

**CODE OF PRACTICE
FOR CONCRETE PLACEMENT OF
DOMESTIC DRIVEWAYS**
NEW ZEALAND MASTER CONCRETE PLACERS ASSOCIATION

Private Driveways

This document is a guide to what you should expect from a concrete contractor to minimise the risk of defects such as Pinto/concrete discoloration and cracking; it should be noted that this is purely cosmetic and does not affect the durability of the concrete.

Concrete is a natural material that arrives on site in an unfinished state. Weather, site conditions and finishing processes all influence the final appearance. Colour consistency, surface texture and flatness will vary and these variances do not constitute a basis for rejection of the finished product.

Colour swatches or samples are indicative only and the finished product will vary from these reference systems.

Concrete can crack. It is not possible to guarantee the absence of concrete cracking, regardless of processes and placing systems employed on the job.

Different locations can have different soils, sands and other matter that will need to be considered when making preparation for a project to be completed.

1.0 Preparation

1. Sub Base Preparation

- 1.1. It is important that the ground under the concrete is uniform in surface smoothness and has a good bearing capacity.
- 1.2. All soils, vegetation and weak material need to be removed and replaced with 100mm of Gap 20 or similar which needs to be placed and consolidated.

2. Surface Tolerance

- 2.1. Is to be +/- 10mm from the established datum for the work.
- 2.2. String lined in several directions - fall 1:100 minimum (10mm per metre fall)

3. Sand Blinding *(if used)*

- 3.1. Level tolerances +/- 10mm.
- 3.2. String lined in several directions.
- 3.3. Fall 1:100 minimum (10mm per metre fall)

4. Polythene

4.1. If polythene is used it should be placed on the prepared blinding and it serves three functions:

- a) To reduce the friction of the slab on the sub-base, reducing the extent of restraint that can increase the extent of shrinkage cracking.
- b) Ensuring that all moisture leaves in a controlled manner via the top of the slab rather than down into the sub base; and
- c) Controlling the likelihood of moisture from under the slab migrating to the top surface, bringing with it unwanted contaminants.

4.2. Things to note:

- a) If being sealed this will need to be done later as the moisture will stay in the surface longer.
- b) If using polythene under exposed there may be a delay in the washing off time.

5. Mesh/fibre

- 5.1. Steel mesh 665 or 668 should be used. Consider the use of polypropylene or cellulose fibre to control the risk of plastic cracking.
- 5.2. Mesh – overlap and tie sheets, reinforce internal corners, do not cut every second bar.
- 5.3. Mesh should be within the top 1/3 of the finished concrete level of the slab so chairs need to be the right height for the thickness of the slab.

6. Other Notes

- 6.1. Prepare a cutting schedule to place the control joints in the right locations, to ensure good function and acceptable visual appearance.
- 6.2. Ensure that there is a drawing showing the location of the saw cuts. Discuss timing of saw cutting i.e. within 24 hours – (Note: different areas of the country may react differently, resulting in different cutting times.)
- 6.3. Record all discussions with the client to provide a good record of what has been agreed, and who has taken ownership of the process.
- 6.4. Hot, sunny and windy days should be avoided for decorative jobs, or go early and beat the heat.

2.0 Concrete

- 2.1 **Thickness** – minimum of 100mm thick, however, the thickness needs to reflect use. If trucks or heavy vehicles will use it, then the slab needs to be designed to allow for this additional loading.
- 2.2 **Concrete** –20 MPa or stronger to be used – the higher the strength, the more cement and therefore better strength.
- 2.3 Control water on site. The rule as by NZS 3104 is 10 litres/m³
- 2.4 Consistent slump is needed for colour uniformity. Do not add water to pigmented concrete, but use admixtures if the slump needs to be adjusted.
- 2.5 Planning in advance and communication with the ready-mix plant is vital.
- 2.6 Slump, truck timing, concrete quantity all need to be organised before the job is confirmed.

3.0 Placement

- 3.1 Mask any buildings and fences that require protection.
- 3.2 Use larger pumps that can pump 19mm stone, which will result in less shrinkage and less cracks.
- 3.3 Carry out larger pours in one day to avoid differences in colour.
- 3.4 Vibration – correct choice of placing methodology is important.
 - 3.4.1 The concrete must be consolidated by either immersion vibrators, vibrating screeds or floats with mini-vibrators attached.
 - 3.4.2 **It is important to use the appropriate vibration to give consistent density in the slab.**
 - 3.4.3 **ALL CONCRETE MUST BE VIBRATED.**
- 3.5 Screed to correct levels, apply antivap
- 3.6 Bull Float – in two directions, apply antivap
- 3.7 Power float – power float before the final finish
- 3.8 Antivap (use a long arm sprayer) used after every trowel– this must be used especially if there is a chance of plastic cracking. The risk of plastic cracking needs to be monitored and dealt with by the antivap coating (it is not a curing compound) and by the use of polypropylene fibres.
- 3.9 Add no water to the surface of the concrete.
- 3.10 Final finishes – trowel, sponge and broom. These are needed for skid resistance, but the application of these finishes will increase the risk of plastic cracking. Fit for purpose has to be at the forefront when considering finishes i.e. hard trowelling gives a smooth finish which is slippery if used in outside projects.

4.0 Curing

- 4.1 IT IS STRONGLY ADVISED THAT ALL CONCRETE SHOULD BE CURED.
- 4.2 Consistent moisture control on the surface of the concrete is critical in managing colour consistency of the concrete.
- 4.3 Constant 24/7 curing with water is the simplest way to cure plain concrete, for a minimum of 4 days or 96 hours, or the use of other recommended curing methods.
- 4.4 Protect concrete from pets and humans in the first 12 - 24 hours.

5.0 Cutting

- 5.1 Hand cut/joint concrete with jointing trowel on the day – planning and marking out of hand cuts/joints on formwork needs to be done before concrete is confirmed or the use of crack inducers can be placed in the concrete during placing.
- 5.2 **Expansion Cutting.** It is recommended this is done 24 - 48 hours after concrete is placed. Some edge chipping may occur. Work on three metre centres, and cut to the cutting plan previously agreed. This will need to accommodate fixed restraint points such as sumps, drains, posts, re-entrant corners and changes in cross section. Three metre centres. Cutting depth is to be $\frac{1}{4}$ of the slab thickness.
- 5.3 All slurry to be controlled using suction truck or wet vacuum.
- 5.4 Decorative cutting – done if or as required.

References

Supporting documents to be read in conjunction with this document

- New Zealand Standards - NZS 3104:2003 *Specification for concrete production*
 NZS 3114:1987 - *Specification for concrete surface finishes*
 NZS 3109:1997 - *Concrete construction*

For more in depth information refer to CCANZ Information Bulletin IB80 – *Residential Concrete Driveways and Paths*

This document has been developed by members of the New Zealand Master Concrete Placers Association (NZMCPA with the assistance from Cement & Concrete Association of New Zealand (CCANZ), Chris Munn (Allied Concrete), Cameron Grieg (Peter Fell) and Derek Chisholm (Technical Committee, NZ Ready Mix Concrete Association).

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