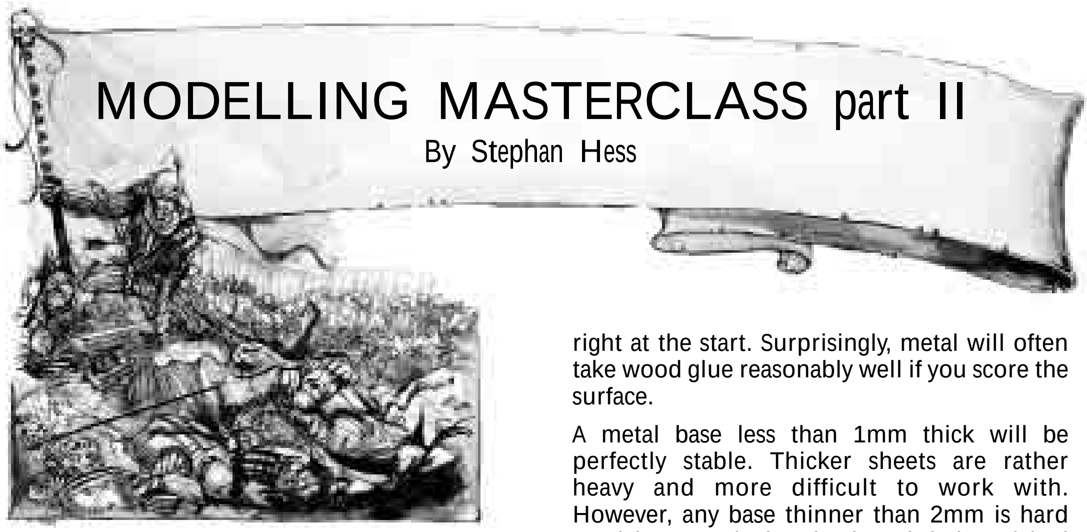
MODELLING MASTERCLASS part II

By Stephan Hess



Foundations

If you followed last issue's article you are now well on your way to becoming the proud owner of a new wargames table. Before we start filling it with terrain we'll take a look at the bases or modules for the terrain itself. OT (Ordinary Terrain) style terrain pieces will need their own integral base whilst MT (Modular Terrain) will require a base for the module itself which I call the module body.

BASING SCENERY FOR O.T.

Bases make terrain easier to handle and stop it falling over. This is especially important for trees and card buildings which might otherwise be knocked over or displaced during play. In the case of woods and similar features the base conveniently demarcates the area covered by the entire wood/feature. This also allows us to use relatively few tree models thereby permitting practical movement of models within the wooded area.

Larger bases are needed for multiple or complex terrain features; a river running through a wood for example. In the case of villages I prefer to group several buildings onto a single base. This makes it possible to add streets, fences, a well and whatever else you fancy and turn the makeshift assembly of buildings into something more interesting.

It is highly recommended that you stick with one style and one kind of material for all your bases. Even where terrain pieces don't really need a base it looks better if all terrain pieces are based in the same way. The thinner the base the less obtrusive it will appear. I prefer such a base not to be thicker than 5mm, 3 to 4mm being the best compromise between appearance and ease of handling.

Metal sheet. Most thin wood or card gets rather wobbly, but a sheet of metal retains its stiffness in really thin sheets. Admittedly metal is harder to work than card or wood. Some metal sheets are supplied with a coating of grease to prevent the metal from oxidising. Make sure you wash off any residue of this kind right at the start. Surprisingly, metal will often take wood glue reasonably well if you score the surface.

A metal base less than 1mm thick will be perfectly stable. Thicker sheets are rather heavy and more difficult to work with. However, any base thinner than 2mm is hard to pick up, and often leads to it being picked up by a delicate feature instead of the base itself. This can damage the model and the whole thing will come apart if handled carelessly.

Cardboard. It is possible to glue multiple layers of thin card together to get a thicker base and for stability. This adds another step to the building process and does not cure the major drawback of warpage. Corrugated cardboard is preferable to ordinary cardboard, but is still liable to warp and can be bent, creased and nicked more easily than other materials. You will need to use an all purpose filler to get closed and smooth edges because of the corrugations.

