

Making the most of a timber roof

Timber seems an unlikely material for a roof. But it's long been used and remains today one of the most distinctive and appealing roof materials. Tim Newsham summarises the upside of the craft of timber shingles and shakes.

Earth, thatch and wood are the oldest known roof materials since mankind crawled out of their caves. Despite the space-age, they are probably still the most common roof types in the world. However, we New Zealanders have largely forgotten our pre-corrugated iron history in which timber roofs were common.

Maori and early white settlers chose wood out of the handy forests and would have been more concerned about fastening it to their structures than questioning its suitability. Often, giant slabs of totara were laid up vertically and lashed on, as nails were precious or non-existent. Overlapping layers of manuka bark and grass (raupo huts), and long wooden palings laid in overlapping rows with offset joints made primitive timber roofs. Gradually, drawing on the knowledge and skills of immigrant tradesmen, timber shingle and shake roofs became more prevalent and better constructed. After twenty-five years here in Marlborough, I'm still discovering roofs made of tiny shakes laboriously split out of kahikatea, red beech or totara. Up north I've seen the same split out of kauri.

Cost and sustainability

Some of these pioneer shakes are tucked away from sight under a rusting layer of "corri", others have made great kindling for the coal range. Had we managed our indigenous forests properly we might all enjoy the warmth, quiet and good looks of a wooden roof today, rather than it being mainly an option for the financially well heeled. But on the subject of cost and sustainability, let me share two thoughts.

Firstly, considering that all material and energy inputs in a new building should be properly accounted for, and looking at the cradle to grave environmental / sociological impact of those materials, timber doesn't look like the worst choice. Given the global appetite for old growth forest many species of timber cannot be considered a sustainable resource. But the true cost to the environment of manufacturing and disposing of a non-treated wood roof from a sustainable source looks good compared to some of the modern roofing materials we are now using.

Secondly, function often takes precedence over



form because of price. But a timber roof will often influence the overall look of a building to such an extent that using it becomes a financial priority.

Shingles and shakes

When asked my occupation, I describe myself as a "shingle and shake roofer". Leaving aside references to unsealed road surfaces, this often leads to a second question: "What's the difference between a shingle and a shake?" A clear understanding of the difference is essential for both the homeowner and the designer.

Simply put, a shingle is a section of wood sawn on both faces, whereas a shake is usually hand split along the natural grain of the wood either on one face or both. Each has its own benefits and application and the difference in appearance can be significant in achieving the look you may want to achieve.

Since we're talking "wood" we'll ignore the other materials that shingles are sometimes made from. What shingles and shakes have in common is that they are cut from a short section of log called a "bolt" which is either sawn or hand split. The timber from which they are sourced must be durable and stable and should be from old growth trees rather than quickly grown rotational trees.

Every inhabited continent has had its own timber variety that has proved suitable for the job but here in



Above: A shingle roof on the Fyffe Gallery, Kaikoura.
Left: A round house, Mangamā, Northland.



Left: Fyffe Gallery, Kaikoura. Right: Private home, Waiheke Island.

New Zealand we are more likely to have had contact with either the Australian hardwoods such as *casuarina* (sheoaks), a few of the suitable eucalypts such as *saligna*, *fastigata* and *jarrah*, or cedar (*thuja plicata*, western red cedar) which grows exclusively in the Pacific north west region of North America.

New Zealand grown cedar is very limited and likely to be a maximum age of about 80 years rather than the 200 years plus of most imported cedar. Further, while it may be a romantic challenge for an owner/builder to laboriously craft his own materials out of an acquired bit of suitable timber, a contractor will be looking for premanufactured materials in quantity with an assurance of quality. At present this means using either locally sourced eucalyptus machined into shingles, or the wide range of cedar products imported by New Zealand-based timber merchants from North America.

Imported cedar shingles and shakes can be obtained either treated (with a fire retardant and/or a preserva-

tive) or, for drier climates or where rainwater is to be collected, untreated. Weather exposure (the amount of shingle that is not overlapped by shingle above) varies according to material and application but is generally greater on steeper roofs, wall sheathing and in protected locations.

Shingles

- Shingles have a smooth uniform appearance and suit modern buildings where a less rustic effect is required. They come in a wide range of grades depending on application requirements. Quality is usually determined by amount of edge grain versus flat grain, frequency of knots, amount of sapwood etc.
- Used commonly as a wall cladding and found throughout New Zealand on gable ends since the 1920s. 'Designer shingles' in a choice of eight different designs can be obtained for fancy gable-end work.



Eucalyptus *fastigata* shakes on an Auckland house.

