



LEARN AND WORK ASSIGNMENT (LWA)



NOSS (CODE NOSS)	INDUSTRIAL MAINTENANCE OPERATION (ME-010-3:2012)		
Competency Unit Title (CU CODE)	STATIC AND ROTATING EQUIPMENT MAINTENANCE ME-010-3:2012-C06	LEVEL	3
Competency Unit Descriptor	<p>Static and rotating equipment maintenance is the daily maintenance, and troubleshooting, monitoring, shut down of equipment, testing equipment to determine the operating condition.</p> <p>The person who is competent in this CU shall be able to Select static and rotating equipment, Select type of static and rotating equipment maintenance requirement, Perform static and rotating equipment maintenance, Perform static and rotating equipment functionality test and Produce static and rotating equipment maintenance report.</p> <p>The outcome of this competency is to provide excellence static and rotating equipment maintenance according to machine manual as per company's policy, rules and regulation.</p>		
Candidate Name			
Candidate I/C Number			
Company's Name			

CU WORK ACTIVITY STATEMENT:**PERFORM STATIC AND ROTATING EQUIPMENT MAINTENANCE ACTIVITIES****DURATION: 216 HOURS****A. SETTING GOAL**

You are required to perform static and rotating equipment maintenance activities based on performance criteria below:

- 1.1 Determine types of static and rotating equipment to be maintained conformed is in accordance to the maintenance schedule
 - 1.1.1 Various Pumps
 - 1.1.2 Blower
 - 1.1.3 Various Valves
 - 1.1.4 Air Compressor
 - 1.1.5 Steam injection
- 1.2 Explain job order in accordance with company's policy
- 1.3 Explain static and rotating equipment rules and regulation compliance.
- 1.4 Identify type of maintenance
 - 1.4.1 Preventive
 - 1.4.2 Corrective
 - 1.4.3 Predictive
- 1.5 Explain maintenance schedule.
- 1.6 Describe maintenance requirement.
- 1.7 Describe Static and rotating equipment technical drawing.
 - 1.7.1 Drawing symbol
 - 1.7.2 Critical dimension
 - 1.7.3 Static and rotating equipment Maintenance machine component
 - 1.7.4 Static and rotating equipment component's dismantling or re-installing procedures
- 1.8 List tool and spare parts for static and rotating equipment maintenance in accordance with job requirement.
- 1.9 Identify static and rotating equipment components problem.
 - 1.9.1 Leakage
 - 1.9.2 Low pressure
 - 1.9.3 Wear and tear
 - 1.9.4 Unbalance
 - 1.9.5 Misalignment
 - 1.9.6 Noise
 - 1.9.7 Vibration

1.9.8 Over heat

1.10 Determine static and rotating equipment mechanical component maintenance activity in accordance to Standard Operation Procedures

1.10.1 replace

1.10.2 repair

1.10.3 Alignment

1.10.4 Balancing

1.10.5 Servicing

1.11 Identify static and rotating equipment functionality

1.11.1 Free Run

1.11.2 Actual machine run

1.12 Identify fitting and joining report format.

1.13 Identify submission documentations to person in charge.

B. PLANNING

You are required to plan activities in performing static and rotating equipment maintenance to achieve setting goal by using resources listed below:

2.1 Identify tools, equipment & materials.

ITEMS	RATIO (TEM : Trainees)
1. Measuring instruments	1:1
2. Measuring Instrument storage (cabinet)	1:5
3. Measuring Instrument charts and posters	1:5
4. Testing instrument	1:1
5. Technical drawing	1:5
6. Static equipment, accessories and consumable item	1:5
7. Rotating equipment, accessories and consumable item	1:5
8. Maintenance check sheet	1:1
9. Tool box	1:1
10. Hand tool set	1:1
11. Power tools	1:5
12. Personal Protective Equipment (PPE)	1:1
13. Workpiece / Sample for testing	1:1
14. Management Information System (MIS)	1:5

2.2 Perform static and rotating equipment maintenance workflow.

2.3 Identify static and rotating equipment maintenance procedures, flow chart and correct sequence.

2.4 Plan duration/time of static and rotating equipment maintenance procedures.

2.5 Identify manpower in performing static and rotating equipment maintenance activities.

2.6 You may review references as guidelines in performing this activity.

REFERENCES

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4. Ibrahim Che Muda, N Ramudaram, (2004) Teknologi Bengkel Mesin Dewan Bahasa dan Pustaka, Kementerian Pendidikan Malaysia, Kuala Lumpur ISBN 983-62-1233-7
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C. DECISION MAKING

You are required to get coach approval before performing static and rotating equipment maintenance activities.

D. EXECUTING & MONITORING

You are required to perform static and rotating equipment maintenance activities according to the steps below:

3.1 Select static and rotating equipment

3.1.1 Interpret static and rotating equipment maintenance schedule

- Type of maintenance (Corrective, Preventive and Predictive)
- Type of machines
- Time interval (Daily, Weekly, Monthly, Quarterly, Yearly)
- Duration
- Verification (Prepare, Check and Approve)
- Location
- Etc.

