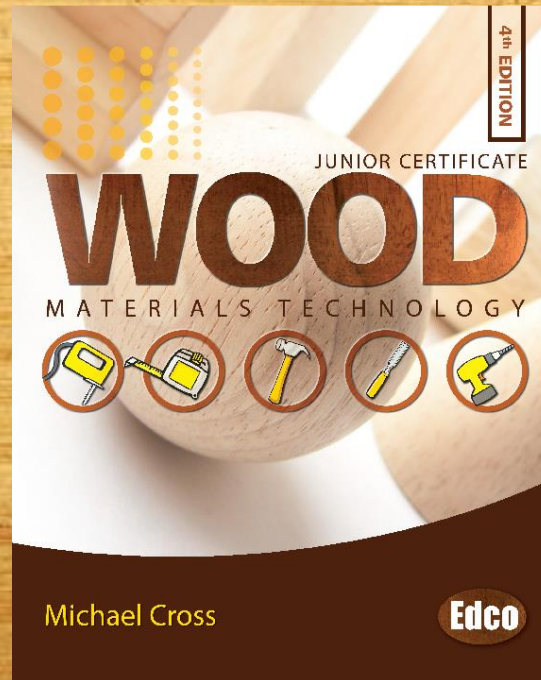


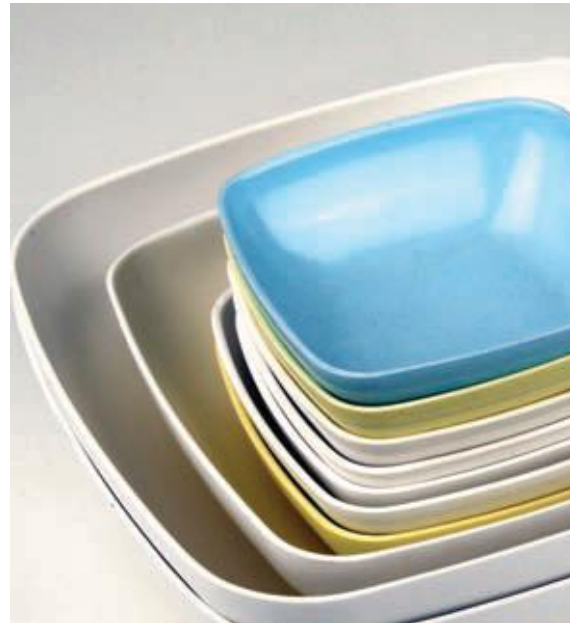
WOOD MATERIALS TECHNOLOGY

4th Edition



Chapter 18

Plastics



Plastics

- Are used all around us
 - CDs, TVs, videos, phones, PCs, cars, packaging, etc.
- Do not degrade easily, so disposal is a problem
- Two Groups
 - Thermoplastics
 - Thermosetting plastics

Plastics

Advantages

- Durable
- Won't rust or corrode
- Good insulators
- Resistant to chemicals
- Can be formed into complex shapes

Disadvantages

- Expensive
- Not friendly to the environment
- Don't break down or degrade easily
- Energy needed to produce them
- Can be a fire hazard

Types of plastic

- Thermoplastic

- PVC (polyvinyl chloride)
- Polystyrene
- Polycarbonate
- Nylon
- Acrylic

- Thermosetting plastic

- Polyester
- Melamine
- Epoxy resins

Thermoplastic



Can be heated and reshaped repeatedly

- Can be softened and reshaped by heating again and again
- Many types – soften at different temperatures
- Examples of thermoplastics
 - Acrylic
 - Nylon
 - Polyvinyl Chloride (PVC)
 - Polythene

