ISSUE 28

SCOPE

MRM

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.

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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 28

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, Scott Duncan, Phillip Prior, 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.
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The careful use of lighting brings this home to life for entertaining and has the added benefit of supplementing the state of the art security system.

CREATIVE SPACE

Starting with a blank slate to design your family home, a show home and a workplace, may seem like utopia however as Architectural Designer Andre Laurent discovered it is rather a challenge to be your own client. Being familiar with the importance of "getting the brief right" did not reduce the task of defining his own direction and the needs of the family. Together with his wife Rebecca and their three children they set about defining the essentials which followed through to the absolute details of what would go where. Everything from the hi-tech computer systems to the kitchen utensils was considered and given a place.

Having found a site of approximately 750 m2 and location that suited both the business and the family Andre and Rebecca were ready to decipher their own brief and translate it into a home, studio and showcase of their Creative Architectural Solutions. Andre places great importance on the investment aspect of all architectural projects and this home was no exception. "Great design creates great value, it should be an investment in the future and reflect personality and lifestyle," says Andre,"but it is more than this. It is about the influence the design has on those who live there and the positive impact it has on the occupants. In this case our own family and particularly our children." In looking at the overall project one could be forgiven for believing it is the result of a passion for design and while this is an important aspect of the home Andre is quick to point out his true passion is for function.

Form must follow function and this extends to every detail from the effects of the sun to the place where the kids store their personal treasures.

The first essential was to clearly define the working areas from the family area so both clients and family could clearly see the boundaries. The solution is a simple one, "When you enter the house you go one way to the office and the other to the home. These demarcations are clear and essential in keeping interference to a minimum and avoiding confusion between personal friends and clients. The home features a lobby which provides access to the office area, home and garden.

The brief the family established was detailed but essentially it would include 3 bedrooms plus a master bedroom which would feature a walk behind robe which opened to an ensuite. The master bedroom is generous and designed to provide an escape to relax, watch television or just take time out. The master bedroom opens to the deck and outdoor entertainment area.

The children have played a role in the decor of their rooms and as can be expected feature vibrant colours that reflect their own tastes.

The kitchen is designed as an open plan and forms part of the family area. There is a direct connection with the family / dinning and out door area. This is one of Rebecca's favourite spaces because of the informal flow and family interaction. Andre admits his favourite spot is the daybed with the bi-fold windows opening to the deck and a view of the surrounds. From a practical point of view the kitchen cabinetwork is finished in Colorform which is a durable surface which has proven very "knock" resistant and easy to clean. Silestone has been used on the bench tops throughout the home.

The family room steps down to the lounge area which has extensive bi-fold doors that open the entire 5.4 metre wall giving access to the outdoor dinning options. The deck is protected from both sun and rain with a huge cantilevered roof that extends 4 meters. The north and west facing roof section of the house have 1.2 metre soffits to assist in the passive solar design and control temperatures inside the home and offices.

The lounge area also serves as a central hub to control all state of the art media within the home. The design allows for all media, computer. sound system,,etc to be closed off in specially designed cabinets in the wall cavities.

The over all design of the home is computer modelled to take the best possible advantage of the Tauranga sunshine hours. The exposed concrete floors in the main living area provide a heat sink to collect energy which is controlled by the extended soffits to the north and west. The shape of the home allows the maximum space to provide a private garden area at the rear which is well protected from the prevailing wind. The exterior of the home is clad in a combination of Craftstone veneer on a cavity system and Solid plaster on Austral brick veneer.

Vitex hardwood decks and gates surround the building.

The roof is clad in Dimond Endura styleline 0.40 longrun roofing over underlay and supported by 75x 45mm purlins @ 900 c/c. The design of the multi planes of the 3° roofline give the home a elegance and interest as well as providing function with shade and sun protection. The cantilevered sections of roof are supported by 200 UCs that allows flexibility of design without the need for external supports.

This home features some of the most advanced technology available including integrated networking, security sensors, fully automated Buss lighting motion sensors and future proofed wiring and switches.

Overall this home has been extremely well thought out with every conceivable possibility considered. There is a place for everything and if everything goes according to plan...everything will be in place.

As a testament to their design excellence there can be little doubt that the clients of Creative Space will extract many worthwhile ideas they can see first hand, in action.

Creative Space

Our mission at Creative Space Architectural Design Ltd is to provide fresh and innovative architecture that complements the way you live, function and work. We believe that every site and lifestyle is different and this requires unique and individual ideas to fully unlock the potential that suits our clients.

We know that successful architecture creates function, value and equity and because of this we strive to achieve the perfect solution every time.

Our in-house building and project management experience is an essential factor in ensuring that our design is practical and achievable. We have designed, specified and built/project-managed many homes with excellent results.

Client: Andre and Rebecca Laurent

Architectural Design Team:
Andre Laurent
Joanne Fredrickson
Regan Little
Troy Dolman
Lloyd Bassett-Smith

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Engineer:
Kirk Roberts Engineering Tauranga
Telephone: 07 571 0950

Roofing Manufacturer: Dimond
Telephone: 0800 Dimond
www.dimond.co.nz
Roof Profile: Endura Styline

PELORUS TRUST SPORTSHOUSE HUTT CITY

By Graham Hepburn

Hutt Park is one of the treasures of Hutt City with its sports fields, nine-hole golf course and camping ground among its many facilities. But when harness racing's Hutt Park Raceway folded in 2002, Hutt City Council was left with a bit of an eyesore at the southern end of the park with the old racetrack and its increasingly derelict buildings remaining.

So the council was delighted when they were approached by Pelorus Trust, who wanted to build a 'sportshouse' to accommodate sporting organisations on part of the old raceway site. The proposal not only meshed perfectly with the council's proposed redevelopment of the southern end of the 35ha park but would also bring social, recreational and economic benefits.

An agreement was reached under which the Trust pays a peppercorn rental to the council for the use of the land.

Alister Skene, who recently retired as Pelorus Trust manager, says developing the sportshouse was quite a departure from the normal business of the Trust, which distributes money raised from gaming machines to community groups.

"We believe this is a first for the charitable gaming sector which has traditionally been a passive recipient of applications for community funding," he says.

"In this instance we have responded to a funding need which was identified by the likes of Sport Wellington Region and other sports organisations who were housed in inadequate accommodation.

"Our solution was to first promote the idea of the Sportshouse, and then bring it to fruition by providing a total design, project management, funding and ownership package."

The Trust commissioned architect's Designgroup Stapleton Elliott lead by Nigel Dong, to come up with a cost-effective but 'edgy' concept for the sportshouse with a budget of about $6 million.

Alister says, "We are a community developer so, as we are using funds raised by the community through the operation of gaming machines, it was essential that every dollar spent was used to maximum effect.

Despite this we were determined to build a structure with a quality design aesthetic, one that reflected our desire to create a professional environment for sport to flourish in, and be proud of. The structure had to connect with the park and become an anchor for an emerging sports precinct."

The planned 1440sq m facility would house up to 100 sports administrators, training and development officers, and support staff. The open plan nature of the complex is conducive to sharing ideas, resources and reducing costs. To attract tenants from their existing premises, rentals at the sportshouse are charged on a cost-recovery basis.

What Designgroup Stapleton Elliott had to bring together under one roof was a building that demonstrates and reflects the principles of its tenants, who strive to promote fit and healthy lifestyles. The building also had to reflect the park-like setting and be environmentally friendly and energy efficient.

To deal with the Wellington weather, the structure also had to be robust externally, while coping with sustained use by many tenants meant it had to be durable internally. The spaces within had to be flexible to cope with different uses and changing tenants, and had to be designed to foster interaction between the different groups.

Nigel Dong says, "The Trust wanted something that was leading edge – the concept of a sports house was a first certainly for Wellington and probably nationally. We had to come up with a building design and amenity that would entice organisations to vacate their premises – so the building had to be like a beacon."

requirement but we took advantage of that to make it appear as it if was floating on the site," says Nigel.
Founding tenants of the building are BikeNZ, Swimming NZ, Swimming Wellington, Softball NZ, GymSports NZ, Wellington Rugby League, Handball NZ, Bowls Wellington, Touch NZ, Sport Wellington Region and Leisure Active, a business unit of Hutt City Council that manages and co-ordinates the new facility as well as providing the organisations with expertise in event and programme management.
In the building's forecourt sits Cube4, an artwork commissioned by Pelorus Trust. The interactive sculpture (resembling stacked but slightly askew boxes) by Waiheke Island sculptor Aiko Groot can be changed by turning handles on each side.

