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NZ METAL ROOFING MANUFACTURERS INC.

TOWARD GREEN BUILDINGS

Today there is global awareness of the effect our buildings, culture and product usage has on the environment.

Professor Ray Cole, an internationally-eminant building scientist, argues that the rate and scale of global environmental degradation, and access to information about it are unprecedented, and that "we won't be able to plead ignorance in the history books."

So what are we doing to find solutions?

Tom Evison, of Technical Press Service, reported on a new rating scheme which aims to transform the New Zealand build environment.

The NZ Green Building Council, supported by the Ministry of the environment, have access to the wealth of experience offered by Dr Cole. Dr Cole co-founded the Green Building Challenge - an international collaborative effort to benchmark progress in green building performance and environmental assessment. He was also instrumental in developing the Canadian rating scheme and is currently helping New Zealand set up its own schemes for residential and commercial office buildings.

Being familiar with the various rating schemes now operating in many countries, Dr Cole is in a strong position to advise us which components will work best. "In New Zealand, the same emphasis should be given to designing the system of output and delivery as to the technical framework of the schemes themselves," Dr Cole advises. "We could easily draw on the structural and technical component systems in other countries with the unique implementation context of New Zealand", he says. "We need to create a clear vision, inspired leadership, broad partnership, full co-operation and common language which will bring this about."

He strongly advocates the NZ Green Building Council in the leading role, providing a trusted source of rational, unbiased information. NZGBC membership must be made up of the widest



possible group of stakeholders including scientists, academics, industry, manufacturers, government and the media.

Two pathways to the mainstream adoption of green building practice were described by Dr Cole. The regulatory approach assumes that increased international environmental attention and public concern will create political intent. This will then manifest as more demanding environmental policy and subsequently as increasingly stringent regulations related to building performance requirements.

By contrast, Dr Cole identifies that voluntary assessment methods are a primary mechanism for creating interest and providing focus in building environmental issues. No other approach, he suggests, has had the same effect in giving definition to the field.

Now the issue is providing a comprehensive, objective building assessment and the time, effort and cost involved in doing so.

To make our rating schemes successful, Dr Cole favours developing a suite of related tools designed to create positive change in the way that buildings are produced - not just a system that simply scores the environmental performance of a building. "The tools," he says, "must enhance the dialogue between the various members of design teams, establish common ground and help navigate through often fundamentally different positions and priorities."

In the following pages are three projects designed by three independent architects in New Zealand with a common objective.

Helen Richards home, "Concept One" illustrates the contemporary flair possible with creative Solar design.

CONCEPT ONE

Architect Helen Richards has always had a passion for sustainable building design and capturing solar energy.

Conventional homes, globally, use huge amounts of energy that consume natural resources and are responsible for approximately 50% of the Co2 emissions which have a profound effect on our environment and Global warming. The proto-type, 'Concept One' has captured the attention of many and raised the awareness of the environmental issues and the benefits of solar design. In 2005 Helen's home was recognised by BRANZ as the first New Zealand house design, assessed by their revised Green Home Scheme for environmental Performance, to achieve a rating of excellence. It was also the first house to ever meet all the space heating requirements through passive means only.

'Concept One', Helen Richards own home, is the culmination of considerable research and collaboration. Whilst Helen is not the first to recognise style in architecture, her home is testament to this, she is adamant that it is the fusion of style and performance that is most important. In the order of priorities the choice is clear - solar design comes first.



The concept of 'Concept One' has been in progress for some years with a variety of expertise contributing. In particular Helen found a shared enthusiasm and philosophy with Wellington architect, Roger Walker, who has contributed his experience to the project.

Helen's vision was to create a template for a passive solar home using thermal mass to collect, store and release the sun's energy making it cost effective to build and run. The objective was not to create a 'one style fits all' but rather a concept which could easily be adapted to suit the tastes and styles of prospective clients at realistic cost. The proto type deliberately uses many traditional building materials and techniques which sit comfortably with the building fraternity and clearly puts 'Concept One' apart from the

perception that 'green' houses, with eco-energy efficiency, do not have to be made from materials less suited to the New Zealand climate, such as earth buildings.

The position of the 'Concept One' house was critical, with the glazed areas being oriented within 30 degrees of true north, as was the relationship of the glazing to the concrete floor and walls. To prevent heat loss the insulation under the floor slab is 1.5 times higher than stipulated by NZ building regulations. The concrete has been highly polished and honey coloured resulting in a flagstone appearance. "A challenging and complex task to get right," says Helen. The concrete floor, being the primary heat store, is kept uncovered with the exception of porcelain tiles in the bathroom area. Carpet is avoided as it prevents heat absorption.



In the centre of the house is a tilt concrete wall that provides additional thermal mass with the balance of the walls and roof being conventional timber framing insulated with 'latitude', a 100% natural wool product, which performs well keeping the house warm in winter and cool in summer.

Double glazing has been fitted through the home with the northerly profile being 80% glass to trap the maximum sunlight. Unshaded glazed areas to the west are kept to a minimum to prevent over heating and the south has only 20% glazing to prevent heat loss.

The roof is clad in 5 Rib Colorcote®. North/west exterior walls are clad in timber and the south walls are of vertical Zinalume® Corrugate.

'Concept One' favours a contemporary style to have mainstream appeal. This was a deliberate choice to illustrate clearly that energy efficient homes do not have to look 'hippy' and do not have any limitations in concept. Helen points out that Powered Living houses use the same materials and methods as non-solar houses. The difference is in the layout as it relates to the sun.

"The challenge with passive solar design is to store the heat and distribute it evenly to all parts of the house - even those that never get the sun." To aid in this process the house is open plan with levels and partitions creating separate spaces.

The efficiency of the house has now been well tested and documented and has lived up to



expectations. Dataloggers have recorded the temperatures inside and out every 30 minutes for the past 3 years and show the temperature variation within the target area. 'In reality' the temperatures were very close to the goal of 17-21 degrees without any other form of heating. Passive ventilation is also an important part of the design with clerestory roof windows that ventilate the entire house keeping it cool in summer.

In addition to the solar heating benefits the house includes many eco-friendly features. Solar panels assist with water heating, rain water collection and organic waste is composted in worm bins

Helen is the first to acknowledge that it is difficult to be 'pure' in every respect when approaching sustainable design.

She describes the process as, "Making the right choices in the right order which is where solar design takes priority. Self-sufficiency is a good feeling and we are trying to demonstrate a better way."

'Concept One', without a doubt, is an excellent example of energy efficiency combined with excellence in design flair.

Architect: Helen Richards.

Helen has been passionate about sustainable design and solar energy since she was a student at the London School of Architecture.

After graduating Helen worked on numerous projects in UK earning membership to the RIBA (Royal Institute of British Architects). She also worked in Kuala Lumpur prior to visiting and settling in Nelson, NZ. The projects she has been involved with range from sports stadiums to office developments, government housing to London mansions.

The climate in Nelson afforded her the opportunity to seriously pursue her long term interest and goal to create energy efficient housing which would benefit the clients who live in them and the environment.

*Architect: Helen Richards.
Powered Living, Nelson.
Telephone: (03) 548 1680
www.poweredliving.co.nz*

Main contractor: Phil Hay Builder

*Roofing and Cladding:
Contour, Nelson.
Telephone: (03) 546 4260
Profile: 5 Rib Colorcote®
and Zinalume® Corrugate.*

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