BUILDER EDUCATION

The Guide to Bricklaying

Bricklaying is one of the oldest profession in the world. It requires some time and skills to master. The bricklayer works internally and externally, in all weather conditions. This trade requires the ability to understand the specification and interpret drawings, measure and set out, construct and finish to a high standard.

Preparations

Bricks/blocks can be laid their long side so called stretcher face or their short side called header face. They way they are laid in the wall structure is called a bond. Most bricks or blocks bonds are to ensure the strength of the wall, so joints are always staggered between each course. There are various bonds but most common are stretcher, English or Flemish bond. Laying bricks or blocks in line with the stretcher bond creates the single-skin wall. Other patterns create the thick double-skin wall. Bond is important for the wall corners. If bricks or blocks are not laid in the correct pattern, the wall will be weak. For instance, pillars or piers are often used not only as a decoration but also to strengthen single-skin walls over 400mm in height.

Bricks - the main components of the masonry are bricks, blocks and stone. A wall may be built from only one material or few of them. Many types of bricks are available in terms of colour, composition and usage.

- Common bricks - clay based used for fence walls
- Facing bricks - both sides of brick have good finish
- Engineering bricks - very dense, made of clay, used for extra strength and resistance
- Calcium silicate - made from lime and sand in variety of colours
- Fire - used in fireplaces, resistant to high temperatures
- Concrete - made of concrete in various textures and colours
- Air - used for ventilation purposes

Bricks are made in various sizes with the most common of 215 x 102.5 x 65mm. They are available in various design too- solid, cored, faced, speciality.

Blocks - used commonly on an exterior wall for render and plaster, or on an internal wall for a dry lining. Sizes vary. On the market available are rectangular concrete blocks, thermal insulation blocks, concrete with a cavity or faced building blocks.

Estimating the quantities - to calculate a number of bricks or blocks required the easiest way is to measure the surface required and divide by the nominal size of the chosen brick or block (nominal size allows for mortar joints). Bricks measure 65mm x 215 mm plus allow for a 10mm mortar joint.

Mixing concrete - it is very important not to make it to wet or to dry. The best is to use a concrete mixer. To estimate the amount of the concrete multiply the depth by the area. Generally to lay 100 bricks with general-purpose mortar there will be required approximately 25kg of cement, 100kg of building sand and 10kg of lime. Do not use mortar two hours after mixing as its adhesive features will diminish. Always stick to one proportion ratio for the whole project, to avoid concrete drying at different shades.

Proportions

Cement - it is an adhesive in a mortar mix which binds all components and dries to a hard finish.

Lime - cement contains lime but adding more makes mortar easier to work with and less likely to crack. Use lime in putty for traditional building mortar or in powder for cement-based mortar.

MIX	USES	CEMENT	PLASTICIZER OR LIME	BUILDING SAND	COARSE AGGREGATE	BALLAST	CONSISTENCY
General purpose mortar	Laying bricks or blocks	1	1	4			Should stick to a trowel

Plasticizer - makes mortar easier to work with and improves its adhesion, it is used as an equivalent to lime. Comes as a liquid. Nowadays more commonly used then lime.

Building sand - fine textured sand.

The tools required to bricklaying include a trowel, a spirit level, a jointing bar, hammer, a tape measure, line and pins and a soft brush. Trowels are most important for bricklayers and there is a brick trowel, gauging trowel or pointing trowel to choose. The reshaping of bricks can be done with a rubber mallet. Brick hammer is used to chip away sections of masonry.

Building a wall

We can distinguish between:

Solid wall (brick or block) - it is a wall constructed of one skin of masonry which can consist of brick or blockwork and does not include a cavity between the interior and exterior.

Cavity wall (brick or block) - it is a wall constructed of brick or blockwork and does not include a cavity.

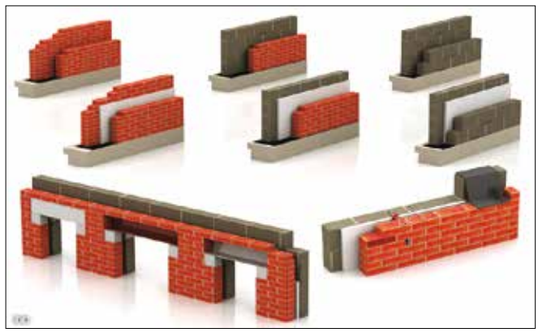
Technique

This step by step guide is generally focused on the bricklaying, but the same technique can be used for laying blocks.

