

Subject: Basic Technology

Year/Level: 10

<b>Strand</b>	<b>BT10.6 JOINTS AND PROCESSES</b>
<b>Sub Strand</b>	<b>BT10.6.1 WOODWORK JOINTS</b>
<b>Content Learning Outcome</b>	BT10.6.1.1 Identify and state the use of complex woodwork joints and develop confidence in skillful construction of the joints incorporated in tasks, projects and other artifacts.

LESSON NOTES

JOINTS AND PROCESSES

Outcome

After studying this chapter students should be able to:

- Identify common joints
- State the use of common joints in wood
- Able to construct these joints

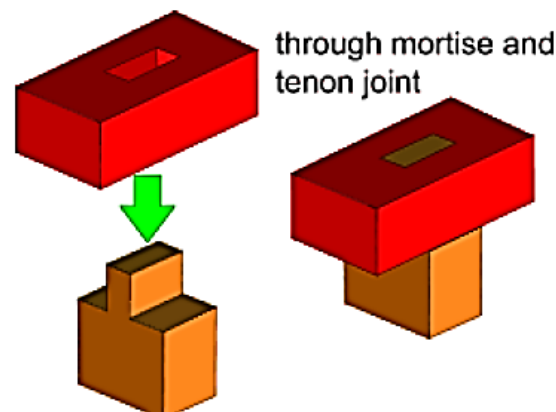
INTRODUCION

Dimensioning of joints is a very difficult and complex operation which precedes breach of the construction and product deterioration. Stiffness and strength of structural furniture elements related to and furniture itself depends mainly on the material properties joining (element dimensions, material type, etc.), the type mechanical connectors and the way of its shoulder application. It is often found in furniture construction single shear steel-to-timber joints, they represent the connection fittings, such as allowing the movement of furniture parts with screws. From the size and purpose of fittings depends on size of screws for fixing fitting. Our research task is ascertaining the mechanical properties of single shear steel-to-timber joints with wood screws.

WOODWORK JOINTS

**Common Mortise and Tenon joint**

This is one of the most common woodworking joints and the strongest as well. The two parts are the **tenon** which has a projection on the end and the **mortise**, the hole in the other part into which the tenon fits. The width of the tenon is usually 1/3rd the width of the board.



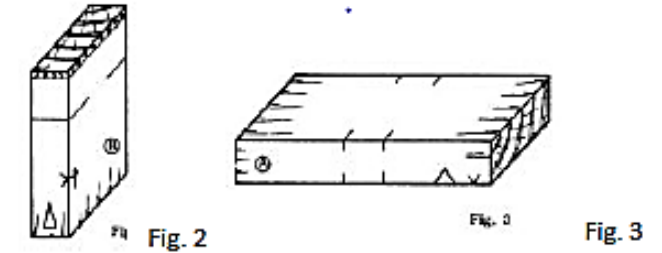
Constructing the joint:

**Step 1 - Preparation of timber**

- (a) Prepare the timber to the required sizes using the FEWTEL (Face Side, Face Edge, Gauge for Width, Gauge for Thickness, Shoot the End, Measure the required Length) method.

**Step 2 - Marking out**

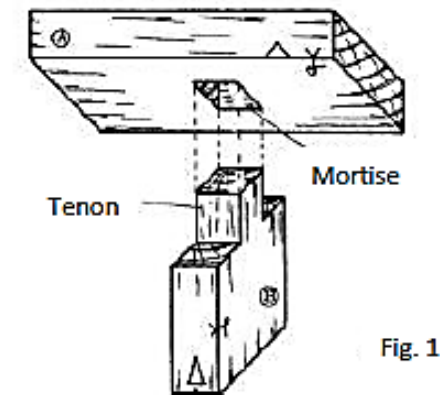
(In the following steps, the piece with the mortise is "piece A" and the one with the tenon is "piece B".)



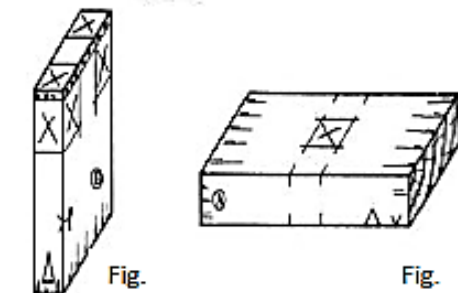
- (a) Mark out the length of the tenon on piece B.

Allow 3 mm waste in the length and make square lines all around with a try square and pencil (Fig. 2).

- (b) Take piece A and mark out the position of the mortise on the face edge and make square lines on the edges on both sides with the try square (Fig. 3).



- (c) Set the marking gauge to the width of the tenon and mark the lines around piece B at the width. Mark the waste with small crosses (Fig. 4).

