ISSUE 27

SCOPE

NZ METAL ROOFING MANUFACTURERS INC.

Below is a brief introduction to the 2011 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 Business Development for Metalcraft Industries.

Executive Members:
Dave Hall: Manager of Freeman Roofing
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.
John D'Arcy
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

CONTENT ISSUE 27

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.

Managing Editors: Warren Oliver, Christine Wilkinson, Dean Lee, Dave Hall, Campbell Glennie. Gary McNamara.
Published by ICG Limited.
57 Glendhu Road, Glenfield, Auckland. Telephone: 09 444 2424.
e-mail: conceptart@xtra.co.nz

Scope is the official publication of
The NZ Metal Roofing Manufacturers Inc.
Executive Officer: Peter Atkinson
Private Bag 92 066, Auckland.
DDI Ph: 09 367 0934,
Ph: 09 367 0913

FORGOTTEN LESSONS OF THE PAST

By Graham Hepburn

Following the Christchurch earthquakes, engineering experts have recommended replacing heavy tile roofs with lightweight metal roofing.
Inspections revealed that extensive damage was caused to houses by chimneys falling through heavy tile roofs or by the tiles coming loose and falling whereas metal roofing generally did not collapse under falling chimneys and was able to withstand the quakes themselves. That was one of the main findings of Wayne Brown, a trained civil/ structural engineer and Mayor of the Far North.

Brown was part of Operation Suburb, which involved a team of 400 building inspectors and 300 welfare officers visiting all homes in the affected suburbs to assess damage following the February 22 earthquake. Building inspectors red-stickered any dangerous or uninhabitable homes, and Mr Brown was one of a group of 12 engineers that provided follow-up to further assess borderline, tricky or dangerous structures and land subsidences and confirm or remove the red stickers.
Following that work during the first week of March, Mr Brown produced a report to Christchurch Mayor Bob Parker and the Minister of Housing, Maurice Williamson, outlining his findings.

In it, he says: "Simply put house damage fell into some obvious categories and some simple rules were agreed among the engineers that would have reduced the damage cost by billions if they had been in place.

"Flexible structures performed way better than rigid ones and the choice of cladding made a big difference. Earthquake responses are worse with increased structure weight, particularly weight up high.

"Heavy roof tiles and brick chimneys consistently failed and as they fell they created more damage and danger to anyone below. Conversely corrugated iron roofs performed well, even when the chimneys fell as they kept the inhabitants safe. If this had been at night many would have died from falling tiles and chimney bricks. Why not ban both and use iron roofs and steel chimney flues."

Echoing those findings is a report done by the Royal Society of New Zealand, the Institution of

Professional Engineers New Zealand, the Structural Engineering Society New Zealand, the New Zealand Geotechnical Society and the New Zealand Society for Earthquake Engineering, who co-ordinated science and engineering expertise from across New Zealand. In a section concerning improving earthquake safety, the report recommends:

"When building, use 'earthquake friendly' materials like piled or waffle-slab foundations, timber (or light steel frame) walls and lightweight roofs.
"Remove heavy roofs like concrete tiles and replace them with lightweight materials such as steel."

The report also recommends that larger brick and masonry buildings can be earthquake-strengthened by either internal steel bracing or an external steel frame.

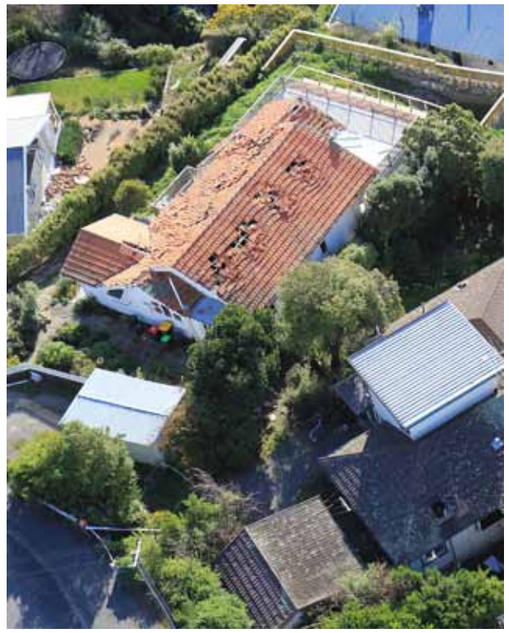
Another report, compiled by Prof Andy Buchanan and Michael Newcombe, at the University of Canterbury, points out the damage done by falling chimneys and how metal roofs were better able to withstand the impacts.

Their report says: "The most common type of damage for older buildings (more than 15 years old) was chimney collapse. This occurred in many thousands of buildings. "Falling chimneys could be interpreted as a violation of the 'life-safety' criterion required by New Zealand Standards (NZS1170.5:2004) for current building
seismic design. Falling chimneys resulted in damage or piercing of the surrounding roof structure, damage to neighbouring properties, vehicles but (luckily) no loss of life.

"Chimney collapse on to corrugated steel roofing often caused no further damage,depending on the height of the chimney, but some fell through the roof or caused rafter failure. Chimneys falling on to tile roofs (concrete or clay tiles, or slate roofs) more often fell through into the house, sometimes causing further structural damage and potential loss of life."

The experience in the United States has been the same where structural and civil engineers in Southern California say home builders and homeowners should increase their use of lighter weight roofing systems.
"When you put a heavy mass on your home, like a concrete roof versus lightweight steel or cedar shake, it causes problems when the ground shakes," said James A. Bihr, a structural engineer and co-author of a study on the effects of the 6.8 Northridge earthquake on residential roofs in 1994.

The study, conducted by The McMullen Company, said lightweight materials "tended to withstand



shaking and appeared to not contribute to other structural damage." Yet hundreds of heavy tile roofs were damaged "where no other significant structural damage was obvious."

In Wayne Brown's report, Under a section entitled 'Forgotten Lessons of the past', he makes this point: "ECANZ have posters reminding of the swarm of earthquakes that damaged the Christchurch cathedral in the 1859 to 1870 period, yet it was widely reported that only the recent earthquakes have had this effect. Locals built in timber frame and iron roofs for the fifty years following those 1870 earthquakes but slowly they forgot and moved to brick and tile with tragic consequences. The lesson of the metal chimney flue doesn't seem to have made it south into Canterbury, yet these [brick chimneys] virtually all failed often landing in the upstairs bedrooms."

Also in the report in the section titled 'Restoration recommendations', Mr Brown observes, "Many houses with timber frames but tile roofs and brick veneers looked dreadfully damaged after the walls had fallen off and the tiles had fallen through the roof structure, but in many ways these houses have been made much safer than they were. There are thousands of houses in this situation and it would be a waste to demolish these. Repairs are relatively simple. Reclad the roofs in corrugated iron (or if they must have tiles, use metal tile strips). This requires no structural change as this is a much lighter solution.
Mr Brown goes on to make these points about the Building Code:

"From this operation it is clear that complicated codes of recent years were of little benefit as they simply had not been followed or most likely not even understood or in wide public acceptance. Simple sensible widely accepted rules such as the six above would have done far more good than toughening up what is already a laughably long and complicated residential building code that concentrates on the wrong things. This earthquake has focused us all on what really matters and that is the choice of safe, reliable, easily built and inspected building products and systems.

The excellent performance of very old timber frame, corrugated iron houses that precede any current building code proves this. Good structural performance of houses was not code related but was impacted by the type of structure and the cladding and roofing choices and the flexible ones proved the best.

The recent code's fixation on fifty year reliability has produced unexpected unwanted poor results (a lot of houses didn't last 50 years) and was probably behind the widespread use of concrete floors in the low lying flat suburbs that suffered from liquefaction. If timber subfloor structures had been used that were designed for easy re-levelling post ground movement they probably would be disallowed under the 50 year rule. This needs a revisit."

Mr Brown also worries that mistakes of the past may be repeated if the insurance industry insists on sticking to the letter of agreements for replacement cover of damaged housing. He says "it would seen unwise to replace a failed brick veneer and tile roof with the same products that have performed so poorly. Surely a better result is a reclad in weatherboards and a corrugated iron roof, but it is possible that the insurance contract wording might work against this."

However, having sighted the report, the Insurance Council of New Zealand says it would expect insurers to work with homeowners for the best possible outcome, and contracts could be reworded to guard against any future events.

Wayne Brown is a trained civil/ structural engineer, founder of Brown and Thomson Consulting Engineers of Northland and Auckland, owner of a construction company specialising in domestic construction, house removal and restoration of Historic Places listed buildings. He is experienced in post disaster engineering reporting and is also the Mayor of the Far North. He has extensive experience at Chairman level of large infrastructure companies that have experienced major failures before his arrival, such as Vector, Transpower and LTSA. Wayne has designed and developed a number of projects in Christchurch including Hoyts on Moorehouse.

The Roofing Association of New Zealand has issued a set of guidelines for roof replacement for homes damaged in the Christchurch earthquakes.

The guidelines apply only to work done within the Christchurch City Council jurisdiction and cover timber frames only and give the requirements for the replacement of concrete and clay tiles with profiled metal or metal tiles.

Under Christchurch City Council bylaws this work does not require a building consent but "all building work (whether subject to consent or not) is required to comply with the Building Act, Building Code and all other laws".

The council also advises that homeowners doing "repairs without building consent" should "keep records of the work done and who carried out the work".

RANZ recommends that roofing contractors "should take before and after photos of not only the top plate/rafter connection but the purlin/rafter fixings and the fixing method as well. Full documentation of dates, identification of the site must be made and include the specifications of the materials used".

The RANZ guidelines are:

1.1 TIMBER In many cases the roofing contractor will be doing the timber upgrade and therefore it is important that both the existing and all the new roof connections are made in accordance with NZS 3604:2011. The wind load will, in some cases, determine the spacing and fixings required but if it is assumed that truss or rafter centres are at 900mm and that the wind design load is medium = 37m/s = 1.23 kPa (kl =1.5) then.

Trusses and rafters fixed to the top plate must be brought up to the Building Code requirements = 4.7kN capacity.

This will most easily be achieved using purlin cleats and assuming that the original connections are in place and are adequate (2 skewed nails for example) then the addition of 1 Pryda NPPC4 or 1 Mitek CPC40 fixed according to manufacturers instructions per rafter would suffice.

Purlins up to 1200mm spacing – must be fixed with a 1/10g 80mm long purlin screw (minimum) OR a Pryda purlin strap BS 70.

1.2 It should be noted that timber purlins for metal roof cladding are minimum 70mm x 45mm H1.2 <18% moisture content and that battens used previously for tiles must not be used. NOTE:

a) Cantilevered enclosed decks and exposed skillion roof construction require H3.2 treatment.

b) Cavity battens require H3.1 treatment.

c) All other roof framing, including enclosed flat roof framing and associated roof supporting members, valley boards and boards supporting flashings or box gutters, and flashings to roof penetrations and upstands to roof decks require to be H1.2.

Brick chimneys in most cases will already be down but those still standing must be inspected and reinforced or flued before roof cladding replacement is completed.

