ISSUE 38

SCOPE

MRM

NZ METAL ROOFING MANUFACTURERS INC.

SCOPE

ISSUE 38 APRIL 2015

Below is a brief introduction to the 2015 executive of The Metal Roofing Manufacturers Inc. It is intended that Scope be representative of the Metal Roofing and Cladding Industry in both commercial and residential sectors. Your submission of material you consider is of interest is welcomed be it design, research, manufacture or construction.

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

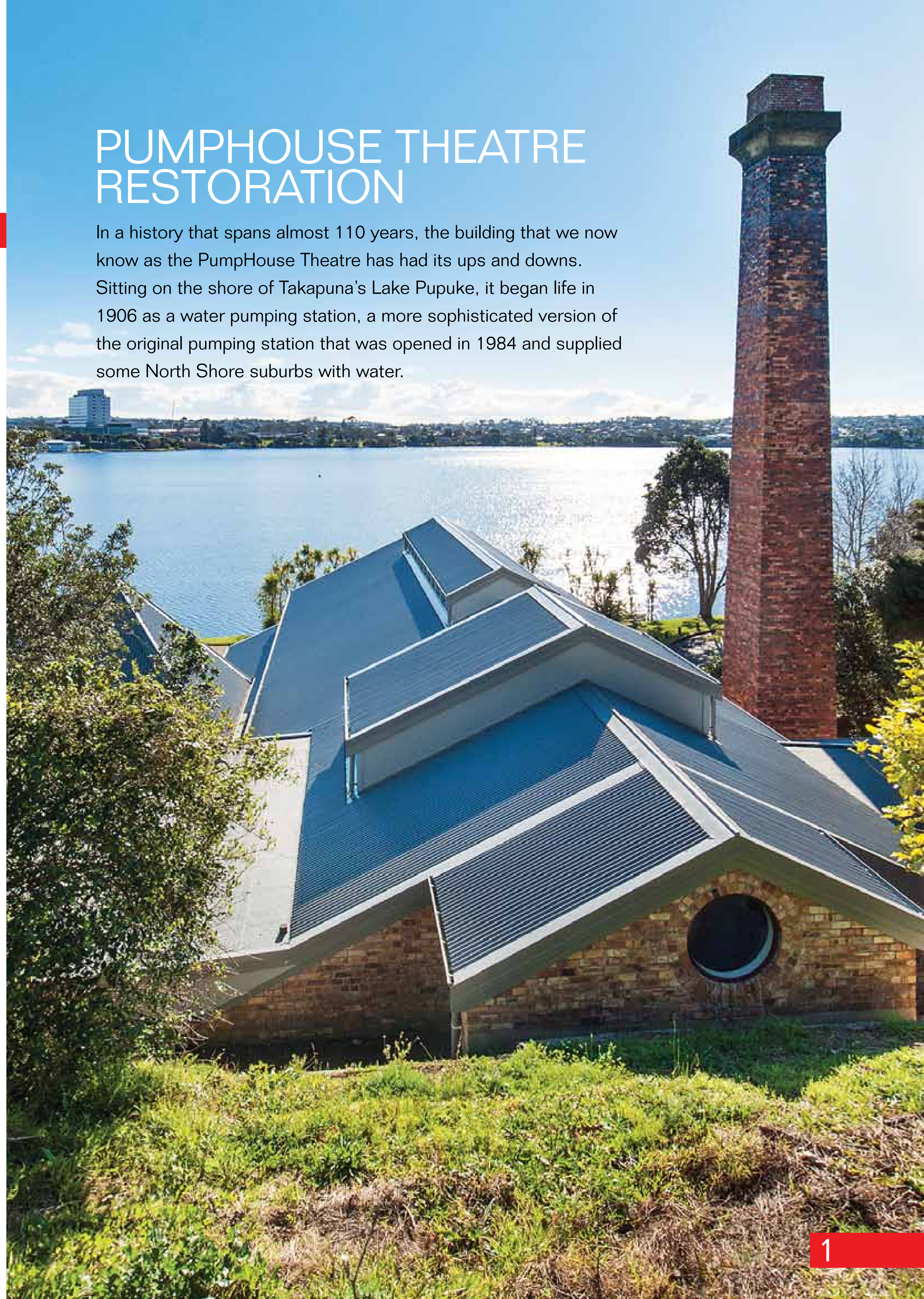
Opinions expressed in Scope do not necessarily reflect the views of the NZ Metal Roofing Manufacturers Inc., it's executive, committee members or publisher unless expressly stated.

Managing Editors: Warren Oliver, Christine Wilkinson, Phil Prior, Chris Back.

Published by ICG Limited.
57 Glendhu Road, Glenfield, Auckland. Telephone: 09 444 2424.
e-mail: conceptart@xtra.co.nz

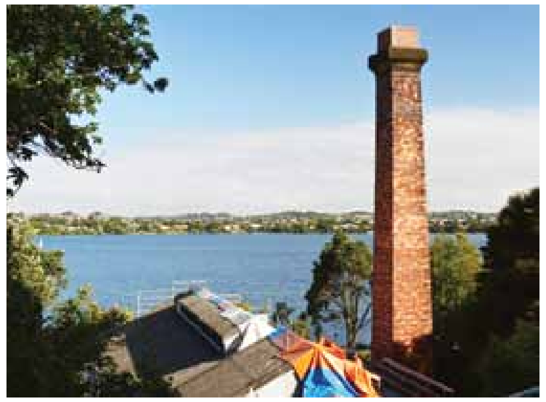
Scope is the official publication of The NZ Metal Roofing Manufacturers Inc.
Executive Officer: Garth Wyllie
Private Bag 92 066, Auckland.
DDI Ph: 09 367 0935,
Ph: 09 367 0913

Visit our website at:
www.metalroofing.org.nz



PUMPHOUSE THEATRE RESTORATION

In a history that spans almost 110 years, the building that we now know as the PumpHouse Theatre has had its ups and downs. Sitting on the shore of Takapuna's Lake Pupuke, it began life in 1906 as a water pumping station, a more sophisticated version of the original pumping station that was opened in 1984 and supplied some North Shore suburbs with water.



Part of the project required the removal of the asbestos roof. The removal, disposal and spray treatment was carefully monitored.

According to a heritage report commissioned by Auckland Council, the new brick pumphouse was designed by H Metcalfe and built by Mays and Gordon. The machinery was provided by J Chambers and Son.

Water was taken from Lake Pupuke to supply Devonport and Takapuna as well as growth areas such as Birkenhead and Northcote. Once demand for water grew, the lake was not able to refill from local run-off, and water quality became an issue. Since 1941 water has been pumped to Takapuna from reservoirs in the Waitakere Ranges through Birkenhead. Around that time the pumphouse was closed and in the following decades the building fell into disrepair.

Nick Herangi, of Legacy Construction, says, "At some stage the concrete cap was removed from the chimney for safety reasons and an attempt was made to fix cracks in the chimney shaft but otherwise the site was neglected for the better part of 30 years."

The pumphouse was slated for demolition in the late 1960s but got a last-minute reprieve when a group of amateur artists came together and later formed the North Shore Theatre and Arts Trust to save the building. They began raising money and planning a restoration that would turn the building into a community theatre and gallery. Architect Harry Turbott did the design work for the refit and renovation and the first performance in the PumpHouse Theatre was held in 1977.

Nick Herangi says no major structural work or strengthening was carried out on the actual brick building during the renovations and conversion to a theatre. He says, "Essentially, the brick building and chimney had been held together by the original 1905 bricks and mortar until an engineer's report commissioned by North Shore City Council in 2010 revealed serious structural issues with the leaning chimney and immediately closed the building while urgent seismic strengthening work was undertaken."

The PumpHouse was closed for a few months while that remedial work was carried out and reopened later in 2010.

Nick says the structural integrity of the PumpHouse was scrutinised yet again following the devastation of the Christchurch earthquakes. "Auckland Council's tabled maintenance schedule for earthquake strengthening works on its historic building assets was prioritised and so in 2014 The PumpHouse Theatre roof was replaced," says Nick.

"Legacy Construction were again employed to undertake the structural strengthening of the PumpHouse roof. Work took 16 weeks and consisted of removing the asbestos roof very carefully by certified people and disposing in a registered tip. Anti-asbestos spray was then applied to the roof area, encapsulating any remaining fibres. Scaffolding was set up around the entire building to make a safe working platform from where the workers could undertake their tasks.

"The existing rafters were exposed, re-levelled and then overlaid with 18mm structural ply to allow the roof to have a much sturdier roof brace. Strapping was then placed over the ply and the new corrugated iron laid.

Heritage specialists Dave Pearson Architects consulted on the construction work and recommended using True Oak® Corrugate roofing because it complemented the aesthetics of the brick building.

Matt Davey, of Dave Pearson Architects, says, "It probably had a slate roof originally but that would have been too expensive to replicate and using a corrugated profile metal roof does do justice to these old buildings."

Nick Herangi adds, "On the interior of the building, new structural steel was installed to tie all of the rafters and bottom chords together to allow the transfer of load.

"Site foreman Anthony Campbell worked well with the staff of the PumpHouse, having to pre-program his works to include the ongoing productions that were taking place at the time. Quite often work started early to accommodate this."

As well as work on the brick building, Legacy Construction also undertook strengthening and refurbishing of the chimney.

Grant Hemana, of Legacy Construction, was project manager for this job, which took about five months.

He says, "The scope was to do immediate structural strengthening repairs to the chimney structure. The brief was to pour reinforced concrete walls inside the chimney with brick ties at 400 centres each way.

"The chimney is approximately 28m high, the internal space was 1700mm square at the bottom and 1400mm square at the top. Once we had the reinforcing fitted we had a space of 900mm to work in. A 900mm x 900mm space 28m down a chimney made it a very challenging job.

"There was only space for one worker at a time during the duration of the works, all the materials had to be lowered in whilst the worker was inside so every safety aspect had to thoroughly thought out and managed.

"The chimney was fully scaffolded; this was also used to brace the external faces to counter the pressure of the concrete poured inside. Access was gained by an electric bosun's chair, which was operated by an operator at the top of the chimney. There was also external brick repairs and new pointing done."

Dave Pearson Architects

Founded 19 years ago by Dave Pearson, this practice specialises in the conservation of New Zealand's built heritage. In the years since it was established, the practice has received heritage and architecture awards for its work on buildings such as the old Auckland Supreme Court, Rotorua's Bath House Museum and Motat's Pumphouse. Dave Pearson has a Bachelor of Architecture from the University of Auckland, and has specialised in heritage architecture and has completed a series of conservation courses at the Centre for Conservation Studies at the University of York in Britain.

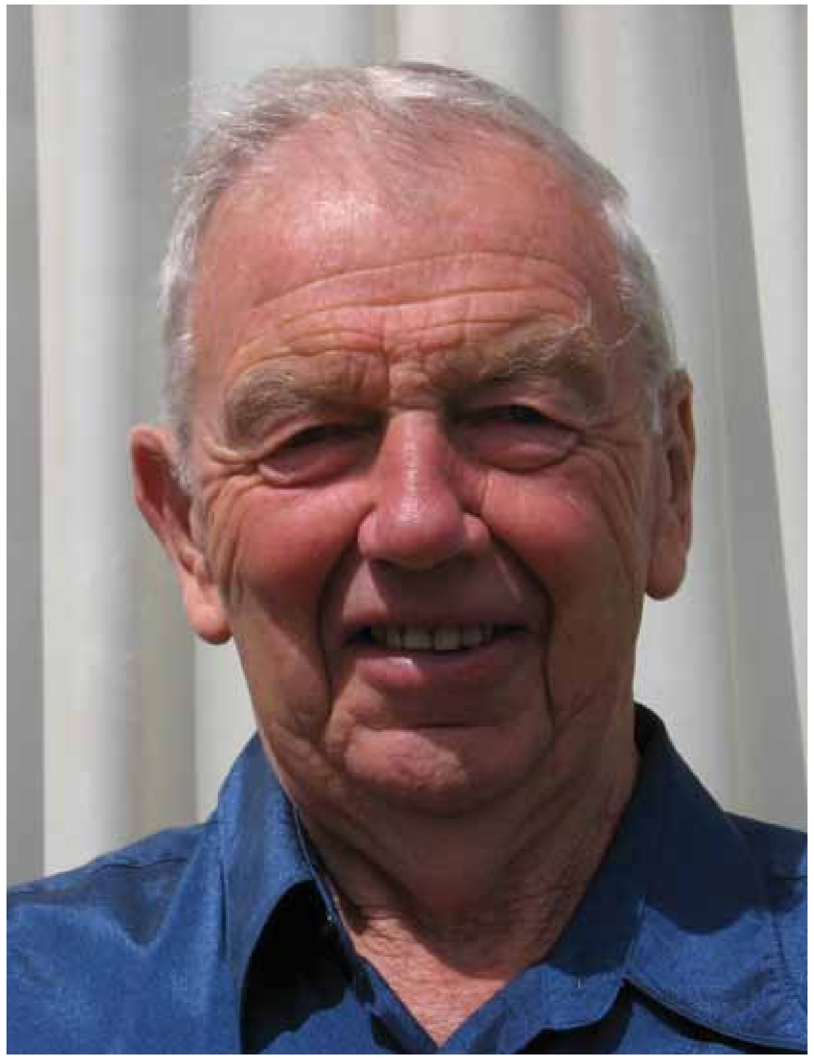
Dave Pearson Architects
Devonport, Auckland
Telephone: 09 445 8544
Email: heritagearchitects@paradise.net.nz
www.heritagearchitects.co.nz

Roofing Manufacturer:
Roofing Industries
Telephone: 09 414 4585
www.roof.co.nz
Profile: True Oak Corrugate
Colorcote ZRX®
Colour: Sandstone Grey

Roofing installer:
Metro Roofing,
Telephone: 09 415 0863

Builder: Legacy Construction
Telephone: 09 250 2150

STUART THOMSON: 'THOMO' A MAN FULL OF SURPRISES



Kaipara Coast Sculpture Gardens north of Auckland is home to many artworks. One of these site-specific exhibits was created by Stuart Thomson – that Stuart Thomson who is widely associated with roofing expertise.

His kinetic glass and electronic sculpture is called 'Surprise' and features three water lilies: the pink one is open and ingenuous; the tight-budded yellow flower symbolizes introversion; the blue water lily bursts with extrovert flamboyance, full of surprises.

And that's how it's been with Stuart: his life's full of surprises. It started in Wellington in mid-January 1929. By 1951 he had his Advanced Trade Certificate in Sheetmetal Working under his belt and was a registered plumber. He was brimful of ideas about how to do things better, which is where he came up against the 'old-school' attitudes of his father. On leaving school Stuart had hoped to be an engineer or architect but his father had other plans. "Get your overalls on," he instructed at the end of his son's Form 6 year and so Stuart was apprenticed for a six-year tenure into his father's family plumbing business, Thomson Brothers, with words like 'filial responsibilities' ringing in his ears.

Regardless, however, Stuart was determined. On three nights a week he went to night school at Wellington Tech where Principal Reg Ridling noted his academic schooling at Wellington Boys' College and advised him to learn as much as he could in his apprenticeship. "Keep your eyes and ears open and your mouth shut."

As if . . . !

"I was constantly asking questions," he recalls and at the end of his fifth year Stuart had passed all his local and national trade exams with no requirement to complete the 6th year. He'd met a young woman who was off on her OE and Stuart wanted to follow. Father, however, insisted he serve his contracted six years and continued to pay him an apprentice's pittance which would have kept most young man tethered to their job.
But not Stuart. He was going to Britain, come what may! He reckoned he'd work his passage and got himself a job as a trimmer supplying coal to the stokers on board a P&O passenger vessel. He was prepared for heavy work but not for his father's intervention. When he heard of the plan Thomson senior used his influence to have the job withdrawn – and Stuart was back in his overalls.

But not for long. His father was furious when Stuart secretly secured a job with the Shaw Savill Line as a firemen's Peggy on board the SS Corinthic. While being a trimmer would have been hard work, being a firemen's Peggy defied description, He was on duty 24 hours a day, his job to service the firemen. That meant feeding them, cleaning their quarters including toilets – and whatever else they demanded.

"And boy, did I come up to speed! I was an overweight, naive 21 year old. They were seasoned scousers and absolute bastards. They nagged and threatened me; they made extra work to spite me; they stole food and blamed me. I used to hide in the lifeboats to get some sleep. By the time I got to England I'd lost two stone – and I'd grown up."

His ambition was to buy a new car in England and he had the cash. When he was 15 he'd formed a dance band which played at weekends and from which he made more money than from his day job. He'd set his heart on a £350 Standard Vanguard and promptly bought one.

This was the early 1950s. Tradesmen were in demand as Britain was in post-war repair mode. New Zealanders were respected for their work ethic and skills and Stuart was soon earning good money doing roofing and plumbing work. But then his foreman sent him to a job with the instructions that work had to be completed that day: strip out the lead from the roof and get it into the waiting trucks.

"At the end of that day I was sacked. The boss was stealing the lead and wanted rid of a witness." But getting another job wasn't easy for outsiders at that time with Unions protecting members so Stuart paid his dues and joined the Union – and at the same time sought a meeting with the CEO of the Employers' Association.

"It was a bit cheeky," Stuart admits. "I told him I was from New Zealand and had some information to share. I told him his members were under-paying their workers; that roofers' and plumbers' wages in New Zealand were one-and-a-half times higher and that New Zealand expertise was far ahead. I asked him to tell me his most successful employer as I wanted a six-month job with that business. It happened that the boss of that business was also the president of the Employers' Association. He took me on – and, for diplomatic and political reasons, paid me one farthing per hour less than his foremen, who got 2/11½ (two shillings and eleven-and-a-half pence) per hour. When I occasionally took my 'posh' car to work my colleagues were more than a little suspicious!

"Work was mostly outside – and cold – and before long I was asking for five weeks off to tour Europe with my girl friend Alison who later became – and still is – my wife. I had contacts through my apprentice days with British Steel, British Aluminium and ICI and took time off work to see through their factories. ICI were still manufacturing ammunition and were a bit coy but persistence paid off and Alison and I were entertained to cucumber sandwiches in the ICI boardroom and later saw copper being made into ammunition using new tempers and alloys."

Stuart noted that British Steel mills were still producing steel in slabs or sheets while at British Aluminium he saw continuous coil production and recognised the future of the steel industry lay in coil not just slab production.

After a year in Britain, Stuart worked his passage back, this time more genteelly, as Assistant Linen Keeper on board Shaw Savill's Dominion Monarch. On his return to the family firm, and with an eye on potential, Stuart identified a need for machinery to manufacture roofing in New Zealand, and put it to his father that Thomson Brothers could build such a machine.

In the face of his father's flat refusal, Stuart overnight bought and installed a lathe in the company's workshop and had the machine wired up and operational by the following day. His father was outraged and ordered it be removed but Stuart refused and was backed by his uncle who gave his nephew half the money he needed to make New Zealand's first roll forming machinery in that workshop. Where his father goaded Stuart, his uncle guided him. Between them, those brothers had a strong influence on the young, fast-maturing Stuart.

More night school followed and by 1963, at the age of 26, Stuart had his Certificate of Engineering, a wife and three children – and a timber family home he'd designed and built himself. By then he'd also designed and built New Zealand's first roll former for secret fix roofing and in 1964 designed and built the expanding company's new steel factory in Porirua. The following year he designed and built for his family one of the world's first 400 solar heated houses. The solar heating notion was too far ahead of its time for New Zealand local authorities to cope with, nor did it endear itself to the electric power companies, but it was appreciated up in the Islands.
It was this feat that brought him to the attention some eight years later of Peter Mulgrew who was working closely with Edmund Hillary. The problem there, Peter Mulgrew explained, was that trees were being chopped down for fuel, leaving no alternative power source. Stuart was invited to join Ed Hillary's hospital and school programmes in Nepal and designed, built and installed solar water heating at Kunde and, later, at Salleri.

After playing the organ in church for 25 years Stuart happened, just at this time, to be questioning the uniqueness of Christianity and had developed an interest in Buddhism and Hinduism and so jumped at the opportunity to be involved. "It was a challenge: doing something new and undreamed of," he recalls. "I felt privileged being able to share what I knew."

He absorbed himself in this assignment, took time out from his work and, starting in Calcutta, travelled by local bus and train – and even hitchhiked – to Delhi by which time he'd familiarised himself with Indian food, customs and even language. When he finally reached Kathmandu

Solar Collector installed at Khude Hospital, Nepal. 18,000 ft

When there were no troads and no help you do it yourself

Trekking in Nepal to get to Khunde Hospital

Mud brick Rotacottages in Ba Fiji. – Designed by Stuart and built by Rotarians supervised by Stuart

5 of these pre-school classrooms designed by Stuart have been erected in Taveuni Fiji

he was sent to buy stores and especially glass for the solar panels and in this way he got to find his way round that city. On the next excursion he was asked to show representatives of potential sponsors Sears Roebuck round Kathmandu before they inspected the project. They were surprised – as was Ed – at the extent of their guide's knowledge of that city!

By late 1950s Stuart was manager of Thomson Metal Industries formed by the brothers, with Stuart's 10% holding, to handle metal contracting, roofing and manufacturing. Stuart appreciated he had to sell the notion of longrun roofing to architects and, as a would-be architect, he knew ease of fixing the metal roofing would be an important issue so he designed and manufactured metal studs for the interior walls. At this stage Winstones imported steel from Britain and on-sold it to Thomsons who roll formed it and sold it as roofing 'iron' back to Winstones. Eventually, after 20 years at the head of Thomsons, Stuart recognised the company needed further expansion and sold to Dimond where he ran the R & D division for five years during which he installed a roofing machine in Hawaii to suit local requirements. By 1978 he'd earned his Master Craftsman Certificate in Plumbing and Sheetmetal Working – and was constantly designing or redesigning equipment to cope with the requirements of new steel production techniques.

By his own admission Stuart preferred developing new products and rather lost interest when his innovations became integrated into the process. "I should have stayed with it. That's when the new product started to make money but by then I'd lost interest and was thinking of the next development. When Dimond sold to Winstones and Winstones were about to sell to Fletchers they were advised to sell the R&D division as standalone entity. Thus it was the research section was bought by New Zealand Steel!"

Stuart transferred with the company to NZS where over the six years he was development engineer, which included investigation and research. He designed the Steelspan profile for the new steel mill and established Steltech. On retirement he was retained by NZS as a consultant.

Hurricane damage in Fiji in the mid-1980s saw Stuart investigating the extent of the damage then designing cyclonic washers and developing a cyclone testing programme in Australia and later advising NZ External Relations and Trade in cyclone-resistant design. Stints at lecturing on roofing at technical institutes in Auckland, Wellington and Christchurch kept his name before the next generation of roofers. Meanwhile at Stuart's instigation, NZS developed an innovative steel-framed housing system in south Auckland.

