Murdock Builder's Merchants




your step by step guide
to building your new home

Murdock Builder's Merchants (MBM) has developed since 1982 to become recognised as the leading building materials supplier; and one that has many years of experience helping Self-Builders realise their dreams.

MBM has an ever expanding network of merchants throughout Ireland and the UK - your local supplier. We pride ourselves in looking after you at all stages of your build from conception and planning, to landscape and completion.

Our successful growth has been built around our commitment to customer service. Our knowledgeable, professional and friendly staff will help you throughout your project. Our Sales Representatives can call at your convenience, help you plan your requirements, source special products and keep you on track with the building programme.

Contents

The construction of any building, large or small, is a complex undertaking and there are many pitfalls, for the novice and professional alike.

Having worked along with many one-off self-builders, it became apparent that they have differing degrees of Building/Construction knowledge, and therefore a guide to building a new home may be useful.

The aim of this booklet is to explain some of the things that should be taken into account when planning the construction work of your new home. It should be highlighted, however, that it is not intended to be a "block by block" explanation of how the dwelling will be constructed; as not every house is the same and each brief requires a different design solution. The main purpose is to give you a basic understanding of how your new dwelling will come together, and the different stages the building process takes.

Due to the complexity and specialised nature of the plumbing and electrical work it will only be briefly mentioned throughout. It is recommended that competent tradesmen undertake such work. No short cuts should be taken, as the consequences can be extremely dangerous or very expensive to correct.

It will become apparent as you read through this booklet, that the most important part of the project is to have it planned as well as possible. You should always be aware of the material and labour requirements for the next stage of work.

There are a number of other important items that should be addressed before work commences on site, these are as follows:

1 **Statutory Authorities:**
You should make contact with the statutory authorities (i.e. electrical, water, telephone and gas boards) to agree with their requirements and the cost of installation. Whilst working on site, a temporary supply of electricity and water will have to be organised. The timing of such connections should be agreed in advance with the authorities.

2. **Site Safety:**
Building sites are dangerous places. Most accidents can be avoided by taking a common sense approach, and by always ensuring that the site is kept as tidy as possible. Always work off stable platforms, never taking risks when working above ground level. Excavated foundations are extremely dangerous, and great care must be taken when this work is underway. If the sides of the foundations require support, you are advised to spend the time and money to ensure this is done. A first-aid box must be kept on site at all times.

3 Insurance:
It is a requirement by law to have insurance to cover workers, visitors, and illegal trespassers. It is also advisable to insure for loss or theft of tools and materials.

4 Book-Keeping:
This is something that should not be overlooked amid the enthusiasm to get started on the actual building. A small bookkeeping system should be set up to record expenditure and ensure work is carried out within budget. Another financial consideration is VAT, which is payable at the time of expenditure but can be reclaimed on new build work when the dwelling is complete. To make a claim, all materials must be itemized, original VAT receipts, together with a copy of your planning permission and evidence of completion of the building must be provided to the Tax Office. Contact your local office for further information as only one claim is permitted.

5. Building Control:
Your plans should be passed by Building Control before you start on site, and must adhere to the current building regulations. The Building Inspector will visit your site to ensure such requirements are met and should be looked upon as a friend, someone whose vast experience can be tapped and used to your advantage. You must give your local Building Control Office 48 hours notice before you require an inspection.

The main inspection stages are:

i Foundation Excavations
The strength of the ground is what the whole building depends upon, the house literally stands or falls on this. This inspection is the most important as any faults in this area cannot be remedied afterwards, except at great expense.

ii Hard-core
This needs to be very compact to prevent settlement at a later stage. Foundation concrete may also be inspected.

iii Damp Proof Course
This needs to be continuous, wide enough and in the correct position, to prevent moisture spreading up the walls.
Radon Membranes should also be inspected.

iv Wall Construction to Ground Floor Cill Level
To check insulation, wall ties and cold bridging.

v Wall Construction to First Floor Cill Level
Again to check insulation, etc.

vi When the Roofing Timbers are in place
To check roof structure.

vii Drainage
To ensure adequate falls in the foul and rainwater systems.

viii Finishing Out Stage
To check ventilation, windows, safety glazing, fire doors, staircases and handrails.

ix Occupation Inspection
To check loft insulation etc. are in place.

x The Completion Inspection
To check mechanical extraction, automatic door closures, smoke detectors, steps, heating systems and sanitary appliances.

The advice given by the Building Inspector is to ensure structural ability and must therefore be acted upon.

So often, self-builders, because they want to see a start made on their new home, forget about planning the work. Yes, it is good to see the building, "coming out of the ground", but is it "coming out" correctly. For example, is the service ducting in place or, are the posts to support the sun-lounge roof in place?

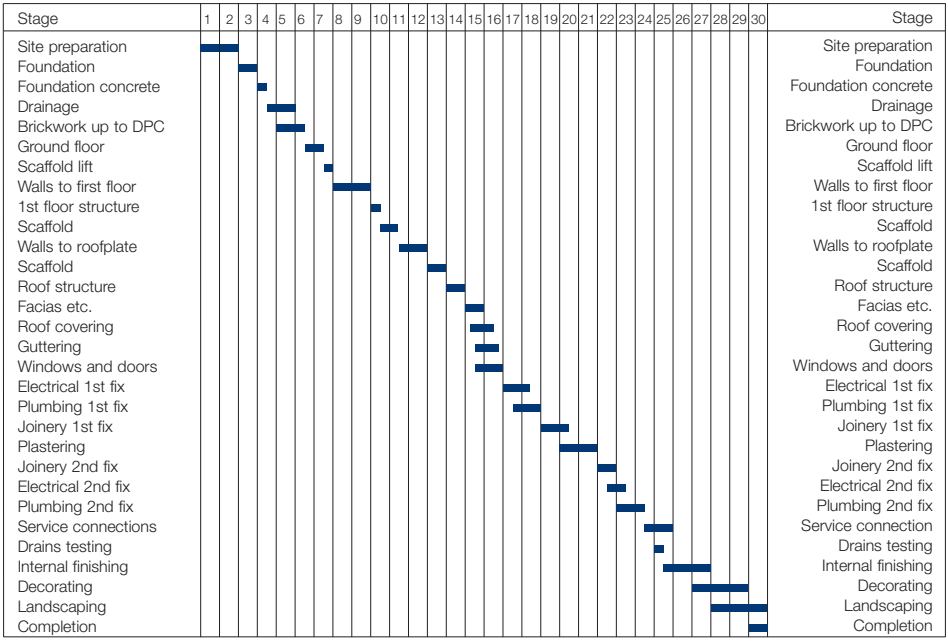
The most important part of the building process is to have the project carefully planned in advance with the different stages of construction following in sequence. Deliveries and site services must be organised and co-ordinated to ensure they are on site at the right time that enables continuity of work, and helps to eliminate non-productive time payments.

A few hours spent drawing up a programme or schedule for the job, are probably the best few hours you will spend in the overall duration of your self-build lifetime. Your programme will enable you to become familiar with your new home and will give you the chance to see where possible problems may lie, and provide an opportunity to pre-empt adverse situations.

The programme may be in the form of a bar chart (see figure 1.1), with time periods set against each building element or it may be a simple list, with your plant and material requirements displayed (see figure 1.2). Whichever is used, it must be realistic and easily implemented. The proper use of such a programme, will ensure all necessary tools, materials and services, are on site when they are required, so saving you money.

Remember some materials may have long delivery periods – i.e. some bricks or roof coverings may have a two or three month delivery time.