2.0 PROFILED METAL ROOFING Roof pitch should be determined prior to profile selection. Refer NZMRM CoP for profile and pitch selections. If corrugate or trapezoidal profile is chosen there are two options of gauge (either 0.40mm and 0.55mm) and their performance under load is given in the load span graphs excerpted from the NZMRM Code of Practice included in this bulletin. It can be seen that for normal application within the Christchurch environs with the use of high strength 0.55mm, intermediate purlin spacings can be up to 1.800mm. with end spans 1.200mm. This can offer a saving in timber, labour and fasteners which can offset the higher cost of the heavier gauge material. If high strength 0.40mm corrugate is used then the usual 0.900mm end and 1.200mm intermediate spacing can be used. If underlay is run horizontally then the intermediate purlin spacing must be reduced to 1.100mm so that the underlay is 'captured' by the fasteners at the purlin. If the site is exposed or on a hillside then the design wind load increases and these purlin spacings should be reduced accordingly. Roof cladding should not be 'over-fixed' as this can cause noise particularly if dark colours are chosen and the screw fixing patterns shown with the load span graphs should be used. It is recommended that an eaves flashing is used particularly when plastic spouting is used.

Checklist

- Identify the site, document dates work was done and specify materials used.
- Take before and after photos of the job, including top plate/rafter connection, purlin/rafter fixings and fixing method.
- Make sure that existing and new roof connections comply with Standards New Zealand's requirements.
- Ensure trusses and rafters fixed to the top plate are brought up to the Building Code requirements.
- Battens used previously for tiles must not be re-used
- Any standing brick chimneys must be inspected and reinforced or flued before roof cladding replacement is completed.
- Roof pitch should be determined prior to profile selection. Refer NZMRM CoP for profile and pitch selections.
- If the site is exposed or on a hillside then the design wind load increases and purlin spacings should be reduced accordingly.

SCOPE NEWS AND VIEWS

Changes at Dimond:

Dimond are pleased to announce some positive changes to their management team – with a focus on putting the right people in the right job at the right time. We are excited to announce these new appointments.

Aidan Taylor will add Auckland Branch to his existing Northern Regional Manager position in Dimond and will relocate to Auckland. He will assume the overall responsibility for the Auckland Branch, in addition to overseeing Whangarei, Hamilton, Rotorua and Tauranga. Aidan's customer focus will ensure the upper North Island is serviced well.

Chris Saunders has been appointed to Branch Manager Whangarei. Chris has an extensive history with Fletcher's. His most recent role was with Laminex Whangarei where he was the Branch Manager for 7 years. Chris's proven management experience will provide Dimond with a great platform to develop into one of the best suppliers of roofing products in the Northland Region.

Craig Lowry our current Sales Manager in Hamilton has been appointed to the position of Branch Manager Hamilton. Craig has been in the acting Branch Manager role for the past 6 weeks while Aidan has been overseeing the transition of Whangarei's new Branch Manager, Chris Saunders.

Darran Roberts has been appointed to the newly created position of Specified Solutions/National Accounts Manager reporting to Mike Klemick in the Business Development Team. This position will be focused on national accounts and servicing all stakeholders within the building supply chain to ensure Dimond solutions are specified and held through the sale.

Gerard Roofs New South Island Regional Sales Manager

Gerard Roofs has appointed a new South Island Regional Sales Manager.
Jake Walker started on 2 May, with responsibility for driving sales and supporting Gerard distributors throughout the South Island.
Jake will be based in Christchurch and comes to Gerard with industry experience including his role as a Key Account and Sales Manager for Hilti in London where he worked on projects that ranged from London Olympic Park to the Cross Rail Tube Projects. Prior to working in the UK, Jake was an Account Manager with Metalcraft in Christchurch.
Jake brings a wealth of experience in sales, account and relationship management as well as local roofing industry knowledge. His appointment follows the retirement of Don Wise from the role of South Island RSM at end of last year. Don is continuing in a part-time capacity, providing support to local distributors and Canterbury Earthquake initiatives.

Gerard Roofs Commitment to Training

Gerard Roofs continued to show its commitment to industry training recently holding a very successful day in which 31 of their Auckland and Northland based contractors completed Licensed Building Practitioner (LBP) Roofing applications.
Holding this function at the Gerard Roofs factory in Glen Innes was "right on the money" for the contractors who made good use of the opportunity to have original documents verified onsite and passport photos produced to complete their applications. A number of contractors arrived with partly completed applications and they really appreciated the opportunity to get some on the spot information and advice to complete this important documentation.
For Gerard Roofs this continues the journey of ensuring that our installers are well trained, but more imminently with the implementation of the LBP scheme in March 2012, that Gerard Roofs provides seamless transition to Specifiers and Tradespeople in the Licensing era" where roofing becomes restricted work.

Left to right: Tufao Faauiga (Apex Roofing), Graham Price (Harvey Roofing Centre Tauranga), Kelvin Gatland (Apex Roofing) and Gordon Hellyer (Harvey Roofing Centre)

Nigel Bryant with Graham Moor, Bay of Islands Roofing

RANZ Professionalism in Metal Tile Installation Award.

Metrotile is proud to announce that the winner of the RANZ Professionalism in Metal Tile Roof Installation Award was Nigel Bryant from Bay of Islands Roofing.

Both Bay of Islands Roofing and Nigel Bryant have been formally recognized by RANZ as the 2011 Award winners and Nigel has won a $1,500 trip to the Gold Coast.

The Award judges were Stuart Thomson and Des Cowperthwaite who were impressed by the quality of all the Award Entrants and noted that the standard across the five finalists was very high. The only points of difference were small details of fixing and flashing.

The RANZ Professionalism in Metal Tile Roof Installation Award, sponsored by Metrotile (NZ) Ltd aims to encourage and reward those who demonstrate high workmanship standards which have been at the heart of the Roofing Association's principal objectives since formation in 1994.

Metrotile will be meeting with Lorraine Mills, Stuart Thomson and Des Cowperthwaite in regards to the design and launch of the 2012 Professionalism in Metal Tile Roof Installation Award program.

Roofing Association of New Zealand
Phone: 09 415 0278 or
email info@roofingassn.org.nz
Metrotile: Telephone: 09 299 9498
email: info@metrotile.com
www.metrotile.com

Craig Taylor (the Homeowner) and Mark Hughes (The Roof & Brick Shoppe)

Metrotile Support Christchurch Earthquake victims with free roof tiles offer.

Metrotile has around 50 roof lots of fully warranted end of line metal roof tiles, totalling some $250,000, that it is offering free of charge to the people of Christchurch.

To access this support the applicants were required to register there interest on the Metrotile website www.metrotile.com.

The confirmed jobs – which are composed of Labour, Contracting Margin, Accessory Product, Travel and free metal tiles are directed through Metrotile Distributors for installation.

"To date 15 homes have been accepted and 10 homes have had new roofs installed with owners who are very happy with the results," say Gary McNamara.

Some of the feed back from home owners who have had a new roof;

Hi Gary

I am delighted with the new roof and Pete who installed it is a really good guy, worked through the southerly storm and got it finished last night.

The colour is fantastic, and surprised it is end of life, and not that far away from the new denim blue on extension of house so really pleased

Thank you very much for the materials you supplied and I sleep much better at night now knowing I have a light roof over our heads.

Kind regards
Craig Taylor

Hi Gary,

I am one of the fortunate recipients of your generous offer of free roof materials. My roof was finished today and is amazing.

We now have a safe, watertight, great looking roof.

Town and Country Roofing have done a fantastic job and were a pleasure to deal with. Thank you once again for your very kind offer.

Best regards
Linley Coulson

Dear Gary

THANK YOU ALL SO MUCH FOR THE NEW ROOF

It looks awesome

We had a few smaller aftershocks on Saturday night and we were amazed - NO SOUND!

YOU WILL NEVER KNOW WHAT THIS OPPORTUNITY HAS MEANT FOR US.

If you are looking for further work in Christchurch for the rebuild. Arrow International and Hawkins Construction are 2 major companies handling the rebuild of new houses for insurance companies. They are not tied up with Fletchers repairs through EQC.

Kind regards
Rosemarie Clouston

Chris Henderson and Stuart Thomson

Roofing Excellence Award

The inaugural winner of the Roofing Association of New Zealand's Roofing Excellence Award is 33 year-old Chris Henderson, Operations Manager for Comag Ltd of Matamata. The award recognises a high achiever in the industry involved in a practical or administrative role and who has demonstrated commitment, personal development and achievement in his career.

One of nine directors of the Comag Ltd, Chris started work as a roofer when he left school and has been with the company for 16 years. He holds National Certificates in Metal Roof and Wall Cladding and Metal Tiles and is a Licensed Building Practitioner. He received his award at this month's RANZ conference at Wairakei.

The award's benefactor is RANZ Life Member, Stuart Thomson, author of the NZ Metal Roofing Code of Practice and a roofing consultant for the last 25 years. As a member of the judging panel for this award, Stuart said it was gratifying to have seen good work from specialist practitioners with skills, dedication and qualifications.

The 2011 winner, Chris Henderson has managed some very difficult projects for Comag including the architecturally unique Kaimai Cheese factory at Waharoa and the new Knoll Ridge Cafe at Mt Ruapehu in the middle of winter.

In addition to the engraved trophy which he will keep until it is next awarded in 2013, Chris received a framed Roofing Excellence Award Certificate and a total prize package worth in excess of $3000.

Email: info@roofingassn.org.nz or
Phone: 09 415 0278.

Metalcraft's new factory Showcases Thermospan

The Metalcraft Insulated Panel industrial building at 139 Roscommon Road, Wiri, designed by Code Design, utilises a variety of profiles and finishes now available in the Thermospan range.

The insulated Thermospan and Thermopanel EPS cladding and roofing systems offer numerous beneficial design considerations in construction, allowing for a reduction of purlin and girt members with cleaner interior surfaces. The use of Thermopanel EPS cladding for offices gives a pre-finished interior with the added benefits of thermal insulation against excessive solar gain in north facing aspects.

The fixing details, junctions and flashing system provides for a uniform and uninterrupted finish on both the building exterior and interior and the use of double skinned translucent roof panel sections allows excellent light reflectivity into the factory work areas.

The innovative application of Thermospan in industrial and residential projects can now be seen first hand by interested specifiers.

For further information contact
Metalcraft Thermospan FR
Ph: 09 274 0408
architectural@metpanels.co.nz
www.metalcraftroofing.co.nz

An apology to Design Metal Roofing.

In issue 26 we reported on the holiday home of David Jack and Elizabeth Thomas at Langs Beach. An important design element of this innovative project was the design and fixing of the Thermospan roofing installed by Design Metal roofing. We acknowledge the excellent work done by Design Metal Roofing on this project.

Theromspan, from metalcraft, combines the outer metal sheathing with insulation and the interior ceiling finish in one product. Design Metal Roofing, are the only residential housing installer of Thermospan in the Northland area.

Design Metal Roofing
Telephone: 09 4321119

WAITANGI GATEWAY

"Staff at the Waitangi Treaty Grounds now have the space and facilities to welcome and engage with every visitor individually," commented Waitangi National Trust CEO Jeanette Richardson following the official opening on Waitangi Day 2010 of the new 'Gateway' Reception Centre.