Plastics. These come in many quite different forms. The soft expanded foams will easily snap if used in thin sections of 5mm or less. They also tend to bend under the weight of all but the lightest terrain features. An exception is 'architectural foam' or foam-board as it is often called. This is a layer of soft foams sandwiched between layers of cardboard top and bottom. This material is good for most purposes and can be obtained from some hobby or art stores specialising in architect's materials.

Poly Vinyl Chloride (PVC) & Polystyrene (PS). These are the most widely accessible types of hard plastic. Polystyrene is available in hobby shops while PVC can be found in DIYs. 'Hard-PVC' is most suitable. It can be worked using wood or metal cutting tools. PVC can be glued to PVC with contact glues. It can be bonded to other materials with super-glue or two-part epoxy. After roughening it will hold wood glue well enough. Polystyrene is very widely used and is familiar in the form of model kits. It can be worked with ordinary tools. With power tools you will need to use high revolutions and slow stepping speeds. Polystyrene can be glued using 'plastic glues' or polystyrene cement, or by means of solvents. It will take wood glue well enough but it is best to score the surface first.

Acrylic glass. There are two qualities; cast

(GS) and extruded (XT). Cast is more expensive, but is easier to work with and will not splinter so readily when cut, milled or drilled. It is not a natural choice for bases because of the cost, but for a display table or if you have different basic terrain (i.e. sand as well as grass) it might be worth it. Acrylic glass is available in some hobby stores or architect's shops. It can be worked using ordinary tools, but tools designed for treating metal are recommended. Solvents like Dichlormethan will bond it very well and without a seam, either to another piece of acrylic glass or other soluble plastics like polystyrene. Use contact glue and silicone to glue it to other materials.

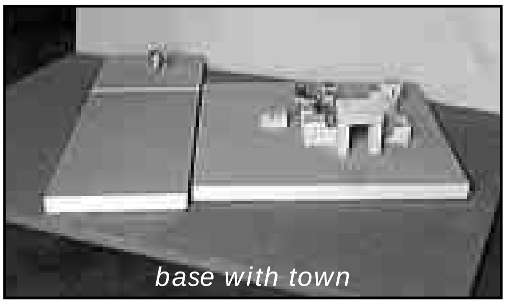
Wood. The most suitable is plywood, HDF (High Density Fibreboard) and hardboard which can be used as thin as 3 mm. Hardboard is despite its name rather soft and edges get damaged easily even under normal handling conditions. For bases this is not too much of a problem as most bases will not have vulnerable pointed corners. Plywood is the wood that will warp most easily and is the most expensive. HDF is first choice because it is well suited to the task and it is not expensive.

Making your Bases

In my view irregular shaped bases look better because they naturally distract the eye from the edge itself. Regular shapes can be chosen to underline the nature of a terrain piece or when more than one terrain piece will be arranged touching each other. If you base your buildings on rectangular bases you can place them next to each other to create the impression of a larger town.

Naturally the base will be need to be bigger than the feature that stands on it. By placing the terrain features close to the edge, within 5mm say, the surrounding edge will tend to look like an integral part of the feature. On the otherhand it is sometimes a good idea to leave a space large enough to place an infantry stand along the edge – allow 22mm for possible overhang which allows you to deploy within a wood without the trees getting in the way.

When the bases are not meant to fit against one another, chamfered edges will give a more professional look and minimise the apparent thickness of the base. An angle of 45 degrees is fine. Flatter angles might look better but anything less than 30 degrees and the edges will break too easily.


base with town

A scroll saw is ideal for cutting bases. Scroll saws are the power version of fretsaws and are at home cutting any kind of shape.

MAKING THE BODY FOR MODULAR TERRAIN

Modular terrain consists of individual modules that can be arranged in as many ways as possible. To ensure flexibility without chaos I begin with a grid – the smallest division of a grid being a single square or cell. Each module is designed to fit exactly into a single cell or into a pattern of adjacent cells.

The narrower the grid and therefore the cell size the more varied and intricate the scenery and the more modules you'll need to fill the table. I find 25cm is about the minimum width that allows for a feature like a (wide) river or the slope of a hill. Consequently, choose a grid size of at least 25cm to produce a cell edge length (CEL) the desired distance. Keep in mind that choosing too wide a grid will reduce the flexibility of the system.

