

Plan for concrete

What you will learn

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

- Work out how thick the concrete must be for a job
- Say when you need steel reinforcement
- Work out the amount of concrete needed for a job



Things you need before you start

Materials

Paper and pencil

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Tools

Paper and pencil

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Introduction

This course deals only with simple, small concreting jobs. For example paths or driveways and small slabs and foundations.

Big jobs or commercial jobs need experts to work out the loads and stresses and the right concrete mixture and construction.

All house or structural concrete work needs plans and specifications drawn by a qualified engineer. Local council permits may be needed as well.

You **must** have expert assistance for any large job, house or where the safety of people is concerned.

But, very small jobs are easy to do. They just need a little planning.

To plan your concrete, you need to:

- work out the size and shape of the area to be concreted
- work out how thick it should be
- think about steel reinforcing
- decide the type of concrete mix
- work out the amounts of water, cement, sand and rock you will need.

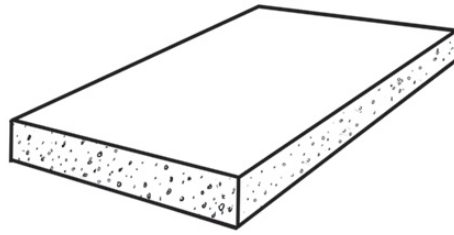
The size and thickness of a finished job

How big does the concrete need to be?

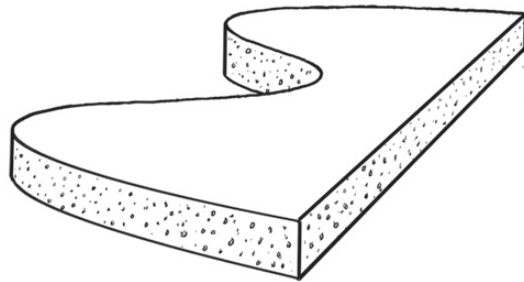
- a walking path needs to be about a metre wide — maybe more
- a driveway for cars will be at least 2.5 metres wide
- a concrete slab has to be the size of your planned building or yard area.

What shape is it?