Nigel says the decision to use metal roofing and cladding was due to cost-effectiveness and durability.
The choice of angle seam cladding helps to accentuate the form of the building. To delineate the covered entrance from the dark body of the building, it has been rendered in white plaster and has a butynol rather than a metal roof. Metal flashing is used inside to frame some of the rooms.
"The metal was also taken into the building to celebrate the material," says Nigel.
The low slung building has the foyer, café, meeting rooms and common areas at its centre with a large open plan office space either side and breakout rooms. On the northern side, one of the common areas extends out to the park and is glazed on three sides with wide eaves overhead covering and mirroring the surrounding decking.
"The whole basis of that central area has been designed to open out on to the park," says Nigel. "The whole space can be completely opened up and we deliberately kept the surrounding landscaping quite simple because of that."

Recessed glazed end walls on the open plan office areas keep the spaces light and bright, emphasizing the philosophy of health and wellbeing.
The building seems to sit lightly on the site, with boulders scattered about its base.
"We consciously raised the building to bring it above any potential flood plain – that was a council

Alister Skene says the project has met all the Trust's objectives.
"From our perspective, the building has been enormously successful – it is fully tenanted with 14 different sporting organisations utilising the facility along with countless community groups. It has been a fantastic project to be associated with."

And it has met the council's plans for the building to form part of a sporting precinct in that part of the park, with an indoor netball and cricket centre having gone up following the completion of the sportshouse.

Designgroup Stapleton Elliott

This architectural practice was created in 2009 from the merger of two successful and long-established firms, Designgroup Stapleton Architects and Designgroup Elliott Architects. The two firms had a strong history of collaboration on many award-winning projects and were both founding members of the Designgroup New Zealand affiliation. Bringing together the complimentary and compatible skills of both firms and drawing on experience going back more than 40 years, Designgroup Stapleton Elliott provides clients with a broad range of architecture, interior design, urban design and project management services, with specialist experience in vocational tertiary education, community housing, urban renewal and healthcare. Central to the practice's work is a belief that the quality of people's surroundings has a direct influence on the quality of their lives.
The firm says, "We believe great architecture reflects the history, culture, beliefs and needs of its particular place and time. Our work seeks to bring together and balance the many challenging elements of site, symbolism, environment and the wider cultural and physical context, to create spaces and buildings that stimulate, inspire and uplift those who move through them."

Architect: Nigel Dong,
Designgroup Stapleton Elliott
Telephone: 04 920 0022.

Building contractor:
L. T. McGuinness Building Contractors
Telephone: 04 384 8455

Engineer: Spencer Holmes
Telephone: 04 472 2261

Roofing Manufacturer: Dimond
Telephone: 04 5708460
Roofing Profile:
Colorcote 0.55mm ZRX LT7
Colour :'Titania'
Wall cladding and flashings: 0.55mm ZRX Classic Metal Angle Seam profile.
Colour :'Ironsands'.
Wider cappings and flashings 0.75mm Ironsands ZRX.

Cladding and flashings supplier:
Classic Metal Roofing & Cladding, a division of Aquaheat Industries
Telephone: 04 232 5179
Roofing and cladding installer:
Aquaheat Industries.

Photography courtesy of
Kevin Hawkins Photography
Telephone: 021 2668960
www.kevinhawkinsphotography.com

GOLDEN HOME WITH A HEART OF STEEL

When self-described ‘town boy’ David Grigor decided it was time to move to the ‘country’ to be closer to his business, he and his wife Donna knew exactly what they wanted out of a new home.

While many people move away from the city to retreat from work and city life, for David commuting between his Drury based business and his home in Kohimarama had become too time consuming. When he found a stunning five acre site in Ramarama, set on rolling hills with commanding views across Ramarama and Bombay, he knew he had found the perfect spot to build his new home.

“My daily commute was anywhere between 45 minutes and an hour and a half, each way, each day,” says David. “Having worked in Drury for many years, I knew the area well. The tremendous views and great privacy offered by the section were very appealing. We decided it was time to do it.” As the Golden Homes franchise owner for Drury for the past 15 years, David of course chose to build a Golden Home on his new site. All his experience and knowledge from building hundreds of homes in the area was brought to the new property.

“The site deserved an impressive house and we wanted to build a family home that was spacious, but felt connected and comfortable inside,” says David. “Like many Golden Homes customers, we developed our own plans and we then took them to the in-house Golden Homes design team. What was eventually built reflected our own thinking about what makes a great family home.”

Before building could begin, the first challenge was to put in a driveway. To enable contractor access to the top of the site where the house was to be built, a 270m metal driveway

was built up the steep hill to the house. The driveway tested many contractors through the building process, not least the crane that was required to bring in the trusses for the home.

At 541m2 David and Donna's home is large and impressive but well integrated within the five acre site it sits on. It has a striking 35 degree pitch on the roof, an over height stud throughout and is finished in plaster.

The house is comprised of five bedrooms including a master bedroom complete with walk-in wardrobe and ensuite, a guest room with ensuite, three further bedrooms, a study, family bathroom and an additional guest toilet. It has a substantial connected living space that flows from kitchen, through family living and dining into a further large lounge. All living areas are flanked by external patios which lead directly onto external paths and decking which in turn, lead onto the pool and surrounding gardens. Visitors are welcomed into the house through an imposing 5.5m stud that is classically styled and which draws guests straight into the heart of the expansive living and entertaining area.

"Many people are surprised when we tell them this is a Golden Home," says David, "but I wonder why people build any other way. The pricing, quality and construction of Golden Homes are hard to beat. And while I know you would expect

me to say that, our own experience of building the Golden Homes way reaffirms my very strong belief in the model."

David and Donna's choice to build their house with steel framing rather than traditional timber framing also gets a reaction from people. "About four years ago, Golden Homes started to explore alternatives to timber framing for residential building," explains David. "We now recommend ZOG® Steel Framing on all new homes. The great advantage of using steel framing over timber framing in a home is that steel doesn't shrink, twist, warp,rust, or rot and it doesn't require any chemical treatment."

"Initially people are resistant to the concept of steel framing, and I understand that. It is not something New Zealanders are used to as a method for residential construction. But when they start to look at the facts and understand the benefits, they quickly come around to the

idea and we have seen a significant uptake in steel framing in the past couple of years."

"The very strong performance of steel framing in homes in Christchurch through the earthquakes has further endorsed the benefits of using steel. I wish we had started building in steel frames 15 years ago. You get no

recall on cracked ceilings with steel framing! "
Some of the other great advantages of using steel framing is it is lightweight and doesn't require low moisture levels for building so construction can continue in all kinds of weather.

The use of steel framing meant that David and Donna had no concerns with using external plaster cladding on the house, a look they both really liked. The steel framing removed any potential issues from either moisture caused by timber in the wall cavities or cracking due movement in timber framing. They feel they have total peace of mind.

The roof is also a key design feature of the home. At 720m2 the size of the roof is substantial and combines a steep 35 degree pitch alongside valleys and gables to create a roof that is interesting to look at in its own right.

David and Donna chose the Gerard Roofs Corona Shake for their roof. The profile of the Corona Shake suited the design of the house and the lightweight but strong Gerard tile, with the 50 year guarantee, matched the lightweight but strong internal steel framing.

John Rose of Counties Manukau Roofing installed the roof and recalls it was a satisfying roof to work on. "The roof was around double the size of the average house, but for all that it was a straight forward and rewarding roof to install," says John. "The size and mix of heights within the roof-line meant from the roof you could look back on the overall roof profile as it was completed and really appreciate the roof in its own right. The Corona Shake was the perfect tile for the style and design of the house."

