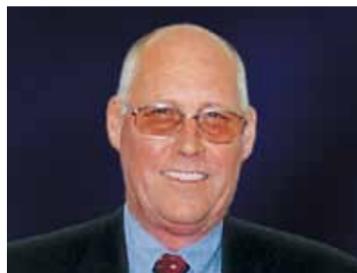


ISSUE 25

SCOPE





Below is a brief introduction to the 2010 executive of The Metal Roofing Manufacturers Inc. It is intended that Scope be representative of the industry and therefore material of interest is welcomed from all sectors of the building industry be it design, research, manufacture or construction.

President
NZ Metal Roofing Manufacturers Inc.
Managing Director of the Steelform Group of Companies.

Vice President

Tom Marshall: Manager
Marshall Industries Ltd.

Immediate past President

Tony Barbarich: Director of
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Executive Members:

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Stuart Hayman: Consultant.

Philip Meyers: Consultant.

Warren Oliver: Managing Director of Franklin Long Roofing.

Darren O'Brien: General Manager for Dimond

Rod Newbold: Commercial Manager Steel and Tube Roofing Products.

Dean Lee: Marketing Manager AHI Roofing Ltd.

Martin Smith
Calder Stewart Roofing Ltd

Gary McNamara. Marketing and Business Development Manager Metrotile Roofing

If you would like to submit material please contact any member of the executive or the publisher.

Visit our website at:

www.metalroofing.org.nz

SCOPE

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Opinions expressed in Scope do not necessarily reflect the views of the NZ Metal Roofing Manufacturers Inc., it's executive, committee members or publisher unless expressly stated

A SANCTUARY FOR GOLFERS AND WILDLIFE

By Graham Hepburn

Wairakei International Golf Course was already rated one of the top courses in the world when owner Gary Lane decided to make it even more special. His vision was to create an environment where golf and the natural habitat work in harmony. He wanted a pest-free environment within the golf course so that threatened species could be introduced and the existing flora and fauna be allowed to flourish.



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To achieve this, the 150ha course at Taupo has been encircled with a 5 kilometre-long, 2 metre-high pest-proof fence at a cost of \$1.5 million to keep out undesirables such as cats, dogs, rats, mice, possums, rabbits and stoats. The fence, built by Xcluder Pest Proof Fencing Company, is stainless steel mesh fixed to posts and topped with a COLORSTEEL® hood. Xcluder's general manager, Dr Tim Day, says COLORSTEEL® was chosen because of its durability and the fact that it was hard for pests to gain a purchase on it. "It's the same principal as putting a band of metal around a tree," he says.

The 300mm COLORSTEEL® cap extends out from the fence and slopes down before curving under to stop pests from scaling the fence, which at 2 metres high is too tall for them to jump over.

The stainless steel mesh goes about 50mm into the ground and extends about 400mm out from the fence to confuse pests trying to dig their way in.

Dr Day says the golf course fence had "slightly higher aesthetic requirements" than fences they had built around farms or reserves. The posts used were landscape rounds



and aluminium rather than timber joinery gave the fence a smarter look in keeping with the status of the golf course. The mesh and hood are in 'Karakra Green' to help the fence blend with the environment.

Automated gates mean there is little chance for pests to sneak in as staff and golfers enter and leave the golf course. A surveillance system also lets staff know if a gate is stuck open or a tree has come down on the fence.

Dr Day says Xcluder began 11 years ago when a farmer came to him wanting a fence that would protect his plantings from pests

– word got around about the fence and the company snowballed from there. It is now involved in projects in New Zealand and overseas such as protecting farms, wildlife reserves and grain storage sites from pests.

Once the fence went up, Dr Day says the next step was ridding the golf course of pests inside it and doing some clearing of scrub before re-vegetating with plants that provide the right sort of habitat and food for resident species such as bellbirds, tui, pheasant and quail. Introducing water fowl and fallow deer are options that might be considered in future. "It's also not inconceivable that

kiwis might be there one day," says Dr Day. "The Department of Conservation is screaming out for places to put kiwis and talks are underway to make it happen." The existing lake on the 18th hole has also been enlarged to create a wetland area.

Wairakei's golf course superintendent, Nigel Lloyd, said the fence had positive spin-offs for wildlife and the golf course. There were no rabbits digging up fairways anymore and it was noticeable that more birds were feeding on the ground since the fence went up.

Nigel says talks are underway with DOC and local Iwi about introducing kiwi but creating the right habitat first was vital.

"I take my hat off to Gary for having the foresight to look at the idea of creating a sanctuary," says Nigel. "It was due to his passion for ecology and the desire to provide a better environment than the one we already had here."

A consequence of building the fence, though, was the need to keep car parking and golf club services outside its perimeter to



reduce the risk of pests sneaking in or being transported inside. The existing clubhouse was left on site but outside the fence there is a new building designed to house about 80 golf carts plus changing rooms, a pro shop and cafe/bar. With this in place, golfers can ready themselves for play before entering the course through one of the automatic gates in the pest proof fence.

Neville King, of Rosetta Stone Arkitektur, was charged with designing a building that would be distinctive - in looks and materials - from the three private lodges and clubhouse already on site.

"Gary wanted anything but a copy of what was on site," says Neville, who had designed two of the three lodges on the course. "So, three strong architectural elements were chosen: Roofing Industries' ColorCote® Eurostyle roofing, Peter Fell-coloured, bandsawn board-faced precast concrete panels and dark stained bandsawn cedar shiplap.

"The longrun ribbed roofing was overlaid on ply and that gives it some great shadowing effects - and, again, that hadn't been used on site before," Neville says.

The almost 700sq m building's prominent position beside State Highway One and the fact that it is just inside the stone gate entrance to the course means "it's the course's opening statement so it couldn't just be any old building", says Neville.

"It had to reflect the course's intention of being top class and reflect its new direction as a sanctuary," he says.

The interior fit-out was also part of that 'opening statement' to visitors, with polished concrete floors and exposed steelwork in the pro shop

and café suggesting an industrial look that is lightened with an area of timber flooring and a whitewashed cedar sarked ceiling. A feature wall of copper panelling also provides a point of interest in the pro shop, and copper panelling is used again on the face of the bar. An enclosed patio protected from the elements by folding glass doors and a LouvreTec roof provides another seating area for bar patrons.

Even the cart shed has an enviable finish, with a suspended tiled ceiling, coloured concrete walls and

on Egyptian architecture and is a constant reminder to the practice of its duty to decipher clients' wishes. The firm also believes that close attention to detail produces great design. Technical drawings and design images are prepared using the latest professional software and this allows for the creation of realistic three-dimensional imagery at an early concept stage which is so accurate that it can be used to provide detailed consent documentation later on.

Building Design: Rosetta Stone Arkitektur, Taupo, Telephone: 07 378 9436. www.rosettastone.co.nz

Builder: C J Fisher Builders, Taupo, Telephone: 07 377 0142 or 0274 933 607.

Roofer: J R Roofing, Taupo, Telephone: 021 404 902.

Roofing manufacturer: Roofing Industries, Taupo, Telephone: (07) 376 7971, www.roof.co.nz

Roofing: Colorcote® Eurostyle Colour: 'Ironsand' Fence capping: COLORSTEEL® in 'Karaka Green'

Fence construction: Xcluder Pest Proof Fencing Company, Rotorua, Telephone: 07 349 4505. www.xcluder.co.nz

polished concrete floors. Before these developments Wairakei already offered a spectacular golfing experience but that is now going to be complemented with a greater awareness and enjoyment of the natural habitat.

Rosetta Stone Arkitektur

One of the hallmarks of Rosetta Stone Arkitektur is listening intently to the client, deciphering how key elements will be expressed in architectural form, then drawing out what will be truly essential to the success of the project. The name Rosetta Stone is taken from the famous artefact that was used to unlock the hieroglyphic secrets



TRANQUILITY

When the owners of this unique home briefed Mark Brown, Solutions Architecture Ltd, they came with some very specific requirements on the function of their new home but beyond this the brief allowed for a high degree of input in design and material choices. The overall concept was to create a contemporary family home that would stand the test of time and still look good, without dating, in 20 years. This is a family orientated home designed to accommodate the needs of two growing sons, to provide guest accommodation, a study and privacy for parents, children and guests.