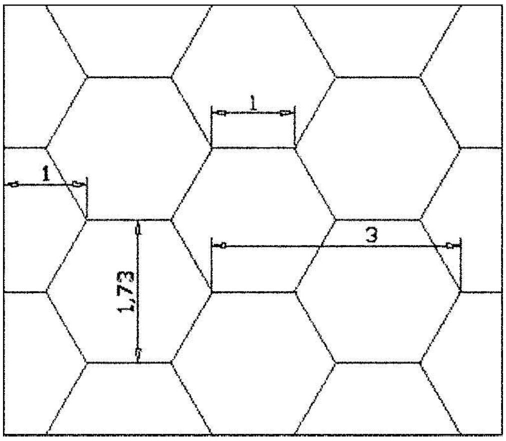
You can also design modules that spread over more than one cell – which gives you the best of both worlds. In practice a CEL of between 25 and 40cm has proven the most practical. The exact size depends on the size of the gaming table.

It is perfectly possibly to design a modular system based around hexagons, but I find squares work much better on the whole. The best reason to choose a hexagonal grid is that you can rotate a module in six instead of four steps, and of course we wargamers all love hexes. I have built a table with hex modules and got rid of it because the gain is very small for the increased complexity.

With both cell shape and size sorted, the next thing is do decide how deep you can dig into any module. A good dig-in-depth (DID) for Warmaster is 3 to 5cm. So you can have gorges, rivers and gullies up to five times the height of a Warmaster miniature. A depth greater than 5cm is of no great use in this scale except for very specialist terrain pieces and for those we can find a different solution. This ability to dig in to the terrain is one of the advantages of modular terrain. To make the models you will need dense insulation foam as thick as the DID, so check first what's available at your favourite DIY.

Cell shape, size and edge length will naturally define a set of standard modules. For hex cell modules you will also need half cell modules to match the table edges.

For square cells we only actually need one design of module, but as the time needed to make a module body varies little irrespective of its size it is a good idea to include double and



Mapping out your hexagon modules

quadruple sizes too as this makes them quicker to build. To begin I suggest this rule of thumb:- about eight cells should be covered by single cell modules, about half of the remaining cells should be covered by double cell modules, and the other half by quadruple cell modules. About 50% of all cells covered by the modules should be 'open ground' and the open ground cells should be spread evenly over the three standard types.

Making the module bodies

As all module bodies are made in the same way I'll only describe how to make those for the standard type.

DIY stores will cut the wooden sheets to size for you but only in rectangular shapes. So if you do square cells, you can leave the shop with ready-made module bodies. For the table described in last issue you would need to buy 9 sheets of 30 x 30cm, 7 sheets of 30 x 60cm and 3 sheets of 60 x 60cm.

For hex cells it is not that easy. For single cell modules get sheets cut to a length of twice the CEL and a width of 1.73 times CEL. Mark the centre of both smaller sides. Mark the quarters of both wider sides. Draw lines from the centre to both adjacent quarter marks and cut along.

For half-cell hexes get the sheets cut to CEL and a width of 1.73 times the cell edge length. Mark the centre of one of the wider sides. Mark the centres of both smaller sides. Draw lines from the wide side centre mark to both other centre marks and cut along. For the other half cells get sheets cut to a length of twice the cell edge length and a width of 0.86 time the cell edge length. Mark the quarters of one wider side. Draw a line from each of the marks to the closer of the opposite corners and cut along. Did I mention that hex modules are more complex than rectangular modules?

Foam of the kind with a foam core is best for making module bodies. The standard expanded polystyrene foam used for packaging is the least suitable material. Dense insulation foam is the way to go. It comes in different kinds, colours and thicknesses. Try to stay with one type as this will ensure a consistent depth and appearance.

You can either make the module bodies from foam alone or from a foam core within a frame. I've built both types and those with wooden frames are now seven years old and don't show any wear other than dust. On my Warmaster table I decided to dispense with the frame and now after one and a half years the corners are chipped and some edges have broken although I must admit that I'm not the most loving kind when it comes to terrain though.

