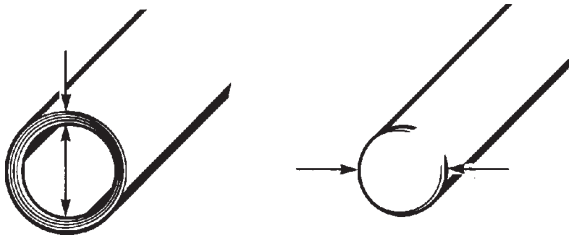
MAKING ROLL TUBES

ROLL TUBES

Roll tubes are made from paper wound tightly around a plastic or metal cylinder called a mandrel. When the rolled tube is slipped off the mandrel, it is very stiff. Unlike drinking straws, roll tubes consist of at least 10 layers of paper making up a wall thickness of at least 1 mm.

Roll tube dimensions
The inside diameter (I/D) of a roll tube is the outside diameter (O/D) of the mandel - providing the tube is tightly wound.



The outside diameter of a roll tube depends on the number of turns of paper.

• For a required O/D of roll tube, the number of turns of paper required is given by:

$$\textbf{No. turns} = \frac{\textbf{Required outside diameter - mandrel diameter}}{\textbf{2}} \div \textbf{paper thickness}$$

For example, **for a required O/D = 8 mm**, mandrel O/D = 5mm and paper thickness = 0.1 mm (ordinary photocopy paper):

$$\text{Number of turns} = \frac{8 - 5}{2} \div 0.1 \text{ mm} = 15 \text{ turns.}$$

• The *approximate* length of paper needed for a required O/D of roll tube is given by:

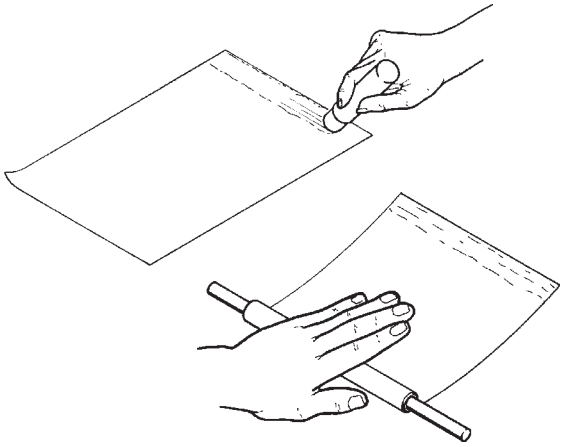
Length = no. turns × mean diameter of the tube × π

For example, number of turns = 15, mandrel O/D = 15 mm, tube O/D = 18mm:

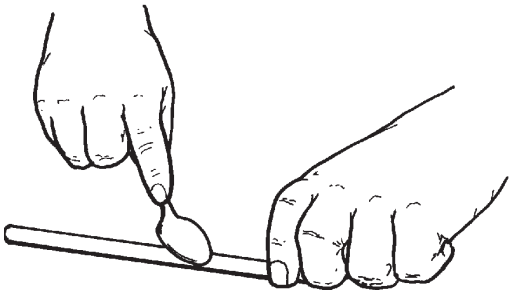
Length = 15 × 16.5mm × 3.142 = 778 mm approximately.

MAKING ROLL TUBES

Method 1
Cut the paper to the correct length and width (allowing extra width for trimming after rolling). Apply adhesive (e.g. Pritt stick) to the paper edge to close the roll.

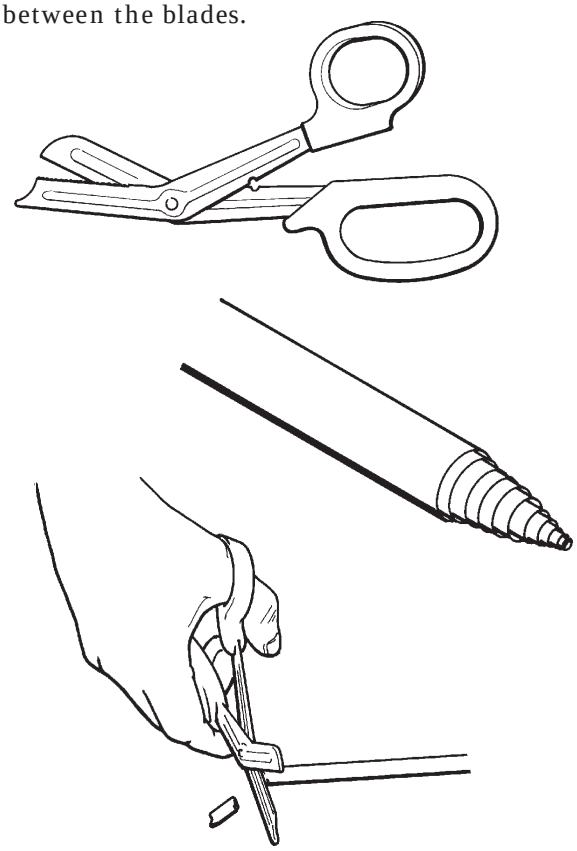


Carefully wrap the opposite edge of the paper round the mandrel and roll it up over a flat surface.

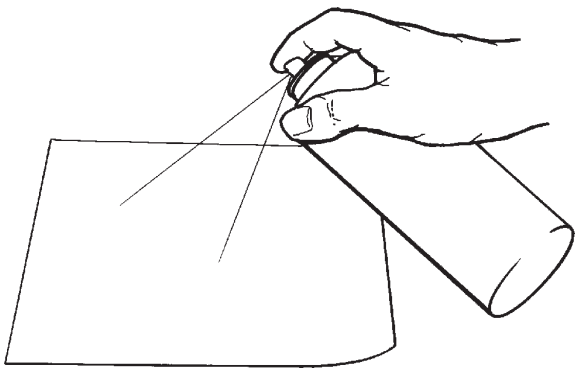


When rolling is complete, burnish the glued edge with the back of a spoon - keeping the mandrel inside. Slide the tube off the mandrel.

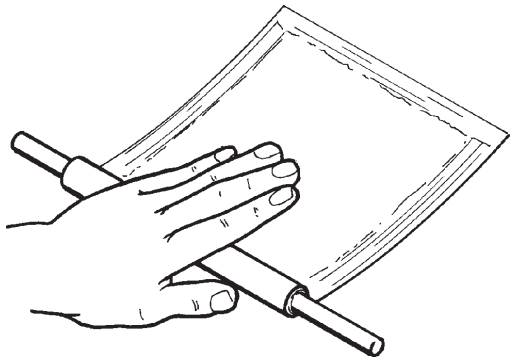
Unless the paper is wound perfectly parallel to the mandrel, one end will 'spiral' in slightly and the other end will 'spiral' out. Trim both ends with the type of scissors shown. Their high mechanical advantage enables the thick tubes to be cut easily and the serrations prevent the tube sliding between the blades.



Method 2
For additional strength, adhesive can be applied to the whole paper surface before rolling. Spraymount or dilute PVA can be used.

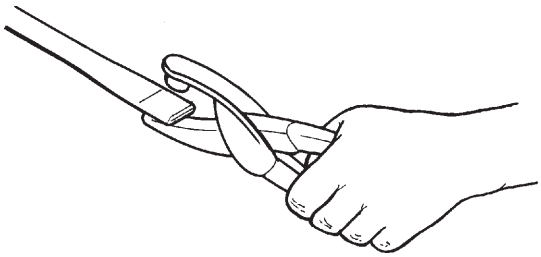


Method 3
If the end of a larger diameter tube is to be left open - for example, to contain another sliding tube - adhesive should be applied along the edges of the paper so the layers of paper at the ends are glued solidly together.

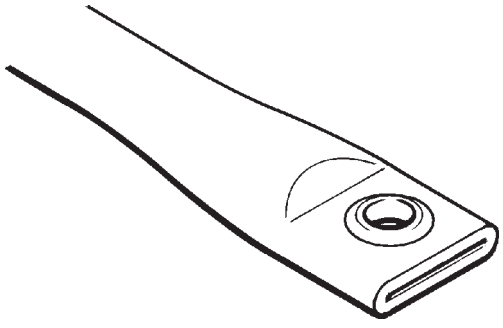


TERMINATING ROLL TUBES

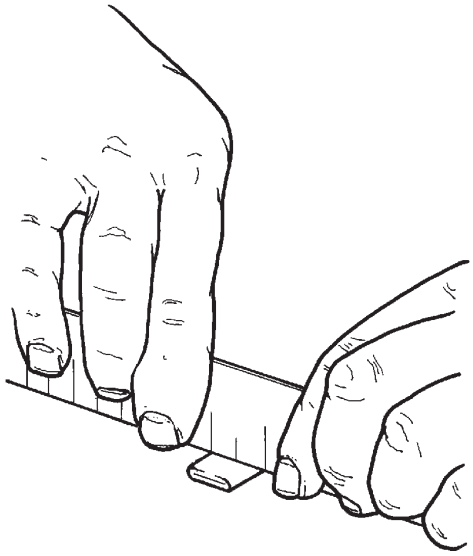
For most space frame structures, roll tubes can be joined using small nuts and bolts. The tube requires flattening and reinforcing where a bolt passes through.



The tube is pressed flat and then punched using a combined eyeletter and riveting tool. Reinforcing eyelets are then inserted and closed with the tool.



The flats on a tube may be parallel to each other or at any desired angle. The flats can be made to flex or 'hinge' by creasing with a ruler edge pressed down very firmly.



FINISHING ROLL TUBES

Roll tubes can be spray painted with cellulose or enamel paint. Alternatively, coloured paper can be used in their construction. Special papers available include those with 'day-glow' colour finishes. For other modelling effects or simple labelling, the paper can first be passed through a photocopier to print an image. (This needs to be printed only on the edge of the paper.)