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Introduction

Many people in urban areas collect water from roofs for re-use on residential properties and as a means of reducing urban runoff. The Auckland Regional Public Health Service supports measures to reduce stormwater runoff, but recommends caution in the collection and re-use of roof water in urban environments. In this edition we discuss ways to collect, store and use roof water safely in urban environments.

Over the last few months there have been threats of cyanide contamination. In this issue we outline the symptoms of cyanide poisoning and discuss appropriate first aid measures for suspected cyanide poisoning incidents in non-occupational settings.

Safe non-potable use of roof collected water in urban areas

Many people in urban areas collect water from roofs for re-use on residential properties. Some territorial local authorities within the Auckland region encourage the on-site re-use of roof collected water as a means of reducing urban runoff. The Auckland Regional Public Health Service supports measures to reduce storm-water runoff, but recommends caution in the collection and re-use of roof water in urban environments. We do not recommend using roof collected rainwater in urban environments for drinking water purposes unless water is adequately treated and monitored. A recent study in the Auckland region (Simmons et al. 2001) have shown that roof collected water in the Auckland region is of poor microbiological and physico-chemical quality and would be unlikely to meet the New Zealand Drinking Water Standards 2000 (Ministry of Health 2000). Untreated roof collected rainwater should only be used for garden watering, washing cars and hosing paths. Roof collected rainwater could be used for flushing toilets provided that there is no direct connection to the reticulated water supply. Roof collected rainwater must never be allowed to contaminate the reticulated water supply. There are public health risks associated with the collection, storage and re-use of roof water in urban environments.

The position of the Auckland Regional Public Health Service on the unsuitability of roof collected water for drinking purposes in urban environments is consistent with international practice. For example the New South Wales Health Department does not recommend drinking roof water in urban areas. "The use of rain-water tanks for drinking purposes is not recommended where a reticulated supply is available".

Legal Requirements

The installation of a roof water tank will need to comply with local by-laws and in many cases will require a building consent. Plumbing work may require consent from your local territorial authority. The installation of a roof water tank must comply with the Building Regulations 1992 which state the following:-

The First Schedule Clause G12 Water Supplies requires that

- ▶ piped water supplies intended for human consumption, food preparation, utensil washing or oral hygiene shall be potable and;
- ▶ piped water supply and outlets provided with non-potable water shall be clearly identified and;
- ▶ water supply systems shall be installed in a manner which avoids the likelihood of potable water contamination.

Potable water (i.e. water suitable for drinking) is defined in the New Zealand Drinking Water Standards 2000 (DWSNZ) as *drinking water which does not contain any determinands which exceed the maximum acceptable values given in the DWSNZ.*

Water authorities/suppliers in the Auckland region do not allow the direct connection of rainwater systems with reticulated water supplies and/or require the use of backflow prevention devices to stop rainwater from domestic tanks entering the reticulated water supply. The local water supplier should be consulted prior to the installation of a roof water tank.

Microbiological hazards

The biological quality of roof water in New Zealand is usually poor (Ministry of Health 2001). Potential microbiological contaminants in roof collected water include E coli O157, Cryptosporidium, Campylobacter, Giardia and Salmonella. Salmonella and campylobacter bacteria are increasingly detected in roof water supplies in the Auckland region.

Likely sources of microbiological hazards in roof collected water include:

- ▶ soil and leaf litter accumulated in gutters particularly if kept damp for long periods of time due to poor drainage and/or maintenance.
- ▶ faecal material from animals including cats, birds and rats.
- ▶ dead animals and insects in the guttering or the tank itself (National Environmental Health Forum 1998).

Chemical hazards

Chemical contaminants commonly encountered in roof water supplies include copper, zinc, lead and arsenic. Copper pipes and flashings can be a source of copper and zinc may leach out of roofing materials. Roofing paints can be a source of metals entering rain-water tanks, for example some older roof paints may contain lead, chromium and cadmium (Ministry of Health 2001). Arsenic contamination is usually the result of roof water coming into contact with treated timber. The Auckland study (Simmons et al. 2001) found that 7% (1 out of 14) of supplies in which exposed treated timber formed a part of the system, had an arsenic level above the drinking water maximum acceptable value. Sources of lead in roof water tanks include lead paint or flashing on roofs, lead paint or soldering in guttering, soft soldered tanks or lead fallout from pollution including lead paint removal, woodsmoke, and lead washers from corrugate roofing (these can fall into water tanks). Sources of airborne contaminants (eg polyaromatic hydrocarbons, combustion products and dust) include traffic, industrial emissions and woodburners. Pesticide treated roofing materials and spraydrift may be a source of pesticide contamination in roof collected water supplies. Re- using old containers for the collection and storage of roof water may also result in chemical contamination.

