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What are Occupational Standards(OS)?

- OS describe what individuals need to do, know and understand in order to carry out a particular job role or function
- OS are performance standard that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding

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Introduction

Qualifications Pack- Gas Detector

SECTOR: MINING

SUB-SECTOR: Underground Mines

OCCUPATION: Mine Rescue/ Health

REFERENCE ID: MIN/Q 0412

ALIGNED TO: NCO-2004/NIL

A Gas detector ensures identification of gases from rock and analysis of their concentration

Brief Job Description: Gas Detector identifies the rate of emission of the adsorbed gas like CH_4 from the rock being extracted and identifies the percentage/ concentration of different gases like CO , CO_2 , etc. which might be present in the general body of air or the sealed off area in an underground mine.

Personal Attributes: The job requires technical knowledge about different gases and their reactions. The individual need to be physically fit to withstand working in a underground environment and respond to the needs and requirement of the tasks.

Job Details	Qualification Pack Code	MIN/Q 0412		
	Job Role	Gas Detector		
	Credits(NSQF)	TBD	Version number	1.0
	Industry	Mining	Drafted on	15/12/2014
	Sub-sector	Underground Mines	Last reviewed on	24/03/2015
	Occupation	Mine Rescue/ Health	Next review date	24/03/2017

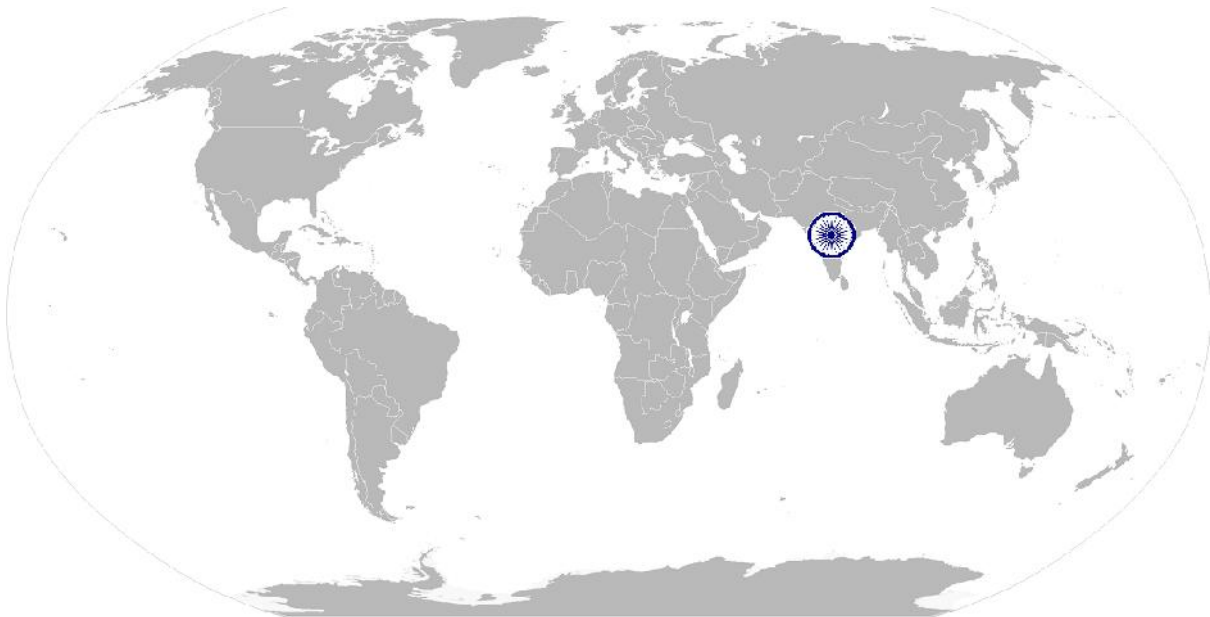
Job Role	Gas Detector
Role Description	The role of gas detector is to identify the rate of emission of the adsorbed gas like CH ₄ from the rock being extracted and to identify the percentage/ concentration of different gases like CO, CO ₂ , etc. which might be present in the general body of air or the sealed off area in an underground mine.
NSQF level Minimum Educational Qualification Maximum Educational Qualification	4 Class X and Possesses Gas Testing Certificate from DGMS NA
Training (Suggested but not mandatory)	<ol style="list-style-type: none"> 1. Gas Detection/ Ventilation Adequacy Checking techniques 2. Various types of gases and their properties 3. Safety 4. Quality Management
Experience	1-10 Years
Applicable National Occupational Standards	<p>Compulsory:</p> <p>Click on the hyperlink to read/download the required NOS</p> <ol style="list-style-type: none"> 1. MIN/ N 0437 (Pre Operation check) 2. MIN/ N 0438 (Operation and Running of Gas detecting unit) 3. MIN/ N 0901 (Health and Safety) <p>Optional:</p> <p>Not Applicable</p>
Performance Criteria	As described in the relevant OS units

