

MAKING A FLATBACK MANDOLIN

By Shaun Newman with photographs by Andrew McNinch

Why would you want to make a mandolin? Perhaps you have read Captain Corelli's Mandolin by Louis de Bernières, or seen the film? Perhaps you have heard Vivaldi's Concerto For Two Mandolins (or John Williams' transcription for two guitars)? Perhaps you are attracted by the idea of a small, easily portable instrument of lovely shape, or simply by the challenge of making something a little different? Perhaps... Well, why would you not want to make a mandolin?!

A few misguided people do not take the mandolin seriously, thinking it

only fit to play light or inferior music – but just listen to Vivaldi's mandolin concerto, or works by Raffaele Calace or Pietro Denis, to discover how seriously both composers and players take the instrument. Beethoven wrote four works for mandolin and piano and even played the mandolin himself. It has a firm place in jazz, bluegrass and folk music, and can even be heard in the opening riff of Rod Stewart's 'Maggie May'. The mandolin clearly has a wide appeal to lovers of many styles of music. It is lovely to look at, has a fascinating history, and making one offers all sorts of opportunities. I could not resist the challenge for this article and have made two instruments in a slightly different design and have started a third!

History

The mandolin belongs to a wide family of instruments – the mandola, the octave mandolin, the mandocello and the mandobass. The earliest was derived from a soprano form of the medieval lute known as the mandore. The mandore was 'bowl backed', had six pairs of strings and was plucked with the fingers. Towards the end of the 18th century a new form developed, principally in Naples – still with a bowl back, but with just four pairs of strings made from gut, brass, steel or silk. One maker, Giovanni Fouchetti (1724–1793), perhaps trying to get the best of all worlds, used brass for the lower strings, gut for the middle ones and silk for the trebles. The so-called Neapolitan period saw the first use of a plectrum. Originally a goose quill was used (sharpened to a point and sometimes tied to the

forefinger), then tortoiseshell and now, of course, plastic. In a time of variation other forms emerged, but it was not until the mandolin arrived in the USA in the 1880s that the modification to the flatback (attributed to Orville Gibson of the now famous Gibson company) really gained popularity. The instrument quickly became established and, over time, entire mandolin orchestras became popular... The rest, as they say, is history.

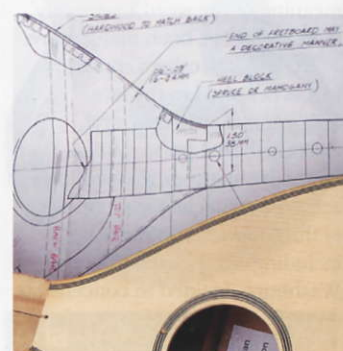
The modern mandolin is an extremely versatile instrument which comes in three distinct forms: the traditional 'bowl backed', in which laminated strips are used to make the distinctive body resembling half a Terry's Orange; the 'carved top', which is constructed rather in the style of a violin; and the 'flatback', which is the one I chose to make and which I describe in this article.

Construction

The first step in making a mandolin is to get hold of a plan. It can be puzzling that plans often come with no instructions, some even with no measurements, being accurate full-scale drawings. Time must be spent

in studying them to envisage the steps needed (and the correct sequence if frustrating pitfalls are to be avoided) to bring the two-dimensional drawing to three-dimensional life. I find it valuable to trace from the plan onto parchment, then draw around the transparent templates with a sharp pencil directly onto the wood, following centre lines or fret spacing where necessary.

Next comes the selection of timbers. The instruments illustrated



here are made from rosewood and koa (sometimes mixed) for the backs and sides; spruce or cedar for the tops; and cedar, mahogany or poplar for the head and neck. The fingerboards are of ebony or bird's eye maple. It is accepted that the mandolin can be made from a variety of timbers – from traditional hardwoods such as walnut, apple or pear for the back and sides, to any available resonant timber that will not twist when reduced to around 2 mm of thickness – allowing wide scope to the imagination of the maker.

