Introduction

Compared to free-standing furniture, built-in furniture presents a unique set of problems that need to be addressed at the planning stage. They have to fit into the space allocated, and they have to fit neatly into a space with walls that aren't straight and floors that aren't level. I've yet to find one room in 35 years that didn't have wonky walls and floors. Sometimes you have to level the floor or straighten the walls but usually the solution is just to make the cabinets level and plumb and then hide all the sloping bits behind a decorative fascia or face-frame.

Historically, built-ins were created by fixing a lightweight frame-work to the wall, with the walls of the alcoves forming the back and sides of the cupboard. This was labour intensive and the interiors were always a bit of a mess.

Modern built in construction uses wide panels of manufactured board screwed together to form a box or carcase; this is then installed into the alcove. The practical advantages of this form of construction outweigh the increased cost of materials; speed, ease, neatness and a wide range of decorative options are just a few of the benefits.

During this week's course, we will be using these modern techniques to make a wardrobe and a bookcase; two common forms that can be adapted to suit a range of situations and styles.

Measuring Your Space

We're going to assume that your cabinet is going to be installed in an alcove; this immediately puts constraints on the width and height of your unit. The depth will depend on what you intend to store in it. Bookcases are rarely much deeper than your biggest book, and wardrobes are at least 600mm deep so that your clothes can hang without rubbing against the doors.

Tempting as it is to try to maximise the internal space in your cabinet by making the carcase the same size as the alcove, don't. You need to take into account the fact that your walls aren't going to be dead straight, the floors anything but level and you need to consider the height of your ceiling. If you build your carcase to the maximum dimensions available you won't be able to get the damn thing in. It'll catch somewhere, get stuck and you'll force the whole box out of square. If you've learned nothing else from your previous classes, you know that square is what we want at all times; unintentional weird angles set the scene for endless frustration and nothing fitting as it should; doors and drawers become a trial by fire to hang neatly with an even gap.

The way to avoid all this drama is to give you and your cabinet some breathing room. Try to allow a gap of at least 50mm in the width and height between the wall and your carcase. More often than not you might need to leave a bit more room, so that the decorative trim or face frames look even on both sides.

Where To Start

Measure the width of your alcove at the top, middle and bottom; measure the height from the floor to the ceiling or to the underside of one of the room's architectural features, such as the picture rail; measure the front to back depth of your alcove again in several different spots, so you can see how the wall undulates in and out. Make a note of where electrical outlets are and other services like radiators are in the vicinity; you may need to move them or incorporate them into your design.



Dan McClark showing us how it's done.

A large square such as a roofing square will also help you determine to what extent your alcoves aren't square to the back wall; sometimes they are wider at the back than they are at the front, vice versa or a baffling mix of the two. Whatever the

situation, blame it on the plasterer; they don't know the meaning of flat, square or straight but that's how they roll. Make sure the size of your carcase doesn't end up wedged into one of these odd angles by leaving a bit of space. Now you see where that 50mm allowance comes in, don't you?

If you live in an old house, with high ceilings, then the chances are that you have a picture rail about 600mm down from the ceiling. The height of your cabinets with either coincide with this rail or the architraves around your room door. Modern rooms tend to be devoid of mouldings so line the top of units up with one of the other architectural features in the room, like the top of a window.