Physical hazards

Large volumes of water are very heavy e.g. 1000 litres of water weighs 1000 kg (1 tonne). Tanks need to be installed in such a way as to ensure that they are secure i.e. they are unable to move and tanks structures are not likely to collapse. Roof water tanks should be securely covered to prevent access by children and must not pose a drowning risk. In particular the Auckland Regional Public Health Service does not recommend open containers as a means of collection and storage of roof water.

Rainwater that is not collected in the tank or overflows from the tank should be diverted away from tank foundations, buildings and other structures into a stormwater drain. It should not be allowed to pool or to run onto either the property or neighbouring properties.

Mosquitoes

Rainwater tanks can provide excellent habitats for freshwater container breeder mosquitoes. The best control measure is to prevent adult mosquitoes from entering the tank. The Australian National Environmental Health Forum (1998) recommends that inlets and overflows are covered with closely fitting removable insect-proof screens. The screens should be made of non-rusting material with a 0.315 mm diameter material and 6x7 mesh openings per cm². The screens should be readily accessible for regular cleaning. Mosquito larvae in rainwater tanks can be killed by the addition of a small quantity of domestic kerosene or bleach. (Check with the manufacturer of the tank before adding chemicals as some tank linings may be damaged by chemicals).

Recommended Risk Management Practices for Owners

This information is intended for property owners in urban areas. People relying on roof water supplies in rural areas are advised to contact the Auckland Regional Public Health Service for advice appropriate to their situation.

- ▶ Install an approved backflow prevention device if the roofwater supply is to be plumbed into a house for flushing toilets. This is a legal requirement.
- ▶ Install first flush devices on collection tanks.
- ▶ Install a protective sieve guard/screen on the inlet, outlet and overflow pipes to prevent birds and animals from getting into the tank.
- ▶ Outlets from the roof water tank need to be clearly labelled "not suitable for drinking". This is particularly important for tenanted properties.
- ▶ Ensure that children and visitors know that the roof collected rain water supply is not suitable for drinking i.e. teach children not to drink from outside taps or hoses.
- ▶ Make sure that water from the overflow pipe does not pond or flow onto your own or neighbouring properties.
- ▶ Maintain any roof collected water system on a regular basis.
- ▶ Do not use untreated roof collected water for drinking. In an emergency, roof collected water should only be used for drinking if there is no other source of drinking water and then must be boiled. Boiling water will destroy microbiological contamination, however roof collected water may still be chemically unsafe to drink. If no power is available, add 5 drops of household bleach e.g. Janola, per litre of water. Do not drink for at least 30 minutes after disinfecting.
- ▶ Wash fruit and vegetables in reticulated water.
- ▶ If roof water is to be used in the washing machine, use a dedicated tap to prevent other uses of this water.
- ▶ Use reticulated water for swimming and paddling pools and if children are playing under sprinklers.

References and Further Information

- Gadd J and Kennedy P (2001) House roof runoff: is it as clean as we think? 2nd South Pacific Stormwater Conference 2001. <http://www.kma.co.nz.pubs1.htm>
- National Environmental Health Forum (1998) Guidance on the use of rainwater tanks. National Environmental Health Forum Monographs. Water Series No. 3. <http://enhealth.nphp.gov.au/council/pubs/pubs.htm>
- Ministry of Health (2001) *Household Water Supplies*. Ministry of Health, Wellington.
- Ministry of Health (2000) *New Zealand Drinking Water Standards 2000*
- Simmons G., Hope V., Lewis, G., Whitmore J., and Gao, W (2001) Contamination of potable roof-collected rainwater in Auckland, New Zealand. *Water Research* 35(6) 1518-1524.

▶ For further information please contact Megan Owen and Snezana Nickolic in the Environmental Health Team telephone 09 262 1855.

Cyanide Poisoning

There have been recent threats of cyanide contamination. The following article outlines the symptoms of cyanide poisoning and discusses appropriate first aid measures for suspected cyanide poisoning incidents in non-occupational settings.

What are the symptoms of cyanide poisoning?