Frameless Bodies. For those who are perhaps more easy going on their terrain that I am, we'll deal with the frameless version first. DIY stores won't usually cut foam so you will have to do it yourself. A large circular saw is useful. Few table saws provide a sufficiently deep cut and most struggle with pieces of 5cm

CEL Size

To find the optimum CEL size for your table divide the width once by 25cm and once by 40cm and note the results. The results indicate the range of cells that will fit the table width. For all possible cell numbers we calculate the cell width (rounding down to the nearest cm). Now divide the table depth by the cell width and see how close you get to an integer result. 30cm would be the perfect cell size resulting in a grid of 5 x 7 cells. If you're not satisfied with any result reverse the role of width and depth and try again. Like so often in life this reads more complicated than it is.

Hexagons are more complex so I will be brief – you will find further explanation on my web site (www.brumbaer.de). Remember with hex cells you can never fill a rectangular table completely. To do so special edge cells of at least two types are needed and so you will have to make some special modules for the sole purpose of using a rectangular table efficiently. To make everything as simple as possible the hex cells should fit in the way shown over.

Divide the table width once by 75cm and once by 120cm and note the results. The results indicate the range of double cells that will fit the table width. For all possible double cell numbers we calculate the CEL. If we go for 5 rows we will get a CEL of 24 cm. Note that the orientation for hex cells is important and the cells will only fit on the table if properly oriented. Note that any feature running from one module to another must not be wider than 24 cm in this example. Like so often in life this sounds as complicated as it is.

thickness. With a circular saw it is difficult to get cuts that are accurate, especially after changing the settings of guides and rulers, so it is a good idea to cut some spare or scrap material first until you are satisfied the saw is set-up to cut the exact length you want.

An alternative method to make wooden templates for the standard module sizes. Then put them on the foam and cut along with a long bladed knife or saw (thermos saws/polystyrene cutters are good for that). This works reasonably well so long as you are careful to maintain a right angle: the thicker the template the more guidance it provides.

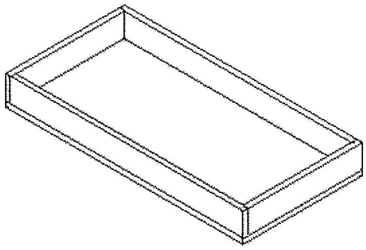
Framed bodies. To make a framed body you will need to construct a foam core with a wooden frame. This makes the module extremely robust and you can increase this even more by adding a wooden bottom piece so the foam is supported all around. A bottom piece will also help to align the frame sides. If you use sturdy battens for the frame this is not such an advantage, but if you use thin sheets for the sides I recommend adding a bottom sheet as well. There are different ways to build the frame, but to save space I'll concentrate on the method I find fastest. You could try using hard plastic sheets instead of wood but as you will need to glue the plastic this is likely to melt the foam so experiment beforehand if you want to pursue this option.

I prefer to use sheets of 5mm HDF for the frame and bottom. This is the minimum thickness I'd recommend. If you can't get HDF use plywood or hardboard whichever you prefer. Hardboard however, is a poor third choice as far as I'm concerned because the edges get damaged so easily.

The bottom sheet must be cut to the module's dimensions. On a module intended to lie at ground level on all edges (e.g. a stretch of plain grassland) the sides will need to be the same height as the foam core. Before you build your first module measure the foam you intend to use. It might be specified as 4cm deep but it may well be slightly thinner or deeper and it is best to check before committing yourself. This will determine the height of all ground level sides that you will ever build. If the foam is thinner than specified use the specified thickness as you can raise the foam insert slightly in its frame, if it is thicker use the measured thickness as your nominal ground height.

To start with we'll look at making standard modules as quickly and efficiently as possible. More complicated shapes are built using the same methods but need a bit more thought. For the sake of clarity we'll only concern ourselves with module bodies that have edges aligned to ground level, more complicated matters can be left for later. Similarly we'll start with modules based on square cells.

Because the saw cuts sheets at a 90 degree angle and the corners have to be at 90 degree angles we can join the pieces together using simple butt joints – there is no need to mitre the joints. Thus we need only two sizes of edge piece for all our standard modules. Both will have the same nominal ground height and the length of one is CEL minus sheet thickness and the other is twice the CEL minus sheet thickness.



