



# Managing Your Project



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## Get the Best From Your Concrete

Correct preparation and finishing of the concrete can make a huge difference to the final appearance and durability. The following is not a complete guide, but is intended to provide some helpful advice on items to watch out for.

# Key Principles to Manage

## 1. **Expectations.**

The most important thing to understand is that concrete is a natural product with natural variation - it is not a perfect product and so some variation in texture and colour is to be expected.

## 2. **Concrete shrinks as it dries.**

Sawcuts are used to control where the shrinkage occurs. The more water in the mix the more shrinkage will occur, so avoid placing very wet concrete. Also control how fast the concrete is allowed to dry by curing and get sawcuts done in a timely manner.

## 3. **Allow the concrete to move.**

Shrinkage isn't the only cause of cracking - restraint is a major contributor. So sawcut between any restraints (eg footings, foundations, penetrations, slab thickening, sumps, drains, posts, and the like)

## 4. **Steel is more elastic than concrete.**

The mesh is used primarily to minimise crack widths, not prevent cracking.

## 5. **Concrete colour is mostly affected by water-cement ratio, and temperature.**

Different drying rates will give you a different colour so shading can cause problems, as can pours on different days. Avoid both.

6. **Traffic Management** is the responsibility of the site manager or owner.



# Plan Your Project

- » Patios, paths driveways and pool surrounds should be at least 80mm but are better at 100mm.
- » Consider using DPM (plastic sheet) for patios, paths and driveways: this eliminates moisture movement which can sometimes contribute to colour variation.
  - » Use bar chairs to keep mesh at the right level.
  - » Use 665 mesh. 668 is cheaper but has just over half the restraint of 665
    - » Plan where cuts are to be made.
  - » Don't use polypropylene/plastic fibres as a mesh replacement. It is our belief that polypropylene fibres help only with early age cracking reduction and are not suitable to replace mesh.

## Plan Your Pour

- » Check the weather. Hot windy days cause the concrete to dry quickly and so have higher cracking risk.
- » In Spring and Autumn, be aware of areas with shading as drying rates between sunny and shaded areas (eg under eaves, fences or trees) can cause set time differences resulting in colour differences are likely.
  - » Carefully check concrete volume - most important is the depth (if the concrete is 10mm deeper you will use 10% more).
  - » Try to use a 20mm structural mix: 10mm pump mixes shrink up to 20% more and so have a much higher chance of cracking.
- » Polypropylene fibres such as Sika Fibre can be used to help reduce the chance of early age cracking.
  - » Confirm the type of concrete, slump and volume that is required.
- » Work out the speed of supply - how close together the concrete trucks are required?
- » Order your concrete and pump at least 2 weeks before. Advise pump company they will not be able to blow back into the concrete truck on-site.
  - » Don't pour a project in a lot of small pours, they will be different colours.



# Getting Ready for the Pour

- » Ensure concrete is an even thickness throughout as thinner sections are more likely to crack.
  - » Saturate ground prior to pouring if not using DPM.
  - » Plan your sawcuts and mark on the formwork where they should be.
  - » Don't cut every second bar of reinforcement: this weakens the mesh which is supposed to hold the crack together.
    - » Tie mesh sheets together.
- » Get materials ready to keep the slab wet after finishing is complete (see below for curing options).
  - » If the job is a cash sale, organise payment.
- » Ensure there is safe and clear access to the site for concrete trucks.



# Pour Day

- » Pouring the concrete on a hot and windy day can be risky, as the cracking risk is much higher due to a higher evaporation rate. Go early in the morning while it is cool and have enough people to get the concrete in quickly, then flood as soon as is practicable after finishing. Also, use Sika Anti-Vap to reduce evaporation. See our 'Laying in Hot Weather' page for more discussion and options.
- » Try not to add water to the concrete truck on site unless absolutely necessary. Wet concrete is easy to place but it shrinks more and so cracks more.
  - » Use an anti-vap like Sika Anti-Vap on hot and or windy days.
  - » If a cold night expected get your sawcuts in same day, or use crack inducers or tooled joints to minimise chance of thermal shock cracking.
  - » The pumps will not be allowed to blow back any excess concrete into the bowl of the truck.
- » If there are any breakdowns, Bridgeman trucks are only allowed to be towed out by a specialised contractor that we will organise.



# Curing

Concrete should be protected from early loss of moisture (this loss can cause shrinkage cracking, as little strength development has occurred to withstand the stresses resulting from the volume change from evaporation).

