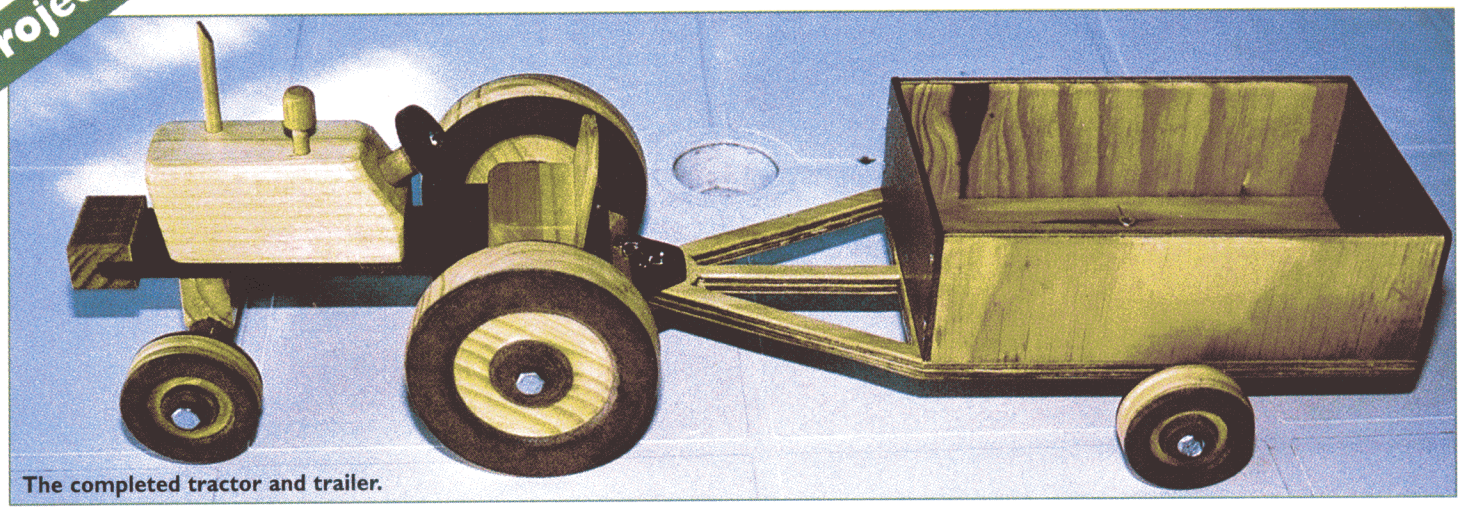
Four TOY projects

Mac MacLaughlin and Winston Klein, two woodworking enthusiasts, offer four simple woodworking projects.

Project 1

Make a wooden tractor and trailer



The completed tractor and trailer.

Mac MacLaughlin of Kempton Park shows you how to build a wooden tractor and trailer

The materials used for making wooden toys often depend on off-cuts and the types of wood available. These two factors will also influence the size of the toy. Your main objective whenever making a toy is to get its proportions right.

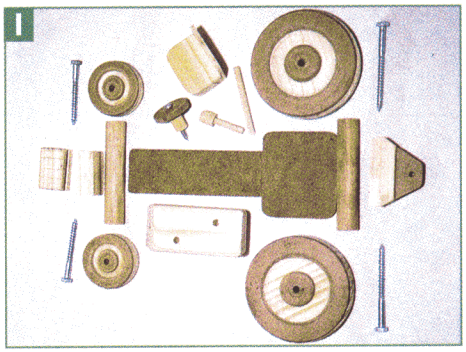
In this case, the diameter of the tractor and trailer wheels will allow you to deduce the proportions of the remainder of the components. The large wheels are 100mm in diameter and the small wheels, 50mm.

The wheels

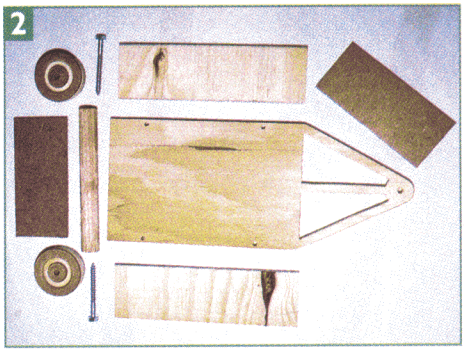
- You can make use of 20mm laminated pine and 3mm masonite for the wheels.
- Start by cutting the laminated pine circles on a fret or jigsaw.
- Glue and clamp the masonite to the side of these circles.
- Tighten a 6mm bolt through the centre hole of each wheel and insert it into the lathe chuck.
- Draw pencilled circles onto the wheel as shown in pics 3 and 4.
- Turn the wheel with a 9,5mm ($^3/_8$-inch)-long and strong turning gouge and then round it on the sides.
- Change the bolt around and turn the wheel in the same way on the opposite side.
- Finish each wheel off with sandpaper.

