



Republic of Rwanda
Ministry of Education



RTB | RWANDA
TVET BOARD

WOTMM301

WOODWORKING MACHINES MAINTENANCE

MAINTAIN WOODWORKING MACHINES

Competence

RQF Level: 3

Learning Hours



Credits: 3

Sector: Agriculture and Food Processing

Trade: Wood Technology

Module Type: Specific

Curriculum: AFPWOT3002- TVET Certificate 3 in Wood Technology

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Purpose statement	This module describes employable and practicable skills, knowledge and right attitudes required by the student to schedule maintenance according to frequency of equipment usage, determine the machine maintenance requirement, replace inefficient components or parts, drill run a machine and check conformity to the service manuals and document maintenance service visits. It is designed for students pursuing TVET certificate III in wood technology. Graduates at this level will have knowledge and skills for initial work, community involvement and/or further learning.					
Delivery modality	Training delivery		100%	Assessment		Total 100%
	Theoretical content		30%	Formative assessment	30%	50%
	Practical work:		70%		70%	
	• Group project and presentation	20%				
	• Individual project /Work	50%				
		Summative Assessment		50%		

Elements of Competency and Performance Criteria

Elements of competency	Performance criteria
1. Schedule maintenance according to frequency of equipment usage	1.1. Specific instructions are strictly followed during the operation of the machines as directed by the manufacturer
	1.2. Areas that need critical attention during maintenance are clearly ascertained as per the guidelines
	1.3. Working areas of the machines are completely freed of clutter and any other material that may pose health risk
	1.4. Power connections are properly fitted before any operations start as per the instruction manual
2. Determine the machine maintenance requirement	2.1. Tools and equipment to perform maintenance tasks are adequately availed as per job requirements
	2.2. Maintenance data, plans and workflows are conveniently made accessible and easy to follow by the maintenance team
	2.3. Total costs for the equipment to be replaced is correctly determined

	2.4. Inventory management system is properly created to prioritize the tools and equipment needed based on the risks of assessment
	2.5. Existing and estimated spare parts consumption records tracking are transparently kept and often availed for procurement planning
3. Replace inefficient components or parts	3.1. Machine operations are properly stopped and safety check done to ensure no machine parts are in use.
	3.2. Power connections are strictly switched off for safety handling of the machine parts
	3.3. Instructions on replacing the parts are strictly followed as outlined in the manual
4. Drill run a machine and check conformity to the service manuals	4.1. Precision leveling and alignment is appropriately conducted and any adjustments necessary made
	4.2. Equipment operation/functionality is properly tested as per the service manual
	4.3. Visual, sound and rotation/movement check of the replaced parts are correctly performed as per manual instructions
	4.4. Proper PPEs are adequately worn during the drill runs of the machine
5. Document maintenance service visits	5.1. Relevant records/paperwork are clearly documented and filed with the organization for future use in repair or maintenance.
	5.2. Files are properly marked to ensure easy access of the document while doing routine checks
	5.3. Preventive maintenance is properly scheduled so as to assess the condition of the machines

Course content

Learning outcomes	At the end of the module the learner will be able to: <ol style="list-style-type: none"> 1. Schedule maintenance 2. Determine the machine maintenance requirement 3. Replace inefficient components or parts 4. Drill run a machine and check conformity to the service manuals 5. Document maintenance service visits
Learning outcome 1: Schedule maintenance	Learning hours: 6
Indicative content	
<ul style="list-style-type: none"> • Specific instructions to follow during the operation of the machines <ul style="list-style-type: none"> ✓ Description of location and use of : <ul style="list-style-type: none">  Main switch  Circuit breaker  Emergency switches  On and off switches ✓ Conducting visual check on machine components and parts ✓ Description and identification of machine parts • Areas that need critical attention during maintenance <ul style="list-style-type: none"> ✓ Description of wear and tear ✓ Identification of moving parts that require lubrication ✓ Description of tools and equipment to be used in maintenance job ✓ Description and identification of maintenance materials tools and equipment <ul style="list-style-type: none">  Grease  Paint • Preparation of the working areas of the machines <ul style="list-style-type: none"> ✓ Description of marking out a maintenance areas for limited access ✓ Identification of specific workplace hazards ✓ Preparation of visual safety aids and messages • Fitting power connections before any operation 	

- ✓ Identification of power cut out points
- ✓ Circuit breaks connection for safety
- ✓ Connection of industrial sockets

Resources required for the learning outcome

Equipment	<ul style="list-style-type: none"> • PPEs, • Machines to install, • Computer, • Internet, • Projector
Materials	<ul style="list-style-type: none"> • Machine manuals • Charts and diagrams • Flipchart
Tools	<ul style="list-style-type: none"> • Screw drivers, • power testers, • voltmeters
Facilitation techniques	<ul style="list-style-type: none"> • Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Performance assessment

