

Joining techniques

Adhesives:

Contact adhesive:

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Good strength• Quick dry time/instant stick• Waterproof• Can be used over large areas	<ul style="list-style-type: none">• Can be toxic• No slip time

Uses: Applying Formica and veneers

Tensol cement:

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Joins thermoplastics• Chemical weld (melts plastics together)• Strong bond• Quick drying	<ul style="list-style-type: none">• Lots of fumes• Toxic to skin• Must wear PPE (gloves)- dangerous

Note: Applied with syringe

Uses: Applying Formica, veneers

Epoxy resin:

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Very strong• Waterproof• Heat and chemical resistant	<ul style="list-style-type: none">• Takes time to cure/harden• Requires two elements (resin and catalyst)

Uses: Aircraft, Boats, Golf clubs, Skis

Polyvinyl acetate (PVA):

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Produces strong bond when joining wood• Can be used on cards/papers	<ul style="list-style-type: none">• Takes 24 hours to bond wood• Requires clamps to hold work whilst hardening

Uses: Wood joints, Card making, Fabrics joining

Hot melt glue (glue gun):

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Good bond when used in model making• Relatively quick dry time	<ul style="list-style-type: none">• Safety issues (hot glue can burn skin)• When using thin plastic glue can melt through creating gaps

Uses: Model making, Model designs

Cyanoacrylate (superglue):

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Very strong bond• Dries instantly• Can glue dissimilar materials together	<ul style="list-style-type: none">• Can dry too quickly• Expensive• Irritant to skin

Uses: Seal cuts, Temporary fixes to damages, stopping runs in nylons

Polystyrene cement

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Excellent bond for joining polystyrene• Chemical weld• Long slip time	<ul style="list-style-type: none">• 24 hours to harden• Must be used carefully (can melt polystyrene)

Uses: Airfix model kits, Joining polystyrene

Mechanical:

Screws:

Used to join materials together

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Holds in place well• Can be removed easily	<ul style="list-style-type: none">• Prone to corrosion if exposed

Uses: Bedroom furniture

Nuts:

Used to lock the joint

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Can be applied and removed an infinite number of times	<ul style="list-style-type: none">• Prone to vibration

Uses: Engineering situations where joints need to be undone

Bolts:

Passes through workpiece (Hex head bolt, Coach bolt, stud)

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Can be applied and removed an infinite number of times	<ul style="list-style-type: none">• Prone to vibration

Uses: Engineering situations where joints need to be undone

Washers:

Used to reduce friction and spread pressure (Plain washer, spring washers)

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Stops vibrations• Reduces stress on joins	<ul style="list-style-type: none">• Prone to vibration

Rivets:

Pop rivets and snap rivets- pop rivets use a gun, snap rivets use a snap and hammer

<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Quick process• Only need access to one side (pop rivets)• Can be used to tack work together	<ul style="list-style-type: none">• Not the strongest method of joining• Need access to both sides (snap rivets)• Hard to undo the joint

Uses: sheet metal, boats

Press:

Presses patterns into sheet metal

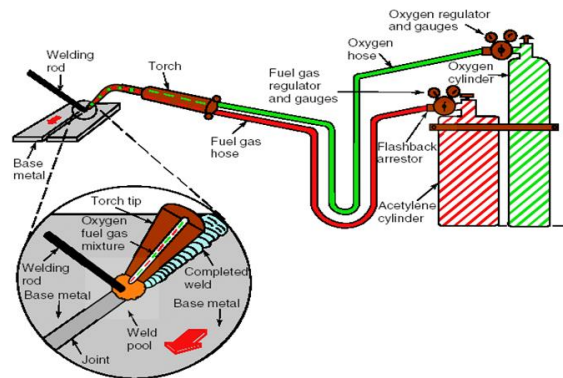
<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• High strength in pressed parts• Can be mass produced	<ul style="list-style-type: none">• Expensive set up cost• Large runs needed to be economical• Can make product heavy

Uses: Pattern making on metals

Heat:

Oxy acetylene welding:

1. Hi
2. Hi
3. Hi
4. Hi
5. Hi
6. Hi

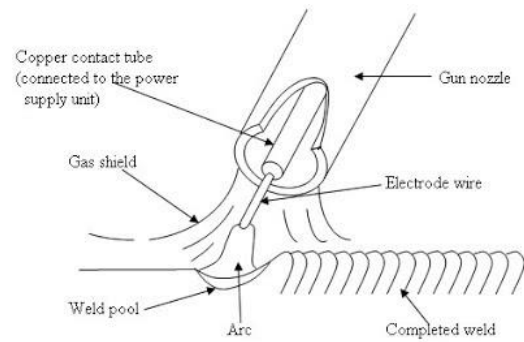


<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none">• Weld is as strong as parent metal• Clean joint No flux needed• Portable equipment• No electricity needed	<ul style="list-style-type: none">• Safety issues (gas equipment etc)• Poor aesthetics• Large heat effected zone