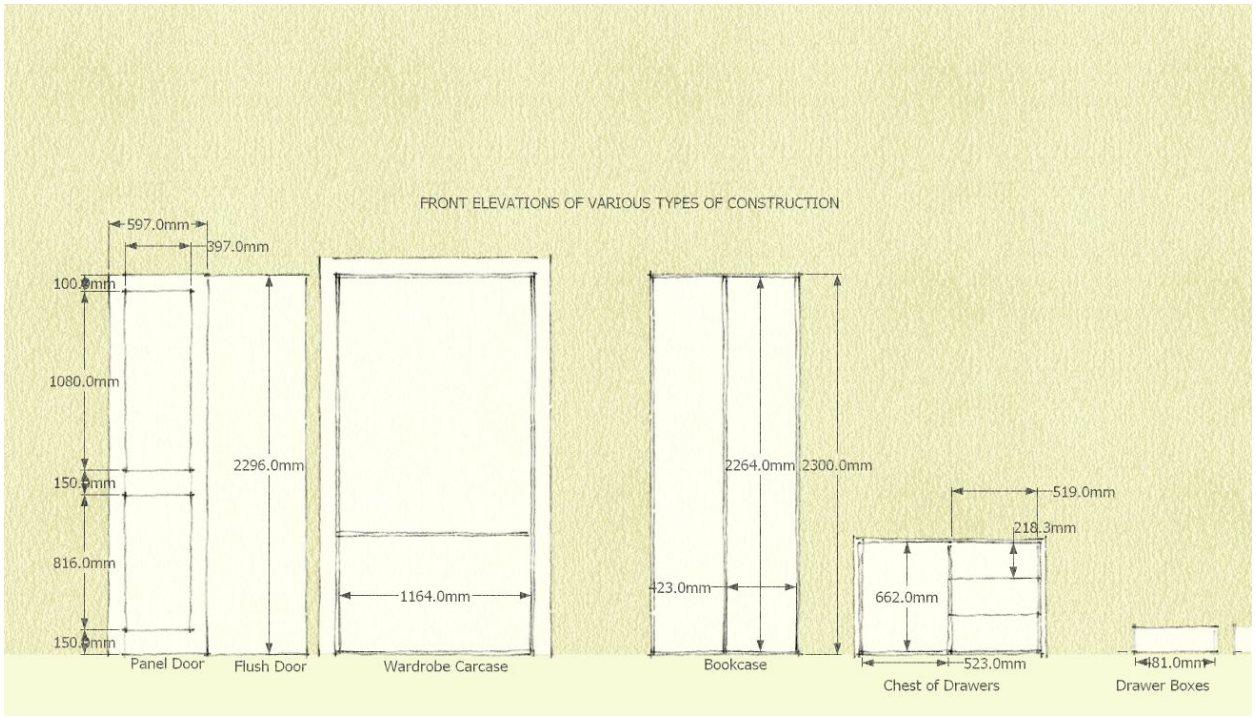
Low ceiling heights usually call for the carcase to go all the way to the ceiling; don't forget you still need at least 50mm clearance. You'll need this to get your cabinet into a standing position; if you don't leave enough room it'll get caught on the way up and you'll damage either your cabinet, the ceiling, or both.

Drawings

Armed with your site measurements you can now settle down to make the design drawings.

It's up to you whether you use a CAD package or good old pencil and paper. The internal details will show where things such as shelves, hanging rails and dividers go. The external details need to express the style of the piece; does it complement the existing architecture of the room or does it contrast? Those are your choices, but remember you are going to have to live with it for a long time, so take the time to settle on a style and design you believe in.

These drawings don't need to be masterpieces, but they do need to show a clear idea of what you're making and most importantly they should have accurate dimensions of each piece.



Front elevation and plan views with dimensions

Cutting List

Your completed drawing forms the basis of everything you do from now on. It is also the source material for your cutting list. A cutting list is simply a list of all the parts that go into your project.
It probably goes without saying that this should be as accurate as possible, to avoid making costly mistakes; check it and then check it again.

Example cutting list

DIY or Get Some Help

Now you have to decide on how much involvement you want with the cutting and preparation of the boards.

The Easy Route

Take your cutting list off to your local timber merchant; the good ones will cut your boards to size and even deliver them to your door. They usually charge you the cost of the board plus a fee per cut. Alternatively, there are a few online merchants who will cut to size and deliver. The bonus here is that you don't have to work out how many boards to buy, they'll do that for you.

The Harder Route

Cutting the boards yourself needs you to have access to a dimension saw or vertical panel saw, or if you really want to work hard, a portable track saw system such as the Festool TS RBQ plus. You will have to work out how many boards you need; don't forget to allow for the thickness of the saw blade.

