

Built shade is a good form of sun protection



Well-designed shade structures can provide safe and comfortable outdoor spaces for summer activities, protecting people from the sun's ultraviolet radiation (UVR). Shade is appropriate for those places where groups gather. In public spaces, summer shade is required, for example, over outdoor cafes and spectator areas at sports grounds. The Cancer Society resource *Undercover*¹ has detailed information about shade design and materials.

In schools, shaded spaces can be created for outdoor classes, small assemblies, eating lunch, and places where students gather to play, such as over play equipment, sandpits and courts. The Cancer Society has information on shade structures for schools on our website (www.cancernz.org.nz). In homes, shade can provide attractive outdoor living spaces for dining, lounging and children's play.

Where people are moving between shaded and open areas, it is important to consider built shade as an additional protection to the use of hats, clothing, sunscreen, and glasses.

Shade design challenges

The New Zealand environment creates unique challenges for shade design because the climate is windy, changeable and temperate. Fixed structures often need engineered fixings to cope with the wind. Lighter more temporary shades may need to be removed in high winds.

Most importantly, because the high UVR times of September to April (the temperature can sometimes be cooler) we often need shade that is **warm** rather than cool.

Shade design

The design of shade needs to be right for its intended use and the micro-climate of the location. The following issues should be considered.

The sun's path

The path and angle of the sun should be plotted so the area is shaded from the direct high UVR periods. These are September to April, especially between 10am and 4pm. The best orientation is often north-facing to give good shade coverage in the summer, while still allowing low winter sun to fill the space.

Scattered ultraviolet radiation (UVR)

Indirect UVR is scattered by the clouds and atmospheric particles (dust). A site can often receive as much scattered UVR as it does direct UVR. Shade structures should have a width no less than 3 metres wide and be low-sided in order to reduce exposure to scattered UVR.

Reflected UVR

UVR is also reflected off surrounding surfaces, such as concrete, water, metal and snow.¹ In order to absorb and diffuse UVR, surrounding surfaces should be soft and rough. Grass and plants do this well.

Shade materials

Shading materials need to be chosen with care. Solid materials provide a 100 percent barrier while perforated materials provide less of a barrier. Although normal window glass offers little protection from UVR, some laminated and/or specialty glass is a good barrier. Polycarbonate provides a high degree of protection,¹ while other translucent plastic sheeting may be of little use. Many sunshade fabrics can be stretched over frames or tensioned, as 'sails', between

poles. Horticultural shade cloth offers lower protection and is not recommended. UVR protection ratings for translucent sheeting and shade fabrics vary widely. Check with the manufacturer's specifications before choosing a material.

Creating warm shade

In temperate locations various design strategies can provide warmth. Dark tone, high-mass paving, such as coloured concrete, if oriented to the morning sun, will slowly release stored heat later in the day. Some shade materials, such as translucent polycarbonate, transmit light and heat while blocking UVR.

Other shade materials, such as metal roofing, provide a solid block, but will radiate heat. Darker fabrics absorb more UVR than lighter colours and also radiate the heat.

Temporary shade

UVR intensity varies hugely from mid-summer to mid-winter. Apart from situations for example, snow fields, with highly reflected UVR,² it is generally safe to be in full sun during the winter months (May to August).

Shade material can be removed during this time. Removing shade also reduces wear and tear on the fabric.

Maintenance issues

While permanent materials are usually durable and require little maintenance, shade fabrics can be vulnerable to vandalism. Shade fabrics should be designed to be out of reach and structures sited where the public can keep an eye on them.

Natural shade

Trees can provide excellent shade. Deciduous trees and vines can be an ideal shade solution in providing protection only when it is required. For more information, read the *Tree Planting for Schools* Information Sheet on the Cancer Society's website (www.cancernz.org.nz).

Multipurpose structures

In new developments, shade is often an afterthought and/or the first element to be removed in budget cuts. Well-located, covered spaces can have many uses. As well as summer shade, a north-facing veranda can prevent overheating of the host building and provide dry outdoor space in wet weather.

Shade designers and manufacturers

Public, sports, educational and residential environments should have summer shade. Your architect and/or landscape architect can advise on the best solution for individual situations. Talk to your local Cancer Society for information on designers and suppliers.

For further information on designing shade refer to:

- 1 Greenwood, J.S. Soulos, G. P., and Thomas, N. D. (1998). *Undercover: Guidelines for shade planning and design*. Sydney: NSW Cancer Council and NSW Health Department. Adapted for New Zealand use by the Cancer Society of New Zealand, 2000. http://www.cancernz.org.nz/Uploads/Guidelines_Under_Cover.pdf
- 2 World Health Organization. (2010). Ultraviolet radiation and the INTERSUN Programme. Which environmental factors affect a person's UV exposure? from <http://www.who.int/uv/faq/whatisuv/en/index3.html>