Thermosetting plastic



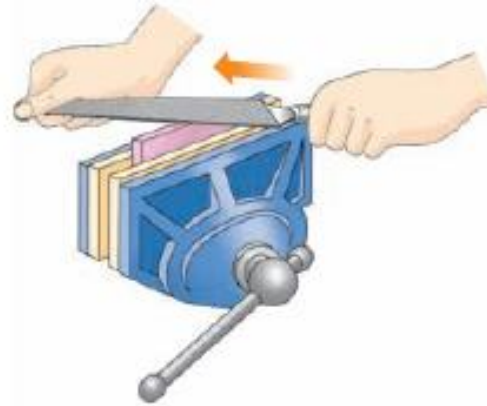
Softened and formed once only

- It can be heated and set, once only
- Cannot be re-softened
- Used where an item needs to withstand heat

- Examples of thermosetting plastics
 - Polyurethane
 - Polyester

Finishing Acrylic

- Hold piece low in the vice and plane or file to the line
- Cross file, then draw file the edge to smoothen it
- Smoothen the surface with fine sandpaper
- Finally, shine the edge with a metal polish



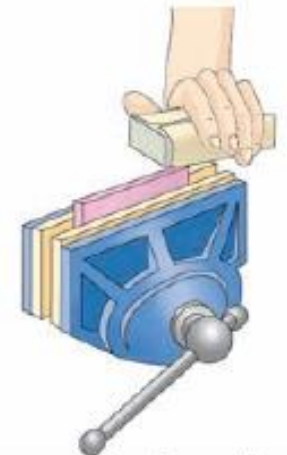
Cross file the piece down to a line



Draw filing to finish off smooth



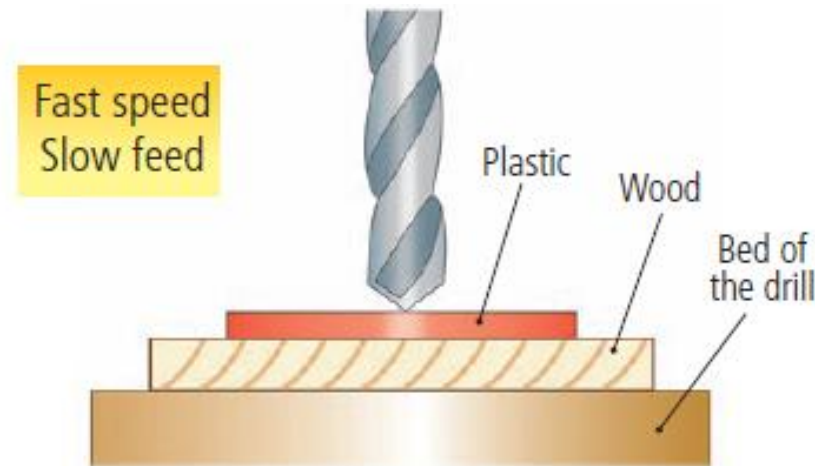
Polishing the edge



Sanding with fine sandpaper

Drilling Plastic

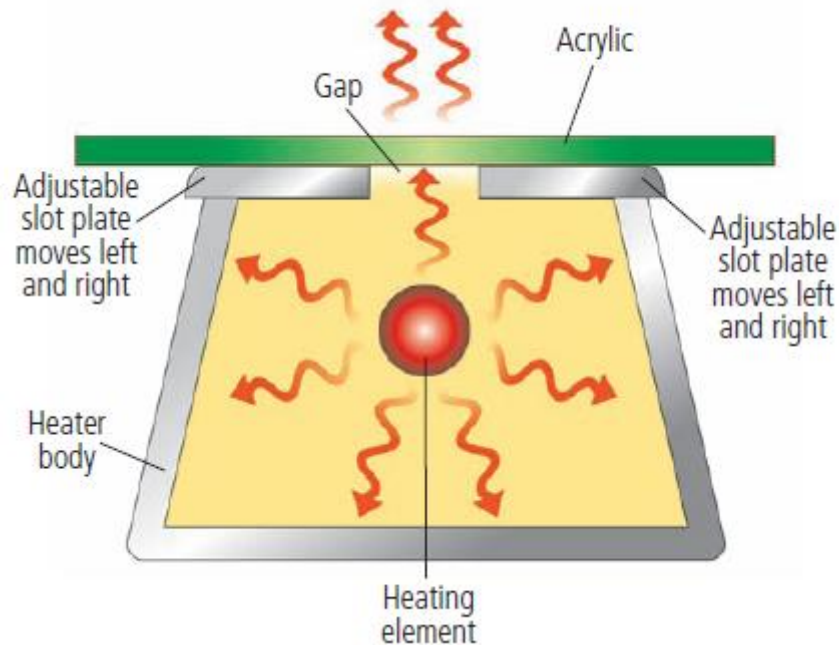
- Support the piece being drilled with a piece of wood. This also protects the table of the drill press.



