



## LEARN AND WORK ASSIGNMENT (LWA)



<b>NOSS (CODE NOSS)</b>	<b>INDUSTRIAL MAINTENANCE OPERATION ( ME-010-3 : 2012 )</b>		
<b>Competency Unit Title (CU CODE)</b>	<b>WELDING MACHINE MAINTENANCE ( ME-010-3 : 2012 – C05 )</b>	<b>LEVEL</b>	<b>3</b>
<b>Competency Unit Descriptor</b>	Welding machine maintenance is a necessary action for retaining or restoring welding machine to the specified operable condition to achieve its maximum useful lifespan. It included corrective, preventive and predictive maintenance. The person who is competent in this CU shall be able to Select welding machine to be maintained, Select maintenance requirement, Troubleshoot welding machine faulty, Repaired/replaced welding machine faulty components, Perform welding machine functionality test and Produce maintenance report. The outcome of this competency is to provide excellence welding machine maintenance according to Machine manual as per company's policy, rules and regulation		
<b>Candidate Name</b>			
<b>Candidate I/C Number</b>			
<b>Company's Name</b>			

**CU WORK ACTIVITY STATEMENT:**  
**PERFORM WELDING MACHINE MAINTENANCE ACTIVITIES**

**DURATION: 144 HOURS**

**A. SETTING GOAL :**

You are required to perform welding machine maintenance activities based on performance criteria below:

- 1.1 Determine type of welding machine to be maintain conform is in accordance to welding machine maintenance schedule,
  - 1.1.1. Shielded metal arc welding (SMAW)
  - 1.1.2. Gas tungsten arc welding (GTAW /TIG)
  - 1.1.3. Gas metal arc welding (GMAW / MIG)
  - 1.1.4. Flux Core arc welding (FCAW)
- 1.2 Describe job order in accordance with company's policy, rules and regulation.
- 1.3 Determine type of maintenance requirement
  - 1.3.1. Preventive
  - 1.3.2. Corrective
  - 1.3.3. Predictive
- 1.4 Describe maintenance schedule.
- 1.5 Identify type of welding machine maintenance in accordance with technical manual.
- 1.6 Describe machine technical manual.
- 1.7 Identify welding machine tool and parts.
- 1.8 Identify welding equipment's problem.
- 1.9 Explain troubleshoot component:
  - 1.9.1. Cable connection and power supply
  - 1.9.2. Electrical components including transformer
  - 1.9.3. Ventilation fan
  - 1.9.4. Cooling system
- 1.10 Identify welding machine maintenance activity
  - 1.10.1. Adjust
  - 1.10.2. Replace
  - 1.10.3. Repair
- 1.11 Identify safety procedures adhered in accordance to Standard Operation Procedures.
  - 1.11.1. Safety of machine
  - 1.11.2. safety interlock of equipment.
- 1.12 Identify functionality of the machine.
  - 1.12.1. Free run
  - 1.12.2. Actual test
- 1.13 Identify welding machine maintenance report format.
- 1.14 Identify submission documentations to person in charge

## **B. PLANNING**

You are required to plan activities to achieve listed setting goal of performing welding machine maintenance activities by using resources listed below:

- 2.1 Identify tools, materials and equipment for performing welding machine maintenance activities according to listed below:

ITEMS	RATIO (TEM : Trainees)
1. Job Order	1:5
2. Welding Machine And Accessories	1:5
3. Testing Instrument	1:5
4. Welding Machine Instruction Manual	1:5
5. Maintenance Checklist	1:5
6. Performance Checklist	1:5
7. Tool Box	1:5
8. Hand Tool Set	1:5
9. Power Tools	1:5
10. Personal Protective Equipment (PPE)	1:1
11. Workpiece For Testing	1:10
12. Computer And Peripherals	1:10

- 2.2 Perform welding machine maintenance workflow.
- 2.3 Identify welding machine maintenance procedures, flow chart and correct sequence.
- 2.4 Plan duration/time of welding machine maintenance procedures.
- 2.5 Identify manpower in performing welding machine maintenance activities.

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

## REFERENCES

1. Zakaria Saad, (2002), Mekanik Industri Teori dan teknologi, Golden Books center Sdn. Bhd ISBN: 983-72-0503-2.
2. Mohd Ramzan Mainal, (2005). Lukisan Kejuruteraan Asas (Edisi Kedua), Universiti Teknologi Malaysia ISBN 983-99502-2-3
3. Ibrahim Che Muda, N Ramudaram, (2004) Teknologi Bengkel Mesin Dewan Bahasa dan Pustaka, Kementerian Pendidikan Malaysia, Kuala Lumpur ISBN 983-62-1233-7
4. Yahaya Emat, (1987). Prinsip Elektrik, Dewan Bahasa dan Pustaka KK.537-3395-2101

2.7 List out any references related when performing this activity such as:

- 2.7.1 Standard Operating Manual (SOP)/ Service manual / Manufacturer's manual
- 2.7.2 Service job sheet
- 2.7.3 Owner's manual
- 2.7.4 Etc.

## C. DECISION MAKING

You are required to get coach approval before performing welding machine maintenance activities.