"I retired from NZS at 60 (in 1989) and have consistently worked over a 40-hour week ever since!" Retirement, he feels, is a stupid word – and the extent of his work as a building consultant, from 'retirement' to the present day backs that up. "I'll never 'retire'. I do what I want – as much or as little."

Stuart regards himself as an adventurer, having visited over 50 countries. His adventures include crossing the Gobi Desert in a land rover, climbing Machu Picchu, visiting the Galapagos in a yacht, visiting the Atlas Mountains in Morocco and walking through the Amazon Rainforest – all in the last ten years! In this same decade he also became a life member of NZMRM and RANZ and, in 2007, was awarded the NZ Order of Merit.

One of the highlights of his life, Stuart says, is his involvement in Rotary International projects which have seen him design and supervise the building of cyclone rota shelters in Western Samoa; earth brick houses in Fiji, and, more recently, also in Fiji, school classrooms for cyclone conditions.

Importantly, he has shared his research and ideas through countless conference presentations and umpteen articles in magazines like Scope, the NZ Metal Roofing Manufacturers' online magazine. He has published supporting material in handbooks (Profiled Metal Cladding, 1980, and revised in 1988; Profiled Roofing Handbook, 1993) and codes of practice (NZ Metal Roof and Wall Cladding, 2003). Building for Cyclones along with his more light-hearted poetry anthology, Trifles and Truffles were both projects to assist Rotary International and the fascinating Wrinkly Tin – the history of corrugated iron in New Zealand is a must-have.

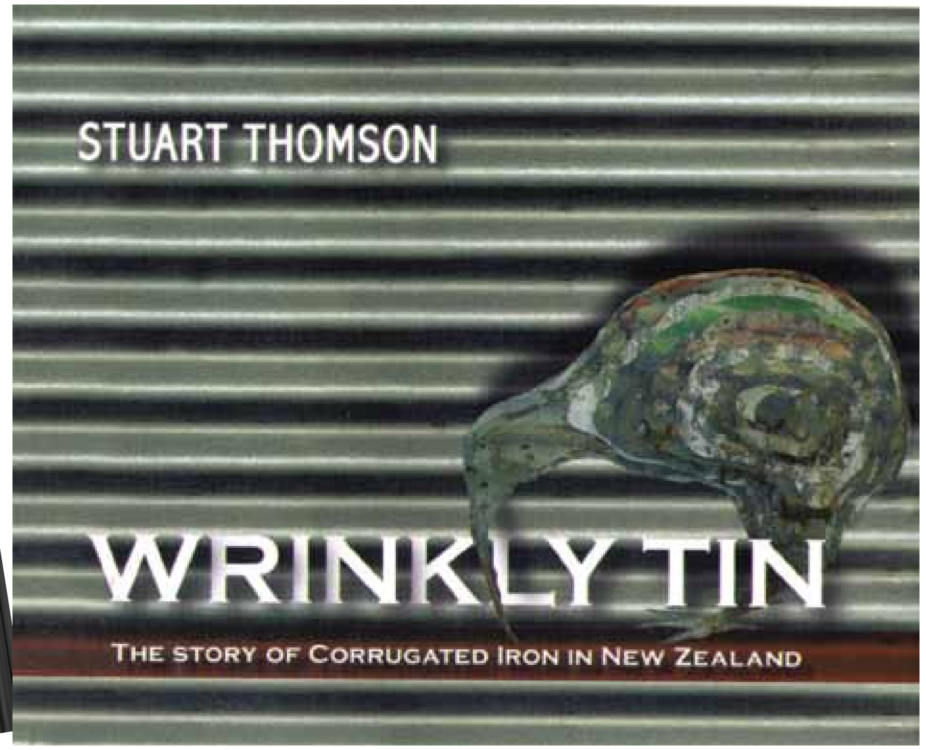
Just last year he published Metal Forming: Folding and Roll Forming 2014. Later this year his book, Common Sense, will be published. We can expect to chuckle. "Humour's missing in life," he asserts – and set out to change that.

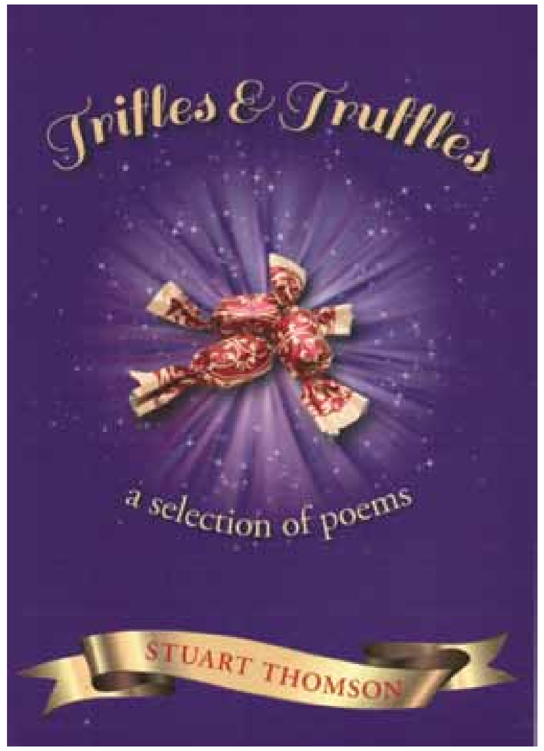
He's currently working with colleagues to redo the metal roofing Code of Practice and continues to serve on working committees while also being involved in the Corrosion Programme and Ventilation Project, both with important outcomes for New Zealand Steel and the roofing industry. Not bad going for an 86 year old!

As he says, he's been lucky with the experiences he's had in his lifetime and has always felt a responsibility to share his knowledge.

But luck is not a word he cares for. "You make your own luck," he asserts. He's more comfortable with words like 'persistence',' ambition', 'determination' and 'hard work' – and 'privilege'. He considers himself privileged in having had 65 years of stable family life with his wife Alison and their three children and lists those early years of family life and the achievements as his business expanded as the best period of his life.

Some of the writing in Stuart's poetry anthology, Trifles and Truffles is light hearted, almost frivolous, while other poems, like Questions, Reg the Regulator and Self demand repeated readings to recognise the bite within them. In Four Seasons he traces the threads of his life with 'Summer' poignantly reflecting that cherished period: "lonely made decisions . . . with targets located . . . a future looms . . . business booms . . . family now arriving . . . several more lives . . . having fun, how time flies . . . which comes as no surprise". His Wrinkly Tin story reveals both his life-long passion for and the depth of his knowledge of corrugated iron and its transformation into roofing steel as we know it today.





While rain on a tin roof is music to the ears, music means even more to Stuart. He played piano back in that teen-age dance band of his and the church organ for 25 years. Until recently he and a group of friends entertained at various events including Rotary Christmas 'dos' but lugging around the sound system, keyboard and other musical instruments has now become too much for these aging Pakatarians. At home on his grand piano he still plays duets, with Alison on their second piano. He has good memories of singing with the Orpheus Choir in his Wellington days.

Now in his sunset years Stuart continues his interest in the challenges of his industry though he admits to frustration at his lack of energy to get 'stuck in'. He's always been outspoken. He hits out at bureaucracy, lamenting how the RMA has inhibited progress and limited New Zealand's competitiveness on the world market. He's critical of politicians whom he sees as creating a 'No' rather than a 'Yes' mode of government. He's perturbed at the trend to bring in managers with management qualifications but little understanding of either the industry or the people who work within it.

He's earned the right to be heard: "Companies need to develop a healthy culture. People need to be treated well – and that goes for all employees not just management. That's just common sense," he says. With 65 years in the industry and widely recognised as 'the grandfather of roofing', Stuart knows the importance of understanding the quirks of the market place and those too of not only the material he's working with, but also the people involved.

But he's philosophical: he can only hope others will hear. As for himself, he's content:

"I've had a wonderful life, with no regrets. If I could live it over I'd do the same again."

SIMPLY SPECTACULAR

When Mary and John Washer were designing their home on the Taranaki coastline, they wanted to do justice to the site and the sea views.

They also wanted something befitting the work they had put into their development of Tapuae Country Estate, where their home is on one of 30 sites in a gated community.

The Estate is only seven minutes' drive from New Plymouth but provides residents with the benefits of a rural lifestyle without the hassle or time pressures of farm work.

Residents have 4000sq m freehold house sites within the 58ha farm that are all positioned to maximise sea and mountain views. Their title also comes with an equal 1/30th part share in the farmlands and amenities. The farmland is leased to a professional farmer for dry stock grazing. Amenities include tennis courts and a central lakeside pavilion, which serves as a gathering place for residents. There are also more than 4km of bush walks and walkways around waterways and the central lake. Tracks provide private beach access as well as weaving along the river and up to the adjacent award winning restaurant and vineyard of Okurukuru Winery. John and Mary chose Lot 18 in the Estate, an elevated site about 50m above the beach with views out to sea and up and down the coast.

With the help of Mike Johns, of Mike Johns Design, they drew up plans for a 745sq m single-storey house that hugged the coastline, and brought in builder Tony Farmer to see the project through.

Mary says, "It's funny because a lot of people around our age are down sizing but we are up sizing for the sort of spaces that we love."
She says the brief for the design was very straightforward: "I wanted a spacious house with very clean lines – I wanted a linear look; I wanted everything to be symmetrical."

Selecting the right style of roofing was a big part of getting the lines and symmetry right as Mike Johns explains: "Because the driveway winds down the hill to the house, the first thing you see is the roof. With the scale of the house, we needed to go for as wide a tray as possible so the roof wasn't cluttered with too many lines."

With that in mind, Roofing Industries' Eurostyle profile was a logical choice, in unpainted aluminium for its durability in a marine environment.

Phil Prior, of Roofing Industries, says, "The material was run on site, due to the handling of long lengths, size of the job and ease at which the profile can be damaged in transport. When we arrived a Taranaki storm blew in. To start with the material was run in the hay shed down the road until the shed ran out of space. Then the machine and material got Hiabed into the big hallway of the actual house that was under construction. All the roofing material got stacked in the kitchen and lounge as it waited installation."
Mike Johns says the roof, with its low pitch and big overhangs – 900mm eaves and 1.5m gable ends – was reminiscent of a Frank Lloyd Wright design and also evoked images of wings and seabirds in the coastal environment.

He says he was impressed with the Eurostyle product and installation right down to the precise placement of the gutter clips and the use of mitred downpipes to maintain the clean look.

"It's the first time I've been involved in a project using Eurostyle and I think the roof looks fantastic."

A flat roof canopy over the central entrance way, which is framed by 3.5m high stone walls either side, separates the two gable-roofed wings of the cedar-clad home.
A pivoting plasma glass door – 1100mm wide by 2.7m high – opens to a 3m x 8m foyer and then into a 22m long gallery that is 2.7m wide to provide a sense of arrival and spaciousness.

The eastern wing of the house is largely living spaces with “Mary’s garage” at the end and this has access into the elegant kitchen, which is a product of Kitchens by Glen Johns. The western wing has four bedrooms with tiled en suites, a laundry and “John’s garage” at the end. Floor to ceiling stacking, sliding doors are used extensively throughout to provide access to the kwila deck and to embrace the wide views of the sea. Because the two wings are angled away from each other, there is always a sheltered deck to be found around the house. Mary says with the expanse of glass on the seaward side of the house, the double-glazing has a thermal break for improved insulation and has been tinted green to highlight the colours of the ocean.

The two main living spaces are warmed by gas fires, and there is also underfloor heating.
In the kitchen/family living space, a cantilevered steel frame has been employed so that one corner of

the room has no mullion, allowing stacking sliding doors either side to be pulled back so the room can be opened right out to the deck and sea views.

John has his own “man cave” with a bar and TV screen as well as an antique billiard table that has just been reassembled.

The centerpiece of the home, though, is a room called “the bridge” on the seaward side of the house. The 4m x 5m room is stepped down from the formal dining/living area and cantilevered out and glazed on three sides to provide panoramic views.

Mary says, “When you are standing at the front of the bridge, you can look up and down the coast, probably 30km each way. When the waves come in, you are looking through the waves at the rock.”
Mike adds, “I wanted to achieve the views that took in the changing tides, the exposed beach, and the rocky outcrops down by the mouth of the Tapuae Stream.

While Mike wanted to maximise the views from the home, the aim was also to minimise its visual impact on the coastline.

“I wanted to keep the bulk of the house nestled into the surrounding rolling topography of the site, partly due to the extreme weather conditions that nature can throw up on the west coast and also to retain the sense of remoteness for the users of the beach below.

“When you walk up the coast in the direction of the house, the only thing you see is the bridge cantilevered out from the house. And because the owners used green-tinted glass it’s a good look from the outside as well as the inside.”

Mike says he loves the result, with the home having “a timeless quality”.

Mary agrees: “We’re thrilled to bits with it; it’s working perfectly for us. We love the spaces and it’s very good for entertaining.”

Mike Johns Design

Mike Johns has been in the industry for 35-plus years and has worked for several design offices, a team of architects, and a couple of home building companies. For the last 18 years he has been self-employed. The Washer’s home is the third design project he has been involved in at Tapuae Country Estate and he is currently doing working drawings for a fourth project.

Architectural designer:
Mike Johns Design
Telephone: 06 7585493
mjdesign@clear.net.nz

Roofing manufacturer:
Roofing Industries
Telephone: 06 353 8480
Eurostyle in unpainted aluminium

Roofing Installer:
Millwards Roofing
Telephone: 06 758 5663

Builder: Tony Farmer
Telephone: 027 231 5774

Engineering consultant:
Red Jacket
Telephone: 06 759 0999

Kitchen and cabinetry:
Kitchens by Glen Johns,
Telephone: 06 759 0940

RECYCLING, RECYCLABILITY AND GREENSTAR

New Zealand Metal Roofing Manufacturers (NZMRM), as does every industry that wants to survive, is continuously looking at the sustainability of their products and member companies. We have been operating a Sustainability Subcommittee since 2006, which looks at issues affecting the sustainability of our products and industry. It has been proactive in promoting the sustainability benefits of MRM to various external bodies, including Metals NZ, and the NZ Green Building Council. We are members of the Sustainable Steel Council.

We have discussed elsewhere and will again the very sustainable operation of New Zealand Steel, our primary source of material, and how it is in this respect a world leader. The manufacturer obviously concerns primarily the beginning of the usually long life of steel cladding, its manufacture as brand new coil, painted or unpainted. What is not always well known is the other end of the life of steel and indeed all metal cladding – its ability to be recycled and its actual level of recycling. In fact metal used in cladding (and elsewhere of course) is able to be recycled indefinitely with no loss of quality (unlike any other material), and actually is recycled to a very high degree, not least because the processing energy cost of recycling is significantly less than that of making virgin metal.

An ongoing issue for us in New Zealand and our environmental credentials, not always well understood, is the difference between recycled content of a product and its own ability to be recycled at the end of its life. In this area New Zealand is different to many other countries.

In this article, we provide information from world sources and specifically New Zealand sources to discuss the generic recyclability and recycling of metal, in particular steel, and about the unique system and cycle operating in New Zealand, which works well for all parties. What follows has been taken from a number of sources and all data, volumes, numbers etc. are derived from published information so are only as accurate as the sources. We deal primarily with steel, which is by far the main material used for metal building cladding, but many of the comments also apply to aluminium, certainly at world level.

Recyclability vs recycling

It is important to separate these two similar sounding operations. Steel is the ultimately recyclable material. Its quality is unaffected by recycling and recycled steel is as good as new, but has much less embodied energy. All steel products have the ability to be recycled, but the degree to which they are recycled and the ease of doing so does depend on how much they are mixed with other materials and the difficulty of recovery from the other materials. Reuse of material similarly depends on its quality at the end of the life of whatever contains it. Structural steel is very reusable and also quite easily recycled. Steel cladding can be reused depending on its condition (and may end up on a lower quality building) but is more easily recycled (and is much easier to melt than structural steel). Steel used as reinforcing in concrete is fairly easy to recycle although as this requires the destruction of the concrete it is difficult to recover.

Steel used in motor car bodies is highly contaminated with other materials. In spite of this variability steel for recycling is a valuable resource and 85-90% of steel used in construction is recycled globally. Over 60% of all steel used globally is subsequently recycled.

The ability to be recycled

A number of common materials can be recycled in the sense of being removed from a form which is no longer needed and then converted into something else. A number of products themselves are able to be reused once the item into which they are incorporated is no longer required.

Metals in various forms, glass, plastics, paper, timber, fabrics and others are able to be reused in some way, and we are all familiar with the recycling programmes of local councils – unheard of 20 years ago but now common – in which various materials are left outside to be "recycled". We have the idea that they are reused in some way without being very aware of what this might be. For a number of materials collected in this way recycling is actually not possible currently.

In fact, to varying degrees nearly all these – apart from metals – are either not actually reused in a recognisable way or are degraded during reprocessing from the original form or quality (often referred to as "down cycling"). Nearly all non-metals even if reused as part of a new or similar product are in a product of lower quality or value with reduced physical or aesthetic properties.

Metal and specifically steel cladding (which after all is what we make and sell) can both often be reused in the original form but more importantly it can be recycled into product indistinguishable from the original, totally undegraded and capable of being recycled indefinitely. Steel cladding is generally unmixed with anything other than metal coating and paint and has thin sections and so is one of the most easy to recycle steel products, compared with e.g. reinforcing steel buried in concrete. Throughout its history steel has always been recycled and all steel contains a proportion of recycled material from 10 – 100%, so that any steel currently in use actually has some content that may have been used many times and be 100's of years old.

Recycling levels

Because of the factors discussed above - and below – (no loss of quality, scrap required for efficient function of steel mills, much lower energy content), steel has a very high level of recycling – typically up to 90% of all steel embodied in buildings and in artefacts which have ended their useful life ends up being recycled into fresh steel ready to start as good as new, into a long new useful life.

In the case of building cladding, quite a lot can actually get reused (rather than recycled as material) although generally in a lower value role – e.g. steel roofing from an office might end up in a fence or a farm shed. The actual percentage of steel which is recycled obviously depends on the application, so that steel which can be reused when a building is taken down is different to steel in a crushed motorcar body or an old fridge, but overall it is very high.

In the USA in 2013 98% of structural steel was recycled; and 81% of all steel.

Steel manufacture and recycling
Today, steel is nearly all made by one of two processes world-wide. The Basic Oxygen Furnace (BOF) is the main method for converting iron metal made from iron ore into steel.

It needs to use some recycled steel for efficient running and will use from 10-25% of recycled material.

This may be in-plant scrap ("pre-consumer recycle" or "home scrap") or bought-in scrap metal that is derived from steel items past their usefulness ("post-consumer recycle"). Typically a BOF unit will use all its own in-house scrap and some bought-in material.

The Electric Arc Furnace (EAF) can also convert iron into steel but is the main way of consuming scrap steel materials (post-consumer), and the process requires a minimum level of at least 30% scrap to function. EAF units run from 30 to 100% scrap. A number of mills with EAF only use scrap steel as a raw material.

Because steel is a durable material and is used mainly in quite long-life products (unlike packaging materials) and is also in increasing demand, the amount of scrap available (even at very high recycling rates) is not sufficient to feed the demand and so virgin steel continues to be made from iron ore. Many global steel companies have both types of furnace and are able to take in and reuse large amounts of scrap steel – typically as much as they can get, because reprocessing scrap steel requires less energy than making new steel.

It is worthy of note that the embodied energy aspect of Life Cycle Assessment of steel requires that both new manufacture and reuse are considered, so that all steel has a multi-level energy cost reflecting the fact that any new steel made will almost certainly be recycled many times way into the future and so the energy required to make it progressively decreases as it is successively recycled.

The New Zealand scene

Globally then, steel mills making all sorts of steel products use both recycled (pre- and post-consumer scrap) and virgin iron made from iron ore. The proportion varies from mill to mill; some only use scrap and others use smaller amounts of it in their mix. Overall a very high level of recycling is achieved.

New Zealand (of course) is different.

New Zealand Steel (now part of Bluescope Steel, an Australian manufacturer also operating throughout Asia) started manufacturing steel at Glenbrook (approximately 60km south of Auckland, the biggest market) in 1963. After many decades of research, a process had been developed to process the local ironsand in a unique process, which has a small 'ecological footprint', and the Glenbrook plant was built to use this process. After various changes in technology (and ownership) New Zealand Steel now uses the BOF process and makes all new steel from iron with only about 12% in-plant waste (pre-consumer scrap) added. From 2014 on the New Zealand steel industry consists of this one manufacturing plant at Glenbrook.

This New Zealand Steel plant manufactures a variety of steel products, from coil for roll-formed roofing and framing and metal joinery to reinforcing bars and wire rods. The coil may be metal-coated with zinc (galvanised steel) or aluminium/zinc (Zincalume ®), and may be painted on a coil-coating line or unpainted. The steel cladding materials NZMRM members use and supply primarily come from NZ Steel, with a small amount imported from Asian mills.

Type of scrap steel used in NZ
Home scrap (also known as circulating or internal scrap) is the residue left from the steelmaking, rolling and finishing operations and includes croppings, offcuts and material rejected by quality inspection procedures. This internal scrap usually accounts for about 10% of total crude steel production in an integrated steelworks. NZ Steel uses only the BOF process which can use a maximum 20% of scrap in its metallic charge. Thus NZ Steel uses only its own "home scrap" in its steelmaking process. No post-consumer recycle (PCR) is used here as is this not needed in this steel-making process.

All post-consumer scrap steel generated and collected in New Zealand is exported as a valuable resource for steel plants elsewhere which use the Electric Arc Furnace (EAF) process which can be based entirely on scrap because the furnace is suitable for heating, rather than the BOF process which is a complex chemical reaction.

In purchasing steel made in New Zealand you can be sure it has been made with maximum recyclability. New Zealand has a high level of recovery of steel products either for reuse or recycling at Pacific Steel. All good, you might think, but there is one problem with this very neat system.

Energy rating systems

For a number of years there has been an increasing global demand for energy efficient buildings. Typically this starts with office buildings and then extends to institutions like schools, and finally to domestic dwellings. The methods of rating buildings is (of course) different in different countries but generally the system looks at the derivation of the raw materials used, the transportation of materials and of people to the building, the energy used during construction of the building and during its life, the water used and processed, and finally the ability to be reused or recycled at the end of the building's life.

This is only a summary, and you can find more details easily on the internet. There are some well-known rating systems including BREEAM (early 1990's) in the UK, Casbee in Japan, and LEED (2000) in the United States. These are of varying ages and levels of development and New Zealand has been a rather late starter in this area.

In 2003 Australia developed a system called the Green Star Rating (initially for new office buildings only, but rating systems for other buildings exist, and the intention is that all new buildings will eventually be covered by this system - sooner rather than later).

In 2007 New Zealand followed suit with a very similar Green Star NZ rating system, managed by the NZ Green Building Council. Until recently both of these have been somewhat different to either BREEAM or LEED in their regard for the recycled content of steel. Without going into the somewhat complicated details – BREEAM and LEED credit for "sustainable sourced and used" steel. To achieve points with either Green Star system required the steel used in a building to have a high recycled content - "Up to two points are awarded where it can be demonstrated that the percentage of all steel used in the design has a post-consumer recycled content greater than x % as follows - 1 point = 60% by mass and 2 points = 90% by mass".