Within their home, David and Donna have included various elements to maximise the heating efficiency. They use solar power for all water heating and used floor tiles extensively throughout which retain heat and help keep the house warm. For David there are many satisfying aspects to the finished property. "We love the location. We really appreciate the tranquil views and the great privacy we enjoy. The way the house has been designed means we are fortunate to have all the space we need as a family with two growing children, but we are never feeling separated by that space. It doesn't feel like living in a big house."

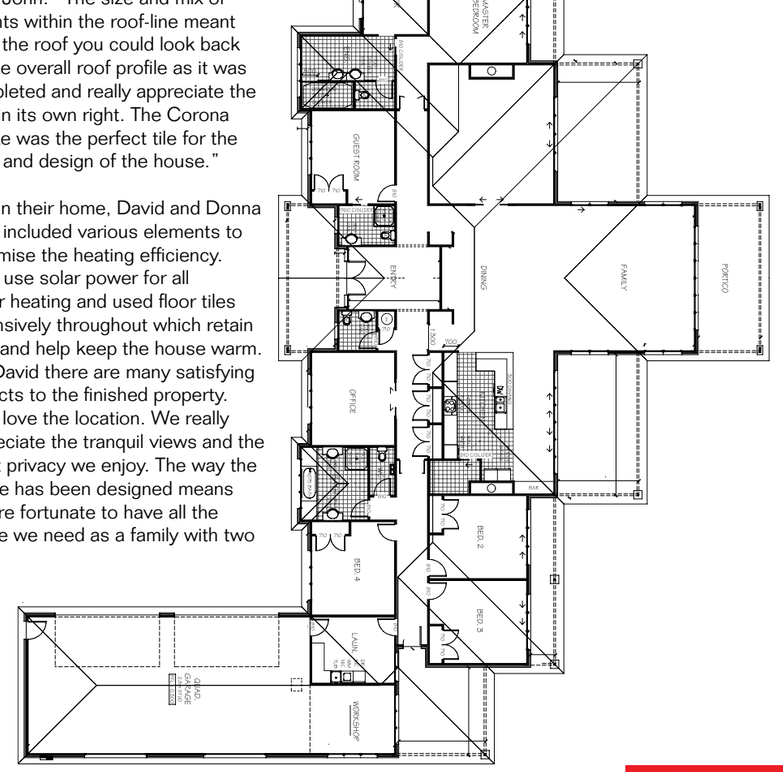
Client:
David and Donna Grigor

Contractor:
Grigor Construction Drury
Takanini, Auckland
Telephone: 09 294 6065
email counties@goldenhomes.co.nz

Roof Cladding Manufacturer:
Gerard Roofs
Telephone: 0800 164 868
www.gerardroofs.co.nz or
email info@gerardroofs.co.nz
Roofing Profile: Corona Shake
Colour: Pepper

Roofing Installer: John Rose
Counties Manukau Roofing
Pukekohe 2120, Franklin
Telephone: 09 238 085
email countiesmanukauroofing@xtra.co.nz

Steel Framing
ZOG® Steel Frames
www.zog.co.nz



LEIGH MARINE CENTRE

By Graham Hepburn

Since the early 1960s the University of Auckland's Marine Laboratory at Leigh has played a vital role in marine science research and education.
Over the years the centre has grown to accommodate the increasing numbers of academic staff and those doing undergraduate and postgraduate work on the marine campus.
But the success of the programme had also become a bit of a problem as buildings were added or extended on the clifftop site but with no overall plan, says Arthur Cozens, the operations manager at the laboratory.

"It's grown like a Kiwi bach," he says. "There's been a bit of this and a bit of that and while the infrastructure worked, it was not all that well thought out."
And things might have remained that way if not for a generous donation of $4.6 million from the Edith Winstone Blackwell Foundation Trust.

The donation kick-started a $10 million redevelopment of the site on a pohutukawa-fringed headland that overlooks the Goat Island Marine Reserve.

The redevelopment, master planned by Cheshire Architects in conjunction with the University's own Property Services Department, involved the reuse and refurbishment of existing buildings, and the construction of three new buildings: a block of bunkrooms, a science centre and an information centre for the public, which has been named the Edith Winstone Blackwell Interpretive Centre.

Arthur Cozens says the steepness of the site meant buildings that looked good on paper weren't necessarily going to be practical to build. And because the buildings are on a prominent coastal site, gaining resource consent for the redevelopment was always going to be a challenge with building heights and colours critical factors.
"The fundamental brief was that the buildings had to work and be structured in a manner that would fly the resource consent," Arthur says.

Sean Flanagan, of Cheshire Architects, says coastal sites such as that at Leigh provide challenges because they are visually sensitive but harsh environments, especially as sea spray is a factor.

"Working in a close relationship with the Property Services Department, we did a lot of research into the materials that we would use," he says. "And the reflectivity of the buildings was a consideration."

Because of its robust nature, Colorcote ARX was chosen for the roofing and cladding on the interpretive centre, and was also used to partially clad the science centre which also has timber cladding and exposed blockwork. Colorcote ARX has also been used to roof the timber-clad bunkrooms.

Varying the width of the tray is a design feature available with Eurostyle™ metal Cladding

The Eurostyle™ metal cladding was installed with angle standing seams on the science and interpretive centres to create shadow lines across the elevation. On the interpretive centre, three different tray widths were used and arrayed in a pattern to make the façade shimmer in the light.

The science centre, which sits behind the interpretive centre when seen from the marine reserve, steps up the slope to a maximum height of three stories, minimizing its visual impact "At resource consent stage we had to show how the buildings sat from the sea," says Sean. "Siting the buildings within the clifftop fringe of pohutkawas helps the buildings settle into this sensitive site."
The Edith Winstone Blackwell Interpretive Centre was given a jagged edge on its public face to draw people to it.

"We paid a lot of attention to the form of the interpretive centre building," says Sean. "Pip [Cheshire] said it had to 'shake its hips' a bit, to attract the public parking down the hill and draw them into walking up to the centre. The gill-like serrated edge down one side gives it some presence but it also gives you views into the building as you walk up the hill."
Sean says a lot of work went into the detailing of the roofing and cladding to add interest to the building.
"The seams on the interpretive centre are quite subtle – on the science centre they are regular but on the interpretive centre we have used different Eurostyle™ tray widths to enrich the façade," he says. "We also put a lot of effort into making it look like the wall folded over the roof, again to give it some interest but at the same time that detail has to work in terms of weathertightness."

Whereas the interpretive centre is metal, the bunkrooms are timber construction, with the science centre providing a link between the two.
"The science centre is timber and metal so it's the hinge building," says Sean. "- we created a conversation between the three buildings."
The bunkroom was the first of the three buildings completed and the timber cladding has been designed to weather and settle into its surroundings.
"The bunkroom has stained radiata pine rain screen boards but in behind is a shadowclad plywood system," says Sean. "It's like the building has a raincoat to deflect the harsh coastal weather, but the coat will also protect it from the sun."

The balcony off the Interpretative Centre features a salt water tank, with live specimens,that allows children to interact with marine creatures from the reserve and a view of the specimen tanks below.

The science centre was the next to be constructed and has laboratories, student spaces and academic offices. It has been designed so that marine samples can be brought into the building straight from the research boats, sorted and cleaned before being moved through to the spotless microscopy room.

The recently completed interpretive centre will give the public a window into the sort of research done at the marine centre. An entry fee is charged to the centre, which has video screens, touch screens, display boards and specimens on show.

"The centre has to meet its own costs but it also has to be accessible and allow the public to see our marine environment and highlight the work of the people in the science building," says Arthur Cozens. "It also supplies some income for graduate students who show the public what we actually do, why we do it and why it is important.

"We are making no bones about the fact that we also hope it will be a pathway into the university for youngsters, and not just those interested in marine biology."

Cheshire Architects

The practice is based in Auckland City and was founded in March 2004 by award-winning architects Pip Cheshire and Nat Cheshire "to concentrate on the making of interesting buildings". The firm employs 12 architects and graduates, working on a diverse range of projects including urban masterplanning, the design of theatres, university research buildings, mixed use city buildings and 'oneoff' houses around New Zealand and the Pacific.The practice is also involved in university teaching, writing and lecturing.