Definitions

Keywords /Terms	Description
Sector	Sector is a conglomeration of different business operations having similar businesses and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/related set of functions in an industry.
Function	Function is an activity necessary for achieving the key purpose of the sector, occupation, or area of work, which can be carried out by a person or a group of persons. Functions are identified through functional analysis and form the basis of OS.
Job Role	Job role defines a unique set of functions that together form a unique employment opportunity in an organization.
OS	OS specify the standard of performance an individual must achieve when carrying out a function in the workplace, together with the knowledge and understanding they need to meet that standard consistently. Occupational Standard are applicable both in the Indian and global contexts.
Performance Criteria	Performance Criteria are statements that together specify the standard of performance required when carrying out a task.
NOS	NOS are Occupational Standard which apply uniquely in the Indian context.
Qualification Pack Code	Qualification Pack Code is a unique reference code that identifies a qualification pack.
Qualification Pack	Qualification Pack comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A Qualification Pack is assigned a unique qualification pack code.
Unit Code	Unit Code is a unique identifier for an Occupational Standard , which is denoted by an 'N'
Unit Title	Unit Title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Knowledge and Understanding	Knowledge and Understanding are statements which together specify the technical, generic, professional and organizational specific knowledge that an individual needs in order to perform to the required standard.
Organizational Context	Organizational Context includes the way the organization is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical Knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills or Generic Skills	Core Skills or Generic Skills are a group of skills that are key to learning and working in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.

Acronyms	Keywords /Terms	Description
	SCMS	Skill council for Mining Sector
	NOS	National Occupational Standard
	NSQF	National Skill Qualification Framework
	NVEQF	National Vocational Educational Qualification Framework
	NVQF	National Vocational Qualification Framework
	OS	Occupational Standard
	PC	Performance Criteria
	QP	Qualification Pack
SSC	Sector Skill Council	

National Occupational Standard



Overview

This unit is about conducting Pre Operation check in gas detecting unit

MIN/ N 0437 Pre Operation Check

Unit Code	MIN/ N0437
Unit Title (Task)	Pre Operation Check
Description	This OS unit is about conducting Pre Operation check in gas detecting unit
Scope	This unit/task covers the following: <ul style="list-style-type: none"> Pre Operation check in gas detecting unit
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Conduct underground gas testing	<p>PC1. Check least count of the gas detecting equipment.</p> <p>PC2. Inspect physical condition of the gas detecting equipment like flame safety lamp, multi gas detectors, methanometers, toximeters etc.</p> <p>PC3. Operate and record readings of the gas detecting equipment in the fresh air. If any extraneous results are obtained in the fresh air in the general atmosphere on the surface, it should be reported to the concerned official.</p> <p>PC4. Ensure that testing equipment is in a serviceable condition and has been calibrated correctly</p> <p>PC5. Check threshold limit of the gas detecting equipment.</p>
Knowledge and Understanding (K) w.r.t. the scope	
A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Code of traffic in specific areas of mine. Significance of fences</p> <p>KA5. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA6. Shot-firing and Safety regulations. How and where to take shelter</p> <p>KA7. Tramways and siding, Haulage rooms, Winding rooms, Boilers, Electrical Gears</p> <p>KA8. Duties of workmen</p> <p>KA9. Provision of wages, working hours and accident compensation as per Mines act</p> <p>KA10. Knowledge of mining safety procedures</p>