3.1.2 Determine types and functions of static equipment

- Valves (gate or steam)
- Expansion joint
- Piping system
- Injection
- Etc.

3.1.3 Determine types and functions of rotating equipment

- Various Pumps (Positive, centrifugal, etc.)
- Blower
- Air Compressor
- Etc.

3.1.4 Interpret Job order instructions/maintenance checklist

- List of jobs
- Person in charge
- Type of job order
- Type of maintenance list
- Status of work
- Department
- Date and time start
- Date and time completed
- Etc.

- 3.1.5 Comply static and rotating equipment maintenance safety rules and regulation
 - Occupational Safety & Health Act (OSHA)
 - Manual operation
 - Manual installation
 - Standard Operating Procedure (SOP)
 - Etc.
- 3.1.6 Select static and rotating equipment to be maintained
 - Packing
 - Mechanical seal
 - Gasket
 - Propeller
 - Bearing
 - Shaft
 - Bush
 - Lock pin
 - Gear
 - Etc.
- 3.2 Select types of static and rotating equipment maintenance requirement
 - 3.2.1 Differentiate types of maintenance
 - Preventive Maintenance
 - Corrective Maintenance
 - Predictive Maintenance
 - 3.2.2 Interpret Maintenance Schedule
 - Daily
 - Monthly
 - Quarterly
 - Yearly
 - 3.2.3 Interpret Job Order
 - Type of machine
 - Type of maintenance
 - Type of job
 - Department
 - Person in charge
 - Tools requirement
 - Date (commence and complete)
 - Verification
 - Etc.
- 3.3 Perform static and rotating equipment maintenance
 - 3.3.1 Interpret static and rotating equipment maintenance technical manual
 - Installation manual
 - Operation manual
 - Etc.
 - 3.3.2 Interpret Technical drawing
 - Symbols
 - Dimensions
 - Projection view

- Assembly drawing
 - Etc.
- 3.3.3 Prepare Tools for maintenance
- Hand tools
 - Power tools
 - Special tools
 - Etc.
- 3.3.4 Check static and rotating equipment components for maintenance activity
- Valve
 - Shaft
 - Belting
 - Chain
 - Mechanical Seal
 - Gasket
 - Etc
- 3.3.5 Interpret static and rotating equipment components maintenance procedure
- Installation procedure
 - Maintenance procedure
 - Etc.
- 3.3.6 Apply static and rotating equipment components maintenance technique
- Repair
 - Service
 - Part replacement
 - Calibration
 - Etc
- 3.3.7 Apply lubrication for static and rotating equipment
- Grease
 - Lube oil
 - Etc.
- 3.3.8 Dismantle and replace /repair accordingly to SOP static and rotating equipment components for maintenance activity
- Numbering / lettering technique
 - Segregation technique
 - Replacement technique
 - Repair technique
 - Etc
- 3.3.9 Confirm static and rotating equipment assembly
- First in First Out (FIFO)
 - First out Last Out (FOLO)
 - Last Out First In (LOFI)
 - Last Out Last in (LOLI)
 - Fixing technique
 - Etc

- 3.3.10 Execute Troubleshooting activity
 - Mechanical stability
 - Electrical / electronic faulty
 - Etc.
- 3.4 Perform static and rotating equipment functionality test
 - 3.4.1 Comply to static and rotating equipment safety features according to Standard Operation Procedure (SOP)
 - Occupation Safety and Health Act (OSHA)
 - Manual Operation
 - Installation procedure
 - Etc.
 - 3.4.2 Perform test run method and procedures of the static and rotating equipment under condition without load and with load using
 - Visual Testing
 - Vibration Testing
 - Noise Testing
 - Heat Testing
 - Alignment Testing
 - Balancing Testing
 - Etc.
 - 3.4.3 Confirm functionality of static and rotating equipment
 - Jot down performance check list
 - Apply Commissioning and endorsement method
 - Etc.
- 3.5 Produce static and rotating equipment maintenance report according to work and test data checklist
 - 3.5.1 Collect maintenance technical Data
 - 3.5.2 Interpret maintenance technical Data
 - 3.5.3 Confirm maintenance technical Data comply to technical drawing and job order
 - 3.5.4 Produce maintenance technical report
 - Manual
 - Computerize

3.6 Comply with attitude, safety and environment listed below when performing this activity.

ATTITUDE	SAFETY	ENVIRONMENTAL
i. Meticulous in selecting Component	i. Adhere to safety requirement	i. Comply to environment act
ii. Alertness in handling static and rotating equipment		
iii. Knowledgeable and meticulous		
iv. Responsible to perform static and rotating equipment maintenance		
v. Meticulous and detail in handling		
vi. static and rotating equipment		
vii. Cleanliness at the workplace		
viii. 5S compliance		