Side Note

The standard size for UK sheet material is 2440mm x 1220mm (8' by 4' in old money). Larger sheets are available but you aren't going to want to cut these yourself because they are really heavy.

Materials

You now have many options with the materials are going to make up your carcase, internal fixtures, doors, and trim.

Carcase/Drawers

MDF -(Medium Density Fiberboard) available in a number of versions including: plain, water resistant, melamine coated, coloured, and veneered.

Birch plywood - smooth,pale coloured timber with distinctive contrasting stripes on the edges.

Egger - chipboard with a textured melamine facing; edges usually finished off with an applied plastic strip, available in matching colours.

Doors, False Drawer Fronts and Face-Frames

Painted

MDF - edges are porous and need to be sealed so they don't absorb too much paint; moisture resistant versions work better in this instance and are more dense. While you can brush on paint for a hand finished look, spray finishing makes the best use of MDF's smooth flat surfaces.

Tulipwood - smooth grained hardwood, that machines well and accepts a painted finish; used in high-end, hand-painted kitchens and bedroom furniture.

Clear Finished

Veneered MDF - comes in a wide range of pre-veneered sheets; edges need to be covered with either solid timber strips or a veneer; suitable for spray finishing or a hand brushed finish.

Coloured MDF - comes in a range of solid colours under trade names such as Valchromat.

Birch plywood - looks good under a sprayed clear lacquer or hand applied, acrylic varnish.

Solid timber - You can make your doors out of any hardwood or softwood that takes your fancy; choose one that suits your colour scheme and your budget. The finish should be based on the hue of your timber, and your level of expertise with that particular method. Finishing is a whole separate sub-area of woodworking which we cover in our Basic Skills - Finishing class.

Hardware

Hinges - the concealed kitchen cupboard type (BLUM) work best with sheet materials like MDF and plywood; if you are using solid timber you have the option to use traditional butt hinges over the concealed type. Unless you are using very long screws, avoid fitting butt hinges to MDF; the screws will work loose over time.

Drawer runners - full extension runners are easy to fit and take a lot of weight; available in soft close and self closing versions; tandem runners give a neater less industrial finish.

Hanging rails - available in chrome, brass and solid timber

Handles - choose what suits the mood of your room, or ignore them all together and recess a finger grip into the door or drawer front.

Screws - choose the best screws you can afford; those by **Reisser or Spax** are excellent.

Links to Hardware Catalogues

Sugatsune
Hettitch
Blum
Hafele
Screwfix

Tools

Fitted furniture construction relies on power tools and plenty; not just for the making but also the install.

Spirit level or even better a laser level
Combination square
Large square or roofing square
Cordless drill/driver
Jigsaw
Electric planer
Electric Mitre/chop saw or hand powered mitre box.
Vacuum/Extractor capable of dealing with fine dust - the filter in a domestic vacuum isn't up to the job.
Electric Router + router table
Biscuit jointer
Random orbit sander
35mm hinge cutter
Pocket hole jig

Putting It All Together

Once your materials are cut to size, you need to mark where all the connections are going for the corners, shelves and other structural elements. Professional makers use a mixture of biscuit/domino joints and screws to join the carcase together. Both biscuit jointers and the Festool Domino Jointer are dedicated tools which are designed to do a specific job, quickly and efficiently, which is to cut slots of a set length, width

and thickness to take an premade biscuit.In carcase construction, their main purpose is to act as locators to stop the parts moving about before the screws are inserted. It is possible to do some of these things with a router, but it is fiddly and requires you to have a good understanding of how to use the machine.

While you are setting out and cutting the positions of your carcase/drawers connections you can also mark and drill out the holes for your shelf pins, hanging rail brackets, drawer runners etc. The more you do while everything is still apart the better.