Bar chart Programme Figure 1.1



Schedule of Works
Figure 1.2

	Building Element	Requirements
1	Apply for all services	
2	Apply for building water supply	
3	Arrange site insurances	
4	Provide access, hardstanding, site storage	Hardcore
5	Strip top soil and store	Digger Hire
6	Excavate foundations, service trenches	Digger Hire
7	Building inspector to inspect the trenches	
8	Pour foundation concrete	Concrete; possible reinforcement
9	Building inspector to inspect foundations	
10	Build foundation brick/block work	Mixer, bricks, blocks, cement, sand, wall-ties
11	Fill foundations, blind, lay membrane	Roller, hardcore, membrane
12	Building inspector to inspect foundation brick/block work and membrane	
13	Cast floor slab, leaving ducts for services	Concrete, ducting for services
14	Build off D.P.C.	Cement, sand, bricks, blocks, wall-ties, insulation
15	Building inspector to inspect D.P.C.	
16	Build up to wallplate	Walling materials, lintels, cills, scaffolding
17	Fix wallplate and gable guides, if required	Wallplate, wallplate straps, roof trusses or timber guides
18	Build gables and chimney through roof	Walling materials and flue liners
19	Fix roof trusses or cut roof	Trusses or timbers to form cut roof
20	Roof covering	Felt, laths, lead, if required, tiles or slates
21	Fix rainwater goods	Rainwater goods
22	First fix joinery, door linings, window boards, stud partitions	Joinery first fix materials
23	Fix windows	Windows
24	First fix plumbing and electrical	Appropriate materials
25	Plaster out	Plasterboard, plastering materials
26	Lay floor screed	Floor insulation, screed materials
27	Building drying out	
28	Second fix plumbing, water on	Appropriate materials
29	Second fix electrical, electricity on	Appropriate materials
30	Second fix joinery, kitchen, fitted furniture	Appropriate materials
31	External drainage, pathways, drive, etc.	Drainage materials, possible septic tank, kerbs, etc.
32	Arrange householders insurance to take over from site insurance	

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1	**Blind/Blinding**	A layer of sand or dust placed between the hardcore and the damp proof membrane.
2	**Cut Roof**	Traditional form of roof construction, the roof is manufactured on site and gives a usable area in the roof-space.
3	**D.P.C.**	Damp proof course; placed under all walls in contact with floor slab, under outside walls and around window and door openings to prevent dampness spreading into the building.
4	**Ducting**	Piping placed under the floor slab and through external walls for services coming into the building, or drainage from baths, sinks, water closets or showers.
5	**Felt**	Waterproofing layer under slates or roof tiles.
6	**Flue Liners**	Used to form a non-combustible lining to the chimney and ensure smoke does not leak into the building.
7	**Footing**	Prepared foundation trench base before concrete is laid.
8	**Gable Guides**	Timber members or roof trusses used to guide brick/block work to ensure correct roof pitch is achieved.
9	**Hardcore**	A layer of well compacted stone to form a base for the concrete floor.
10	**Hardstanding**	A stoned area to enable off-loading of materials.
11	**Laths**	Timber used to secure slates or roof tiles to rafters.
12	**D.P.M.**	Damp Proof Membrane; P.V.C. sheet laid under floor slab to prevent dampness entering the building through the floor.
13	**Roof Trusses**	Manufactured off-site roof construction members.
14	**Services**	Electricity, water, gas.
15	**Wallplate**	Timber member at top of external walls, roof trusses or rafters rest on this member.
16	**Wallplate Straps**	'L' shaped straps used to secure wallplate to blockwork.

At the moment your site is no more than a "green field" and now after many months of waiting design and approval, the project can start on site. For most this is when the work really begins.

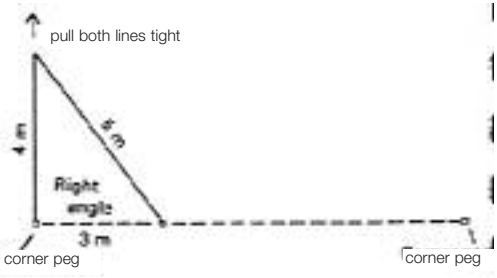
Your first task to establish a good means of entrance and exit and therefore a mechanical digger and operator will be required. (If you are hiring machinery, knowing the work you require the digger to undertake will reduce the length of hire time, thus reducing the overall cost.) After the entrance has been established, the site should be stripped of topsoil, and stored where it is not an obstacle to future works.

The site may have to be levelled, if this is the case, an amount of subsoil may have to be removed from site. A lorry and somewhere to dump the materials will have to be organised.

The entrance and an area close to the excavations should be stoned to ensure vehicles have easy access. The site should now be level with a sufficient hardstanding.

The next stage is to setout the new dwelling. After the front wall has been established the rest of the walls can be set out. Most walls are at right angles to each other, see figure 2.1 to assist in setting out a right angle. To check the "squareness" of the building, the two diagonals are measured, which should be the same, if they are not, the building is not square.

Setting out a right angle
Figure 2.1

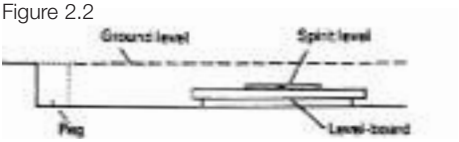


To help the operator dig the correct foundations the building should be marked out on the ground, using chalk or lime. Surplus soil can be removed off-site.

It is at this stage that you contact the Building Control Officer to examine the trenches before you can proceed any further.

The next stage will require you to pour concrete into your foundations. It is essential that you refer to the architectural drawings to seek the required depth of concrete. To ensure this is constant throughout it is advisable to use metal pegs placed at the correct depth. The use of a level will also ensure this is achieved. See figure 2.2.

Setting pegs at correct level
Figure 2.2



After the concrete has been allowed to set the foundation walls should then be built up to DPC level. These should also be allowed to strengthen before the sub-floor is laid. The stone base of the sub-floor is placed in layers, not exceeding 225mm thick and should be well compacted using a vibrating plate or a roller.

In some areas of N.Ireland, radon levels are higher than the accepted level, if this is the case in your area, a radon sump or barrier will have to be put in place. You can check with your local Building Control Office for further advice.

The concrete sub-floor should be laid next, and the foundation walls are often used as a formwork for the concrete. The top of the walls can be used to tamp the concrete surface achieving a level surface. Great care should be taken to ensure that all drainage and under-floor ducting is in place before the concrete is laid, therefore careful planning is essential.

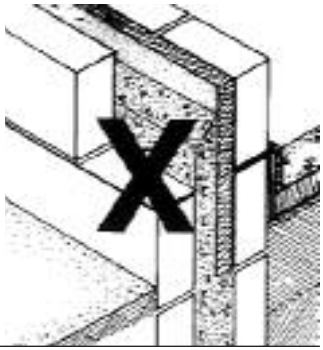
		TERMINOLOGY
1	**Levelled**	Most sites are not flat and this describes the process of achieving a level "playing field".
2	**Sub-Soil**	The clay under the top soil.
3	**Formwork**	A temporary framework to encase concrete while it sets.
4	**Hardstanding**	A stoned area to ensure ingress and egress from the site and an area to "off-load" materials.
5	**Set-Out**	Marking the ground floor walls of the building on the site.
6	**"Squareness"**	All angles should be right angles.
7	**Footings**	The foundations after they have been dug out and before the concrete is poured.
8	**Tamped**	Levelling off concrete using a straight edge to ensure the concrete is at the same level.
9	**Radon**	A natural occurring radioactive gas, greater in some areas of N.Ireland than others.

The external walls along with the roof are the main weather proofing elements of a building. Their main function is to keep out adverse weather conditions and to retain heat. Your dwelling may have a brick or plastered render outer appearance, this may be your choice or a requirement of the planning authority.

The internal face of an external wall should not be damp. Listed below are some of the main causes of dampness which vigilance will eliminate.

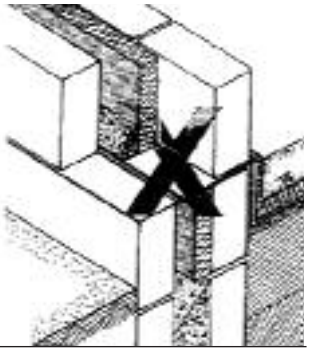
1. Mortar filling too high in cavity;
(see figure 3.1) caused by mortar droppings, the cavity should be clear, at least 150mm below DPC level.

Figure 3.1



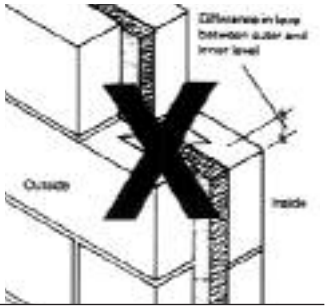
2. Too wide DPC being used;
(see figure 3.2) again mortar droppings collecting on DPC, assisting the passage of moisture.