3.7 Apply core activities listed below when performing this activity.

Social Skills	Core Abilities
Communication skills	L1-CA01-01 Apply working language appropriately (English/ national language etc). L1-CA01-02 Apply oral communication and speak reasonably. L1-CA01-03 Understand reading material. L2-CA01-01 Apply two-way communication L2-CA01-02 Disseminate information electronically L2-CA01-03 Disseminate information manually L3-CA01-01 Demonstrate communication practice
Problem solving skills	L1-CA02-01 Demonstrate honesty and integrity L1-CA02-02 Adopt work punctuality L1-CA02-03 Demonstrate team cooperation L2-CA02-01 Demonstrate responsibility at workplace L2-CA02-02 Apply teamwork cooperation concept L2-CA02-03 Initiate problem solving at workplace L2-CA02-04 Demonstrate work performance awareness
Leadership skill	L3-CA02-01 Demonstrate counselling ability L3-CA02-02 Demonstrate responsibility & authority L3-CA02-03 Demonstrate teamwork ability L3-CA02-04 Demonstrate emotional intelligence L3-CA02-05 Apply work knowledge in identifying clients needs L3-CA02-06 Monitor work performance delivery L2-CA01-04 Apply information confidentiality L3-CA01-02 Apply basic negotiation skills L3-CA06-03 Implement workforce practices L3-CA03-01 Apply cultural requirement at workplace L3-CA03-02 Handle situations that require attention
Teamwork	L1-CA03-01 Respond to instructions L1-CA03-02 Demonstrate discipline at workplace L2-CA03-01 Apply practice work culture L2-CA03-02 Respond appropriately to unusual situations L2-CA03-03 Demonstrate initiative and flexibility L2-CA04-01 Demonstrate health compliance L2-CA04-02 Demonstrate safety compliance L2-CA04-03 Demonstrate environment compliance L3-CA04-01 Execute health consciousness L3-CA04-02 Execute safety consciousness L3-CA04-03 Execute environment compliance
Multitasking and prioritizing	L1-CA04-01 Adhere to health awareness activity L1-CA04-02 Adhere to safety awareness activity L1-CA04-03 Adhere to environmental awareness activity L3-CA05-01 Demonstrate Technology update awareness L3-CA05-02 Demonstrate Information technology regulatory Awareness L3-CA06-01 Demonstrate work asset usage awareness L3-CA06-02 Negotiate acceptance and delivery of products and/or services

E. EVALUATING

You are required to evaluate static and rotating equipment maintenance activities using the checklist below.

A	ASSESSMENT CRITERIA (60%)	MARKS GIVEN BY APPRENTICE					MARKS GIVEN BY COACH				
		0	1-2	3-4	5-6	7	0	1-2	3-4	5-6	7
1	Static and rotating equipment to be maintained confirmed										
2	Job order instructions/ Maintenance checklist interpreted										
3.	Type of maintenance selected										
4	Static and rotating equipment maintenance technical manual interpreted										
5	Technical drawing interpreted										
6	Types of tools selected										
7	Static and rotating equipment replaced or repaired										
8	Static and rotating equipment assembly confirmed										
9	Automation system problem troubleshoot carried out										

10	Test run method and procedures of the static and rotating equipment performed										
11	Automation maintenance data recorded										
	SUBTOTAL	A₁					A₂				
	FULL MARKS	77					77				

B	ATTITUDE/SAFETY/ENVIRONMENT (20%)	MARKS GIVEN BY APPRENTICE					MARKS GIVEN BY COACH				
		0	1-2	3-4	5-6	7	0	1-2	3-4	5-6	7
1	Attitude										
2.	Safety										
3	Environmental										
		B₁					B₂				
		21					21				
C	EMPLOYABILITY SKILLS (SOCIAL SKILLS) (20%)	MARKS GIVEN BY APPRENTICE					MARKS GIVEN BY COACH				
		0	1-2	3-4	5-6	7	0	1-2	3-4	5-6	7
1	Communication skills										
2	Problem solving skills										
3	Leadership skill										
4	Teamwork										
5	Multitasking and prioritizing										
		C₁					C₂				
	FULL MARKS	35					35				

CALCULATION TABLE

	MARKS GIVEN BY APPRENTICE	MARKS GIVEN BY COACH	WEIGHTED MARKS GIVEN BY APPRENTICE	WEIGHTED MARKS GIVEN BY COACH
ASSESSMENT CRITERIA	A_1	A_2	$A_1 / 77 \times 60$	$A_2 / 77 \times 60$
ATTITUDE, SAFETY & ENVIRONMENT	B_1	B_2	$B_1 / 21 \times 20$	$B_2 / 21 \times 20$
EMPLOYABILITY SKILLS (SOCIAL SKILLS)	C_1	C_2	$C_1 / 35 \times 20$	$C_2 / 35 \times 20$
Total			X	Y
Ratio of Percentage (Apprentice: Coach)			P%	Q%
Grand Total			$(P/100 \times X) + (Q/100 \times Y)$	

COMMENTS/ RECOMMENDATIONS BY COACH

COACH:
DATE:

APPRENTICE:
DATE: