

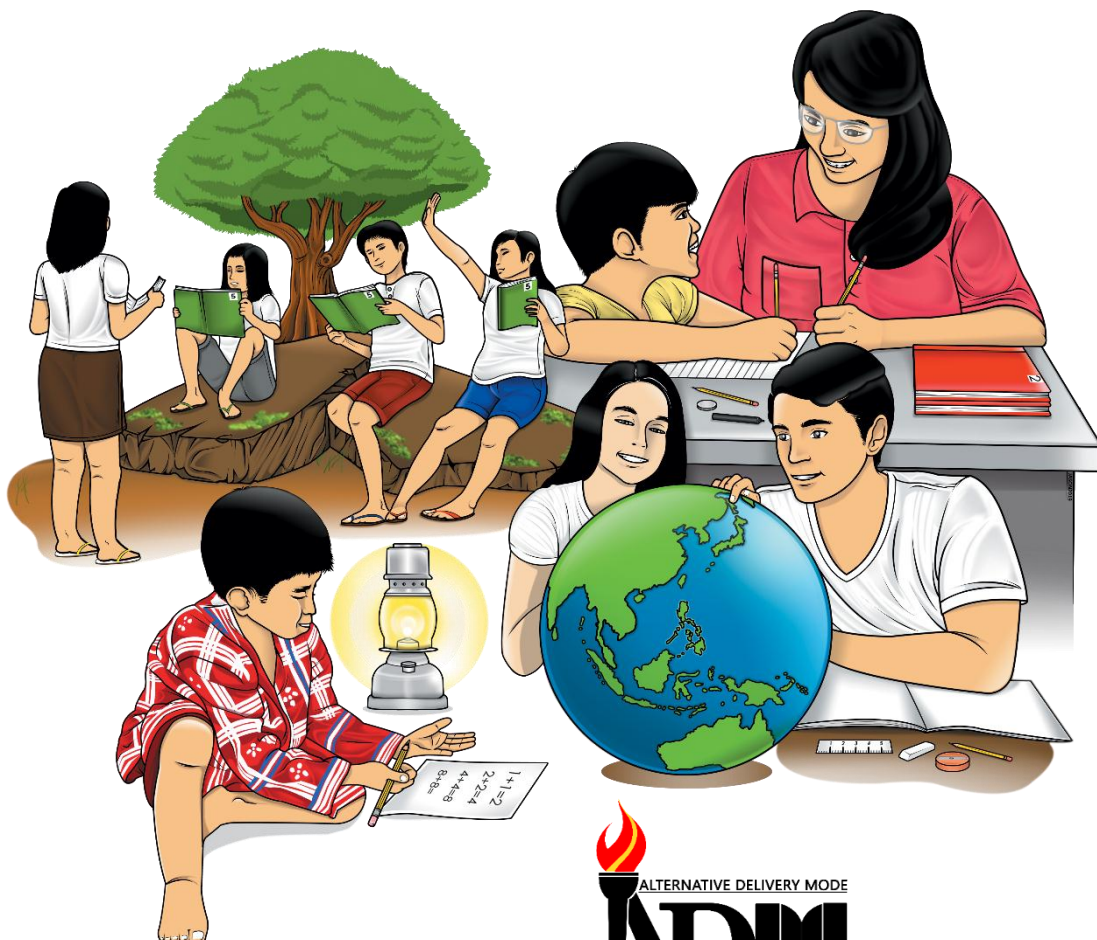
Technology and Livelihood Education

Quarter 1 - Module 2

Prepare Tools, Equipment and Materials for Staking-out Building Lines

(Identifying properties and defects of wood)

CARPENTRY NC II



10

Technology and Livelihood Education

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CARPENTRY NC II

TLE Carpentry – Grade 10

Alternative Delivery Mode

Quarter 1 – Module 2: Prepare Tools, Equipment and Materials for Staking-out Building Lines (Identifying properties and defects of wood)

First Edition, 2020

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLMS is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and test. And read the instructions carefully before performing each task.

If you have questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.



Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learner.











For the facilitator:

Hi, as a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Kindly, advise the learner's parents or guardians of the same procedure since they will be the primary supporters in the learners' progress. Please, do not forget to remind the learner to use separate sheets in answering all of the activities found in the learning module.