Figure 3.2



3. Coursing at different levels;
(see figure 3.3) therefore ties may be bent downwards towards internal walls.

Figure 3.3

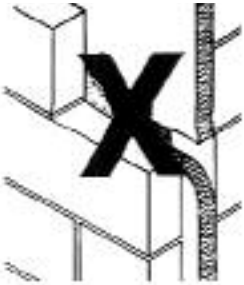


4. Build-up of mortar on cavity tray, lintels or built-in joists, projecting into cavity;
(see figure 3.4)

Figure 3.4

5. Insulation not secured to internal walls properly (see figure 3.5)
mortar may drop behind insulation and assist moisture movement; always ensure correct wall-ties are used to secure insulation.

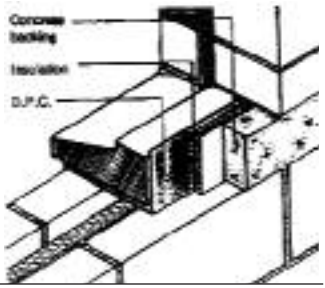
Figure 3.5



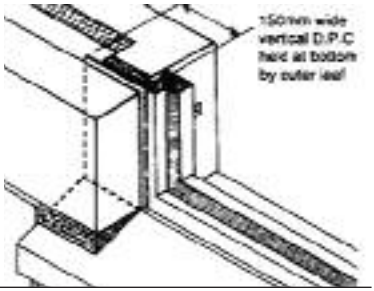
It also very important to ensure that DPC's are fitted correctly and in the correct place. At the base of the wall, the DPC should be at least 150mm above ground level. This helps to ensure moisture cannot be transferred from the ground to the dwelling.

Figures 3.6 to 3.8, show the correct positioning of DPC's around openings.

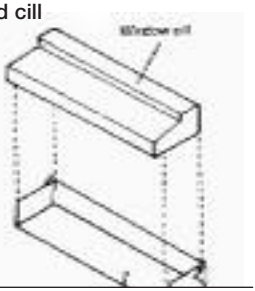
Positioning of DPC and insulation at cill
Fig 3.6



Positioning of DPC and insulation at jambs
Fig 3.7



Fitting of DPC around cill
Fig 3.8



All dwellings have to be insulated to some degree and building regulations lay down the minimum requirements. Most houses are constructed with the insulation incorporated as the building progresses ensuring the cavity is completely insulated.

Around openings (i.e. windows & doors) the inner and outer leaves come together, this may cause "cold bridging", an area of construction where heat loss is increased. To prevent this, strips of insulation, normally 25mm thick are placed between the two leaves as shown in figures 3.6 and 3.7.

Internal walls may be block or timber stud construction, the latter will be discussed at a later stage. Internal block walls will normally be built at the same time as the external walls, thus assisting the stability of the complete construction. Caution should be taken to ensure the internal walls are built on a DPC, this should be overlapped and bonded to the DPM.

If the external walls have peaks, the bricklayer will need some form of guide to build to the correct angle. In the case of a truss roof, the trusses may be ordered and on site before the builder reaches the gables. In this case, a truss can be used as a guide, otherwise the Bricklayer may use a length of timber and string.

As walls progress the main warning is to be vigilant and not to rush the job.

TERMINOLOGY

1 **D.P.C** See stage 1.
2. **Wall Ties** Galvanised or stainless steel ties used to hold the two walls of a cavity wall together. Also, used to secure insulation to inner wall.
3 **D.P.M.** See stage 1.

The first timbers to be incorporated into a traditionally built house are floor/ceiling joists. A two storey or dormer bungalow will have floor and ceiling joists, whereas a traditional bungalow will only have ceiling joists which are incorporated into the roof structure.

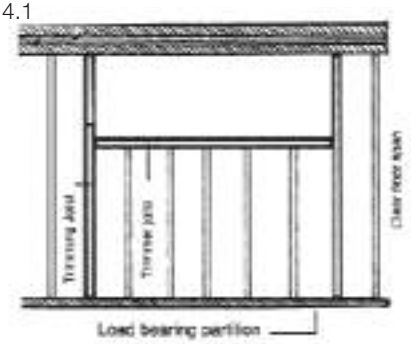
Floor joists will be put in place as the work progresses upwards. Once the walls are started on the floor slab, you should be thinking about ordering the joists. It is advisable to consult the joiner before doing so, as he is the person who has the experience and knows how to tackle the work. Also, if there is any material missing, the blame lies with the joiner, and he cannot demand payment for 'waiting time'.

Normally joists span the shortest distance between two supporting walls, however this is not always the case. Most drawings indicate the direction in which the joist should span. Check with your architect and joiner if this is not the case.

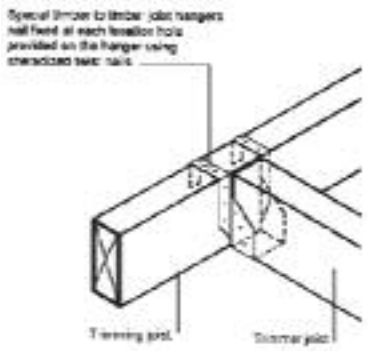
Additional materials related to this area of work will be required e.g. anchor straps, joist hangers and bridging. Again to ensure all these materials are on site it is advisable to get your joiner to order these materials.

See figures 4.1 to 4.4 for explanation of terms and floor joist layouts.

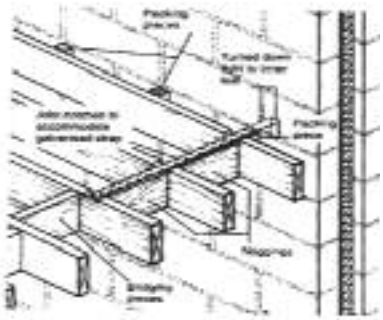
Floor joist layout around stair opening
Fig 4.1



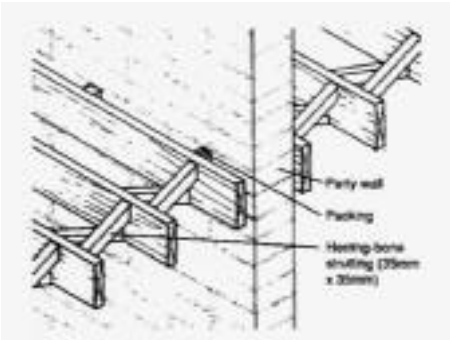
Trimmer detail showing timber joist hanger
Fig 4.2



Floor joists showing anchor straps and solid bridging
Fig 4.3

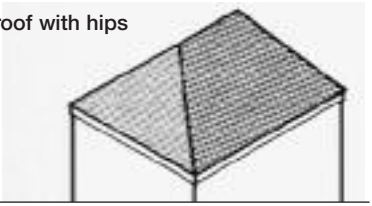


Floor joist showing herringbone bridging
Fig 4.4

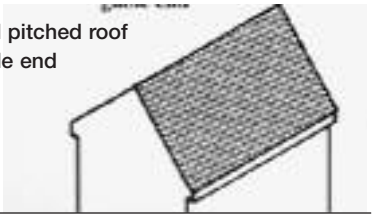


The next main stage, is the construction of the roof. As it is a complex part of the building it is important that the standard of materials and workmanship is high to ensure its structural stability. There are numerous different roof structures, as can be seen from figures 4.5a to 4.5e.