Uses: General engineering, Automotive engineering

MIG welding:

1. Hi
2. Hi
3. Hi
4. Hi
5. Hi
6. Hi

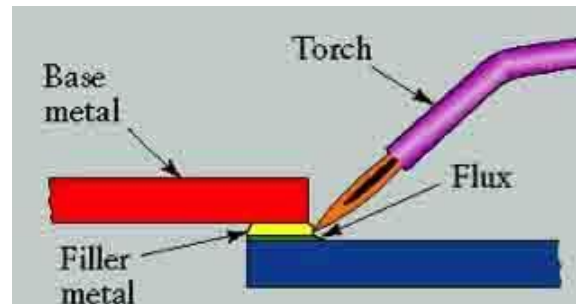


<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> • Easier than oxy-acetylene welding • Quicker than most welds • Very strong joint 	<ul style="list-style-type: none"> • Poor aesthetics • Can accidentally melt through the metal if not careful

Uses: Cars, Safety barrier/walkway

Brazing:

1. Hi
2. Hi
3. Hi
4. Hi
5. Hi
6. Hi

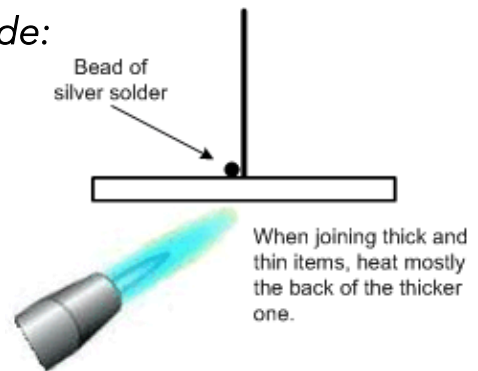


<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> • Good general-purpose joint • Can be undertaken with little training • Low bond temperature needed 	<ul style="list-style-type: none"> • Needs flux (if not weak joint) • Metal must be cleaned before hand

Uses: General engineering, Bicycle frame

Hard soldering (625⁰-800⁰) depends on grade:

1. Hi
2. Hi
3. Hi
4. Hi
5. Hi
6. Hi

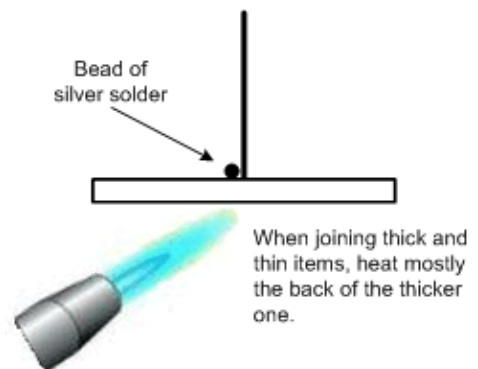


<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> • Stronger than soft soldering • Better aesthetics • Soldering larger objects 	<ul style="list-style-type: none"> • More skill • Higher melting point

Uses: Jewellery, ornaments, silverware, model engines

Soft soldering (625⁰):

1. Hi
2. Hi
3. Hi
4. Hi
5. Hi
6. Hi



<i>Advantages</i>	<i>Disadvantages</i>
<ul style="list-style-type: none"> • Low melting point • Quick process • Little skill 	<ul style="list-style-type: none"> • Weak joint • Only suitable for small objects

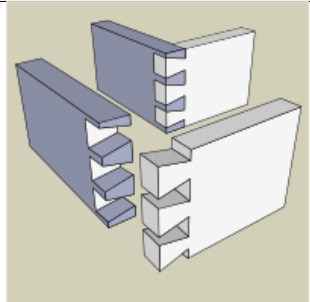
Uses: Electronics, small jewellery

Jointing:

Traditional wood joints:

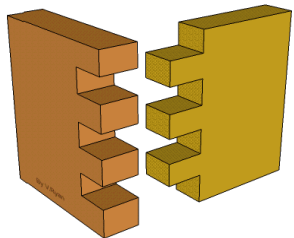
- Large contact area required for all wood joints (dovetail joint, comb joint, housing joint, half lap joint, dowel joint, mortise and tenon joint)

Dovetail joint:

Advantages	Disadvantages	
<ul style="list-style-type: none">• Multi directional strength• Large glue area• Can't be pulled apart• Aesthetically pleasing	<ul style="list-style-type: none">• Difficult to make• Need accuracy so time/labour intensive	

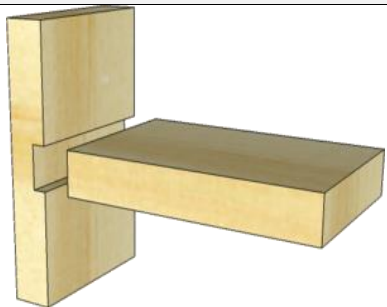
Uses: Drawers, office tables

Comb joint:

