



LEARN AND WORK ASSIGNMENT (LWA)



NOSS (CODE NOSS)	INDUSTRIAL MAINTENANCE OPERATION (ME-010-3:2012)		
Competency Unit Title (CU CODE)	MATERIAL FITTING AND JOINING ME-010-3:2012-C01	LEVEL	3
Competency Unit Descriptor	<p>Material fitting and joining is the process of bringing and holding materials together by fastening, adhesive bonding, welding, or other similar processes. The person who is competent shall be able to select material, perform joint operation, perform fitting work, inspect joint material and produce fitting and joint material report.</p> <p>The outcome of this competency is to provide excellence fitting and joint material according to machine manual and Standard Operating Procedures (SOP) as per company's policy, rules and regulation.</p>		
Candidate Name			
Candidate I/C Number			
Company's Name			

CU WORK ACTIVITY STATEMENT:
PERFORM MATERIAL FITTING AND JOINING ACTIVITIES

DURATION: 288 HOURS

A. SETTING GOAL

You are required to perform material fitting and joining activities based on performance criteria below:

- 1.1 Determine types of material requirement.
- 1.2 Interpret job order in accordance with company's policy, rules and regulation.
- 1.3 Confirm types of material joining
- 1.4 Interpret technical drawing
 - 1.4.1 Drawing symbol
 - 1.4.2 Critical dimension
 - 1.4.3 Joining component
- 1.5 Prepare material joining tools
- 1.6 Identify joint operation in accordance to technical drawing specification
 - 1.6.1 Arc welding (SMAW , TIG , MIG) - 1G , 1F position
 - 1.6.2 Bronze brazing
 - 1.6.3 Silver brazing
 - 1.6.4 Mild steel brazing
 - 1.6.5 Plastic welding
 - 1.6.6 Soldering
 - 1.6.7 Riveting
 - 1.6.8 Fastener / Bolting
 - 1.6.9 Seaming
- 1.7 Identify operation safety procedures adhered in accordance to SOP
 - 1.7.1 Cutting activity procedure
 - 1.7.2 Drilling activity procedure
 - 1.7.3 Threading activity procedure
 - 1.7.4 Bending activity procedure
 - 1.7.5 Filing activity procedure

- 1.8 Identify operation procedures material joining operations visually.
- 1.9 Identify joining operations dimensional.
- 1.10 Identify fitting and joining report format.
- 1.11 Identify submission documentations to person in charge.

B. PLANNING

You are required to plan activities in performing material fitting and joining 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 : 25
3. Measuring Instrument charts and posters	1 : 25
4. Technical drawing	1 : 5
5. Jointing material equipment, accessories and consumable item	1 : 5
6. Fitting equipment, accessories and consumable item	1 : 5
7. Check sheet	1 : 1
8. Tool box	1 : 1
9. Hand tool set	1 : 1
10. Power tools	1 : 5
11. Personal Protective Equipment (PPE)	1 : 1
12. Workpiece	1 : 1
13. Workbench	1 : 5

2.2 Perform material fitting and joining workflow.

2.3 Identify material fitting and joining procedures, flow chart and correct sequence.

2.4 Plan duration/time of material fitting and joining procedures.

2.5 Identify manpower in performing material fitting and joining 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. Armin Rahn, (March 1993), The Basic of Soldering, Wiley-Interscience ISBN - 13:9780471584711.

C. DECISION MAKING

You are required to get coach approval before performing material fitting and joining activities.

D. EXECUTING & MONITORING

You are required to perform material fitting and joining activities according to the steps below:

3.1. Select Material Joining

3.1.1. Interpret job order

- List of job
- Person incharge
- Type of job order
- Type of maintenance list
- Job status
- Department
- Date and time start
- Date and time complete
- Etc.

3.1.2. Interpret technical drawing

- Symbols
- Dimensions
- Detail drawing
- Assembly drawing
- Isometric drawing
- Etc.

3.1.3. Select material for joining and fitting

- Ferrous
- Non ferrous
- Etc.

3.2. Perform Material Joining

3.2.1. Determine types of joining

- Arc welding (SMAW, TIG, MIG) - 1G , 1F positions
- Bronze brazing
- Silver brazing
- Mild steel brazing
- Plastic welding
- Soldering
- Riveting
- Fastener / Bolting
- Seaming

3.2.2. Select joining tools and components

- Hand tool
- Power tool
- Special tool
- Etc

3.2.3. Perform joining techniques

- Temporarily (soldering, riveting, fastener / bolting, etc)
- Permanent (arc welding, braze and brazing)
- Butt joint, lap joint, tee joint, edge joint, corner joint (1G, 1F)
- Etc.

3.3. Perform Fitting Works

3.3.1. Interpret basic fitting operation

- Blue print
- Manual operation (cutting, drilling, threading, bending, filing)

3.3.2. Apply materials marking process for basic fitting

- Marking tools
- Marking technique
- Holding material

- Surface preparation
- Measuring technique

3.3.3. Carry out fitting activities

- Cutting (sawing, shearing, grinding, chisel)
- Drilling (counter sunk, counter bore)
- Threading (internal and external thread)
- Bending (plate, pipe)
- Filing (flat, grove triangle)
- Deburring
- Cleaning
- Sealing
- Surfacing
- Etc.

3.3.4. Confirm fitting quality

- Leakage
- Stability
- Noise
- Vibration
- Etc.

3.4. Inspect Material Joining

3.4.1. Determine type of measuring instrument

- Measuring tape
- Vernier calliper
- Micrometer
- Dial indicator
- Developer
- Etc.

3.4.2. Check joining's dimension

- Distance

- Area
- Tolerance
- Etc.

3.4.3. Check joining quality

- Flatness surface
- Softness
- Fixed
- Smoothness
- Etc.

3.5. Produce Fitting and Joint Material 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 machine	i. Meticulous in performing fitting activities	i. Adhere to DOE requirements
ii. Alertness in selecting material joining	ii. Alertness in performing fitting activities	ii. Handle waste properly
iii. Meticulous in performing joining operations	iii. Use appropriate PPE	
iv. Alertness in performing joining operations	iv. Perform safe work practices	
v. Use appropriate PPE	v. Ensure safe working condition	
vi. Perform safe work practices	vi. Meticulous in inspecting joining operations	
vii. Ensure safe working condition	vii. Alertness in inspecting joining operations	
viii. Meticulous in performing fitting activities	viii. Meticulous and accuracy in measurement	
ix. Alertness in performing fitting activities		
x. Use appropriate PPE		
xi. Perform safe work practices		
xii. Ensure safe working condition		
xiii. Meticulous in inspecting joining operations		
xiv. Alertness in inspecting joining operations		
xv. Meticulous and accuracy in measurement		
xvi. Meticulous and detail in writing report		
xvii. 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 material fitting and joining 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.	Job order interpreted										
2.	Technical drawing interpreted										
3.	Material joining and fitting requirement selected										
4.	Joining tools and components selected										
5.	Joining technique performed										
6.	Basic fitting performed										
7.	Fitting and joining quality checked										
8.	Joining and fitting activity recorded										
	SUBTOTAL	A₁					A₂				
	FULL MARKS	56					56				
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										
		C ₁					C ₂				
	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	$A_1 / 56 \times 60$	$A_2 / 56 \times 60$
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: