

Living in a solid wood house is comparable to wearing merino wool, according to recent research undertaken at Lincoln University.

Merino has the ability to absorb body moisture and regulate temperature. Studies have shown that houses built from solid wood demonstrate similar 'breathing' properties, offering real advantages for comfort and health.

Research engineers Larry Bellamy and Don MacKensie from Lincoln University looked at both the thermal properties of wood and its ability to absorb moisture from the environment.

Relative humidity in buildings needs to be kept between 30 percent and 55 percent to avoid the build up of bacteria, viruses, fungi and mites, and to minimize respiratory infections and asthma.

Overnight, a solid wall bedroom wall was shown to absorb enough moisture to lower humidity levels five to ten percent, Dr Bellamy said.

'Particularly in damp conditions, that makes for a much healthier living environment.'

Research from Germany's respected Fraunhofer Institute backs up their findings.

Dr Bellamy said the Fraunhofer research compared two identical rooms. One had walls lined with solid wood and the other with painted plaster board. Water vapour was added at different times of the day to simulate people living in the rooms.

The solid wood lined room was found to have a remarkable ability to moderate over 50 percent of the moisture variations so that the room was only outside the safe humidity zone for three percent of the time compared to 27 percent of the time for the room with the painted plaster linings.

The Lincoln researchers also studied the paradox of houses built from solid wood seeming to have greater levels of heat retention and cosiness than the insulation value of the wood wall itself would suggest.

On their own, solid wooden walls have a fairly low R-value - meaning that theoretically the walls should not provide a particularly high level of thermal insulation.

'But the R-value is just a measure of the material's resistance to heat flow,' Dr Bellamy said.

'It only says how much heat is passing through, not how much is being stored.'

They discovered the answer to this puzzle was wood's superior thermal mass. Having worked extensively with the concrete industry where concrete's ability to store heat is well known, Dr Bellamy was not expecting wood to provide as much thermal benefit as it does.

Traditionally brick and concrete were thought to have superior insulation and passive solar heating properties, but the researchers have shown solid wood to provide up to 2.5 times the thermal mass of concrete per kilo.

Solid wood walls are able to store the sun's heat during the day and release it into the house at night.

Dr Bellamy used a Danish building simulation model to confirm that when the thermal mass effect was added to the relatively low R value of the external walls, the solid wood house performed very favourably.

The thermal performance of the solid wood house was further increased when solid wood internal walls and ceilings were used.

'Basically, the more wood you use the better,' Dr Bellamy said.

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