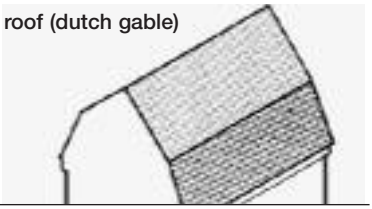
Pitched roof with hips
Fig 4.5a



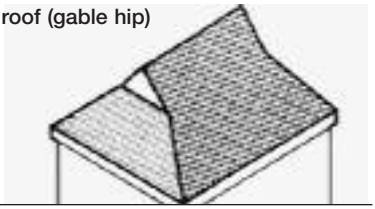
Standard pitched roof with gable end
Fig 4.5b



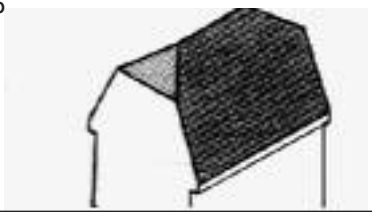
Mansard roof (dutch gable)
Fig 4.5c



Gambrel roof (gable hip)
Fig 4.5d



Dutch hip
Fig 4.5e



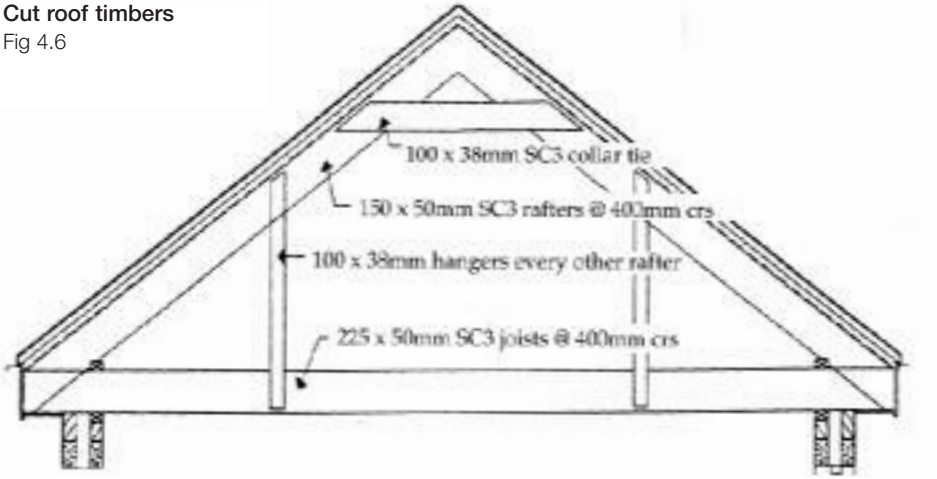
You have the option of your roof preformed and transported to site, or 'cut' on site.

A preformed roof, is commonly known as a truss roof, (manufactured off site).
To ensure your delivery date can be met a truss roof should be ordered well before it is required. If requested a representative of the manufacturing company will call on site, to measure for the trusses. A copy of the structural calculations should also be forwarded to building control to be passed, before the roof is constructed.

Alternatively the most common roof construction is a 'cut roof', and as the name suggests the timbers come on site and are cut and nailed into the required roof design by the joiner. This form of construction gives more flexibility in the roof design.

As already stated, the roof is a very complex element of the structure, therefore some diagrams are included to familiarise with the main roof elements see figure 4.6.

Cut roof timbers
Fig 4.6

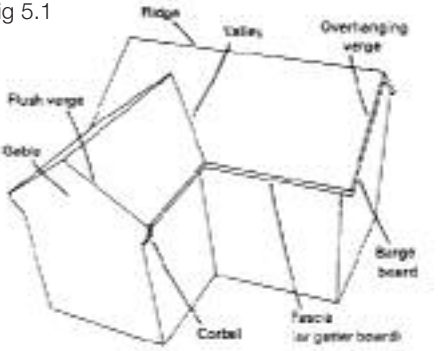


Terminology

1	**Joists**	Timber members, used to support a floor or tie roof members together.
2	**Anchor Straps**	'L' Shaped galvanised straps, used to tie the joists to walls.
3	**Joist Hangers**	See figure 4.2.
4	**Bridging**	Either timber or galvanised members, used to strengthen joists, figure 4.3 and 4.4.
5	**Carcassing**	Rough sawn timbers, e.g. joists and roof timbers.

Once the roof timbers are in place, they must be covered. Figure 5.1, illustrates the main elements in the roofing progress.

Main roof elements
Fig 5.1

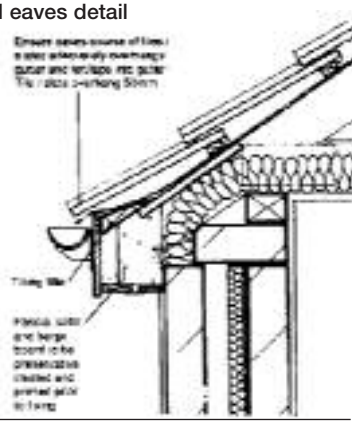


Factors such as cost, location and aesthetics will have an influence on the choice of tiles or slates that are used. It is essential that the manufacturers fixing recommendations be adhered to.

Whether you choose slates or tiles, a waterproof layer of felt, is placed between the timbers and the final covering. This layer becomes the second line of defence against water penetration and should be laid carefully. It must be lapped both vertically and horizontally:

- Vertical laps; should be at least 100mm and occur over a rafter.
- Horizontal laps; should be 150mm and should occur under a batten
- At ridge level, the felt should be carried over the ridge, keeping the recommended 150mm lap.
- Ensure the felt is dressed 50mm into the gutter at eaves level and that a tilting fillet is provided behind the fascia to avoid a water tap; See figure 5.2 below.
- On hipped roofs, (see figure 4.5a), an extra layer of felt is laid along the hips, which should be at least 600mm wide and laid over the main horizontal felt.

A standard eaves detail
Figure 5.2



Battens are used to secure the felt. These are placed at equal spacing and must not exceed the distance recommended by the tile/slate manufacturer. There are a large variety of tiles and slates on the market. All manufacturers have their own recommendations, when it comes to fixing their product. It is therefore advisable to acquire the manufacturer information, to ensure your particular roof covering is put in place correctly.

Finally, flashings around chimneys or abutment walls are put in place to prevent moisture penetration to the interior of the building. If your roofer is not prepared to undertake this task, ask him to recommend someone who will.

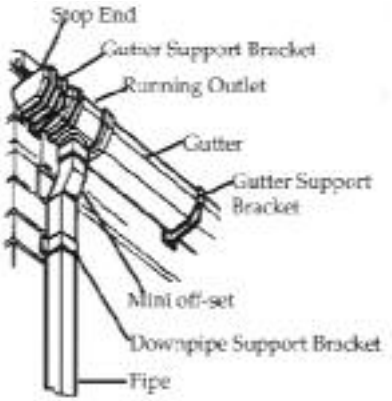
TERMINOLOGY

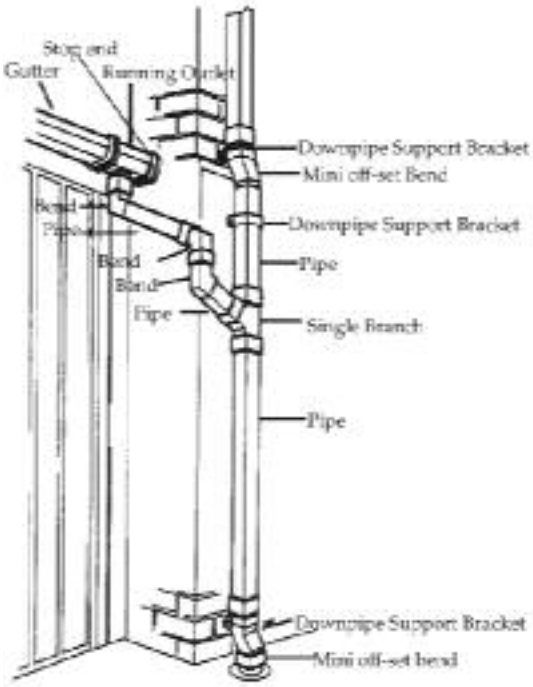
1	**Dressed**	Laid into the gutter, to ensure any moisture that does get under the slate or tile, can run into the gutter.
2	**Flashing**	A layer of lead is placed around the chimney to ensure any moisture runs onto the tiles or slates and does not run down the face or penetrate the chimney breast, which may cause dampness internally.

Rainwater goods, more commonly known as guttering, are available in different materials; e.g., cast iron; aluminium and UPVC. The most popular being the latter. There are also numerous different systems e.g., Half Round; Square or Ogee. Figure 6.1 shows the main elements involved in the placing of a rainwater system. The downpipe is run into a gully trap and then into the 'surface water drainage system', which will be discussed later.