- The piece should be held firmly on the table of the drill press
- Use a **FAST** drill speed and a **SLOW** feed rate to drill the plastic

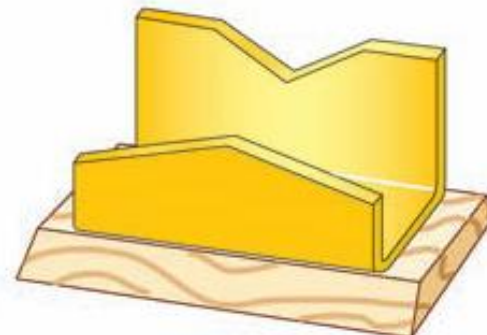
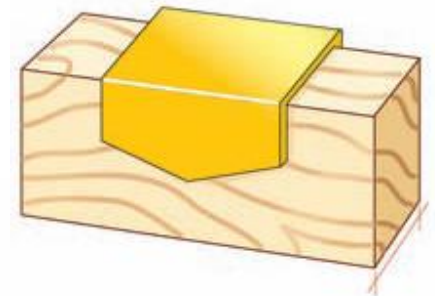
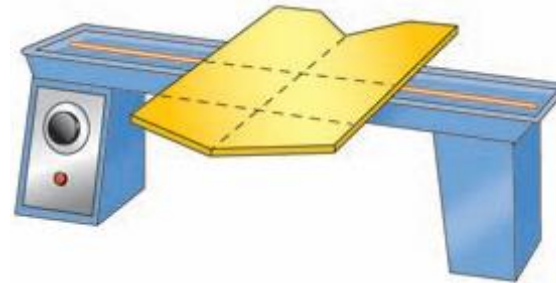
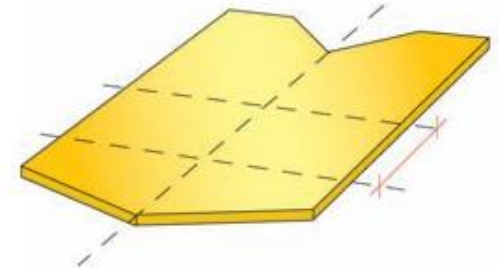
Bending plastic

- The **strip heater** has a heated element which heats the plastic through the gap above



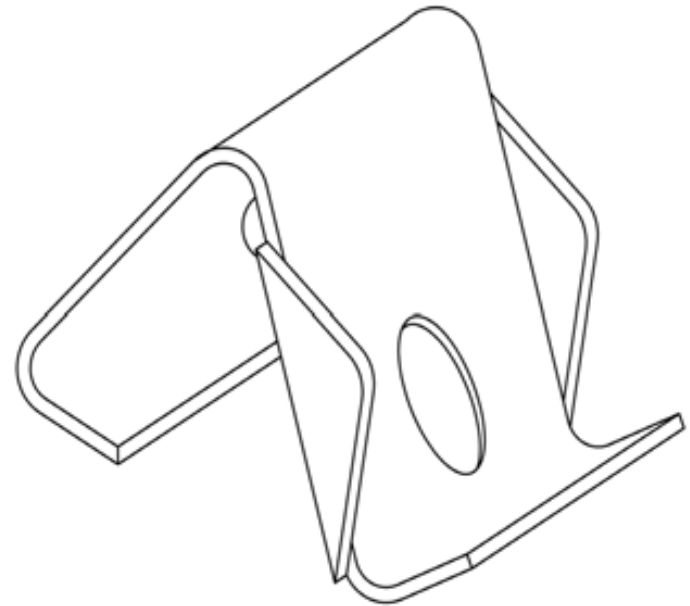
Shaping Plastic - forming

- Plan your bending & shaping carefully
- Draw a **development** of the shape onto the sheet
- Cut out the shape and finish the edges properly
- Heat the piece along the bend lines with the strip heater
- A mould or former is used to keep the bends more accurate & then leave to cool