Tractor

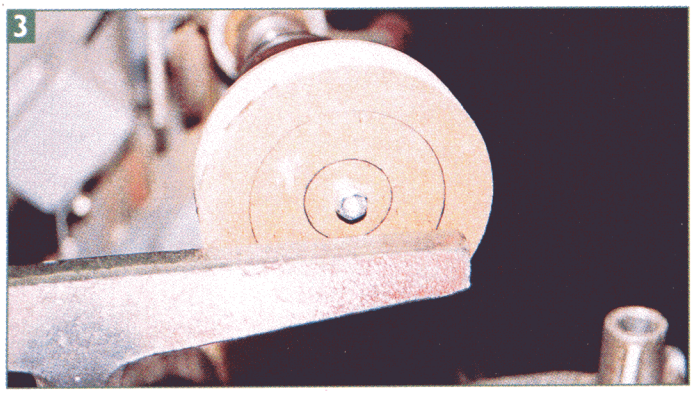
- Cut out the flat chassis from a 6mm-thick piece of ply or masonite on a scroll saw to the shape shown in pic 1 (below).
- Glue two 20mm-thick pine pieces together and shape them on a scroll saw. You can round the edges off on a sanding machine.
- Make the exhaust and air filter from wooden dowels and drill holes into the top of each one.
- Cut and then shape the seat and backrest, before gluing them together.
- Screw the engine and seat into position, from underneath the flat chassis.
- Use 20mm dowels for the front and rear axles into which the wheels are screwed to spin freely.
- Make sure that the front and rear axle are screwed from underneath onto the flat chassis, with a spacer in between. This will ensure that the tractor stands level.
- Shape and groove the front weight so that it slides onto the chassis and then use screws to secure it from underneath.



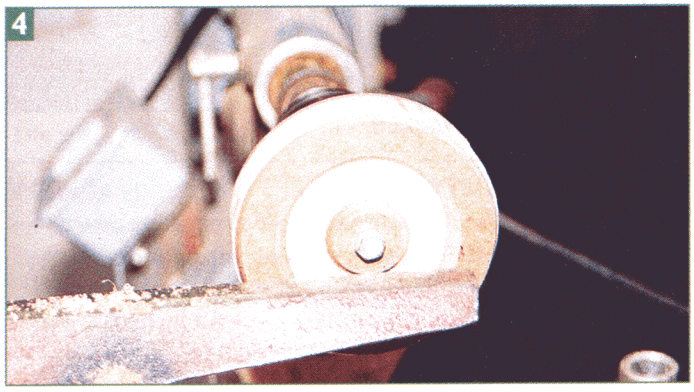
The various tractor pieces.



Trailer parts before assembly.



Secure the long bolt through the centre of the wheel with a nut, before tightening it in the lathe chuck.



A large wheel after shaping and sanding on both sides.

Trailer

- Cut out the trailer bottom, sides, back and front from a 6mm-thick piece of masonite or ply to the shape shown in pic 2 (below right).
- Make sure that you screw the side, front and back pieces of the trailer into position, from underneath the flat bottom.
- Carefully screw the wheels into the axle.
- You can then screw the axle onto the flat bottom, from above.