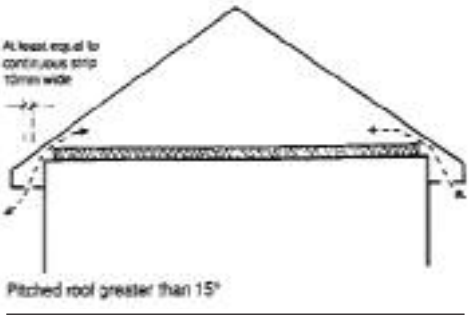
The requirements for the ventilation of the roof-space area are indicated in the building regulations. However, your architect will have specified the appropriate system to use at the planning stage. The requirements for a roof, which will be used as living accommodation, is a gap at the soffit equal to a continuos 25mm gap. At the ridge, the gap should be equal to a continuos 5mm gap. An unobstructed air path of 50mm should be placed between the underside of the felt and the surface of the insulation. The above is required on both sides of the roof. Where the roof-space is not required for living accommodation, the continuous gap at soffit level is 10mm, there is no requirement at ridge level. See figures 6.2 and 6.3 below.

Rainpipe gutter and downpipe layout
Fig 6.1



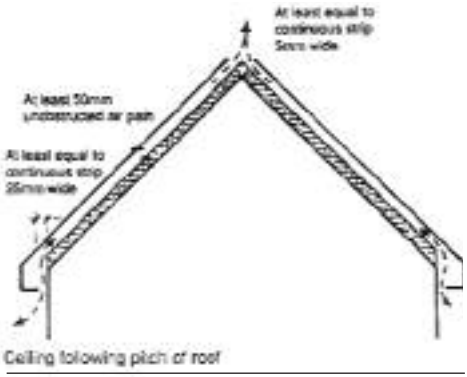


Ventilation requirement for an un-inhabited attic space
Fig 6.2

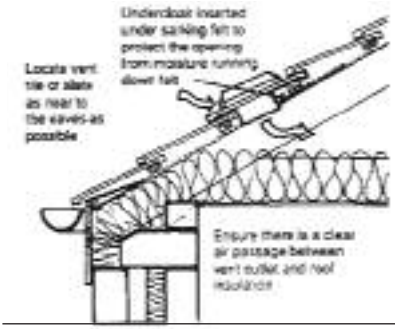


Ventilation does not have to be formed by the use of a continuous gap. Any form of ventilation that gives the same level of ventilation will do. Figures 6.4 and 6.5 show two different ways of achieving the same ventilated requirement.

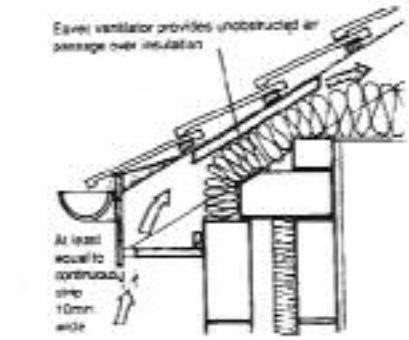
Ventilation requirement for a habited attic space
Fig 6.3



Roof ventilation using ventilation tile
Fig 6.4



Roof ventilation using ventilation tray and soffit strip
Fig 6.4



The installation of the windows will ensure the building is 'sealed' and the internal finishes can begin. The plumber and electrician will have to 'first fix' any pipes or cabling that will go below the upper floor covering before the joiner can start.

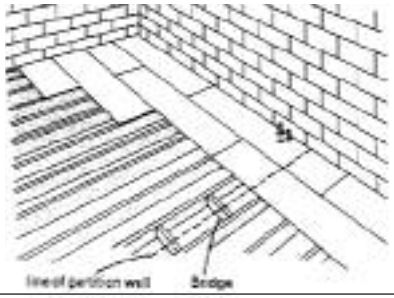
The main tasks for the joiner are upper floor coverings, studwalls, door linings and window boards. All these have to be in place before the plasterer, plumber or electrician can return.

Floor Coverings

T&G Chipboard; T&G Plywood or T&G Floor Boards can be used. These are the most common floor coverings. Some people also lay solid timber floors that will be discussed later.

Chipboard flooring layout

Fig 7.1



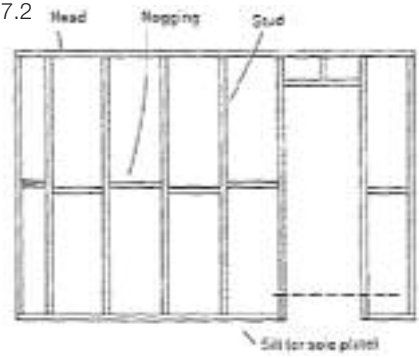
Whatever the floor covering it must be in place before stud-walls can be constructed. Figure 7.1 illustrates how chipboard flooring is laid. It should be noted that in bathrooms or any area where moisture may occur, moisture resistant chipboard or plywood should be used.

Stud-Walls:

This is the next operation to be undertaken by the joiner. Figure 7.2 shows the main elements of a stud-wall. Stud-walls are normally constructed from 75x50mm timbers. They are faced with plasterboard in 9.5mm or 12mm. To improve sound insulation two boards may be applied to both sides of the stud.

Elements of a stud wall

Fig 7.2



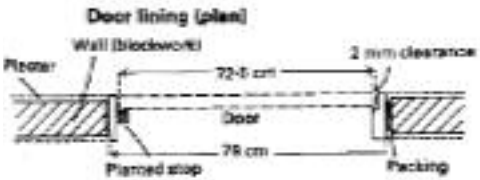
The simplest way to reduce sound is with mass – twice as much plasterboard makes a significant reduction.

Door Lining

A door lining is placed between the stud/ concrete block wall and the door, see figure 7.3.

Internal door lining detail

Fig 7.3

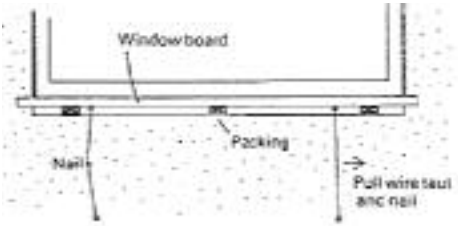


At a later stage the door will be hung to this timber member. The finish coat of plaster is also plastered to this level.

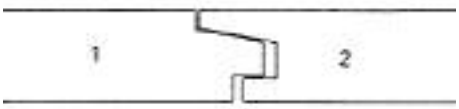
Window Boards:
Most householders will call this a widow cill. It may be UPVC or timber. UPVC tends to scratch and mark easily. The window board should be in place before the plasterer starts and should run 50mm either side of the opening, see figure 7.4. Any external timber door frames should also be in place at this stage.

The interior of the house should now be ready for the electrician to complete his first fix.

Positioning of window board
Fig 7.4



Tongue & Grooved joint
Fig 7.5



TERMINOLOGY

1	**Sealed**	Roof is water tight and the windows are glazed so that the interior of the house is weather protected.
2	**T&G**	Tongued and grooved See figure 7.5.
3	**Hung**	The term used to describe how a door is hinged to a door frame or lining.

Plastering is a very skilled and time-consuming job and it is therefore advisable to sub-contract this work out to a reputable tradesman.

However, there are certain areas of work that can be undertaken, for example it would be possible to put plasterboard on ceilings and stud walls.

Plasterboard comes in two thicknesses, 9.5mm and 12.5mm. The latter having a maximum span of 600mm and the former, a maximum span of 450mm. When roof trusses are spaced at 600mm centres, 12.5mm thick boards must be used.

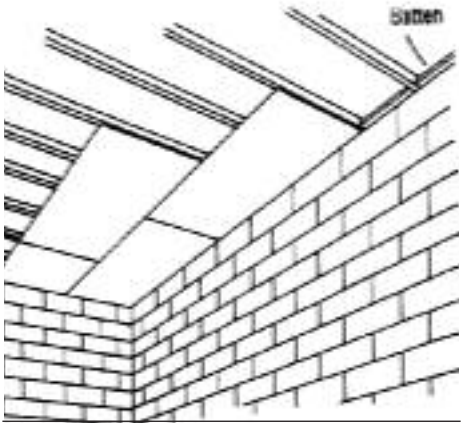
All ceilings will require plasterboarding, except on a timber ceiling. It is available in various sizes. The larger board has fewer joints but is more difficult to work with, especially at ceiling level. At least two people should undertake the task to ensure the board is held in position while it is secured in place.