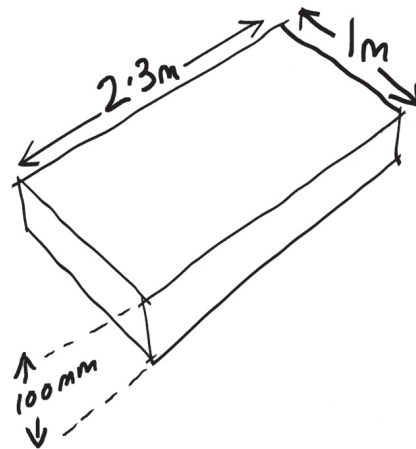
It may be a simple shape



or it may be a more complicated curved path

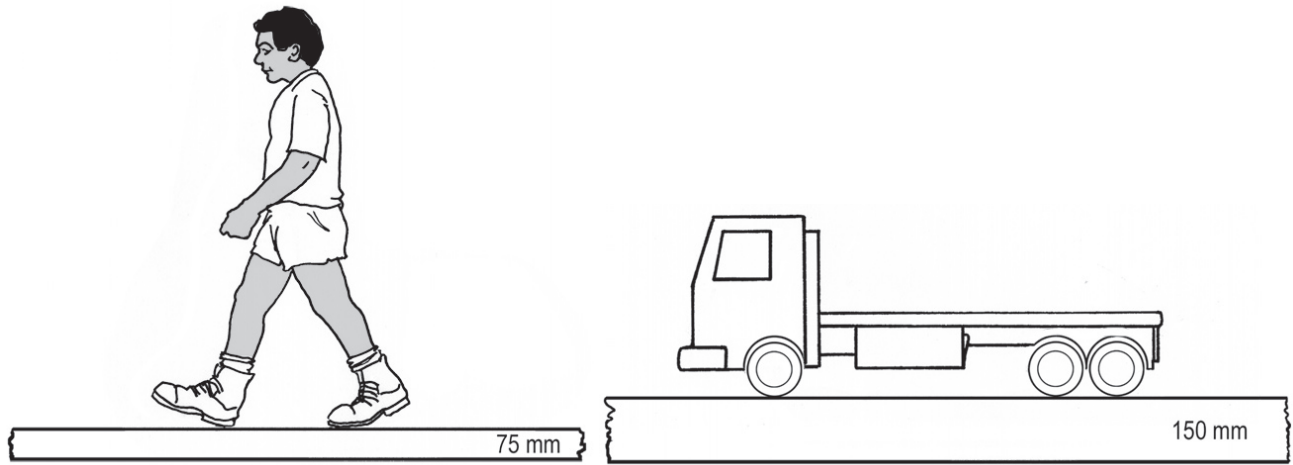


Draw a sketch plan. Write in the measurements



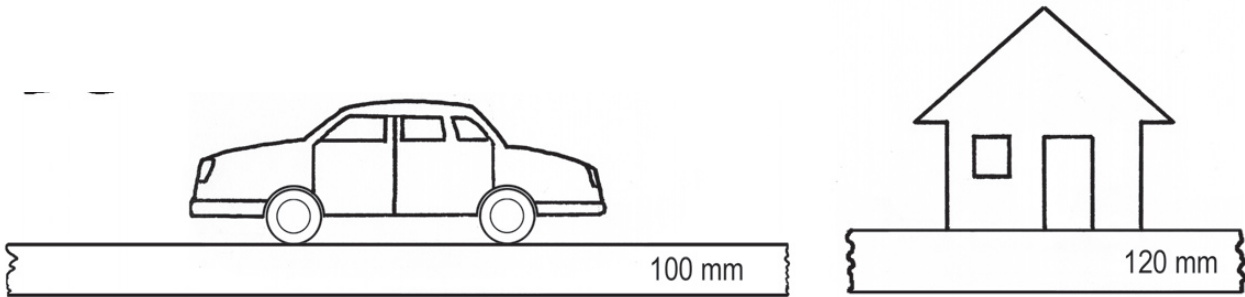
How thick does it need to be?

On good firm soil, here are some examples of how thick the concrete should be:



Path

Road



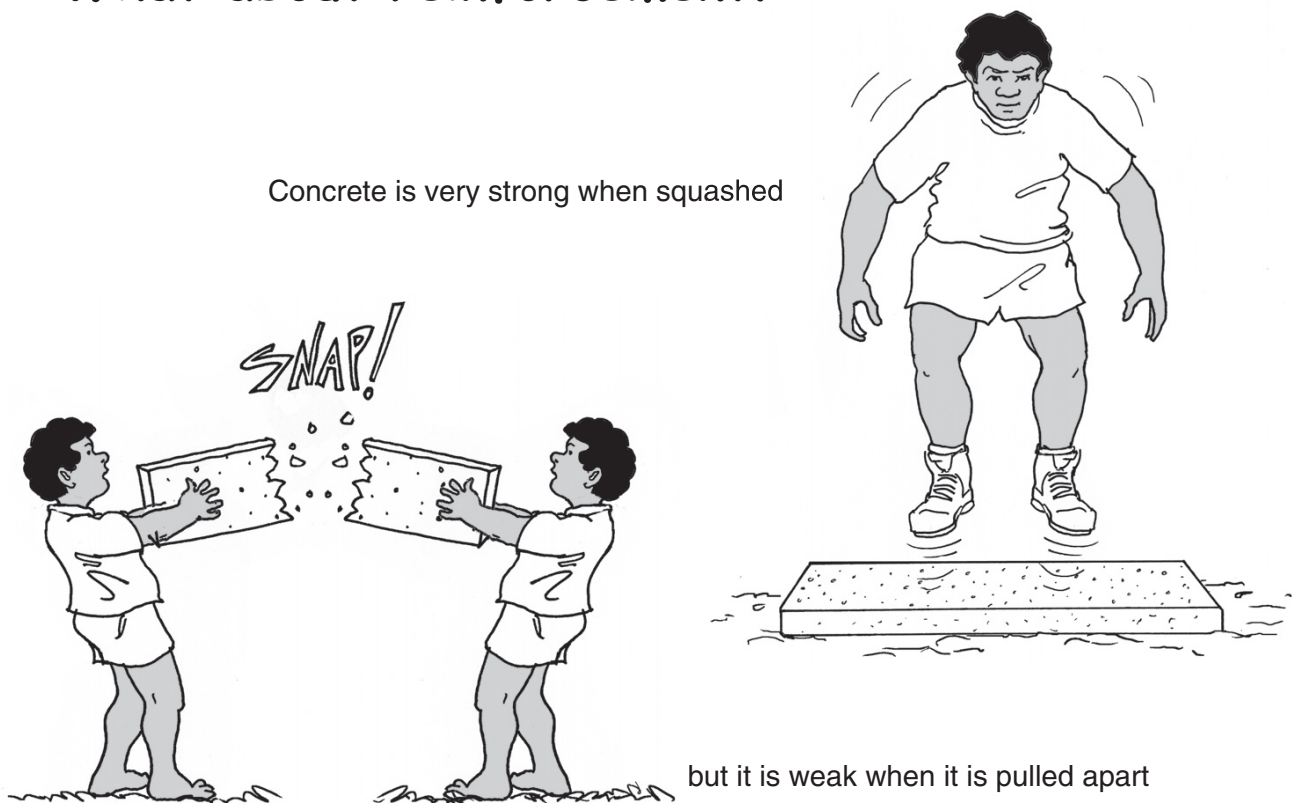
Driveway

House slab

On sand or other soft soil you may need much thicker concrete.

Have a look at the concrete paths and roads where you live. How thick are they?

What about reinforcement?

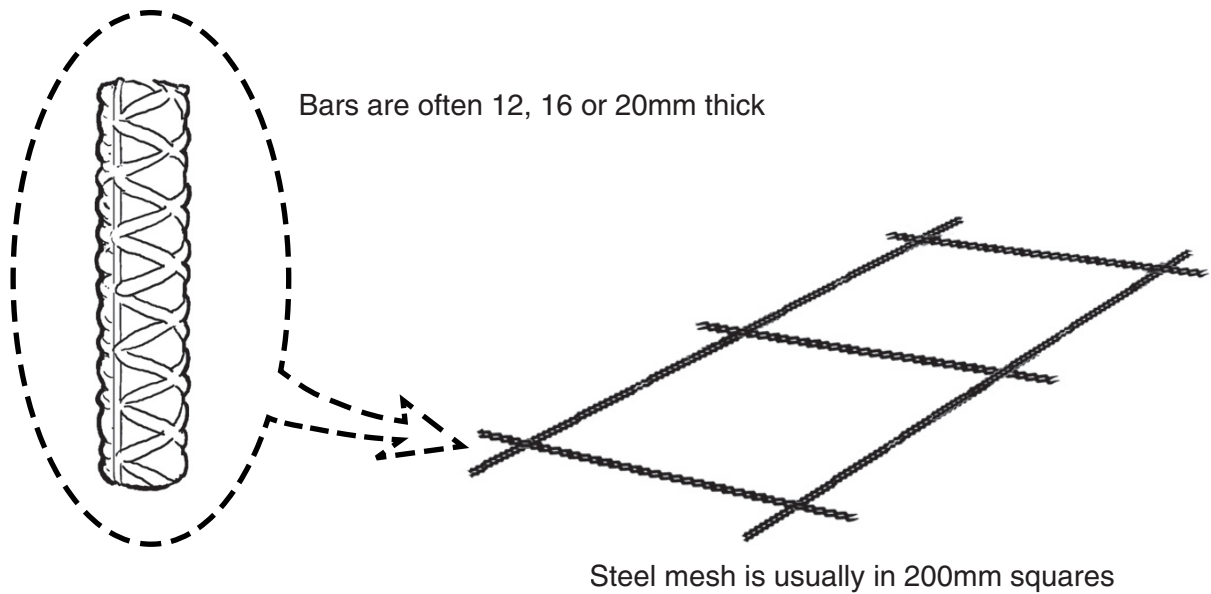


Reinforcement with steel bars or mesh will give concrete more strength.