MIN/ N 0437 Pre Operation Check

	<p>KA11. Impact of violation of safely procedures</p> <p>KA12. Precautions to be taken when handling heavy equipment.</p> <p>KA13. Refresher training as per fourth schedule MVTR (1966) within one month of joining duties following absence from duties for a period exceeding one year.</p>
<p>B. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. relevant standard and procedures followed in the company</p>
<p>C. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. Different types of techniques and technologies of gas detecting equipment</p> <p>KC2. Preparing testing instrument (lamp, electronic etc.)</p> <p>KC3. Checking and calibrating gas testing equipment</p> <p>KC4. Physical/chemical properties of different types of gases found in an underground mine (Life support gases, harmful gases CO₂, NO_x, SO₂, CO etc. and Hazardous & noxious gases – CH₄, C₂H₂ etc.</p> <p>KC5. Physiological effects of the gases likely to be present in an underground mine.</p>
Skills (S) [Optional]	
<p>Element</p> <p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. Note down observations (if any)</p> <p>SA2. Write information documents or enter the information in online ERP systems under guidance of the supervisor</p>
	<p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. Read and interpret symbols and measurements</p> <p>SA4. Read information documents</p> <p>SA5. Understand and analyse the available data about the site</p>
	<p>Oral Communication (Listening and Speaking skills)</p>

MIN/ N 0437 Pre Operation Check

	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SA6. Discuss task lists, schedules and activities SA7. Effectively communicate SA8. Attentively listen with full attention and comprehend the information given by various sources about the site
B. Professional Skills	Plan and Organize
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB1. Plan and organize the work order and jobs SB2. Organize all process manuals so that sorting/ accessing information is easy
	Judgment and Critical Thinking
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB3. Use common sense and make judgments during day to day basis SB4. Use reasoning skills to identify and resolve basic problems SB5. Use intuition to detect any potential problems which could arise
	Desire to learn and take initiatives
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB6. Follow instructions and work on areas of improvement identified SB7. Complete the assigned tasks with minimum supervision SB8. Complete the job within timelines and quality norms
	Problem Solving and Decision making
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB9. Detect problems in day to day tasks SB10. Discuss possible solution with the supervisor for problem solving SB11. Make decisions in emergency conditions

MIN/ N 0437 Pre Operation Check

NOS Version Control

NOS Code	MIN/N 0437		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Underground Mines	Last reviewed on	24/03/2015
Occupation	Mine Rescue/ Health	Next review date	24/03/2017

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MIN/ N 0438 Operation and Running of Gas detecting unit`

National Occupational Standard



Overview

This unit is about operation and running of gas detecting unit in the mining area