Learning outcome 2: Determine the machine maintenance requirement

Learning hours: 10

Indicative content

- **Tools and equipment preparation**
 - ✓ Selection of tools and equipment
 - ✓ Description of application of tools and equipment
- **Maintenance data, plans and workflows**
 - ✓ Records and journal keeping
 - ✓ Drawing of workflows and process charts
 - ✓ Making of maintenance work plans
 - ✓ Making of machine inventory tracking
- **Total costs for the equipment to be replaced**
 - ✓ Identification of factors that determine cost of work done

- ✓ Methods of cost estimation
- ✓ Examples of cost estimation for specific works
- Inventory management system creation for equipment and tools
 - ✓ Identification of inventory techniques
 - ✓ Description of demand planning
 - ✓ Description of warehouse management
- **Keeping existing and estimated spare parts consumption records tracking**
 - ✓ Identification of stock taking methods
 - ✓ Description and identification of lead time for various spare parts
 - ✓ Making of order re-order level for spare parts

Resources required for the indicative content

Equipment	<ul style="list-style-type: none"> • PPEs, • Machines to install, • Computer, • Internet, • Projector
Materials	<ul style="list-style-type: none"> • Machine manuals • Charts and diagrams • Flipchart
Tools	<ul style="list-style-type: none"> • Screw drivers, • power testers, • voltmeters
Facilitation techniques	<ul style="list-style-type: none"> • Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Performance assessment

Indicative content

- **Stopping machine operations and safety checking**
 - ✓ Checking of machine motions
 - ✓ Identification of machine breaks
 - ✓ Description of stopping process of complex machines
- **Switching off power connections**
 - ✓ Identification of machine switches
 - ✓ Description of emergency switch application and procedure :
- **Instructions on replacing machine parts**
 - ✓ Part compatibility confirmation from manuals
 - ✓ Spare part installation requirement

Resources required for the indicative content

Equipment	<ul style="list-style-type: none"> • PPEs, • Machines to install, • Computer, • Internet, • Projector
Materials	<ul style="list-style-type: none"> • Machine manuals • Charts and diagrams • Flipchart
Tools	<ul style="list-style-type: none"> • Screw drivers, • power testers, • voltmeters
Facilitation techniques	<ul style="list-style-type: none"> • Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment

Learning outcome 4: Drill run a machine and check conformity to the service manuals	Learning hours:5
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Indicative content

- **Precision leveling, alignment and adjustment**
 - ✓ Description of levelling and alignment
 - ✓ Examples of alignment tool and equipment
 - ✓ Testing for level of machines
 - ✓ Process of adjusting machine alignment
- **Testing equipment operation/functionality**
 - ✓ Description of machine motor rotation directions
 - ✓ Description of machine loading requirement
 - ✓ Identification of machine compatible feedstock
 - ✚ Type of materials to be used
 - ✚ Sizes of materials and form
- **Visual, sound and rotation/movement check of the replaced parts**
 - ✓ Observation of machine parts behaviour
 - ✓ Identification of malfunctioning parts of replaced components
- **PPEs worn during the drill runs of the machine**
 - ✓ Types of PPE used during maintenance
 - ✓ Description of importance of PPE in maintenance

Resources required for the indicative content

Equipment	<ul style="list-style-type: none"> • PPEs, • Machines to install, • Computer, • Internet, • Projector
Materials	<ul style="list-style-type: none"> • Machine manuals • Charts and diagrams • Flipchart
Tools	<ul style="list-style-type: none"> • Screw drivers, • power testers, • voltmeters
Facilitation techniques	<ul style="list-style-type: none"> • Lectures • Demonstration and simulation • Individual and group work • Practical exercise

	<ul style="list-style-type: none"> • Individualized • Trainer guided
Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment • Project based assessment

Learning outcome 5: Document maintenance service visits	Learning hours: 4
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Indicative content

- **Documenting and filing relevant records/paperwork**
 - ✓ Identification of types of records to keep in machine maintenance
 - ✓ Description of general Filing methods
- **Files marking**
 - ✓ File ordering system
 - ✓ Composition of file marking
 - 📁 Types of data to capture in data marking
 - ✓ Importance of file marking
 - ✓ File arrangement
- **Scheduling preventive maintenance**
 - ✓ Description of weekly preventive maintenance
 - ✓ Description of monthly preventive requirement
 - ✓ Description of quarterly preventive requirement
 - ✓ Description of yearly preventive maintenance

Resources required for the indicative content
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Equipment	<ul style="list-style-type: none"> • Projector
Materials	<ul style="list-style-type: none"> • Machine manuals • Charts and diagrams • Flipchart
Tools	<ul style="list-style-type: none"> •
Facilitation techniques	<ul style="list-style-type: none"> • Lectures • Demonstration and simulation • Individual and group work • Practical exercise • Individualized • Trainer guided • Group discussion

Formative assessment methods	<ul style="list-style-type: none"> • Written assessment • Oral presentation • Performance assessment • Product based assessment
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Integrated/Summative assessment

Integrated situation

Kalika wood Ltd, a furniture making company based in Kigali Rwanda have been running their machines for almost a year without conducting any proper maintenance since they did not have any qualified maintenance personnel.