Exactly what this means (read it again) is not clear to me, but it is clear that steel manufactured by New Zealand Steel contribute no points to the total. Neither is there any recognition of distance travelled, either way (i.e. no penalty for long distance and no benefit for short distance). What this means for NZ is that cladding made in NZ receives no points. Imported cladding from 10,000 kms away, painted with paint of unknown quality, and sourced from a plant or country with no known sustainability credentials, can get two points if it is made in an EAF. It is recognised elsewhere that both systems complement each other and should not be regarded differently. If there was no BOF process there would be no new steel to be recycled.

NZMRM and NZ Steel through Sustainable Steel Council and directly have been objecting to this rating method ever since it was first published in the mid-2000s. Now we are seeing some possible movement to our advantage.

The Green Building Council of Australia recently changed its view on this methodology and no longer requires recycled content as its sole means of assessment and instead looks for "sustainably sourced" steel which has been defined in several ways for the plant and for the product. The direction this is heading in is called Environmental Product Declaration (EPD) which is a sort of externally monitored self-certification process. This is a well-established process globally and the methodology and certification authorities exist. This is now how most international environmental rating systems work.

The NZ Green Building Council which operates the NZ Green Star rating system now intends to review all Material Credits (which contribute to the overall Greenstar rating of the building) and publish in some common format later in 2015. NZMRM and New Zealand Steel through Sustainable Steel Council have commented extensively on the proposed Steel Credit (Mat-8) and suggested it be aligned with the Australian steel credit, and recognise EPD as the primary rating option. The significance of this for NZ-made steel in NZ Greenstar rated buildings is quite significant as it now means that (assuming our suggestions are accepted and we follow Australia) it will be possible to obtain points toward your Greenstar building rating by using new, New Zealand made, steel products in its construction. Quite how this will work is as yet unclear, but it seems likely it will revolve around the actual steel manufacturing plant and process, more than how it is actually used. We still have to work on this.

Conclusion

Regardless of the Green Star rating system issue, steel is the most recyclable and recycled building material in the world. You can use it or design for its use in buildings confident that this in some way contributes to the sustainability of New Zealand as a whole. In the near future you should be able to obtain Greenstar points for its use as well.

Updated from an article in Scope 18.

METROTILE SHINGLE REROOF WHANGAREI HOUSE

When a winter storm with 150km/h winds hit a Whangarei home, sections of its asphalt shingle roof were blown off.
With only the plywood substrate left to protect the two-storey home, water began making its way through the joins in the plywood and into the home, damaging wall linings and carpet.

It was at this stage, the owner decided to opt for a strong and durable metal tile roof with the good looks offered by Metrotile Shingle. As well as being resistant to hurricane force winds, earthquakes and UV damage, Metrotile roofing is low profile and comes in a range of natural stone colours that provide a similar aesthetic look to materials such as timber, clay or asphalt – but without the maintenance.

Roofer Jonathon Telfer, of Telfer Roofing, said time was of the essence when repairing the roof and installing the Metrotile Shingle. "The job took about five days and we had a pretty good weather window but we had no choice anyway because it was a family house that they were living in so we wanted to get it done as quickly as possible," Jonathon says.
"Water had seeped through the joins in the plywood into the second storey of the house and had damaged Gib and carpet so we needed to get the roof fixed as soon as possible. Because the family were living in the house while we did the job they had to move into a different areas while we worked."

Jonathon says the six-year-old asphalt roofing had to be repaired first to provide a true base for the Metrotile Shingle overlay. One of the advantages of Metrotile shingles is its ability to be fixed directly onto the ply substrate without the need to completely remove the roof it is replacing. Where time and cost is important this feature represents considerable savings.

"The asphalt single roof had previously been repaired and this was the third time it had failed," he says. "There were three different areas that needed repair where the asphalt had peeled off, like a deck of cards, so these had to be fixed first to give us the right level before we could do the overlay."

Jonathon says with its concealed fixing system, the Metrotile Shingle provides a clean, low profile look and it is laid in one direction and from the bottom upwards.

"It's great to use and easy to use but it all starts with your preparation," he says. "It's just like painting, if you do the preparation right then you get a great result.

"As a roofing material, it's stronger than most because you don't have a big void between the tile and the roof. Metrotile shingles are laid directly onto the plywood roof. Structurally, it's bulletproof and it's like walking on a footpath once it's laid."

Roofing installer:
Telfer Roofing, Kerikeri
Telephone: 021 347 657

Roofing Manufacturer:
Ross Roof Group
Profile Metrotile Shingle 'Mesquite'
Roofing Supplier:
Metrotile Roofing Systems
Telephone: 09 299 9498
www.metrotile.com

Metrotile Shingle

With its textured finish, Metrotile Shingle has a natural look that captures the charm of traditional shingles but is manufactured to be durable and low-maintenance. Unlike traditional materials, Metrotile Shingle is not subject to freeze-thaw damage, delaminating by UV rays or lifting and breaking caused by high winds and hail storms. It is also a lightweight roofing material, providing cost savings during construction. Extensive research and development in the design process has produced a lightweight roofing material fabricated from Zincalume® protected steel. The textured finish provides added protection by embedding stone granules in an acrylic base-coat. A final clear acrylic over-glaze is applied before being oven cured. This extremely durable UV-resistant coating enables Metrotile roofing products to withstand the harshest environments around the world. The 1250mm x 255mm tile sheets are engineered to interlock and overlap and use a concealed fixing system that resists wind lifting and keeps the roof weather tight. International test reports, appraisals and field results show the product is 100% waterproof, earthquake safe, fire resistant and able to withstand hurricane-force winds of up to 190kph. The product is backed by a 50-year limited warranty. With its textured finish and natural, weathered tones Metrotile Shingle has the visual appeal of timber, asphalt or clay shingles but with greater durability and less maintenance.

COLORSTEEL®
THE ROOF OF NEW ZEALAND®

ALL ROOFS ARE NOT CREATED EQUAL.

TRADE MARK AWARENESS NOTICE FROM NEW ZEALAND STEEL - COLORSTEEL®

February 2015

To: The Building Industry

Re: Trade mark awareness notice from New Zealand Steel – COLORSTEEL®

For over 30 years, New Zealand Steel has been known for its COLORSTEEL® prepainted steel products used for roofing, cladding, rainwater products and fencing.

New Zealand Steel owns several trade marks for its COLORSTEEL® range, including some registered marks: COLORSTEEL®, THE ROOF OF NEW ZEALAND®, COLORSTEEL® ENDURA®, COLORSTEEL® MAXX®, COLORSTEEL® METALLIC®, COLORSTEEL® BOUNCE® and COLORSTEEL® CP ANTIBACTERIAL.

Not all prepainted steel products are equivalent. The COLORSTEEL® brand is synonymous with high quality products[1] made in New Zealand and formulated for New Zealand conditions. Through ongoing innovation and research COLORSTEEL® products remain at the forefront of coated steel technology, utilising unique paint formulations that provide excellent colour performance to withstand New Zealand's extreme climate and harsh UV rays and excellent pencil hardness for a tough and scratch resistant finish.

Unfortunately, over the last 12 months, New Zealand Steel has received an increasing number of complaints from homeowners with defective roofs, made from imported prepainted steel[2], who were of the understanding that they had been supplied with a genuine COLORSTEEL® branded product. Defects have included premature fading and a base metal thickness (BMT) below that required by the NZ Building Code Acceptable Solution E2/AS1.

New Zealand Steel is concerned that some suppliers of these prepainted steel products may be inaccurately describing its products. In particular, a) there have been examples of confusion between a prepainted roof and a genuine COLORSTEEL® roof, b) use of the term "COLORSTEEL®" to refer to prepainted steel generally, and c) using words similar to COLORSTEEL® to imply that it is a COLORSTEEL® branded product.

It is vitally important to New Zealand Steel that its COLORSTEEL® trade mark is not infringed to protect and reinforce New Zealand Steel's position as a pre-eminent supplier of roofing products in New Zealand. Constant monitoring and vigilance by New Zealand Steel supports rollformers and roofers who supply and install genuine COLORSTEEL® products, and ensures homeowners and commercial project managers receive nothing less than the high quality COLORSTEEL® branded products they ordered.

New Zealand Steel takes the protection of its COLORSTEEL® trade mark seriously and issues 'Cease and Desist' letters to companies incorrectly associating their product to the COLORSTEEL® brand.

If roofing suppliers or specialists require clarification regarding the use of New Zealand Steel's trade marks or suspect that someone may be incorrectly using the COLORSTEEL® trade marks, please contact the COLORSTEEL® Marketing team on **09 375 8824** or email **info@colorsteel.co.nz**.

If it is not manufactured by New Zealand Steel then it's not a genuine COLORSTEEL® branded product:

COLORSTEEL® | COLORSTEEL® Endura® | COLORSTEEL® BOUNCE®
COLORSTEEL® Maxx® | COLORSTEEL® Metallic®

NEW ZEALAND STEEL

[1] COLORSTEEL® products are manufactured under a third party accredited ISO9001 quality management system to ensure consistency and reliability. COLORSTEEL® products have undergone a four year exposure test on New Zealand and Australian extreme exposure sites for both (UV) colour performance and long term durability. COLORSTEEL® ENDURA® and COLORSTEEL® MAXX® products are manufactured to comply with the requirements of AS/NZS2728:2013.

[2] Testing by NZ Metal Roofing Manufacturers Inc showed after 2000 hours of UV exposure NZ made prepainted steel showed no evidence of degradation compared with the imported product tested under the same conditions (Source: www.metalroofing.org.nz. Search "imported" under "Technical Articles").

HCA.CO.NZ BSS0019_SM

DESIGNING SMART WITH PROFILED METAL ROOFING.

It is easy when designing a building to leave the roof cladding until last; however, consideration should be made at the outset of design of the Kl pressure coefficient factors, which apply to roof cladding and the purlins at the periphery of all buildings.
Some engineers are now designing specifically for the wind pressures, but just how much the site orientation, topography, location and roof pitch of a building affects the design requirements is not universally appreciated by designers and some engineers.

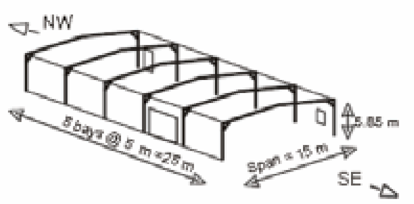
As an example:

At a wind engineering workshop in Wellington recently, John Holmes (one of the main drivers behind AS/NZS 1170.2) made available copies of a series of worked examples on AS/NZS 1170.2. The following is quoted with acknowledgment to John Holmes and Cameron Smart – Engineering Projects Manager IPENZ, Engineers New Zealand. While the details of the calculations are directional, these have been omitted and the worst case, south-west (SW) Direction is used as a means of illustration.

5.3 Example 3 - A steel-framed warehouse on the edge of an urban area

Design wind loads are required for a steel portal-framed warehouse in Manukau at the southern edge of the Auckland metropolitan area. The relevant information is as follows:

- Location : southern edge of Auckland (Region A6)
- Terrain : Suburban terrain for westerly through northerly to south-easterly directions. Open water to south and south-west.
- Topography : ground slope less than 1 in 20 for greater than 5 kilometres in all directions.
- Dimensions : eaves height : 5.85 m
  Horizontal dimensions, (Figure 5.3) : 25 metres × 15 metres.
  Gable roof with 5 degrees pitch.
  average roof height = 5.85 + 0.5(7.5 tan 5°) = 6.2 metres
- Building orientation : major axis is North-west – South-east
- Steel portal frame construction. Frames are spaced at 5 m
- The building has a large (4m wide by 3 m high) roller door on the south-west wall.
- There are windows (1 m²) near the south-east end, and a small (2.5 m²) door near the north-west end, of the north-east wall.