MIN/ N 0438 Operation and Running of Gas detecting unit`

National Occupational Standard

Unit Code	MIN/ N0438
Unit Title (Task)	Operation & Running of Gas detecting unit
Description	This OS unit is about operation and running of gas detecting unit in the mining area
Scope	This unit/task covers the following: <ul style="list-style-type: none"> • Operation and Running of gas detecting unit
Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria
Conduct underground gas testing	<p>PC1. Measure the percentage of oxygen at every place in the mine where persons are require to work or pass. (For eg: at every place in the mine where persons are required to work or pass, the air should not contain less than 19 percent of oxygen or more than 0.5 percent of carbon dioxide or any noxious gas in quantity likely to affect the health of any person)</p> <p>PC2. Measure the percentage of inflammable gas in an underground coal mine according to the regulations made for the purpose. (For ex: the percentage of inflammable gas should not exceed 0.75 in the general body of the return air of any ventilating district and 1.25 in any place in the mine)</p> <p>PC3. Measure the percentage of other noxious gases like CO, H2S in the general body of air.</p> <p>PC4. Measure the presence of inflammable gas and other noxious gas in the part of mine which is not in use and have not yet been sealed off , once in 7 days.</p> <p>PC5. Observe and report any variation over the threshold limits for the percentage of different gases as laid down in statute is observed , it should be reported to the manager/concerned official.</p> <p>PC6. Conduct air sampling at regular intervals as per the regulation for the detailed laboratory analysis of the concentration of different gases.</p> <p>PC7. Maintenance of flame safety lamp like cleaning of inner and outer gauzes and glass, lids and other parts of flame safety lamp</p> <p>PC8. Ensure Regular charging of the digital type gas detectors.</p> <p>PC9. Ensure the maintenance and management of the following records:</p>

MIN/ N 0438 Operation and Running of Gas detecting unit`

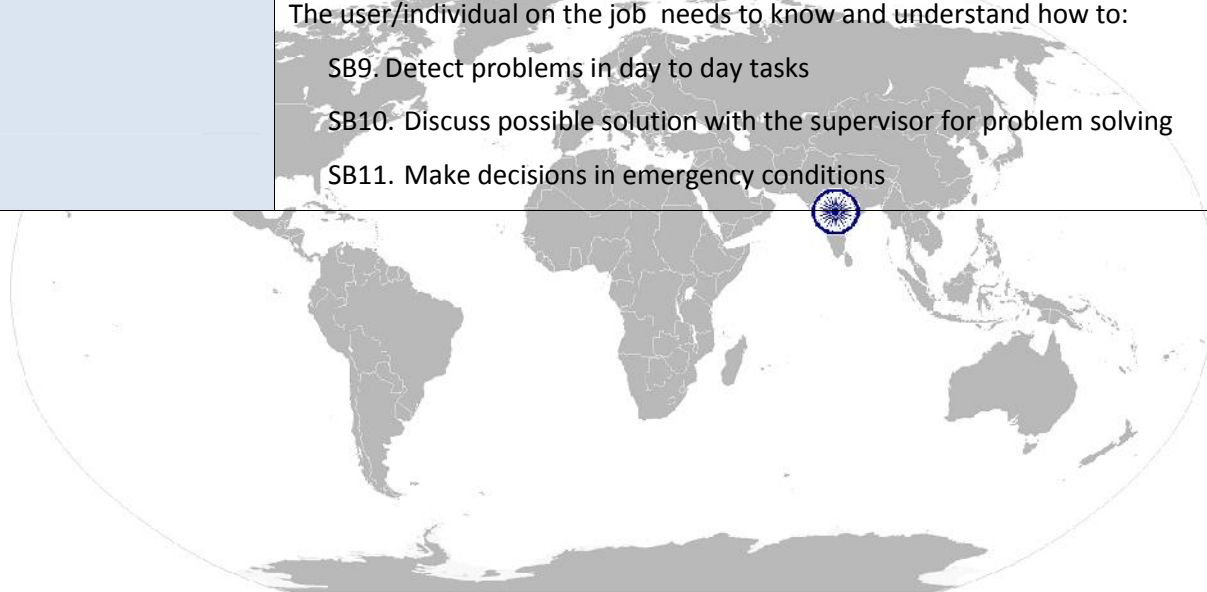
	<ul style="list-style-type: none"> • Different gases detected with their concentration. • Places, date and time of inspection for the purpose of detection of gases. • Places from where the air samples have been collected with date and time of collection. The analysis report obtained from the laboratory shall also be recorded.
Knowledge and Understanding (K) w.r.t. the scope	
<p>A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KA1. Different types of mines and detail of the mine he is working in</p> <p>KA2. Mine Organisation, time keeping, need for discipline and punctuality</p> <p>KA3. Benching in quarries, Dressing of overhangs, undercuts, Fencing, First aid and Hygiene</p> <p>KA4. Code of traffic in specific areas of mine. Significance of fences</p> <p>KA5. Standing orders in force at the mine. Safety in the vicinity of machinery</p> <p>KA6. Shot-firing and Safety regulations. How and where to take shelter</p> <p>KA7. Tramways and siding, Haulage rooms, Winding rooms, Boilers, Electrical Gears</p> <p>KA8. Duties of workmen</p> <p>KA9. Provision of wages, working hrs and accident compensation as per Mines act</p> <p>KA10. Knowledge of mining safety procedures</p> <p>KA11. Impact of violation of safely procedures</p> <p>KA12. Precautions to be taken when handling heavy equipment.</p> <p>KA13. Refresher training as per fourth schedule MVTR (1966) within one month of joining duties following absence from duties for a period exceeding one year.</p>
<p>B. Organizational Context (Knowledge of the company / organization and its processes)</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KB1. relevant standard and procedures followed in the company</p>

