

Design and plan for blocks

What you will learn

When you have finished this section, you should be able to:

- Work out how many blocks you need
- Plan how the blocks will fit together
- Describe the type of foundations and reinforcing you need
- Ask for expert help with your plans at the right time.

What do I need to plan for?

Before you start building with blocks you need to know:

- The size and shape of what you are building
- How many blocks to buy or make — and what type
- How much cement/mortar you will need
- How the blocks will go together
- The size of the foundations needed for the blocks
- What reinforcing you need.

Warning

- Badly designed and poorly built walls can be very dangerous. When they are exposed to high winds, heavy rain, waves or earth movement they can break and fall down.

Well placed steel or concrete reinforcing can make walls very strong, but you need an expert to tell you how much to put in — and where to place it.

You **must** have expert help in the design and planning for any block wall over 1 metre high or 5 metres long.

You must have qualified engineering plans:

- For walls over 1.5 metres high or 10 metres long
- Walls for any house or work building

You may need government permits or local authority approval for your plans. This varies from country to country — check what is required in your place.

Things about the wall I am building

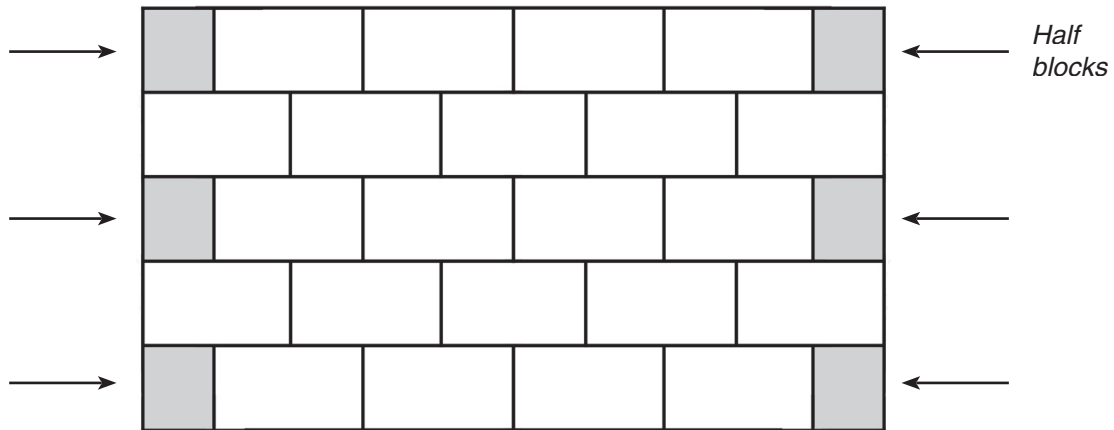
You need to know:

- The size and shape of the wall
 - How long?
 - How high?
 - How thick?
 - Does it have a simple end or does it join another wall at a corner?
- What is the wall for?
 - A low wall? A retaining wall? A house?
- What loads will be on the wall?
- What regulations apply to it?
- Where will I build it?
- What type of earth or ground underneath?

Numbers of blocks

Most buildings use the *stretcher bond* pattern for the layers of blocks. This is a simple and strong way to build. You will try out some other patterns in the next section.

Stretcher bond wall



You will need

- standard full blocks for most of the wall
- some half-blocks for the ends of walls

You may be able to make or buy half-blocks — or you may have to cut full blocks to size.

To work out the number of blocks you need you could;

Mark the sizes of the blocks accurately on your plan. Then count the number of full and half blocks for each layer and multiply by the number of layers.

For this wall (above) it would be 22 full and 6 half blocks. Count them for yourself.

or

If you don't have an accurate plan, measure and mark the length of the wall onto the ground, place blocks along your marks — and count them. Remember to leave space for the mortar.

or

Calculate by dividing the length of wall by the nominal length of your blocks and then multiply by the number of layers.

If you are free to make your wall to any length that you like, design it to fit the size of standard blocks. It will save a lot of block cutting later.

If you use 400mm standard blocks, the wall in the diagram above will be exactly 2 metres long. If the wall had to be 3.8 metres for some reason, you would have to cut one block in each layer to make things fit.

Foundations

All block walls need good foundations in the ground to support them.

Foundations are made of concrete.

The size of foundations depends on:

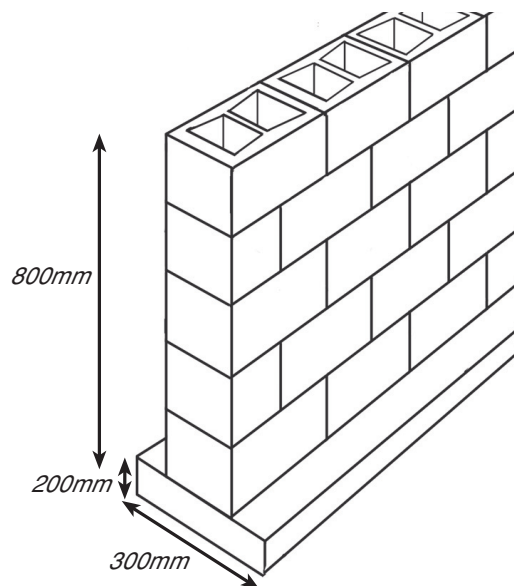
- the size and purpose of the wall — high, strong walls need big foundations
- the type of soil or earth underneath — soft or loose soil needs wider, deep foundations

Foundations for a house and any load-bearing walls **must** have steel reinforcing placed in the concrete.

