

- MAKE A CROSS HALVING JOINT OF TWO WOODEN PIECES AT PERPENDICULAR DIRECTION.

SRMIST  
MECHANICAL DEPT  
RAMAPURAM CAMPUS

**18MES103L – WORKSHOP LAB**

- Carpentry tools are used to produce components to an exact size.
- The types of carpentry tools are as follows.
  1. Marking tools
  2. Measuring tools
  3. Holding tools
  4. Cutting tools
  5. Planing tools
  6. Boring tools
  7. Striking tools
  8. Miscellaneous tools

## Carpentry Tools

- It is used to marking lines parallel to the edges of a wooden piece. It consists of a square wooden stem with a sliding wooden stock on it. On the stem, a marking pin is attached which is made up of steel.
- This stem is provided with a **steel nail to scratch the surface** of the work. It consists of two pins; the distance between the pins is adjustable. It is used to draw parallel lines on the stock.

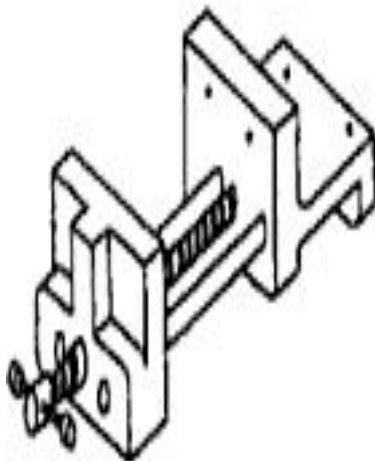
## Marking tools

- The carpentry measuring tools are classified as follows
  1. Steel tape
  2. Steel rule
  3. Calipers
- Steel tapes and steel rules are mainly used for measuring short and lengths in millimeters.
- A try square is used for testing squareness and marking of joints.
- A mitre square is used for marking and measuring an angle of 45 degree.
- A bevel square is used for marking and listing angles between 0 degree to 180 degree.
- Calipers
  - Calipers are used for the precision measurement of cylindrical surface. Inside calipers are used for measuring outside diameter and outside calipers are used to measure inner diameter of a pipe

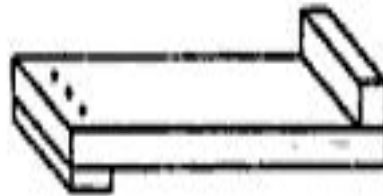
## Measuring tools

# Holding tools

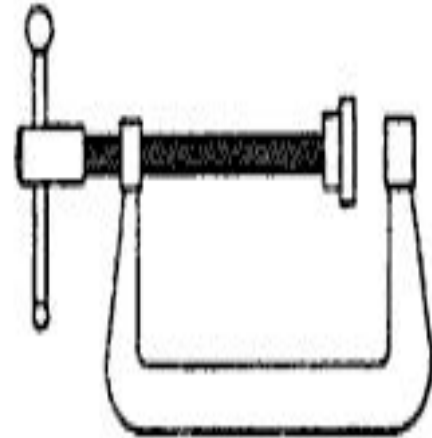
- The carpentry holding tools are shown in fig.



Bench vice



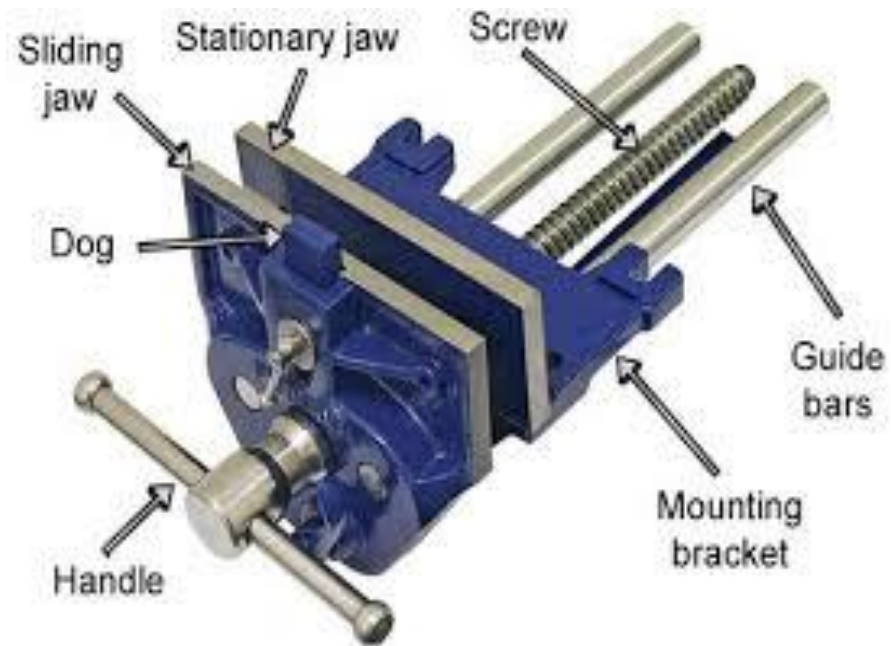
Bench stop



G-cramp

Holding tools.