Planning the work is again important, as is deciding on which size of board to use and how to approach the work.

Take the required number of boards into the room to be plasterboarded and stack them upright against a wall. Assemble a platform to work from. Once this is in place, it will be difficult to take more boards into the room. Mark the position of the joists on the wall, so you know where the joists are hidden.

When boarding a ceiling, the first board should be placed in the corner, the board should be placed across the joists and the end cut so that it ends in the centre of one of the joists. Add another board at the end of the first, leaving a 3mm gap to give the skim coat a key. Start the next row with a shorter board to ensure the head joints do not coincide and increase the likelihood of the skim coat cracking. The short board should be secured over more than two joists to prevent the board from sagging, see figure 8.1, for board layout. A batten should be fixed at joist level on the wall, to enable the board to be nailed to it at the edge.

Plasterboard layout
Fig 8.1



Once the ceilings are plasterboarded, the delay before skimming should be kept to a minimum. Plasterboard relies on the skim coat to hold it taut, if it is, left longer than two weeks, the board will begin to sag, especially in damp weather.

Stud-walls will also be sealed with plasterboard, but this is a much easier task, as the work is not carried out overhead. It is common to use boards that are 2400mm long, the normal height of stud-walls. At this stage it should be remembered that holes need to be cut in the plasterboard where electrical sockets, etc., will be placed. The first fix electrical work should be carried our before boarding commences, as cables will be in place. Make sure the cables are pulled through the holes or it may become difficult to find them when the time comes for second fixing the electrical work.

As already stated, plastering is a skilled job and should be undertaken by a professional. The following is just a guide to help when communicating with your plasterer.

Ceilings and stud-walls should always be bonded, a special adhesive coat to help the final skim coat stick to the plasterboard. All joints should be fitted with a scrim cloth to reduce the likelihood of cracking. The finish or skim coat is applied in two coats 1mm thick, and great care should be taken to ensure that this coat is smooth and flat. The ceilings should be plastered first.

Block walls are plastered with a two-coat system. The base coat or scratch coat is approximately 25mm thick and can either be cement/sand or a specially produced floating coat.

A cement/sand scratch coat will take longer to dry out and is a cheaper option. The coat should be left for several days to ensure all shrinkage or cracking has occurred before the finished coat is applied.

However, the most commonly used option is the floating layer. This is a specially manufactured material that dries quicker and enables the plasterer to apply the finish coat within a few hours.

Once the plastering is completed, the building should be left to dry out before any internal timber work starts. Plastering is one of the "wet" trades and the moisture levels within the house will be very high at this time. It is normal to allow the house to sit for up to six weeks before any internal timber work is commenced. If timber work is commenced too soon, the moisture may get into the timber and expand it, eventually it will shrink when the heating is turned on, thus causing damage.

TERMINOLOGY

1 **Stud-Walls** Partition walls constructed from timber and plasterboard.

2 **Scrim Cloth or SA Scrim** A woven cloth roll, used to strengthen joints in plasterboard and plastering.

Your new home is now coming near to completion. Once the second fix work is complete, you will be ready to move in.

Second fix joinery consists of such items as skirting, architrave, wooden floors, panelling, etc. This work will be the finished item and therefore, it is advisable to employ a qualified joiner. The self-builder can undertake such work, but it will take longer and the required quality may not be achieved.

Architrave, is the timber, which is fitted around the door lining, to hide the joint between the plaster and the lining. To fit architrave, start with one of the uprights. A mitre or 45 degrees cut will have to be made across the face of the timber. To enable an accurate cut, a mitre box can be used. Once an upright is in place, the next stage is to fix the head. Firstly cut a mitre to suit the upright which is already in place. Then measure and cut a mitre at the other end of the head. Finally, cut the mitre to fit the last head mitre on the second upright. Take care and time to do this work, as it will be seen every time someone walks through the door.

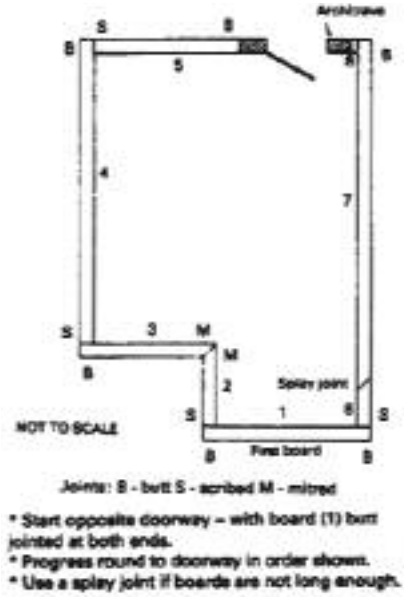
The next item to be fixed is the skirting, this is placed at the bottom of the wall. When placing skirting, there are three main joints:-

i **Mitred**; a 45 degree cut, used when joining two pieces for forming external or internal corner;

ii **Butt**; which is two pieces of timber adjoined in length;

iii **Scribed**;when one board is cut to fit the profile of the other.

Joints in skirting board
Fig 9.1



Skirting should be started opposite the door and worked around the room as shown on figure 9.1. The different joints are also indicated on this diagram.

The next major job is to hang doors, which are available in various designs and in many different materials. It may seem smple to screw the hinges to a door and frame, however, it will become apparent to anyone who undertakes this task, that there are many things which can go wrong. It is advisable to get a joiner to hang doors and fix ironmongery, to ensure everything fits and works properly.

Doors are available in various designs and made from many different materials. External mahogany doors are manufactured in imperial sizes only, however internal doors are produced in both imperial and metric sizes.

There are showrooms in each Murdock Builders Merchant branch from which to choose your Doors, Handles, Skirting, Architrave and Flooring ranges. Murdock's can also design and manufacture your skirting and architraves to provide you with something different to our standard moulds.

In order to cater for all tastes, be it Traditional or Modern design, a wide variety of timber species are available from Murdock's specialist machining division. These include Oak, Ash, Maple, Mahogany, Beech, Walnut, Cherry, Yellow Pine and many others, all which can be machined to individual specifications.

The staircases will also be placed at this stage, if it is not already in place. Internally, the basics of your new home are in place.

There are numerous small pieces of work to be finished, e.g. hot-press shelving, timber wall or ceiling panelling, if desired. Panelling is normally a T&G board that is fixed to battens, it is a relatively simple task and can be undertaken by most handymen. The main thing is to ensure that the first board is plumb, time should be taken to ensure this is so. After this, each board fitted into the last and nailed to the battens, a check should be kept to ensure the boards are plumb before they are nailed.

The next task internally, is to undertake decoration, this is a personal thing, as everyone's tastes differ.

TERMINOLOGY

1 **Planed** Timber that has a smooth finish, it can either have a square-edge, rounded edge or moulded finish.

Placing drains can be undertaken at any stage of the construction, however, it is commonplace to wait until the shell is complete. It is also advisable to do this work in clement weather and when there is little or no need for heavy lorries to be on site.

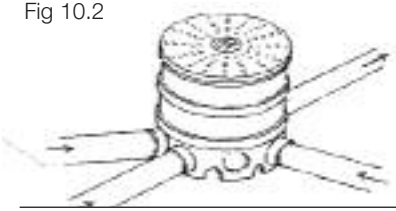
The drain layout will have been passed by building control and drains should be placed as so. The design depends on the availability of a main sewer. In towns and cities, connection to the sewage system should not be difficult. In rural area where no main sewer exist, surface water can be disposed of in a soakaway and foul waste can be dealt with in a septic tank, provided there is a waterway or spare land to take the clarified effluent.

When laying drains, it is essential that the drains run downslope, the fall of the drain run will be specified on the Architectural drawing.

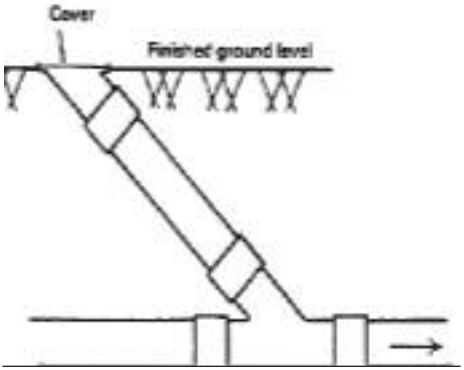
Drains should also be roddable to ensure that any blockages can be cleared. Access for rodding can be via a roddable gully. See figure 10.1, for an inspection chamber see figure 10.2 and for rodding eye see figure 10.3.