This 'space' was designed to reflect the historic significance of the Waitangi Treaty Grounds, for both Maori and Pakeha, with the combination of steel and timber in the construction representing the blend of the two cultures. It is literally a gateway to the historical and cultural journey through the grounds, a portal from the carpark through which visitors are drawn into the surrounding bush beyond.

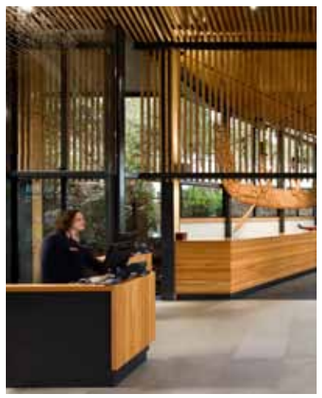
Early in the design programme it was agreed that the building would have significant timber content, as this was the material most commonly used by pre-European Maori and since European settlement.

HB Architecture worked with the Waitangi National Trust to establish this welcoming point of entry for visitors to the Waitangi Treaty Grounds. A significant feature of the building is the slated timber 'whare' form which is suspended under the main roof. With its large gable roof covering a front porch area and an open plan internal space, the structure reflects the traditional form of Te Whare Runanga.

Architect Grant Harris explains his design concept: "The need for shelter from the hot summer sun was paramount – for the visitor, and also the person welcoming visitors on the start of their journey through the Treaty Grounds. Because the building is essentially a gateway – where people can be informed and made ready for the next step in the journey – finishes have been

kept deliberately simple. The walls are glass, creating a sense of enclosure, while still connecting strongly with the surrounding bush. This structure serves the present while also establishing a conduit between the past and future."

While timber is the dominant finishing material, the COLORSTEEL® roof is supported on an exposed steel structural frame with macrocarpa inserts, providing strength and durability with flexibility and warmth. Ceilings are Fijian Kauri-finished plywood; walls are generally glass with some painted blockwork and the floor is finished with tiles and carpet. Oiled macrocarpa features in the portal frames, the exposed timber screen and in inserts to the structural frame. The timber has aged naturally and is picking up the natural colours of the surrounding bush.



The form of the new building respects the existing Visitor Centre designed by architect John Scott: the roof is at 22.5 degrees, matching that of the Centre; it is approximately the same height; and it is orientated along the existing path – in the direction of pedestrian flow.

"Scott's original design concept encouraged the notion of 'curiosity'. This was reinforced through the use of a curving path, creating a sense of connection and anticipation," said Grant Harris. "We made every effort to reinforce this idea. The 'gateway' connects the open space of the existing parking area with the track, and acts as a switch, leading to the enclosed bush path which then opens to the Visitor Centre courtyard."

HB Architecture

The primary goal of Harris Butt Architecture is to produce elegant architecture that utilises a combination of proven building approaches and the best technological advances available today.

The Directors of HB Architecture strongly believe that the form of a building must first of all offer protection against the elements - wind, rain, heat and cold - and that the beauty and design of a building is as important as its usability and function. Only beautifully made buildings contribute to our built environment in a sustainable way - ultimately it is only these buildings that will be considered worthy of preservation.

The challenge is to integrate function and aesthetic value into an enduring architecture that cooperates with nature and works in concert with ecological principles.

HB Architecture will continue to provide creative design solutions backed by excellent communications technology and rigorous delivery controls.

Architect: Grant Harris
Harris Butt Architecture Ltd
HB Architecture
Whangarei
www.hbarchitecture.co.nz
email: info@hbarchitecture.co.nz
Telephone: (09) 438 9545

Roofing Manufacturer:
Steel and Tube Roofing Products
Whangarei
Telephone: 09 438 4600

Profile: Hi Rib 500
COLORSTEEL® Maxx®
Thunder Grey

Builder - Henwood Builders
Telephone: 09 4010789
mobile: 021 795 206
www.henwoodbuilders.co.nz.

Roofing installer:
Bay of Islands Roofing
Telephone: 09-407 9288
Kerikeri
Email: bayroof@xtra.co.nz
www.bayofislandsroofing.co.nz

TE HANA TE AO MARAMA

By Graham Hepburn

The opening of an educational and cultural tourist village in Te Hana has signalled a new dawn for what was once a community in crisis.
In fact, such were Te Hana's problems with poor housing, crime and a polluted water supply that authorities wanted to close down the town, which is just north of Wellsford on SH1 and on the border of the Auckland and Northland regions.
In 2002, concerned local iwi and community members formed the Te Hana Community Development Charitable Trust to turn things around.
The Trust's CEO, local architect Linda Clapham, recalls that they were trying to resurrect "an imploding community" with problems such as high unemployment, vandalism, poor literacy and drug and alcohol dependency.
They came up with a plan to build an educational marae and cultural tourist village to provide inspiration and employment for the people of Ngati Whatua ki Kaipara.
Throughout the process, Linda says the trust has been guided by elders on matters of tikanga (protocol).

"We started off with nothing but a dream," says Linda. "We had no land, no money but we just thought there must be a better way for our community and for our young ones."

A major breakthrough was convincing the Rodney District Council to upgrade the town's water and sewerage systems, which had been causing residents health problems.

To fulfil their vision, the trust needed land for the project and it was able to get a recreational reserve beside SH1 that was being grazed by cattle reclassified to a special purposes reserve, for which they were granted a 99-year lease.

Linda, who has an architecture practice in Wellsford, came up with the design for the ambitious project that the trust hoped would help address unemployment in Te Hana which was running at 20 per cent, as well as wider social issues.

"In the old days when we had the dairy factory, forestry and the railways there were plenty of jobs but those have pretty much disappeared," says Linda. "When the dairy factory closed down in the 70s that left a huge hole." Discontent in the community manifested itself in problems with arson, graffiti and kids throwing rocks at cars passing on SH1. With not much money to begin with, the trust focused on cleaning up and replanting the nearby river bank and landscaping the site.
"Before we got started, anyone from here doing community service work was doing it down in Glenfield," says Linda. "But we talked to the Department of Corrections and got the workers into the riverbank clearing gorse and blackberry."

Construction work began in November 2007 and over the years two buildings shifted on to the site have been converted to become the wharenohanga (sleeping house) and whare kai (dining room).

The whare kai used to be a fishing lodge on Kawau Island, which was barged across in three pieces before being reassembled and altered to give it a more traditional look. Likewise, the wharenohanga used to be a Salvation Army building that was shifted from Snells Beach. The roofline of the whare kai was altered to give it a traditional gabled look and all buildings, including the new wharenui (meeting house) were roofed in Colorcote ZR8 Corrugate, with the Scoria colour also reinforcing the traditional look.

The whare kai (named Matariki) can cater for 200 guests and also has a café that opens to a north-facing deck that can cater for 40 people. The café can be shut off from the main dining room and has its own entrance so casual visitors don't disturb guests who are being hosted at the village.

There is an adjoining whare paku (toilet and shower block) for guests, with the women's facilities having a specially made mother-of-pearl inlay around the mirrors, while the mirrors in the men's area are edged with a paua shell inlay.

The wharenui can sleep up to 50 people and has LED lights embedded in its ceiling to represent a starscape (in keeping with the name of the wharenui – Nga Whetu o te Rangi, or 'Stars of the Universe').

Projectors on either side of the wharenui will be used to create a night sky on the ceiling.
"The idea is that you put the mattresses out on the floor and lie down in the evening and this will be part of storytelling about the constellations," says Linda.

Across from the whare kai is a replica 17th century Maori village that is accessed via a winding boardwalk with a nikau frond roof.
"This boardwalk represents the transition between the contemporary world and the ancient world," says Linda.

The gateway to the village is a collection of small caves – recycled from an award-winning display at the Ellerlise Flower Show – which has a waterfall tumbling down over top and an LED water feature inside.
The creation of the caves has been led by Clyde Tukaiora Connell, a landscape designer and contractor, and a team of local rangitahi (youths)

The village has raupo whare, manuka palisades and 9m-high watchtowers (pourewa) that can be lit up.
At the centre of the village is a stage for performances and a seating area for guests that will eventually be covered by a tensile canvas canopy.

Linda says the idea behind the project is that guests will be welcomed on to the Te Ao Marama Marae with traditional powhiri before enjoying food and kapa haka entertainment and a tour of the village. The marae will provide accommodation as well as a cultural experience and already has bookings from school groups. Linda says it would also host tour groups and could also be used for seminars or conferences.
The replica village has a watercourse running in front of it so there is also potential for guests to arrive there by waka.

Beyond the village, towards the river bank, is a pou (carved totem pole) depicting the 17th century legend of Princess Te Hana (after whom Te Hana is named), who fell in love with a warrior from another tribe with tragic consequences.

Plans are under way for a visitor centre towards the roadside off the boardwalk and a carving and weaving studio on the other side of the boardwalk. Currently, carving and weaving is done in a building that is fronted by the Ahi Kaa Gallery beside SH1. This building also houses Kaipara FM, a radio station with a broadcast range of about 8km that encourages local youth to get involved.
Building Te Ao Marama has provided plenty of work and training for locals but when it is fully up and running Linda says it will create about 250 jobs as well as providing an outlet for performing arts and traditional crafts such as carving and weaving.
"The young ones are right into it; they become so animated with the performing arts and the radio station," says Linda. "There is so much creativity and talent among them but there's been no platform for them."

Local kaumatua Ben Hita, people from the local community and several Department of Corrections teams are responsible for creating the village and have planted thousands of native trees and shrubs in this area.

Community fund raisers have helped to finance the project as have grants from the ASB Community Trust and NZ Lotteries, and money from an anonymous donor.
Linda is particularly proud of the fact that the marae has a Qualmark rating and an Enviro Award but adds, "There's no point this being a five-star facility if you don't address the social issues."
With that in mind, the trust has successfully lobbied for Te Hana to be included in the Auckland region's Long Term Council Community Plan (LTCCP) and wants it to be recognised as the gateway between Auckland and Northland.
"It's important to be in the LTCCP because that means you have access to funding that can create the outcomes," says Linda. "And with something like 4.5 million cars coming through here each year it would be great to be recognised as the gateway. We're very proactive on those fronts."

With its strategic location on SH1, Linda expects Te Hana Te Ao Marama will be a magnet for domestic and overseas tourists who are curious about Maori culture.

Linda says she and trust chairman Thomas de Thierry have basically forsaken their careers to push the project through in the past 10 years. "It's been a lot of work not only on the physical buildings but also providing tertiary education and employment opportunities," says Linda.

"Little old Te Hana will be on a national stage and on an international stage and that speaks volumes for the power of architecture."

Architecture North

Architect Linda Clapham's practice is in Wellsford and she is an honours graduate of the University of Auckland School of Architecture. Linda did her thesis on hotels and tourism, and worked for architecture firm Swan Railley for a number of years. Linda says, "For me architecture is about building within a social context and a landscape context and providing environments that can help people to flourish."