The company have the following machines used in the workshop;

- Long belt sander
- Table jointer
- Table circular saw
- Thickness planer and
- Vertical band saw

Temporally, the company hire you as qualified wood technologist to perform the following responsibilities:

- ✓ Schedule maintenance
- ✓ Determine the machine maintenance requirement
- ✓ Replace inefficient components or parts
- ✓ Drill run a machine and check conformity to the service manuals
- ✓ Document maintenance service visits

Before being confirmed, you are asked to demonstrate your competences by performing maintenance randomly on one of those equipment.

All resources are available

You have given 8 hours maximum

Resources

Tools	<ul style="list-style-type: none"> ✓ Screw drivers, ✓ Power testers, ✓ Voltmeters
Equipment	<ul style="list-style-type: none"> ✓ Digital laser leveling
Materials/ Consumables	<ul style="list-style-type: none"> ✓ Machine manuals ✓ Charts and diagrams

Assessable outcomes	Assessment criteria (Based on performance criteria)	Indicator	Observation		Marks allocation
			Yes	No	
Learning outcome 1: Schedule maintenance according to frequency of equipment usage (20%)	1.1 Specific instructions are strictly followed during the operation of the machines as directed by the manufacturer	Instructions from the machines manual properly followed			5
	1.2 Areas that need critical attention during maintenance are clearly ascertained as per the guidelines	Components and parts for frequent maintenance checks appropriately identified and monitored during machine operations			5
	1.3 Working areas of the machines are completely freed of clutter and any other material that may pose health risk	Work area hygiene is properly maintained			5
	1.4 Power connections are properly fitted before any operations start as per the instruction manual	Electrical wires and connections are properly put in place, are not left loose hanging or non-insulated.			5
Learning outcome 2: Determine the machine maintenance requirement (15%)	2.1 Tools and equipment to perform maintenance tasks are adequately availed as per job requirements	Maintenance tools are appropriately selected and used			3
	2.2 Maintenance data, plans and workflows are conveniently made accessible and easy to follow by the maintenance team	Workflows and diagrams correctly interpreted and followed			3
	2.3 Total costs for the equipment to be replaced is correctly determined	Work valuation is reasonably done according to prevailing work rates and amount of work done			3
	2.4 Inventory management system is properly created to prioritize the tools and equipment needed based on the risks of assessment	Machine status and performance data well recorded and stored			3
	2.5 Existing and estimated spare parts consumption records tracking are transparently kept and often availed for procurement planning	Consumable usage details and record well-kept for future reference and planning			3
Learning outcome 3:	3.1 Machine operations are properly stopped and safety check done to	Visual inspection of machines is carefully done before			10

Replace inefficient components or parts (30%)	ensure no machine parts are in use	maintenance operations start to ensure no connection is live.			
	3.2 Power connections are strictly switched off for safety handling of the machine parts	Power supply is correctly disconnected and verified using power measuring tools			10
	3.3 Instructions on replacing the parts are strictly followed as outlined in the manual	Interpretation of spare manuals is correctly done and spares well fitted as per the manuals			10
Learning outcome 4: Drill run a machine and check conformity to the service manuals (20%)	4.1 Precision levelling and alignment is appropriately conducted and any adjustments necessary made	Levelling instruments correctly identified and used			5
	4.2 Equipment operation/functionality is properly tested as per the service manual	Equipment is properly working as usual			5
	4.3 Visual, sound and rotation/movement check of the replaced parts are correctly performed as per manual instructions	Behavior of replaced parts keenly observed to work normally			5
	4.4 Proper PPEs are adequately worn during the drill runs of the machine	Appropriate PPEs are correctly used			5
Learning outcome 5: Document maintenance service visits (15%)	5.1 Relevant records/paperwork are clearly documented and filed with the organization for future use in repair or maintenance.	Work recording is clearly done			5
	5.2 Files are properly marked to ensure easy access of the document while doing routine checks	File containing record including spare inventory well filed			5
	5.3 Preventive maintenance is properly scheduled so as to assess the condition of the machines	Preventive maintenance is properly and reasonably scheduled			5
Total marks					100
Percentage Weightage					100%
Minimum Passing line % (Aggregate): 70%					