For the learner:

Hello learner, Welcome to the Carpentry NC II Alternative Delivery Mode (ADM) Module on Identifying properties and defects of wood. I hope you are ready to progress in your Grade 10 TLE in Carpentry NC II with this learning module. This is designed to provide you with interactive tasks to further develop the desired learning competencies prescribed in our curriculum. With this, you are expected to appreciate staking through the information and activity given.

This module has the following parts and corresponding icons:

ICON	LABEL	DETAIL
	What I Need to Know	This contains the learning objectives which you need to accomplish.
	What I know	This evaluates what you know about the lesson you are to learn.
	What's In	This connects the current lesson with a topic necessary in your understanding.
	What's New	This introduces the lesson through an activity.
	What Is It	This contains a brief discussion of the learning module lesson.
	What's More	These are activities to check your understanding of the lesson.
	What I Have Learned	This summarizes the important ideas presented in the lesson.
	What I Can Do	This is a real-life application of what you have learned.
	Assessment	This is a post assessment of what you have learned.
	Additional Activity	This is an activity that will strengthen your knowledge about the lesson.

At the end of this module you will also find:

References

This is a list of all sources used in developing this module.

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What I Need to Know	Error! Bookmark not defined.
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Lesson

1

Identifying properties and defects of Wood

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!



What I Need to Know

This module was designed and written to guide you to acquire the learning competencies and develop your skills in preparing tools, equipment and materials for staking-out building lines. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. However, the order in which you read the module can be changed to correspond with the textbook you are now using.

Learning Objectives: Prepare tools, equipment and materials for staking out building lines (TLE_IACP9-12BLIa-h-1)

After going through this module, you are expected to:

1. identify the properties of wood for staking out building lines;
2. describe wood defects; and,
3. value the importance of using wood of good quality.



What I Know

Pre-Test

Multiple Choice.

Directions. Read the following questions carefully, select the letter of the correct answer and write in your activity notebook.

1. It is the warping of lumber where the ends twist in opposite direction.
A. Bow
B. Crock
C. Twist
D. Wane
2. It is the longitudinal separation of the fibers which extends to the opposite face of a piece of sawn timber.
A. Cupping
B. Split
C. Twist
D. Crock
3. Is the ratio of the mass of water contained in the mass of the same sample of dry wood?
A. Moisture content
B. Shrinkage
C. Density
D. Mass
4. Mechanical properties of wood include _____.
A. Elasticity
B. Vibration
C. Strength
D. All of these
5. It is used to cut pegs for stake out.
A. Bolo
B. Cross cut saw
C. Knife
D. adze
6. It is a milled or processed piece of wood and ready to use.
A. Plywood
B. Lumber
C. Timber
D. Plank
7. It is used for marking straight lines on a long piece of stock or lumber.
A. Pencil
B. Chalk
C. Chalk line
D. Charcoal
8. It is use to drive pegs for stake out.
A. Claw hammer
B. Framing hammer
C. Ball peen hammer
D. Sledge hammer
9. A material used for laying out building lines over the batter board.
A. Nylon String / *Tansi*
B. Plastic twine chord
C. Chalk line
D. Nails
10. It occurs when wood loses moisture below the fiber saturation point.
A. Cleavability
B. Knot
C. Permeability
D. Shrinkage
11. It is the resistance of wood to cleavage along the grain.
A. Cleavability
B. Knot
C. Permeability
D. Shrinkage
12. It is the wood defects caused by insects.
A. Crack
B. Crock
C. Twist
D. Wood bores

13. It is influenced by the anatomy of wood cells.
- A. Cleavability
 - B. Knot
 - C. Permeability
 - D. Shrinkage
14. Which of the following is NOT a wood defect?
- A. Bow
 - B. Crook or Crown
 - C. Knot
 - D. Shearing Strength
15. Wood defects ____
- A. are abnormalities in wood.
 - B. lower the economic value of wood
 - C. reduce the strength of wood
 - D. all of the above



What's In

This Module is a useful document which you can use to add more knowledge and skills that you acquired in the previous lesson. It includes instructions and procedure on how to perform the different learning outcomes. The unit of competency contains the knowledge, skills, and attitudes required to know the physical, defects and properties of wood for staking-out building lines course. You are required to go through a series of learning activities in order to complete each of the learning outcomes of this module.



What's New

Activity 1. How do you do?

Copy the template in your activity notebook and fill with the needed information. List the different tools, materials and equipment which you can see in your house and write its uses according to what you know.

Name of tools, materials and equipment use in Carpentry	Write each use according to its specification.



What Is It

Wood is obviously both a common and a historical choice as a building material. However, in the past few decades, there has been a move away from wood in favor of engineered products or metals like aluminum.

While the desire to not rely on the world's forests for building demands is well-intentioned, the advantages of wood as a building material still outweigh other products on the market when looking at the environmental impact and performance.

In the construction of formworks wood is the most important material needed. You will be selecting the appropriate lumber for every part of the forms. You also need to learn how to identify the different defects of wood which may cause unnecessary failures in the assembling process.

Knowing the physical properties of wood can help guide us in choosing good, quality lumber for our carpentry works. In this lesson, we will not only learn the different physical properties of wood, we will also discuss the different kinds of wood defects that we need to look out for and avoid. Quality should never be compromised by cheap but defective lumber.

PHYSICAL PROPERTIES OF WOOD

1. **Strength** Physically, wood is strong and stiff but, compared to a material like steel, it's also light and flexible. It has another interesting property too. Metals, plastics, and ceramics tend to have a fairly uniform inner structure and that makes them isotropic: they behave exactly the same way in all directions. Strength is the general term used in reference to the ability of wood to resist stresses and strain. Different wood varies materially in the following manner.
 - a. Wood is resistant to compression along the fiber.
 - b. Stiffness or the ability to resist bending as in floor joist and beam supporting heavy load.
 - c. Strength in tension or the ability to resist in lengthwise
 - d. Shearing strength or the ability of the fibers to resist rupture along across the grain
2. **Moisture** is an important factor in strength of wood, thus to a certain extent, strength increase with the degree of seasoning of wood
 - a. **MOISTURE CONTENT** is the ratio of the mass of water contain in the mass of same sample of dry wood.
 - b. **SHRINKAGE** occurs when wood loses moisture below the fiber saturation point.

3. **Knots** or other defects also influence strength. The size, character and location of the knots are important. EXAMPLE in cross bending strength, knots on the upper surface of the beam do not detract from the strength as much as on the lower part of the beam
4. **Weight** of wood is also important, Heavy wood are usually strong and light wood are usually weak.
5. **Hardness** is expressed as resistance to indentation or to the saw or ax across the grain. Hardness dependent largely on weight, structure elements of the wood and degree of seasoning.
6. **Durability** as applied to wood, means the ability to resist decay or simply the length of life of a certain timber under given conditions.
7. **Cleavability** is the resistance of wood to cleavage along the grain.
8. **Color** is often a means of identification of wood, as mentioned earlier, heartwood is generally much darker in color than sapwood.
9. **Permeability** is influence by the anatomy of wood cells.
10. **Mass** properties of wood are conductivity, heat and coefficient of thermal expansion.
11. **Electrical** properties of wood are dielectric constant and the dielectric power factor alternating current.

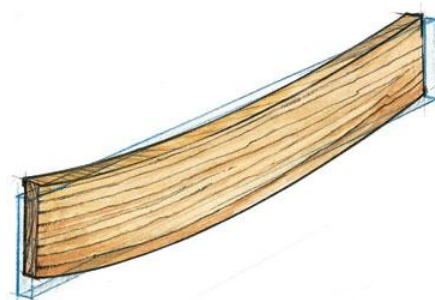
MECHANICAL PROPERTIES OF WOOD:

1. **ELASTICITY** of wood depends on grain orientation, moisture, species, temperature, and rate of loading
2. **STRENGTH** depends upon the rate of loading species, moisture, contents, orientation, temperature, size and location of natural characteristics such as knots and species size.
3. **VIBRATION** damping and sound velocity are two primary vibration phenomena of interest in structural application.

WOOD DEFECTS

Wood defects are abnormalities which tend to lower the economic value or decorative value of wood and also reduces the strength of wood. The main defects of wood include knots, cracks, fungal damage, warping, slanting of grain, and wormholes. A knot is a part of a branch embedded in wood.

A crook or crown is a defect found in a board that is bent end-to-end in the direction of the tall ends of a board as it continues down the length of the board.