Architect: Cheshire Architects
Telephone: 09 358 2770

Builders: Cooper Construction
Matakana (Bunkroom)
Telephone: 09 423 0361
Amstar Interiors
Science centre and interpretive centre
Telephone: 09 441 4550

Engineer: Structure Design
Telephone: 09 302 0205

Services Engineers: URS
Telephone:09 355 1300

Landscape Architects: Chow-Hill
Telephone: 09 522 6460

Quantity Surveyors:
Rider Levett Bucknall
Telephone: 09 373 3086

Exhibition Design Architect: Pearson and Associates
Telephone: 376 1156

Interpretive centre roofing and cladding, science centre cladding: Eurostyle™ in Colorcote® ARX 'Metallic Gun Metal'.
Bunkroom roofing: Colorcote® ARX Maxispan profile in 'Metallic Gun Metal'.

Roofing and cladding supplier: Roofing Industries
Telephone:(09) 414 4585

Roofing and cladding installer: Metro Roofing
Telephone: 0800 766 3496.

A LOW PROFILE THAT IS UNIQUE TO METROTILE

Darren and Melanie Arnold purchased a 12 acre life style block in Karaka in 2001, with the intention of building a house that they could call a home and which would meet the ongoing and changing demands of their family.

Darren has been involved in the building industry for over 20 years and has been the owner of Crittal Arnold Ltd, a Takanini based manufacturer of steel window frames, for nearly 10 years. He was also actively involved in the build process of his first home. As a result, Darren and Melanie decided to manage the design and build process of their Karaka property themselves.

Their key consideration in the design of the property was to build a house that was in keeping with its rural setting. To this end Darren and Melanie were heavily influenced by the Colonial style houses evident throughout Commonwealth on larger estates. Having settled upon the design of the house Darren and Melanie undertook a review of a wide range of tile roofing products. Due to the location and style of the house Darren settled on a lightweight Metrotile Shake Textured Greenstone roof because of the structural cost savings and reduced maintenance that it would provide.

Darren and Melanie used a personal friend, Garth Kennedy, who had also been involved in the building of their first house, to draught the 275 square meter, four bedroom Karaka Home to their design specifications.

Ian Cartmer from Auski Homes was brought in to complete the build process, as Darren had dealt with Ian Cartmer on previous projects and was impressed with his professionalism. Ian has been building for over thirty years and has built up a boutique building company that specializes in quality of its workmanship, industry expertise and client relationships.

Unfortunately an electrical fault in February 2010, to one of their upstairs bathroom exhaust fans, resulted in significant fire damage to the top storey of their house. As a result, the Arnold family had to vacate the property for eight months as the house was rebuilt.

VERO, who Darren and Melanie were insured with, showed considerable flexibility in allowing

Darren to personally manage the rebuild process of his fire damaged home. Darren was genuinely appreciative of being able to work with tradesmen he knew and trusted and after some consideration Darren and Melanie settled on the Metrotile Shingle profile which is now available. The low profile of the ridge cappings and trims offered by the Metrotile Shingle is unique in the metal tile market and was more in keeping with the Colonial design of his home.

Peter Hill of Hill Design Engineering Ltd. was engaged to draft up the revised plans for the rebuild of the dwelling. This incorporated minor changes to the layout of the home to accommodate the family's needs. There were no problems relating to the rebuild and the council were quick to provide an interim consent so demolition and building works could proceed without any delay.

Scott Harris from SH Roofing, who undertook the installation of the Metrotile Shingle roof, was recommended to Darren by Quentin Ross, one of the Directors of Metrotile. Scott Harris has been roofing for 19 years and has owned his own roofing company for 14 years. Scott has actively worked with Metrotile in the trialing of their new products and profiles and specializes in high end metal tile roof installations. His skills were put to the test in the re-roofing of the Arnold roof, which is a particularly "cut about", steep and complex highly visible 2 storey roof.

Subsequent to the re-roofing of their property Darren and Melanie Arnold have added a new boat shed and garage to the property which they have also roofed in the Metrotile Shingle profile.

Client:Darren and Melanie Arnold
Karaka

Designer: Peter Hill
Hill Design Engineering Ltd
Telephone: 09 298 0654
E-mail: peter@hde.co.nz

Builder: Ian Cartmer
Auski Homes
Telephone: 0274 971 179

Roofing Manufacturer:
Roofing Manufacturer;
Metrotile NZ Ltd.
Telephone: 09 299 9498
email: info@metrotile.com
www.metrotile.com

Product: Metrotile Shingle
Finish: Textured
Colour: Custom Grey

Roofing Company: SH Roofing
Contact: Scott Harris
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THE UNDERLAY DILEMMA

Stuart Thomson

Metal roof and wall claddings contribute a lot more to buildings than just keeping the water out. They are part of the moisture management of the building and a necessary part of the regulatory system as required by the NZBC.E3 (internal moisture).

This article is the first of three which discusses the designer's role and the roofer's responsibility in this process which includes condensation, insulation and ventilation of roof spaces.

This first part discusses underlay and its changing role in the changing circumstances of the last few decades.

It is understandable that designers are confused about underlay.
The new NZS 3604: 2011 removed section 11 the building envelope (which included underlay) from its scope, while the new E2/AS1 published on August 1 now cites NZS 2295:2006 as the compliance document for underlays. This document does not permit synthetic materials for use as a roof underlay, however in a recent document published by the Ministry of Education, only synthetics are permitted to be used for school buildings.
So hello- what's going on?
This issue is not only important but topical as the increase in the number of complaints about excessive condensation and the role of underlay and ventilation is right up there. While this is predominately a residential building problem, the use of foils and synthetic underlay in Commercial and Industrial buildings requiring some insulation present exactly the same issues.

This situation has not just occurred, it has been going on for years and perhaps the best place to start is with a bit of history.

This 'concertina' result happened because the underlay was not 'captured at each edge by the fasteners at the purlins. That is why the 1200mm spacing must be reduced by the lap (150mm) = 1100mm for a 1250mm wide underlay.

Way back we used heavy absorptive bitumen impregnated roofing felt as an underlay under metal roof cladding supported on sarking which was made of native timber boards about 11/2 inch (40 mm) apart.
The attic space was pretty drafty because permanent gable air vents were fitted and when any condensation occurred it was absorbed by the felt and would soon dry out due to the (sometimes excessive) ventilation.
NZS 3602: 1975 said:

24.2.3.1.Roof cavities including cavities beneath flat roofs should be ventilated by such means as:
a) grilles in eaves;
b) louvre frames in gables;
c) a continuous gap in the roof soffit:
d) ventilating ridging: or
e) other suitable means

This principle continued for many years with the substitution of roofing felt with a heavy bitumen impregnated kraft paper but the venting of the attic space was overtaken by the energy crisis and we forgot about it.

About 1980 solvent based fire retardant kraft paper underlay came into general use, the pink, green

and red stuff and although black bituminous underlay was perceived to be a fire risk it still was the most popular underlay.
The fire retardant additives were based on antimony trioxide/chlorine chemistry and dispersed in highly toxic petroleum based solvents.
About 1989, for health and safety reasons, the solvent base was replaced with either chlorinated paraffin waxes or a water-based fire retardant system incorporating antimony trioxide/chlorinated emulsions. Both of these systems had serious inherent shrinkage issues.

There were many examples of the failure of kraft fire retardant underlay due to shrinkage over the next few decades. Everybody blamed everybody else. The manufacturer stated that the underlay should not get wet, the roofer said he only put the roof on and didn't design the structure underneath while the designer had no regulatory requirement to provide any ventilation under the underlay.

The Roofing Industry asked the manufacturer (by this time there was only one) to withdraw kraft fire retardant underlay products from the market which, after a few frustrating years, was eventually done.

The underlay standard has been changed many times over the years starting back in 1965 when New Zealand adopted the British Standard 1521 and called it NZS 873: 1969. Later the British Standard 4016 1992 was adopted as NZS 2295 1988.
Meanwhile NZS 3604: 1981 cited a previous version of NZS 2295 1969 entitled *Building papers breathing* type which had the absorbent test included (> 100g/m2).
Prior to this everyone knew that underlays needed to be breathable and absorbent but by how much was not quantified till this time. This standard also required underlay to be run horizontally and lapped 75mm.
However in 1999 NZS3604 adopted AS/NZS4200 called 'pliable building membranes' before (fortunately) changing it back again in 2000 to NZS 2295.