Final touches

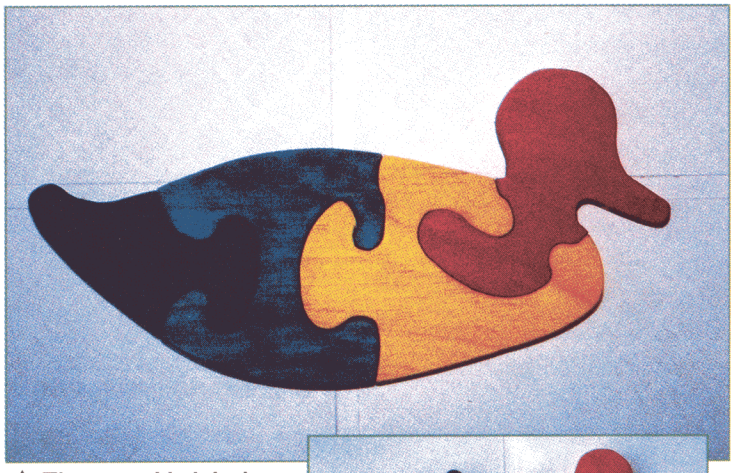
- Sand the tractor and trailer, remembering to remove all of the sawdust when you are finished.
- Apply a coat of suede varnish.
- Make sure that the varnish has dried before you join the trailer and the tractor.

Tools	Materials
Fret or jigsaw	6mm ply or masonite
G-clamp	20mm laminated pine
Electric scroll saw	3mm masonite
Lathe	6mm bolt
Electric sanding machine	Screws
Electric drill press	Sandpaper
Screwdriver	Suede varnish
	Wood glue

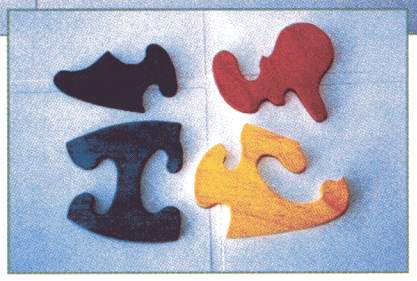
Project 2

Duck tales

Mac Maclaughlin shows you how to design attractive, non-toxic wooden puzzles.



▲ The assembled duck puzzle has dimensions of 260 x 100mm through the middle.



Pieces of the puzzle that have been coloured with cake colouring. ▶

The secret in cutting a puzzle is to make a template first. You can use 3mm-thick masonite for the template. Follow these steps:

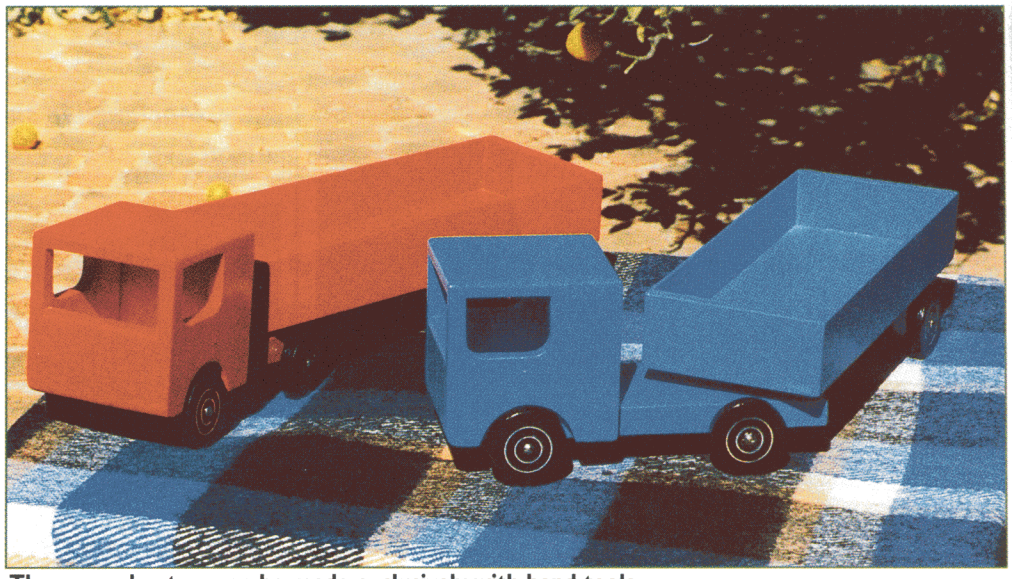
- Mark the separate pieces and cut them out with a fret or scroll saw.
- Place the whole template onto the wood to be marked and draw the outline. This can be done by removing one piece of the template at a time, while holding the remaining pieces together and drawing along the line of the remaining outside piece.
- Sand the separate pieces by hand with 180 grit sandpaper
- Spread an old sheet or towel or some newspaper across your work surface, in order to protect it from being stained by the cake colouring liquid.
- Make use of a different cake colouring liquid to colour each piece of the puzzle.
- Paint the one side of each piece first, with a small-diameter paintbrush. Remember to rinse the brush each time you change colours.
- Allow the pieces to dry completely, before tackling the other side.
- You can assemble the puzzle once both sides of each puzzle piece are completely dry.

