

Thermal mass in the Rotorua NOW Home

Passive solar design in the Rotorua NOW Home included a concrete slab floor; however, the family did not get the maximum benefit from their thermal mass.

Making the most of the sun's warmth, and retaining the heat is important in the colder climate of Rotorua. The Rotorua NOW Home is oriented north, with both living areas, the dining area and one bedroom on the northern face of the house. Large windows and doors on the northern side admit the maximum amount of sunlight during winter while 900mm overhanging eaves provide summer shade.

To make the most of the sun, the Rotorua NOW Home sits on a 100mm thick concrete slab and footings. This acts as a heat store, absorbing warmth from the sun and releasing it gradually overnight. It is insulated with expanded polystyrene insulation panels both underneath and around the edges to prevent heat loss into the ground. The concrete floor, coloured with black oxide and sealed with water-based polyurethane, is exposed through the house, except in the bedrooms which are carpeted for greater comfort.



The Rotorua NOW Home did not always reach the World Health Organisation recommended minimum temperatures of 16°C in bedrooms and 18°C in living. In the family living areas the Rotorua NOW Home had acceptable temperatures in daytimes and evenings, but dropped below 16°C for a small proportion of the time. The bedrooms however have been below healthy temperatures over half the time, and have been particularly cold during winter nights.

One issue which affected this home's performance was the family's use of the concrete floor. For a concrete floor to absorb the most possible sun, it must be left exposed. Unfortunately there were quality issues with the coating applied to the concrete floor and the tenants covered much of the floor with rugs and mats. The floor absorbed less heat and consequently not only reflected less heat at night, but also took longer to dry out. A concrete floor can take up to a year to dry out fully and work at optimal levels. An alternative to a full concrete slab floor would be leaving only part of the floor exposed (for example, a one metre strip along the sunny northern face).

For more information:

- Beacon website www.beaconpathway.co.nz/new-homes/article/what-is-the-rotorua-now-home-project