When cyanide has been eaten it may produce a bitter, pungent, burning taste in the mouth and sometimes numbness and tightness in the throat and stiffness in the lower jaw. Salivation, nausea and vomiting often follows and an odour

of bitter almonds may be on the breath or vomit. A sign that is sometimes found when cyanide poisoning has occurred is a red or pink discolouration of the skin.

Where cyanide has been inhaled the patient may feel generally unwell and experience a headache, dizziness, giddiness, confusion and/or anxiety.

Patients may also experience an irregular heartbeat and chest tightness. In severe cases breathing becomes rapid and deep and then becomes slow and gasping. Fluid may enter the lungs and cause breathing difficulties. Unconsciousness, convulsions and death can quickly follow depending on the degree of exposure.

Where cyanide has come into contact with skin a burning sensation may be felt on the area affected and the skin may become discoloured. Where cyanide has come into contact with the eyes patients may feel a slight irritation. Very high exposures to cyanide vapour may damage the retina and optic nerves.

How should people respond to a suspected cyanide poisoning?

In all cases of suspected cyanide poisoning immediate ambulance and medical attention should be sought by dialing 111.

Decisions about treatment will vary depending on the circumstances; however general treatment for mild exposure to cyanide includes oxygen and bedrest. Treatment for moderate to severe exposure includes oxygen and antidotes.

Where cyanide has come into contact with skin the area should be well flushed with plenty of cold water and soap. Contaminated clothing should be removed by someone wearing gloves.

Where cyanide has come in contact with eyes, the eyes should be flushed with cold water for at least 15 minutes.

Where cyanide has been inhaled the patient should be removed to an uncontaminated area.

Where cyanide has been ingested the patient should not be induced to vomit as the expelled stomach contents may be contaminated or hydrogen cyanide gas may also be expelled. If the collapsed person vomits during resuscitation in open air and if that person has ingested cyanide, the risk to a resuscitator remains low.

If resuscitation is required, the Ministry of Health recommends using the same precautions you would use in first aid to protect yourself from infections. Pre-cautions may include the use of gloves and a one-way valve resuscitation mask (for example Life Aid). This advice would not apply in an industrial accident where the suspected level of cyanide poisoning may be much higher. If vapour is inhaled the resuscitator should withdraw to open air, and recovery is usually rapid.

▶ For further information please contact The Duty Medical Officer of Health, Environment Team, Auckland Regional Public Health, ph 262 1855 or the National Poisons Centre 0800 764 766.

Cyanide related websites:

Ministry of Health

<http://www.moh.govt.nz>

New Zealand Police

<http://www.police.govt.nz>

New Zealand Food Safety Authority <http://www.nzfsa.govt.nz>

Occupational Safety and Health Advice on handling suspicious packages <http://www.osh.dol.govt.nz>

National Poisons Centre Toxins database

<http://www.toxinz.com>

Short Notes

▶ New Drinking Water website

The Ministry of Health has developed a new drinking-water website (<http://www.moh.govt.nz/water>) which provides information on drinking water in New Zealand. The site provides information on the current status of drinking water in New Zealand. The site also has links to the Health Education Resources website with pamphlets, posters and other resources available on several drinking water issues including water-borne diseases, water treatment in emergency situations, rainwater tanks and fluoride.

▶ Updates for Early Childhood Education Centres:

Minimum height of fences and gates

The Ministry of Education has advised that all licensed centres are required to have childproof fencing and gates at least 1.5 metres high (previously 1.2 metres was considered adequate). Fencing needs to be childproof - refer Assessment Information for Childcare Centres 1999. Swimming-pool type fencing is preferred. Existing centres should upgrade their fencing and gates as part of their ongoing maintenance programme.

Provision of nappy changing facilities

The Ministry of Education has advised that all licensed centres are required to have appropriate nappy changing facilities (not just those catering for "Under 2s"). Please contact us for further advice about installing or upgrading nappy changing facilities or shubs, to ensure they are appropriate and hygienic.

Maria Wood



Maria was recently appointed as a Scientist Planner with the Environmental Health Team. She has a Master of Science from Waikato University and has completed papers in environmental law. Maria has been working in environmental science and resource management for 8 years in both the public and private sectors. She has expertise in resource management and legislative and policy planning procedures from a local to national level and is experienced in environmental monitoring particularly ecology and water quality, and soil conservation. She has been involved with coastal development projects, energy & utility schemes, forestry, and agriculture. Maria is working towards strengthening relationships between the local and regional authorities and the Auckland Regional Public Health Service (ARPHS) to achieve public health objectives and is overseeing ARPHS interests in the RMA consent process.