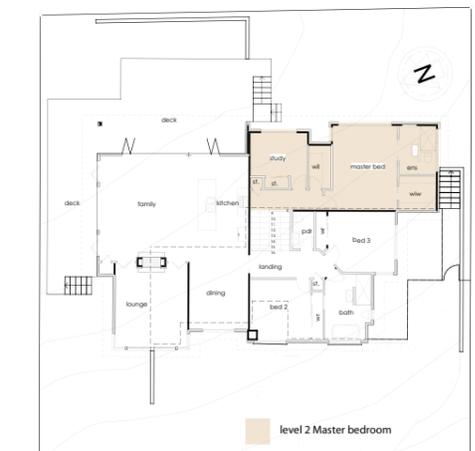
privacy required for the guest accommodation, the master bedroom, the lounge and communal living areas and the boy's bedrooms.

The levels are divided with the guest accommodation, garaging and entrance gallery at the base. The stairs rise 1300 mm to the second level landing servicing the master bedroom and study. A further 1300 mm above the landing services the boys bedrooms, their shared bathroom, a guest powder room/toilet and the main living/dining and kitchen areas.

Project description

The 600 m.sq. site created some challenges as the footprint of the home could not be within 6 metres of either the front or rear boundary due to Residential heritage site restrictions. To further complicate the project the site had a 4 metre fall from North East to South West.. The challenge was to provide high quality living spaces, which were not 2 or 3 metres below the surrounding ground level, and where possible give direct access at ground level to living areas.

At the outset it became apparent that to achieve the objectives, required in the brief, the home would be multi-level but rather than create a two story home Mark's solution was to step the various spaces on the slope. This achieved the separation and





Design features.

The exterior of the home utilises a variety of claddings and materials which are both practical and provide texture and form to the home. The entry is bounded by the strong linear forms of stack20 series blocks which provide the structural support for the upper levels which combine the textures of Rockcote EPS 40 Plus and horizontal lines of Pine bevelled Back Weatherboards. The roof is in COLORSTEEL® Maxx® Custom Orb. The exterior joinery is in double glazed Fletcher Residential series which, together with the claddings, provides excellent insulation and energy savings. Heat pumps within the home circulate air throughout providing ventilation during the summer and warmth in winter. Louvres in living areas control the temperature during hot summer months by expelling hot air from the skillion ceiling. The combine effects of double glazing, claddings, insulation, heat pumps and ventilation all contribute to the sustainability and comfort of the home. With well-placed rooms, oriented north, complimenting the sustainable features the owners have found little need to use additional heating.



A striking features of the interior is the polished kwila timber floors throughout the entry, dining, kitchen and lounge areas which gives a warm, visual elegance to the home. The open plan kitchen, dining and lounge areas are expansive and the collective spaces provide the family with opportunity to entertain or interact. The centralised kitchen, whilst deceptively simple in design, features every possible modern convenience with state of the art appliances and fittings.

The Unique bathroom layouts with 'hidden areas' create something special and privacy...particularly when a bathroom is shared between boys. The master bedroom and guest bedrooms both have an ensuite and all bathrooms (four in total) feature exceptionally high end fittings and fixtures.

The lounge opens to the courtyard/deck via Fletcher bi-fold doors giving uninterrupted access of 5.4 metres.



This private courtyard/deck is at ground level and provides a sunny morning spot, with shade later in the day. It also creates an area for alfresco dining with easy accessibility to the kitchen.

The master bedroom is a quiet oasis with pleasant outlooks to the east and courtyard.



On level one, the guest room is conveniently situated close to the entry, tucked away from the rest of the home to provide guests with self contained privacy and a place to retreat.

The boy's rooms, which are of a generous size, are on the same level as the living areas which enables easy access and supervision during day and in the evening.



Overall this has proven to be a highly successful project for Solutions Architecture Limited. The project was built by Ashley Sims Ltd. and the high standard of workmanship coupled with the materials illustrates the results that can be achieved when all disciplines involved work together towards the same goal. Excellence.

Solutions Architecture Ltd.

Solutions Architecture Ltd pride themselves on imaginative architectural design that is unique to the site characteristics and the lifestyle or working environment of their clients.

The principal, Mark Brown has been in the design field for 25 years, with a rebranding and launch of Solutions Architecture in 2006. Involvement with ADNZ (Architectural Designers of NZ Inc) at both branch and national level has given Mark the tools to respond in a professional manner to clients needs. The senior staff of Solutions Architecture each has over 20 years experience and the company is committed to continued professional development on Industry standards, trends and regular



seminar attendance. "We consider staying abreast with the latest developments, products, trends and good practice is vital to the success of our practice. Our clients expect nothing less," says Mark Brown.

The practice has been commissioned on a wide variety of National and international projects but consider they have a special affinity for unique residential design with special attention to the client's individual needs and the relationship of the building to the site. To this end Solutions Architecture offer their clients a wide range of design skills and complimentary expertise ranging from subdivision to interior decorating.

"We consider our success can be attributed to our innovative approach to projects from the smallest alteration to multi million dollar homes and commercial projects. The attention to detail, costing, observation and documentation is of the highest standard ensuring our projects run smoothly", says Mark. "This is vital to our business and our clients."

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Email: agsim2build@gmail.com

Roofing Manufacturer:
Steel & Tube roofing Products
Telephone: 09-274 4056
Profile: COLORSTEEL® Maxx®
Custom Orb

Glazing/external joinery:
Fletcher Residential

Bathrooms: Graham Walton
Telephone: 021 166 5194

Photography: Elise Jennings



FROM THE GROUND UP

By Graham Hepburn



Building a new hangar at a working airport comes with its challenges, especially when you aren't allowed cranes on site. And those challenges magnify when the hangar is 80 metres wide by 60 metres long and 15 metres tall at its highest point.

Air Nelson needed the new hangar at Nelson Airport to have a clear span of 80 metres so it could house five of its Bombardier Q300 aircraft. The hangar also had to have the capacity to accommodate the bigger Bombardier Q400 if Air Nelson upgrades its fleet. The project also included 700m² of an attached amenities area consisting of two aircraft parts storerooms, a tool room, a workshop, mezzanine floor and a staff amenities and toilet block.

Cranes couldn't be used on site because of the danger they would pose to air traffic so the solution was to build the roof of the hangar on the ground and jack it up almost 8 metres before building the supporting steel framework beneath it.

Architect Don Gillies, the founding director of Tetrad Design Group, said Air Nelson wanted the new hangar to acknowledge the existing hangar, built in the 1940s, which has a heritage classification on its windows. They also wanted the new hangar to have the same roofing and cladding as the existing hangar and be the same colour so COLORSTEEL® Maxx® Multi-rib in Champagne Half-Spring was used – even on the 12-leaf, 9.5 metre high motorised doors that,

when retracted, provide a 55m-wide clear opening. Almost 9km of longrun was required for the roofing and cladding, which is also insulated for the comfort of technical crew working on the planes at night.

Don says that building the roof on the ground saved time and money – and gave a better result. "It probably saved us four weeks in time," says Don "and the construction crew had better control of the job and a hell of a lot of health and safety issues went away because the work was being done on the ground." Even if cranes had been allowed on the project, finding big enough

equipment locally would have been a problem. A crane would probably have to have been brought in from the North Island just to lift the packets of COLORSTEEL® on to the roof.

Don says constructing the roof on the ground also meant that most of the ceiling mounted services such as gas heaters, lights and fire protection could go in at the same time rather than having to be installed by tradesmen working at great heights.

Stephen Hogg, an executive in structural engineering at Aurecon, says because the roof was designed to be jacked up, it was built with three load bearing beams rather than as a portal framed structure.

Stephen says the steel I beams are 60 metres long (made up of 5 12-metre beams bolted together) and are 2.4 metres deep with flanges 600mm wide and steel 40mm thick. One of the beams sits at the apex of the roof with a beam either side about 10 metres from the edge of the 80 metre-wide roof. A system of steel rafters, purlins and fly braces completes the structure.



The 391 tonne roof was hydraulically jacked up on five 14 metre-high pre-cast concrete columns that had ground anchors to keep them straight under stress. The design employed three concrete columns at the rear and two at the front, with a jack on each. Channels in the concrete columns were used to guide the roof up as it was lifted 300mm at a time, one column at a time. Once the roof had been jacked 300mm on a particular column it was locked off and the same process began on the next column, with the jacking process done mostly in rotation on the columns unless one part of the roof needed more jacking to keep it on plane.

Stephen says three 100-tonne hydraulic jacks powered by electric motors were used for the rear of the roof, while two 200-tonne jacks helped to raise the front. The rear of the roof was jacked up from the bottom, while the front had the jacks at the top of the two columns raising the big doorhead truss which was effectively sitting in a cradle. "From my point of view, the trickiest bit of it all was getting us as engineers and the steel fabricators aligned so we all knew what we were going to do and that it was safe," says Stephen.

The project was overseen by Graeme Earl, Mainzeal's Southern Region construction manager, who says the jacking process put stress on the roof but it was manageable.



"Lifting it one column at a time means you're warping the roof a little bit but it's well within the tolerance of the metal roof," says Graeme.

The process took five days and went smoothly despite the small tolerances they were working with, and Graeme says that was all down to planning.

"We delayed the lift by a week just to make sure we got everything right before we attempted it," he says.

Over five days, bad weather was always going to be a worry during such a mammoth undertaking, especially when there was no going back.

"Obviously wind was a big issue for us but we were monitoring it throughout," says Graeme. Stephen says that at one stage the wind did get up to 20-25 knots causing the ends of the roof to flap. This was solved by using truck tie-downs attached to the foundations to hold the roof taut and these were released and re-

tightened as the roof went up. "And the big thing was that once we got the roof up to height we had to get the steel columns in and get that all bolted and braced as quickly as possible," says Graeme.

With the roof and wall cladding in place, that provided the perfect environment for the next big job: pouring the 160mm-thick post-tensioned floor slab.

Air Nelson wanted a flawless polished concrete finish, which meant ready-mix concrete being poured over a continuous 16-hour





period, with no construction joints. "The floor had to be spotless and that was totally to do with working on the planes," says Graeme. "One time their mechanics lost a nut off an engine and they thought it had gone into a crack in the floor but it had gone into the motor and it stuffed the motor. So they needed a floor where if they dropped anything they would be able to find it."

Because the ground was "puggy" the site had already been excavated and hard-filled before the roof went up to provide a stable base for the slab, which required 760 cubic metres of concrete.

Graeme says the pour had to be planned and carried out with military precision to avert problems such as cracking or the concrete setting too quickly.

"We had everyone on standby as far as the concrete plant went and everyone and their dog on standby as far as concrete truck drivers," says Graeme. "Four loads of cement had to be delivered to the plant to keep it running but we never had a time when there wasn't a concrete truck waiting at the pump."

The floor was coated with Ashford Formula sealer, which gives a shiny but grippy finish.

Graeme says the hangar project was a unique one to be involved with as cranes are normally used when constructing large commercial, civil or industrial buildings. "It has to be one of the biggest roof lifts done in New Zealand."

Tetrad Design Group

An architectural practice based in Wellington, Tetrad Design Group was established in 1991 and specialises in a wide range of design including architectural, marine, aviation and industrial furniture design. Projects include educational and commercial buildings, industrial facilities and structures, apartment and housing design. The strength of

the practice is based on its ability to plan and analyse client needs and projections – an approach that produces practical, consistent and affordable design. Tetrad manages most of its projects from inception, coordinating consultants and acting as lead managers of the construction process.

Mainzeal

Having recently celebrated 40 years of doing business in New Zealand, construction company Mainzeal can look back on many successful projects such as Vector Arena, North Harbour Stadium, Spring Hill Corrections Facility and the Two Double Seven shopping mall redevelopment. Mainzeal's achievements are testament to the company's ability to adapt to a changing work environment. It focuses on core principles such as sustainable design; making sure buildings fit the client's needs, rather than vice versa; proven cost savings; and certainty of outcome for both the client and stakeholders.

*Design: Tetrad Design Group, Wellington,
Telephone: 04 385 9167
www.tetrad.co.nz*

*Construction: Mainzeal, Christchurch,
Telephone: 03 341 2191
www.mainzeal.co.nz*

*Engineer: Aurecon, Wellington,
Telephone: 04 472 9589*

*Roofing installer: Freeman Roofing, Nelson,
Telephone: 03 544 3108
www.freemanroofing.co.nz*

*Roofing supplier: Freemans Roofing
Roofing and cladding:
COLORSTEEL® Maxx® Multi-rib*

Colour: Champagne Half-Spring





COUNTRY RETREAT

The best way to learn to love the land is to live on it. That's exactly what Mike and Marcelle Waugh did when they purchased a cherished piece of land, with a large bush covenant overlooking the south Kaipara harbour, in 2002. A corralled yard previously used for deer farming proved the ideal sheltered spot for an old trailer home, set out of the wind and facing the sweeping view north along the bush-clad gully to the sea.



The simple trailer home provided a great base for camping on site to replant native bush, vegetables and fruit trees, and to plan for the day a permanent dwelling could be built. Initially, the caravan site seemed the perfect spot for the new house, and Jane St George Waugh was commissioned to begin sketch plans for a layout that would enclose a north-facing courtyard and frame the view. Then a neighbour relocated a

tall house onto a site just across the fence, overlooking the Waugh's planned front yard, and the thinking and planning took a different turn as it became clear the house should be built elsewhere on the land.

Mike, as a painter-decorator, and Marcelle, as a colour consultant, have a great eye for detail and strong design ideas. Their personal scrapbooks became a rich design



source, with ethnic details, natural textures, light play themes and a preference for long clean lines emerging clearly. Jane drew on these ideas along with many site visits and times of in-depth discussion to develop the design intentions to buildable detail that suited the site and the owners' flair.

The final position for the dwelling allowed a large shed to be nestled

in along an old macrocarpa shelter belt, with the house set out to the north. The new setting meant the planned wings of the house could be spread wider to embrace a broad sweep of grass, along with the gully and sea views beyond. Planning progressed, with the master bedroom wing angled north west, to frame winter afternoon sun and a deck overlooking regenerating native bush. This wing also utilised

natural terraces in the landscape to house a downstairs studio bedroom. Living spaces face north, with an open plan layout oriented to decks along the north-facing courtyard. The east wing provides guest accommodation and a long glazed gallery facing the courtyard terrace.

Working the design to provide a closed 'back' and open 'front' made sense for controlling the impact of wind from the south and harnessing winter sun from the north. Dry-block masonry was selected for its water repellent qualities and thermal mass. Plastered externally, and strapped and lined internally, the block work is a structural component, providing a long sheltering spine to the south face, with punctuated walls extending beyond the floor plan to articulate the main entry and to shelter the porches that face east and west from the main living wing. Glazing is open and expansive to the north face, with large sliders that can be slid aside into wall cavities, behind



cedar weatherboard panels. Wide verandah overhangs control direct solar heat gain. Likewise, glazing to the east and west is carefully framed by deep porches to limit sun ingress to the winter months. Designed before double glazing was a requirement, the thermal mass/ solar heat gain balance was carefully worked, with the result that the 'Sunflow' reticulating under-slab heating system circulates the water through the pipes merely by passive thermal movement through the slab, shifting heat from warmer to cooler areas, and has never required an external heating source to be added to the system.

The ability to efficiently store and use rainwater runoff is an



important factor in rural settings, and 'COLORSTEEL® Endura' made good sense, both as the roofing for the house, and the roofing and cladding for the shed. A mono pitched roof design suited both buildings; articulating the long clean lines of the design, ensuring the two different buildings complement each other despite clearly differing functions, and assisting the wrap-around house form to shelter the north-facing courtyard. The shed is dressed in 'Ironsand' COLORSTEEL®, with silvering

cedar doors, and tends to slip into the shade of the macrocarpa hedge as a deliberately recessive element in the design. The house roof is COLORSTEEL® colour 'Ironsand' which blends well with the painted plaster masonry exterior, the natural toning of vertical shiplap cedar weatherboard and the landscape of native grasses and rengarenga lilies.

Internally, the monopitch roof form is echoed in the sloping ceilings



suspended under 'Posistrut Trimmable' roof trusses. Clean ceiling and wall planes combine with a paint palette of soft whites and a warm-toned 'Peter Fell' polished concrete floorslab to create an airy open environment, with a changing



DEFINE DESIGN

Define DESIGN favours a consultative design approach and is regularly involved in residential, community and church projects at a variety of scales, from alterations and additions to new 'greenfields' projects.

COLOUR CONSULTANT

Working as a Colour consultant for many years provided me with a strong base to draw upon, when coming up with ideas for our own home. We strongly felt that the exterior colours should blend in with the surrounding environment, choosing colours that reflected the grey/green/browns of the predominantly Kanuka bush. Internally we kept the colour palette simple with a soft off-white and gradually introduced stronger colours in the living areas – green, blue and a splash of yellow endeavouring to still reflect the colours in the surrounding environment. Our own home as a project has been exciting and ongoing, a never-ending dream in progress.

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Builder: Dave Naismith, Helensville
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Roofing contactor: Delta Plumbing, Tony Gripping
 Telephone: 0274 964 122

Roofing profile: COLORSTEEL® ENDURA

Joinery: MD Aluminium
 Telephone: 09 832 1736

Heating Partners Ltd - Solar panels & Underfloor heating
 Telephone: 09 820 8480

Concrete floors: Peter Fell,
 Telephone: 09 828 6460

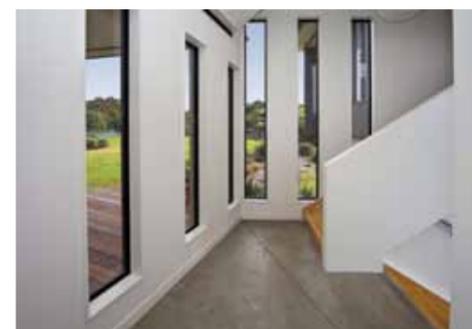
M G Decorators
 Telephone: 0275950262



light play through tall narrow windows in the stairwell leading to the master bedroom. The calm setting has been developed as backdrop for the daily invitation to savour the landscape and views. Marcelle and Mike have further developed the interior with panels of vibrant colour chosen to echo elements in original artworks and selected oriental, pacifika and kiwi timber elements.



It has taken some time to complete decks and establish landscaping. Galvanised steel frames still await retractable canvas for further summer shade in the courtyard area, yet most of the design intentions have been realised and are standing the test of time well. The goal was to enhance the natural landscape rather than burden it. Native bush is regenerating well along the gully and boundaries. Organic orchard and garden practices are building up the soil near the house. Solar water heating, on-site grey water and waste water treatment, passive solar thermal design and rain-water harvesting each play a role in allowing the owners to live more lightly on the land. The result is an inviting and reflective place, with an open, hospitable lifestyle to match.





BENT BUT NOT BROKEN.

CHRISTCHURCH QUAKE
SEPTEMBER 4TH 2010

This personal report by Stuart Thomson highlights the validity of the claim previously made in *Scope* that light metal roof cladding not only can save money but can save lives as well. Heavy tile roofs did not fare well but metal roofs were bent but not broken.

Visiting Christchurch was déjà vu for the writer because of the memory of the two Masterton earthquakes which occurred in 1942, both within five weeks of one

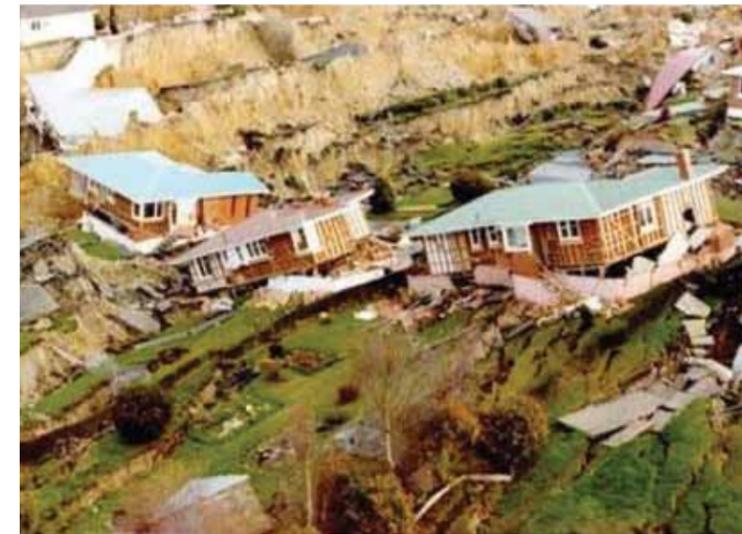
another which changed Wellington in the same way that Christchurch has now been changed forever.

Fortunately the Wellington (7.2 & 6.8) quakes also struck at night with only one person killed in comparison to the 1931 Napier (7.8) earthquake which struck at about 11 o'clock in the morning and killed 256 people. Compare these with 2010 Haiti (7.1) quake which struck the capital Port-Au-Prince at about 5 p.m. killing 230,000.

Wellington's Manners Street was closed for four months in 1942 while the brick and rubble was cleared 20,000 chimneys had to come down along with many buildings in the CBD. This was wartime and my job was to repair damaged roofs and to inspect chimneys and dismantle them. As a result of the Wellington quake the Earthquake & War Damage Commission was set up in 1945.

The Darfield quake (as it is officially known) should not have come as a surprise to Christchurch, like Wellington it was (and is) just a matter of when, not if. Christchurch's last major earthquake happened in 1922 at Motunau. The seismic map of NZS 3604:1999 shows Canterbury fairly and squarely in zones A, B, and C, low medium and high all within 30 km of one another! Was that ever possible? The proposed seismic map intended for publication in the New Zealand Standard 3604 (unchanged in that respect) to be published in 2011 will have to be drawn again.

The obvious damage inspected by the writer within a week of the disaster appeared to be mostly divided into two classes of buildings. Those that were brick and had simply fallen down and houses that had suffered subsidence due to



liquefaction. While the quake struck at the best time of the day, it also struck at the worst time of the year – when winter rains had saturated the ground.

Amongst the things to be learned from Christchurch quake was the remarkable redundancy provided as a safety factor (undesigned) for all those buildings with metal roof cladding. The diaphragm action of the roof cladding literally can hold the building up as illustrated by this picture of the 160 year old Dean Homestead at Home Bush.

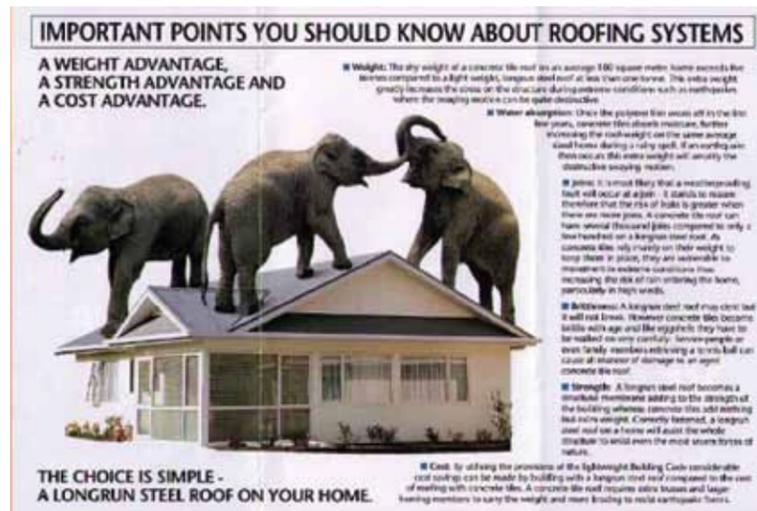
Also shown is the ability of hip roofs to hold the roof structure together, which is not surprising either as the remarkable photo of the Dunedin suburb of Abbotsford 1978 landslide shows. Hipped roofs, unlike the tile roofed houses that disintegrated before they hit the bottom, kept some of the 69 houses intact.

Even metal tile roofs managed to hold the building together in Christchurch!

N.B. The corrugate verandah would have saved a king hit!

Not so lucky were the tile roofs which were destroyed by the brick chimneys falling on them. Heavy roofs with concrete tiles swaying in a 7.1 quake destroyed many roofs in Christchurch.