Design: Architecture North
Linda Clapham
Telephone: 09 423 8701
E-mail: linda.tehana@xtra.co.nz

Builder: RM & WL Cato Builders,
Telephone: 0274 969 247

Roofing Manufacturer:
Roofing Industries Auckland,
Telephone: (09) 414 4585

Roofing installer:
RM & WL Cato Builders.

Roofing: ColorcoteZR8 Corrugate.
Colour: Scoria

Electrician: Colin Snedden, RedBluff Enterprises, ph 09-425 8249

THE TORNADO-PROOF ROOF

On Tuesday 3rd May 2011, the Auckland suburb of Albany experienced 'an extreme weather event'. A large tornado touched down at 3.15pm and slammed through a shopping mall before moving south leaving a 5km trail of destruction.

Weather Watch chief analyst Philip Duncan said that the speed of the winds in the tornado would have been between 160kmh and 200 kmh. The tornado claimed one life and seriously damaged close to 30 homes.

One of the houses directly in the tornado's path was a 12-year-old home belonging to Sharon and Mike Tomoana. Sharon recounts the experience:

"Mike was at home and watched the twister coming towards our house. He said the noise was like the engine of a Jumbo jet – and he should know, he's an Air New Zealand pilot. As it got closer, he could see sheets of iron and concrete roof tiles whirling around. When he realised that it was headed directly for our house, he ran into the kitchen, lay down on the tiles and covered his head."

Concrete tiles became missiles

An aerial view of the Tomoana's neighbourhood reveals that several homes suffered extensive roof damage. However the Tomoana's roof – clad in Gerard Corona Shake pressed-steel tiles - remained intact.

"Our roof was the only one that stayed down and intact. The only damage we suffered was a slice to one metal tile, caused by a flying concrete tile from the neighbour's roof. All of the homes around us have concrete tile roofs and in strong winds, the front of the tile lifts and the tile flies off, becoming a lethal missile. They weigh about 3kg each."

Roof failures resulted in extensive water damage

Strong winds were only part of the problem that day. Three hours of torrential rain followed the tornado, drenching the ceiling cavities of homes that had lost their concrete tile roofs.

"Our elderly neighbours lost their concrete tile roof and the rain poured in, soaking their ceiling insulation. The ceiling sagged and you could poke your finger through

Gerard gets the nod for beach house

Sharon and Mike hadn't given their roof much thought before the tornado struck, although Sharon's brother – a builder – had said to them that they had a 'hurricane-proof roof' when they bought the home 12 years ago.

"Mike and I are very grateful to have a Gerard Roof. We bought this house brand new from the builder, and at the time we simply thought it was a good-looking roof. We didn't realise the durability and quality of our roof until Tuesday's tornado. We have land in Rarotonga and will be building a beach house on it soon. It will definitely have a Gerard roof. I've seen a couple of storms in Raro – having a hurricane-proof roof will be really important there."

We have more tornados than you might think

Generally we think of tornadoes in the notorious "Tornado alley" in the midwest of the United States but statistics show us that Auckland alone has experienced tornadoes in August 1980, May 1982, September 1986, May 1991, August 1992; March 1997.

The worst recorded tornado hit Franklin in the Waikato in 1948 leaving 3 dead and destroyed nearly 200 shops and houses.
May 1991 Albany experienced a tornado which lifted roofs and flying debris claimed the life of a bulldozer driver.

New Plymouth has recently experience a tornado which caused Hundreds of thousands of dollars damage. As recently as 10th July 2011 a tornado struck Waikanae destroying buildings as it travelled across farmland uprooting trees and reportedly lifted a 40,000 litre water tank.

The "wind uplift" performance of roofing products is becoming an increasingly important factor in New Zealand as more people build on sites that take full advantage

Gerard support arrives without delay

Although the Tomoana's roof suffered nothing more than a slice to one tile, Gerard were at the house before Sharon even thought about calling them.

"We were quite gobsmacked. Mike had just come off the roof and Richard Field, the Gerard Roofs guy, pulls up in the driveway. He said 'I put your roof on 12 years ago and just want to check that you're OK'. Mike told him about the little bit of damage and Richard said he'd be back after lunch with the right size piece. Not only did he arrive back with the new tile, he helped Mike to install it so that we wouldn't get any water in the ceiling cavity."

Tests in Florida show the horizontal fixing method used by Gerard Roofs withstood the 160 km winds.

of our undulating topography and coastal environment.

Gerard roofs interlocking tiles are secured in place with a unique horizontal fastening system. The result is a very strong roof with superior wind resistance, which allows specification in extremely high wind zones.

When roofs are lost due to high winds it is not accurate to say the roof is blown off... in reality it is a combination of the imbalance of high pressure created by the wind moving over the roof and the low pressure in the roof cavity. This creates uplift that has been compared to the same principle which creates high and low pressure on an aircraft wing giving the plane lift.

Extensive tests on fixing methods have been carried out in New Zealand using the MRM test rig. A summary of their findings was published in Scope 19 and is available on the MRM website. Comparative tests done in Florida showed that horizontally fixed metal tiles withstood high winds in excess of 160km without damage or leaking.

COPTHORNE HOTEL

The Copthorne Hotel in central Auckland is an established and high profile landmark, that is strategically sited on Anzac Avenue, in Auckland's Central Business District, just "down the hill" from the University of Auckland Campus and close to the Vector Arena.

The Copthorne, which is in easy walking distance of the Viaduct and Parnell and has views of the Waitemata Harbour, has witnessed considerable change in the last 40 years and the Millenuim Hotels decided that it was time for an exterior "make over".

However this "make over" wasn't going to be a simple "lick of paint" as the Copthorne is a 9 Storey Hotel and Matassa Property Services was chosen to manage this comprehensive project.

The Millennium Hotels original brief included the repainting of all exterior surfaces, the repairing of the existing mansard tiles and the repainting of the longrun roof. In the original brief the Copthrone Hotel was to be closed for one month over the December / January holiday period.

After a further review of the project logistics it was decided, due to the access difficulties and timing issues, to replace all Mansards and Roofing with new products and to extend the project over a 3 month period. This would allow the Hotel to remain operational during the renovation.

Due to the cost in attaining local government approval to change the Mansard profile it was finally decided to "tile over" the existing

Working at these heights required extreme attention to safety standards and nerves of steel.

Stage One of the project, which involved tiling over the Premier Tiles with the Metrotile Shake profile was always going to be a challenge due to the angle and pitch of the Mansards and the fact that they were seven stories up.

After reviewing the various options it was found that a fixed scaffold would have been 3 times more expensive than the final solution that involved using swing stages, a boom lift and some abseiling. In addition the fixed scaffolding would have been an "eyesore" and hindrance to guests during the period of the project.

Premier Sky Blue tiles with the Metrotile Shake profile in Ironsand which tied in with the new exterior colour scheme.

Megami Roofing was appointed to undertake the "over tiling" of the Hotels Mansard, which is one of the more and significant and challenging projects undertaken by any roofing company.

In order to complete this project Matassa had on call a 30 tonne crane to lift up the new roofing iron and safety fencing. It also served, from time to time, as a working platform for the Megami Installers, who also worked off swing stages and booms. Professional abseilers were also used to "over tile" some of the more awkward corners and the project was completed without

incident.

The cutting of the tiles to fit dormer angles and corners of fire escapes proved to be most challenging but the final result was exceptional with the Mansard fully tiled in the Metrotile Shake profile, This gave the Hotel a more modern look even before the painting started.

Stage Two of the project involved painting the exterior cladding, which was a difficult project in its own right. The profile and finish of the "Roskill Stone" was rough and pitted and it was not a simple case of painting a block wall. The only way to cost effectively paint the "Roskill Stone" was by spray painting. This required the balcony and room doors to be covered and masked each day. With any spray painting operation wind direction was an issue which complicated the day to day operation. However the painters were always careful and cautious and the job was completed with no incidents. Dulux Hibuild Acrashield Coatings were used to recoat the 9 storey hotel bricks and stucco base and Dulux Gloss Enamel was used on the balcony railings.

Stage Three of the project was contracted to Total Roofing and involved the replacement of 1,120 lineal metres of longrun roofing.

This was a more traditional re-roofing project however with the Hotel still using 13 500 litre Plastic Tanks and Copper Pipes for their amenities everything had to be relocated "twice" to allow the old rusting iron and rotten timber Tank supports to be replaced. The roofing was replaced with Colorcote Dimondek 40 .75 gauge product. Temporary PVC pipes and 25mm Hosing were used by Plumbworx to keep the hotel operational during the relocation and renovation. Fortunately the only minor problems were a couple of call outs and leaks to the 6th floor suites during the replacement process.

The re-roofing of the top roof was completed in autumn with the installation of a new Enviroclad Gutter, which was laid over the existing guttering system.

The renovation of any building can present unforeseen problems and the height of this project required particular attention to meet safety standards. It is testament to the project management and skills of those working on all stages that the project was successfully completed

Client: Millennium Hotels
Keiran Davies

Main contractor: Simon Pringle
Matassa Property Services Ltd

Roofing Manufacturer;
Metrotile NZ Ltd.
Telephone: 09 299 9498
email: info@metrotile.com
www.metrotile.com
Metrotile Installer: Dave Moselen
Megami Roofing
Profile: Metrotile Shake Ironsand

Manufacturer: Dimond
Telephone: 0800 Dimond
www.dimond.co.nz

Dimondek Installer: Gerrard Newman
Total Roofing
Profile: Colourcote Dimondek
40.75 gauge
Colour: Sandstone Grey

Plumbing: Mike Robinson
Plumbworx
Paint Manufacturer: Dulux NZ
Sean Truesdell
Access Equipment: At Height
Mike Sharp
Crane: On Call Cranes
Fay Parkinson

QUALITY OF IMPORTED COIL COATED STEEL

Note: Dave Hall, Chairman, MRM Technical committee. Whilst the results from the samples tested showed that the best result was achieved by NZ made painted steel and the least durable was from an imported sample, we should not draw the conclusion that all NZ made products are better and all imported products are inferior.

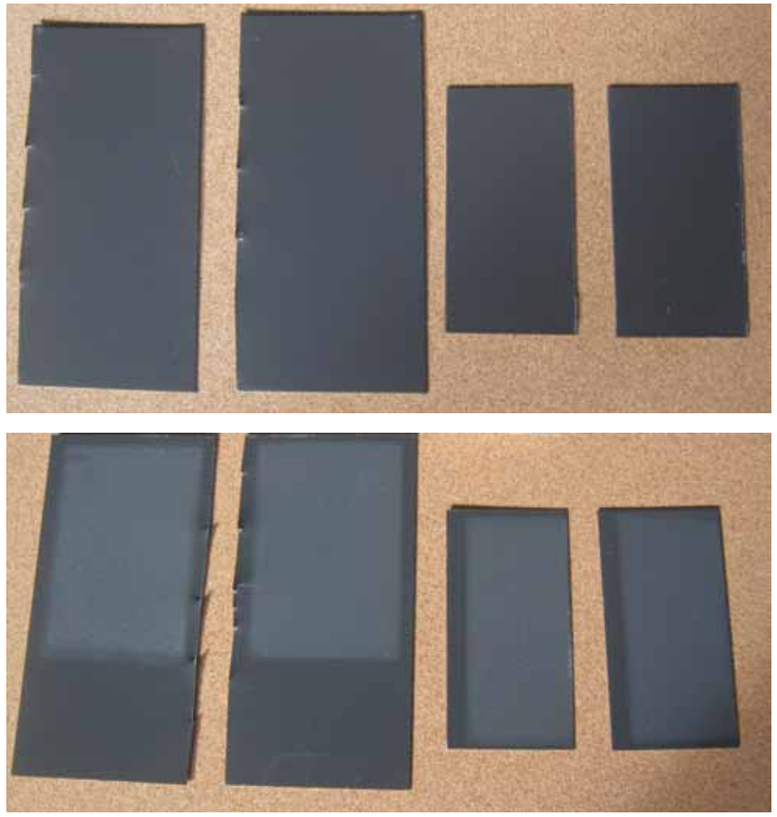
However we do advise that it is better to use a product made in New Zealand for New Zealand conditions and backed by the warranty of a local manufacturer.