Direction	V_{500} (m/s)	M_d	$M_{z,cat}$	M_s	M_t	$V_{sit,\beta}$ (m/s)
N	45	0.85	0.83	0.85	1.0	27.0
NE	45	0.95	0.83	1.0	1.0	35.5
E	45	1.00	0.83	1.0	1.0	37.4
SE	45	0.95	0.83	1.0	1.0	35.5
S	45	0.85	1.00	1.0	1.0	38.3
SW	45	0.95	1.00	1.0	1.0	42.8
W	45	1.00	0.83	0.85	1.0	31.7
NW	45	0.95	0.83	0.85	1.0	30.2

Governing design pressures for roof cladding elements, less than 2.25m² in area, are shown in Figure 5.10. Further simplification of these zones could be carried out if required.

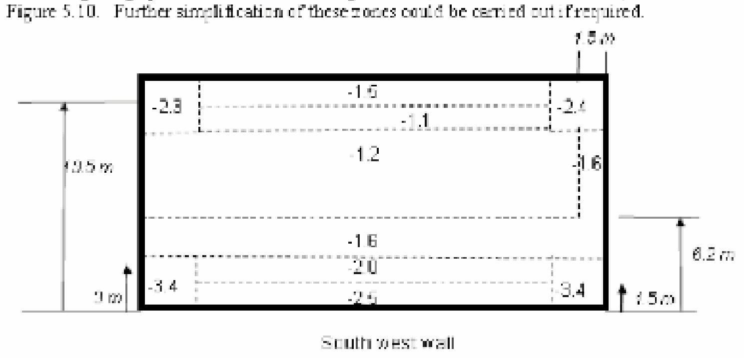


Figure 5.10 Design pressures for roof cladding (kPa)

SECTION 3 CALCULATION OF PRESSURES AND FORCES

3.1 PRESSURE ZONES

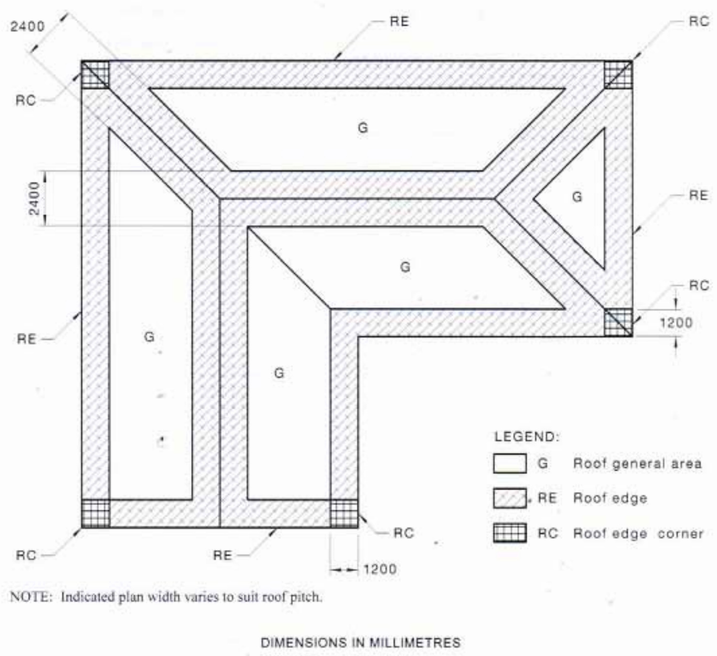
The following external pressure zones (illustrated in Figure 3.1 for roofs and Figure 3.2 for walls) shall be used in evaluating wind loads on houses:

(a) *General (G)* Areas of roofs more than 1200 mm from edges, and areas of walls (including windows and doors) more than 1200 mm from external corners.

(b) *Roof edge (RE)* Areas of roofs within 1200 mm of all edges except the external corners of the roof.

(c) *Roof corners (RC)* Areas of the external corners of roofs within 1200 mm of two adjacent edges. (This is the overlap area between two RE zones.)

(d) *Walls near corners (SC)* Walls (including windows and doors) at external corners of the house within 1200 mm of the corner.



NOTE: Indicated plan width varies to suit roof pitch.

DIMENSIONS IN MILLIMETRES

FIGURE 3.1 PRESSURE ZONES ON HOUSING—ROOFS (PLAN VIEW)

For the body of the roof, the wind design speed is given as 42.8m/s (see table above), which equates to the 1.1kPa on the area shown in Fig. 5.10.

While the Kl factor in the corners of the building is given as 3 in AS/NZS 1170.2: 2011, because the various factors concerned, this translates to 3.4kPa as the worst case scenario on the SW Wall.

The question could be asked why the Kl = 3 factor was ignored in NZS 3604 and the answer from Roger Shelton, Structural Engineer BRANZ Ltd, who provided the engineering data for the NZS 3604 revision in 2011 was:

It was "ignored" in 3604:2011 because 1170.2 hadn't been amended at that stage. In any case the area RC1 is small enough to ignore in 3604 scale buildings. I agree that for commercial sized buildings it may be a concern.

To apply the Kl = 3 factor from AS/NZS 1170.2 the roof has to be < 10° (i.e. a roof ≥ 10° is exempt). However, from wind tunnel tests conducted in UK, BS 6399-2 gives a maximum Cpe of 2.6 at the corners of a building, but extends this to include roofs with a 15° pitch. This document is very detailed and gives hundreds of precise Cp factors unlike AS/NZS 1170.2:2011 which uses only factors of 1.5, 2, and 3.

Australia's Standard AS 4055 'Wind Loads for houses' takes a more pragmatic view and gives a Kl peripheral figure for distance of 1.200m, but still has different pressure coefficients for the corners of the roof and the walls. It does appear to include the roof corners, no matter what the roof pitch is, but also limits the combined net coefficient to 2.61 for non-cyclonic areas (see Table 3.1 of AS 4055, below).

The question could be asked why have the changes to AS/NZS 1170.2 only happened now and what prompted the change? It is believed that it occurred because a number of steel framed buildings were destroyed in the recent cyclones in Australia but my own investigations into cladding loss or purlin failure, points to the fact that these buildings did not follow the recommended fastening patterns and purlin spacings for the thickness of the material already existing at the time. It is well documented that roof cladding failure starts at the barge, and often at the corners, and is an incremental failure not a catastrophic one as it sometimes appears but has not been widespread enough to cause any great alarm in New Zealand.

TABLE 3.1

PRESSURE COEFFICIENTS FOR WIND CLASSES N1 TO N6 (REGIONS A AND B FOR ULTIMATE STRENGTH AND SERVICEABILITY)

Housing component	Factored external pressure coefficient ($K_l C_{p,e}$)	Internal pressure coefficient ($C_{p,i}$)	Net pressure coefficient ($K_C C_{p,n}$)
Roof—General areas (See Region G in Figure 3.1)			
(a) General, including all trusses and rafters	−0.9 +0.4	+0.2 −0.3	−1.0 +0.63
(b) Cladding, fasteners and immediate supporting members not within 1200 mm of edges	−0.9 +0.4	+0.2 −0.3	−1.0 +0.63
Roof—Edges			
(c) Cladding, fasteners and immediate supporting members within 1200 mm of edges (See Region RE in Figure 3.1)	−1.8	+0.2	−1.8
(d) Cladding, fasteners and immediate supporting members within 1200 mm of eaves corners (applies to roof slopes less than 10°) (See Region RC in Figure 3.1)	−2.7	+0.2	−2.61
Walls			
(a) General, including all studs (See Region G in Figure 3.2)	+0.7 −0.65	−0.3 +0.2	+0.9 −0.77
(b) Cladding, fasteners, doors and windows not within 1200 mm of edges (See Region G in Figure 3.2)	−0.65 +0.7	+0.2 −0.3	−0.77 +0.9
(c) Cladding, fasteners, doors and corner windows within 1200 mm of edges (See Region SC in Figure 3.2)	−1.3	+0.2	−1.35

NOTES:

1 Positive internal or external pressures are towards the surface (negative values are away from the surface—suctions). For net pressures, positive values are inwards net pressures, and negative values are outwards net pressures.

2 For roofs, immediate supporting members include battens and purlins. Rafters and trusses are not considered as immediate supporting members.

3 The internal pressures presented in this table may only be used where all cladding elements including windows demonstrate compliance with the relevant Australian Standard.

4 Net pressure coefficient includes the effect of a combination factor and so will not equal $K_l C_{p,e} - C_{p,i}$ (see Paragraph A4).

5 Windows and doors with 25% or more of the width of a single panel or pane within 1200 mm of the building edge are classified as SC not G.

3.2.2 Wind Classes C1 to C4 (cyclonic)

For houses with Wind Classes C1 to C4 (in Regions C and D) the pressure coefficients in Tables 3.2A and B shall be used.

3.2.3 Wind pressures on photovoltaic solar panels

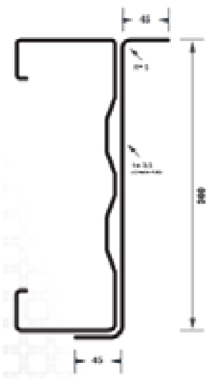
Pressures on photovoltaic solar panels for designing their connection to the roof structure shall be obtained from Appendix D in AS/NZS 1170.2.

We are, however, bound by the changes made to the loadings code and must design within its requirements but not to the extent that results in over-design of the whole roof fastening system. So to design smart we must know what to do. There is no one size fits all but an appreciation of what can help is what this article is about.

It could be said that to get over the Kl = 3 hiccup, it would pay to only design roofs of 10° or greater, or to have parapets, but that would be complying with the Standard and not necessarily understanding the way wind works.

Quite a saving can be made by first reducing the end portal spacings so that purlin spacing can remain constant and still comply with a higher loads experienced at the periphery. Another way is to use a splice to provide added strength at the end spans and also over 100% increase in UDL performance can be achieved by using a purlin of the same size but of a greater thickness and 25% by increasing the number of braces.

It is a given that the purlin spacing at the eave and at the gutter line be reduced to 2/3rds of the rest of the roof, not only for the performance of the sheeting but because of the increased load at the periphery.



We would like to think this is always done but…..

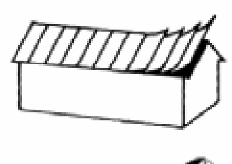
Of particular importance are the corners of the roof of the building when the pitch is less than 10°. AS/NZS 1170: 2011 (our New Zealand loadings code) calls for a much higher load factor of Kl = 3 for roof and wall cladding corners; this does not need to be a problem because the tested wind load for corrugated and trapezoidal profiles and their fastening patterns are given in Section 3.9 of the NZMRM Code of Practice. What it means is that the corners of roof and wall cladding fastening pattern should be increased but, more importantly, barge flashings require double fixing.

The CoP already has this to say:

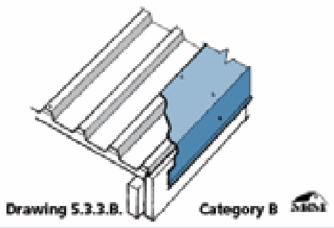
This needs to be spelt out on the drawings and not left to the roofer's discretion. There is sufficient information provided in the NZMRM Code of Practice or the manufacturer's literature for the designer to be more explicit in what he wants. Engineers can (and should) do this in their own best interest, as well as their client.

