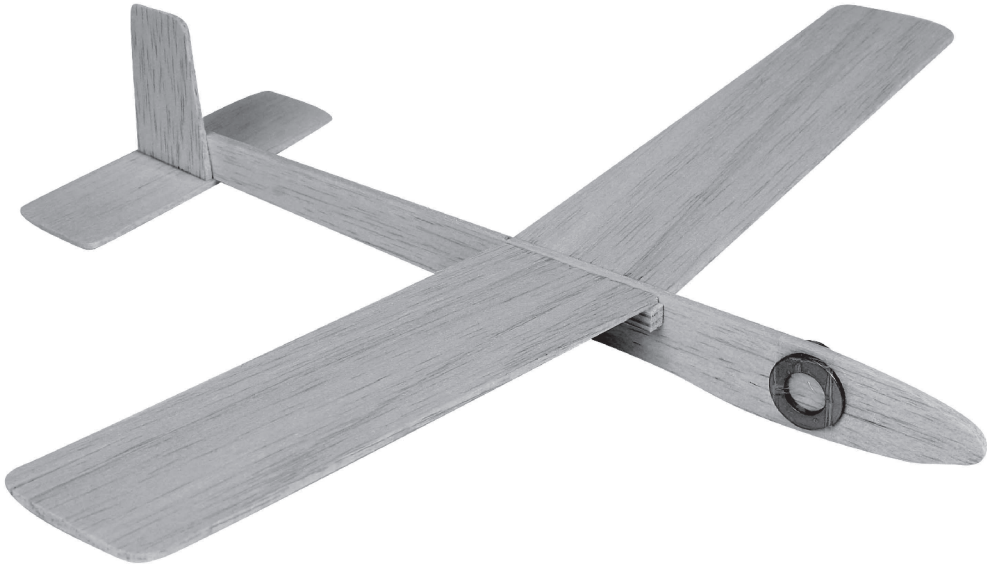
OPITEC

Hobbyfix

102.021

Balsa-Glider



Please Note

You may find that this pack contains two balsa strips 1x48x180mm instead of a single piece 2x48x180mm. The two thinner strips will therefore need to be glued together.

Contents

Part	Quantity	Material
Body (fuselage)	1	Balsa 3 x 25 x 300 mm
Wings	2	Balsa 2 x 48 x 180 mm
Tailplane	1	Balsa 2 x 32 x 110 mm
Tail fin	1	Balsa 2 x 32 x 50 mm
Strengtheners	2	Pine 5 x 5 x 50 mm
Wing support	2	card
Trimming	1	washers approx. 10 g

Please Note

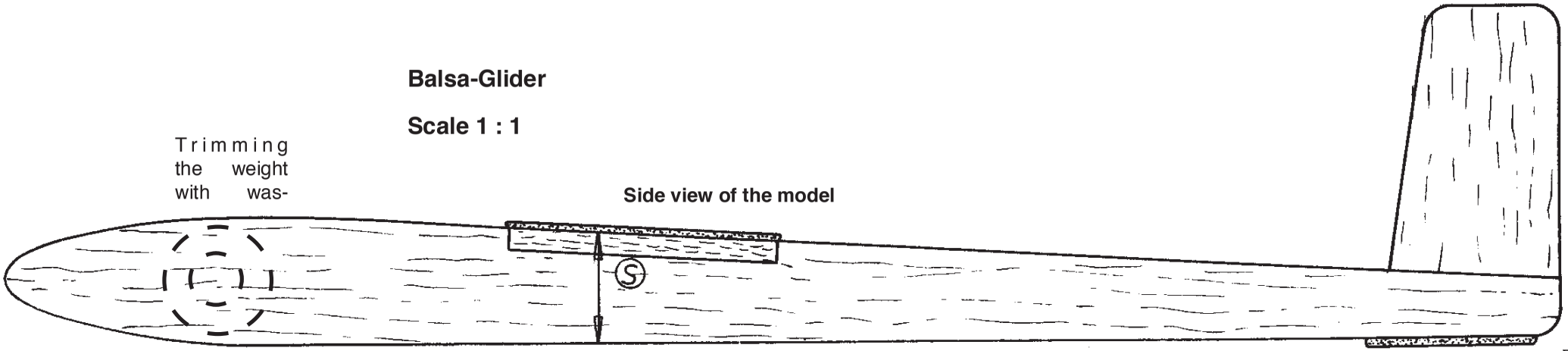
The OPITEC range of projects is not intended as play toys for young children.They are teaching aids for young people learning the skills of Craft, Design and Techno- lo- gy.These projects should only be undertaken and tested with the guidance of a fully qualified adult. The finished projects are not suitable to give to children under 3 years old. Some parts can be swallowed. Dan- ger of suffocation!