This is supported in a report on residential houses performance in the Darfield earthquake co-authored by Professor of Timber Structures at the University of Canterbury, Professor Andy Buchanan. In it he compares the performance of roofs under collapsing chimneys, noting that those falling onto corrugated steel roofing "often caused no further damage" while those falling onto tile roofs "more often fell through into the house, sometimes causing further structural damage and potential loss of life. Buildings with heavy roofs tended to have more lining damage than those with light roofs".



While it is not intended to take advantage of the Christchurch disaster to promote metal roof cladding, the results are self-evident. Many years ago the concrete tile industry launched an advertising campaign to denigrate metal roof cladding showing an ancient corrugated iron roof alongside a new concrete tile one. This prompted a response from the New Zealand Metal Roofing Manufacturers and their advertising agency suggested an elephant campaign and produced this ad to make the point.

The point was well made with the average concrete tile roof weighing five tonnes, severe strain is placed on the roof structure and many Christchurch buildings will require rebuilding to restore them. Many will end up with a new metal tile roof because the old clay or concrete patterns will not be available to repair the holes where brick chimneys have destroyed them.

The elephants have done their work. Not only did metal roofs stand up well but vulnerable silos miraculously survived, although like houses they relied on good foundations. Corrugated galvanised Steel silos made by MRM member company Dan Cosgrove Ltd of Timaru have been used for years for the storage of grain on the Canterbury plains. They have stood up well; that is until September 4th when a lot of their

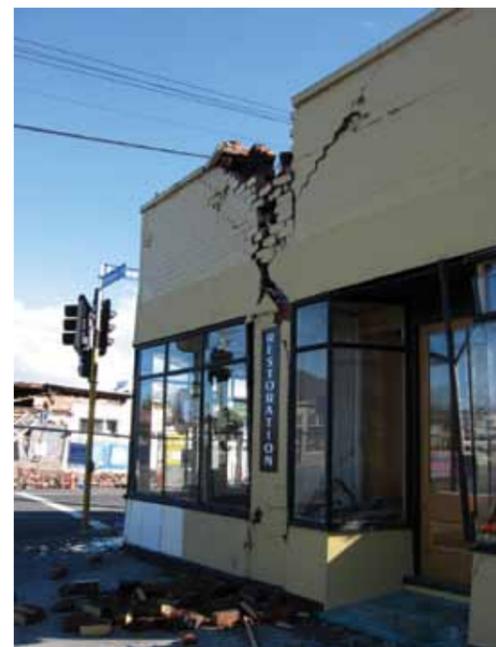


foundations let them down. Tonnes of grain tossed around by the force of the quake put stress onto the concrete or steel that was not built for such an event. N.B. Tanks and silos built on foundations designed and detailed for earthquake resistance incorporating the lessons learned from the 1987 Edgecumbe

earthquake performed very well showing no damage or loss of function.

The moral of that story is: a building is only as good as its foundations.

Some steel framed warehouses were affected when their contents fell onto them while in others roof cladding slid and moved to slot the fixing holes as shown by the following photo; another good reason for using load spreading washers.



Our Industry responded quickly New Zealand Steel committed \$500,000 in steel products and building solutions towards recovery efforts in the earthquake affected Canterbury region. New Zealand Steel President Mr Ross Murray said: "Many of our people have family and friends whose lives have

been affected by the earthquake. "We will work closely with our customers and others in the region to identify community rebuilding projects that will be supported by New Zealand Steel's \$500,000 products and building solutions package," Mr Murray said. Although Cantabs may have not



noticed it, for the last hundred years they also have been living in 'the shaky Isles' centred on the 'Ring of Fire', close to the edge of the Pacific and Australian plates.

The Ring of Fire is an area in the Pacific Ocean basin where 90% of the world's earthquakes and most volcanic eruptions occur. It has 452 volcanoes and is home to over 75% of the world's active and dormant volcanoes. So if you want to live in God's own – be prepared because the risk goes with the territory! NZ has some of the world's top experts in earthquake engineering for building, many of whom come out of the University of Canterbury's Engineering Department This includes our own metal-man ex HERA Dr Charles Clifton, who has the hybrid vigour of both a Canterbury and Auckland background and who is now

Associate Professor of Engineering at Auckland University. Like most countries that experience frequent seismic activity, New Zealand has incorporated earthquake design principles into its building code and recently published NZS 1170.5:2004.



What we have learned is how to design and construct buildings out of material that is ductile so that it can bend like timber and steel, however the increases in seismic resistance building that have occurred regularly since 1932, have come at a cost and have been criticised for being prohibitively expensive. This is the main reason why local authorities have been procrastinating for years on upgrading their EPB's (Earthquake prone buildings).

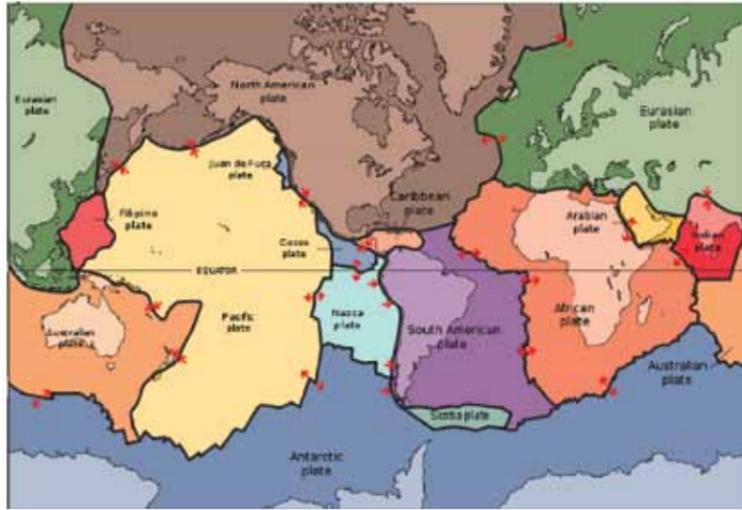
Building Act 2004 Part 2, 122 Meaning of earthquake-prone building.

(1) A building is earthquake prone for the purposes of this Act if, having regard to its condition and to the ground on which is built, and because of its construction, the building—
(a) will have its ultimate capacity exceeded in a moderate earthquake (as defined in the regulations); and

(b) would be likely to collapse causing—
(i) injury or death to persons in the building or to persons on any other property; or
(ii) damage to any other property.
(2) Subsection (1) does not apply to a building that is used wholly or mainly

for residential purposes unless the building—
(a) comprises 2 or more storeys; and
(b) contains 3 or more household units.

A moderate earthquake is legally defined as: an earthquake that would generate shaking at the site of the building that is of the same duration as, but that is one-third as strong as, the earthquake shaking (determined by normal measures of acceleration, velocity and displacement) that would be used to design a new building at the site. We may have learnt a lot about the techniques of building in a seismic country but are we prepared for the high social cost to upgrade? An old car gets to the stage when a WOF simply is going to cost too much and the car is a menace to other road users. There are a lot of NZ buildings without a seismic WOF.



What Price of New Zealand's Architectural Heritage? Mayor Parker's idea of a think tank of Architects may be a good idea but a boatload of engineers would be a better one.

Noted NZ Engineer Adam Thornton of Dunning Thornton says "Crucially, some owners appear to have a modus operandi of shopping around between consultants to find those recommending the lowest target strength i.e. to achieve 34% NBS (New Building Standard). It is my view that this is damaging to the profession and Engineering consultants should be acting co-operatively, recommending cost-effective solutions (measured on a whole of life basis) and leading their clients and the public at large to realise the benefits of appropriate retrofit.

How often can we expect the earthquake the big snowfall or the cyclone to happen?
NZS 1170.5:2004

The Ultimate Limit State (ULS) for buildings of normal use (importance level 2) is typically based around earthquake with a return period of 500-years (10% probability in an assumed 50-year life).

The Standard draws attention to the fact that the prediction of the effects of an earthquake on soil, e.g. liquefaction, is outside the scope of NZS 1170.5:2004 and that the 'advice of appropriate experts should be sought for these

considerations. It also states that Fatality risk is at an acceptable level. but does not elaborate

A look at the return period map (NZS 1170.5 Fig C2.3) might have some people shifting their place of abode from the top of the South Island and the bottom of the North Island for the apparent (recent historical) safety of Dunedin or Auckland.