About the time that Leaky Homes were being built 1993- 1999 synthetic building wraps were introduced to the market and touted as being a replacement for kraft underlay.

Then when the leaky homes scandal broke (2002), BRANZ conducted a number of seminars around the country entitled 'Wrap it up' but the confusion of the name 'wrap' and the purpose of the underlay created a number of failures by using the wrong material. This is evidenced by the number of synthetic underlays and wraps now withdrawn from the market. Some started life as envelopes or protective apparel while others started life as babies' nappies.
It was not until about 2007 that synthetics which were specifically designed to meet and exceed the properties of 'good ol' black building paper' were locally manufactured and there was general acceptance that this material was an excellent, even if a more expensive, replacement.

One of the problem issues was that the role of underlay had never been clearly defined or agreed as underlay manufacturers saw their role as a sales one and it was left to the roofing industry to put the' system' together. The NZMRM Code of practice published in 2003 said:
The performance and properties of an underlay must be related to the purpose for which it is required and because an underlay performs more than one function, a definition is necessary. Although the principles are the same for other claddings and their use is similar, an underlay as referenced in this Code of Practice is used in conjunction with metal roof and wall cladding.
The purposes of an underlay are:
• To provide a temporary means for the accumulation of condensation by absorption.
• To provide a permeable membrane to allow the passage of water vapour
• To prevent the ingress of external moisture into roof or wall cavities.

The good thing about the second generation synthetic underlays is that they are fire retardant and do not shrink like kraft papers do when they are wet; the bad thing about synthetic underlays is that not all of them comply with the requirements that have been proven over the years to be required for an underlay. These can be found tabulated in the Code of Practice 4.3.

While the latest NZS 2295:2005 did include synthetic materials for wall cladding they were not permitted for use with roof cladding.
NZS 2295:2006 does not include

Kraft paper (left) has always been subject to movement (expansion and shrinkage). Synthetic underlay (right) is not affected in this manner.

foils and although they are sometimes referred to as underlays, they are not – they are VCL's -vapour control layers If they are sealed they are termed vapour barriers.

NZS 2295 is a standard that covers underlays for all buildings in all situations. An anomalous situation has arisen because the NZBC Acceptable Solution E2/AS1 only covers the scope of NZS 3604 The requirements of E2/AS1 by referencing NZS 2295 and quoting R1 & R2 as the only underlay types of roofing underlay (kraft) has meant that designers and BCA's alike are caught between a rock and a hard place. The regulations are out of step with the market place as nearly 50% of roofing underlay used is now synthetic.

E2/AS1 was also amended in August 2011 changing the rules yet again for support, for pitch and for span.

E2/AS1 2005

8.1.5.1 Underlay support
Roof underlays shall be installed in a manner that prevents ponding of water by:
Run horizontally or vertically when the roof pitch is not less than 8°
a) Allowing roof underlays classed as extra heavy or heavy in AS/NZS 4200 to span no more than 1200 mm in one direction, or
b) If supported by a corrosion-resistant material:
i) roof underlays classed as medium light or extra light in AS/NZS 4200 shall span no more than 300 mm in one direction, and shall be used only at pitches of 8° or above, or
ii) roof underlays classed as extra heavy or heavy in AS/NZS 4200 shall be used at pitches less than 8°.
Appropriate corrosion-resistant materials are polypropylene tape or a minimum 0.9 mm diameter steel wire mesh galvanized in compliance with AS/NZS 4534.

(It should be noted that the industry has never regarded either packaging strapping or 0.9 mm diameter galvanized steel wire mesh netting as being either appropriate or corrosion resistant in severe environments, simply because they do not last 50 years.)

E2/AS1 2011
Run horizontally for roof pitches below 10°
• Run horizontally or vertically for roof pitches above 10°
.
8.1.5.1 Underlay support
Prevent sagging of roof underlay by either:
• For RI underlays, fully support with a corrosion resistant material
• For R2 self supporting underlays, laid to maximum 1.2 metre span between adjacent supports

It should be noted that the pitch has been upped by 2° -or has it? as a roof of 10° appears to be in limbo!!

The requirements of both of these E2/AS 1 versions appear to take it for granted that self-supporting underlay is exactly that, and does not need any support if it spans no more than 1200 mm.
The MRM Code of practice has always required support even for self-supporting kraft underlays below 8°.simply because the instruction was not to pull underlay taut because it would tear on shrinking.
4.3.8. To avoid splitting due to shrinkage or damage from structural movement, roofing underlay should be fixed securely and should not be laid taut but tensioned sufficiently to give fall on low pitches.

Table C2 in NZS 2295 appears to contradict E2/AS1 by allowing R2 underlays to be used at greater than 1200 mm if it is supported however it also omits to qualify the statement by any roof pitch.
Table C2 also doesn't make sense because it is the purlin spacing not the rafter spacing that determines the span.
It also appears to contradict again:
A3.4. If the roof underlay runs over and is fixed to the top of the purlin then it should be run vertically.

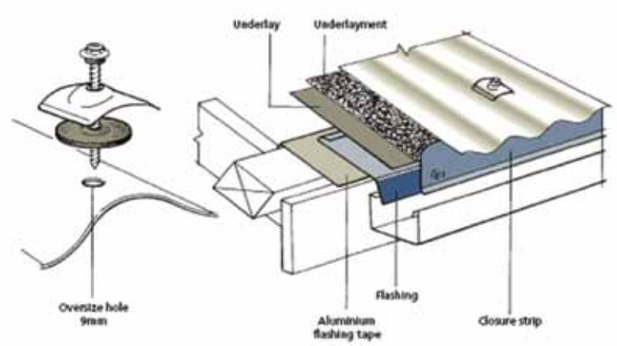
The 1200mm dimension is also incorrect. Self-support and synthetic underlay is usually 1250mm wide and requires a 150mm lap.
COP 4.3.8. requires
Horizontally laid underlay must be fixed to the purlins on both edges by the roof fastenings i.e. The purlin spacing must be 150mm less than the width of the underlay. If it exceeds this spacing it must be laid vertically.
Because horizontally run underlay is fixed at each purlin the minimum dimension becomes 1100mm.
While it could be said that the DBH Acceptable Solutions were directed towards residential roofs, because, as it has been pointed out many times before, these documents become the default ones as they are applied to commercial and industrial roofs alike.

This Table is a summary of COP 4.3.8, 4.3.9

Pitch	Direction	Purlin Spacing	Support	All Wind Zones
<8°	horizontal	1100mm*	Y	R1, R2
>8°	horizontal	1100mm*	N#	R2
<8°	vertical	>1200mm	Y	R2
>8°	vertical	<1200mm	N#	R2

** Assumes an underlay width of 1250mm*
 # Assumes self support underlay (R2) - E2/AS1 now says 10°
N.B. All laps 150mm

This is not such a support problem simply because safety mesh is normally used as support underneath underlay on commercial and industrial roofs for safety reasons.
The issue now is to categorise synthetic underlays as to if, or when, the requirement for support is necessary. Wire netting has been shown to be the cause of corrosion of metal cladding in severe environments and therefore should not be used as underlay support in these environments.
See photo below



This gutter detail is recommended in all severe and very severe environments.

Underlay has assumed another role, that as a separation between treated timber, dissimilar metals, or materials and works quite well but only on the condition that the underlay does not remain wet. This is very likely in severe and very severe environments particularly at the gutter line where metal profiles are open to salt aerosol. (see COP 2.4.5.) If the time of wetness is such that the metal remains wet then a different separation material is recommended. This material is termed underlayment and is described in the Code of practice 4.3.11.
Such material is termed 'underlayment' which can provide a 'slip joint' between cladding and the structure and can also provide an air gap. Some such materials are a three-dimensional mesh made from polypropylene synthetic monofilaments 6mm high which is tangled and welded where they cross and provides a ventilating and drainage gap between the metal cladding and the batten. This separation also will reduce noise transmission. If this material is used it is not necessary to provide an underlay as a separator between copper preservative treated timber and metal cladding, however an underlay is still normally required.