Advantages	Disadvantages	
<ul style="list-style-type: none">• Makes a straighter joint• Less wood gets wasted during manufacturing• Cost Effective• Durable for a vertical load	<ul style="list-style-type: none">• Can come out crooked• Harder to achieve a smooth wall	

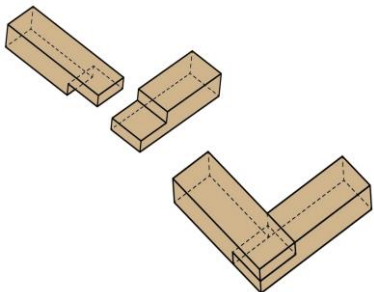
Uses: Box construction, small scale projects

Housing joint:

Advantages	Disadvantages	
<ul style="list-style-type: none">• Joint can't be seen	<ul style="list-style-type: none">• Not very strong	

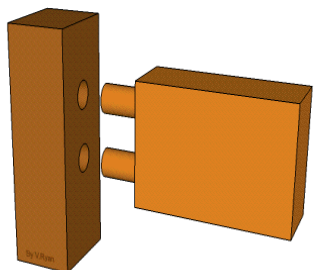
Uses: Framework construction, cabinets, shelving

Half lap joint:

Advantages	Disadvantages	
<ul style="list-style-type: none">• Quick to make• Large contact area• Easy/low skilled• Tough	<ul style="list-style-type: none">• Weak without extra reinforcement• Relatively weak with reinforcement	

Uses: Simple frames or boxes

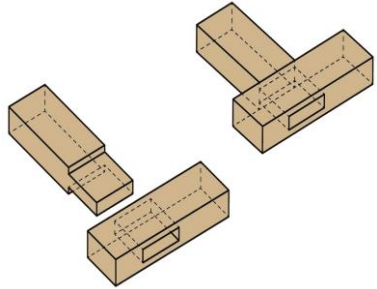
Dowel joint:

Advantages	Disadvantages	
<ul style="list-style-type: none">• Dowling is a quick process.• It helps to ensure a neat finish.• There is no need for screws, nails or	<ul style="list-style-type: none">• Misalignment of Joints• Dowel Shearing• Weaker Joint• No Face to Face Grain Contact	

<p>other equipment.</p> <ul style="list-style-type: none"> • Dowel joints are the strongest type of joints when it comes to woodworking, especially when using multiple rows of dowels. • Dowels help to create strong joints that are easy to make at home. 		
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Uses: Flat pack furniture, bookcase, wardrobes, Ikea furniture

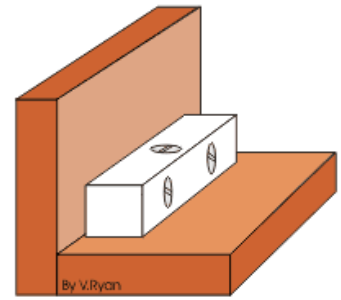
Mortise and tenon joint:

<i>Advantages</i>	<i>Disadvantages</i>	
<ul style="list-style-type: none"> • Strong joint • Clean/aesthetically pleasing joint 	<ul style="list-style-type: none"> • High accuracy needed to be made correctly • Slow/labour intensive 	

Uses: Frame constructions, tables, chairs

Knock-down fittings:

Knock-down (KD) fittings are used to manufacture flat-pack furniture, they are easy to use and are built by the user with simple tools that are supplied with the product



Modesty block:

Moulded holes that take screws that are used to join the block to the panel (Cupboards and storage units)



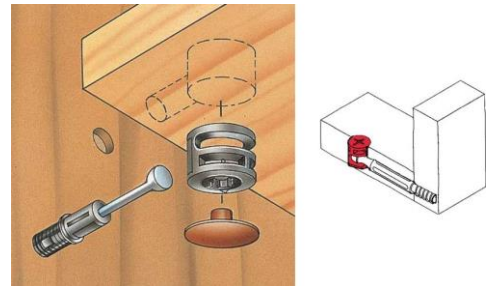
Barrel nuts and bolts:

Cross-dowel that is fitted into one of the pieces being joined, bolt inserted through the other piece of timber and tightened (bed frames)



Cam-lock connectors:

Metal dowel that is screwed into one of the pieces, cam disk is a disk that fits into a predrilled hole, using a screw driver the cam is tightened locking the two pieces together (horizontal shelves)



Wood screws:

Screws two pieces of wood together, top part is drilled with clearance hole so the screw goes in easily (wood sheets)



Coach bolts:

Join wood pieces together, when tightened the bolt can't rotate undoing the joint (wooden benches)

