



EFFECTIVE USE OF CONCRETE



Concrete is a versatile building material made by mixing cement, water, coarse (stone) and fine (sand) aggregates. It is the cement and water that forms a paste which glues the aggregates together and enables the concrete to set into a hard, durable product.

To obtain the maximum strength and durability from the product, it is necessary to follow some simple rules. These points are outlined in this guide.

Materials

To produce good concrete it is necessary to use good quality materials.

Cement

For general use around the home, Type GP Grey and Type GB Premium Cements are both suitable. The cement should be stored in a well-aired, dry environment, stacked off of the ground. Cement has a limited shelf life – do not use if it has become lumpy.



Water

Water for use in a concrete mix must be clean, fresh and free from impurities. As a general rule, if the water is suitable for drinking (potable), it will be okay for making concrete.

Aggregates

Both coarse aggregates, such as crushed rock & gravel, and fine aggregates such as sand, should be strong, hard and clean. Do not use aggregates that have impurities, such as clay, as this will weaken the bond of the cement paste.



Aggregates should be graded to contain a variety of sizes and should be stored so as to remain clean and dry.

Coarse aggregate (also called metal) with a 20mm maximum size is suitable for general concrete work.

Sand for concrete should be concrete sand and not brickie's or plasterer's sand.

Formwork

Formwork is the mould for the concrete and is usually made out of 25mm thick timber. Forms must be placed carefully and accurately with adequate bracing. Ensure that the formwork is smooth, clean and does not warp under the pressure of freshly poured concrete (fresh

concrete can exert considerable pressure). All formwork should be lightly oiled with a proprietary form oil or release agent to aid removal once the concrete has set. When placing formwork keep in mind drainage. Formwork should be slightly lower on one side than the other so rainwater can run off.



Reinforcing

When concrete is subject to very heavy loads or traffic it is wise to use steel or mesh re-inforcing. It is essential that the right amount of steel be used and that it is placed correctly in the concrete mass. Obtain further advice from your steel supplier.

Mixes

Site Mixed Concrete

When site mixing concrete, always measure materials by volume in a suitable container (i.e. a bucket). Do not measure by shovelfuls. For small quantities *DryPak* General Purpose Concrete can be used.

Mechanical Mixing

Place one quarter of the water in the mixing bowl with the coarse aggregate. Next add the sand, cement and remainder of the water. Mixing should continue for at least three minutes or until the mixture is uniform in colour and texture.

Hand Mixing

The coarse aggregate, sand and cement should be thoroughly mixed to a uniform colour prior to adding the water. The water is then sprinkled over the mix which needs to be frequently turned until the materials have combined into a plastic mass of even colour and consistency.

Note: Concrete should be placed within half an hour of mixing.

Pre-mixed Concrete

Pre-mixed concrete is available throughout metropolitan areas and in most country towns. It is supplied in quantities from 0.2m³. When ordering from the manufacturer, state the purpose for which the concrete is required, the quantity and the time of delivery. It is essential with pre-mixed concrete to begin placing and compacting the concrete as soon as the truck arrives.

It takes approximately 30 – 60 minutes for two experienced men to place 1m³ of pre-mixed concrete. This is a useful guide to estimate the time for a job.

Concrete Guide

Mix	Concrete Use
A	High structural concrete for thin reinforced walls, slender reinforced columns, fence posts and heavy duty floors.
B	Commonly adopted mixture for reinforced concrete beams, floors slabs, driveways, paths and footings for domestic buildings or walls

Parts By Volume				
Mix	Cement	Sand	Coarse Aggregate	Water (Bucket Per Bucket Of Cement)
A	1	2	3	2
B	1	2	4	2

DryPak General Purpose Concrete



DryPak General Purpose Concrete is a premium grade pre-packed dry-mixed concrete designed for medium strength applications and is available in 20kg and 30kg bags for ease of handling.

This 25MPa concrete is suitable for non-structural applications such as garden paths, borders, stepping stones, post fixing and light duty foundations.

It requires only the addition of clean water and mixing prior to use. On a clean surface, slowly add the water whilst mixing until a uniform, workable consistency is obtained.

DryPak General Purpose Concrete Guide

Bag Size	Max Water Per Bag	Yield Per Bag	Bags/m ² @ 50mm Thick	Bags/m ² @ 100mm Thick	Bags/m ² @ 150mm Thick	Bags/m ³
20kg	2.0 litres	8.5 litres	6	12	18	118
30kg	3.0 litres	13.0 litres	4	8	12	77

Application

Placing

Concrete should be placed in its final position as soon as possible after mixing or arrival on site. Moving of the concrete should be kept to a minimum, and always by use of a shovel rather than allowing the concrete to flow into place. Ensure that the concrete is placed on a firm compacted base and it is advised that you lightly soak the area to avoid excessive moisture loss.