These Christchurch owners were shocked to learn after the recent snowstorms that this detail was consented because it appears 'on reasonable grounds' to comply with the NZBC. The problem is with NZS 4206:1992 which says that unless the pitch is170 or less or it is of skillion construction, a concrete tile roof does not require any underlay !

If you are still confused about underlay then go to the MRM Code of Practice. It is all there! Synthetics are approved under metal roof and wall cladding because they satisfy the requirements of table 4.3.1. Support is still required below 80 in the COP, however it is recognised that if synthetic underlay can be sufficiently tensioned then support is not always necessary.
The designer's dilemma is to know who and what to believe about underlay and you could say that the COP is the best bet – I couldn't possibly say that!

This is no underlay problem because there is no underlay.

INNOVATION IN FORM AND FUNCTION

By John Henderson

The Brief

The owners are long term friends and have been great clients over the years in various ventures. The site had an old house in poor condition, complete with asbestos cement sidings and roof. Since 2002 we looked at various ideas, and in September 2008, the following email arrived.

"... could you proceed to draw up some sketch plans for a house at Oceanbeach Road. We have no particular design in mind so we need to rely on your creative skills. "

What further invitation does an Architect need !

"However, [there is always an "however"] we would like any design to include generally the following:

- the design and construction must not exceed $400,000;
- have an open kitchen/dining/lounge area, preferably having these facilities on the ground floor;
- have an emphasis on indoor/outdoor living;
- have three bedrooms plus study (which could convert to a bedroom);
- main bedroom to have ensuite;
- upstairs and downstairs bathrooms;
- no necessity to go to three storeys unless you advise otherwise;
- have two car garaging;
- have outdoor shower and barbecue area;
- be an attractive design for resale purposes."

Tall order ?.... Well 3 stories was.

There was little to be gained in terms of aspect – so with the budget in mind – and my comment to the client about being an optimist and not a magician all too fresh in the memory - the sketching of a 2 storey version began.

3m. However, in a 393m2 site, we were able to achieve a living yard of 116m2 plus the loggia of 56m2. The rest of the footprint being 69m2 ground floor plus 37m2 for a simple garage.
The garage is placed in the south west, almost unseen from the street.

cladding angled with the form, has fortunately been associated with insobriety – not disaster. [This was designed before the Christchurch quakes.] Apart from reflecting the ascent of the stair, and catching of morning sun to the living pavilion, it adds a measure of architectural humour. The passing observer, invariably does a "double take."

Designers statement

Plan organization

There are many subdivided lots in the Mount Maunganui – Tauranga area, with 325m2 being the minimum. My general observation is that these are not handled well, and the minimal exterior space tends to be what is left over rather than integral in the design.

The art of designing on a small site is to make both house and garden feel apparently more spacious than they are physically.
Consequently, my practice now has a focus on particularly designing for these compact sites.

In this case, we settled on a container holding the upper floor bedrooms with second lounge, surmounting a living pavilion and loggia. The ground floor opens generously to the loggia and garden on the north east and north west.

The Local Authority require a minimum 50m2 living yard containing a uniform space of at least 4m by

Form

A principal aim was to have clarity of form and minimize the external complexity.
Hence the rectilinear container .
Cover is achieved by "subtraction".
The north east street frontage, which is largely glazed, is recessed, and the loggia "stripped" from the lower mass on the sunny aspects.
The steel skeleton is left exposed by this peeling back of the skin.
The rotated pod, with joinery and

Material

While not beach front, the site is clearly affected by the marine environment.
A tough skin is required. So the theme of "Reptilian" skin, "Mammalian" interior was pursued.
The skin :
Which product has ;

- traditional links,
- is light and easily fixed in large pieces,

Client: P.& A. Cooney

Architect:
John Henderson Architecture Ltd.
Tauranga
Telephone: 07 5780872
powderson@xtra.co.nz

Engineer:
Arnold & Johnstone Ltd

Builders:
Kevin Johanson and Mike Ireland

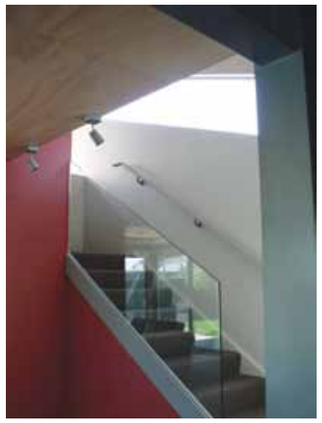
Roofing & Cladding:
Taylor roofing, Tauranga.
Profile: ColorCote ® ZRX
Ironsand & Gunmetal metallic

Structural steel:
Profile Engineering, Tauranga

- associated with strength,
- has no public phobias regarding weather tightness,
- wide colour range,
- should not need to be recoated for more than 15 years,
- is easily removed and recyclable
- and will fit the budget ?

Hence our choice of the corrugated profiled metal with the higher specification coating.

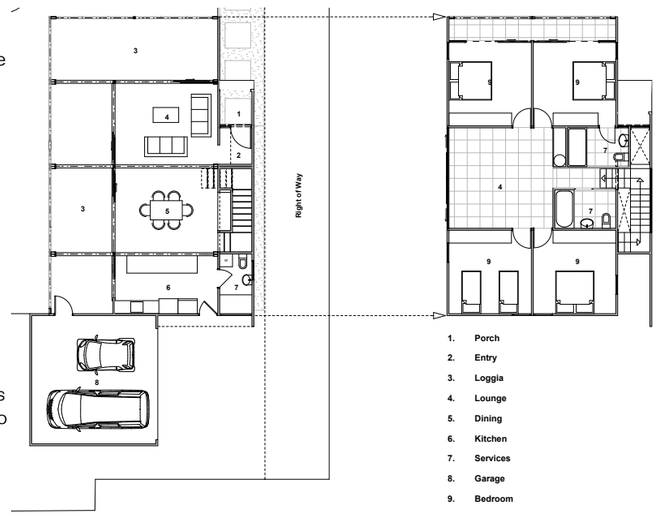
The chosen colours of Ironsand and Gunmetal reflect the metallic nature of the material. Importantly, all the presented metal surfaces are rain washed. The recess soffits and linings, which are extensions of the interior surfaces, are non metallic. The only non standard detailing, comes with the skewed windows. These have welded stainless steel flashings on four sides, with back flashings extending to the bottom of the cladding from the down slope jambs.



The finished building is now enjoyed by the clients, very pleased with the practical yet playful response to their brief.

The interior :

Colour – particularly the Resene "Hot August" - and plywood are used to achieve the contrasting warmth of the interior.
Inside the rotated pod, the rotation is reflected with the tiling and lining following that geometry.
Plywood and painted MDF linings were used with expressed joints, preferred for its robustness and avoidance of stopping. The success of the interior design is testimony to the skills of Marilyn Cleland.



SCOPE NEWS AND VIEWS

Metrotile launch two new profiles

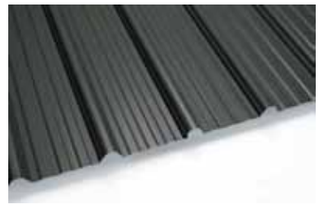
Metrotile continue to enhance their range of metal tile options with Tudor and Royal.

The new Metrotile Tudor profile will complete their mainstream product range of Shake, Bond and Classic. The new Tudor profile is an attractive and robust 7 pan tile which is available in an extensive colour range in both satin an textured finishes. The batten spacing and competitive pricing is consistent with the mainstream product range already in the market.

The new Metrotile Royal tile replicates a traditional shingle profile and is installed on 50 x 40 battens at 370mm spacing. The key benefit of the Royal tile is it's aesthetics, with the low profile providing the clean finish associated with traditional and asphalt shingles.
Metrotile Royal is available in a selected colour range of textured finishes. The tile does not require a centre batten, which reduces the cost making this a highly competitive and viable high end option.