MIN/ N 0438 Operation and Running of Gas detecting unit`

<p>C. Technical Knowledge</p>	<p>The user/individual on the job needs to know and understand:</p> <p>KC1. Different types of techniques and technologies of gas detecting equipment</p> <p>KC2. Preparing testing instrument (lamp, electronic etc.)</p> <p>KC3. Checking and calibrating gas testing equipment</p> <p>KC4. Physical/chemical properties of different types of gases found in an underground mine (Life support gases, harmful gases CO₂, NO_x, SO₂, CO etc. and Hazardous & noxious gases – CH₄, C₂H₂ etc. and their threshold limits</p> <p>KC5. Physiological effects of the gases likely to be present in an underground mine.</p>
<p>Skills (S) [Optional]</p>	
<p>Element</p> <p>A. Core Skills/ Generic Skills</p>	<p>Writing Skills</p> <p>The user/ individual on the job needs to know and understand how to:</p> <p>SA1. Note down observations (if any)</p> <p>SA2. Write information documents or enter the information in online ERP systems under guidance of the supervisor</p> <p>Reading Skills</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA3. Read and interpret symbols and measurements</p> <p>SA4. Read information documents</p> <p>SA5. Understand and analyse the available data about the site</p> <p>Oral Communication (Listening and Speaking skills)</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SA6. Discuss task lists, schedules and activities</p> <p>SA7. Effectively communicate</p> <p>SA8. Attentively listen with full attention and comprehend the information given by various sources about the site</p>
<p>B. Professional Skills</p>	<p>Plan and Organize</p> <p>The user/individual on the job needs to know and understand how to:</p> <p>SB1. Plan and organize the work order and jobs</p> <p>SB2. Organize all process manuals so that sorting/ accessing information is easy</p> <p>Judgment and Critical Thinking</p>

MIN/ N 0438 Operation and Running of Gas detecting unit`

	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB3. Use common sense and make judgments during day to day basis SB4. Use reasoning skills to identify and resolve basic problems SB5. Use intuition to detect any potential problems which could arise
	<p>Desire to learn and take initiatives</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB6. Follow instructions and work on areas of improvement identified SB7. Complete the assigned tasks with minimum supervision SB8. Complete the job within timelines and quality norms
	<p>Problem Solving and Decision making</p>
	<p>The user/individual on the job needs to know and understand how to:</p> <ul style="list-style-type: none"> SB9. Detect problems in day to day tasks SB10. Discuss possible solution with the supervisor for problem solving SB11. Make decisions in emergency conditions

