Safe Environmental Guidelines

On Site Management of Concrete Washwater

Masonry Edition

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New Zealand
Concrete Masonry
Association Inc.

Introduction

As our living environment becomes more heavily used we need to be aware of the correct methods that must be used when disposing of fresh concrete, or water contaminated with it.

Due to the significant risk of environmental damage caused by concrete-related activities, city, district and regional councils are increasingly committed to enforcing the Resource Management Act, 1991 (RMA) against all companies or persons who fail to manage their waste correctly.

Many councils are now taking an active role in issuing infringement notices. Any person or company found breaching the RMA may be liable for an infringement fee of up to $1,000 or prosecution. Little if any leniency is being shown towards those infringing these regulations.

The recommendations set out in this document form what the NZCMA considers to be acceptable best practice for managing and disposing of fresh concrete or water contaminated with it. This document has been produced in partnership with the Auckland Regional Council who accept the various methods of wastewater control discussed here. The aim of this guideline is to stop the discharge of any cement slurry or wastewater from a site into the stormwater system and natural waterways.

Examples of Cases Where Controls Are Necessary.

- Washing down tools, mixers and wheelbarrows, etc. [Extra care required with use of a colouring agent].
- Hosing away excess materials.
- Washing down pumps and ready-mix trucks.
- Cleaning up spilt mortar or blockfill.
- Washing down completed walls.
- Masonry cutting operations.

Why is Run-off Control So Important?

The chemical processes that cause fresh concrete to slowly stiffen then harden are very complex. One by-product from this chemical reaction is the release of very large amounts of a chemical known as calcium hydroxide. This compound is very alkaline and has a high pH, sometimes as high as 12.9 on a scale of 14. (Drinking water has a pH of 7, and a strong acid a pH of 2 or 3.)

To make it even worse, the pH scale is "logarithmic". This means that each increase in number is a 10-fold increase in strength.

	pH	**Quantity of water required to dilute 1 L of each pH level to neutral (pH = 7)**
Neutral	7	0 L
Common pH Range of Concrete	10	1,000 L
	11	10,000 L
	12	100,000 L
	13	1,000,000 L

Water that comes into contact with cement, uncured concrete, concrete dust, etc, quickly produces a strong alkaline solution that causes chemical burns to fish, insects and plants. If even a small volume of concrete wastewater is allowed to enter streams, lakes, wetlands or harbours through the stormwater system, it can cause immense damage to the environment.

Why Can't I Just Dilute the Run-off to a Safer pH Level?

Because of the logarithmic scale of pH, a huge volume of water is needed to dilute the wastewater to a safe level, the dilution volumes are huge. To dilute 1 litre of "neat" runoff to a safer pH of 7, approximately 10,000 (or more) litres of water would be needed. If the correct dilution rates were not achieved in the attempt to dilute the contaminant, you will simply be increasing the size of the problem (on a massive scale) rather than fixing it.

Remember: "Dilution isn't the solution"

What Can I Do To Control This Problem On-site?

The site conditions will determine the most sensible preventative procedures that can be used. Washwater or slurry should be directed onto an area of ground close to the work area, where the alkaline water is absorbed by the soil and neutralized by naturally occurring chemicals in the ground. Great care should be taken to ensure the water or slurry does not run overland to the stormwater system or waterway. A shallow pit dug into the ground may help avoid this and constant monitoring is necessary to prevent overflow. It is important to note that large volumes of concrete wastewater can burn plant roots; avoid discharging water near plants where possible.

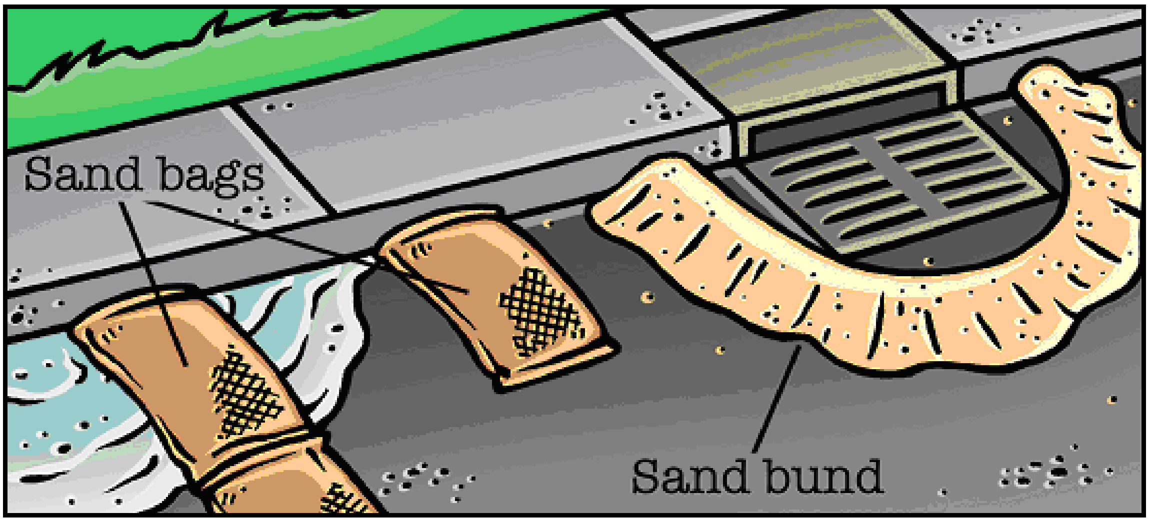
In Residential Construction:

When volumes of discharge water are relatively small, simply tipping the wash water over the lawn is a good option (the lime in the water is beneficial to lawns if small amounts are involved but if washwater contains any sand or aggregate this may not be a suitable option).

In areas where there is no bare ground, or the falls on the site direct the runoff directly into the storm water system or stream, more pro-active measures are necessary.

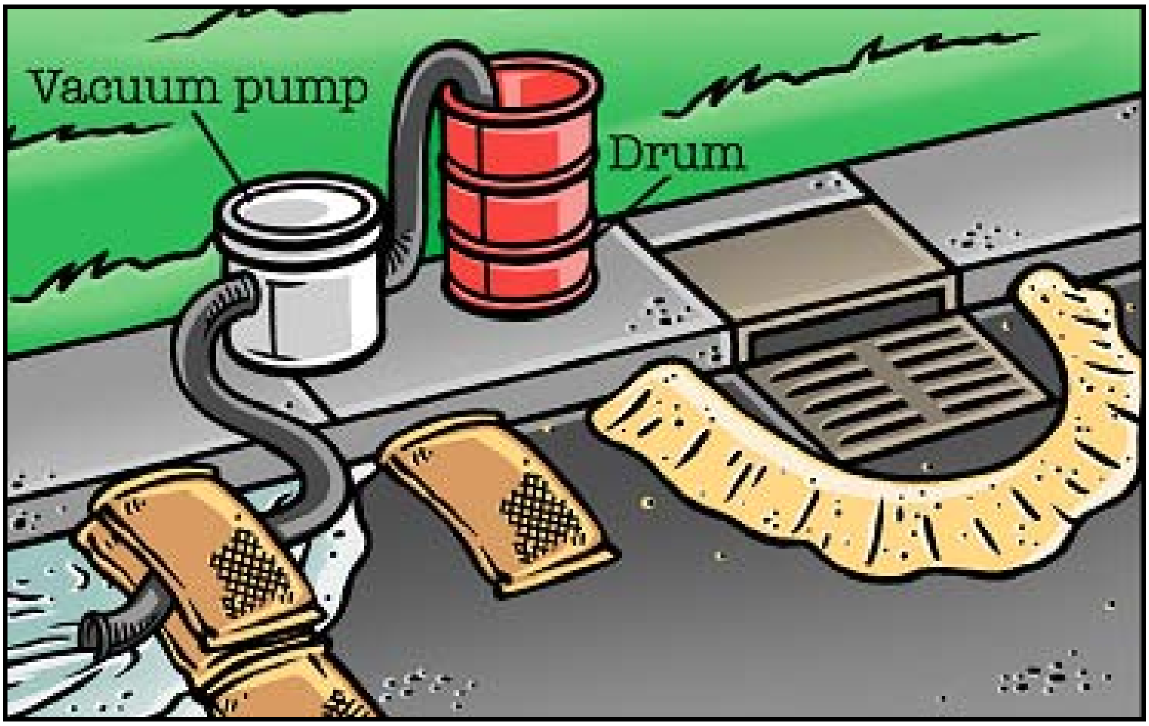
In this instance it will be necessary to intercept the water by use of "wet vacs" or by capturing the water in stormwater catchpits or sumps that have been securely blocked so no discharge can occur. The water can then be 'bucketed' or pumped out and disposed of to unsealed ground as above. If using the stormwater catchpit as a collection system ensure that all contaminated water and slurry is removed prior to unblocking.