Bow A board that rocks from end to end when laid on one face. Curvature is formed in direction of the length of the sawn timber.



Cupping This often occurs when one side dries faster the other. Where the face of a board warps up across its width such that if one looks at the end of the board, it will look like a shallow letter “U”.



Checking A crack in the wood structure of a piece, running lengthwise usually caused by rapid seasoning.



Split A longitudinal separation of the fibers which extends to the opposite face of a piece of sawn timber.



Wane The presence of bark or absence of wood on corners of a piece of lumber.



Blue Stain A discoloration that penetrates the wood fiber. It can be any color other than the natural color of the piece in which it is found. It is classified as light, medium, or heavy and is generally blue or brown.



Machine Burn A darkening of the wood due to overheating by the machine knives or rolls when pieces are stopped in a machine.



Pitch An accumulation of resinous material on the surface or in pockets below the surface of wood. It is also called gum or sap.



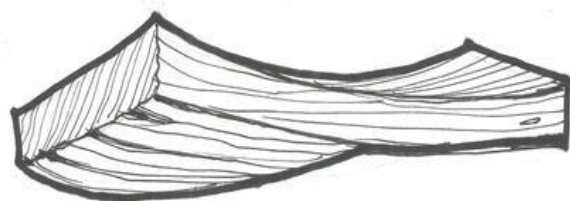
Tight Knot A knot fixed by growth or position in the wood structure so that it firmly places in the its surrounding wood.



Wood bores Holes in the wood caused by insects and beetles.



Twist Warping in lumber where the ends twist in opposite directions.

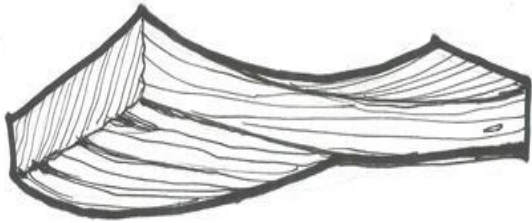




What's More

Activity 2: Identification of Wood Defects

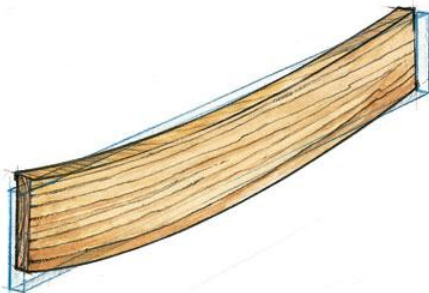
Direction: Identify the wood defects as shown on the picture below. Write your answer on your activity notebook.



1. _____



5. _____



2. _____



6. _____



3. _____



7. _____



4. _____



8. _____



What I Have Learned

Activity 3: HUNT ME

Directions: Hunt the words in the box associated in our lesson. Write your answers in your Activity Notebook.

N	O	M	G	O	K	U	G	D	A	Z	X	W	C	L
R	I	W	T	S	P	M	C	S	J	N	S	O	H	S
X	O	V	T	S	E	Z	E	G	V	C	X	U	E	T
B	B	R	M	I	I	R	S	R	S	E	Z	P	C	R
W	U	L	W	X	L	W	O	G	U	D	K	B	K	E
A	T	G	U	S	J	P	T	B	Z	T	I	P	I	N
N	P	M	F	E	F	S	S	F	D	P	S	H	N	G
E	Q	Z	U	T	S	L	S	C	N	O	I	I	G	T
F	V	N	A	M	O	T	G	E	R	Z	O	T	O	H
W	L	D	H	C	V	N	A	N	N	O	G	W	C	M
J	N	A	W	R	P	S	K	I	I	D	O	Q	J	H
F	V	L	F	D	Z	E	Q	B	N	P	R	K	T	Q
N	R	U	B	E	N	I	H	C	A	M	P	A	R	G
J	C	V	G	R	V	R	G	Q	N	Q	I	U	H	B
E	I	Y	O	C	H	B	N	E	M	S	K	D	C	L



What I Can Do

Activity 4. DRAW ME

In a sheet of paper, draw the types of wood defects. Your output will be rated using the rubric below.