- A carpentry vice is the common work holding device. It consists of one fixed jaw and one movable jaw. Its one jaw is fixed to the side of the table while the other is movable by means of a screw and a handle.



**Carpentry vice**

- The bar clamp (or) sash cramps are generally used in pairs in glueing up operations at the final assembly of joinery work. It is made up of a steel bar of T-section, wine malleable iron fittings and a steel screw.



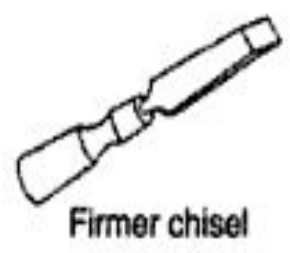
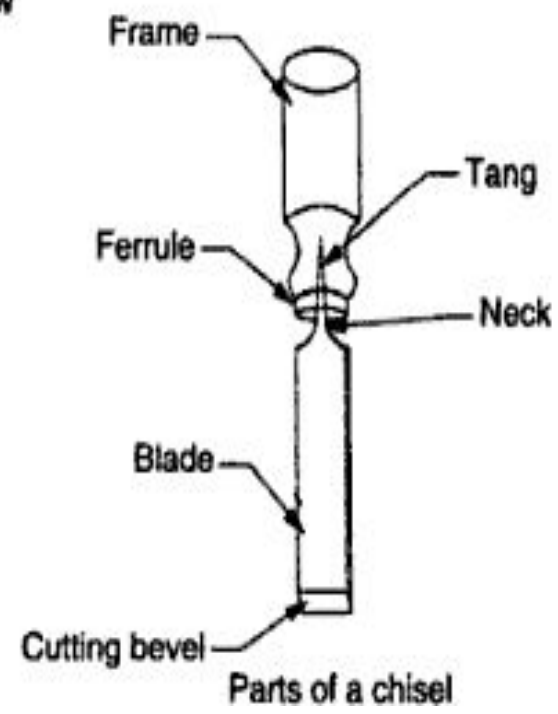
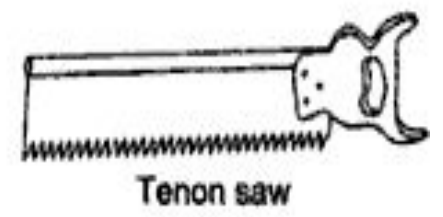
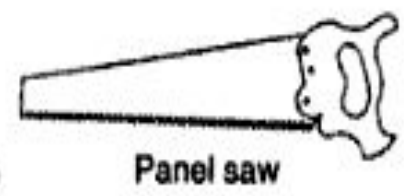
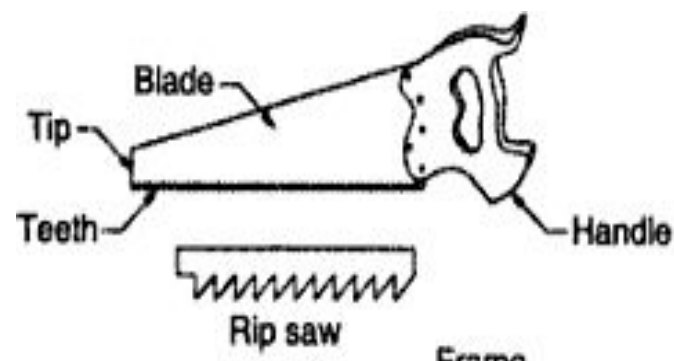
**Bar clamp**

- G-clamp is made up of malleable iron with acme threads of high quality steel .It can be used for clamping small work when gluing up.



**G-clamp**





- A saw is used to cut wood into pieces. There is different type of saws, designed to suit different purpose. A saw is specified by the length of its tooled edge. The following saws are used in the carpentry section.

## Saws

- The blade of rip saw is either straight or skew-backed. The teeth are so set that the cutting edge of this saw makes a steeper angle about  $60^{\circ}$



**Rip Saw**

- This is similar in shape of a rip saw. It is used to cut across the grain of the stock. The correct angle for cross cutting is  $45^{\circ}$ . The teeth are so set that the saw kerf is wider than the blade thickness. This allows the blade to move freely in the cut without sticking.