Cure your concrete immediately after the finishing process for a **minimum of three days**, preferably seven.

## Methods of Curing

» **Ponding**: build a sand bund around the perimeter and fill with water to cover slab  
» Spraying: the use of sprinklers to keep slab continuously wet.

» **Covering**: impermeable covering such as plastic sheet will trap moisture on concrete surface and minimise evaporation.

» **Curing compounds**: apply after finishing when bleed water disappears (use with caution, these products may affect follow on trades like paint, tiles, vinyl, adhesives).

» Ensure curing is **even** and **consistent** - do not allow some areas to dry and some to stay wet during curing - different colors will likely result.

» **Do not** store anything on wet or covered concrete, as this will change the way the concrete cures beneath, likely colour variation.





# Technical Info



All Bridgeman concrete plants are externally audited and graded, subsequently all concrete produced complies with the NZS 3104 concrete standard. In addition Bridgeman concrete have a stringent internal Quality Assurance system coupled with qualified engineers and testing staff to ensure, product consistency, Quality and customer support where required.

For optimum results it is highly recommended that when commencing your project that an experienced concrete placer is engaged and that all aspects of the desired out-come(s) of your project are discussed with your concrete placer.

# Cracking

**Concrete cracks** may occur in concrete construction for a variety of reasons.

Cracking in concrete construction is almost inevitable because concrete, like most other building materials, moves with changes in its moisture content; specifically, it shrinks as it loses moisture.

Being a brittle material, it is liable to crack as it shrinks unless appropriate measures are taken to prevent this, e.g. by the provision of control joints.

**Shrinkage cracking**, although common, is not the only form of cracking.

Cracks may occur also due to settlement of the concrete, movement of the formwork before the concrete member is able to sustain its own weight, or due to changes in the temperature of the concrete and the resulting thermal movement.

Appropriate measures will at least minimise, if not prevent entirely, these forms of cracking. In all cases, joints at appropriate intervals will control cracking and ensure that it does not occur in a random fashion to the detriment of the appearance and long-term durability of the structure.



# Pinto

## Managing Before & After

### What is Pinto?

Pinto is a problem that occurs only from time to time but one that leaves all parties in a project disappointed. Unfortunately, despite being a global issue no single cause has been established and so it is difficult to prevent.

### Causes

It is a phenomenon that occurs from time to time, all over the country and internationally, and no single cause has been established despite investigations by most major industry players. It happens regardless of concrete company, location, season, cement, admixtures, aggregates, and in jobs both with and without added oxide colouring.

The only significant helpful evidence is that it only very rarely happens on house floors. House floors usually use a higher strength than exterior concrete, have polythene underneath and are power-floated.

Also, due to the shape and appearance of the defects, it is widely concluded that Pinto could also be caused by moisture movement within the slab.

So it is highly unlikely to be caused by the concrete supplied as jobs supplied before or after jobs that result in pinto are almost always unaffected.

### Prevention

Because the cause is unknown, it is difficult to know exactly what to do to prevent Pinto, but based on the example shown by house floors, we suggest that:

1. Polythene be used underneath.
2. At least 25Mpa concrete be used.
3. Surfaces are power floated.

Unfortunately even with the above measures, no guarantee can be made that pinto will not occur.



# Pinto

## Managing Before & After

### Fixing

Our advice if Pinto occurs is to either:

1. Give the concrete an **acid wash**, wait a few months and then give it another. This seems to open up the surface and facilitate some changes. Both time and using an acid wash have been shown to have a positive effect in many instances.
2. If time is not available, then a **tinted sealer** can be used to cover up the issue.

**Grinding:** In some instances (but not all) grinding the surface has removed the issue.

**White vinegar:** for smaller areas, white vinegar has been applied and left overnight and has successfully reduced the effect.

### Conclusion

Pinto is a very unfortunate situation for all parties, but some things can be done to reduce the chance of it occurring.

If it does happen, a light acid wash should be undertaken immediately as that can definitely help.



# Fibres

Fibres can be very beneficial to concrete when used in the right situations, but sometimes they are not a suitable replacement for normal.

Some contractors believe that polypropylene fibres are a replacement for mesh, but we do not agree.

## Plastic Fibres

There are hundreds of variants of plastic fibres and these have definite benefits when used in concrete. Primarily this is to reduce the risk of cracking when the concrete hasn't set yet, which they are very good for and so recommended.