5.3.3 BARGE AND VERGE

Barge or verge flashings serve a dual purpose, which is not only to weather the junction of the roof cladding at the barge, but also to hold the roof cladding in place under greatly fluctuating wind suction loads. Unstiffened roof cladding without barge flashings can fail under high wind load conditions, because of the 'peeling' effect, which can lift a roof off in what appears to be a catastrophic moment, although the cause is actually the incremental failure of the fasteners at the verge. *(see drawing 5.3.3.A.)*



Drawing 5.3.3.A.



Drawing 5.3.3.B. Category B

Barge flashings must be fastened on both the vertical and horizontal face at centres determined by the wind design load. *(see section 5.4.2.)*

Barge roll flashings or rolled roof cladding edges are not acceptable because they cannot be fastened on the vertical face.

Designers who design using 'skeleton' under eave construction which is open and not lined and omit any barge flashings, should take into account the significant additional loading placed on the roof cladding and their fixings. *(see kl loadings section 3.3.2.)* This type of design is considered an 'at risk' structure and is not acceptable trade practice. This flashing requirement applies to the barges of curved or monoslope roof structures and also at the top end of the roof cladding on a monoslope roof.

All metal cladding profiles have been tested for wind uplift and point load.

It is worthwhile doing the sums on using thicker cladding material at larger purlin spacings as this not only saves on fasteners and purlins, but provides a roof which most times you can walk on with care. A base metal thickness of 0.40 mm in steel and 0.70 mm in aluminium maybe OK for walls, but for roofs it pays to have a look at the performance of 0.55mm steel or 0.90mm aluminium and deeper rib profiles. Roofs are point load tested to 1.1kN which can easily be exceeded with a man carrying or sharing an air conditioning unit to install. Roofers are often dismayed to return to their newly laid roof to find the amount of damage done in the vicinity of the air conditioning unit or solar panels.

Speak to roofers and you will often hear – 'We never do it that way' or ' We always do it that way' but they seldom know the reason why.

One common error that is made by designers and installers alike is to increase the number of fasteners on the gutter purlin; whereas, the highest load is on the penultimate purlin. This is because the end span is normally reduced to 2/3 and the tributary area is greater on the penultimate span. There should be no worries about trough fixing as, unlike roofs, wall lengths are limited and gravity and sealing washes take care of the water. They don't leak -trough fixing is commonplace for roofs in Europe.

If you are not already specifying LSW (Load Spreading Washers) then have a look at the increased performance that you can get from their use.

Because the wind load is increased by 50% at the periphery the purlin or the rafter spacing should be reduced to 2/3 of that for the main body of the roof. *(see section 3.1.3.)*

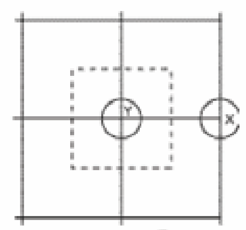
N.B. This reduction for wind is coincident with that required for point load. By reducing the purlin and rafter spacing by 1/3 the load at the purlin/rafter joint is equalized. L = load S = span

i.e. $L_1 \times S_1 = 1kN$
$L_1 \times 1.5 = L_2 = 1.5$
$S_1 \times 2/3 = S_2 = 0.667$
$L_2 \times S_2 = 1.5 \times 0.667 = 1$

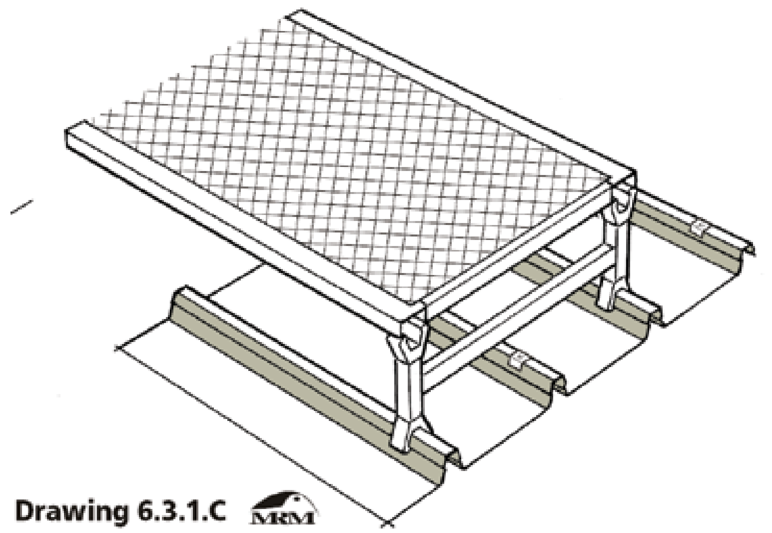
The load on the purlin/rafter connection or joint is also increased and although it is shared by adjacent connections it should withstand its share, which is dependent on the distance from other connections. To obtain the load on such a connection, multiply the span by the spacing to provide the effective area and multiply the result by the wind design load in kPa for the building

The result in kN is the load on the connection.

N.B. The load at Y = 2X



Drawing 3.3.2.B



Drawing 6.3.1.C

If there are air conditioning units or solar panels that are to be installed, they have to be serviced so it pays to install walkways beforehand. Damage often occurs to a new roof by the installation of such units on the false assumption that men carrying them can walk indiscriminately on a metal roof. However undesirable as it is to place service units on the roof, designing for the end use of the building is part of the designers' responsibility.

It pays to forget fibreglass sheeting in the end bays if possible because, unless the heaviest fibreglass 3600gsm is used, the uplift performance of thinner fibreglass sheeting does not equal that of the metal roof cladding. Canopies require a lot more consideration as well.

Secret fix profiles have the advantage of long lengths and a built-in expansion provision, but they do not perform as well as top fix roofs under high uplift loads. We know there is an advantage in venting a roof to obtain a reduction in the wind uplift load but quantifying it is a bit of a problem. Because of failure in the Pacific islands these profiles are required to be top or pan fixed, which negates the advantages of secret fix. The disadvantage of top fix roofs is that the fastener is exposed. Not many fasteners can match the substrate corrosion performance and stainless steel fasteners are considered (at the present time) to be incompatible with the Zincalume cladding.

The isolation technique of separation by using oversized holes appears to be working but the jury (MRM technical committee) is out on that issue. The cost of the fastener versus the cost of installation and roof cladding warrants the use of class 5 screws which are the best available and include aluminium fasteners for timber and stainless steel screws.

Low pitch and long lengths for metal cladding offer cost effective design solutions but here is a fine line between over-design and under-design; cost per m2 is probably what the client wants to know. This is not an easy job but then anyone can do those!

The climate has changed on liability in these areas and we need a tighter specification by the designer in areas such as flashings and fixings. Understanding what is required is part of the service that MRM provides to the industry.

STONEWOOD HOMES WINS REGIONAL SUPREME AWARD 2014

Stonewood Homes picked up two prizes: the New Homes $350,000-$450,000 category in Manawatu-Wanganui and then went on to take out the region's Registered Master Builders Supreme Award for the 2014 House of the Year. As a new home consultant for Stonewood Homes in Palmerston North, Kaye Cunningham has helped guide clients through the house building process for the past five years.

And Kaye drew on all of that experience when she and her husband built an award-winning home on land that the Awapuni Racecourse had sold off for subdivision.

"We had already built one house before with Stonewood but we were real novices then – and that was supposed to be our one and only until retirement," says Kaye. But when the chance came up to buy one of the racecourse sections for a good price, the Cunninghams jumped at it because the subdivision offered superior sites.

Again, Stonewood Homes was the builder and Kaye worked closely with franchise owner Peter Robson and Steven Butterworth, of SWB Design.
"They say it takes you two or three houses to get it right, and we are very pleased with the results," says Kaye.

The Cunninghams' feelings were also shared by the judges for the Registered Master Builders House of the Year awards.

The judges said, "This home was built with a great deal of love and care. A fantastic family home, the quality of the build and attention to detail throughout is something to be proud of. Designed to capture the sun and featuring functional, easy-living spaces, this is a home that a typical New Zealand family would be delighted to own."

Kaye says, "I expected it to win gold in the first category but I was blown away when it won the supreme award because the judges crawl all over these houses to make sure everything is right – they even use compasses in each room to make sure it sits like it's supposed to sit."

Driving the design process was a desire for an easy-care, low maintenance but comfortable home.

"I am a big fan of low-maintenance and we wanted to make sure it was a house that we could look after in our seventies," says Kaye. "It's single-storey, of course, and although we have a big section, we have very little garden."

Kaye says the design of the home was based on a standard plan from one of Stonewood Homes old plan books and then "tweaked" with the help of Steven Butterworth.

"We also grew all the rooms so the house went from 202sq m to 260sq m with 50sq m of veranda," she says. "I work with Steve all the time with our clients because we use him as our main designer and he is great."

In line with the low-maintenance policy, the house is clad in brick and Linea weatherboard with aluminium joinery and a COLORSTEEL® roof. "I like the long-run roofing because I think it has a nice, clean look," says Kaye.

Inside, tiled floors feature in the kitchen/dining area and bathrooms, with carpet in the lounge, media room and four bedrooms.
"It's a very warm house because it is perfectly positioned for the sun coming into all the living areas," says Kaye.

As well as double glazing and above-code insulation, the home has in-slab underfloor heating on a meter and heat pumps.

The living areas and master bedroom open out to the wrap-around veranda, which has plastic drop down sides to protect the space from the elements.
"With the plastic curtains it's like an outdoor room all year round and it has a beautiful outlook over the Mangaone Stream."

As well as being the perfect space for outdoor entertaining, the veranda boasts a spa pool sitting outside the master bedroom.
The 890sq m section is mainly grassed but has a large concreted area outside the oversized double garage that provides plenty of off-street parking in the meantime but, in another future-proofing exercise, could also accommodate a motor home or boat.

Architectural Designer:
Steven Butterworth
SWB Design
Telephone: 03 338 4768

Builder: Stonewood Homes
Palmerston North
Telephone: 06 356 4874

Roofing Manufacturer:
Metalcraft
Profile: Corrugated 0.40 Gauge COLORSTEEL® Endura
Colour: Grey Friars
Metalcraft 185 Fascia
Metalcraft Colonial Quad gutter both COLORSTEEL® Endura

Roofing supplier and installer:
Metalcraft Roofing
Palmerston North
Telephone: 06 358 9149

KAIMATA RETREAT A DECADE IN THE NEWS

Ten years after it was designed and built, Kaimata Retreat has brought architect Will Lewis of Lewis Architecture, Dunedin, yet more accolades with his joint-winning of the Colin Stanley People's Choice Memorial Award at the 2014 ADNZ/ Resene Architectural Design Awards and the Highly Commended citation in the ADNZ 2014 Otago/Southland Residential Interiors.

Will is the first to acknowledge Kaimata Retreat's superb location is a significant factor in attracting universal admiration. But it's the sensitivity of his design as it beds into the landscape that continues to win recognition.

The lodge sits in five acres of coastal land overlooking the Papanui Inlet and affording panoramic views from every window – except these are more than just ordinary 'windows': much of the north-facing wall comprises in-fill panels of cladding and floor-to-ceiling glass, set within post-and-beam exposed construction from Macrocarpa timber harvested from the property.

In every project where views are a feature, Will begins by considering how the naturally beautiful surrounds will look from the inside of the building and in his design aims to position every part of the building to take advantage of the view and thus give rhythm to his architecture.

His aim with Kaimata Retreat was to maximise visibility of this spectacular natural landscape by bringing the view into the house so that residents feel they are living within, and are part of, the landscape rather than just admiring it when they go outside.