**Cross Cut saw**

- A tenon saw is used for fine and accurate work. It consists of a very fine blade, which is reinforced with a rigid steel back. The teeth are shaped like those of cross cut saw.



- Chisels are used for cutting and shaping wood accurately. Wood chisels are made in various blade widths, ranging from 3 to 50mm .Most of the wood chisels are made into tang type, having a steel shank which fits inside the handle.



**Chisels**

- These are general purpose chisels and are used either by hand pressure or by a mallet. The blade of a firmer chisel is flat and their sloping face is at an angle  $15^{\circ}$  to  $52^{\circ}$

## Firmer chisels



- These are general purpose chisels and are used for cutting mortises above 9 mm wide. The blade of a firmer type in which they have a thicker section and a stronger neck. By means of this chisel we can apply more Leverage to remove waste wood from the mortise

## Mortise Chisels





- A bevel chisel is similar in construction to the firmer chisel. Its edges are bevelled to allow access to difficult corners. It has a blade with a bevelled back due to which it can enter sharp corners for finishing in dovetail joints.

## Bevel chisels



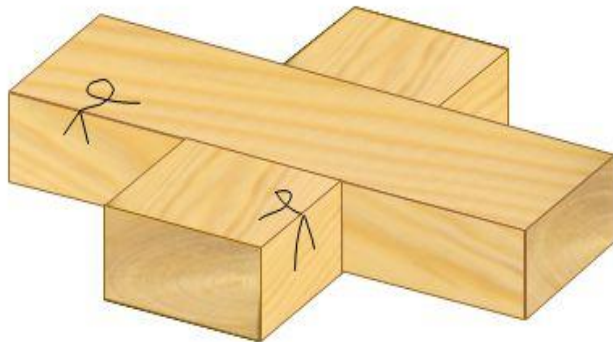
- In general, planes are used to produce flat surfaces on wood. The cutting blade used in a plane is very similar to a chisel. The blade of a plane is fitted in a wood or metallic block at an angle



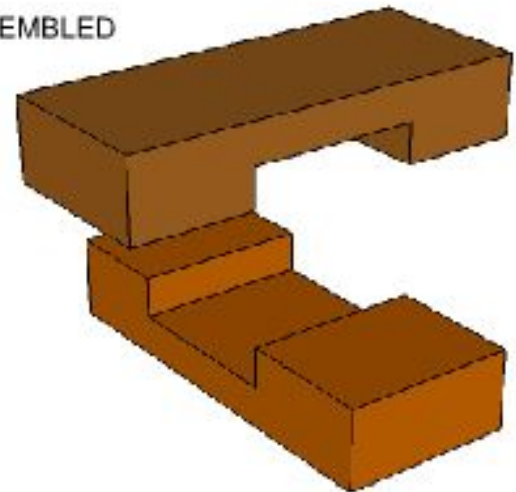
## Planing Tools

# Cross Halving Joint

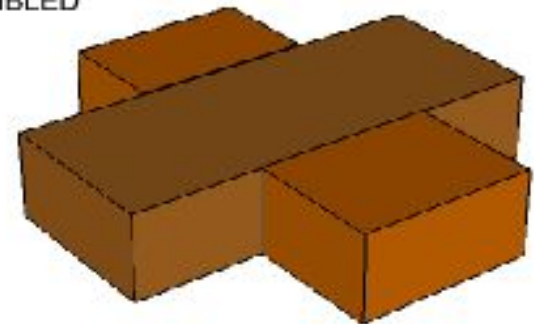
How to prepared the cross halving joint with basic hand tools



DISASSEMBLED



ASSEMBLED



**AIM:**

To produce a cross halving joint from the given work piece

**APPLICATION:**

Cross bars in a cot, shelves.

**SUPPLIED MATERIAL SPECIFICATION:**

Venteak wood of size 150 x 45 x 30

**TOOLS REQUIRED:**

- 1) Jack plane. 2) Hand saw. 3) Steel rule. 4) Pencil
- 5) Marking Gauge 6) Try square 7) Firmer Chisel.
- 8) Cleaning brush. 9) Wooden mallet

**SEQUENCE OF OPERATION:**

- 1) Preparing.) Marking. 3) Cutting/Sawing. 4) Finishing.

## **WORKING STEPS:**

### **1) PREPARING**

Prepare the work piece as described in previous with a length of 150mm, 45mm and 30mm.

