



Model Curriculum

Mechanic/Fitter

SECTOR: Mining

SUB-SECTOR: Engineering Services

OCCUPATION: Mechanical Services

REF ID: MIN/Q0304, V2.0

NSQF LEVEL: 3



Certificate

COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

SKILL COUNCIL FOR MINING SECTOR

for

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/Qualification Pack: '**Mechanic Fitter**' QP No. '**MIN/Qo3o4 NSQF Level 3**'

Date of Issuance: July 23rd, 2018

Valid up to*: March 31st, 2019

*Valid up to the next review date of the Qualification Pack or the
'Valid up to' date mentioned above (whichever is earlier)


Authorised Signatory
(Skill Council for Mining Sector)



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Mechanic/Fitter

This program is aimed at training candidates for the job of a “Mechanic/Fitter”, in the “Mining & Allied” Sector/Industry and aims at building the following key competencies amongst the learner.

Program Name	Mechanic/Fitter		
Qualification Pack Name & Reference ID.	MIN/Q0304		
Version No.	2.0	Version update date	23/07/2018
Pre-requisites to Training	ITI (Fitter or Mechanic)		
Training Outcomes	<p>After completing this programme, participants will be able to:</p> <ul style="list-style-type: none"> • Illustrate installing machines, mechanical components and equipment. • List conducting preventive maintenance of machine components in plant machinery, medium, other light vehicles, pumps, compressors, pneumatic and other machines. • Demonstrate tracking and logging preventive maintenance, repairs, troubleshooting, operational faults and other activities. • Perform diagnostics, troubleshooting and repair of mechanical components in plant machinery, medium and light vehicles, compressors, pumps, pneumatic, hydraulic and other machines. • Outline systematic recording and reporting of repair activities conducted. • Ensure safety, security and administrative requirements 		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Mechanic/Fitter” Qualification Pack issued by “Skill Council for Mining Sector”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	<p>Introduction</p> <p>Theory Duration (hh:mm) 20:00</p> <p>Practical Duration (hh:mm) 13:00</p> <p>Corresponding NOS Code Bridge Module</p>	<ul style="list-style-type: none"> • Discuss the general discipline in the class room (Do’s & Don’ts) • Explain the role of Mechanic/Fitter in mining industry • Report benching in quarries, dressing of overhangs, undercuts, fencing, first aid and hygiene • Illustrate the standing orders in force at the mine. • Practice safety in the vicinity of machinery. • Characterize the shot-firing and safety regulations. How and where to take shelter. • Discuss the basic skills of communication • Underline the basic reading capabilities to enable reading of signs, notices and/or cautions at site. 	
2	<p>Perform preventive maintenance</p> <p>(hh:mm) 50:00</p> <p>Practical Duration (hh:mm) 49:00</p> <p>Corresponding NOS Code MIN/N0309</p>	<ul style="list-style-type: none"> • Make use of ropes, slings, towing and lifting devices while assembling / disassembling machine / equipment and safely operate various types of hand and power-tools • Follow drawings and blue-prints given in the instruction sheet and installation manual. • Carry out various assembling of machines and conveyors etc. • Follow the manufacturer’s instructions which apply to the care and safe handling of the machine / automobile • Survey the machine for proper performance before handing over for operations • List the maintenance schedule recommended by the equipment manufacturer. • Demonstrate the correct procedure to grease and lubricate pivot points in a machine • Carry out opening and re-assembling various types of bearings in machines. • Demonstrate the adjusting of valves, linkages, bearings, hydraulic, pneumatic and systems for smooth operation. • Describe the responsibly of a worker so that no one’s health and safety is put in risk? • Show the track hours-in-operation and adhere to preventive maintenance schedules of various machines assigned to them. • Maintain a checking/maintenance logbook to record all activities performed. • Outline the supervisor for the problems that are beyond scope • Maintain inventory and order fuel, lubricants, consumables and other supplies 	<p>Multi Meter, Hydrometer, Torque Wrenches ,Engine Assembly (Petrol Or Diesel), Clutch Plate, Gearbox, Rear Axle, Front Axle, Pressure Plate, Cut model of engine assembly, Model of transmission system</p>