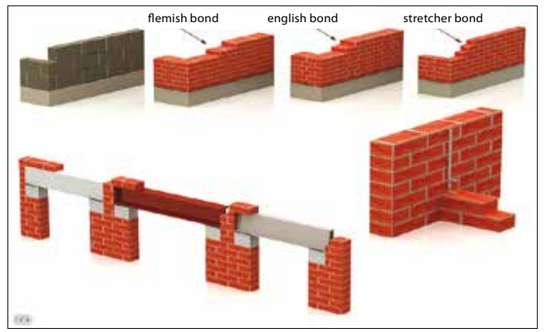
Firstly it is necessary to dry line the first row of bricks allowing for mortar joints of 10 mm. The gauging rod allows keeping the size of mortar joint consistent. Bricks are laid flat on the ground one on the other, stretcher -face up. A gap of 10mm is left between each brick to allow for the mortar joint. The position of each mortar joint can be easily marked by using the gauging rod. To set up a levelled brick wall it is best to wrap string around a brick at each end of the course. First course on the foundation is laid with the engineering bricks to ensure the strength of the wall. Bricks during laying can be moist but not wet.

Lay a first bricks at the start of the first course on the 10mm bed of mortar applied on the foundation. With a trowel create a v shaped trench and make sure the mortar is evenly spread. Use a spirit level to ensure brick alignment with the string lines. Apply mortar to the end of the next brick and position it on the mortar. The half bond is when each brick covers the brick below halfway along its length. Press with pressure if required to level bricks and cut away the excess of mortar. Continue along the course by positioning three bricks at the time and cleaning the joints. Remove the nails with lines when the first course is completed. In the next step start building up at the end of the wall what will allow to infill the remaining bricks later. To build the corner it is necessary to set up the square guide line for corner and ensure it is at the 90 degrees with the bond correctly done. In Strecher bond turn corner using the whole brick, whilst for English and Flemish bonds so called queen closer is required- bricks cut in half length.

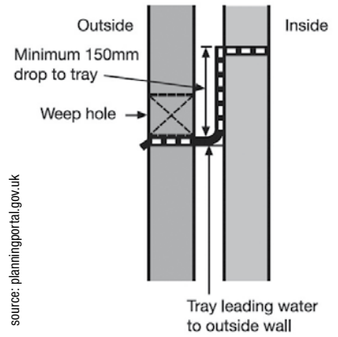
Apply mortar on the trowel and slide it onto the bricks. Ensure the mortar is laid on the central line of the brick course. It should be applied to the end of the brick too it is so called buttering. Position the brick, press it down and side against the bricks



Cavity wall



Solid wall (brick or block)



source: planningportal.gov.uk

below and on the same level. Use the handle of the trowel or rubber hammer to properly fit the brick into correct position. Remove excess of mortar from the brick with the edge of the trowel. Continue this while checking if each brick is aligned with the string line and brick course. At the end fill any areas of missing mortar in the wall and make the joints good when the mortar is firm. Brick jointer can be used to create pattern in joints, for instance v shaped.

The waterproof course DPC is laid approximately 30cm above the ground level between the brick course. It is used to stop rising damp up the walls. When applied mortar can be both under and above the DPC, however most of bricklayers lay the sheet of DPC directly onto the bricks and cover it with mortar to avoid the thick joint. While building the cavity wall it is also possible to install damp proof membrance DPM on DPC. There is no need to put mortar in between DPC and DPM, apply approx 7mm on top and continue with the bricklaying.

To sum up, cavity trays prevent moisture that is going downwards from being carried to the inner leaf, whilst damp-proof courses is used to prevent rising damp. Weep holes are installed in cavity walls for ventilation and drainage purposes as bricks and blocks tend to absorb and store water. Weep holes are installed in the outer skin of cavity walls. Wall ties are metal bars that are position in the cavity and which join the internal and external walls of bricks or blockwork. Ties main feature is to prevent water transfer from the outer to the inner leaf of the wall.

The cavity width and the width of each wall determine the appropriate spacing of the wall ties which varies from a 900mm x 450mm staggered pattern to 450mm x 450mm for instance around windows. As a minimum for a standard brick cavity wall, a 50mm penetration of the ties into each leaf is suggested.

IMPORTANT TO REMEMBER

- ✓ ***Typical mortar joint is 10mm***
- ✓ ***Brick*** is 65mm height and 75mm with a mortar joint
- ✓ ***Brickwork gauge*** – allows for the consistent joints. Two courses of bricks will be 150mm, 4 courses will be 300mm.
- ✓ ***Avoid laying bricks*** in rain as it will stain your bricks with mortar
- ✓ ***Avoid laying bricks in low temperatures.*** Frost can make the mortar cracking. It has to be at least 2 Celcius degrees to start bricklaying
- ✓ ***Only mix mortar*** sufficient for one hour of bricklaying.
- ✓ ***Never add water to dry/stiff mortar***, mix again and always stick to same mixing proportion for one project
- ✓ ***While spreading*** create trench and use a little bit of mortar at a time to avoid it to become stiff
- ✓ ***To cut bricks*** use the angle grinder or stone saw- remember to use safety gloves and googles.
- ✓ ***Colouring agents can be added*** to mortar to achieve the particular finish