For some time NZMRM have been aware of imported prepainted steel being used to provide roofs which are then sold at lower prices than our members who are using painted steel made in New Zealand by Pacific Coil Coaters and New Zealand Steel.

While there could be several reasons for this, generally speaking the World steel market is quite competitive and it is unlikely that product of the same specification will be significantly different in cost. One reason could be that the steel used is of lower quality in some respect and so costs less from the supplier.

Like all things you get what you pay for and while overseas suppliers can make quality goods, they will also reduce quality to make down to a price.

Is that what is happening here?



Above: After 2000 hours of UV testing the NZ product showed no evidence of degradation compared with the imported product (below) tested under the same conditions.

We have looked at ways to provide a measure of quality for our members to use when buying coil to prevent bad public opinion of painted steel roofs that can be caused by using badly performing raw materials.

There are several issues to consider with different outcomes.

The quality of the steel, its thickness and strength will determine how it performs in terms of its ability to span purlin spacings, its ability to withstand point load during installation and subsequent roof traffic and its ability to roll-form without distortion. We have seen cases in New Zealand where steel less than 0.4 mm has been used on house roofs resulting in damage, poor appearance, and complaints. Both thickness and strength are easily measured with no time delays, and so inadequate material can quickly be detected by testing or by the problems caused on the roof. These properties can be specified precisely and measured against these specifications.

The quality and thickness of the metallic coating will determine how well the coated steel performs in marine environments. While it is relatively easy to measure the metallic coating type and thickness, the effect of poor or thin coating normally takes some time to manifest itself on a roof, as corrosion, usually starting at the ends or laps. To some extent this can be assessed more quickly than in real life situations by doing accelerated corrosion testing which does allow comparisons between various materials (although it does not provide an accurate absolute prediction of real time life). The properties of the metallic coating can also be specified quite precisely and can be analysed and measured reasonably easily and quickly.

The quality of the paint coating can assist the corrosion resistance but lower quality primarily shows up in fading or colour change under exposure to UV radiation (sunlight). New Zealand and Australia suffer from very severe levels of UV radiation, far higher than anywhere in Asia or Europe, and so paints not formulated specifically for NZ conditions may suffer colour changes quite early in their lives and this is so visible it results in complaints from customers.

Here are a couple of examples.

Different colours perform differently, with lighter colours being less susceptible to fading, or at least fading is less noticeable. Unfortunately this is much more difficult to detect by specification, as paint companies are notoriously reluctant to reveal their paint formulas.

So, do we have a standard which can be used to specify painted steel quality?

It is AS/NZS 2728:2007 which has effect in both New Zealand and Australia. It specifies the types of environment that painted steel should be suitable for, and provides some exposure tests for both corrosion resistance and UV fading resistance.

The corrosion testing can be done by long-term exposure at recognised sites or by accelerated testing in a cabinet in which samples are exposed to corrosive (salt) sprays under various regimes simulating real life conditions. These can be done reasonably quickly although not cheaply. However, the resistance to corrosion is mostly provided by the metallic coating and the thickness and quality of this is governed by another standard, AS 1397, and so product can be required to comply with this and can be checked by measurement.

This leaves us with UV resistance – the property whose failure is most likely to be noticed quickly by roof owners.

AS/NZS 2728 unfortunately does not give us an easy solution as the current version only provides for real life exposure to UV which can take up to four years. This is because the standard, as it is, is intended to provide guidance to suitability for use under real-life conditions. Accelerated UV testing will compare products and its value is in this comparison. While the outcome of accelerated UV testing does not provide more than an estimate of real-time life, it does provide a very good comparison between products. It can reliably predict which of a number of exposed samples will perform best in real life.

NZMRM chose to follow this path to assess an imported product measured against a NZ made product which has demonstrated by its history that it does perform well.

Samples were obtained anonymously in the market and using a carefully maintained chain of custody were tested them in an accelerated UV test machine (QUV Cabinet) in an Auckland laboratory. Samples tested were identified only by code numbers. At 1000 hours of exposure (equivalent to approximately 4-5 years of real exposure) the imported samples were showing some signs of degradation. After 2000 hours (the normal period for such testing) the NZ made product was unmarked and the imported sample showed a colour change of 4 Δ E units.

Accelerated UV testing, like all accelerated exposure testing, does not provide very accurate absolute real life assessment, which is why it is not included in AS/NZS 2728, a standard intended to provide a means of testing individual materials. However it does offer reasonably accurate relative assessment of similar products of similar colour but using different coating materials. This is what we have here, and while these results cannot provide a realistic absolute estimate of time to colour change they do provide a good reason for using painted material made in and for New Zealand in preference to material made for quite different weather conditions.

SUSTAINABLE SOLUTION

By Graham Hepburn

Pooling equity to create an extended family home seemed a logical step to Neil Jacka and Jacqui Simpson.
The couple had planned to build a home behind Neil's parents' house in the Auckland suburb of Avondale once the property was subdivided.

Because they wanted a well-designed, sustainable home, they called in Johann Bernhardt, of Bernhardt Architecture, who had designed a home for one of Neil's colleagues.

But when the costs of subdivision and building started escalating, the project was canned and the two families began looking for a section where they could start anew. Eventually they found a suitable site with a northerly aspect in the Oratia foothills, in west Auckland.
"So we went back to Johann and said we're going to have another go at this," says Neil.

While the couple was determined to incorporate as many sustainable features as possible, they also had an eye on practicality and budget. They also wanted the home to be single level so Neil's parents could get around easily and they wanted separate north-facing living areas for each family. Incorporating passive solar gain was also important, as was open plan living that flowed outdoors but could be closed down if required.

Although the two living areas are connected by what Johann calls "a hinge" – a common area comprising an entrance and sunroom, Neil's parents part of the house is classified as a minor dwelling because it has its own kitchen, as well as the living area, bedroom and bathroom – limiting its size to 65sq m.

The main part of the house has two bedrooms for their children, a storeroom, a bathroom and the open plan living, dining and kitchen area. Downstairs from the lounge, is Neil and Jacqui's bedroom with its own en suite.

The main living area and sunroom open out to a terrace, which is joined to a deck that wraps around the northwestern corner of the house. An internal access garage sits on the south side of the home. Johann says of the design, "I stretched the living areas east-west for maximum exposure to the sun and used the entrance and sunroom between them as a common area. This layout allowed me to create a semi-outdoor open space protected from the east west and south so that if the wind isn't coming from the north – and it hardly ever does in winter – then you can keep the doors open and enjoy the sun.
"I positioned the garage to the south as a buffer to the weather and used minimal windows in the rear of the house."

It's a design that works perfectly for the extended family.
"Johann nailed the layout first time," says Neil. "He offset the minor dwelling and major dwelling so that both living areas get flooded with light."

And that sunlight helps to warm the concrete slab in winter while exterior shading devices stop the sun hitting the floor in summer. The floor slab uses a modular formwork which

comprises air-pockets below for insulation. This minimises the use of polystyrene which is only used around the edges of the slab. This system of insulation means any heat released goes into the home. To maintain warmth in the home on cold, overcast days, the slab has a hydronic heating system powered by a 20kW wood pellet burner. The burner also provides back-up heating for the solar hot water systems that serve each of the dwellings.
The distinctive brown tinge of the ground and polished concrete floor is due to the aggregate that Neil sourced from Te Kuiti. He didn't like the various shades of grey of most concrete floors so experimented with different aggregates until he got the colour he wanted.

Because the floor slab has some tricky elements such as limestone in the mix and airspaces beneath it to cut down on the amount of polystyrene, Neil, a project engineer, decided he would oversee its construction before handing it over to the builder, Location Homes, to finish the job.

"I took a couple of months off work and said 'I'm going to deliver you a slab'.

With the help of Firth Concrete on what was a complex, one-off pour, Neil was true to his word.

Timber flooring – eucalyptus saligna - has been used in the lounge and in combination with the concrete, cuts down on dust and makes for easy cleaning. Skirting boards are cut at an angle and cupboards taken right up to the ceiling to cut dust accumulation. Carpet has been used in the bedrooms for comfort, while the home has low-toxicity paint throughout.

The home has a conventional lightweight timber frame although the walls are 150mm thick as opposed to the standard 100mm. "I reckon one of the best returns on investment is going for 150mm thick walls because it doesn't cost that much more but it has allowed us to have very high levels of insulation and this place holds the heat amazingly," says Neil.

The ceiling spaces of the mono-pitched rooflines have two layers of insulation layed at 90 degrees to each other. There are no recessed downlights in the home because

Photography: Peter Lawrence

they require holes to be cut in the ceiling insulation, causing heat loss. Compact fluorescent lighting is used throughout the home to conserve energy.

Aluminium framed double-glazed doors and windows also help to keep the heat in while ventilation is provided by clerestory windows set high in the walls behind a cedar slat shading device that protrudes from the house.

"With the shading device I tried to create something that combines the need for shading with some aesthetic appeal," says Johann. ColorSteel roofing was a natural choice because the family wanted to collect its own drinking water, which goes through coarse and fine filters before being passed through a UV tube for purification.

Wastewater is treated with a low-energy Biolytix system that uses natural processes to treat solids and filter liquid before it is discharged into the garden. Organisms turn the solids into humus which acts as a filter for the liquids along with other media in the system.

Neil says one of the things he loves about the design is the lack of corner posts in the sunroom and his parent's lounge so that when the doors are retracted the house is opened right out to the terrace.

"When we want it to, this whole space opens up so we can have both kitchens going and 30 to 40 people sitting down to dinner." Neil says the great thing about the home's design is that the family is able to easily regulate heat in the house, whether it be in the depths of winter or the height of summer. "The clerestory windows are great for cooling the house in summer and we put a shade sail over the terrace, which also helps," he says. "In winter at about 3 or 4 in the afternoon we close the clerestory windows and the house stays toasty until about 10 at night."