But don't be too sure – we are not called the 'Shaky Isles' for nothing Learning from the past is not something that we are good at. There are already existing improvements in seismic design available without incurring a great deal of extra cost. We must build light. We must build 'Life-safe' buildings.

Ribbed or waffle residential concrete slab construction with reinforcing would have saved a lot of residential damage when built on alluvial ground. You can't avoid damage with lateral spread but you can prevent building collapse. Gable end buildings never have performed well and are more vulnerable in wind and earthquake. All double brick gable ends must come down. All brick parapets must come down – a lot are down already!

The diaphragm action of metal roof cladding is not normally

part of a calculated design but comes free as a bonus for all those specifying metal cladding. Metal roofs only require half the bracing of heavy roofs and 'Stressed skin design' can be used to reduce the bracing requirements further but in an earthquake it can also save lives as well.

The predictions of seismologists (weather forecasters) are said to be no more than hopes distorted by primitive science however MetService Weather Ambassador, Bob McDavitt told me he never gets the weather forecast wrong – just the timing.

During El Niño, (little boy) in summer New Zealand experiences stronger or more frequent westerly winds, with rain in the west and drought in the east. In winter southerly winds bring colder conditions to both land and sea while in spring and autumn southwesterly winds are more common.

La Niña (little girl) brings Northeasterly winds with moist, rainy conditions to the northeast of the North Island, and reduced rainfall to the south and southwest of the South Island. Although there are regional and seasonal exceptions warmer than normal temperatures occur over much of the country and central Otago and South Canterbury, can experience drought.

Now in 2010 the little girl is taking control and I could predict the likelihood of cyclone force winds in the North this summer! To predict the weather is one thing, - at least you can look out the window and form your own opinion but to foretell an earthquake is rather more difficult. It is some consolation that if you build well for wind you should fare well in the shake and many industrial buildings in the Darfield and Rolleston areas stand undamaged as testament to this.

If you believe psychic Blair Robertson or believe in astrology or the moon movements (a la Ken Ring) then maybe you can hit it right sometimes; but remember a broken clock is right twice a day. There were a number of people that predicted the Christchurch quake (including Dr Charles) but the best you can do is to insure your building and make sure that it has got a metal roof.

SCOPE NEWS AND VIEWS

New Metrotile Satin & Textured Warranties

Metrotile is updating its Metal Tile Satin and Textured Warranties to bring the Metrotile Satin Tile Warranty into line with other Painted Steel products and to better reflect the enhanced performance of Textured Tile products. As all post painted Metal Tile Roof Installation companies are aware Textured tiles have the following advantages over Satin tiles;

- Textured tiles are more forgiving during installation
- Textured Tiles provide a natural "low glare" finish
- There are no fading or "chalking" issues with Textured tiles
- Textured Tiles produce less rain noise
- Textured Tiles are easily and cheaply maintained over time with a "newly installed" look

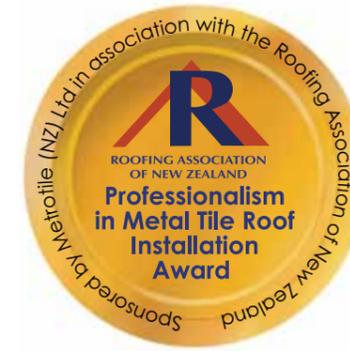
Metrotile will be updating its Satin and Textured warranties as follows;

Metrotile Surface Coating Warranty

- Ten Year Satin Surface Coating Warranty: A 5 year full surface coating warranty plus a diminishing pro-rata surface coating warranty for a further 5 years.
- Twenty Year Textured Surface Coating Warranty: A 10 year full surface coating warranty plus a diminishing pro-rata surface coating warranty for a further 10 years.

Metrotile Weather Proof Warranty

- Thirty Year Satin Weather Proof Warranty: A 15 year weather proof warranty plus a diminishing pro-rata weather proof warranty for a further 15 years.
- Fifty Year Textured Weather Proof Warranty: A 25 year weather proof warranty plus a diminishing pro-rata weather proof warranty for a further 25 years.



RANZ Inaugural Professionalism in Metal Tile Installation Award

RANZ (Roofing Association of New Zealand) is proud to announce the inaugural Professionalism in Metal Tile Roof Installation Award which is sponsored by Metrotile.

The Metal Tile Award program is open to all RANZ members and is designed to recognise and celebrate the professional installation of metal tile roofs by the Installer. Over the next five months all roofing companies that are installing metal tile roofs will be invited to submit jobs undertaken by their Installers and contractors to the Metal Tile Award program. The Award program is open to all products that meet the NZS 4217 standard for Pressed Metal Tiles.

The winner of the Professionalism in Metal Tile Roof Installation Award, which will be judged by RANZ representatives, will be announced at next years RANZ conference. The winner of the Award will receive a trip to the Gold Coast valued at \$1,500.

Contact RANZ for an entry form

Phone: 09-415-0278 or email info@roofingassn.org.nz or download from the RANZ website: www.roofingassn.org.nz -Members Section/Awards



A new Gerard roof for a very old building

A recent visitor to the western Ukraine brought back some photos of this church which was originally built in the 15th Century. The original roof was made from wooden shakes which were rotting and had to be replaced. The re-roof was done in Gerard textured CoronaShakes.

The funding was provided by the Ukrainian Institute of Architecture and EU grants. The project, now completed, provides an example to the conservationists who have often resisted using Gerard Roofing products on historical buildings.

This church is thought to be the oldest building ever re-roofed with Gerard CoronaShake. If anyone can confirm that there is an older building that uses Gerard Roofing, Gerard would be interested to know about it.



SUSTAINABLE WATER

By Graham Hepburn



There's little doubt that water is one of the planet's most valuable commodities and maintaining water supply will become even more important if predictions about the dire consequences of global warming become true.

If the planet is going to be subjected to the extremes of flooding and drought, then security of good quality water supply will be increasingly important.

In rural areas with no mains supply there has been little choice but to harvest rainwater from roofs and collect it in tanks, and many rural households prefer this source, but in recent years suburban dwellers and even businesses have begun to get in on the act.

This trend is partly due to greater environmental awareness but also to the fact that water is becoming an increasingly expensive commodity. Councils have also been encouraging home owners and businesses – sometimes with financial incentives – to collect rainwater because this has twin advantages: it helps to reduce stormwater flows and alleviates some of the pressure on water supply and water infrastructure from a growing population.

In urban environments with their proliferation of impermeable surfaces, stormwater during heavy downpours can cause surface

flooding and overwhelm sewers, causing foulwater discharge into waterways. Collecting water off roofs reduces stormwater problems by attenuating the flood peak and helps to conserve a valuable resource and will reduce the need for councils to build more dams or find other water sources. If you are providing your own water, then that also cuts demands on treatment facilities and pumping stations, which in turn means they will need to consume less energy. In urban Australia new houses are required to have stormwater retention systems for these reasons and this has encouraged use of the retained water in tanks for non potable uses, often metal tanks are the most cost effective due to the easy ability to have a non-circular tank.

Just harvesting rainwater for uses other than drinking drastically cuts demand on mains supply. The old Waitakere City Council estimated that only 5 litres per person per day is needed for cooking and drinking while 150 litres per day is used for bathing, washing dishes and clothes, flushing toilets, in the garden or for washing down cars etc. As New Zealanders have known for decades, catching water off a metal roof for drinking and other household uses is easy and safe as long as some basic precautions are taken.

BRANZ says metal roofs are safe to collect rainwater from but a check should be made to ensure there is no lead, chromium or cadmium in the roof and its flashings or in any soldering or paint. The roof and gutters need to be cleaned regularly with diverters in place to make sure contaminants such as bird droppings that are being washed away aren't entering the water supply. And a first-flush diverter and debris diverters should be installed – this reduces the risk of contaminants entering the storage.