Bridgeman Concrete use and recommend **Sika Fibre** from *Sika*.

Plastic fibres are not suitable as mesh replacement.

## Steel Fibres

Steel fibres can be a replacement for steel mesh, but only when engineered to do so. Their suitability is dependent on the location and design of the slab.

Please check with your Bridgeman Concrete Sales Manager for more info.



# Choosing a Contractor

The contractor, not the concrete itself, has the **biggest influence** on the outcome of a project and so they must be chosen carefully.

No matter if you're interested in a driveway, patio, walkway, or other type of project, there are plenty of professionals out there who can help you.

However, because there is no licence or qualification required for a contractor doing exterior work, nor is there a NZ standard, it's important to choose a contractor that will do a **thorough** and **proper** job.

Hiring a concrete contractor is more than just finding a name on an internet search or choosing the lowest price. If you want to ensure your project gets done on time, on budget, and with quality in mind.

Use the following tips (see next page) to make the right decision...





# Choosing a Contractor

## ✓ **Do your research.**

Before you hire anyone, you need to do your research. A simple internet search will give you a list of potential contractors in your area but consider also asking friends and family members for referrals.

If you contact your local Bridgeman Concrete plant, they can refer you to concrete contractors who have a good reputation.

## ✓ **Ask for and contact references.**

Before you sign any contract, always ask the contractor for a list of references, and then contact those references to learn more about the contractor and their operation.

Be sure to ask questions regarding the type of project, the length of the project, the contractor's communication and involvement, and the referee's overall opinion.

## ✓ **Go with your gut feel.**

You can tell a lot about someone by the way he or she acts.

Consider choosing a contractor that has a friendly demeanor, is willing to spend time meeting with or talking with you, answers your questions, and gets back to you in a timely fashion.

This type of interaction can go a long way in proving their dedication and quality. If the contractor seems hesitant to answer any questions, doesn't call you back, or seems standoffish in any way, consider it an unprofessional sign and move on.

Choosing the right contractor is essential to getting a great finished concrete project. When considering your options, be sure to use these tips to make the best choice.

# Choosing a Contractor

## ✓ **Look for experience.**

You want to ensure you choose a contractor who has experience. Try to choose one who has been in the business for at least **five** years, as this will give you some level of stability and reliability.

Experienced contractors will actively be a part of your project while also providing insights and suggestions to help your project run smoothly.

## ✓ **Compare prices.**

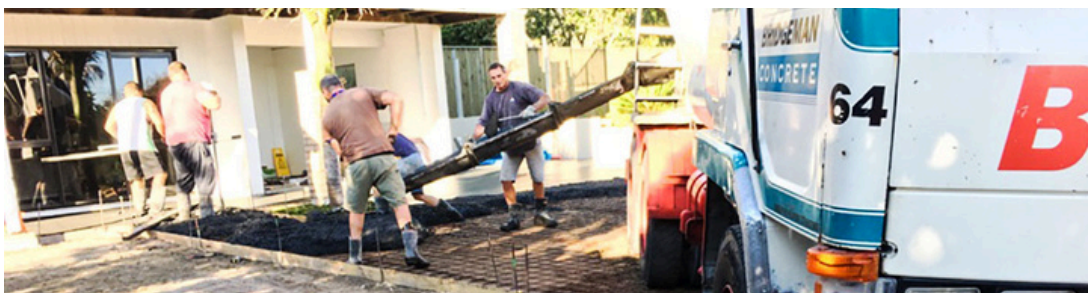
When you meet with contractors, they will typically provide you with a quote for the project. Compare the information you receive and use this to help influence your decision.

Look for quotes that included **compacted sub-base, mesh on chairs, saw-cuts**, and the **correct concrete**. Decide with the contractor who will be responsible for **curing**.

If you have a **big** area, ensure the project is done in as **few pours as possible** as colour differences are likely - smaller operators may struggle to do this.

So, you should be wary about choosing a contractor based on price alone, especially if that quote is significantly less than others.

These budget contractors may cut corners or provide low-quality work, and you don't want your project to suffer just to save some initial money.



# Laying in Cold Weather

When concrete sets it is the result of the cement having a **chemical reaction** with **water**. Very cold temperatures **slow down** this reaction, and so set times are slower. Keeping the temperature of the concrete **as high as possible** is therefore the goal.

