

Shade structures



Built shade is a good form of protection

Well-designed built shade structures can provide safe and comfortable outdoor spaces for summer activities. They are particularly appropriate where groups congregate. In public spaces, summer shade is required over outdoor cafes and for spectators watching sports. In schools, shaded spaces can be created for outdoor teaching, small assemblies, eating lunch, and places where children gather to play; over play equipment, sandpits and courts. In homes, shade can provide attractive outdoor living spaces for dining, lounging and children's play.

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

Shade design challenges

The New Zealand environment creates unique challenges for shade design. As a south sea island, the climate is windy, changeable and temperate. Fixed structures often require engineered fixings to cope with the wind loadings. Lighter more temporary shades require constant monitoring. Most significantly, unlike tropical countries and Mediterranean climates, we often want our shade to be warm rather than cool.

Shade design

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

Sunpath

The path and angle of sun should be plotted to ensure the area will be shaded from the direct sun between 11am and 4pm through October to March. The best orientation is often north-facing, to give good shade coverage in the summer, but allow low winter sun to penetrate the space.

Scattered ultraviolet radiation (UVR)

Indirect UVR is scattered by the clouds and atmospheric particles. In many situations, a site can receive as much scattered UVR as direct UVR. In principle, shade structures should be deep (greater than 3m) and low sided in order to reduce exposure to scattered UVR.

Reflected UVR

UVR is also reflected off surrounding surfaces. Although snow can reflect up to 80 percent of the UVR it receives, the reflectance of other materials is usually less than 10 percent. 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. 'Under-cover'¹ the Cancer Society publication, recommends a 94 percent barrier to UVR. Obviously, solid materials would provide a 100 percent barrier and perforated materials the percentage proportional to the solid area. Although normal window glass offers little protection from UVR, some laminated and/or specialty glass is a good barrier. While polycarbonate provides a high degree of protection, 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. As UVR protection ratings for translucent sheeting and shade fabrics vary widely, it is important to 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 (eg coloured concrete), if orientated to the morning sun, will heat up to slowly release the heat later in the day. Some shade materials (eg polycarbonate) transmit light and heat while blocking UVR.

Other shade materials (eg metal roofing) provide a solid block, but in turn radiate heat. Darker fabrics absorb more UVR than lighter hues and also radiate the heat.

Temporary shade

The UVR intensity varies hugely from mid-summer to mid-winter. Apart from situations (eg snow fields) with high reflected UVR, it is generally safe to be in full sun during the winter months (April to September).

The shade material can be removed during this time. This strategy also reduces fabric deterioration.

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 to be under public surveillance.

Natural shade

Trees can be excellent 'shade structures'. Deciduous trees and vines can be an ideal shade solution in providing protection only when it is required. Unfortunately, native trees are generally evergreen.

Multipurpose structures

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

Shade designers and manufacturers

Summer shade should be an integral feature of public, sports, educational and residential environments. Your architect and/or landscape architect can advise on the best solution for individual situations. Shade manufacturers generally design using shade fabric only. Consult your local Cancer Society for information on designers and suppliers.

For further information on designing shade refer to 'Undercover – Guidelines for shade planning and design'. The publication is available at a cost of \$17.50 from your local Cancer Society.

References

1. Greenwood J S, Soulos G P, Thomas N D. Under cover: Guidelines for shade planning and design. NSW Health Department Sydney, 1998. Adapted for New Zealand use by the Cancer Society of New Zealand, 2000. Factors Affecting UVR levels."
2. McKay C, School of Architecture and Design, Victoria University.