Once the timber has been selected and stored in a dry place, it is time to start work on a mould. Opinion is



Plans and templates - vital first steps

MATERIALS REQUIRED

Back and sides – any resonant hardwood such as rosewood, koa, maple, walnut etc
Front – quarter-sawn cedar or spruce
Head and neck – mahogany, cedar, poplar or maple
Fingerboard – ebony, maple or rosewood
Bridge – same material as fingerboard capped with fret wire
Bracing struts – mahogany for back, and spruce or cedar for front
Tentellones – spruce
Kerfed linings for back – basswood, lime, mahogany or beech
Tailblock – laminated poplar or spruce
Bindings – rosewood, box or ebony
Purflings – maple in black and white
Headstock veneer – hardwood left over from back or sides
Top nut – bone
Tailpiece – nickel silver or nickel-plated brass
Tuners – Grover mandolin tuners, nickel silver with pearly buttons
Strings – four pairs of Martin mandolin strings: 10, 12, 24 and 34 gauge
Adhesives – Titebond Original and Pacer superglue



The mould constructed from chipboard and held together with coach bolts

divided here: some makers suggest that a flat work board is sufficient, but it needs a complex set of cams around the outline of the instrument drawn onto the board. I feel it is safer and more reliable to make a chipboard mould comprising base board and sides. To allow for the slight rise in the front of the mandolin, a hollow is made to a depth of around 3 mm in the base itself. A small rebate must be cut into the underside of the mould edges to allow for the overlapped front to sit in place while the sides are glued. A clear centre line should be marked through the inside of the mould, as this helps to ensure the neck is held straight during a range of operations.



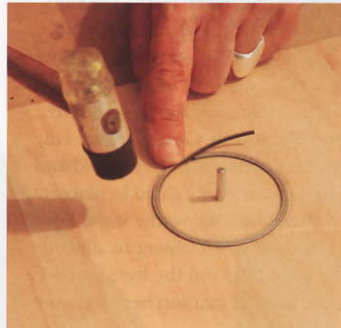
The centre line on the mould must match up exactly with the centre of the neck

The sides come next and are cut from bookmatched timber, reduced to 2 mm in thickness. The plan will indicate the dimensions, but it is important to ensure at this stage that the edges of the sides that come into contact with the front are planed true. The sides are bent on the hot iron and held in the mould while the tailblock is made (normally from cedar, poplar or basswood). I always laminate the tailblock for added strength. An inlay can be introduced



A hot bending iron is used to shape the sides

at this stage to cover where the ends of the two sides meet at the tail. At this point, consideration should be given to any decoration that may be used to enhance the appearance of the instrument. For example, the tailblock inlay can be of the same design as the back centre inlay, the headstock centrepiece and the purflings. It can also be chosen in keeping with the rosette. The inlay is tapped in with a rubber-headed hammer, and the sides are then replaced into the mould.

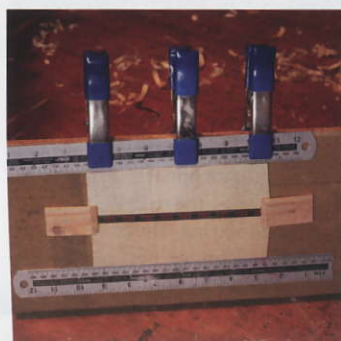


The head and neck are made from a single piece of timber – cedar or mahogany are the most popular choices. The headstock is created by a scarf joint cut at around 15°. If a shallower angle is used the strings



The heel joint is vital to the strength of the instrument

may buzz at the top nut, while if the angle is too steep it can increase the tension on the strings and cause the front to buckle inwards. A veneer is normally placed on the upper face of the headstock, helping to strengthen the scarf joint and offering a further opportunity for decoration. A jig made from two metal rulers and a piece of chipboard can be used to create the headstock veneer; remember to cover the chipboard with parcel tape to avoid gluing



The headstock can be shaped to offer some individuality

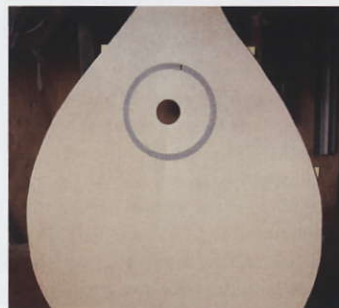
the whole thing up! The headstock can then be shaped to add a little individuality. The heel block is made by laminating pieces cut from the end of the neck billet to achieve the required depth. The sides are then glued into the heel block using a simple rebate and butt joint. Clamping this joint is difficult, so it is



The sides should fit snugly into the mould

worth investing some time in making a jig with angled blocks to hold the whole assemblage in place while the glue cures.