## Precautions

**Precautions which may be taken to protect the concrete in cold weather may consist of one or more of the following practices:**

- Avoid very cold mornings, so pour later in the day when everything has warmed up.
  - Use (chloride-free) accelerating admixture and or higher cement contents.
  - Providing heaters, insulating materials, and enclosures if sub-zero temperatures are expected.
    - Do not placing concrete on frozen ground.
- Ensuring means of maintaining suitable curing temperatures - the temperature of the concrete should be maintained at 20°C or above for 3 days.
  - Insulating the concrete with a thick insulating blanket.



### Checklist:

- ✓ Avoid sub zero times.
- ✓ Use higher cement (strengths) mixes.
- ✓ Insulate.



# Laying in Hot Weather

**The effects of high temperatures can be summarised as follows:**

- Short set times and faster stiffening and setting.
- Faster rates of hardening.
- Increased tendency for plastic cracks (cracks that form when the concrete has not set).
- Difficulties in placing and finishing due to all the above.
- Danger of cold joints - (a cold joint is formed when plastic concrete is placed against concrete that has set and commenced hardening).



# Laying in Hot Weather

**A good day for drying your washing, is a very risky day for concrete.**

At higher temperatures, particularly if accompanied by hot dry winds, plastic cracking and premature stiffening of the concrete may take place. Minimising water loss from the concrete is the key principle to manage.

**Precautions for hot-weather concreting should be initiated when the ambient temperature is expected to exceed 30 to 35°C or lower if it is a windy day as well.**

**These precautions may consist of one or more of the following practices:**

- Plan the pour early in the morning to avoid time of very high evaporation.
- Dampening forms, reinforcement and subbase, or using Polythene below to stop water loss through base.
  - Erecting wind breaks and sunshades to protect exposed concrete surfaces.
  - Completing the transporting, placing and finishing of concrete as rapidly as is practicable.
- Informed usage of set-retarding admixtures (to counter premature stiffening of the fresh mix).
- Immediately following the initial finishing operation, apply **Antivap** by *Sika* (a fine film of aliphatic alcohol to reduce evaporation) over the exposed concrete (this should be repeated as necessary during any subsequent operations up to final finishing).
  - Immediate curing after final finishing is complete.

## Checklist:

- ✓ Avoid times of heat and wind.
- ✓ Use Anti-vap.
- ✓ Take precautions.
- ✓ Cure early.

# Toppings/Slabs

**It is recommended that any concrete poured on top of an existing slab needs to be either:**

- 1) **Separated** (but still supported by the lower slab) by means of 2 layers of plastic DPM to act as a slip layer,  
**or:**
- 2) Bonded to the existing slab by means of an **epoxy tie-coat (Sikadur 32 or similar)** to prevent.

## **Notes on Concrete Mix and Placement**

Concrete mix should be designed for minimum shrinkage and have low water/moisture content, and not be a pump mix as pump mixes have a higher paste content and are therefore more prone to shrinkage cracks.

Often poly fibre is added to reduce plastic shrinkage cracking in fresh concrete.

We recommend placement by wheelbarrow, and compaction by use of a handheld motorized vibrating screed. The edges of the old slab/new topping interface should be cleaned up as much as possible to produce a clean straight line between the two areas of floor.

Existing slab to be covered must be clean and free from any loose or deleterious material (water blasting or something similar).

**Curing** of the slab is **essential**. We recommend wet curing the slab with water, and covering with polythene for at least **4 days**.

The topping/screed can suffer from curling and delaminating as drying shrinkage occurs.



# Toppings/Slabs

## Bonded Slabs

Concrete poured on top of an existing slab needs to be bonded to existing slab by means of an epoxy tie-coat must be applied **immediately** prior to the fresh concrete screed being laid, to prevent the topping from curling and delaminating as drying shrinkage occurs.

An epoxy tie coat (**Sikadur 32**) must be applied immediately prior to the fresh concrete screed being laid In accordance with the manufacturer's instructions.

Any cut, cracks or joints in the underlying slab will reflect through the topping, so care should be taken to transfer marks from existing joints for saw cutting in the topping.

## Separated Slabs

Slip layers are generally only suitable for toppings of **80mm depth or greater**, and the surface of the underlying slab must be **smooth** and free from humps or hollows that will stop the slab from sliding freely.

## Floor coverings

Tests may be necessary to ascertain **moisture** content if other floor levelling compounds or vinyl etc. are to be laid on the topping at a later date.

**This is by no means a complete list of the issues involved with topping slabs, but a brief outline to give you an idea of the process involved.**