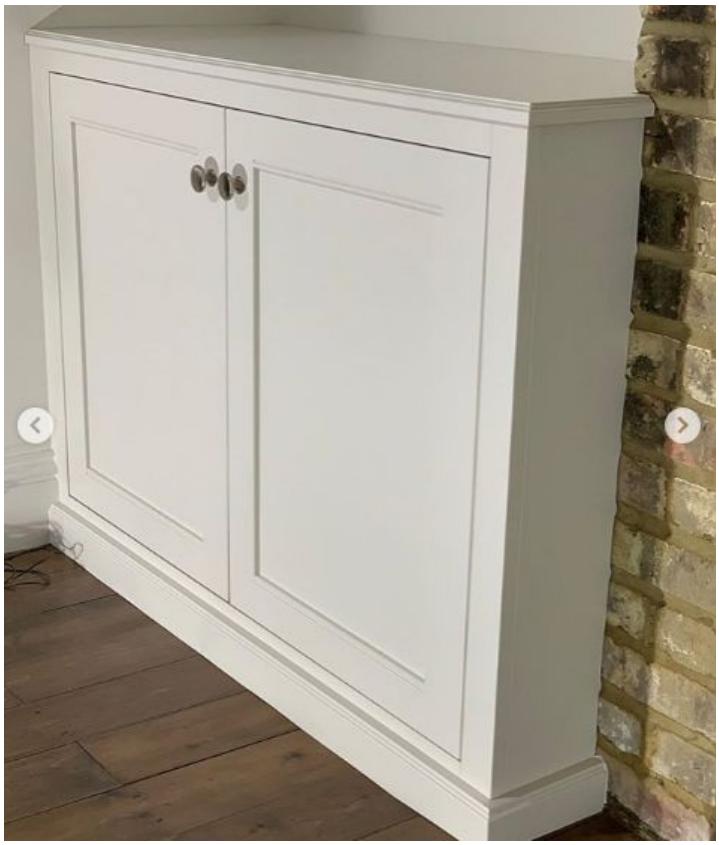
Professional fitters usually hand paint or spray the parts before they are installed; it is easier to get a good finish in a workshop rather than on site. It's up to you which method you choose, but a hand painted finish is easier to touch up if the work gets scratched or damaged at any point. A top notch painter can make a hand painted surface look as smooth as one that has been spray finished. Before you attempt to replicate this feat of fine decorating for yourself do check out the tips and good ideas over at www.traditionalpainter.com.

Finishing Off

Once you have you have your carcases in place the hard bit is making it all blend seamlessly into the space around it.

Face-frames and End Panels

All of those ugly gaps between the wall and the cabinet will be hidden behind the trim. Face frames are simply strips of wood or MDF that cover the edge of the cabinet and butt up to the wall. They can secured to the cabinet using biscuits, screws and glue; the outside edges are cut to closely match the shape of the adjacent wall, in a process called *scribing*.



Scribing is a process where your face frame or end panel is cut to match the shape of the wall it is going up against. That shape can be transferred on to the work using a compass, a scrap

of wood or an expensive scribing tool. Then that shape is cut using a jigsaw and refined with abrasive paper if necessary. Good scribing technique is what separates professional fitters from the general builder/diyer, who will usually rely on caulk to fill the gap.

Suppliers

Sheet materials

James Latham - http://www.lathamtimber.co.uk/
Richard Russell - http://richardrussell.co.uk/

Machining Services

If you don't want to go through the hassle of cutting up your own materials there are a few businesses that can do it all for you. They can also apply the edgings and some will CNC machine the doors for you.

C - Workshop - http://www.cworkshop.co.uk/
CSE Workshop - www.cseworkshop.com
The Timber Shop - www.buywood.co.uk/
DW General Wood Machinists-
https://dwgeneralwood.co.uk/our-services/

Spray Finishing Services

Flo-rite - http://www.flo-rite.co.uk/ Really nice people and conveniently located behind DW General Wood Machinists.

Painting Information

Traditional Painter - www.traditionalpainter.com

Inspiration

If you are looking for ideas for built-in designs you need look no further than our very own **Dan McClark** whose work you can see on Instagram.