For further information please contact
Metrotile NZ Ltd.
Telephone: 09 299 9498
email: info@metrotile.com
www.metrotile.com

Pictured from the left: Robbie Shaw, David Bullock, Graham Moir, Darren O'Brien, Jonathan Ling, Aidan Taylor, Ian McClew and Mike Klemick



Dimond receive the Product Innovation award for DP 955

Dimond are proud to be able to announce to the industry that Dimond DP955 Roof product has won the Product Innovation Award in the inaugural Fletcher Building Innovation Awards presented in early November 2011.

The judges were impressed with the way in which Dimond listened to customer needs and set out to meet them in what is a world first development of a roof sheet that resists buckling damage while in fact using less material. The award was presented by Jonathan Ling who noted how pleasing it was to see Dimond recognised amongst the larger scale Fletcher Building businesses with international markets given the tough market conditions facing NZ.

Congratulations to all involved with the DP955 development, and particular thanks to: Ian McClew for the concept development, Graham Moir and Craig Cannell for the development and commissioning of the roll former, David Bullock for the product testing, technical information and promotion, Mike Klemick, Aidan Taylor and Jason Whiteman for early sales promotion, Roger Munien and Paul Malo for early production problem solving, and customers who have helped promote the merits of the product to gain the traction it now has in the market.

The timing of this award is appropriate as Dimond look forward to further success with the second DP955 machine underway for Christchurch.

Winner of the Metrotile "Viva Las Vegas" Promotion.

Ben Kendal and Jenni Froggatt will also be visiting Alcatraz, the Golden Gate Bridge, the Grand Canyon and the Hoover Dam.

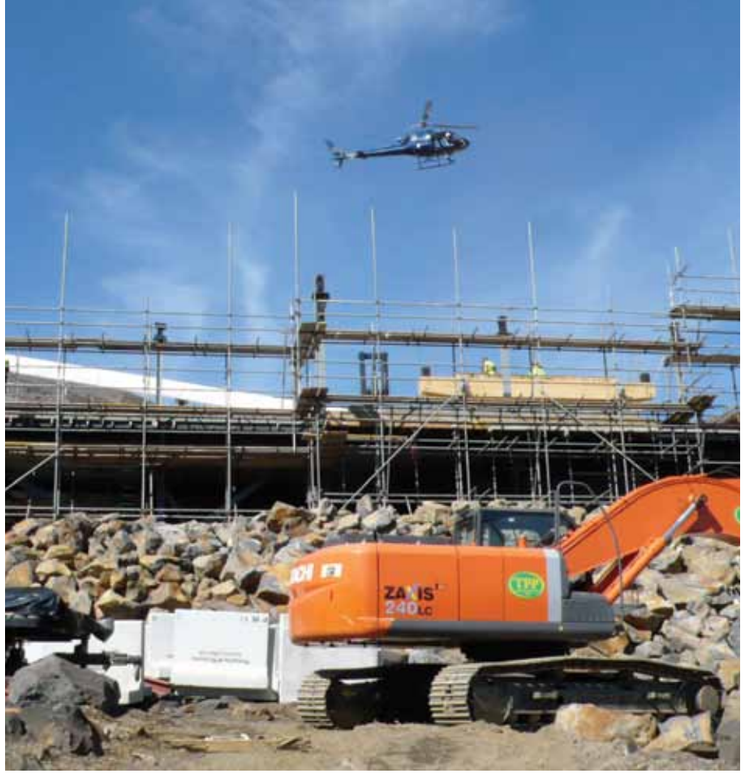
Metrotile confirm that Ben Kendall from Coastal Roofing has won the Metrotile "Viva Las Vegas" October draw, from an order he placed with Metrotile in March of this year.

The competition was open to all designers, builders, roofers and homeowners, who placed an order with Metrotile between 01 October 2010 and 31 October 2011.

Ben's prize is valued at $10,000 and includes return airfares to LA for two, connecting flights to Las Vegas, 5 Star Accommodation for 7 nights in LA and Las Vegas, Airport pickup and drop off and a daily meal allowance.

SUSTAINABLE STEEL IN SKI RESORT CONSTRUCTION

With the destruction of the original Knoll Ridge Chalet in February 2009, an ambitious design/build programme was initiated to create new facilities to be ready for the 2010 winter.
RAL engaged Stanley Construction to provide a design/build service with HB Architecture providing the architectural services.



In designing both the café and the equipment shed, the challenge was to create a facility within a tight time frame using appropriate materials. These had to be durable to withstand the extreme alpine conditions, transportable, prefabricated and pre-finished as much as possible to speed on-site construction.

The challenge of constructing a 1512m² café perched on a rockface some 2010 metres up a mountain within a tight 18-month time frame which straddled two winters seems insurmountable – but it didn't deter owners Ruapehu Alpine Lifts (RAL) from engaging the Stanley Group team who relished the challenge.
The Knoll Ridge Café on Mt Ruapehu opened for business in mid-July to a flurry of snow and an avalanche of enthusiasm. Comments like 'cosy – and sensational'; 'all that glass gives an airy impression, like you're floating over the snow' and 'it's a beautiful building, warm and welcoming, with clever use of wood and glass' confirm the new facility has got the thumbs-up from skiers.
Later in July the building won peer acknowledgement when it took out the 2011 Supreme Award for the Waikato Registered Master Builders Commercial Project of the Year, and more recently it achieved a 'highly commended' award at the NZ Wood Awards.
The building is located 50 metres downhill from the original site, its eastern, fully glazed face perching on the edge of the drop off to the Te Heuheu Valley ski area, affording patrons stunning views to the Pinnacles. Inside, 400 patrons can be accommodated while the surrounding deck seats another 200. Under the building are the public toilet areas, staff facilities and storage.
A 'temporary café' was the first project – constructed on the remaining floor slab of the original building which was destroyed by fire in February 2009. This building had to be ready for the 2009 ski season. Once this was underway, focus moved to the new Cat Shed and Café.
Pre-finished concrete floor panels for both the shed and the café were precast by Stanley Construction at their Matamata premises and transported from the Whakapapa depot by Snow Cats drawing sledges over the 2009 winter snow. The following summer LVL beams were helicoptered in and quickly erected to support the shed's upper roof structure of profiled steel cladding, which also protects the east wall. The building was completed in early 2010.

Meanwhile construction of the Knoll Ridge Café had started.

Work had to be fast-tracked to take advantage of the late summer weather, ensure the structure was closed in before the winter snows – and to be complete for the start of the ski season.

In designing both the café and the equipment shed, the challenge was to create a facility within a tight time frame using appropriate materials. These had to be durable to withstand the extreme alpine conditions, transportable, prefabricated and pre-finished as much as possible to speed on-site construction.

Due to helicopter weight restrictions, all the steel componentry, roof panels and structure had to be designed to weigh less than 900kgs. Precast units transported over snow were also weight-limited to loads of 1.5 tonnes – or six tonnes on a towed trailer.

The modular design system allowed for considerable off-site prefabrication from information supplied by the architect and engineer. The standard of precision permitted only small tolerances in every component, from foundation

beams to roof panels, glulam structural frames, glass units to structural steel – and all the steel connectors.

This precision workmanship enabled rapid on-site construction – an essential provision, given the area's extreme conditions with winter temperatures dropping to -13ºC, wind speeds of up to 241km/h, severe storms and heavy snow.

The café uses all three structural materials: timber for the exposed structure aesthetic, concrete for the robustness of the floors and steel for the lower frame.

Significant use of steel includes column/beam capitals, wall panels on the internal stairway, profiled steel on the roof and on small portions of external walls – and the 10mm steel-plated 'ice wall' featured at the outflow of the 6.0m-wide roof valley.

All steel was fabricated off site. For the roofing, Comag Ltd of Matamata used COLORSTEEL® sourced from Steel & Tube Roofing and structural steel fabricators, Bedford Engineering of Hamilton, handled all other steel componentry.

Project Architect of HB Architecture, Grant Harris notes: "Timber has been used extensively throughout the building in order to create the warm 'alpine chalet' atmosphere, establishing a connection with the original building. This timber structure would not have been possible without the steel connections – an example of two products working together to get the best result!