<p>3</p>	<p>Perform troubleshooting and repair</p> <p>Theory Duration (hh:mm) 33:00</p> <p>Practical Duration (hh:mm) 99:00</p> <p>Corresponding NOS Code MIN/N 0310</p>	<ul style="list-style-type: none"> • Explain various elements of a good maintenance system and difference between preventive and repair maintenance. • Make use of various measuring instruments and testing tools • Compare measured readings with optimal readings to pinpoint faults • Explain service, diagnose and repair faults in mechanical systems such as gears, steering systems, hydraulic pumps, transmission, crawlers, conveyor belts etc. • Ensure the machine is on firm and level ground before attempting to carry out any maintenance activity. • Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only) • Ensure that no maintenance task on the machine / engine is performed when running or still hot • Make use of various kinds of hand held and power-tools to lift, dismantle or assemble machine components. • Classify fine tune and adjust valves, belt tensions for optimal operation. • Test for repaired equipment to ensure everything is working correctly and safely (this may include road / on load testing the machine / vehicle) • Survey daily/weekly maintenance/defect sheets as provided by the company. • Assess when the problem is beyond competence and report the problem to suitably qualified and competent personnel. • Function of inventory of fuel, lubricants and order other spares and consumables as required. 	
<p>4</p>	<p>Adhere to health and safety and Mine Vocational Training Rule (MVTR) requirements in opencast mines</p> <p>Theory Duration (hh:mm) 33:00</p> <p>Practical Duration (hh:mm) 33:00</p> <p>Corresponding NOS Code MIN/N0904</p>	<ul style="list-style-type: none"> • Comply with safety, health, security and environment related regulations / guidelines at the mine and follow the Safe Operation Procedure (SOP) made before hand in consultation with the DGMS and implement the same. • Make use of Personal Protective Equipment (PPE) such as, hand gloves, helmet, safety shoes, dust mask, ear plug, reflective jackets, safety goggles etc., • Survey safety measures during operations to ensure that the health and safety of self or others (including members of the public) is not at risk and carry out operations as per the manufacturer’s and worksite related health and safety guidelines. • Make use of manufacturer’s instructions for care and safe operation of mine machinery, equipment and take requisite care not to damage any power, pneumatic lines and protect self and machinery from unwarranted exposure. • Plan the transport, storage, disposal of hazardous materials and waste in compliance with worksite guidelines as per MVTR (Mine Vocational Training Rule). • Deal with misfires as per laid out process and identify characteristics of post-blast fumes and take necessary 	<p>Helmet, Dust Mask, Goggles, Ear Plug Gloves, Reflective Jacket, Safety Belt Gum Boots/ Safety shoes, Fire Extinguisher Cylinders, First Aid Box, Fire Fighting Charts, First Aid Charts</p>

		<p>precautions like attending the place after lapse of 5 minutes of blasting</p> <ul style="list-style-type: none"> • Support in administering basic first aid and report to the concerned team members and respond promptly and appropriately to an accident/ incident or emergency • Ensure that no person shall travel, work or stay under unsupported roof and that the roof supporting is as per approved SSR while undertaking work in an area. • Survey gas detecting alarm signal to check leakage of inflammable gases and laid out procedure to ensure safety and proceed to Emergency shelter or Mine rescue chamber (if available) in case of major accidents. • Ensure walkway rules are followed, various signalling devices are deployed and operating speed etc. are strictly adhered to for any moving HEMM (Heavy Earth Moving Machinery) or other machinery and ensure that no other operators travel on or stand near the loader • Ensure that HEMM (Heavy Earth Moving Machinery) or other such transportation and moving machinery are always parked on firm, level ground with handbrake applied, drive and controls disengaged • Assume all prescribed measures while camping in a remote site or camp, including compliance to safety procedures in case of inundation, fire hazard, gas occurrence etc., 	
	<p>Total Duration Theory Duration 66:00 Practical Duration 264:00</p>	<p>Unique Equipment Required: Helmet ,Dust Mask, Goggles, Ear Plug, Gloves, Reflective Jacket, Safety Belt, Gum Boots, Fire Extinguisher Cylinders, First Aid Box ,Fire Fighting Charts, First Aid Charts, Clutch Plate, Propeller Shaft, Break Assembly unit, Tyre Repair Kit, Self-Starter Assembly, Alternator Assembly , Horn Assembly, Wiper Motor Assembly, Tyre Pressure Meter, Vehicle Driver Tool Box, Vehicle Log Book, Air Inflating Pump, Cut model of pump cut model of compressor, Typical Vehicle Servicing Chart, Tyre Rotation Chart, Bench-Vice & Line-Vice ,Pressure Plate Cut model of pump, Cut model of compressor</p>	