Criteria	Excellent	Good	Fair	Poor
Knowledge	Subject knowledge is evident throughout the project. All information is clear, appropriate, and correct	Subject knowledge is evident in much of the project. Most information is clear, appropriate, and correct.	Some subject knowledge is evident. Some Information is confusing, incorrect, or flawed.	Subject knowledge is not evident. Information is confusing, incorrect, or flawed.
Drawing Accuracy	Drawing looks perfect with no technical problems. For example, there are no errors in measurement, style.	The sequence of information is logical. Views and Labels of most information are clear	The sequence of information is somewhat logical.	The sequence of information is not logical. Views are not evident.
Drawing Organization	The sequence of drawing information is correct.	Project runs adequately with minor technical problems.	Project runs minimally. There are many technical problems when viewing the project.	Project does not run satisfactorily. There are too many technical problems to view the project.
Completeness	The project shows total completeness.	The project is mostly complete.	The work shows Some level of completeness	The work is a minimally completed.
Cleanliness	The project shows total cleanliness.	The project is mostly clean.	The work shows some level of cleanliness	The work is a minimally clean.

Legend:

SCALE	DISCRIPTION	POINTS
4	Excellent	95-100
3	Good	86-94
2	Fair	81-85
1	Poor	75-80



Post-Assessment

Multiple Choice.

Directions. Read the following questions carefully, select the letter of the correct answer and write in your activity notebook.

1. Mechanical properties of wood include _____.
A. Elasticity
B. Vibration
C. Strength
D. All of these
2. It is used to cut pegs for stake out.
A. Knife
B. Cross cut saw
C. Bolo
D. adze
3. Wood defects ____
A. are abnormalities in wood
B. lower the economic value of wood
C. reduce the strength of wood
D. all of the above
4. It is a milled or processed piece of wood and ready to use.
A. Lumber
B. Plywood
C. Timber
D. Plank
5. It is used for marking straight lines on a long piece of stock or lumber.
A. Pencil
B. Chalk line
C. Chalk
D. Charcoal
6. It is the longitudinal separation of the fibers which extends to the opposite face of a piece of sawn timber.
A. Cupping
B. Split
C. Twist
D. Crock
7. It is use to drive pegs for stake out.
A. Claw hammer
B. Framing hammer
C. Ball peen hammer
D. Sledge hammer
8. A material used for laying out building lines over the batter board.
A. Nails
B. Plastic twine chord
C. Chalk line
D. Nylon String / *Tansi*
9. It occurs when wood loses moisture below the fiber saturation point.
A. Shrinkage
B. Knot
C. Permeability
D. Cleavability
10. It is the resistance of wood to cleavage along the grain.
A. Cleavability
B. Knot
C. Permeability
D. Shrinkage
11. Is the ratio of the mass of water contained in the mass of the same sample of dry wood?
A. Moisture content
B. Shrinkage
C. Density
D. Mass
12. It is the wood defects caused by insects.
A. Crack
B. Crock
C. Twist
D. Wood bores

13. It is the warping of lumber where the ends twist in opposite direction.

- A. Bow
- B. Crock
- C. Twist
- D. Wane

14. It is influenced by the anatomy of wood cells.

- A. Cleavability
- B. Knot
- C. Permeability
- D. Shrinkage

15. Which of the following is NOT a wood defect?

- A. Bow
- B. Crook or Crown
- C. Knot
- D. shearing Strength



Additional Activity

Activity 5. Reality Check

Answer the following questions about properties and defects of wood. Write your answer in your activity notebook.

1. What is wood defect?

2. What are the mechanical properties of wood?

3. What are the benefits of this topics especially in carpentry students and why?



Answer Key

ANSWER KEY	
What I Know: Pre-test	1. C
	2. B
	3. A
	4. D
	5. A
	6. B
	7. C
	8. D
	9. A
	10. D
	11. A
	12. D
	13. C
	14. D
	15. D
What New	
Answers may vary	
What's More	1. Twist
	2. Crook
	3. Split
	4. Machine burn
	5. Bow
	6. Cupping

ANSWER KEY	
What I Have Learned	Answers may vary
What I Can Do	Refer to Rubric
Post Assessment	1. D
	2. C
	3. D
	4. A
	5. B
	6. B
	7. D
	8. D
	9. A
	10. A
	11. A
	12. D
	13. C
	14. C
	15. D
Additional Activity	Answers may vary

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<https://www.wood-database.com/wp-content/uploads/pitch-pine-sealed.jpg>

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