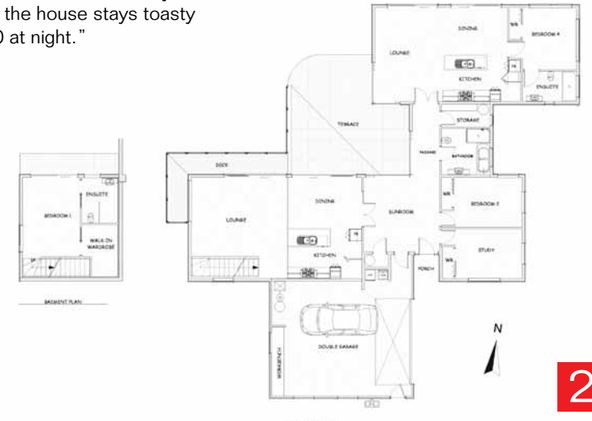
Johann Bernhardt

The director of Bernhardt Architecture, Johann Bernhardt is passionate about creating healthy, warm homes that are energy efficient and environmentally friendly. His firm has been designing these sorts of homes for many years, and he has also been running the Auckland office of the Building Biology and Ecology Institute, which researches, compiles and disseminates information on healthy and environmentally friendly building and living. Johann has an architect's degree from Technical University Berlin, a PhD in urban development from Paris University VIII, and a lifelong interest in sustainability. He edited a book called A Deeper Shade of Green, which looks at every facet of sustainable urban development, building and architecture in New Zealand.

Architectural Design:
Johann Bernhardt,
Bernhardt Architecture,
Telephone: 09 376 6767
email: jobern@ihug.co.nz
www.bernhardtarchitecture.co.nz

Builder: Location Homes,
Contact: Steve Hahn
Telephone 09 412 8883
Email: Rachel @locationhomes.co.nz
Michelle@locationhomes.co.nz
Rachel @locationhomes.co.nz
www.locationhomes.co.nz

Roofing manufacturer:
Steel and Tube Roofing products
Telephone: 09 274 4056
email: info@stroofing.co.nz
www.stroofing.co.nz
Profile: Trimline
.55 COLORSTEEL® Endura



PROVIDING SAFE COVER FOR STUDENTS

Many schools in New Zealand were built prior to the current building standards, in 1998 the New Zealand Ministry of Education undertook a nationwide structural survey of all school buildings and site structures in order to identify specific structural defects that could potentially cause death or serious injury during extreme climatic conditions or earthquakes. The survey identified high priority work and the Ministry directive was for education boards to rectify any building defects under a ten-year property plan.

All buildings with heavy tile roofs were identified as a seismic risk – in many cases the most cost effective way to meet the Ministry criteria is to replace with lightweight roofing.

Rangi Ruru Girls School, Christchurch

Rangi Ruru Girls' School in Christchurch is one of New Zealand's top achieving schools academically and across a wide range of sports, cultural and creative pursuits. The school offers an independent (private) Year 7 to 13 education for Day and Boarding students. Boarding is available from Years 9 to 13.

The School's roof was recently replaced with lightweight Gerard tiles largely as a precautionary measure as the roof was undamaged by the recent Christchurch earthquakes.

The fact that Gerard steel tiles weigh a fraction of their concrete tile counterpart was a comforting thought for the Board.

Board Chairman, Grant Close says after the February 22 earthquake, they had engineering inspections of every building at Rangi Ruru Girls School. "We also completed a 'destructive inspection' of the roof spaces in three buildings that had heavy-weight clay roofing tiles. In two of them, we observed that there had been some movement of trusses," he says.

While the buildings were subsequently green-stickered, the Board decided to remove the 24

tonne heavy clay roofs, and replace with lightweight pressed metal tiles from Gerard Roofs.

The safety and wellbeing of our students is of paramount importance to us explains Neil Templeton, the School's Business Manager. " Since the recent Christchurch earthquakes we have been continuing with regular engineers' reviews of our facilities. These site reviews enable us to identify any developing safety concerns and implement the required repairs or alterations. Additionally, we have reassessed our school through new eyes, looking at any potential threats to the safety of our students in the case of another significant event. With the assistance of our engineers we identified the tile roofs of the intermediate and language areas as an aspect we needed to change."

The Harvey Roofing Centre in Christchurch was commissioned to do the work. The school wanted to retain a similar look and chose Gerard Roofs' Colortile Satin in Smoke Grey with barrel trims. Four separate blocks were reroofed - a total of 856 sq metres using just under 2,000 tiles. The new Gerard roofing weighs about 4 tonne, a sixth of the former weight. An added benefit for the school is the fact that the new roofing now has underlay resulting in less condensation and moisture, and a more even temperature.

Harvey Roofing Canterbury branch manager, Bob Alexander says the work was completed in just over 2 weeks. "Despite delays, due to inclement weather, the 4 blocks were stripped and 856 sq meters of roof were re-clad in two weeks with no rain damage and within school holiday deadline," he says.

Grant Close is very pleased with the outcome of the Board's investment. "The specialist Harvey Roofing team did an amazing job over the April school holidays; completely removing the old roofing material, preparing the structure for new tiles, and having the job completed before the girls started back in Term 2," he says.

Given the Government research agency GNS Science has forecasted the likelihood of another large earthquake in the Canterbury region in the next 12 months, we would expect more decisions made to improve roofing integrity for better protection of the people under them - and more Gerard roofs seen on school campuses throughout New Zealand.

Client:Rangi Ruru Girls School Board

Roofing Manufacturer:
Gerard Roofing
Telephone: 0800 104 868
Email: info@gerardroofs.co.nz
www.gerardroofs.co.nz

Profile: Colortile Satin
Colour: Smoke Grey

Roofing Installer:
Harvey roofing Centre
Christchurch
Telephone: 03-343 1590
Email:
bob.alexander@gerardroofs.co.nz

FLETCHER SYNERGIES AT WORK

The new Laminex building in Penrose is testament to what can be achieved when Fletcher companies work together. Work began in May 2010 and was completed in December 2010 in time for a fresh start to 2011 for Laminex staff.

Dimond supplied the Roofing and Cladding product for the purpose built site, with a unique multi coloured, aesthetically pleasing, cladding system.

The 14,000 sq m Roof was covered with the ever popular DP955 in Threadbow White supplied by Pacific Coil Coaters.

The 4,000 Sq m Cladding mimicked the Roof using DP955 but in a variety of Grey's - Parnell Grey, Smokey and Ghost Grey also via Pacific Coil Coaters.

Dimond Certified Commercial Installer H. W. Coyle was the fixer on site. Dave Henderson Manager, points out a few challenges they overcome on site 'There were some unique aspects on this job which included having no ridge and using a drape curve with a series of steps.

Another interesting aspect was the variety of cladding colours used and the pattern in which they are fixed'. With this new building Laminex can move into the future with confidence in the efficiencies of there new facility for years to come.

Dimond are happy to be involved in such a successful job and are keen to make use of our extensive connection within the Fletcher's brand.

Client: Laminex

Architect: Williams Architects Ltd
Telephone: 09 966 6999

Roofing Manufacturer:
Pacific Coil Coaters
Penrose, Auckland
Cladding Manufacturer:
Pacific Coil Coaters
Telephone: 09 5799199
email: pccwebsales@colorcote.co.nz
web: www.colorcote.co.nz

Profile: DP955

Roofing and Cladding supplier:
Dimond
Telephone: 0800 DIMOND
Email: dimond@dimond.co.nz
www.dimond.co.nz

Installer: H. W. Coyle
Telephone: 09 579 9065

THE TREE HOUSE

Owners Maddie Leach and Gary Bridle, when planning their new home, had a vision of a simple structure reminiscent of the kiwi “Doc Hut”. The practical simplicity of open space providing shelter, warmth and strength appealed to their artistic values. “Simplicity is part of the built language of these places,” says Maddie. ”Nothing seems extraneous.” Maddie’s father, Architectural Designer Paul Leach, designed the home and his influences and experience played an important role in the design process.

The 568m2 site, its features and budget were the design constraints. The hillside site slopes at 25 degrees to the southeast and is approximately 300 metres from the coast. The site is within ISO category 4 and the most elevated area falls within the ‘Very High’ wind zone.

The site had an established pathway and at some stage had been terraced and landscaped. There was secondary growth of native trees, two mature Ngaio, an Oak tree and a large Walnut tree. An important aspect to the site was to retain these trees and the building was embedded amongst them giving a sense being in a “tree house”. The objective was to minimise any earthworks and take full advantage of the attributes the site offered. Whilst sea views were possible Maddie and Gary decided to forego this option to achieve privacy and the house was orientated to the south on the slope and away from the neighbouring property. One of the design difficulties Paul Leach had to resolve was the capture of sunlight and light in a house that was south facing.

Initial designs were given resource consent in 2008 however this design proved to be outside the budget that Maddie acknowledges was “tight and without room for contingencies”. By eliminating a mezzanine above the living room and a lower bedroom, modifying the entry and carefully considering materials to be used, the project was back on track and cleverly retained some attributes of the original design.

The main living spaces are virtually suspended in and above the canopy of surrounding trees - including the much-loved Walnut. This allows glimpses of the sea beyond and achieves the objective of living with the trees without impacting on the environment. In essence the house was sculptured so as to fit the natural surrounding in what Maddie describes as a key part of her father’s “architectural sensibility”.

The influence in design preference came from childhood experiences living in the home designed by her father, Paul Leach. Much of his architectural design stemmed from thinking about the way that family, and ultimately clients, actually used and lived in the spaces created. Whilst aesthetic design was an integral part of the process, function was the driver. Maddie recalls ”Our home was open plan and full of light, life and rooms that interrelated. Nothing was closed off and as a result my own home reflects this with only one internal door (to the bathroom).”

Both Gary and Maddie have fine arts degrees and practise as artists. As a result a studio was an essential part of the overall design concept. It was important that this be a separate workspace to think and create...unfussy and robust. The design is flexible and in the future it is intended that this area be converted into a guest room with a studio potentially being built above the existing garage.

The house, which is split level, has a main floor area of 77m2 together with a lower floor studio space of 26m2 making a total of 103m2. The house has one large bedroom with the studio designed as a potential for conversion into a further bedroom. The maximum height of the house is 8.20 metres supported by galvanised steel columns and concrete pile footings that are typically 500mm square holes taken to a depth of between 500 to 1500mm into Greywacke and mudstone. The steel bearers and columns are braced diagonally.

The building is fully sheathed with 7mm H3 structural plywood and the majority of the exterior cladding is 0.55 corrugated COLORSTEEL® Maxx® in 'Indigo Blue' with contrasting areas of 12mm Shadowclad stained in Cabot's 'Toi Toi' water-based wood stain.

The roof is a trapezoidal profile in 0.55 COLORSTEEL® Maxx® 'Smokey'. Guttering is Marley 'Typhoon' and downpipes use a combination of Marley half-round 'Eclipse' against the steel cladding and standard round piping on the porch areas. A timber fascia of Western Red Cedar runs along the front (south) face of the house. Soffit linings are 12mm Shadowclad. All windows and external doors are in double glazed silver anodised aluminium with the exception of the louver windows in living room and bedroom areas. The lower studio area has a window that uses Custom Orb translucent horizontal sheeting making a great contrast with the adjacent vertical Colorsteel.

Insulation for walls and roof is fibreglass batts. Under floor insulation uses Novafloor polyester batts.