Note: It is best to use these controls in the sequence described on pages 4-5:



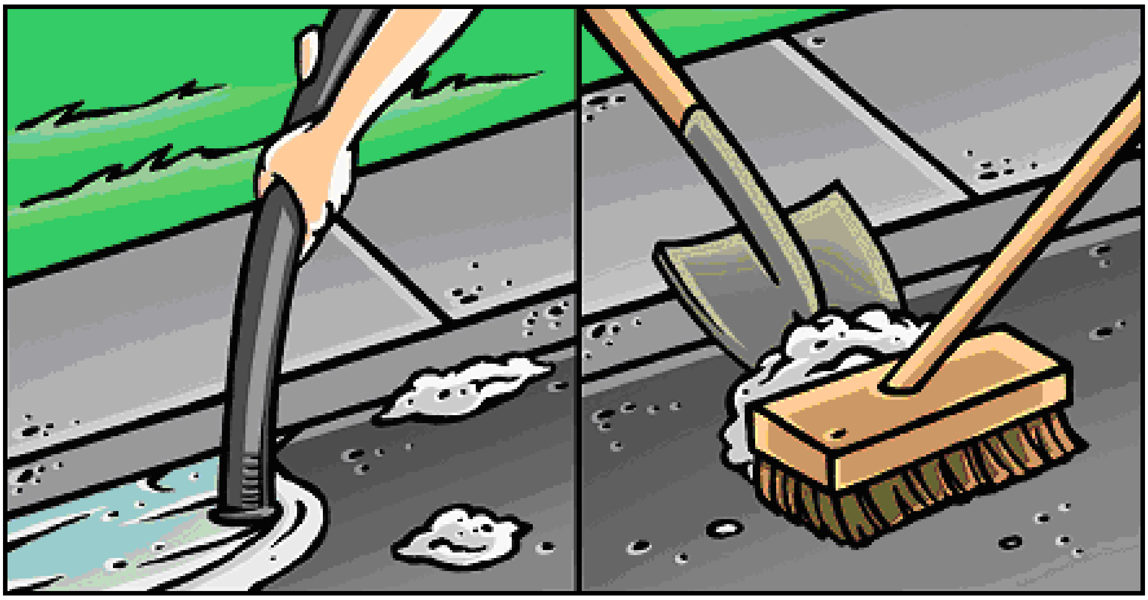
1. Establish a dam in street gutter using sandbags or earth.

Ensure sediment control is firmly against street gutter so as to stop any contaminated run-off leaking into drain.



2. A vacuum system can be set up to constantly suction up contaminated liquid as it reaches the containment dam.

Alternatively, at the end of a particular job, the built-up pool of contaminated liquid can be suctioned up before moving onto the next stage.



3. ***Always vacuum or sweep up any excess concrete slurry or residue left in the street gutter. Slurry may result in staining requiring specialist cleaning.***

There have been instances reported where temporary bunds of sand or similar materials have been used to direct the water flow without total success. Because of the dilution figures already explained, even a small amount of contaminated water escaping into the natural watercourse will have a devastating effect on fish life.

Filtering the runoff through straw bales or something similar is also ineffective, as the clear water, which is produced after passing through the straw, is just as highly alkaline and hazardous as it was before filtering out the suspended solids.

Continual monitoring is required to ensure the collection system is performing correctly. The courts will regard a poorly attempted control system as if no attempt had been made to control the runoff.

Make sure that the controls you intend to use will be effective.

In Commercial Construction:

Large sites are usually equipped with staging areas with a run-off control systems incorporated into them. These are usually designed to satisfy resource or building consent conditions and no further controls ought to be necessary.

Note: Stormwater ponds and stormwater treatment devices do not provide adequate treatment for concrete washwater.

On smaller sites, wash water will need to be either collected from a sump designed for the purpose for subsequent removal and disposal or directed to an area of ground for it to be absorbed and neutralised.

Simple On-site Guidelines

1. Plan and implement your wastewater control measures before starting your job. Also plan and prepare for a spill should it occur.

2. Control the volume of water used when washing down concrete surfaces, or cleaning mixers, wheelbarrows and tools. (Minimise the size of the problem).

3. Spilt or surplus mortar or blockfill should be allowed to harden and removed from site as hardfill.

4. Contain the washwater and slurry. Direct any runoff onto adjacent land for it to be safely absorbed, or into a pit. Ensure that temporary bunds are watertight and are monitored carefully.

5. Do not try to dilute the runoff and dispose of it to the stormwater system; this will make the problem worse.

6. Securely blocked-off stormwater sumps can be used as a last resort to contain washwater and slurry. The water can then be disposed to unsealed ground or removed from site for appropriate disposal.

7. Ensure you clean up after yourself once the job has been completed.

Remember: "Only rain goes down outside drains"

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