Product Feature: Timber

- Generally fixed on battens without building paper next to shingles. Traditionally, the non-use of a waterproof membrane ensured maximum ventilation and helped prevent rot through moisture accumulation.
- Available in lengths from 400mm-610mm, with 455mm being the most common length.
- Maximum weather exposure on roofs is 140mm. This gives triple coverage throughout roof.
- Can be nailed or stapled, preferably with stainless steel fastenings.

Shakes

- Shakes come in medium and heavy thicknesses and being less uniform than shingles, give a more rustic and "timbered" appearance. Using a heavy shake and setting it in a "higgledy piggledy" course increases this rustic, or textured look.
- The heavier shakes give greater durability, thus a longer roof life. The thicker butt-ends on "heavies" give greater shadow-line and thus more to catch the eye.

- Handsplit shakes are split by hand with a steel "fro" hit with a mallet following the natural grain of the wood. Splitting the shake along a line of natural grain gives it greater durability than a sawn shingle and thus its weather exposure can be increased. Increased exposure means less battens, fewer courses and less labour. However, the unevenness of the surface demands more skill in application and thus more time.

- Four types are produced: handsplit-and-resawn, straight-split, tapersplit, and taper-sawn. Lengths are 455mm and 610mm.

- In New Zealand we mainly use the handsplit-resawn variety, which has a machine-sawn back to give it a taper. More popular lately are the taper-sawn, which despite being sawn, are strangely called "shakes".

- Handsplits must be nailed rather than stapled on.
- Heavy grade building paper is woven into each and every course, which in turn provides triple coverage. Handsplits breathe much more than sawn shingles.



Above: A cedar log is cut into "bolts".

Below Top: Marlborough wattle and daub cottage built in the 1800s. Kahikatea and totara shingles have been later overlaid with corrugated iron.

Below Bottom: Private dwelling and workshop, Renwick, Marlborough



Notes on application

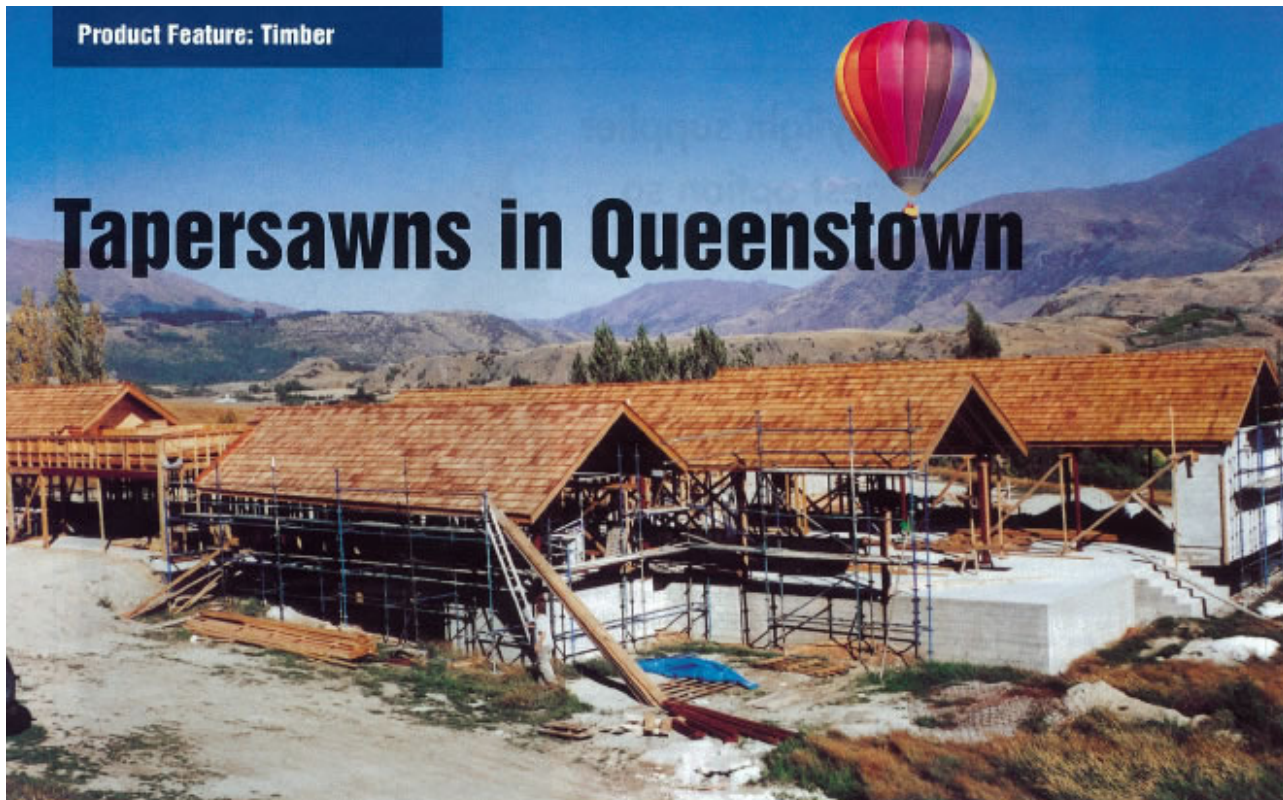
- Battens, 50mm x 50mm or 40mm x 50mm are the most appropriate. Solid sheathing and plywood should be avoided unless used under the battens. Battens at ridges, hips and eaves must be wider to ensure good nailing for caps.
- Capping should be done in the traditional way of machining bevelled caps to fit the roof slope. Metal flashings on high profile lines such as hips and ridges can do an injustice to an otherwise impressive roof.
- Ventilation of the interior roof space should always be considered with any roof, especially wood.
- Valley flashings should be of a material with a guaranteed lifespan of at least twice that of the roof.
- A double undercourse at eaves is a prudent option.
- All roof penetrations should be dealt with at the time of roof fixing.
- Shingle and shake availability should be confirmed months out from proposed roof fixing.