Interior walls and ceilings are generally 10mm Gib Board, but the living room features an untreated Shadowclad ceiling and one bedroom wall is lined with 7mm plywood as a veneer. The studio floor is H3 plywood sanded and clear coated. Upper level floors are particleboard sanded and clear coated with OSMO Polyx Hardwax Oil. The bathroom floor is cork tiled and also coated with OSMO and includes large tiled shower area and laundry with bi-fold doors.

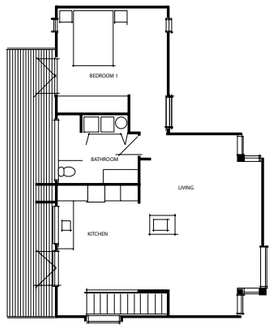
The front face (south) and the rear face (north) each add very different qualities to the overall living experience with both warmth and coolness, groundedness and elevation, sun and trees close at hand.

As artists with a strong connection to their environment both Gary and Maddie feel that this home fulfils the ideas they developed with Paul, and has done so in a cost effective way. For Maddie the home is a particularly special place as her father passed away before he could see the home he designed completed. "This was the 30th house that came under the banner of 'The Considered House', Paul's design studio name, and it is a delight to us every day," says Maddie.

The Considered House

The late Paul Leach, born in Auckland, started his working life as a reporter for The NZ Herald and then trained as a cameraman with the National Film Board of Canada. Paul is well known in the NZ film scene and worked as a cameraman on many noteworthy NZ feature films. Paul was also passionate about architecture and design and in the early 1970s he designed their first family home on Auckland's North Shore. With a list of architectural projects to his credit by 1987, Paul left the film industry and focused on his practice, "The Considered House," as an Architectural Designer.

Paul was one of the first waves of Licensed Building Practitioners in the Design 2 category. His approach to design was informed by a long standing admiration for Frank Lloyd Wright, Group Architects, the work of Glen Murcutt, and New Zealanders Don Donnithorne and Gerald Melling in particular.



Paul Leach brought a very refined practicality to all his work, was always quick to admire and recognise the work of others and modest regarding his own achievements. His residential designs and renovation projects are represented throughout the greater Auckland region and span a period of nearly 40 years.

Clients:
Maddie Leach & Gary Bridle

Architectural Designer:
Paul Leach (1938 - 2010)
The Considered House
Auckland

Engineer: Brian Moore
B C Moore & Associates
Christchurch

Steel fabricators:
Slade Engineering Ltd
Christchurch

Builder:
Tamati Matthews
Harakeke Holdings Ltd
Wellington
Telephone: 0272056367

Roofing Installer: Bayside Roofing
Wellington
Telephone: 0274437277

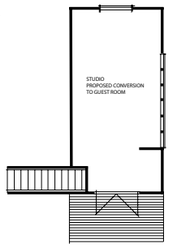
Roofing/cladding Manufacturer:
Metalcraft Roofing

Roofing Profile: MC 700
COLORSTEEL® Maxx®
Colour: Smokey

Cladding Profile: Corrugate
COLORSTEEL® Maxx®
Colour: Indigo Blue

Aluminium Joinery:
Finer Aluminium, Levin
Telephone: 06 3687650

Photography:
Kevin Bridle
www.kevinbridle.co.nz
Telephone: 0274500558



STAINLESS STEEL FASTENERS.

Stuart W.Thomson
Building Consultant

In the last year or so we have seen an increase in demand from BCAs for the use of stainless steel screws in Zincalume® roofs in severe environments.This is partly based on their interpretation of NZS 3604, which of course is for framing not cladding.
This is not acceptable for NZMRM roofs, so in this edited and abridged article Stuart Thomson explains why not, and discusses the technical reasoning behind the BCAs' wish and our rebuttal. Worth noting is that new developments in both cladding material and fasteners may well render this issue a non-problem in the not-too-far-distant future.

Stuart Hayman:
MRM Technical Committee

When speaking with a disgruntled roofer recently he said 'how is it that years ago we just used to nail on the wrinkly tin with some lead heads without all the fuss that we have to go through now?' While one must have sympathy for this point of view, there are things that have changed - a lot of things.

For instance, after a roof was nailed on, the owner got up and painted it every few years which not only protected the galvanised metal but sealed the fastener to the roof cladding as well. Now, we do not use galvanised roof cladding any more, and the majority of steel roofs are made from pre-painted Zincalume® and are expected by the general public to last forever without any maintenance. And then there are the new building Standards, the NZ Building Code and building controls.

There have been some instances recently where BCAs, with probably the best intention of protecting

The evolution of roof cladding fasteners. From left: Hand-forged chisel-point nail with lead washer circa 1840; spring head, (the farmers' friend); lead-head; spiral shank; self-drilling Type 17 screw.

the durability of the building, have required the use of stainless steel fasteners when installing steel roof and wall cladding in a severe or very severe environment. NZMRM does not agree that this suggestion will help the life of the roof and this article will explain why this is not a good solution.

There are a number of different corrosion issues here, which this article will attempt to clarify for designers and BCAs alike.

Firstly it is logical to consider the big picture and then deal with the specific ones. Corrosion as a problem is usually associated with metal, but perhaps the biggest corrosion issue ever for NZ to face has been the corrosion of timber. Leaky homes were mostly caused by designing and using the wrong material in the wrong place and metals are not immune from this problem either.

Rusting steel is a common symbol of deterioration although there are instances of iron or steel that has lasted for centuries. The 7m high iron Pillar of Delhi is over 1600 years old and its oxide has a soft look and feel of chocolate – I felt it before they put the fence around it.
The cans of food found recently in Antarctica have survived over 100 years without rusting away although the missing labels would make their opening interesting! Antarctic's 0.03% average humidity combined with the extreme cold make the South Pole region the world's driest desert.

So what this tells us is that corrosion is very much the result of the environment. What may not be an issue with dissimilar metals in a mild rural environment can quickly become a disaster in a coastal one.

Every country is different and it is not surprising that the Plastisol coated COLORSTEEL® VP developed by British Steel that failed in New Zealand 30 years ago is still being sold in Europe.

The New Zealand Roof and Wall Cladding Code of Practice has been written for local conditions and recognises New Zealand as

unique islands 2,000 km away from any other major land mass. New Zealand, being in the middle of large oceans, naturally has its coast exposed to high winds, UV and high salt aerosol. Everyone likes to live by the sea notwithstanding that this creates a very severe corrosion environment (C5).

For corrosion to occur there must be an electrolyte i.e. moisture, and it just so happens that salt is hygroscopic and therefore if it is not washed off the metal the contact remains wet. The more salt and the longer the time the contact remains wet, the worse the corrosion. All metals have different electrochemical potentials and the greater the difference of the potential between metals in contact, the worse the corrosion.
The subject of corrosion is covered comprehensively in section 2.4. of the COP.

New Zealand has been classified into corrosion categories or zones by various NZ Standards which have all used ISO 9223 and ISO 9224 as their basis. However each new NZ or AS/NZ Standards committee for one reason or another has modified these classifications to suit the prime purpose of the standard under review.

These have now been changed to the extent that there is conflict

between not only the nomenclature used, but also the essence of the Standard classification. The metal manufacturers' paint systems and metal fasteners are also classified for performance to ISO categories so it is little wonder that there is confusion because we have just about as many referees on the field as we have players.

The latest example appears in the revised and recently published NZS 3604:2011 but AS/NZS 3566 and AS/NZS 2728 are also recent examples. The classification of the ISO corrosivity of atmospheres is relatively simple - they are C1 to C5. These are determined by airborne salinity, the TOW (Time of Wetness) and RH (Relative Humidity) although there are a number of methods given to determine these. The decision by the Standards committee to introduce a 'Sea Spray' Zone into NZS 3604:1999, as well as turning the categorizing numbers inside out, was a bad move and opposed by the NZMRM at the time.

NZS 3604: 2011 reverses that decision and has now deleted the Sea Spray Zone - just when everyone was getting their head around it!. A new nomenclature borrowed from AS/NZS 2728 has now been substituted which reclassifies C2-C5 into Category B to E. (In 3604 Category A, indoors has been omitted, and Category D and E have been combined, because they both use the same stainless fasteners).

This change could continue to create the occasional demands by BCAs to use stainless steel fasteners for roof cladding in the worst corrosion zone (now become D in 3604); without regard for metal compatibility. This confusion occurs because Table 4.1 of NZS 3604 2011 requires all structural fixings in Zone D in sheltered and exposed environments to be 304 stainless steel.

There are anomalies within 3604 and the NZBC E2 & B2 because if metal roof and wall cladding is considered easy to replace, the fastener legally need only last 15 years. But try telling this to an owner who has rusty fasteners after a few years e.g. Westpac Stadium.

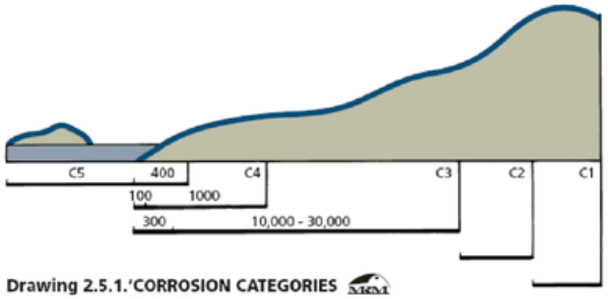
There is a different reason for the NZS 3604 emphasis because it is primarily concerned about the integrity of timber structures and their connections. A stainless fastener is required to work in treated timber in these instances for a number of reasons. Firstly the head is in an exposed marine environment and secondly, the part of the fastener that is embedded in the timber is likely to suffer corrosion from the copper salts required to preserve exposed timber. Exposed timber also suffers from the corrosion of embedded steel fasteners which is known as 'timber sickness'.

For this reason all fixings in contact with timber treated to H3.2 or higher or with Copper Azole, or Alkaline Copper Quaternary (ACQ) preservatives, and used in exposed or sheltered locations must be 304 stainless steel.

But wait there's more - the timber treatment rules have just been changed by the DBH.
What you should know now about timber treatment.

All framing timbers (with a few exceptions) are now required to be Radiata Pine treated to H1.2 or untreated Douglas Fir. Back to Boron (boric acid) treated (pink stuff). This preservative is much less aggressive to fasteners than copper based treatments, but beware there are other preservatives still being sold that are. The exceptions to the H1.2 rule include battens used behind cladding to form a cavity, which have to be H3.1.and this treatment can be either solvent-based or boron (H3.1 boron treatments supplied grey primer-painted). Another exception is any exposed roof framing rafters or purlins (verandas, canopies or eaves) which continue to require H3.2. treatment - using copper based preservatives.

This DBH change does help simplify use of timber on-site, and to some extent with the separation issue between timber and metal claddings and fasteners but doesn't help when the external environment is to be considered. It could be said that the fasteners for metal roof cladding are in a similar situation to exposed framing timbers, but in addition, if the shank is exposed it would be in an unwashed environment (NZS 3604 calls it sheltered).
Because the issue of compatibility is a major concern the



Drawing 2.5.1.'CORROSION CATEGORIES

manufacturers of Zincalume® (painted or plain) do not issue a warranty for any roof fastened with stainless steel fasteners.