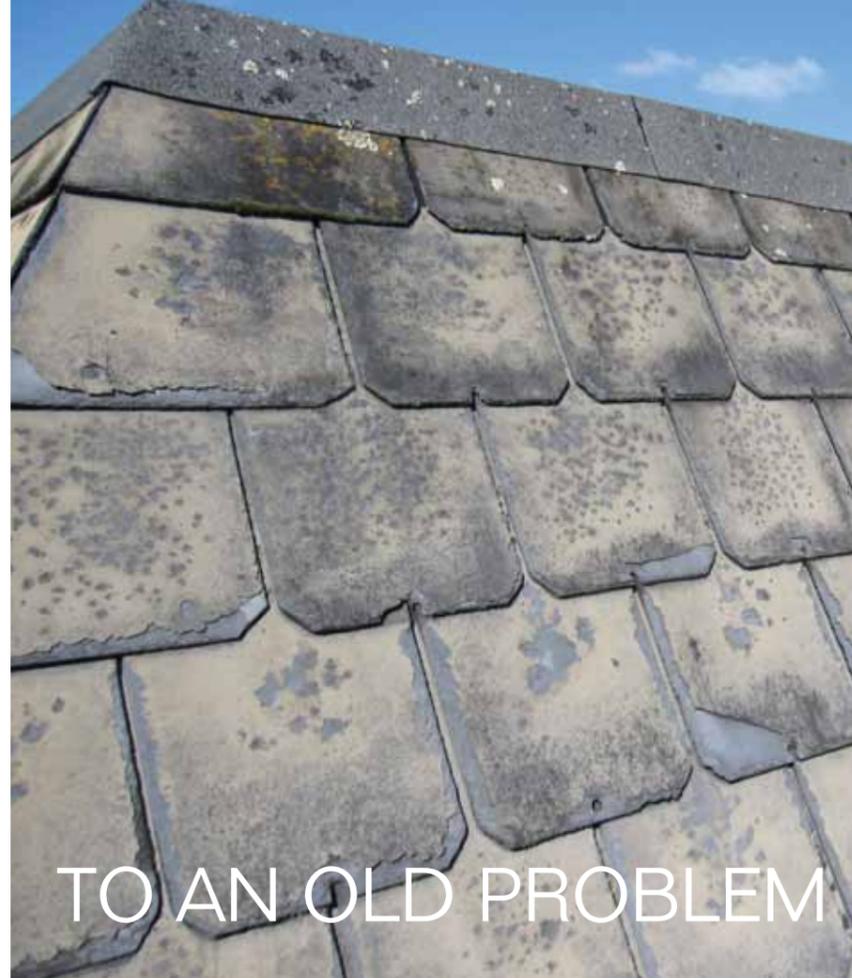
Pacific Coil Coaters and New Zealand Steel have tested the painting systems for the potential to release contaminants and have shown that there are no contaminants released of any public health concern. Therefore,

excluding other environmental factors, when you use COLORSTEEL® or Colorcote® pre-painted metal roofs for the harvesting of rainwater, you can rest assured that the product you are using will not contaminate the water.

The Virginia Rainwater Harvesting Manual recommends metal and membrane roofs, with the exception of copper and lead. It does not recommend asphalt or wood shingles, or tiles made of concrete or terracotta. The reasons for the preference of metal roofs include a lesser content of arsenic, copper, mercury, cadmium and lead contaminants. Uneven surfaces as in asphalt or wooden shingles also contribute to a greater opportunity for algae and biological growth and thus a greater risk of bacterial contamination of water collected. The manual cites Zinalume® and Colorbond® as roofs designed for rainwater harvesting. Colorbond® is similar to the prepainted material supplied in New Zealand by New Zealand Steel (COLORSTEEL®) and Pacific Coil Coaters (Colorcote®). These New Zealand products are arguably the best materials in the market for rainwater harvesting enabling the augmentation of our water resources, which are only becoming more stressed and are critical to the survival of the human race.

Roll-forming of metal for roofing uses no water and the manufacture of the steel coil from which metal roofing is made uses minimal water. As an example, New Zealand Steel's plant at Glenbrook uses about 1 million tonnes of water a day in the steel making process but this is constantly recycled – cleaned, cooled and recirculated - so that only 1% of it is discharged and what is discharged is clean enough to drink.

Homeowners collecting drinking water and greywater replacement from metal roofs can do so knowing they are harvesting a renewable resource. Metal is the roofing material that is arguably the best suited material for rainwater collection.



Roof Improvements are an independent specialist roofing company who are based in Takanini and service the Greater Auckland market with longrun and metal tiles. They have been in business for over ten years, with the owner and many of the staff having over 25 years experience in roofing.

"These boys have done a great job and I am very happy with the result. There was little disruption, they cleaned up and the entire job was done in 3 days. I questioned one flashing and it was rectified immediately with no fuss or argument. A great team I am happy to recommend to anyone." says the owner.

The stripping and re-roof on this project presented no structural issues as the ply base, that the Harvey Shingles were attached to, was in good condition. Building paper was laid and the Metrotile Shingles were screwed directly onto the ply. The finished result looks stunning and as on many new and existing projects throughout the country the unique Metrotile Shingle gives the low flat profile that so many home owners and designers strive to achieve. The benefits; low maintenance, looks great, a range of natural colours, excellent warranty, lightweight building specification, tested in extremes of weather, approved in coastal environments and a company that stands by it's products.

Roofing Manufacturer:
Metrotile
 1C Inlet Road, Takanini 2112
 Telephone: 09 299 9498
<http://www.metrotile.com>
 email: info@metrotile.com
Profile Metrotile Shingle
Colour: Charcoal

Roofing Installer:
Roof Improvements
 Auckland
 Telephone: 09 267 3040
www.roofimprovements.co.nz
 email: roofimprovements@xtra.co.nz

*Above: The original Hardie Shingles that were stripped from the roof.
 Centre: The original Hardie Shingles that have been recoated.
 Below :the New Metrotile Shingle roof.*

Whilst not needing to collect potable water from the roof the Homeowner was interested to hear that potable water could be collected from the Metrotile Shingle roof, which is not the case with all light weight shingle substrates, some of which include or have historically included bitumen and asbestos in the manufacturing process. There is an increasing environmental awareness of harvesting water rather than wasting it and in many instances having the choice is important to home owners.

The Metrotile Shingle profile is unique in the market and the lowest profile pressed metal shingle available. To match the neighbours roof clearly meant dealing with one of Metrotile's certified distributors and being a sensible Kiwi the owner obtained 3 quotes before settling on Roof Improvements to undertake the task of stripping and re cladding the roof.



Metrotile have provided a solution that an increasing number of home owners have with shingle products installed in and around the 1980's. Whilst the original unit's unique design was complimented by the low, flat profile of shingles the long term performance was questionable. In this instance the owners of three units have approached the solution in two ways. One has decided to re-coat the existing Hardie shingles to extend their weatherproofing and visual appearance whilst the other two have chosen to replace the entire roof with Metrotile Shingles. The centre unit was the first to be re-roofed and the owner of the third unit was so impressed by the result he elected to use the same Metrotile Shingle. This made good sense and enhanced the overall visual appeal of the collective group of units.

The original roof was showing serious delamination which did not reflect the well maintained appearance of the units and the owner was no longer confident that it would remain watertight in the near future.

Several factors influence the decision to use Metrotile Shingles the first being they had to compliment the original design with the low profile. The Metrotile Shingles have a natural stone textured finish that also had an appeal as the glare from the original shingles was a problem and one which is often overlooked. Many roofs reflect light which can have an adverse effect on neighbouring homes in the area.

Maintenance and longevity was also a priority and a concern for those who are not able to crawl around the roof cleaning and maintaining it. The Metrotile 50 year pro-rata Weather Proof warranty and 20 year pro-rata Surface Coating Warranty was an added bonus which helped to validate the owner's decision. "I understand Metrotile have a very solid history and they stand by their product. To be honest I expect this from any NZ manufacturer," says the owner.

STOCKTON MINE COAL HANDLING AND PROCESSING PLANT

Mother Nature throws up plenty of issues on this project.
Article supplied courtesy of Jenny Bain, Rooflink



Products

WRS's budget pricing began in August 2008 and before construction drawings were finalised, BWE talked to Dimond about the most appropriate products for this harsh environment. The structural steel specification required the material to be designed for a permissible service temperature of minus 10 degrees C to ensure suppression of brittle fracture. Earthquake loading was the critical design load for the coal processing plant and was approximately three times greater than that for a similar structure in Australia.