Grand Total Course Duration: 330 Hours, 0 Minutes

(This syllabus/ curriculum has been approved by SSC: Skill Council for Mining Sector)

Trainer Prerequisites for Job role: “Mechanic/Fitter” mapped to Qualification Pack: “MIN/Q0304”

Sr. No	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “MIN/Q0304”.
2	Personal Attributes	This job requires sensitivity to problem solving, safety orientation, reading, writing and communication skills and good agility. The person should be of good physical condition with good vision and must pass through periodic medical tests.
3	Minimum Educational Qualifications	Class X/ ITI or Diploma in Mechanical or B-Tech in Mechanical or
4a	Domain Certification	Certified for Job Role: “Mechanic/Fitter” mapped to QP: “MIN/Q304, v2.0”. Minimum accepted score is 70%
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q0102”. Minimum accepted score for platform certification will be 80%.
5	Experience	<ol style="list-style-type: none"> 1. Class X/ ITI - 6 years 2. Diploma in Mechanical - 5 years 3. B-Tech in Mechanical - 4 years

Annexure: Assessment Criteria

Assessment Criteria for Mechanic/Fitter	
Job Role	Mechanic/Fitter
Qualification Pack	MIN/Q0304
Sector Skill Council	Skill Council for Mining Sector

Guidelines for Assessment
<ol style="list-style-type: none"> 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. The assessment for the theory part will be based on knowledge bank of questions created by the SSC. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS. Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training Centre based on these criteria. Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training center (as per assessment criteria below). To pass the Qualification Pack, every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment. In case of <i>unsuccessful completion</i>, the trainee may seek reassessment on the Qualification Pack.

Compulsory NOS				Marks Allocation	
Total Marks: 100					
Assessment outcomes	Assessment Criteria for outcomes	Total Marks	Out Of	Theory	Skills Practical
1. MIN/N0309 Perform preventive maintenance	PC1. Use ropes, slings, towing and lifting devices while disassembling / assembling equipment.	35	3	1	2
	PC2. Safely operate various types of hand and power-tools		3	1	2
	PC3. Follow drawings and blue-prints given in the instructions and installation manual.		3	0	3
	PC4. Follow the manufacturer's instructions which apply to the care and safe handling of the machine		3	1	2
	PC5. Test assembled machine for proper performance before handing over for operations		3	0	3
	PC6. Adhere to maintenance schedule recommended by the equipment manufacturer.		2	1	1
	PC7. Lubricate sufficiently and neatly all pivot points in a machine.		3	0	3
	PC8. Open and re-assemble various types of bearings in machines.		3	1	2
	PC9. Adjust valves and hydraulic systems for smooth operation.		3	1	2