Determining Corrosion zones is a complicated issue because contrary to some of the assumptions made, NZ does have a C5 Zone with about 50% of its coastline in a very severe marine environment. However to further complicate things the corrosion zones do overlap.

Metal roof and wall cladding is not constrained by NZS 3604 or E2/AS1 and therefore does not have to comply as it becomes an Alternative Solution to the NZBC.
Unfortunately some BCAs have taken the stance that roof and wall claddings may be structural and so need to comply with NZS 3604 (framing) and need to use stainless steel fasteners in severe marine environments

This creates a clash with metal roof cladding manufacturers and the NZMRM COP which follows the requirement of the suppliers of the raw material i.e. NZ Steel and P.C.C. who state that stainless steel fasteners must not be used with steel cladding or their warranty will be voided. So the designer or the roofer can be caught between a rock and a hard place. Maintaining the appearance and function of the screw may be at the cost of failure of both appearance and function of the cladding.

It is not well-known that the Zincalume® metallic coating has very little zinc content and is mostly aluminium (80% by volume). What this means is that the sacrificial protection given to steel by the zinc in Zincalume® is much less than is the case with galvanised steel, and it is the relatively unprotected cut edge that causes haloing around the screw in severe environments.

The reason is that in severe or very severe environments corrosion will rapidly occur at the interface of these two dissimilar metals and lead to a breakdown of the paint and metallic coatings at these points.
But while an AZ coating is excellent in well washed areas where it is protected, it must not remain wet particularly when it is directly in contact with other metals and in specifically with stainless steel.
The extra cost of stainless steel fasteners is not the issue. What is of greater concern is the inability or unwillingness of the fastener industry to provide a Class 5 fastener for a C5 corrosion zone. NZ is represented on the AS/NZS 3566.2 joint standards committee by Stuart Thomson and Alistair Fleming from NZ Steel and the draft now has NZ only clauses;

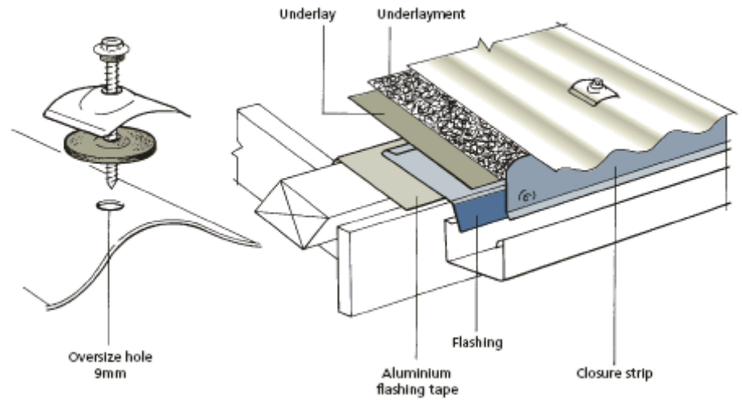
- the introduction of a class 5 fastener,
- the reintroduction of hot dipped galvanised fasteners
- the requirement to mark the corrosion class on the hexagon head of self- drilling screws.

The old HDG (hot dipped galvanised) coated screw has gone, - the result of the 'green' philosophy dominating the scene, hydrogen embrittlement and the fact that the point of self-drilling screws will not 'drill' if it has a lot of zinc on it. At the present time, fasteners for steel roof and wall cladding are mechanically plated with a zinc and tin powder mixture and a class four (C4) is the best available. Hopefully this will change for New Zealand when AS/NZS 3566.2 is finally published.

But wait there's more! - For a C4 fastener to comply with AS/NZS 3566.2 it only has to last for 10 years whereas the NZBC requires metal cladding to last for a minimum of 15. The answer may be to coat the zinc plated fastener with a more exotic organic coating or to replace fasteners during the lifetime of the cladding.

However there is yet another anomaly. Although the AS/NZS 3566.2 performance test only requires <5% red rust over 10 years exposure as a pass, the fastener manufacturers do not warranty their fastener in that manner. Their warranty only covers 'integrity' not aesthetics which is what B2 NZBC also requires. So your roof may not blow off but it might look pretty rusty and yet still comply with the NZBC.

There is an alternative fastener that can be used for fixing metal roof and wall cladding if the framing is timber and that is an aluminium screw fastener. While this is not suitable



for fixing into steel it is compatible with AZ coatings, but just watch though that the purlins or battens are not copper treated with Copper Azole, or ACQ.

For some time now the NZMRM have been investigating and testing isolation techniques for use with aluminium and metallic coated steel cladding and stainless steel fasteners in severe and very severe marine environments. Some of these are to be published in the Code of Practice as shown in the drawings above.

Stainless steel fasteners manufacturers have recently introduced inorganic and organic surface coatings. They come with trade names such as Climaseal, Armourcoat, Rustpert, Xylan, Tufcoat, EP5 and others and these coatings provide a degree of isolation between dissimilar metals. A better bet is to also isolate the fastener and metal cladding physically by the use of oversized holes.

The most commonly specified stainless steel alloys are 304 and 316. 304 is generically referred to as 18-8 which indicates a group of stainless steels having nominally 18% chromium and 8% nickel content. The 18-8 family includes alloys; 302, 302HQ, 303, 303Se, 304 and 304L. 316 is not an 18-8, but is generally accepted as an 18-8 substitute since it has improved corrosion resistance over the 18-8 family. Sometimes 304 stainless screws are marked A2 on the head while 316 are marked A4.

316 fasteners for roof cladding are not recommended at all because they have a higher electro-potential than 304, and so will cause even greater corrosion.

Conclusion

At the present time only galvanised (i.e. with some form of zinc coating) screws should be used with AZ metallic coated steel claddings in severe and very severe marine environments.

304 Stainless steel and aluminium screws are recommended for aluminium roof and wall cladding with oversized holes In the meantime do not use stainless fasteners with AZ coated steel cladding whether it is plain or painted if you want to provide a manufacturer's warranty. This article is intended for you to use in convincing BCAs to agree.

Stop Press. Fastener damage of metal claddings is really an edge corrosion problem but there is some exciting new breaking news. New metallic coatings such as next generation Zincalume® with Activate (magnesium) will be launched in Australia in 2012 and will be tested shortly for New Zealand conditions. This new metallic coating may solve the incompatibility problem but in the meantime only zinc coated fasteners may be used with steel cladding.
Recently two suppliers of fasteners to NZ have introduced a fastener said to be suitable for a class 5 environment and NZMRM will be testing these fasteners for their suitability and corrosion resistance.

For further information on Metal Roofing or Cladding or details of any of the articles which appear in this publication please contact any of the members listed below.

Members of the NZ Metal Roofing Manufacturers Inc.

A Ellery & Sons Ltd
PO Box 178
Greymouth
Telephone: 03 768 5029
Contact: Clark Ellery

AZKO Roofing Limited
41 Shakespeare Road
Christchurch
Telephone: 03 365 9808
Contact: Maurice O'Flaherty

Brockelsby Roofing Products Ltd
49 Rutherford Street
LOWER HUTT
Telephone: 04 566 1971
Contact: Malcolm Smith

B J Moss Ltd
PO Box 1007
Gisborne
Telephone: 06 867 1219
Contact: Roger Moss

B R Roofing & Walling Co Ltd
Ford Road
Onekawa, Napier
Telephone: 06 843 6968
Contact: Phillip Fendall

Calder Stewart Industries Limited
PO Box 1400
Invercargill
Telephone: 03 214 5544
Contact: John D'Arcy

Continuous Spouting New Zealand Ltd
PO Box 151
Takanini, Auckland
Telephone 09 268 1555
Contact: Richard Mabin

Contour Roofing Nelson Ltd
PO Box 9015
Annesbrook, Nelson
Telephone: 03 546 4260
Contact: Dave Freeman

Dan Cosgrove Ltd
PO Box 211
Timaru
Telephone: 03 688 4169
Contact: Brian Cosgrove

Dimond
PO Box 13546
Otahuhu, Auckland 1643
Telephone: 09 622 4625
Contact: Darren O'Brien

Franklin Long Roofing Ltd
PO Box 151
Pukekohe, Auckland
Telephone: 09 238 9249
Contact: Warren Oliver

Freeman Roofing Nelson
Roofline Marlborough Blenheim
Canterbury Long Run Roofing Timaru
Canterbury Long Run Roofing
Ashburton
P.O. Box 2317
Stoke, Nelson
Telephone: 03 5443108
Contact: David Hall

Gerard Roofs
PO Box 18071
Glen Innes, Auckland
Telephone: 09 978 9043
Contact: Grant Williams

HB Longrun Ltd
PO Box 3056
Napier
Telephone: 06 843 6159
Contact: Chris Patheyjohns

Metalformers Ltd
PO Box 22400 Khandallah
Wellington 6441
Telephone : 04 479 6151
Contact: Will Lewis

Marshall Industries Ltd
PO Box 846
Invercargill
Telephone: 03 218 2579
Contact: Tom Marshall

Megami Metal Roofing Systems Auckland Ltd
PO Box 113
Takanini, Auckland
Telephone: 09 268 8959
Contact: David Moselen

Metalcraft Roofing
PO Box 51286
Pakuranga, Auckland
Telephone: 09 274 0408
Contact: Tony Barbarich

Metal Design Solutions
PO Box 33
Drury, Auckland
Telephone: 09 294 9134
Contact: Jan Alberts

Metrotile (NZ) Ltd
PO Box 72-062
Takanini, Auckland
Telephone: 09 299 9498
Contact: Harry Boxall

N S Irwin Ltd
PO Box 27029
Mt Roskill, Auckland
Telephone: 09 620 8149
Contact: Gary Irwin

Quin Roofing Ltd
PO Box 1087
Levin, 5540
Telephone: 06 3679480
Contact: Bruce Love

Roof Manufacturers Limited
PO Box 319
Tauranga
Telephone: 07 578 2650
Contact: Gordon Taylor

Roofing Industries Ltd
PO Box 302 385
North Harbour Post Centre 0751
Telephone: 09 414 4585
Contact: Paul Ross

Roofline Products Ltd
PO Box 16302,
Christchurch
Telephone: 03 349 8439
Contact: Colin Megaw

Silbery Long Run Ltd
69 Montgomery Crescent
Upper Hutt
Telephone: 04 526 9343
Contact: Angie Silbery-Dee

Steel and Tube Roofing Products
PO Box 204216 ,Highbrook,
Manukau 2162, Auckland
Telephone: 09 273 7628
Contact: Rod Newbold

Stratco (NZ) Ltd
PO Box 8494
Christchurch
Telephone: 03 338 9063
Contact: Andrew Staff

Taranaki Steelformers Ltd
Wanganui Steelformers
King Country Longrun
PO Box 36 Stratford
Telephone: 06 765 5191
Contact: Darrell Back

The Architectural Roofing Company
PO Box 8052
Hornby, Christchurch
Telephone: 03-3445991
Contact: Bruce Gibson

SCOPE

Scope is the official publication of the N.Z. Metal Roofing Manufacturers Inc..
http://www.metalroofing.org.nz