Tools and materials
Fret saw or electric scroll saw
3mm masonite
8mm pine plywood
Marking pencil
180 grit sandpaper
Small-diameter paintbrush
Cake colouring liquid
Sheets of newspaper or an old sheet or towel

Project 3

Horse power

Winston Klein of Florida shows you how to construct an articulated horse and trailer.



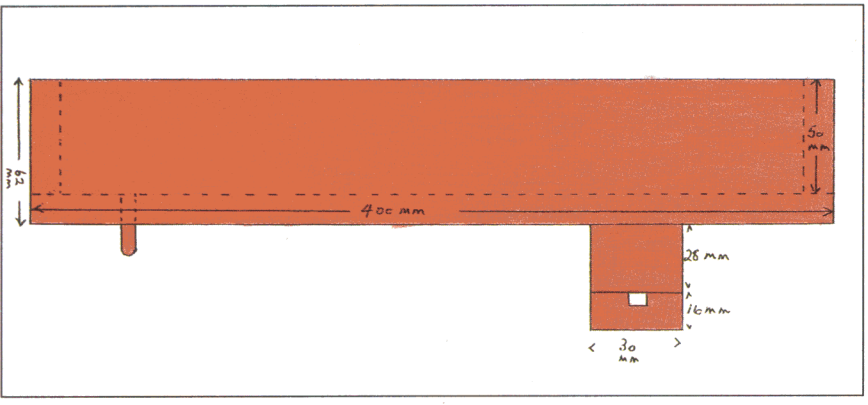
These wooden toys can be made exclusively with hand tools.

Horse cab

- Prepare all of the parts to the sizes, as indicated on graphic 3 and the cutting list.
- Construct the cab using panel pins and glue, and attach it to the base of the horse. Please note that caution is required when you are using Supawood (MDF), as it has a tendency to split very easily when being nailed.
- Use a rasp and sandpaper to shape the edges, as shown in the graphic on page 11.
- You can now prepare the axle supports by running a 7mm groove in the middle on the top.
- Before you attach the axle support to the base of the horse, ensure that a 6mm dowel turns smoothly in the groove.
- Attach the axle supports with panel pins and glue.
- Prepare the 'fifth' wheel and attach it, as shown in the graphic on page 11.
- Fill any nail holes as gaps and sand to a smooth finish, making sure that there are no sharp edges.
- The cab is now ready for painting.

Trailer

- Prepare all of the trailer parts according to the cutting list and construct them as shown in graphic 4.
- Follow the same steps to prepare the trailer axle support as you did for the cab.
- Attach the axle support to the spacer and then to the trailer, as shown in the graphic below.
- Insert the 10mm dowel pin.
- Sand the trailer and prepare it for painting.



The horse cab

Cutting list:

Use 12mm medium-density fibreboard (MDF) (also known as Supawood) to cut the following:

- **2 cab sides – 135mm x 120mm**
- **1 cab roof – 135mm x 130mm**
- **1 cab back – 108mm x 106mm**
- **1 cab front – 106mm x 70mm**
- **1 cab base – 106mm x 285mm**
- **1 trailer bed – 400mm x 160mm**
- **20 trailer ends – 160mm x 50mm**

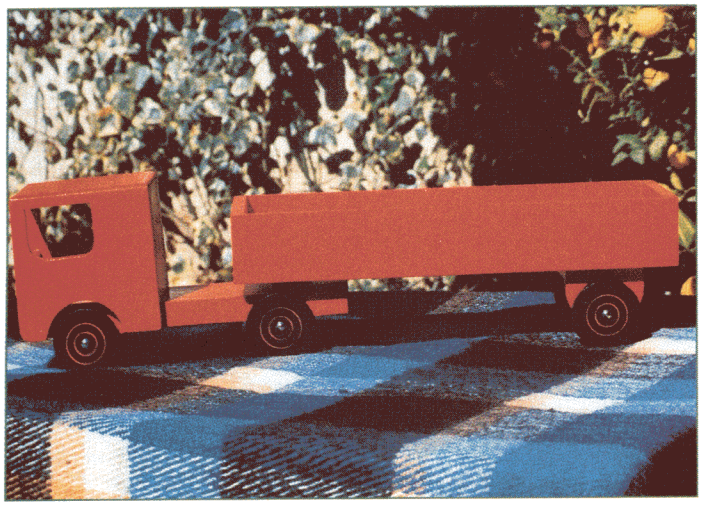
Cut two trailer sides from 400mm x 62mm masonite or ply

Use hardwood to cut the following:

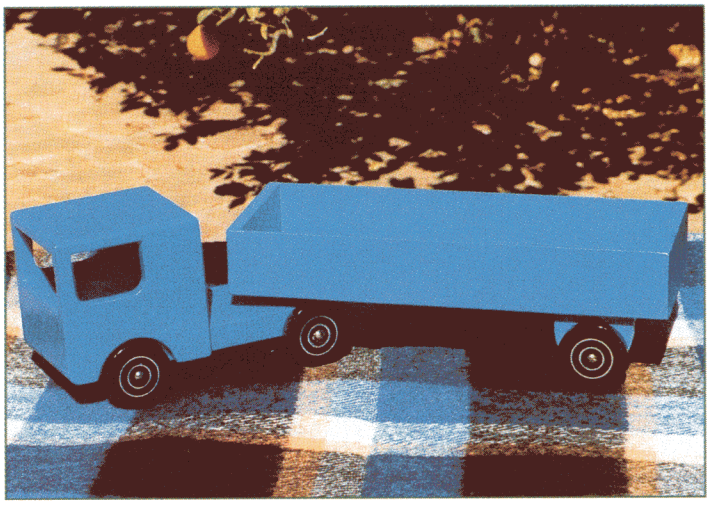
- **2 cab axle supports – 106mm x 16mm x 30mm**
- **1 trailer axle support – 130mm x 16mm x 20mm**
- **1 trailer axle spacer – 130mm x 28mm x 30mm**

Sundries

6 wheels, 60mm diameter
450mm x 6mm dowel
Glue
Rasp
Coping saw
Hammer
Hole saw
Sandpaper
Child-safe paint
Panel pins
10mm dowel pin
Domed upholstery pins for the hubcaps



The completed articulated horse and trailer must be painted in non-toxic paint.



Careful preparation when constructing the cab and trailer will ensure ease of movement.

Wheels

- Use a 60mm hole saw to cut out the six wheels and then round over the edges.

Painting

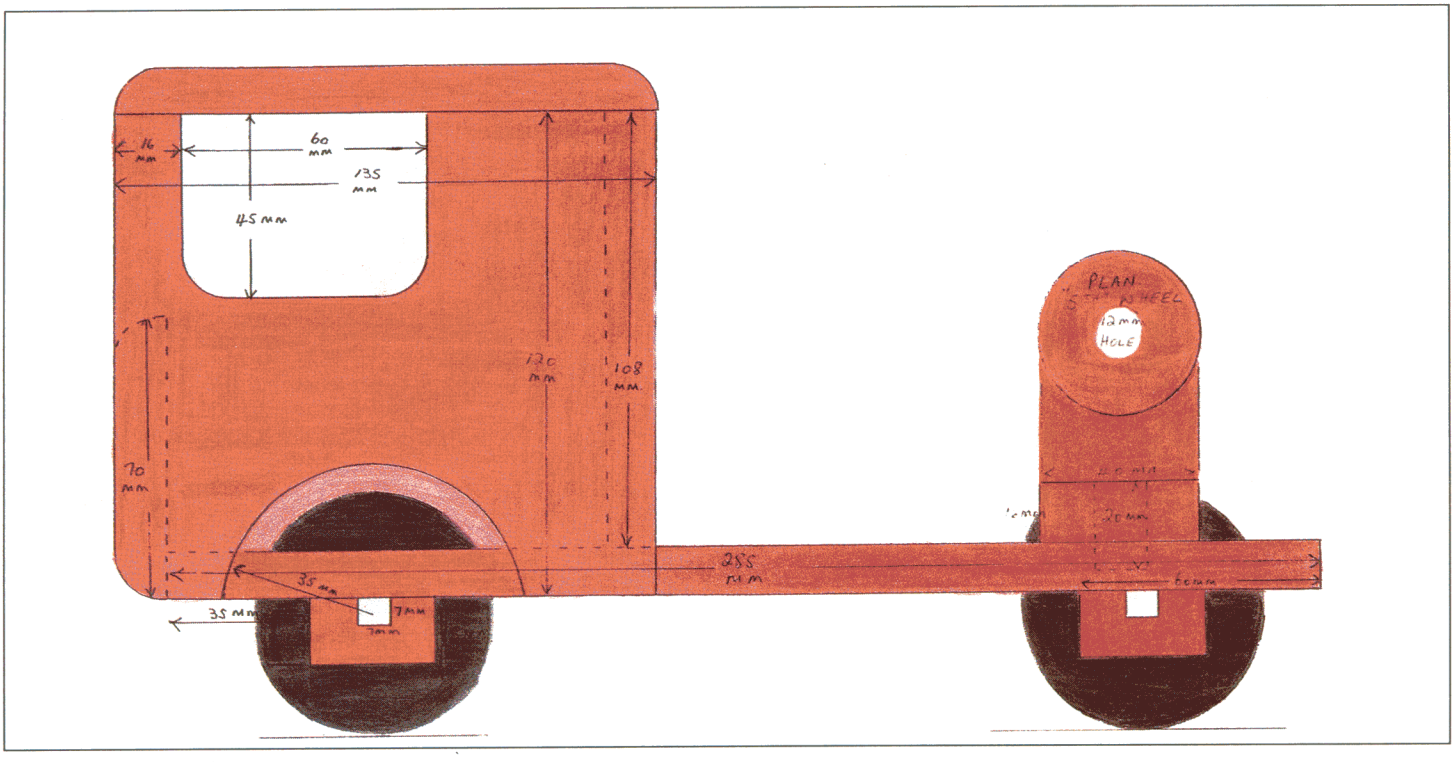
- Paint the model with a suitable undercoat.
- Allow the undercoat to dry properly, before you apply the finish coat.