## **D. EXECUTE & MONITORING**

You are required to perform welding machine maintenance activities according to steps below:

### 3.1 Select welding machine to be maintained

#### 3.1.1 Determine types and functions of welding machine

- Shielded metal arc welding (SMAW)
- Gas tungsten arc welding (GTAW)
- Gas metal arc welding (GMAW)
- Flux Core arc welding (FCAW)

#### 3.1.2 Interpret welding machine specification

- Coding
- Serial number
- Rating
- Etc.

#### 3.1.3 Interpret job order

- 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.

### 3.2 Select maintenance requirement

#### 3.2.1 Determine types of maintenance

- Preventive
- Corrective
- Predictive

#### 3.2.2 Select type of welding machine Spare parts

- Welding gun
- Welding torch / nozzle
- Cable/ tube / gas hose

- Gas regulator
- Current regulator / transformer
- Ventilation system
- Control panel
- Electrode wire feed drive
- Tungsten rod
- Etc.

### 3.2.3 Confirm of selection maintenance and spare parts requirement

## 3.3 Perform Welding machine maintenance

### 3.3.1 Adhere to safety procedures in accordance to Standard Operation Procedure

- Occupation safety and health act (osha)
- Manual operation
- Installation procedure
- Etc.

### 3.3.2 Interpret welding machine instruction manual

- Operation manual
- Maintenance manual

### 3.3.3 Select types of maintenance tools

- Hand tools
- Power tools
- Viscosity meter
- Multimeter
- Etc.

### 3.3.4 Check welding machine components problems

- Electrode feeder stuck
- Drive roll jammed
- Electrode wire stuck
- Pulley jammed
- Current insufficient
- Ac /dc control tripped
- Circuit board burned
- Ventilation part malfunction
- Etc.

### 3.3.5 Select required spare parts for maintenance

- Welding gun
- Welding torch / nozzle
- Cable/ tube / gas hose
- Gas regulator
- Current regulator / transformer
- Ventilation system
- Control panel
- Electrode wire feed drive
- Tungsten rod
- Etc.

### 3.3.6 Dismantle components

### 3.3.7 Repair or replace faulty / damaged components

### 3.3.8 Carry out assemble components

### 3.3.9 Check component assembly

### 3.3.10 Fill-up maintenance checklist

## 3.4 Perform welding machine functionality test

### 3.4.1 Comply machine safety features adhered according to Standard Operation Procedure (SOP)

- Operation manual
- Installation manual
- Etc.

### 3.4.2 Select testing equipment

- Insulation tester
- Volt meter
- Amp meter
- Etc.

### 3.4.3 Utilize testing equipment Apply checking activity

### 3.4.4 Test run welding machine

- Strike test
- Weld test
- Power supply
- Power source cable
- Earth cable
- Work cable
- Etc.

#### 3.4.5 Fill-up Performance checklist

- Leakage
- Stability
- Smooth
- Noise
- Accuracy
- Etc.

### 3.5 Produce welding machine maintenance report

#### 3.5.1 Interpret Checklist

- Maintenance checklist
- Performance Checklist

#### 3.5.2 Write maintenance report

- Manual
- Computerize

#### 3.5.3 Compile welding machine maintenance report



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

ATTITUDE	SAFETY	ENVIRONMENTAL
i. Meticulous in selecting machine tool	i. Adhere to safety requirement	i. Comply to environment act
ii. Responsible	ii. Use Personal Protective Equipment	
iii. Cleanliness at workplace		
iv. Meticulous in maintenance works		
v. Meticulous in writing report		
vi. 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 welding machine maintenance activities using checklist below.

<b>A</b>	<b>ASSESSMENT CRITERIA (60%)</b>	<b>MARKS GIVEN BY APPRENTICE</b>					<b>MARKS GIVEN BY COACH</b>				
		<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>7</b>	<b>0</b>	<b>1-2</b>	<b>3-4</b>	<b>5-6</b>	<b>7</b>
1	Types of welding machine selected										
2	Job Order interpreted										
3	Types of maintenance requirement selected										
4	Type of welding machine spare parts selected										
5	Welding machine instruction manual interpreted										
6	Types of maintenance tools selected										
7	Welding machine components problems checked										
8	Components dismantle										
9	Faulty / damaged component repaired, replaced and troubleshoot										
10	Assemble components carried out										
11	Welding machine tested										
12	Welding machine maintenance recorded										
	<b>SUBTOTAL</b>	<b>A<sub>1</sub></b>					<b>A<sub>2</sub></b>				
	<b>FULL MARKS</b>	<b>84</b>					<b>84</b>				

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

# CALCULATION TABLE

	MARKS GIVEN BY APPRENTICE	MARKS GIVEN BY COACH	WEIGHTED MARKS GIVEN BY APPRENTICE	WEIGHTED MARKS GIVEN BY COACH
ASSESSMENT CRITERIA	$A_1$	$A_2$	$A_1 / 84 \times 60$	$A_2 / 84 \times 60$
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, P: Coach, Q)			P%	Q%
Grand Total			$(P/100 \times X) + (Q/100 \times Y)$	

## COMMENTS/ RECOMMENDATIONS BY COACH

\_\_\_\_\_  
COACH:  
DATE:

\_\_\_\_\_  
APPRENTICE:  
DATE: