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Kagawasan Ave., Daro, Dumaguete City, Negros Oriental



# TLE-IA-CARPENTRY

## Quarter 2 – Module 1: PREPARE TOOLS, EQUIPMENT AND MATERIALS FOR FABRICATING FORMWORKS ACCORDING TO JOB REQUIREMENTS



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## **TLE–IA–CARPENTRY–Grades 9/10**

### **Alternative Delivery Mode**

### **Quarter 2 – Module 1: Prepare Tools, Equipment and Materials for Fabricating Formworks According to Job Requirements**

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**9/10**

# **TLE-IA-CARPENTRY**

**Quarter 2 – Module 1:  
PREPARE TOOLS, EQUIPMENT  
AND MATERIALS FOR  
FABRICATING FORMWORKS  
ACCORDING TO  
JOB REQUIREMENTS**





## ***What I Need to Know***

The module has one lesson:

Lesson 1 - Different Formwork Materials

At the end of the module, you should be able to:

1. Identify types of formwork materials.
2. Differentiate materials used in formwork.
3. Recognize the advantages and disadvantages of different types of formwork materials.



## ***What I Know***

**Directions:** Identify the following terms being described.

1. It is not directly used for formwork and is used with the combination of oxygen atoms which forms magnesium oxide, usually called magnesia or MgO
2. The most commonly used material for formwork.
3. Used often for pre-fabricated formworks.
5. Type of formwork material which is used for small concrete structures or for complex portions of the structure.
6. Also called as traditional formwork.
7. It can be mold into any required shapes which makes it more famous formwork for architectural purposes.
8. GRP means what?
9. It is a manufactured product of timber is also used for formworks
10. It is very costly but it can be used for more number of times than others

### **Lesson**

# **1**

## **Different Formwork Materials**

In this module, you will learn different formwork materials for a specific job in Carpentry. With this, it is necessary that you learn the different materials and tools needed in Carpentry.



## ***What's In***

This portion of the module is about some topics for you to review. As a TLE student, you are recommended to review your topics. Reviewing will help you a lot to gain better understanding on the concepts presented throughout your journey in learning Carpentry.



### ***Notes to the Teacher***

Teacher is recommended to design an activity to recognize prior learning of the students or you may have some motivational activities to incorporate at the start of this module.



## ***What's New***

### **Directions:**

Enumerate the advantages of plywood as formwork material in carpentry. Copy and answer this in your activity notebook.



## ***What is It***

### **Different Formwork Materials**

A formwork is a temporary structure used as mold for the original structure. There are different materials available to construct the formwork. Formwork Material is selected depending upon many factors like cost, requirement, type of structure etc.

### **Different Formwork Materials**

Different formwork materials and their advantages and disadvantages are discussed below.

Timber is the most commonly used material for formwork. Timber logs, lumber etc. are used as bracing members from ancient times. So, the Timber formwork is also called as traditional formwork. It is most economical material used for formwork. This is used in sites as formwork material for number of years so, the method of constructing timber framework is well known to the workers.

### **Advantages**

- Timber is light in weight and it can be handled easily.
- Timber has good thermal resistance which prevents the damage of concrete in colder regions.
- It is easy to understand the construction method of timber formwork hence, skilled workers are not necessary.
- It is easy to replace the damaged parts of timber forms.
- Timber formwork can be easily dismantled.

### **Disadvantages**

- Dry timber may absorb water from wet concrete which result in the reduction of strength in concrete structure.
- Wet timber having high moisture content compress the wet concrete and

forms cracks in the structure and grout may leaked through joints when shrinking occurs.

- Timber forms have limited usage. So, they cannot be useful for more times.



## **2. Plywood as Formwork Material**

Plywood which is a manufactured product of timber is also used for formworks. It consists number of veneer sheets or plies in layers. Now a days, the use of plywood formwork increases especially for facing panels. The reason behind it is that the plywood formwork provides smooth finish when compared to normal timber formwork. Hence, finishing cost may reduce by the use of plywood.

For formwork, special type of plywood called exterior plywood is used. The veneer sheets of exterior plywood are bonded with strong adhesive to make it watertight. The plywood boards are available in thicknesses from 7mm to 32mm.

In general, plywood of size 1220 x 2440 and 18mm thick boards are sufficient for most of the works. For curved structures, special types of plywood with sufficient thickness are also available.

### **Advantages**

- Plywood can also be cut into required size easily.
- Plywood Strong, durable and light in weight.
- Provides smooth finish on the surface.
- Very Large size plywood sheets are available which makes the construction of formwork quicker and easier.
- Curved formworks can also be prepared using plywood.



### **Disadvantages**

- When compared to timber it is costly.
- Thin plywood sheets cannot sustain the weight of concrete they may bow out if proper thickness is not provided.



### **3. Steel as Formwork Material**

Steel can also be used as formwork material. It is very costly but it can be used for more number of times than others. They provides excellent finish to the concrete surfaces. For mass strictures like dams, bridges, etc. steel from work is so strong and safe.

#### **Advantages**

- Steel forms are durable and stronger.
- Provides uniform and smooth surface finish to the structure.
- Great reusability.
- Easy to fix the formwork and also easy to dismantle.

#### **Disadvantages**

- Cost is very much higher.
- It is heavy in weight and requires lifting equipment for large structure formworks.
- The size and shapes of forms available are limited.



#### **4. Aluminum as Formwork Material**

Aluminum formwork is used often for pre-fabricated formworks. It is getting more popular because of its light weight and good strength. It requires fewer supports and ties.

##### **Advantages**

- Easy to fix and easy to dismantle.
- It can be handled easily because of its light weight.
- It can be re-used for many times.
- The walls and slabs of structures can be casted simultaneously.
- Monolithic crack free structures can be built using aluminum formwork.

##### **Disadvantages**

- When the load reaches its maximum limit, the lighter sections may deflect.



### **5. Plastics as Formwork Material**

Plastic is another type of formwork material which is used for small concrete structures or for complex portions of the structure. It is light in weight and durable for long periods. For complicated concrete structures, Glass reinforced plastics (GRP) and vacuum formed plastics are used.

#### **Advantages**

- Plastic is light in weight and can be easily handled.
- Formwork for complex shaped structures can be prepared easily.
- Good resistant against water.
- The damaged plastic sheets can be recycled and useful to make new sheets.
- Good quality plastic has great re-usability.

#### **Disadvantages**

- Plastic is weak against heat.
- It does not take much load when compared with others.



## **6. Magnesium as Formwork Material**

Magnesium is another metal element which is used for formwork. Magnesium is not directly used for formwork and is used with the combination of oxygen atoms which forms magnesium oxide, usually called magnesia or MgO.

Magnesium oxide boards or MgO boards are famous in some countries because of their multiple applications. MgO boards are available in required sizes and grades.

### **Advantages**

- Mgo boards are light in weight and easy to handle.
- They are fire proof and waterproof.
- Bio friendly boards cause no harm to the environment.
- They are strong to resist heavy loads.

### **Disadvantages**

- Skilled supervision is required for installation.
- MgO boards cannot sustain in humid conditions. They absorb moisture easily from atmosphere so, they are called as crying boards.



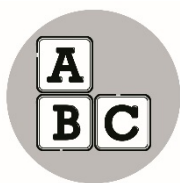
### **7.Fabric as Formwork Material**

Fabric formwork is the modern technology in construction sector. Fabric can be mold into any required shapes which makes it more famous formwork for architectural purposes.

#### **Advantages**

- It weighs very less when compared to any other formwork material.
- It is economical.
- Any complex shape can be constructed using fabric formwork.
- It is waterproof.
- Doesn't affect the concrete properties.
- Easy to removal after the hardening of concrete.

#### **Disadvantages**



### ***What's More***

**Directions:** Answer the following question.

1. What are the advantages of timber as Formwork Material?





## ***What I Have Learned***

Formwork is a temporary structure that supports part or the whole of a permanent structure until it is self-supporting. Once assembled, the components form the temporary structure. There are different materials that can be used depending on the budget and availability of material. Each material has its advantages and disadvantages.



## ***What I Can Do***

**Direction:** Answer the following questions.

1. What are the advantages and disadvantages of steel as formwork material?



## ***Assessment***

**Instruction:** Choose the correct answer from the given options. Write your answers in your notebook.

1. Which of the following formwork material used with the combination of oxygen atoms which forms magnesium oxide, usually called magnesia or  $MgO$ ?  
a. Timber                      b. aluminum                      c. fabric                      d. magnesium
2. What is most commonly used material for formwork?  
a. Timber                      b. plastic                      c. plywood                      d. aluminum
3. What formwork material often used for pre-fabricated formworks.  
a. Timber                      b. plastic                      c. plywood                      d. aluminum
4. What do you call a temporary structure used as mold for the original structure.  
a. Reinforced                      b. plywood                      c. formwork                      d. scaffolding
5. Type of formwork material which is used for small concrete structures or for complex portions of the structure.  
a. Plastic                      b. steel                      c. timber                      d. magnesium
6. Which material can be mold into any required shapes which makes it more famous formwork for architectural purposes.  
a. Timber                      b. fabric                      c. aluminum                      d. plastic
7. It can be mold into any required shapes which makes it more famous formwork for architectural purposes.  
a. Plywood                      b. steel                      c. fabric                      d. timber

8. GRP means what?
- |                             |                            |
|-----------------------------|----------------------------|
| a. Glue reinforced plastic  | c. glass reinforce plastic |
| b. Global reinforce plastic | d. grass reinforce plastic |
9. It is a manufactured product of timber is also used for formworks.
- |           |            |          |            |
|-----------|------------|----------|------------|
| a. Timber | b. plywood | c. steel | d. plastic |
|-----------|------------|----------|------------|
10. It is very costly but it can be used for more number of times than others
- |           |             |            |          |
|-----------|-------------|------------|----------|
| a. Timber | b. aluminum | c. plywood | d. steel |
|-----------|-------------|------------|----------|



## ***Additional Activities***

**Direction:** Answer the following question. Write the correct answer to your activity notebook.

1. What are the different formwork materials?



## Answer Key

<p><b>What I Can Do</b></p> <p>Advantages</p> <ol style="list-style-type: none"> <li>1. durable and stronger</li> <li>2. uniform and smooth surface</li> <li>3. Great reusability</li> <li>4. Easy to fix</li> </ol> <p>Disadvantages</p> <ol style="list-style-type: none"> <li>1. High cost</li> <li>2. Heavy weight</li> <li>3. Corrosion</li> <li>4. size and shapes are limited</li> </ol> <p><b>Assessment</b></p> <ol style="list-style-type: none"> <li>1. D</li> <li>2. A</li> <li>3. D</li> <li>4. C</li> <li>5. A</li> <li>6. A</li> <li>7. C</li> <li>8. C</li> <li>9. B</li> <li>10. D</li> </ol> <p><b>Additional Activities</b></p> <ol style="list-style-type: none"> <li>1. Timber</li> <li>2. Plywood</li> <li>3. Steel</li> <li>4. Aluminum</li> <li>5. Plastics</li> <li>6. Magnesium</li> <li>7. Fabric</li> </ol>	<p><b>What I Know</b></p> <ol style="list-style-type: none"> <li>1. Magnesium</li> <li>2. Timber</li> <li>3. Aluminum</li> <li>4. Formwork</li> <li>5. Plastics</li> <li>6. Timber</li> <li>7. Fabric</li> <li>8. Glass reinforced plastics</li> <li>9. Plywood</li> <li>10. Steel</li> </ol> <p><b>What's New</b></p> <ol style="list-style-type: none"> <li>1. Plywood can also be cut into required size easily.</li> <li>2. Plywood Strong, durable and light in weight.</li> <li>3. Provides smooth finish on the surface.</li> <li>4. Very Large size plywood sheets are available which makes the construction of formwork quicker and easier.</li> <li>5. Curved formworks can also be prepared using plywood.</li> <li>6. When compared to timber, it gives more number of reuses.</li> </ol> <p><b>What's More</b></p> <ol style="list-style-type: none"> <li>1. Can be can to any size</li> <li>2. Light in weight</li> <li>3. Good thermal resistance</li> <li>4. Easy to understand the construction method</li> <li>5. Easy to replace</li> <li>6. easily dismantled</li> </ol>
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# ***References***

## **References for Images and Content:**

- <https://theconstructor.org/building/materials-formwork-advantages-disadvantages/6188/>
- <https://www.bygging-uddemann.se/formwork-material-types-requirements/>

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