### **2) MARKING:**

Check the dimension of the given work piece. 150mm, 45mm and 30mm.

a) First mark from Right side of the piece with distance of 53mm then 45mm.

b) Mark again from the left side of the work piece .same distance 53mm then 45mm.

c) Then mark the piece from the middle or on 6 inches from the steel rule measurement.

d) Now highlight all & fine marking on all four faces of the given work piece.

e) Mark appoint exactly half of the given wooden pieces and mark a groove line from top to bottom by marking gauge on both sides.

### **3) CUTTING / SAWING:**

- Use Firmer chisel to make groove on first & second marking from right side (53mm&45mm) and same on left side..
- Now use hand saw to cut till marking on the side that is depth of 15mm
- Now we have grove mark on firmer chisel and wooden mallet to cut the grooved part on both side of the wooden piece.
- Then clear & level the rough cutting area by Rasp file on both side.
- Then cut the wooden piece from the middle, where it was marked at 6 inches from the steel rule.

#### **4) FINISHING:**

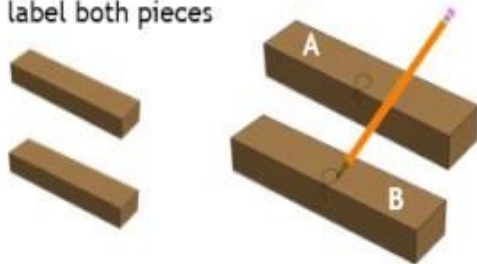
Take a series of small cuts delicately on both the side pieces to remove the excess wood assembly joint in cross shape and clear off the waste by wire brush

#### **RESULT:**

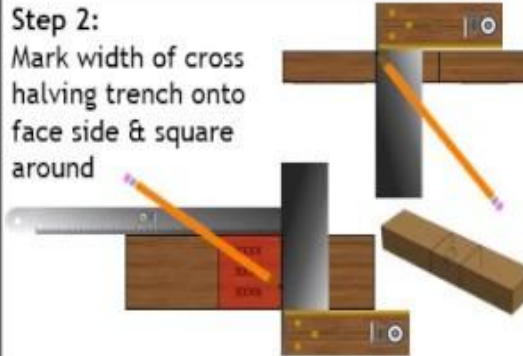
The cross halving joint was produced from the given work piece and assembled joint was submitted for evaluation.

**Step 1:**

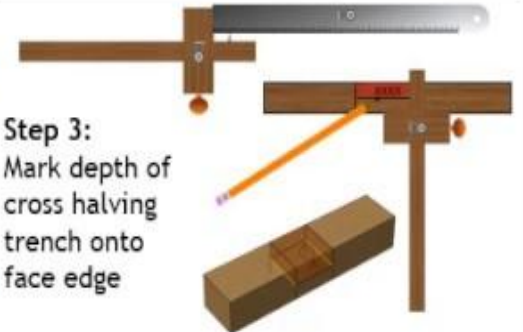
Mark face side & face edge and label both pieces

**Step 2:**

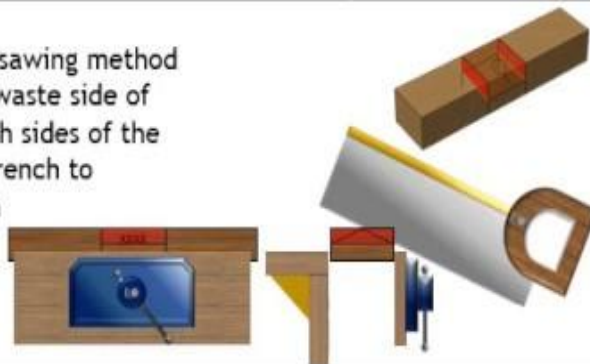
Mark width of cross halving trench onto face side & square around

**Step 3:**

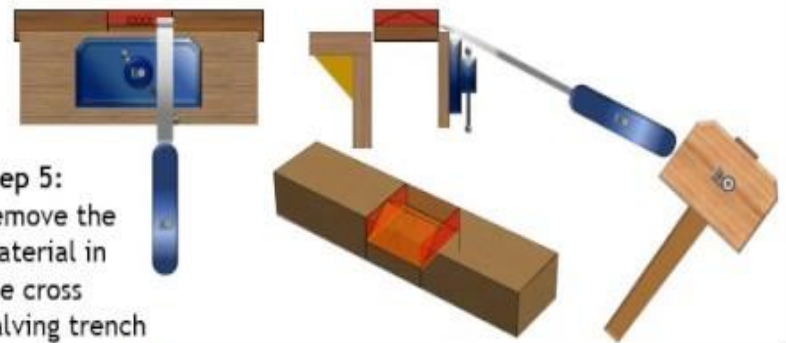
Mark depth of cross halving trench onto face edge