Roddable gully
Fig 10.1

PVC Inspection chamber
Fig 10.2



Rodding eye
Fig 10.3



In the past, Hepworth clay pipes and brick built manholes were used, this was expensive in labour and materials. In recent times PVC has taken over, pipes and inspection chambers are now all plastic, light weight and easy to install. All pipes push together as do all bends, branches and fittings.

Inspection chambers also come in PVC see figure 10.2, there is a base unit with various intersections and on top of this sit riser units to bring the chamber to the required height. An inspection chamber cover and frame sit on top, the strength of the cover required is dependant on the inspection chambers location. If the cover is in a driveway, it will need a frame and cover which will take a vehicular traffic load.

When laying pipes, the trenches will normally be dug with an excavator. An experienced operator will be able to judge falls by eye, but it is advisable to check the trench by using a board or optical level. Plastic pies should be bedded and surrounded with pea gravel to protect the pipes, however, pipes at 60mm or less will need a concrete casing. Once the concrete has set or the pea gravel is in place, the excavator can be used to black-fill the trench.

In foul waste systems an inspection chamber should be placed whenever a pipe joins the system. Inspection chambers are simple to put in place and depending on the system they will be either cut down or built up to achieve the required height. The heaviest flow should preferably be along the straight channel with the required intersections being unplugged and the pipes connected to the base. The excavated hole should then be back-filled along with the pipework.

In an urban area the waste system will connect to an existing main sewer line, however in rural areas options available may include Sceptic Tanks, Cesspools or the more increasingly specified Sewage Treatment Plants (BioDisc).

Septic Tanks are available in various shapes and materials coming in either a 600 litre or 800 litre capacity tank. It is recommended that the manufacturer installation guidelines should be correctly adhered to. Effluent will then be discharged in to a soakaway as recommended by the appropriate local authority. BioDisc's are ideal for locations that require you to provide an environmentally safe solution to your sewage disposal needs either through sub-surface irrigation, reed beds or suitable watercourses. A soil percolation test will be required to satisfy relevant authorities. A site survey is recommended and can be arranged through your local Murdock Builders Merchant. Cesspools are large storage tanks that will require added expense in relation to build and disposal of waste.

A cesspool is much bigger than a septic tank because it stores the waste, whereas a septic uses bacteria to decompose organic sewage. It is therefore more expensive to provide and more room is required on site for a cesspool.

Surface water from gutter and surface drainage can be drained to a soakaway, where the water can filter to the natural water table.

A soakaway is a hole filled with brick and block rubble and covered with polythene and 300mm soil. A disadvantage is that soil quickly dries out in dry weather, resulting in yellow patches in a lawn. The minimum distance from a dwelling is 5 meters.

Your new home should now be at a stage where you can move in, although decoration and furnishing may be required before habitation. However, the basics are now in place and the job is complete except for your own finishing touches, whether these be internal decoration or external landscaping.

TERMINOLOGY

1 **Back-fill** loose clay of soil the windows are glazed so the interior of the house is weather protected.

Your new home is now complete expect for the 'finishing touches' as mentioned in an earlier chapter, decoration will be your personal choice. Decorating is an area where self-builders feel confident taking over from the professionals. Many people will 'turn their hands' to papering and most will undertake the painting.

It should be note that plastered walls are normally dry enough to pain when their colour has turned from pink grey to something like white. This may take a week of a fortnight but the longer it is left, the better. Plastered block walls take about six months to dry completely, they should not be papered during this period.

There is a vast array of paint types and makes on the market. To give a comprehensive description of each and its uses would require a book on its own.

The following is some general information on the more popular paint types, their recommended uses and rough coverage guides.

1 Vinyl Silk Emulsion:
This finish has a soft, lustrous sheen and provides a washable surface ideal in bathrooms, kitchens and children's room. Available in ready mixed colours or from a paint tinting machine in approximately 600 different colour shades. Usually requires two coats over a primer on bare plasterboard or ceilings, and one or two coats depending on the darkness of the colour being covered on already painted areas. (One coat versions are also available.) Apply with brush, medium pile roller, sponge or cloth.

2 Vinyl Matt Emulsion:
Used on walls or ceilings when a non-sheen effect is required, not suitable in areas when moisture or condensation occurs, i.e., kitchens and bathrooms. Availability of colour and application as per vinyl silk emulsions.

3 Undercoat:
This product is used to prepare the area prior to application of the finishing coat, i.e. gloss. Usually a recommended colour of undercoat is required with each finishing coat colour, i.e. Royal Maroon's undercoat is red.

4 Primer:
Primers are used before the undercoat on woodwork and metalwork and they ensure the following coats take to the material. Special undercoats are available for different jobs or conditions, e.g. Calcium Plumbate primer is used for galvanised iron.

5 Masonry Paints:
Available in smooth or textured finish can be applied by brush, long pile roller or spray gun (smooth finishes only). Areas should be free of algae, dry and stable, if not, fungicide and/or stabilising solution should be used. Water based masonry paints are only to be used if the expected temperature of application and curing is over 5C if not oil based versions should be used. Approximate range of colours 30-40.

6 Interior/exterior Gloss:
When used for bare or new timber, requires primer and undercoat, when used on already gloss painted areas, sugar soap and water should be used to clean the surface prior to re-coating. Available in non-drip versions that require no undercoat and should not be stirred like most other paints.

Most manufacturers provide colour or sample cards for you to choose your colour scheme and usually demonstrate sample paint combinations. If you have any queries as to what type of paint to use, please contact our experienced sales team.

Paint Type	Approx. Coverage per Litre	Uses
Vinyl Silk/Emulsion	13-14m2	Interior walls especially Kitchens and bathrooms.
Matt Emulsion	13-14m2	Interior walls and ceilings expect kitchens and bathrooms.
Undercoat	17m2	Interior and external metal and wood work.
Primer	12m2	Interior and external metal and woodwork.
Masonry Paint (Water-based)	12m2	Exterior masonry (over 5C)
Masonry Paint (Oil-based)	12m2	Exterior masonry (below 5C)
Interior Gloss	17m2	Interior metal, radiators and woodwork.
Exterior Gloss	17m2	Exterior metal, woodwork, plastic pipes and gutters.
Non-Drip Gloss	17m2	Interior metal, radiators, woodwork, undercoat not required.

Flooring

When adding those vital finishing touches to your home one of the key areas to focus on is flooring with virtually every square foot of your build area requiring a covering.

Today's market for flooring is very design orientated with people in general now taking a far more innovative approach when looking to choose coverings for their home. As views on home decor have changed rapidly in recent years we have seen a drive towards higher quality and more desirable products that add long term value, typical examples would be for stylish products such as solid real woods, laminates and luxury vinyl's.

At MBM we enjoy the added benefit of working closely with Spectrim another Murdock Group business who specialise in the hard floor covering sector throughout Ireland & the UK. This gives us unrivalled access to volumes of quality and proven flooring products including market leading brands such as Elka & Quick Step for your real wood and laminate flooring requirements. In addition to this and in response to the increasing market demand MBM in partnership with Spectrim have recently introduced a new exclusive range of Evolution Luxury Vinyl flooring products. Sourced via a flooring design studio in Milan the range offers both stone tiles & wood effect planks that are ideally suited to difficult flooring areas such as bathrooms & conservatories.

Flooring ranges available;

- 187 different styles of laminate flooring, with the latest innovations and technology that guarantees a quality installation.
- 21 real wood floors – whether solid or engineered, direct over under floor heating or fully fixed we have a solution.
- 12 Luxury vinyl products – whether stone or wood the solution to those difficult areas.
- Finishing accessories to match – noise reducing underlayment, door trims, skirting it's all available.

For specialist advice on all areas of flooring including installation over under floor heating, noise reduction, DIY products please contact your nearest MBM branch.