Reinforcement will not stop a concrete path or drive from cracking, but it will stop it breaking up if it does crack. It is a good idea if the concrete is going to be used by cars and trucks — or if the ground is likely to move.

Slabs for a house and foundations for a wall should always include steel reinforcing. The reinforcing may also attach to the block walls. For foundations for houses and walls over one metre high, you **must** ask for expert advice and engineering plans of where to place the reinforcing steel.

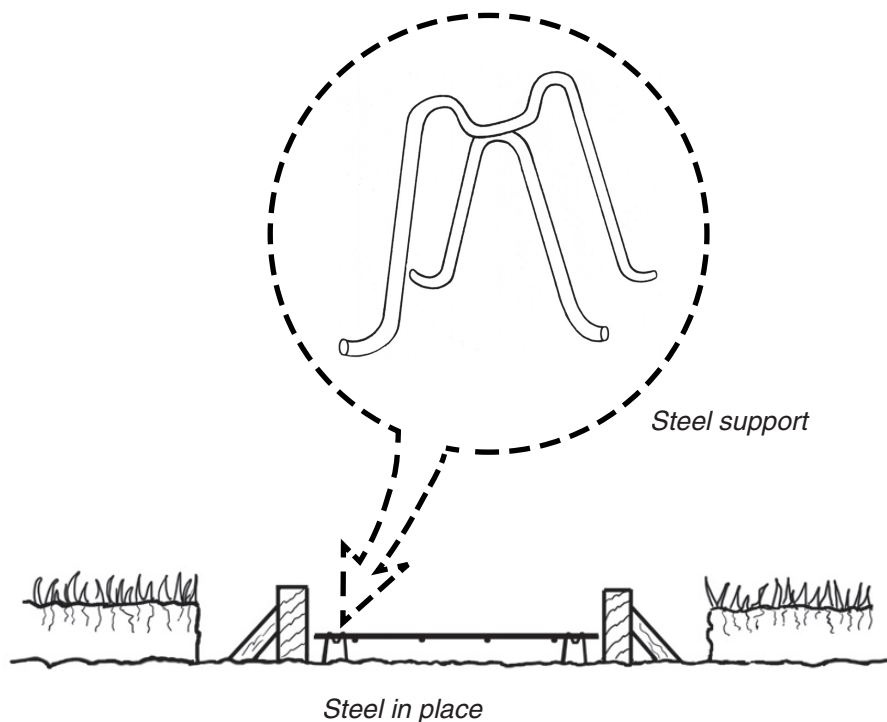
Types of steel in reinforcing



Steel must be clean — no grease, dirt or deep rust

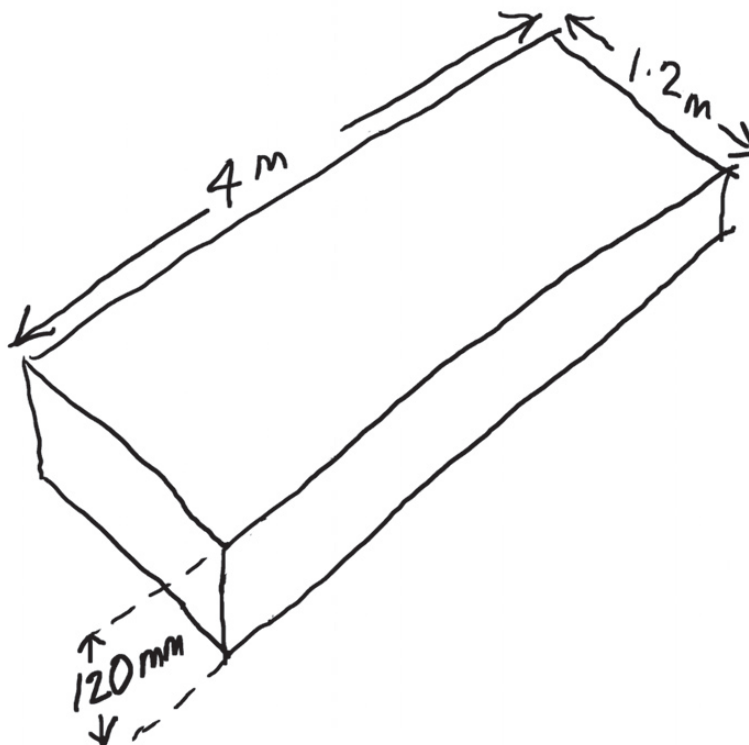
Reinforcing must be put in the right place to get most strength — and with enough concrete covering to stop the steel rusting. Steel should be at least 30–40mm from the top and bottom surfaces.