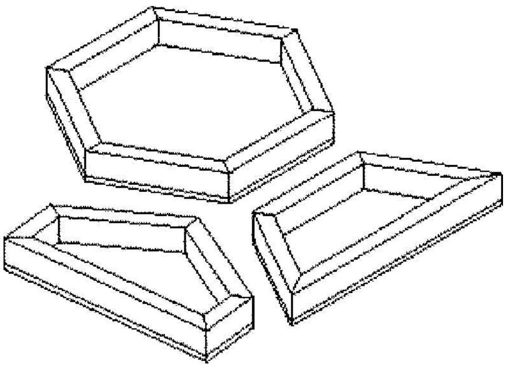
Standard framed module

Get yourself some sheets 30cm by the specified length. This will mean three sides are already cut to the correct dimensions. All you need to do then is use a circular saw to cut off strips in the required width (the nominal ground height). You can use any other saw but a circular saw is quickest. Remember to check that the saw is set-up to give the correct size by cutting a spare piece first. If you don't have the means to saw strips accurately it is better to use thicker wooden battens for the sides instead (see below). As you will need plenty cut some extra when you're at it.

With hex cell based modules mitre joints must be used. For a cell sized module each side piece needs to be as long as a cell edge and will require a 30 degree mitre joint at the vertical edges. You will need to make two different half hex types. For one you will need two standard sides, two sides of half length with one 30 degree mitre joint and one 90 degree joint, and one side 1.73 times the standard length width minus twice the sheet thickness – this with blunt edges. Of course you can use mitre

All the tools for the job...

joints entirely here as well. In this case the long piece is the full 1.73 and the half sides get one 30 degree and one 45 degree mitre joint. The other half-hex types will require one standard side, two sides of the same length with a 30 and 60 degree mitre joint and a long side the same length as the outer diameter width of the hexagon – this will need two 60 degree mitre joints. Have the sheet cut to about 30cm by a bit more than the required side length (depending on your tools between 1 and 5cm to allow for cutting round). If you haven't already guessed as much, square cell based modules are the easier to make.



Hexagon module frames

Before assembling the frame it is a good idea to make a wooden former to hold it in place as this will save time later. We will obviously need a different former for each of the standard modules that we intend to build. The former has exactly the same footprint as the module body's bottom sheet with every edge inset by the width of the sheet. To help support the sides during assembly it is helpful if the former is quite tall – ideally the same height as the side pieces themselves.

Take the former and arrange the side pieces around it adding a bit of glue to the side pieces where they join. Fasten with a band clamp. Put the bottom piece on top of the assembly and use a staple gun to fasten it to the sides. You can add some glue for good measure but it is not necessary. When the bottom is fastened remove the band clamp and, if you have used butt joints, use the staple gun to lock the connecting sides firmly in place. And don't forget to remove the former before the glue starts to dry!

It is possible to use a hammer and tacks to join the frame rather than use the staple gun, but it is much slower, not as much fun and more dangerous for your thumb. It is also possible to use glue alone, but you will have to wait until the glue is dry before you can go on and that is rather slow.

Next put the former on the foam and, using it as a template, cut out along the edge to create your foam core. Put some wood glue on the bottom of the core and insert it into the frame. Do not take too much glue as it will take a long time to dry. You might think it possible to cut the core first and use it as the former to hold the frame as it is assembled. However, bear in mind it is difficult to cut the foam exactly (even using a circular or a thermo saw/polystyrene cutter) and that the foam is soft and will give under the strain of the band clamp.

When the core is inserted in the frame you might find there is a gap between frame and core (it happens). Use suitable filler to cover it. There is a type of filler especially designed for foam but it is not needed. I recommended any ready made filler.

With a bit of practice you can make a square module body as described here in less than 10 minutes no matter whether it is a single cell or four cell module.

If you make modules using shapes that are not standard rectangles or hexes you will have to consider two additional points. The first is that you will have to make a stencil so that the band clamp will work and secondly the standard sides you created earlier will not be sufficient and some additional side pieces with new dimensions will have to be cut.