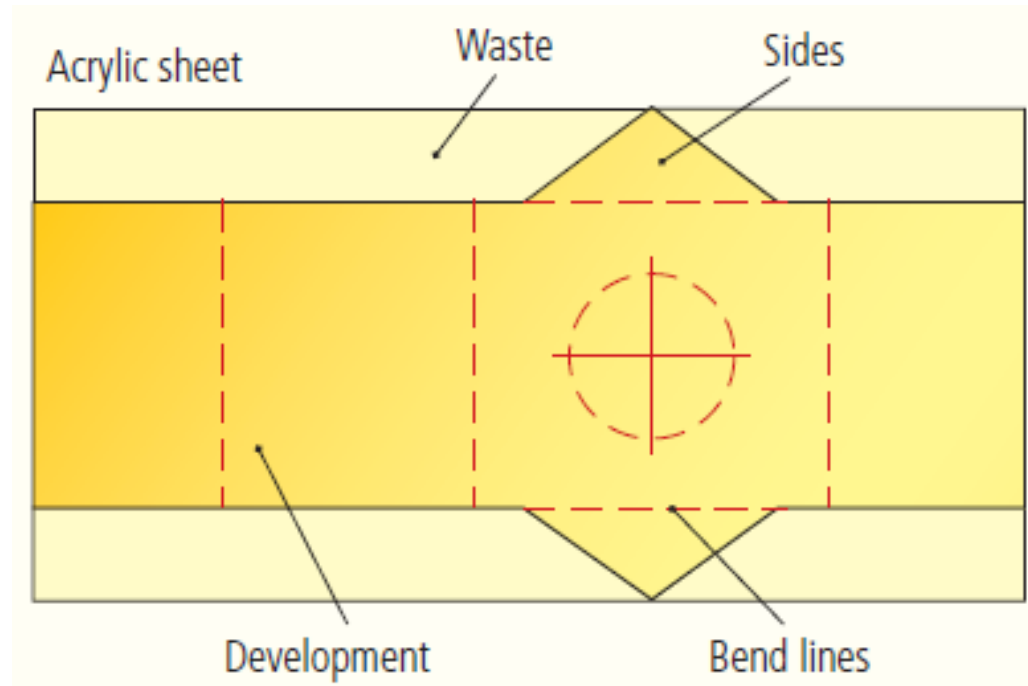
Exam question

- 1 The diagram shows a mobile phone holder manufactured from acrylic.
 - (a) With the aid of neat freehand sketches, draw the development that would be marked out on an acrylic sheet in order to manufacture this folder.
 - (b) With the aid of neat freehand sketches, describe in detail the steps you would follow to cut out and form the holder.
 - (c) With the aid of neat freehand sketches, describe how you would bore the hole in the acrylic sheet
(JC, HL, 2006)



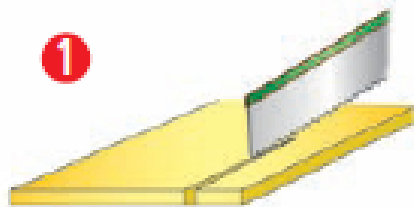
Sample answer to exam question

1 (a) The development of the piece on the sheet is shown below



Sample answer to exam question

1 (b) The holder would be made using the following steps

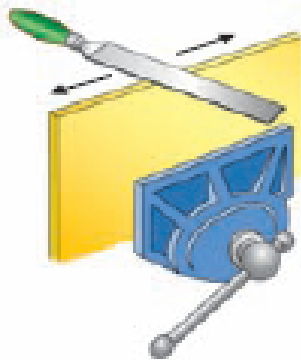


Cut along the line using a tenon saw or scroll saw after the hole is bored

2



The waste is removed using the saw along the lines as shown



- File the edges to the line to make smooth
- Then sand using fine sandpaper
- Finally polish the edges to a smooth finish using metal polish