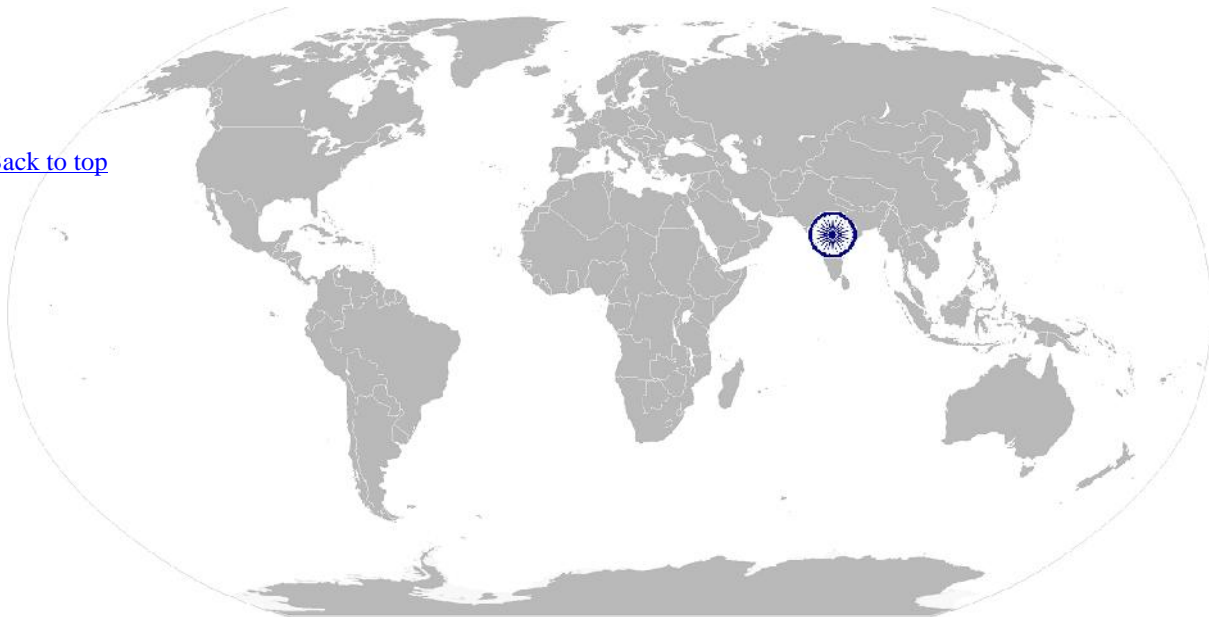


MIN/ N 0438 Operation and Running of Gas detecting unit`

NOS Version Control

NOS Code	MIN/N 0438		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Underground Mines	Last reviewed on	24/03/2015
Occupation	Mine Rescue/ Health	Next review date	24/03/2017

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National Occupational Standard



Overview

This unit is about health and safety measures critical in mines

MIN/ N0901 Health and Safety

National Occupational Standard	Unit Code	MIN/N 0901
	Unit Title (Task)	Health and Safety
	Description	This unit is about health and safety measures critical in mines
	Scope	This OS unit/task covers the following: <ul style="list-style-type: none"> Health and safety measures critical in mines
	Performance Criteria (PC) w.r.t. the Scope	
Element	Performance Criteria	
Safety, Security and Administrative	<p>To be competent, the user/individual on the job must be able to:</p> <p>PC1. Comply with occupational health and safety regulations adopted by the employer.</p> <p>PC2. Follow mining operations procedures with respect to materials handling and accidents</p> <p>PC3. Follow the correct safety steps in case of accident or major failure</p> <p>PC4. Comply with safety regulations and procedures in case of fire hazard.</p> <p>PC5. Operate various grades of fire extinguishers.</p> <p>PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public</p> <p>PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.</p> <p>PC8. Deal with misfires as per statutory requirement</p> <p>PC9. Identify characteristics of post-blast fumes and take necessary precautions.</p> <p>PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection</p> <p>PC11. Follow the manufacturer’s instructions for care and safe operation of the equipment.</p>	