Fitting the wheels

- Using the 6mm dowel as axles, glue the wheels to the axles
- Fit the axles to the truck and trailer, exercising extreme care to make sure that no excess glue causes the wheels to stick to the axle supports.
- Finish off the dowel ends by using domed upholstery pins to serve as the hubcaps.

TIPS TIPS TIPS TIPS

- **This wooden toy can be made exclusively with hand tools.**
- **You can also use the dimensions of the trailer to build a tanker or flatbed trailer.**
- **It is recommended that you only make use of a child-safe paint when you are applying the undercoat and finish coat.**

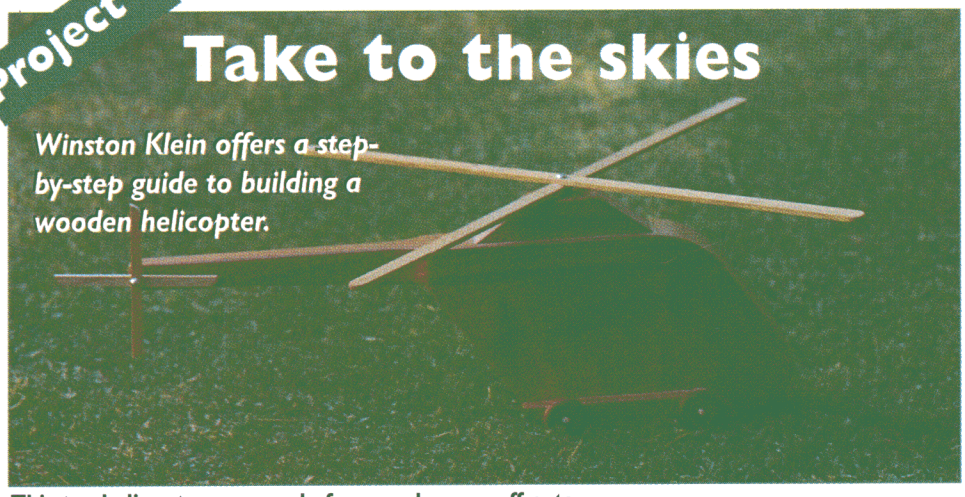


Side view of the trailer

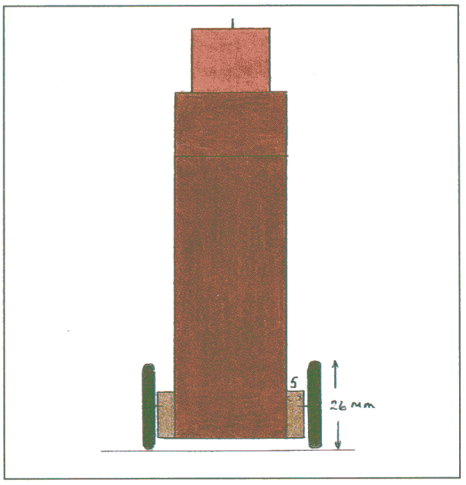
Project 4

Take to the skies

Winston Klein offers a step-by-step guide to building a wooden helicopter.