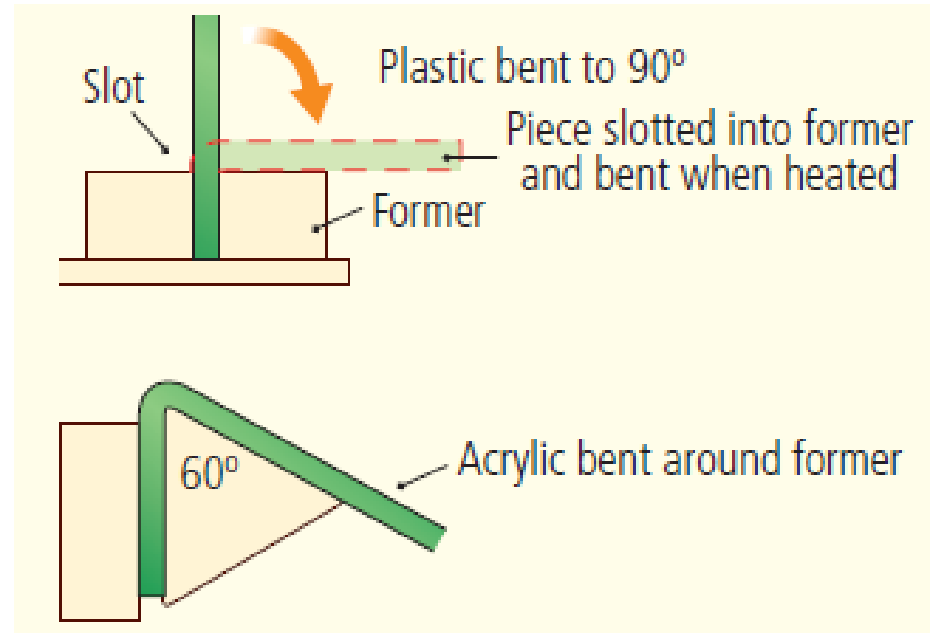
Sample answer to exam question

1 (b) Form:

When the shape is finished and when the hole is drilled, it can be shaped using the strip heater and wooden blocks shaped to the angles.

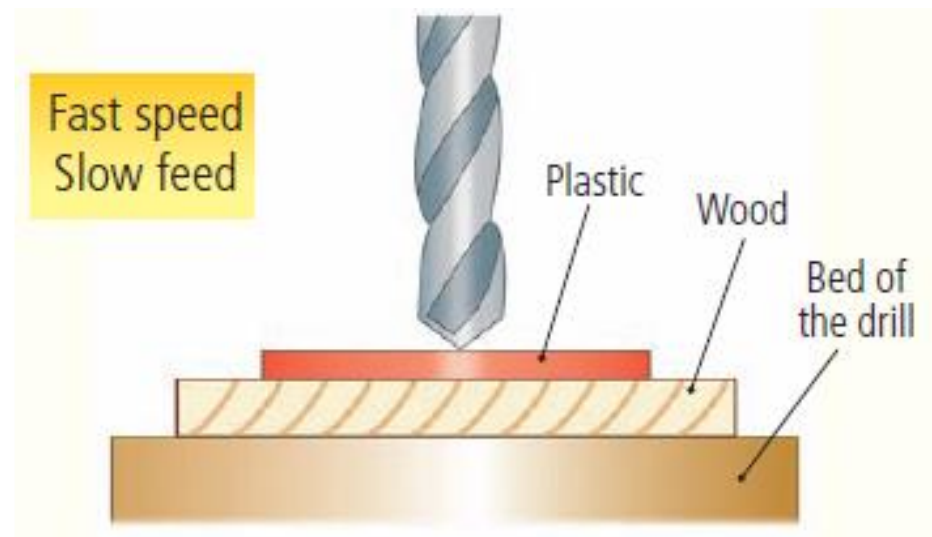
These are called formers and they will help to get the shape and angle correct.