The steel mesh or bars are put on supports and fixed so they won't move when the concrete is poured and compacted.



Work out how much concrete you need

A simple drawing will help work out the amount of concrete you need.



The amount of concrete you need = area x thickness (area multiplied by thickness).

For example from the path plan above:

the path is 1.2 metres wide and 4 metres long

the concrete will be 120mm thick.

So the calculation is:

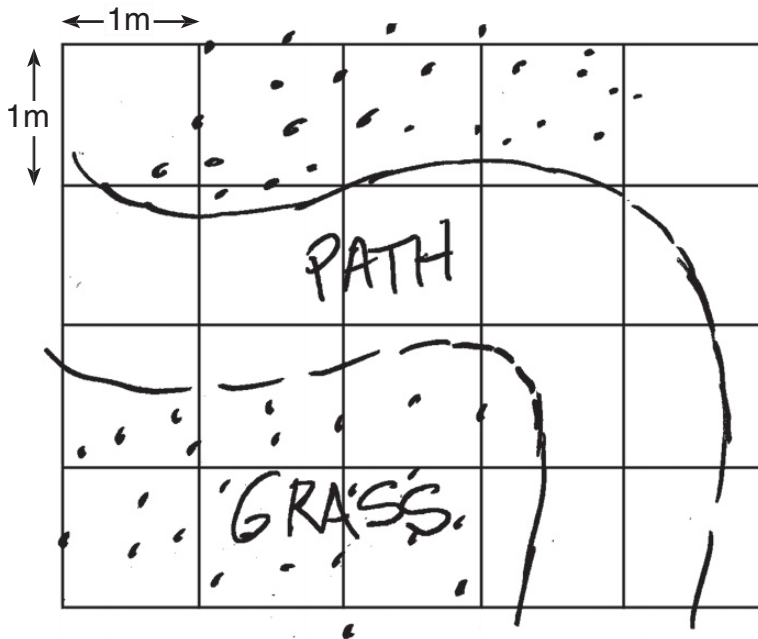
$$1.2 \times 4 \times 0.1 = 0.48 \text{ cubic metres.}$$

Use the chart on the “*different concrete mixes*” to work out how much cement, sand and rock you need.

The area of an odd-shaped or rounded path or slab can be harder to work out.

If you draw a rough plan on a paper that is marked out in 1 metre squares — it's easy!

Like this:



Add up the number of squares covered.

For part squares, just 'guess' how much is covered (for example a half, or 75%, or 'nearly all'). Add these all together and you will be very near to the amount you need.

The example here adds up to about 7.25 square metres

You could use smaller squares for a smaller job.

Activity

1. For each of these, work out the amount of concrete you would need:

- a path that is 1metre wide, 5 metres long and 100mm deep
- 4 postholes that are 300mm square and 450mm deep

Use the chart on the “*different concrete mixes*” to work out how much cement, sand and rock you need.

2. Work together with other students and your tutor on your project

Fill in these on your concrete project planning sheet (at the back of the course):

1. Draw a sketch plan for the project
2. Measure and mark the sizes and shape
3. Decide how thick the concrete needs to be
4. Work out:
 - how much concrete you need
 - the type of concrete
 - the amount of water, cement, sand and rock
 - the reinforcing you need.

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