Compacting

Compacting of concrete is necessary to minimise the number of voids. Voids in concrete decrease the overall strength. Compaction can be achieved by rodding or adequate tamping of the surface if mechanical vibrators are not available. For concrete 100mm or less in depth, a chopping/sawing motion across the surface with a surcharge of concrete in front of the board can provide adequate compaction.

For larger concrete jobs the use of a poker vibrator may be necessary to ensure that the concrete gets into the corners and is well compacted.



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Finishing

After placing and compacting of the concrete, it should be screeded level and floated quickly to ensure a flat, level finish. Be careful not to overwork the surface. After the initial finishing, water will come to the surface of the concrete.

This is known as bleed water. No final finishing should be done until the bleed water has dried up. If evaporation is slow, the bleed water can be removed by dragging a hose across the surface. Never add cement powder to the surface to absorb water.

Once the bleed water has dissipated and the concrete can withstand the weight of a person on knee boards, finishing can commence.

There are different types of finishes available, but the most common are smooth and non-slip. A smooth surface is best achieved by using a steel trowel after finishing with a wooden float. A non-slip surface is best achieved by dragging a stiff yard broom over the surface after finishing with a wooden float. It is a good idea to cut joints and edges into the concrete slab – this achieves two things: reduces the likelihood of cracking across your slab and also prevents the concrete chipping away at the edges.

Using a jointing tool, control joints should be introduced into your slab at regular intervals. Cut your joints towards pipes or post work as this is where your concrete is most likely to crack. It is advised that you use a straight edge or your screed board to ensure you end up with nice straight cuts. Once all joints have been cut use an edging tool to smooth out all edges on your slab.

Curing

Concrete must be protected against loss of moisture as soon as the surface is sufficiently hard to resist damage. This process is known as curing. A recommended method is to cover the concrete with plastic sheeting preventing moisture loss. Avoid wind uplift by securing the edges of the sheet. It is recommended that the surface of the concrete be periodically wetted down to reduce the risk of premature drying.

Another popular method of curing is known as ponding. This is achieved by building up the edges with sand and gently filling with water.

Concrete should be cured for a minimum of 7 days, and longer under some circumstances, and at no stage throughout the seven days should the concrete be allowed to dry out. Formwork should be kept in place during the curing period to help protect the edges of your slab. Contact your concrete or cement supplier if unusual conditions exist.

Concrete Colour

Concrete may be coloured in the following ways:

Cement

Cement is produced in grey, off-white and white, and will have a direct effect on the colour of the surface finish.

Pigments

Mineral oxides provide the most suitable pigments, as other colouring agents are likely to fade and reduce strengths of concrete. The mineral oxide powder needs to be

homogeneously mixed with the cement powder before water is added – this will ensure that the colour is thoroughly dispersed throughout the concrete mix. As a guide, the amount of oxide powder required will generally be 5 – 8 percent of the weight of the cement powder in the mix. For more information contact your local hardware store.



Coloured Concrete Topping

After laying and spreading the normal concrete base and before final set occurs, the coloured topping mix should be applied. A mixture of 1 part cement-oxide blend to 3 parts sand are mixed to a trowel consistency and placed as a topping over the still wet concrete. The surface is then finished and cured to normal good concrete practices as outlined above.

Concreting In Hot Weather

Once the air temperature reaches 30°C it is advisable to delay concreting until the weather cools down. If the job cannot be delayed the following precautions must be taken:

- **Keep raw materials out of the heat.**
- **Cool coarse aggregates by keeping them damp before mixing.**
- **Provide shade and wind breaks to work area.**
- **Dampen ground prior to placing concrete.**
- **Cure concrete for a minimum of 10 days.**
- **Avoid delays once concrete placement has commenced.**
- **Contact your cement or concrete supplier if unusual circumstances exist.**
- **Keep mixing time to the minimum necessary for uniform consistency.**
- **Place concrete in the early morning or coolest part of the day.**
- **Reduce the temperature of the mix water.**
- **Use a cement with a lower heat of hydration (i.e. Type GB Premium Cement).**

Concreting In Cold Weather

Once the air temperature falls below 10°C and the concrete temperature drops under 5°C it is advisable to delay concreting until the weather heats up. If the job cannot be delayed the following precautions must be taken:

- **Protect concrete from cold and frost by covering over night.**
- **Never lay concrete on frozen ground.**
- **Keep raw materials warm.**
- **Retain heat in concrete during curing.**
- **Heating the mix water.**
- **Use a higher cement content in your concrete.**
- **Use a higher early strength cement (i.e. Type HE Grey Cement).**
- **Use accelerating admixtures if available.**
- **Protect the concrete slab from cold winds by covering with a plastic sheet.**



The complete "Users Guide" is available from most leading hardware and cement suppliers.