The front of the mandolin should be made from finely grained spruce or cedar, butt jointed at the centre in a lace and wedge jig. You know you are somewhere near to the required thickness when you can see sunlight through the spruce. The soundhole can be made round or oval, or, if



preferred, f-holes can be cut to the left and right of the centre line. I have chosen a round soundhole because the channel to take the simple rosette can easily be cut using a lightweight router with a trammelling base. The rosette itself can be made from strips of purfling, bent around the

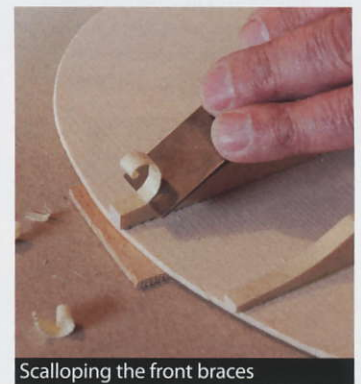


A mini router with trammelling base is handy to cut out the rosette channel

hot iron and tapped into place with a rubber-headed hammer after the channel has been lined with Titebond aliphatic adhesive. Once the Titebond has cured, the whole front should



be cleaned up with 320-grit garnet, and any imperfections in the rosette filled with Pacer green superglue. This will enhance the colour and make for a smooth surface when



Scalloping the front braces

SUPPLIERS OF MANDOLIN-MAKING MATERIALS

Touchstone Tonewoods Ltd
44 Albert Road North
Reigate, Surrey. RH29EZ.
www.touchstonetonewoods.co.uk

Stewart-MacDonald
Box 900, Athens, Ohio
45701 USA
www.stewmac.com

Luthiers Supplies
The Hall, Horebeech Lane,
Horam, Near Heathfield,
East Sussex. TN210HR.
www.luthiersupplies.co.uk

Plans may be obtained from
www.encoremusic.com or from
Luthiers Supplies above.

Selected Reading

There seem to be few comprehensive guides to making a flatback mandolin, but I have used the following: *The Making Of Stringed Instruments* – Buchanan – Batsford, 1989. It has a well-illustrated chapter on making a mandolin and a mandola.

the finish is applied. Once the front has been thickened to around 2 mm, the cross braces can be fitted and then scalloped and gabled, both for elegance and for an even sound distribution.

When the glue has firmly set, the sides and neck assembly can be



removed and the top placed into the mould face down. The sides and neck are then reintroduced into the mould, and the neck is screwed into place from the underside. The screw holes will later be invisible, as they will be covered by the fingerboard. The top of the instrument is held in place with kerfed linings or with 'tentellones' – small triangles of spruce glued into place with Titebond. Once the tentellones are secure, the kerfed linings can be put into place to hold the back. Clothes pegs can be used



for this operation, but small spring clamps bought in Poundland also do a very good job. These linings are best left for 24 hours before the back is fitted, because they take a good deal of pressure while the back is held in place.

The back itself can be made from two bookmarked pieces of rosewood, maple or walnut, or any suitable hardwood. For a striking appearance,

several contrasting woods may be used, with decorative inlays between them. The lace and wedge jig holds everything together while the glue cures. If just two pieces of timber are used, the centre join should be strengthened with a cross banding of spruce; alternatively, if several pieces



Masking tape pulled tight holds the bindings firmly in place

are laminated, a sheet of veneer such as beech or walnut should be glued to the inside, with the grain running at 90° to the laminations to ensure stability and to avoid splits later on. Once braced, the back will be very strong and can be held in place over the linings with cam clamps.

At last the mandolin can be taken from the mould and its three-dimensional form can be appreciated. The overlapping edges of both the back and front must now be removed; this is best done with a router and laminate trimmer. Alternatively, the edges can be removed with a file or chiselled away. If chiselling, take great care, because any grooves accidentally cut in to the sides will be very difficult to remove later.

To seal the edges and to protect them from everyday wear and tear, bindings must be put into place. These are made from hardwood strips (eg ebony, maple, rosewood or box) and are around 5 mm wide and 2 mm thick. A channel must be routed into the edges of the mandolin to accept the bindings, which are bent on the hot iron and held in place with a spring clamp at the heel and with masking tape or strong elastic bands while the glue cures. Additional decoration (purflings) may be introduced to the inside edges of the bindings and can be made from the same material as the rosette, such as thin strips of black and white maple.

Before the fingerboard is fitted it should have the fret slots partially cut. This is best done with a good-quality dovetail saw with almost no set. Mandolin fret wire should be used (one coil will do several instruments – see the list of suppliers at the end of the article), and before working on the real thing a few practice attempts should be made. The most difficult task is to get the frets absolutely parallel, so I use a small wooden try square that I have made for the purpose. It guides the



saw blade without fear of taking the edge off any of the teeth. The slots are cut using the spacings on the plan (accuracy is essential, otherwise true tuning will be impossible) while the sides of the fingerboard are still parallel. Once they are cut, the fingerboard can be tapered and fitted to the neck (glued in place around 5 mm below the lower edge of the headstock veneer to allow for the bone nut) and the frets tapped in. A word of caution here – do not



be tempted to fit the frets to the fingerboard before gluing it to the neck; it might seem a good idea but you will find that as the frets are fitted to the fingerboard unsupported by the neck, it will curve with the frets outermost, each slightly expanding the groove into which it has been tapped. When the fingerboard is in place, the slots can be cut to full



depth and the frets fitted. They should then be dressed with a whetstone to ensure they are flat and recrowned with fine wet and dry. This will ensure that the strings do not buzz while playing. The next task is to make a small bridge, normally from the same material as the fingerboard, with a slight curve on its underside to meet the subtle arch in the top. Good

contact at this point is essential, otherwise the sound will be impaired. A nickel silver tailpiece is fitted to the lower end of the mandolin; it holds the ends of the strings firmly in place and is also designed to prevent them buzzing against the body of the instrument. It is possible to make one of these tailpieces, but considering the reasonable price, this is an item worth buying.

The machine heads come next; they are fitted into holes drilled into the headstock. As there are eight strings, getting the holes to line up exactly can be quite tricky, so a hardwood or steel jig pre-cut to requirement helps a great deal. Many players will say that cheap machine heads are simply not worth the trouble, as constant retuning is needed. I fully agree and recommend fitting a good set such as those made by Grover. They are not cheap but they look good and will keep the instrument in tune for long periods. To set the instrument



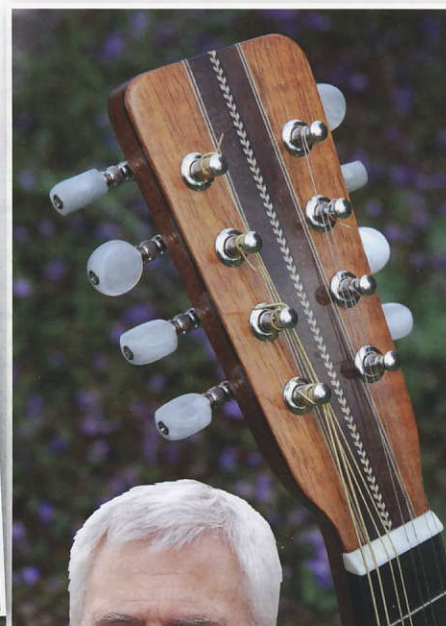
up, a bone nut must be made to support the strings at the headstock end of the fingerboard. This bone will typically be around 5 mm wide and 6–7 mm deep. The string slots must be rounded off on the back edge to create a snug fit for the strings.

To finish the mandolin, oil, varnish, lacquer or French polish can be used. I find that for this type of instrument, Rustin's Plastic Coating produces a really durable finish that brings out the colour and grain of the wood beautifully. Rather than leaving the instrument with the garish appearance of a freshly made toffee apple, I would recommend a final rub-down with rottenstone powder mixed with linseed oil. This produces a magical, deep shine that gives the instrument an added sophistication. If finishing oil is used, the last coat should be applied with 0000 steel wool or fine wet and dry.

Shaun Newman



The headstock and heel layout in poplar



A finished mandolin – this back is of koa and rosewood

SUPPLIERS OF MANDOLIN-MAKING MATERIALS

Touchstone Tonewoods Ltd
44 Albert Road North
Reigate, Surrey. RH29EZ.
www.touchstonetonewoods.co.uk

Stewart-MacDonald
Box 900, Athens, Ohio
45701 USA
www.stewmac.com

Luthiers Supplies
The Hall, Horebeech Lane,
Horam, Near Heathfield,
East Sussex. TN210HR.
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