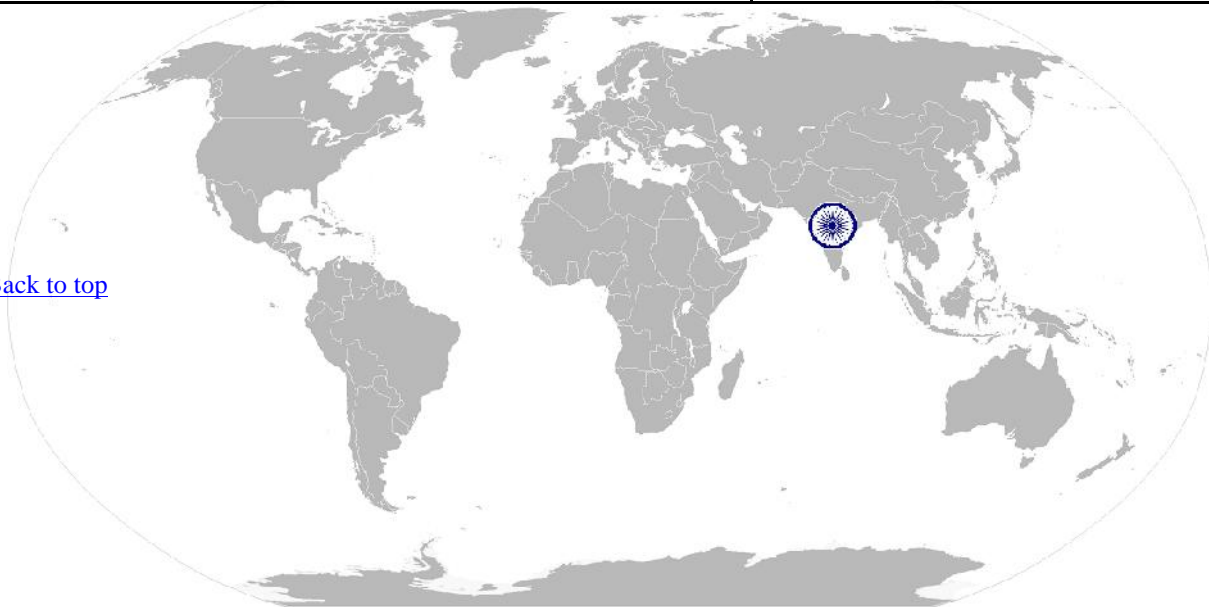
MIN/ N0901 Health and Safety

Knowledge and Understanding (K)	
<p>A. Regulatory context (knowledge of safety guidelines specified by Director General of Mine Safety (DGMS))</p>	<p>The user/individual on the job needs to know and understand:</p> <ul style="list-style-type: none"> KA1. Benching in quarries, Dressing of overhangs, undercuts, Fencing KA2. First aid and Hygiene KA3. Code of traffic in specific areas of mine. Significance of fences KA4. Standing orders in force at the mine. Safety in the vicinity of machinery KA5. Shot-firing and Safety regulations. How and where to take shelter KA6. Knowledge of mining safety procedures KA7. Impact of violation of safety procedures KA8. Locally prepared Emergency Preparedness / Disaster Management Plan. KA9. Environmental impact of mining KA10. Sources of dust, noise and vibration and measures to minimise KA11. Hazardous material safety and security rules and regulations as prescribed by DGMS KA12. Code of practice for safe handling and transport of dangerous material and heavy equipment.

