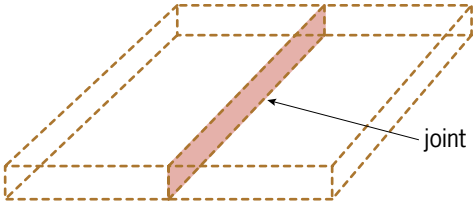
MODELING AND BUILDING TO SPECIFICATION *(page 1 of 2)*

Skilled trades—welding, carpentry, masonry and plumbing—are very different fields that require specific skills and expertise unique to each trade. Yet these trades do have things in common. All use the five basic types of joints shown in Fig.1. The type of joint used by a tradesperson is determined by the shapes of the pieces to be joined and the purpose of the joint. For example, if two pipes are to be joined to make a longer pipe, the choices are a butt joint or a lap joint. If a support for a shelf is being attached to a side, an edge joint would be a good choice.

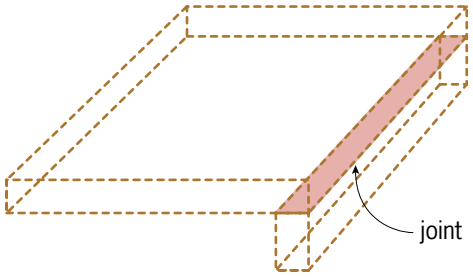
Another thing skilled trades have in common is strict quality specification requirements. All tradespeople must follow exact plans and their work is subjected to testing and inspection.

The use of models and modeling is also common among the trades. Modeling helps people understand problems and visualize possible solutions. It means creating a simpler version of a system. Today a great deal of scientific modeling is done by computer. However, sometimes building concrete models—that is, small, three-dimensional objects to represent larger objects made of different materials—can make it easier to see how parts within a system relate to one another. Models also make testing a structure possible in a much shorter time and at a much less cost than testing the actual structure. Engineers and others in the trades sometimes create models to aid them in making design decisions.

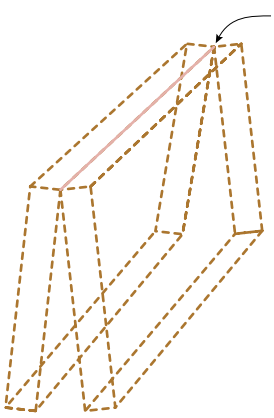
Fig. 1 Five Basic Types of Joints



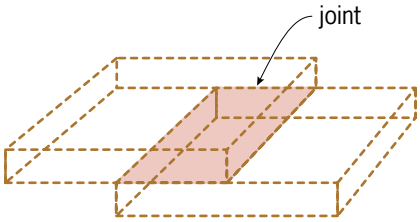
A. Butt joint: A joint between two pieces that are positioned in a more or less straight line on the same flat surface.



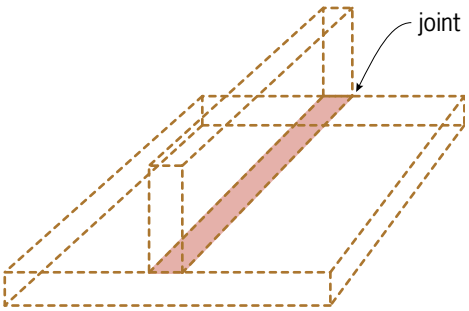
B. Corner joint: A joint between two pieces located at approximately right angles (90°) to each other.



C. Edge joint: A joint between the edges of two or more pieces that are parallel or nearly parallel.



D. Lap joint: A joint between two overlapping pieces.



E. T joint: A joint between two pieces located at approximately right angles (90°) to each other in the form of a T.

MODELING AND BUILDING TO SPECIFICATION *(page 2 of 2)*

APPLYING WHAT YOU KNOW

Materials

2 balsa wood boards:
1 – 10 in. x 1 in. x 1/4 in. and 1 – 7 in. x 1 in. x 1/8 in.;
ruler; protractor; craft knife; wood glue;
wood filler; craft stick; fine sandpaper;
heavy magazine to protect work surface.