Finishing touches also relate to the building exterior and include such items as planting gardens and forming drives and pathways. Paving is becoming very popular and is a practical way in which to enhance your garden or driveway and extend your living space.

A) DRIVEWAYS

If you are planning on paving your driveway, paving slabs are NOT recommended. Instead, the most suitable material is paving brick.

These paving bricks are available in 60mm to 80mm depth usually 100mm x 200mm surface area, and can be purchased in different colours and textures to suit the overall effect you have planned for your house.

Laying Schedule

Clear area to the required depth and lay a compacted sub-base, your architect would be required to advise on clearance and sub-base depths, depending on your soil type and required usage.

Next the sub-base is compacted to a fine finish, allowing for gradients and falls away from the house. Sharp sand at 50mm depth is then screeded and compacted over the sub-base.

The bricks are then laid on top of the sand and compacted using a plate vibrator or 'whacker'.

Special fine dry sand is brushed over the surface filing the joints and locking the surface. A further pass of the vibrator will ensure the joints are completely full.

It is advisable to keep an extra bag of the dry sand to top up any sand is lost before the joints stabilise. It is imperative that all edges of the paved area are re-strained the methods are as follows

1 Kerbing brick, road kerbs or plastic restraints.
2 Haunching with concrete or edge bricks.

B) PATIOS

The already mentioned paving brick can be used for patios, but many people prefer the shape and textures available in paving slabs. Paving slabs vary in surface sizes from 400mm to 900mm, in square or rectangular shapes, they also vary in depths from 32mm to 60mm depending on the use expected. Paving slab designs on the market include:

1 **Riven** – slate type surface

2 **Roman or Corinium** – gives the effect of 16 separate cobbles

3 **Octavian** - gives the effect of 8 paving brick

4 **Cracked Ice** – as the name suggest

5 **Plain** – with or without s bevelled edge

6 **Textured** – sand blasted slab

7 **Hexagonal**

8 **Herringbone**

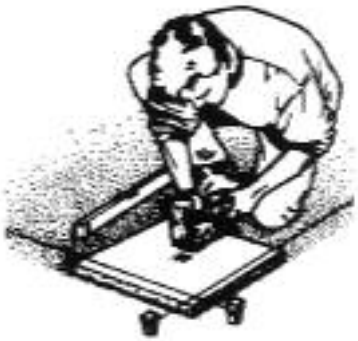
Laying Schedule

Lay sub-base, again checking with your architects requirements, cover this with a mixture of 6 parts sand to 1 part cement, this should be levelled and tamped down with a straight piece of timber. Lay the first paving slab in the corner of the area to be paved using five large spots of mortar.

Tap down the center of the slab with a rubber to the required level, see figure 11.1. Continue outwards checking levels across the area, as shown in figure 11.2.

Some paving slabs require joints of 18mm other require no joints so find out this information before purchasing. If the slabs require joints, fill with 4 parts sand, 1 part cement, semi dry mix making sure the mixture does not stain the slabs. A border of a contrasting coloured paving brick finished off the area.

Laying a concrete flag to required depth
Fig 11.1



Checking levels of flags
Fig 11.2

CONCLUSION

Building your new house will be one of the largest undertakings you will ever make. The expenditure in your personal time and money can be extensive and the project must not be under-taken lightly. We have attempted to point out some of the main areas of work that should be considered when planning to build your new home. However, we have only really scratched the surface, there is a wealth of knowledge which can be obtained and it is advisable to know as much as possible before undertaking this project.

There are numerous places where information can be obtained. You can talk to builders or tradesmen and can consult many books.

Contact our trained staff, who are dealing within building industry on a daily basis, and will only be too pleased to help you.

It is important to be aware of the financial commitment you are entering into. The total building cost should be known as accurately as possible before starting. It would be an advantage to prepare a cash flow forecast to assist you to manage your finances for the duration of your building project.

The success of the building operation depends on the planning that goes into the project: if material plant and tools are there for each stage of the work when they are required, the whole job will run more smoothly. This is turn keeps frustrations and incriminations to a minimum and helps to ensure the project is completed on time and within budget.

Finally, we would like to wish you every success with your forthcoming venture and assure you of our best attention at all times.

ACKNOWLEDGEMENTS

The following publications have been used in the compilation of this booklet.

"The Complete Manual
of Practical House Building"
Robert Matthews

"Building your own Home"
Murray Armor

"The Building Regulations
Explained and Illustrated"
Powell, Smith & Billington

N.H.B.C. - Guide to Your New Home

N.H.B.G.S. - House Building Manual

NOTE:
The information written within this booklet should only be used as a guideline.

Length

1 centimetre (cm)	= 10mm	= 0.3937 in
1 metre (m)	= 100cm	= 1.0936 yd
1 kilometre (km)	= 1000m	= 0.6214 mile
1 inch (in)		= 2.54 cm
1 yard (yd)	= 36in	= 0.9144m
1 mile	= 1760 yd	=1 .6093 km

Surface or Area

1 sq cm (cm2)	= 100mm2	= 0.1550in2
1 sq metre (m2)	= 10 000cm2	= 1.1960yd2
1 sq km (km2)	= 100ha	= 0.3861 mile2
1 sq in (in2)		= 6.4516cm2
1 sq yard (yd2)	= 9ft2	= 0.8361m2
1 sq mile (mile2)	= 640 acres	= 2.59 km2

Volume and Capacity

1 cu cm (cm3)		= 0.0610in3
1 cu metre (m3)	= 1000dm3	= 1.3080 yd3
1 litre (1)	= 1 dm3	= 0.2200 gal
1 hectolitre (hl)	= 100 l	= 21.997 gal
1 cu inch (in30		= 16.387 cm3
1 cu yard (yd30	= 27 ft3	= 0.7646 m3
1 pint (pt)	=20 fl oz	= 0.5683 l
1 gallon (gal)	=8 pt	= 4.5461 l

Weight

1 gram (g)	= 1000mg	= 0.0353 oz
1 kilogram (kg)	= 1000g	= 2.2046 lb
1 tonne (t)	= 1000kg	= 0.9842 ton
1 ounce	= 437.5 grains	= 28.35 g
1 pound (lb)	= 16 oz	= 0.4536 kg
1 ton	= 20 cwt	= 1.016 t

US Measures

1 US dry pint	= 33.60in3	= 0.5506 l
1 US liquid pint	= 0.8327 imp pt	= 0.4732 l
1 US gallon	= 0.8327 imp gal	= 3.7581
1 short cwt	= 100lb	= 45.359 kg
1 short ton	= 2000lb	= 907.19 kg

The central figures represent either of the two adjacent columns.
Example: 1 centimetre = 0.394 inch and 1 inch = 2.540 centimetres.

Centimetres		Inches
2.540	1	0.394
5.080	2	0.787
7.620	3	1.181
10.160	4	1.575
12.700	5	1.969
15.240	6	2.362
17.780	7	2.756
20.320	8	3.150
22.860	9	3.543
25.400	10	3.937
27.940	11	4.331

Kilograms		Pounds
0.113	_	0.551
0.227	_	1.102
0.454	1	2.205
0.907	2	4.409
1.969	3	6.614
1.814	4	8.819
2.268	5	11.023
2.722	6	13.228
3.175	7	15.432
3.629	8	17.637
4.082	9	19.842

Meters		Yards
0.914	1	1.094
1.829	2	2.187
2.743	3	3.281
3.658	4	4.374
4.572	5	5.468
5.486	6	6.562
6.401	7	7.655
7.315	8	8.749
8.230	9	9.843

Litres		Gallons
4.546	1	0.220
9.092	2	0.440
13.638	3	0.660
18.184	4	0.880
22.730	5	1.100
27.276	6	1.320
31.822	7	1.540
36.368	8	1.760
40.914	9	1.980

Kilometres		Miles
1.609	1	0.621
3.219	2	1.243
4.828	3	1.864
6.437	4	2.485
8.047	5	3.107
9.656	6	3.728
11.265	7	4.350
12.875	8	4.971
14.484	9	5.592

Hectares		Acres
0.405	1	2.471
0.809	2	4.942
1.214	3	7.413
1.619	4	9.884
2.023	5	12.355
2.428	6	14.826
2.833	7	17.297
3.237	8	19.769
3.642	9	22.240

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