If you do not have a circular saw it is simpler for you to use wooden battens to make the sides of the frame. The main point is to buy wood of a dimension that will give you the correct height for the module straight-away. In practice it is just like using thick sheets. If you can't get battens that give exactly the desired height get some that are slightly smaller and sand the foam down where it touches the frame. Alternatively buy them slightly higher and set the foam core higher in the frame to compensate. Glue the side pieces together with the aid of the former. There is no need for a bottom piece – the module will be plenty sturdy enough because of the thick frame. When the frame is dry put it on a flat surface. Take the foam core and sparingly apply glue to its sides before inserting in the frame. Press the foam down so that it is flush with the top of the frame and let it dry.

So far we have only dealt with modules intended to reach uniform ground level at every edge. Some modules will need edges that rise above or fall below this level. The most obvious examples are hills and rivers. We expect any river crossing a module edge to fit at any other river edge of another module. This can only happen if the river crosses the module edge in the exact centre of a cell. The riverbed has to have the same shape on both sides of the centre line. What the river looks like on the module doesn't matter, it can turn to a lake or a rivulet but where it runs to an edge the river must have the standard shape and size.

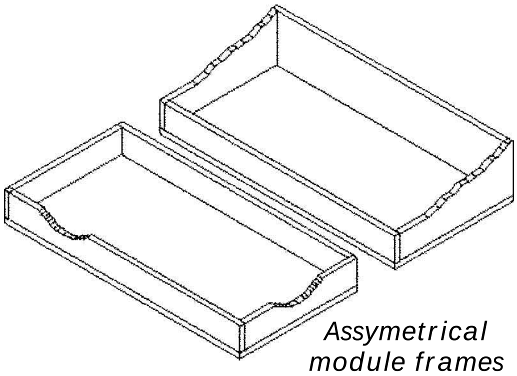
The best way to do this is make a standard river template. Take a standard single cell sized side piece that you have already prepared and cut out a shape that corresponds to the desired profile of the river bed. This must be absolutely symmetrical so either use a computer to create an outline pattern or draw one half on a piece of folded paper and cut out the shape to make a pattern. Use the pattern to copy the river bed profile onto your template. Be careful to mark out the exact centre of the template first. Note that if you are making your frames with butted edges the centre of the frame piece will be off-set by the sheet thickness, so your template will also need a profile that is off-set by the thickness of the material. Even so, you will still only need one river template for any size edge because just by flipping it over you can accommodate a length that butts at either end.

Make sure your river template is carefully labelled so that you don't accidentally mix it up with pieces you cut from it. To use it place it over any standard side piece and draw a pen along the river bed. Because of the thickness of the pen the outline will be smaller than the templates cut, but that is no problem, because all sides will still be the same.

For roads (except high ways in the literal sense) you will not have to change the sides but you must still bear in mind that all roads have to have the same width and must always be symmetrical to the cell centre point so that they join up. Of course this means that you will never have a river and a road that cross the same cell edge – though this is no problem as you can construct crossings on the modules themselves.

Asymmetrically features such as slopes are more awkward. Modules can only connect where the slope runs at exactly the same angle and distance. Because of this the feature does not have to be centred across the corresponding cell edge but it is necessary to plan out how the pieces will connect relative to each other. Wherever you place the slopes, if you are using butted joints you will still have to off-set the slope on the frame edge piece relative to its centre depending on which way it butts to its neighbour.

Models that incorporate slopes often have edges that are higher than ordinary ground level and you will find it useful to have additional formers of the required height. If you don't have a former of the required height it is a good idea to have plenty of spare packing material at hand to level it up so you can fix the bottom piece in place.



Assymetrical module frames

If you use battens for your frame you can cut into them to provide the appropriate profile in the same way as for thinner material – though it's harder work. For features that rise above ground level it is not worth attempting to raise the batten – though this is possible it is hard work. Instead it is easier to model the terrain feature over the top of the frame edge. This makes a less robust edge and is less exact as the sides would otherwise act as but it saves a lot of work.

Regardless of the exact type of module I find it a nice touch to put some self-adhesive felt pads (available in DIYs) on the bottom of the module body. This isn't strictly necessary but it's recommended, as the modules will sit nicely onto the table without damaging either table or the module itself.

And that's it for this issue. Next issue we'll start with real terrain. Have fun but please take care when using any of the tools described in this article.

Finished modules featuring a river and slope.