Critical to the overall project was the time Will spent on the design and its interaction with its surrounds. He visited the site in the morning, at midday and in the

evening before he began design sketches. In this way he could take into account sun angles and the time of the day that different spaces in the house would be used while also considering the orientation of the structure to ensure the main view was in focus while unwanted views were obscured by strategic positioning of walls, columns and doors.

Although Kaimata Retreat was Will's first independently commissioned design, which he developed while still a student in his final year of Architecture School in Auckland, he was well equipped to take on the challenge, having always been inclined to environmentally sustainable architecture.
More significantly, Will was familiar with the area – and the terrain. He owned the land next door to the client who, knowing his situation, invited him to create a building that suited their specific requirements. His brief included using non-toxic materials and incorporating the macrocarpa timber from the site. The client also wanted to be able to see the structure. For his part, as a fan of the passive design philosophy, Will wanted to see the house fitting into its surroundings rather than sticking out on the landscape.

It was a design Will found both challenging and rewarding. Juxta-positioning the project with his architectural studies, he took one year to develop the drawings. Then followed a further two for the build and another two before the landscaping and plantings were complete. The clients then waited a few more years for the native planting to develop before commissioning a photographer to capture the wairua, or 'spiritualness' of Kaimata Retreat.

Using common architectural principles Will designed the width of rooms based on where the sun went in winter and where it would fall on the eaves. To maximise passive energy he incorporated extra-wide eaves; harnessed the sun from stone and concrete materials; installed quality insulation and added double-glazing and underfloor heating. He positioned doors to open onto expansive wooden decks with wide-sweeping views over the inlet to the horizon beyond. He exposed the beams which support the walls and roof and made them a design feature of both the exterior and the stylish interior. His choice of longrun metal roofing accommodated the owners' delight in the sound of rain-on-the-roof as they hunker down over winter. His finishing touches, inside and out, included local volcanic stonework sourced from the peninsula and exterior weatherboard cladding left

to weather. And the property collects roof water and recycles waste water on site, making it almost self-sufficient.

No wonder the ADNZ judges were impressed by this 'naturally conceived' project: "Heavy timbers and natural materials give this interior the feel of a quintessential country lodge. Solid walls, generous spaces and textured materials create a comfortable retreat in a wild natural setting."

Kaimata Retreat owners Kyle Davidson and Rachel Duell are also impressed. They have thoughtfully developed the aesthetic and ecological appeal of this lodge. Their planting programme continues to progress and now includes a variety of native flora, a ten-year-old orchard and a burgeoning kitchen garden. Their aim of meeting, and more than satisfying, the growing eco-tourism demand grows apace, providing guests with quick access to wildlife tourism along with awe-inspiring views across the 350ha estuary which teems with coastal birds and wild life, like the Royal Albatross and the endangered hoiho, the Yellow-eyed penguin.

The luxury eco-retreat offers three guest rooms and not unexpectedly, each room has been named after a local bird. There's Kahu and the smaller Kotare, both protected native birds, and there's Korimako, the spirit bird of the Maori people. With its culturally sensitive, aesthetic and ecological appeal Kaimata Retreat's benign footprint scarcely impacts on the environment and thus both honours its Maori heritage and reflects architect Will Lewis's philosophy of creating environmentally sustainable architecture.

Lewis Architecture

Lewis Architecture is a Dunedin based architectural consultancy providing architectural design and draughting services to New Zealand based clients. Our primary services include the design and documentation of new homes, renovations, extensions, and eco design.

"We strive to work closely with clients and have built strong relationships with local engineers, builders, Territorial Authorities (Councils), suppliers and sub trades to ensure every project runs smoothly," says Will Lewis founder of the practice.

From building consent for a new deck or design sketches for a proposed new multi storey eco house Lewis Architecture's goal is to provide the best advice and solutions for every project.

Architectural designer:
Will Lewis, Lewis Architecture
Dunedin
Telephone: 03 455 4980
Mobile: 021 26 27 941
will@lewisarch.co.nz
www.lewisarch.co.nz

Roofing Profile:
COLORSTEEL® Maxx®

Builder: Alistar McClintock
Telephone: 03 476 1279

NO PLACE LIKE HOME

When presented with the opportunity to rebuild the home of an elderly woman after it was destroyed in the Canterbury earthquakes, Architectural Designer Peter Wynyard took a unique approach, using COLORSTEEL® to design an inspiring and contemporary home.

Peter Wynyard is the founding director of Christchurch architectural design practice Archimetrix. He has a wealth of design experience, having worked on a variety of commercial and residential projects in both New Zealand and the United Kingdom.

Since the destructive Canterbury earthquakes of 2010 and 2011, Peter has seen a change in his client base, with the Archimetrix team being increasingly engaged by insurance companies, and their project managers, to redesign and work on plans for homes that were destroyed by the quakes.

One of these post-quake projects involved the design of a house for a woman in her eighties whose home

in the Christchurch hillside suburb of Mount Pleasant was left in need of a rebuild. While her friends had tried to talk her out of rebuilding in the area, she was firm in her desire to stay. The original brick and tile bungalow had been her home for many years, and although she was upset following its collapse, Peter worked closely with her to design the plans for an updated home suited to her lifestyle and modern building trends.

Smaller, but smarter.

Peter says he first looked at ways the original home could be improved. The three bedroom uninsulated house was cold, dark and gloomy, with small wooden windows set high on the walls, providing limited sunlight and warmth. It had dated features, and a basement laundry that only had external access.

"The challenge for us was to devise an alternative design solution that would cost no more than replicating the original home. We analysed the way the original house was built, and looked at how we could assign and transfer savings to gain improved design features including extra windows to capture the sun and views," says Peter.

The new home is slightly smaller than the original, with the utility space on the lower level removed to make way for an improved single level design. The interior now features an open-plan living area with a raked ceiling and lower windows allowing for better views of the estuary, while also creating a feeling of space and openness.

"The art is to use space better.

Combining the kitchen, dining and living spaces has actually resulted in a smaller area overall, but the sense of space is much greater," says Peter.

Attractive and practical

As well as updating the home's interior, Peter also made changes to the exterior. Instead of using brick like the original dwelling, the new house is clad with Palliside and COLORSTEEL® which complement each other in a collaboration of design style.

COLORSTEEL® has been used in New Zealand homes for more than 30 years, and provides protection from the elements. Whether it's used on the roof, or as an all-over cladding, COLORSTEEL® is designed to both protect and enhance.

"COLORSTEEL® appealed for this particular design because it provided clean modern lines with a point of difference. It is also a particularly cost-effective material. We often use it for its economic benefits," says Peter.

Peter used COLORSTEEL® to encase the overall design. It extends from the roof continuously down the walls of the dwelling. It has provided the client with confidence that her home not only looks good from a design perspective, but is also protected from New Zealand's most extreme weather. She has been very satisfied with her new house, and despite the daunting task of rebuilding ,she is confident she has made the right decision to stay on in a place she has called home for many years.

Archimetrix

Archimetrix is an innovative Christchurch-based architectural design practice. Lead by founding director Peter Wynyard, the practice has grown over the years, and undertakes a range of work, including residential, retail, school, community, office and hospitality projects throughout the country.

The Archimetrix team has been heavily involved with insurance rebuilds and repairs since the Canterbury earthquakes, and they are able to provide a number of services including consultation, design and project management.

Peter and his team are highly regarded in the industry, and have won many awards for their high quality design work.

Peter is a professional member of Architectural Designers New Zealand (ADNZ), and benefits significantly from the support and guidance of the organisation. ADNZ members are at the forefront of design in New Zealand, and the organisation provides its members with access to business templates, marketing assistance, and valuable media coverage through the highly coveted annual ADNZ I Resene Architectural Design Awards.

For more information www.adnz.org.nz

Architectural Designer: Peter Wynyard
Telephone: (03) 366 0664
Website: www.archimetrix.co.nz

Roofing and Cladding :
Profile:.40 COLORSTEEL®
Dimond V-rib longrun

Roofing / cladding Contractor:
Avon Roofing Christchurch
Telephone: 03 348 0035
email: info@avonroofing.co.nz

Builder: Jim The Builder
Christchurch
Telephone: 03 974 1290
email: info@jtb.net.nz

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
www.azko.co.nz

B J Moss Ltd
PO Box 1007
Gisborne
Telephone: 06 867 1219
Contact: Roger Moss
www.bjmoss.co.nz

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
www.calderstewart.co.nz

Continuous New Zealand Ltd
PO Box 151
Takanini, Auckland
Telephone 09 268 1555
Contact: Nick Claridge
www.continuous.co.nz

Contour Roofing Nelson Ltd
PO Box 9015
Annesbrook, Nelson
Telephone: 03 546 4260
Contact: Dave Freeman
www.contourroofing.co.nz

Franklin Long Roofing Ltd
PO Box 151
Pukekohe, Auckland
Telephone: 09 238 9249
Contact: Warren Oliver
www.franklinroofing.co.nz

E.R. Freeman Ltd
Freeman Roofing, Nelson
Roofline Marlborough, Blenheim
Canterbury Long Run Roofing, Timaru
Canterbury Long Run Roofing, Ashburton
www.roofing.co.nz

Roofing Solutions, Dunedin.
P.O. Box 2317
Stoke, Nelson
Telephone: 03 5443108
Contact: Shane Atherton
www.roofing.co.nz

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

Marshall Industries Ltd
PO Box 846
Invercargill
Telephone: 03 218 2579
Contact: Tom Marshall
www.marshalls.co.nz

Megami Metal Roofing Systems
PO Box 113
Takanini, Auckland 2245
Telephone: 09 268 8959
Contact: David Moselen
www.megamiroofing.co.nz

Metalcraft Roofing
PO Box 51286
Pakuranga, Auckland
Telephone: 09 274 0408
Contact: Tony Barbarich
www.metalcraftgroup.co.nz

Metal Design Solutions
PO Box 33
Drury, Auckland
Telephone: 09 294 9134
Contact: Jan Alberts
www.metaldesignsolutions.co.nz

Queenstown Roofing Ltd
PO Box 2418 Queenstown
Telephone: 03 442 3883
Contact: Bill Giller
www.qtroof.co.nz

Quin Roofing Ltd
PO Box 1087
Levin, 5540
Telephone: 06 3679480
Contact: Bruce Love
www.quinbuildings.co.nz

Roof Manufacturers Limited
PO Box 319
Tauranga
Telephone: 07 578 2650
Contact: Martin Smith
www.roofman.co.nz

Roofing Industries Ltd
PO Box 302 385
North Harbour Post Centre 0751
Telephone: 09 414 4585
Contact: Paul Ross
www.roof.co.nz/

Roofline Products Ltd
PO Box 16302,
Christchurch
Telephone: 03 349 8439
Contact: Colin Megaw
www.roofline.co.nz

Ross Roof Group
PO Box 72-062
Takanini, Auckland
Telephone: 09 299 9498
Contact: Sean Wu
www.metrotile.com

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
www.steelandtube.co.nz

Stratco (NZ) Ltd
PO Box 8494
Christchurch
Telephone: 03 338 9063
Contact: Andrew Staff
www.stratco.co.nz

Taranaki Steelformers Ltd
Wanganui Steelformers
King Country Longrun
PO Box 36 Stratford
Telephone: 06 765 5191
Contact: Darrell Back
www.steelformers.co.nz

The Architectural Roofing Company
PO Box 8052
Hornby, Christchurch
Telephone: 03-3445991
Contact: Bruce Gibson
www.trayroofing.co.nz/

SCOPE

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