"Steel is also featured in its own right. The natural colour of the clear lacquered steel plate connections to the beams and columns and the panelling to the main stair reflects the colour (and durability) of the natural rock formations whilst providing the strength to the structural junctions."

Stanley Construction

With 80 years experience the Stanley Group offer unparalleled expertise specialising in off-site construction. From Cape Reinga to the Mt Ruapehu project Stanley Construction have built a solid reputation for meeting challenges with their "can do" attitude.

The group offers expertise in a variety of specialist areas from commercial fit outs, kitchens and joinery to modular off-site pre-construction and Ecobuilding.

Stanley Construction believe Innovative and modular building solutions are the way to the future offering many time and cost saving advantages that are particularly well suited to remote and difficult locations.

"Besides offering a thorough planning process, a rigorous quality assurance programme and a solid guarantee," says Managing Director Kevin Stanley," we are committed to the concept that every person at Stanley is on your side. This has kept us in business for the last 80 years and we reckon it'll stand us in good stead for the next 80 years."

Stanley Construction won the following awards in 2011;
NZIA Western Area Local Award for Commercial Architecture.
National Winner 2011
RMB Commercial Project Awards.
Gold Reserve Award 2011
RMB House of the year.
Local Category Winner
RMB Commercial Project Awards.
Gold Award 2011 RMB
Commercial Project Award.

Client: Ruapehu Alpine Lifts (RAL)

Architect: Grant Harris
Harris Butt Architecture Ltd
Whangarei
www.hbarchitecture.co.nz
email: info@hbarchitecture.co.nz

Engineers: Dunning Thornton

Construction:
Stanley Construction Waikato Ltd
Telephone AK: 09 304 2200
Telephone M: 07 881 9000
Email: info@stanleygroup.co.nz
www.stanleygroup.co.nz

Roofers: Comag Ltd
COLORSTEEL® roofing
profile ST900 Colour Ironsand
supplied by Steel & Tube, Roofing

SUSTAINABLE TRANSPORT

By Graham Hepburn

As sustainability becomes more of an issue around the world, attention has been focused not only on how a product is made but also how raw materials are collected and how the product is distributed.
Transporting materials to a factory and then shipping out the finished product are important factors in assessing its environmental impact through a life cycle assessment (LCA), also known as life cycle analysis.

An LCA looks at each stage of a product's life from-cradle-to-grave, beginning with how the raw material is extracted and transported, processed, manufactured and distributed, and then how it is used, repaired or maintained before it is disposed of or recycled.

Because of the emissions involved in transporting raw materials and the finished product, more emphasis is being placed on producing and using goods locally.

Metal roofing in New Zealand is a classic example of a locally made and used product as no iron ore needs to be imported for its manufacture.

Unlike other steel makers, who mine and transport iron ore, New Zealand Steel uses iron sand from Waikato North Head, where titanomagnetite is extracted before being mixed with water and pumped through a slurry pipe to its plant at Glenbrook, saving the environmental impact of using large trucks.

Meanwhile, Pacific Steel, a division of Fletcher Building, makes all its steel from scrap - including around 90,000 scrap cars each year - to manufacture products such as reinforcing steel and wire. The remaining scrap steel collected in New Zealand makes up the majority of our scrap metal exports, NZ's 17th largest export earner.

New Zealand Steel is the country's sole producer of flat steel products and manufactures coil and sheet for use in building cladding and other industries. The coil may be metal coated with zinc – commonly known as galvanized steel – or a combination of aluminium and zinc (ZINCALUME®) and may be painted on its own coil coating line to produce COLORSTEEL® or trucked a small distance to an independent coil coating line (Pacific Coil Coaters) to produce ColorCote®. Zinc alloy coated steel coil is also sold to NZ metal tile manufacturers, who do paint finishing in-house.

Steel coil can be easily and economically transported around the country and each coil can produce roofing for four to five homes. With improved technology, a tonne of material now goes further because it has become a lighter product. Making roofing from high strength steel coil, which is about twice as tough as the softer steels previously used, means thinner gauges can be used. This dramatically cuts the amount of steel needed and makes for a much lighter product. The typical gauge now used in longrun, for example, is 0.40mm, nearly 30% thinner than 0.55mm which was traditionally the thinnest gauge available. This lighter product is not only more durable because of improved paint systems but easier and more efficient to transport. Because it is lighter, it requires less framing to support than heavier roofing materials and that means not having to transport so much framing to building sites. And because a steel roof is approximately 1/10th the weight of a concrete tile roof and steel has a greater density than concrete, a truck can carry the equivalent of around 17 metal house roofs compared to a single concrete tile roof.

Due to the fact that metal roofs are widely used and there are many roll-forming operations around the country, only the densely packed steel coil is shipped any distance. The actual roofing products are made at local manufacturers thus requiring only minimum transport to the building site, and because roofing is cut exactly to size only what is needed is transported. The popularity of metal roofing means there are installers nationwide working in their local communities and therefore they do not have to travel long distances for roofing jobs.
When metal roofing has reached the end of its life it is easily removed and transported so that it can be recycled, beginning the process all over again.

And the roads it travels back on are likely to be built using slag, which was once a 'by product' of steel production. These days, rather than being dumped, slag is a 'co-product' and is used as a base for roads as well as in filtration and drainage. When it comes to assessing the sustainability of building materials, metal roofing is very much a local success story.

NOISE CONTROL PROJECT

Update on Noise Control Project

Stuart Hayman Oct 2011

From 2006/7 some metal roofs in Auckland were required to have plywood sarking installed underneath in high road traffic zones. This was in the belief that metal roofs without plywood would allow the noise transmitted into bedrooms through the roof to exceed the noise levels set by the Auckland City Council District Plan. Concrete tiles were assumed not to need sarking.

NZMRM thought this assumption to be technically incorrect and obviously made metal roofs uncompetitive. Some on the spot measurements showed the ply to be unnecessary for a particular location, but the situation continued and so we decided to take some action and investigate.

We engaged the University of Canterbury Engineering Department to plan a study. The project consisted of several sequential phases, each based on the previous phase's outcomes.
The stages were:-
1. Literature and direct enquiry survey worldwide of research that had been done;
2. Acoustic laboratory work to determine the difference between different roof claddings;
3. Laboratory assessment of a range of whole roof systems including variants in the ceiling linings;
4. Field measurements of actual roof assemblies;
5. Predictive modelling to allow design of roof/building systems to optimise noise attenuation for as range of external noise situations.

With assistance from TechNZ, NZMRM engaged the University to undertake first the literature survey (which appeared to show that little research had been done on this topic and none recently) and then Phases 2 and 3.

These showed that while there are some (unexpected) differences between actual roof claddings alone (i.e. not in a roof structure), in a complete roof structure with a ceiling and underlay, insulation etc, the make-up of the ceiling is at least as important as the roof cladding and that modifications to the ceiling structure were much more cost-effective and technically acceptable than installing plywood sarking directly under the roof cladding.
Sharing this research with other groups globally showed that in fact research is being done in this area and these contacts also showed the way towards field testing.
The report on this work has been summarised and distributed to NZMRM members but a suitable report for Scope is in the pipeline, and will be published in an upcoming issue.

At this point we have been discussing the 4th phase, field testing, with the University, and have drafted a method. It is now pleasing to report that this phase and phase 5, computer modelling, have been taken up by Winstone Wallboards and Tasman Insulation, use of whose products GIB® plasterboard and Pink® Batts® were shown to be the most effective way to modify noise transmission through the roofing system. This work will complete the research and provide building companies with a scientifically proven route to improve nose attenuation through the roofing system, which is becoming increasingly important globally. As an example, part of the Christchurch rebuild proposes construction of new housing in Kaiapoi, directly in the flight path, and one of the issues is how to reduce aircraft noise in the houses.

Additionally DBH is reviewing the Acceptable Solution G12/AS1 to the NZBC which includes recommended (i.e. "acceptable") methods of noise attenuation through the various elements of the building skin for three levels of external noise. We have made them aware of this research and the outcomes are likely to be used in the Acceptable Solution, which should finally prevent the possibility of any further discussion about plywood sarking, unless in extreme noise environments, and then equally for all roof cladding.

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.

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