When I did my roofing apprenticeship in North America over thirty years ago, my boss said: "There's only one thing you need to know in roofing, and that's that water runs downhill". Although he was generally correct he hadn't been to New Zealand where wind blows water uphill before it reaches the gutters. Almost any builder could put a wood roof on, but as with many specialized trades, the specialist can do it cheaper and better. There is more to a timber roof than there is to one of corrugated iron: it's slow work but most houses beneath that fairly expensive timber roof are worth protecting properly.

As a final word of advice regarding appropriate roofing practice: a decent roof shout is the traditional guarantee of a leak-free roof. 🐉

Tim Newsham is a Blenheim-based roofer with specialist knowledge of all types of shingle and shake applications.

Tapersaws in Queenstown



Marlborough shingle and shake roofer Tim Newsham travels south for an encounter with a new version of an old timber roof.

During a recent fact finding trip to British Columbia I was shown a few variations on materials I have been using for years. Among them were tapersawn shakes - a Canadian-sourced cedar shake measuring 610mm in length, about 15mm thick and varying in width from 75-350mm. Since they are not handsplit but sawn both sides, one would think they'd be called giant shingles rather than shakes. Perhaps it is because they are long and thick enough to be set out at the same exposure as shakes that they have this name.

The export manager of the mill I visited reckoned tapersaws were the best thing since sliced bread. So, when asked on my return to price a job near Queenstown for both shingles and handsplit shakes, I decided to give a quote for tapersaws as a third option. Price-wise they worked out favourably, even though I had to factor in the cost of working with an unfamiliar material. The owner decided to go with the tapersaws. This pleased me - I had just suffered a case of tennis elbow and tapersaws can be fixed with a compressed air staple gun.

Hit the roof

In late January, when I knew the Otago sun would be pushing the mercury toward 40°C daily, my new unsuspecting apprentice and I climbed into my overburdened ute and headed toward "Central" almost a thou-



Top: A roofer's dream - four single-story gable ended structures with no hips or valleys. And a novel way of getting to work.
1: Building paper, two layers of undercourse, then the first layer of shingles proper.

Product Feature: Timber



2: The movable batten sets the shakes at an even height and the chalk lines on the paper mark the correct nailing position.

3: A well setup roof.



4: The last course of shakes is trimmed to the line of the ridge.



sand kilometres away. Purchasing a new air stapler, compressor and hoses specifically for this job, plus 30,000 rounds of 45mm divergent-tip stainless steel staples put me well in debt before we got under way.

The roof design was a roofer's dream: four single-story gable ended structures with no hips or valleys. After setting up a scaffold just below the eave we set up a string line for the overhang into the gutter and ran out the first roll of building paper - 30lb rag felt sourced from the USA.

The rolls are 910mm wide so I power saw them in half to get the right width to weave between each course. The heavy paper has advantages: it holds better and is easier to handle on windy days. Like 15lb

American felt, there are lines on the paper which saves snapping two chalk lines every course. The 30lb felt is so thick and long-lasting that it's like having another roof under the cedar shakes. Two layers of 15lb felt are sometimes used in place of the 30lb material.

