at appropriate locations in accordance with manufacturer's specifications and establishment procedures.</p> |
| 2. Carry out blasting work.   | <p>2.1 Cut safety fuse at required length and crimp with ordinary detonators as per the job requirements.</p> <p>2.2 Prepare and place primer as per the job requirements.</p> <p>2.3 Load specified amount of explosives into blast holes as per the job requirements.</p>   |

|                              |  |
|------------------------------|--|
|                              | <p>2.4 Lay detonating cord between rows of charged holes and tie cord into main line to form blast pattern as per the job requirements.</p> <p>2.5 Tie specified lengths of delay detonators into pattern to time sequence of explosions as per the job requirements.</p> <p>2.6 Stem the holes as per the job requirements.</p> <p>2.7 Check blast areas necessary to ensure that they clear blast sites prior to explosions as per the job requirements.</p> <p>2.8 Note and report abnormal conditions to <b>authorized person</b> in accordance with establishment procedures.</p> |
| <p>3. Complete the work.</p> | <p>3.1 Check misfire and take necessary actions ensuring safety as per the job requirements.</p> <p>3.2 Collect burnt safety fuses and take necessary action as per the establishment procedures.</p> <p>3.3 Return tools and unused explosives to authorized personnel as per the establishment policy and procedures.</p> <p>3.4 Compile and update explosives records in compliance with explosive rules.</p> <p>3.5 Note and report abnormal conditions to authorized person in accordance with establishment procedures.</p>  |

| <b>RANGE STATEMENT</b>   |  |
|--|--|
| <p><b>PPE may include but not limited to:</b></p> <ul style="list-style-type: none"> <li>• Helmet</li> <li>• Goggles</li> <li>• Mask</li> <li>• Ear muff</li> <li>• Safety shoes</li> <li>• Gloves</li> <li>• Company dress</li> </ul> |  |
| <p><b>Tools may include but not limited to:</b></p> <ul style="list-style-type: none"> <li>• Knife</li> <li>• Crimpers</li> <li>• Ordinary detonating box</li> <li>• Scrapper</li> <li>• Pricker</li> </ul>                            |  |

|  |  |
|--|--|
| <b>Drilling plan includes but not limited to:</b>  |  |
| <ul style="list-style-type: none"> <li>• Drilling pattern</li> <li>• Number of holes</li> <li>• Size of holes</li> </ul>         | <ul style="list-style-type: none"> <li>• Spacing</li> <li>• Depth of holes</li> </ul>      |
| <b>Materials may include but not limited to:</b>   |  |
| <ul style="list-style-type: none"> <li>• Lighter</li> <li>• Whisel</li> </ul>  | <ul style="list-style-type: none"> <li>• Stemming rod</li> <li>• Wireless set</li> </ul>   |
| <b>Explosives may include but not limited to:</b>  |  |
| <ul style="list-style-type: none"> <li>• Ordinary detonators</li> <li>• Prilled ammonium nitrate</li> <li>• Power gel</li> </ul> | <ul style="list-style-type: none"> <li>• Detonating cord</li> <li>• Safety fuse</li> </ul> |
| <b>Safety signs may include but not limited to:</b>  |  |
| <ul style="list-style-type: none"> <li>• Sign boards</li> </ul>  | <ul style="list-style-type: none"> <li>• Red flag</li> </ul>                               |
| <b>Authorized person includes but not limited to:</b>  |  |
| <ul style="list-style-type: none"> <li>• Supervisor</li> <li>• Foreman</li> </ul>  | <ul style="list-style-type: none"> <li>• Maintenance engineer</li> </ul>                   |

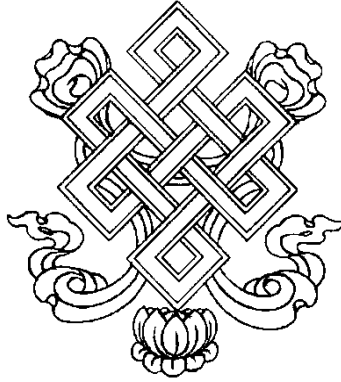
| <b>ASSESSMENT GUIDE</b>  |
|--|
| <p><b>Form of assessment</b></p> <ul style="list-style-type: none"> <li>• Continuous assessment together with collected evidence of performance will be used.</li> <li>• Evidence of the performance shall be based on practical demonstration.</li> <li>• Knowledge can be assessed through diagrams, in writing or orally (viva-voce).</li> </ul> <p><b>Assessment context</b></p> <ul style="list-style-type: none"> <li>• Competency may be assessed in the actual work place or in a simulated workplace setting.</li> </ul> <p><b>Assessment condition</b></p> <ul style="list-style-type: none"> <li>• The candidate shall have access to all required tools, equipment, materials and documents.</li> <li>• The candidate must complete the assessment in industry accepted time frame.</li> </ul> |



**Critical aspects**

- Demonstrate compliance with safety regulation applicable to work site operation.
- Demonstrate compliance with safe handling, storage, disposal and record keeping.

| <b>UNDERPINNING KNOWLEDGE</b>  | <b>UNDERPINNING SKILLS</b>  |
|--|---|
| <ul style="list-style-type: none"><li>• Occupational Health &amp; Safety</li><li>• Basic First Aid</li><li>• Types and uses of personal protective equipment</li><li>• Familiarity with manufacturer's operation manuals</li><li>• Positive work values</li><li>• Basic literacy &amp; numeracy</li><li>• Estimation</li><li>• Environment act</li><li>• Explosive rules in relation to the use and disposal of explosives</li><li>• Classification of explosives and ordinary detonators</li><li>• Types of drilling pattern</li><li>• Velocity of detonating</li></ul> | <ul style="list-style-type: none"><li>• Accessing, interpreting and applying technical / manufacturer's operation manual, information and instructions</li><li>• Safe use of tools</li><li>• Team Work</li><li>• Communication</li><li>• Interpersonal relationship</li><li>• Problem solving</li></ul> |



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