Dimond recommended double sided ZRX V Rib profiled cladding and Duro-lite 3600gm Webglass for the roofing and cladding. High altitude, steep topography and proximity to



Stockton Mine in Buller, New Zealand's largest opencast coal mining operation, has been a site of coal extraction since the late 1870s. Located high on a plateau north of Westport, 800m above sea level, the mine is operated by Stockton Alliance for Solid Energy New Zealand Ltd, delivering high-quality steelmaking coal for export.

Solid Energy has recently built a new coal handling and processing plant to handle the substantial amount of coal mined that could not be sold owing to being mixed with rock or other materials. The new plant means Stockton can add at least 500,000 tonnes a year to the mine's output over the next 20 years.

RANZ member Wayman Roofing Services Ltd (WRS), Christchurch installed the roofing and cladding on the \$124 million plant, construction of which involved more than 250,000 hours of work over 500 days employing more than 750 people over this period with no lost-time injuries. Paul Wayman will attest to the effectiveness of the extremely robust health and safety environment adopted and its success on this contract.

Relationships

The new plant was designed by Downer Engineering and built by Nelson firm Brightwater Engineering (BWE). WRS has enjoyed a working relationship with BWE over many years, having worked on projects in the Nelson area particularly at Nelson Pine Industries. The company has also been involved on several mining projects including the processing plants at Spring Creek Mine, north of Greymouth, (another Solid Energy project) and the Globe Hill Mine for Oceana Gold near Reefton.

Early in 2008 BWE approached WRS about being named as their preferred roofing and cladding contractor in their bid to Solid Energy for the new processing plant at Stockton Mine. There were a number of design and construction issues on this site including those from mother nature: high rainfall (up to 600mm per month), low temperatures (between 0 degrees and 15 degrees C dropping to minus 5 degrees C in winter), fog (which often obscures visibility to the point where earthmoving operations at the mine are suspended to ensure operator safety) and the area is also prone to earthquakes and very high wind speeds.

the coast and very severe climate meant designing for wind speeds in excess of 230km/h.

Prior to any work commencing BWE built 17 conveyor and plough units in their Richmond (Nelson) yard and Nelson Marlborough Roofing Ltd clad these prior to delivery. Once delivered to the Stockton site they were assembled in units of three by WRS and then lifted into place on trestles with all flashings and junctions completed once they were in place by WRS.



Says Paul Wayman: "Because the construction site was in the middle of a working mine and at an altitude of 3000 feet we had our own issues to deal with in terms of rigid health and safety requirements and the extremes in climatic conditions.

"We also had to deal with how to manage and safely install both the roofing and the wall cladding as the height to the ridge from the ground was approximately 25m".

Wall cladding

Clean water is at a premium on the construction site and every effort is made to collect rain water. Therefore the wall cladding was started at the top with a lap in the sheets on the outside of the top sheets facing upwards in order to catch the water shed off the walls which was diverted to the inside for collection. At the base of the walls and all the way round the perimeter WRS installed large catch flashings to divert the rest of the water -shed from below the tap line.



The longest wall sheets were around 13m and we had to devise an approved lifting system to crane the sheets into place, said Paul. This consisted of a profiled cradle into which the V rib was clamped end on and a pair of lifting stroops and yoke was attached to that. This system enabled the sheets to be lifted individually to a vertical position by crane and then installed with the use of the crane and large boom lifts.

There was a WRS crew of up to five on the job at any one time – this was the total required due to the limited work faces made available because of the complex nature of the construction but it also meant less exposure to periods of unproductive



Health and safety

Anyone with doubts that a more prescriptive health and safety environment is unwarranted and unnecessary would have those myths dispelled had they witnessed how successful it was on the mine project, says Paul. The success included the fact that:-

- Everyone was subject to it – no excuses.
- Resources were in place to ensure compliance.
- No expense was spared in providing scaffolding, access equipment and even safety nets where and when required.

■ Brightwater Engineering, Solid Energy and Downer EDI (Solid Energy's partner in Stockton Alliance, the mine operator) all take health and safety seriously and they 'walk the talk'.

■ Outlining some of the H & S processes WRS was subject to Paul said a JSA (Job Safety Analysis – a system to identify risks and hazards in a particular task and either mitigate or eliminate them) was produced for EVERY task on site which all workers had to sign. The JSA had to be modified for any alteration on the work method, or to account for any change that may occur during that work process such as the weather. In addition,-

■ A daily Permit for Work was issued after that JSA had been approved, taking into account that no other conflicting work or trade would impinge on the safety of any work being carried out in close proximity. If it did then a permit would not be issued to the other party until that work area was clear.

■ The JSA was attached to the work area in a clear envelope to ensure it could be seen by everyone in the area. Jobs were subject to random inspection by the HSE Officer to make sure that all processes and safety measures were being adhered to.

■ WRS work was shut down if the weather deteriorated or wind speeds increased to the point where it was considered unsafe to continue work (in the case of installing the wall cladding this could be if ANY wind developed).

■ There were also daily pre-start meetings where all trades on site discussed their work processes for that day accompanied by prestart checks on all plant and equipment (including personal transport vans, etc).

■ Every Monday there was also a weekly pre-start meeting for pre-planning for the week and the identification of hazards.

Says Paul Wayman: "Initially it all seemed quite onerous and over-the-top but the boys soon became used to it and the satisfying thing for us was that EVERYONE was exposed to it and HAD to comply. I am an advocate of a more prescriptive system such as we were exposed to at Stockton as it removes any doubt around "all practicable steps". Solid Energy New Zealand and Brightwater Engineering are prepared to "walk-the-talk" in terms of both enforcement and the associated costs – which is something that we find is seriously lacking in the wider construction industry.

"Overall, taking into account the locality of the site and all that entailed, the logistics surrounding the supply and the installation of the cladding, we are pretty happy with the outcome. There could have been a lot go wrong on a job of this nature.

"It is a testament to our staff, ably supervised by Matt Friedwald and the co-operation of the whole BWE project team on site".

The 'zero harm' target

Says Bryn Somerville, Communications Manager, Solid Energy New Zealand: "At Solid Energy New Zealand we start from a "zero harm" target: no harm to anyone, ever". That means the risks you're prepared to accept will be much lower than

an employer who might say "well, yes, I'm prepared to take the risk one of my guys might get hurt if we carry on. I think the risk is pretty low so we'll carry on." For us, even that small risk might be too much if there's nothing we can do to mitigate it.

"Paul has referred to the start-work and weekly meetings. We hold team meetings to identify hazards and risks because everyone must take responsibility for it. You can't leave it to someone else. If the guys can pass off responsibility for safety to the boss or an HSE officer it's impossible to get a lasting improvement.

"That's one of the things we learned when we really started looking at how to get serious improvement in safety. We'd have someone hurt and do the review and someone on the job would say – "oh yeah, that was an accident waiting to happen" but they hadn't felt like they had a voice in it, or a stake, so hadn't said anything.

"For the last year, Solid Energy New Zealand has really been pushing hazard identification and making sure we follow them all through and get the mitigations in place where it makes sense to do so. If the guys see that their suggestions are being acted on, AND that it is reducing injuries, then they keep looking for hazards and risks and keep coming up with better, safer ways to do things and you start locking in a process that is self-improving."

Design: Downer Engineering

*Main Contractor:
Brightwater Engineering (BWE)
Nelson*

*Roofing and Cladding Manufacturer:
Dimond.*

*Telephone: 09-6340575
www.dimond.co.nz*

*Roofing & Cladding: Double sided
ZRX V Rib combined with Durolite
3600gm Webglass*

*Roofing and Cladding Contractor:
Wayman Roofing Services Ltd
(WRS), Christchurch.
Telephone: 03-338 0877
paul@waymanroofing.co.nz*

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Contact: Maurice O'Flaherty*

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49 Rutherford Street
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*Telephone: 04 566 1971
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*B J Moss Ltd
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*Telephone: 06 867 1219
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Contact: Warren Oliver*

*Freeman Roofing Nelson
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Canterbury Long Run Roofing Timaru*

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Contact: Colin Megaw*

*Silbery Long Run Ltd
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