NOS Version Control

NOS Code	MIN/N 0901		
Credits(NSQF)	TBD	Version number	1.0
Sector	Mining	Drafted on	15/12/2014
Sub-sector	Underground Mines	Last reviewed on	24/03/2015
Occupation	Mine Rescue/ Health	Next review date	24/03/2017

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CRITERIA FOR ASSESSMENT OF TRAINEES

Job Role Gas Detector

Qualification Pack MIN/Q 0412

Sector Skill Council Mining

Guidelines for Assessment

1. Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2. The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria
5. To pass the Qualification Pack, every trainee should score a minimum of 70% in every NOS
6. In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack

		Total Mark (100)	Out Of	Marks Allocation	
				Theory	Skills Practical
1. MIN/ N 0437 (Pre Operation check)	PC1. Check least count of the gas detecting equipment.	30	6	4	2
	PC2. Inspect physical condition of the gas detecting equipment like flame safety lamp, multi gas detectors, methano meters, toxi meters etc.		6	3	3
	PC3. Operate and record readings of the gas detecting equipment in the fresh air. If any extraneous results are obtained in the fresh air in the general atmosphere on the surface, it should be reported to the concerned official.		6	3	3
	PC4. Ensure that testing equipment is in a serviceable condition and has been calibrated correctly		6	3	3
	PC5. Check threshold limit of the gas detecting equipment.		6	4	2

		Total	30	17	13
2. MIN/ N 0438 (Operation and Running of Gas detecting unit)	PC1. Measure the percentage of oxygen at every place in the mine where persons are required to work or pass. (For eg: at every place in the mine where persons are required to work or pass, the air should not contain less than 19 percent of oxygen or more than 0.5 percent of carbon dioxide or any noxious gas in quantity likely to affect the health of any person)	40	5	2.5	2.5
	PC2. Measure the percentage of inflammable gas in an underground coal mine according to the regulations made for the purpose. (For ex: the percentage of inflammable gas should not exceed 0.75 in the general body of the return air of any ventilating district and 1.25 in any place in the mine)		5	2.5	2.5
	PC3. Measure the percentage of other noxious gases like CO, H ₂ S in the general body of air.		5	2.5	2.5
	PC4. Measure the presence of inflammable gas and other noxious gas in the part of mine which is not in use and have not yet been sealed off, once in 7 days.		5	2.5	2.5
	PC5. Observe and report any variation over the threshold limits for the percentage of different gases as laid down in statute is observed, it should be reported to the manager/concerned official.		4	3	1
	PC6. Conduct air sampling at regular intervals as per the regulation for the detailed laboratory analysis of the concentration of different gases.		4	3	1
	PC7. Maintenance of flame safety lamp like cleaning of inner and outer gauzes and glass, lids and other parts of flame safety lamp		4	3	1
	PC8. Ensure Regular charging of the digital type gas detectors.		4	2	2

	"PC9. Ensure the maintenance and management of the following records: <ul style="list-style-type: none"> • Different gases detected with their concentration. • Places, date and time of inspection for the purpose of detection of gases. • Places from where the air samples have been collected with date and time of collection. The analysis report obtained from the laboratory shall also be recorded." 		4	2	2
		Total	40	23	17
3. MIN/ N0901 (Health and Safety)	PC1. Comply with occupational health and safety regulations adopted by the employer.	30	3	2	1
	PC2. Follow mining operations procedures with respect to materials handling and accidents		3	2	1
	PC3. Follow the correct safety steps in case of accident or major failure		3	2	1
	PC4. Comply with safety regulations and procedures in case of fire hazard.		3	2	1
	PC5. Operate various grades of fire extinguishers.		3	2	1
	PC6. Work responsibly and as safe and careful as possible so as not to put the health and safety of self or others at risk, including members of the public		2	1.5	0.5
	PC7. Perform storage and transport of hazardous materials compliant with safety guidelines prescribed by DGMS.		2	1.5	0.5
	PC8. Deal with misfires as per statutory requirement		2	1	1
	PC9. Identify characteristics of post-blast fumes and take necessary precautions.		3	2	1
	PC10. Wears safety gear such as hard hat, respiratory protection, eye protection, ear protection		3	2	1

	PC11. Follow the manufacturer's instructions for care and safe operation of the equipment.		3	2	1
		Total	30	20	10