**Step 4:**

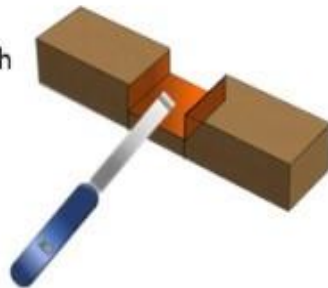
Use triangular sawing method to saw on the waste side of the line on both sides of the cross halving trench to required depth

**Step 5:**

Remove the material in the cross halving trench

**Step 6:**

Clean out and level the trench bed to correct depth

**Step 7:**

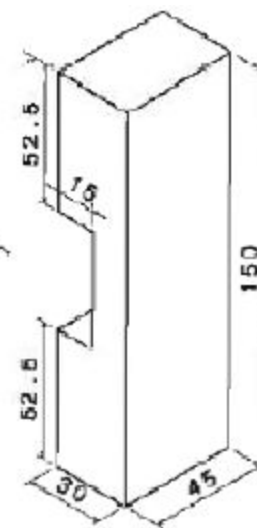
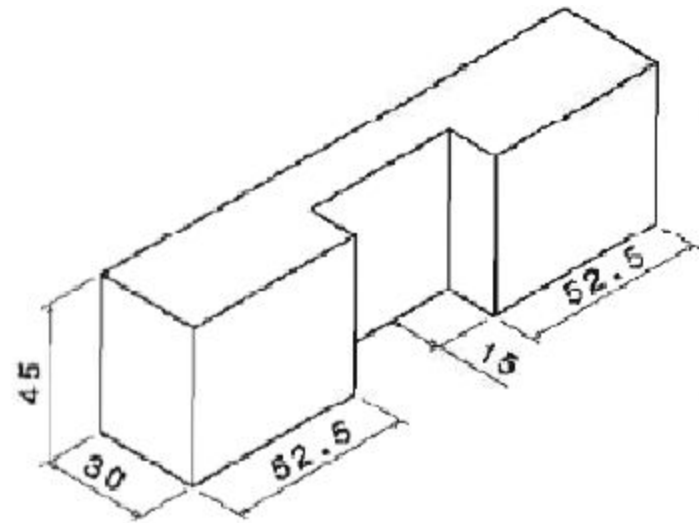
Repeat the process for the second piece (B). Align both pieces and check for fitting.

**Step 8:**

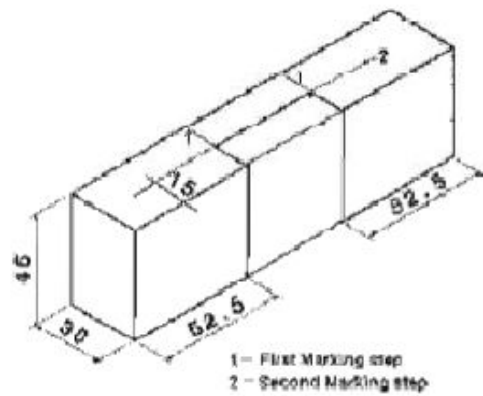
After necessary pairing and fitting, assemble the two pieces A and B to form cross halving joint





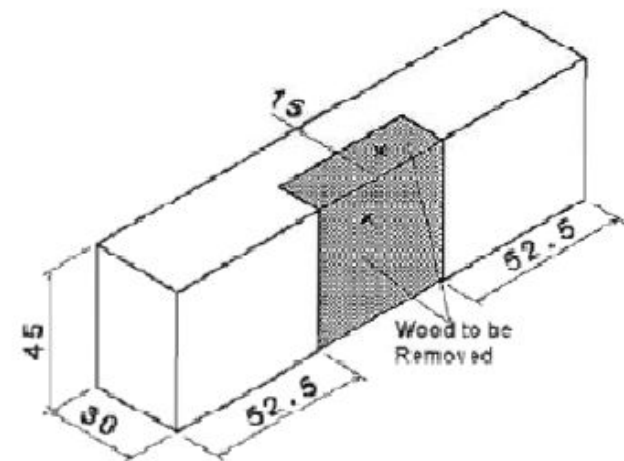


## I. Marking



Same Marking on both Piece 1 and Piece 2

## II. Cutting / Sawing



### III. Finishing & Testing