	PC10. Work responsibly and as safely and carefully as possible so as not to put the health and safety of self or others at risk.		2	0	2
	PC11. Track hours-in-operation and adhere to preventive maintenance schedules of various machines assigned to him.		2	1	1
	PC12. Maintain a checking/ maintenance logbook and history sheets to record all activities performed.		2	1	1
	PC13. Inform supervisor of problems that are beyond scope of his role		2	1	1
	PC14. Maintain inventory of parts / consumables and order fuel, lubes and other supplies.		1	1	0
		Total	35	10	25
2. MIN/N0310 (Perform troubleshooting and repair)	PC1. Use various measuring and testing instruments and record readings	40	4	3	1
	PC2. Compare measured readings to optimal readings to pinpoint faults		3	2	1
	PC3. Service, diagnose and repair faults in mechanical systems such as gears, steering systems, hydraulic pumps, transmission, crawlers, conveyor belts etc.		5	3	2
	PC4. Ensure the machine is on firm and level ground before attempting to carry out any repair and maintenance activity.		3	1	2
	PC5. Ensure the locking bar is in position to prevent the front and rear chassis moving and creating a crushing zone (articulated machines only)		3	1	2
	PC6. Ensure that no maintenance task on the machine is performed when running or still hot		3	0	3
	PC7. Repair or replace faulty parts		3	1	2
	PC8. Use various kinds of hand held and power-tools to lift, dismantle or assemble machine components.		3	0	3
	PC9. Fine tune and adjust various components, valves, belt tensions etc. for optimal operation.		3	0	3
	PC10. Test repaired equipment to ensure everything is working correctly and safely (this may include in operation testing of the machine)		3	1	2
	PC11. Complete timely and legibly daily/weekly maintenance/defect sheets as provided by the company.		2	1	1
	PC12. Assess when the problem is beyond his competence and report the problem to suitably qualified and competent superior personnel.		3	1	2
	PC13. Maintain Inventory and order spares and consumables as required.		2	1	1
		Total	40	15	25
3. MIN/N0904 Adhere to health and safety and Mine Vocational Training Rule (MVTR)	KC1. Comply with safety, health, security and environment related regulations/ guidelines at the Mine and follow the Safe Operation procedure (SOP) made before hand in consultation with the DGMS and implement the same.	25	2	1	1
	PC2. Use Personal Protective Equipment (PPE) and other safety gear such as seat belt, body protection, respiratory		2	1	1

requirements in opencast mines	protection, eye protection, ear protection and hand protection.			
	PC3. Follow safety measures during operations to ensure that the health and safety of self or others (including members of the public) is not at risk and carry out operations as per the manufacturer's and worksite related health and safety guidelines.	2	1	1
	PC4. Follow the manufacturer's instructions for care and safe operation of mine machinery and equipment and take requisite care to not to damage any power and pneumatic lines and protect self and machinery from unwarranted exposure.	2	0	2
	PC5. Handle the transport, storage and disposal of hazardous materials and waste in compliance with worksite guidelines as prescribed by DGMS and Mine manager.	2	0	2
	PC6. Deal with misfires as per laid out process and identify characteristics of post-blast fumes and take necessary precautions like attending the place after lapse of 5 minutes of blasting.	2	0	2
	PC7. Support in administering basic first aid and report to the concerned team members and respond promptly and appropriately to an accident/ incident or emergency situation.	2	0	2
	PC8. Ensure that no person shall travel, work or stay under unsupported roof and ensure that Roof supporting is as per approved SSR while undertaking work in an area.	2	0	2
	PC9. Follow any gas detecting alarm signal on inflammable gases and laid out procedure to ensure safety and proceed to Emergency shelter or Mine rescue chamber (if available) in case of major accidents.	3	1	2
	PC10. ensure walkway rules are followed, various signalling devices are deployed and operating speed etc. are strictly adhered to for any moving HEMM or other machinery and ensure that no other operators travel on or stand near the Loader	2	0	2
	PC11. ensure that HEMM or other such transportation and moving machinery are always parked on firm, level ground; with handbrake applied and drive and controls disengaged	2	1	1
	PC12. undertake all prescribed measures while camping in a remote site or camp, including compliance to safety procedures in case of inundation, fire hazard, gas occurrence etc.	2	0	2
		Total	25	5
	Total Marks	100	30	70