The acrylic is heated along the bend lines and, as it softens, it is bent against a wooden former to the required angle.



Sample answer to exam question

- 1 (c) The hole should be bored on the pillar drill. It should be drilled using a slow feed rate and the drill should be spinning fast. The plastic needs to be held firmly down to the bed of the drill and a waste piece of wood for support placed under the plastic. This will prevent the plastic splintering or shattering when it is drilled.



Quiz

- Plastics can be divided into two groups. Name the two groups.

Plastics	
Group 1	Group 2
Thermoplastic	Thermosetting

Which group of plastics can be moulded only once?

Thermosetting plastics

Acrylic is a part of what group of plastics?

Thermoplastic

Give two advantages of plastics

Plastics do not rust or corrode

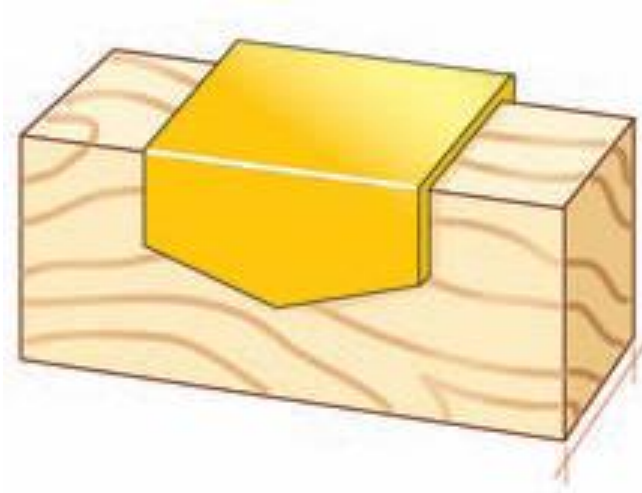
They can be moulded into shapes

Give two disadvantages of plastics

A lot of energy is used to make them

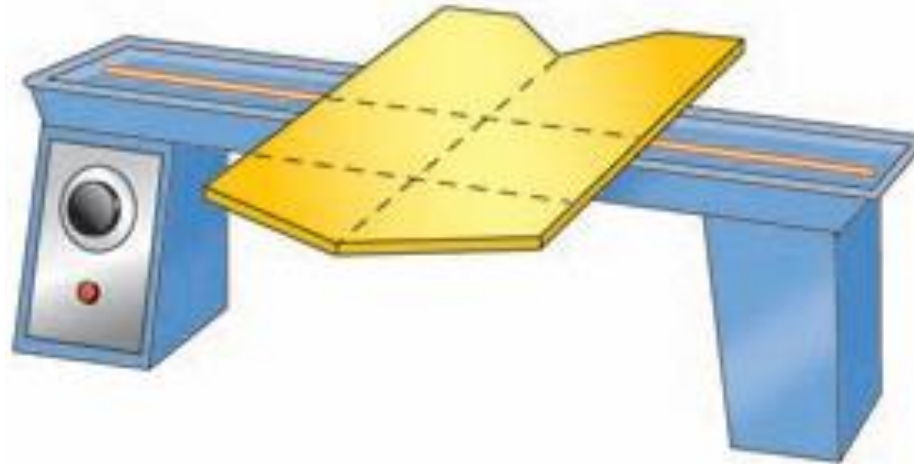
They do not break down or degrade easily

- What is a former used for?



- A former is a wooden block or mould that is used to help shape plastic

- What is this strip heater used for?



- A strip heater is used to heat plastic along bend lines before bending into shape