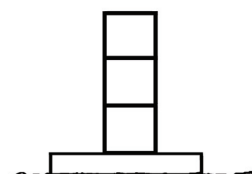
Your tutor will talk to you about the type and size of foundations you will need where you live.

Here are some very general guidelines:

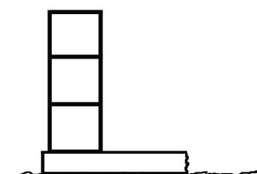
Wall height (mm)	Foundation thickness (mm)	Foundation width (mm)
600	150	250
800	200	300
1000	200	400
1200	200	500



Foundations can be just for the wall



or they could be a part of the concrete slab for a building

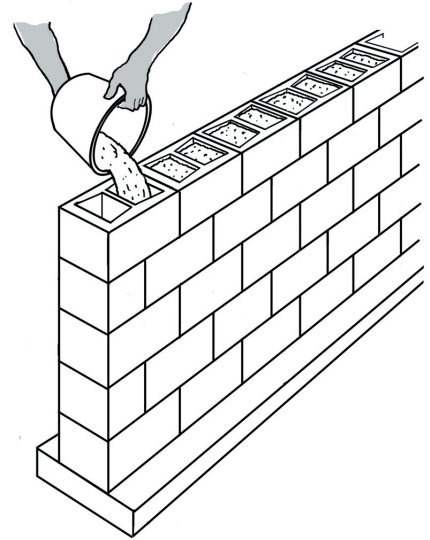
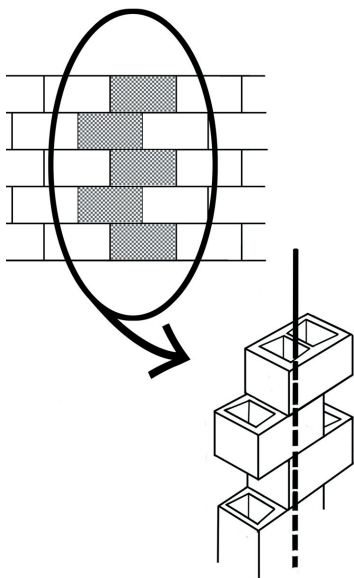


Reinforcing

Most concrete block structures need some reinforcing. This helps to

- make them stronger
- fight wind or waves
- stop cracking along the mortar joints
- stop the wall leaning or falling from its foundations
- bind the walls and floor of a building together.

Low walls can be reinforced with concrete poured into the cores of the blocks.

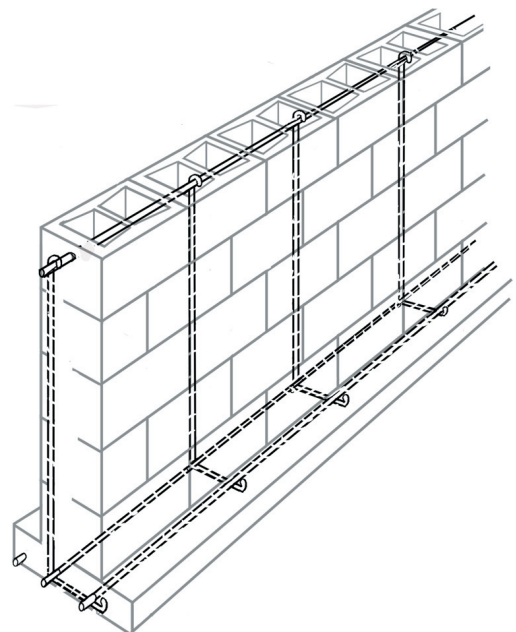


Walls over 1 metre high should have steel reinforcing rods placed in the cores, then filled with concrete.

Houses and all structural walls must have the steel reinforcing tied to steel in the foundations

As a rough guide, 12mm steel bars need to be placed at least every 600mm along the wall and across the wall every 1000mm high. The cores around the steel are filled with concrete.

Here is a diagram of typical reinforcing in a wall and foundations:



Activity

Work with others — and your tutor.

Your tutor will give you a project to work on.

**Work out the answers for these questions for your project.
Write or draw your answers.**

What type of blocks will you use? Full and half blocks?

How many of each type?

What size will the foundations be?

What reinforcing

- will be in the foundations?
- will be in the block wall?

Draw a plan of the wall, showing

- the size and depth of foundation
- the length and height of the wall
- how the blocks will be laid
- where the concrete or steel reinforcing will be placed.

Look at

Video — It shows types of blocks and block making

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