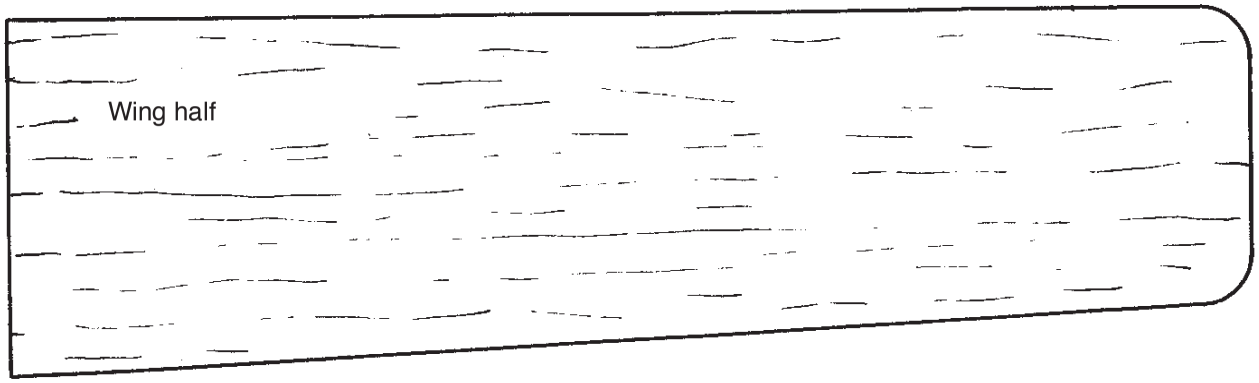
Balsa-Glider

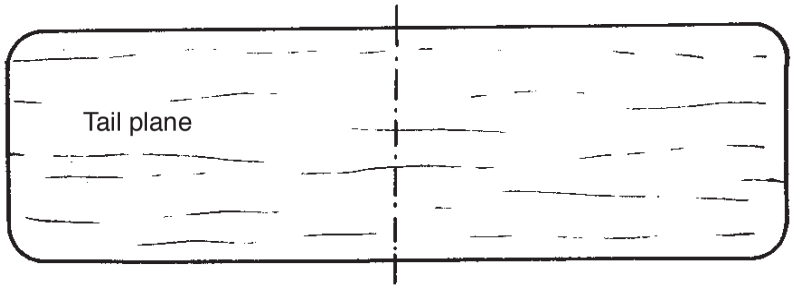
Scale 1 : 1

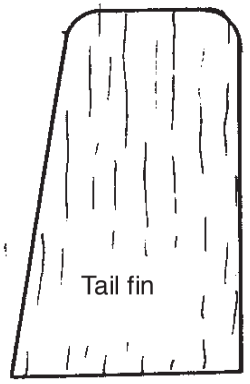
Trimming the weight with was-

Side view of the model



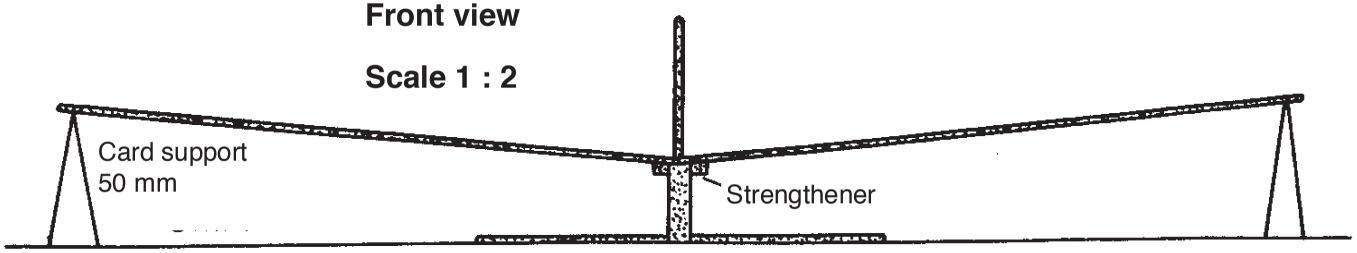






Front view

Scale 1 : 2



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Planning and Making

1. The body shape should be transfered from the plan to the 3mm balsa sheet. This can be done by tracing, photocopying or with carbon paper.
   Then cut out the shapes with a sharp knife or a fine fret saw. The other parts can then be made in a similar way.

2. All the cut out parts should be finished with a fine glasspaper.

3. The tailplane can then be glued in position. (see plan)

4. The tail fin glued in position on the body.

5. The distance from the nose to the leading edge of the wing must be measured and marked out on the body. This denotes where the wings must be glued. The tips of the wings are then supported with the card strips and the wing joint glued. The strip wood is used as strengtheners at the join. (see plan)

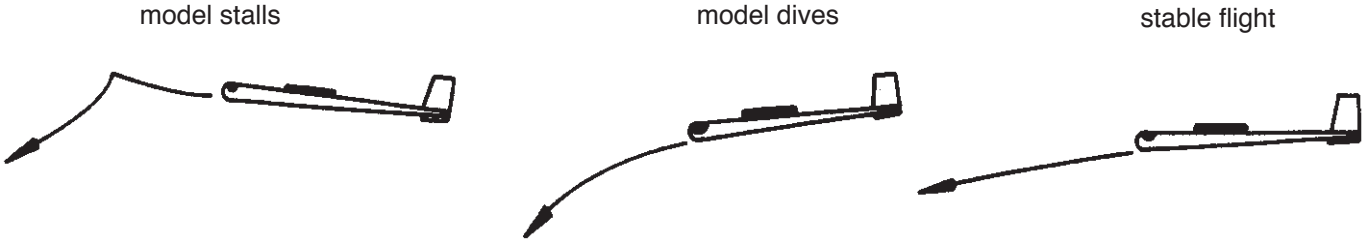
6 After drying, the model can be trimmed.

Trimming the model

The model is heavier at the rear as at the front . However it should balance in a level position
To transfer the weight to the front we will use washers. Take the washers and glue or tape them to the nose of the plane. By moving the washers back and forth a little the correct position can be found where the model balances level on the pencil.

Flying the model

The finished model is held at the centre of gravity between the thumb and fore finger and launched with a swing. Do not throw the model!
When outside, fly only in a light wind and then always launch the model into the wind. Watch the flight path carefully and note any alterations that must be made to the trim.



Altering the flight characteristics

Should the model fly in too a sharp curve the following faults may need correcting

1. The wings are warped and need straightening or remaking

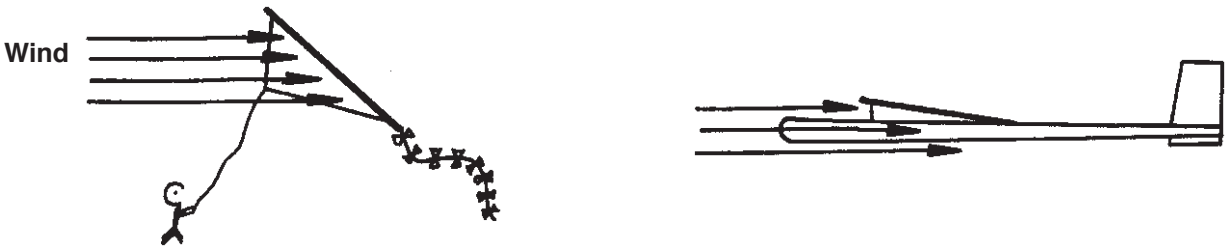
2. The wing halves are not exactly the same size, or one side is heavier than the other. Glasspaper until correct.

3. The tail fin is not straight and may need to be re-aligned.

Have fun with flying and building your model!

How and why does your model fly ?

If a flat wing is held at an angle into a windflow, it will start to rise (lift). This is the principle by which a kite flies, while it is held at angle against the wind.



Our glider flies because of this angle of attack into the wind, this known as the angle of incidence.

THE ANGLE OF INCIDENCE

An angle of incidence can be between 0 and 5 degree will influence the rate of climb. For instance a model with a wing angle of 4 degrees will climb faster than one with 1 degree, this is because it offers a steeper angle to the wind.
However there is a drawback, the greater the angle of the wing the more resistance the wind offers, slowing the model down. A good compromise is an angle of 2 degrees. As the tailplane position is fixed on our model the wings can be angled in realtion to the tailplane.

HOW CAN A MODEL WITHOUT CONTROLS FLY STABLE?

The necessary stability is added to the model by the tailplane and tail fin and the V form of the wings. The V angle can take over the action of the tailplane to give a stable flight. However the tail plane cannot be left off altogether as they supply some of the required stability through the so called '**weather vane effect**'

The air flow pushes the weather vane in the direction of the wind.

This is exactly the same effect the wings, taiplane and fin has upon the model

Different V shaped wing arrangements

Without V shape

bad

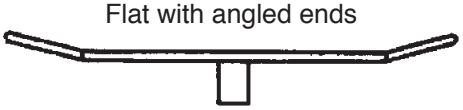
Double V shape

good

Simple V shape

good

Flat with angled ends



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