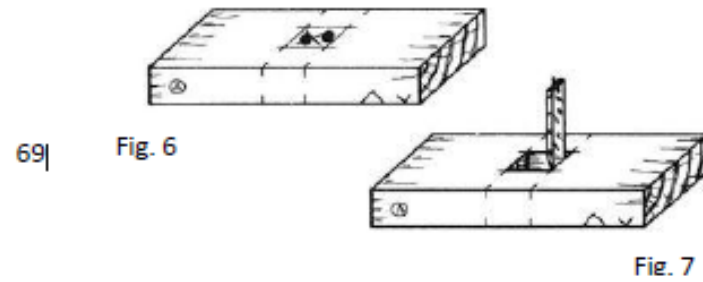


- (d) Use the same setting to mark both faces of piece A and use a try square and (already smoothed) piece B to mark the remaining two lines for the width of the mortise (Fig. 5). Mark the waste with a small cross.

**Note:** If the marking gauge has two pins, set each at its correct measurement and mark both lines at one. If not, mark with the first setting on all the members, then change the setting and mark the other measurement on all the members.

- (e) Always mark from the face edge. Check the marking by setting piece B against the marks on piece A to see if they fit. Piece B must be smoothed first.

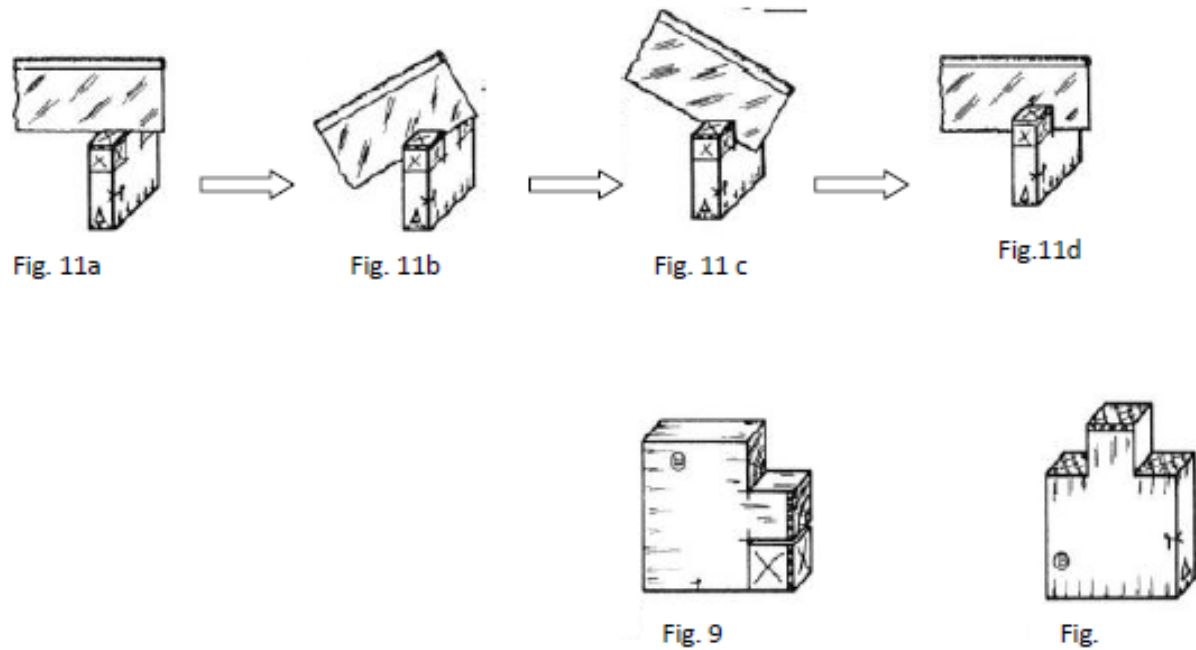
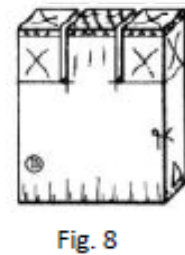
Step 3 - Cutting the mortise



- (a) Bore out most of the waste, using a brace bit (Fig. 6). Clamp a piece of wood to the underside to prevent splintering and damage to the bench.
- (b) Chop out the remaining waste with a mortise chisel, chiseling halfway through from both sides. Leave about 2 mm extra waste on all sides to prevent damage to the sides. Keep the cutting edge of the chisel across the grain.
- (c) Carefully chop out the rest of the mortise up to the lines (Fig. 7). Keep the bevel of the chisel towards the inside of the mortise. Do not use the mallet.

Step 4 - Cutting the tenon

- (a) Rip the sides of the tenon sawing on the waste side of the line (Fig. 8).



- (b) Cut in stages as shown in Fig. 11, a, b, c, &d).
- (c) Carefully saw the shoulders, making sure to hold the saw straight. Keep on the waste side of the line (Figs. 9 & 10).

Step 5 - Assembling the joint

- (a) Check the fit of the members. The tenon should fit tightly into the mortise without splitting the mortised piece. There should be no gap between the shoulders of the tenon and the mortised member. Don't force the members together. If they don't fit, find the problem and correct it.
- (b) Clean up the inside of the joint where it can't be reached after assembly with a smoothing plane. (Remember that the tenon should be smoothed before using it to mark out.)
- (c) Assemble the joint.
- (d) Plane off the waste end of the tenon, clean up all sides and edges with the smoothing plane.

STUDENT ACTIVITY

1. Identify and explain with the help of sketch steps involved in the preparation of **Common mortise and Tenon Joint**.

THE END