Before the first course of shakes goes on an under-course, or "starter course" of shingles is laid down. These catch the water in the gap that occurs between each shake. Some years ago I started using two layers of starter shingles on all dwellings in case a crack developed in the shingle. Since I'm putting down two layers I feel confident using #2 grade shingles which are cheaper. The first layer of shakes are fixed (Photo 1) and lines are snapped and paper rolled out for the second course, which is 250mm above the eaves course. Since "face nailing" is a total taboo anywhere on a wood roof, it's helpful to snap a nailing line in addition to a setting line. This ensures all fastenings are sufficiently covered (Photo 2).

With the right air pressure the staples should penetrate to just the right depth: secure but not breaking the shake surface. A long batten set along the chalk line and tacked above the work allows one worker to place the shakes while another staples them on.

When fixing shingles or shakes it's often forgotten that while you must cover the gap between the shakes in the lower course, you must also make sure no gaps occur one above the other for the next two succeeding courses. This is a challenge which can turn a shingle roof into a giant jigsaw puzzle. If the puzzle pieces you want are to hand it's a breeze, but if you have too few wide shakes or a lack of variety, it can be a tedious and frustrating job.

We work with a razorsharp roofing hatchet rather than a hammer, as even tapersaws occasionally need to be split to size. Hand split shakes, on the other hand, have to be sculptured (or "re-manufactured", as the suppliers prefer to call it) to obtain tight gaps and a flat surface for the succeeding course.

Continuing up the roof there comes a point where we have to move off the comfort of the wide scaffolding and onto the roof slope. I have had special brackets made to allow me to place up to 300mm-wide planks about every 1.2m up the roof. I then set up horizontal



5: Ridge caps are cut to width and bevelled before being fastened with stainless fasteners.



6: The completed roof, its jagged ridge capping echoes the distant Remarkables.

platforms every few metres on which to unpack and sort the bundles. By doing this I ensure I have uncluttered planks to stand on, and materials sorted in front of me at hand and eye level. Considering that, as roofers, we spend most of our working life off the ground standing on a plank, it's paramount to be comfortable, safe and well setup (Photo 3).

Shakes continue above the ridge until there are at least two layers at the ridge. The last row of nails must be high enough to be covered by the ridge caps. The excess is trimmed back to the ridge with a powersaw before removing the scaffolding (Photo 4). I see a roof as the icing on the building cake and the capping off of the ridges as the final touch of perfection. It's common practice these days to put a strip of butynol under the caps; I go one step further and plug the gap between the final course of shakes with a dab of silicone to stop any wind driven rain.

Cap-width should be in proportion to the size of the

roof, usually between 100-125mm. I save the machining of caps for a rainy day and use a table saw with a tilting blade to get the bevel required by all caps except those on a 45° roof. As the lap on the caps alternates from side to side, caps of two different widths must be machined. Further, the thin tails should be trimmed back to achieve a nice straight line (Photo 5).

We used to have craftsmen, now we have silicone. But silicone doesn't diminish the importance of making sure all through-the-roof fittings are installed and properly flashed during roofing, something which requires close liaising with the plumber or chimney blockies.

A roof is only one part of a building but it's an important part. Therefore, it's important for architects and builders to liaise with the roofer from an early stage. Discussing details with the roofer before the working drawings are completed can save time, money and frustration. A roofer worth his salt should be able to suggest best practice and remove the guesswork. Organising sufficient lead-in time to ship materials to New Zealand may also be necessary. A job can run behind schedule, but when the roof is needed everyone expects the roofer to be on the spot, regardless of all else. This can be more easily achieved with good communication throughout the planning and building process.

The tapersaws on the Queenstown job were a success in all respects. I found them faster and easier to work with than any wood roof I've installed. The owner and architect were pleased with the look of the roof and the neighbours who tried unsuccessfully to block the ridge-top structure being built were probably pleased their view wasn't punctuated with a glaring and unnatural surface. Even before we said farewell to Otago's great swimming holes and spectacular horizons our roof was paling to the earth colours of the surrounding hillsides. Further, I was pleased to have put on another roof which, like the rest of the house, was made of wood. Who knows, it will probably outlast both the owner and myself.

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Note on exposure

Exposure is not just what you get when working on a roof in the South Island - it's also that part of a shingle which isn't covered up by the overlap of the next course above it. In other words, it's the visible bit that the sun and rain try to destroy. The material used, the climate and the pitch of the roof - or in the case of a wall covering, the durability required - determine the amount of exposure. The maximum exposure on roofs using shakes is 250mm. In the mostly dry climate of the South Island I feel comfortable with this, especially as I weave very heavy saturated felt building paper between each course. However in warm and humid climates like Northland, some suppliers recommend 190mm exposure, which gives triple coverage throughout. This would also be a prudent option where the pitch is less than 30 degrees.