This toy helicopter was made from mahogany off-cuts.



Front view of the helicopter.

You can make use of any type of wood that is available to you in order to build this model helicopter. In this case, I used mahogany off-cuts and a natural finish. You can, however, also use a child-safe paint to create a bright and colourful helicopter. If you do not own or have access to any power tools, please note that the helicopter can easily be built using only hand tools.

Follow these steps for making the helicopter:

Mark off the pieces on the mahogany, then cut them out with a coping saw

A. One 200mm x 90mm x 35mm (fuselage)

B. One 320mm x 35mm x 20mm (boom)

C. One 95mm x 25mm x 20mm (rotor mounting)

D. Two 120mm x 15mm x 3mm (wheel mountings)

E. Two 360mm x 15mm x 3mm (rotor blades)

F. Two 90mm x 10mm x 3mm (tail rotors)

Step 1

- Cut the front and back of the fuselage (A) to an angle of 50°.
- You can then round the nose and rear with a coping saw and sandpaper.

Step 2

- Prepare the top of the fuselage (A), which incorporates the boom (B) and shape it as indicated in the graphic on the right.

Step 3

- Attach the boom to the fuselage with panel pins and glue.
- Ensure that all joins are tight and sand it so that it will appear to be one solid unit.

Step 4

- Prepare the rotor mounting (C) and attach it to the boom.

Step 5

- Prepare the two wheel mounting pieces (D) and glue them to the sides of the fuselage.

Step 6

- Make four wheels that are 26mm in diameter – you can do this by turning a 26mm diameter dowel and paring off the requirements.

Step 7

- Prepare the rotors (E) and glue them together in the form of a cross.

Step 8

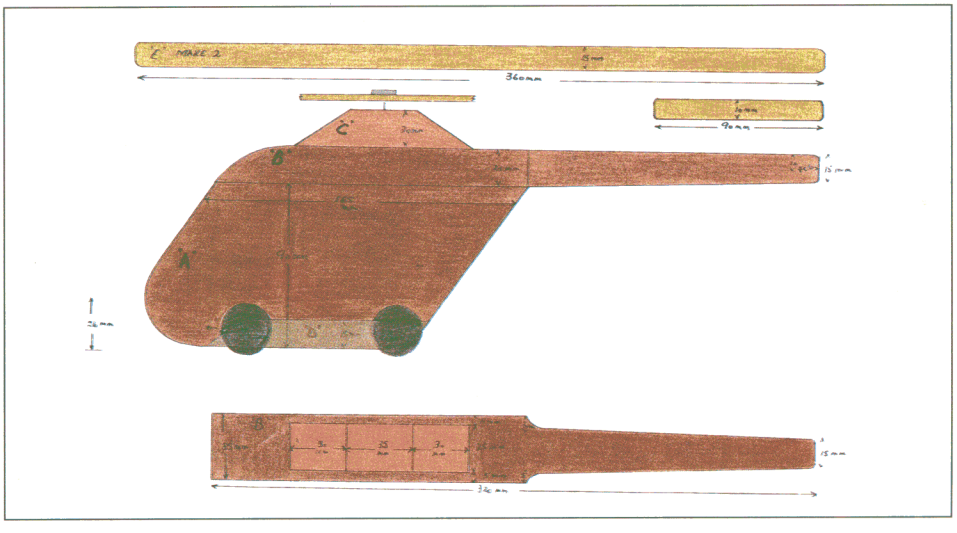
- Sand the model to a smooth finish, ensuring that there are no sharp edges.
- Apply an undercoat with an appropriate paintbrush.
- Allow the paint to dry properly, before using sandpaper to sand the helicopter model.
- Remember to remove all of the sawdust from the model.
- You can then apply a finish coat of suitable child-safe paint.

Step 9

- Attach the rotors and wheels in order to complete the model.

Tools and materials

Child-safe paint
Coping saw
Glue
Hammer
Paintbrush
Panel pins
Sandpaper



The dimensions of the helicopter.