Process: *Follow these steps.*

Caution: *Craft knives are very sharp. Always cut away from the hand holding the wood.*

Study the diagrams of joints in Fig. 1 and the working drawings for joint models on this page. Label each joint on this page and list an example of this type of joint. Then build the models according to the specifications given. Note: All measurements are given in inches and centimeters. When a model is complete, have someone on your team check the items listed under the Specifications Check Chart for that model. If the model meets the specification, the checker (Ck) initials the item. When your team has completed its work, an inspector (Ins) from another team will inspect your models for the same specification items. **Save these models. You will need them in Workshop 12.**

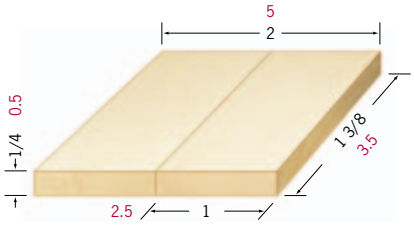


Fig. 2 _____

Example: _____

Specifications	Ck by	Ins by
1. Joined pieces correct measurements?		
2. Joint level and smooth? • top?		
• bottom?		
• ends?		
3. No visible gaps at joint?		
4. No excess glue visible?		

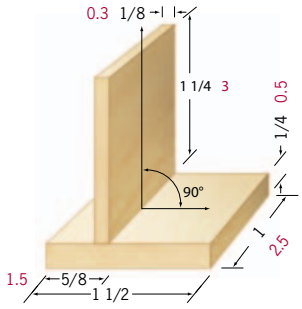


Fig. 3 _____

Example: _____

Specifications	Ck by	Ins by
1. Joined pieces correct measurements?		
2. Angle = 90°?		
3. Joint level and smooth?		
• sides?		
• ends?		
4. No excess glue visible?		

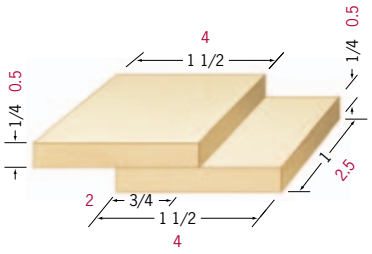


Fig. 4 _____

Example: _____

Specifications	Ck by	Ins by
1. Joined pieces correct measurements?		
2. Joint level and smooth? on sides?		
3. No visible gaps at joint?		
4. No excess glue visible?		

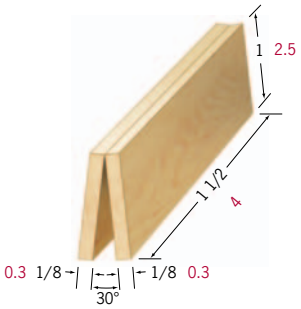


Fig. 5 _____

Example: _____

Specifications	Ck by	Ins by
1. Joined pieces correct measurements?		
2. Joint level and smooth? • top?		
• ends?		
3. No visible gaps at joint?		
4. No excess glue visible?		

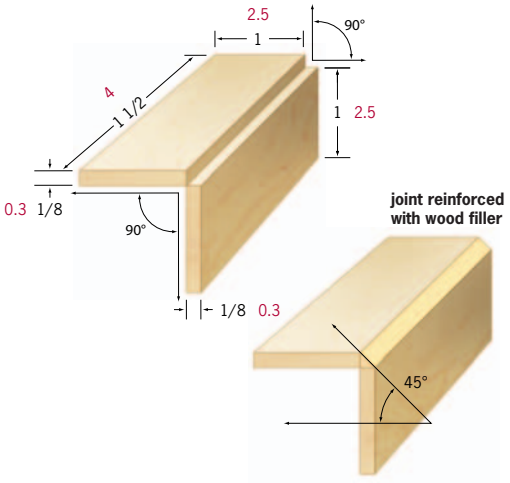


Fig. 6 _____

Example: _____

Specifications	Ck by	Ins by
1. Joined pieces correct measurements?		
2. Pieces joined along edge with no overlap?		
3. Unfilled angle = 90°?		
4. Filled angle = 45°?		
5. Inside joint smooth and even?		
6. Fill smooth and even?		
7. No excess glue, filler visible?		

CONCLUSIONS & INFERENCES

The earliest instance of welding seems to be in gold circular boxes made in Ireland more than 2000 years ago. What two types of joints are possible in a circular box? What type of joints must be present in a rectangular gold box? What types of joints are possible if two boxes were welded together to make a box with two compartments? Include sketches with your answer.