Kilns To Go

Fans and dust collectors for the wood working industry were just the beginning for Windsor Engineering, who now dominate the timber-drying kiln market in New Zealand. This Wellington company has recently broken into the United States export market. LORRAINE BROWN reports.

BASED IN GRENADA NORTH, a small industrial village 15km north of Wellington, Windsor Engineering operates in a typical engineering environment: no-frills office space, a large workshop, rows of containers outside waiting to be loaded for the export market. With in-house expertise ranging from professional engineers around the boardroom table, to your hands-on tradespeople, Windsor is proud of its commitment to the development of engineering practice in New Zealand.

Windsor actually began as a furniture company (Windsor Castle Co.), and needed an efficient extractor and air filtration system. Founder Bill Studd took on the challenge of developing one. Mr Studd, an engineer from Canterbury University, was also with the Forest Service from 1972 till 1975, which showed him the need for better-engineered equipment for timber drying and dust filtration. One of the people he met there, Dr John Kininmonth, was leading research into high-temperature kiln drying with FRI (Forest Research Institute) at the time; he has just retired from Windsor Engineering after 12 years.

Interest from clients saw their range of fans and dust collectors develop into a spin-off business, generating turnover of $40,000 in 1975/76. Windsor Engineering was established in 1976. By 1980/81 turnover was $1 million, and with filter sales growing, Windsor moved into drying timber and kiln manufacture. Since 1980, Windsor has installed more than 400 timber-drying kilns, which handle about 75 per cent of all timber dried in New Zealand. Now they produce kilns, materials handling equipment, fans, dust and fume removal equipment, air pollution control and air filtration and noise control equipment, with current annual sales of $22 million. Each kiln is made to customers' specific requirements, balancing economy and quality.

Windsor's advanced technology drying kilns and filtration equipment represent a major part of the business. Accounting for around 70% of their overall sales, they are targeted at countries with plantation softwood similar to New Zealand pine. Windsor's main export markets are Australia (54%), Chile, South Africa and South Korea, and they see exporting as the key to future success.

"If we choose to only do business in New Zealand we could get left behind," says Chief Executive Peter McKee. International success is not just about evaluating the products already on the market. "It's about price, language and cultural expectations, where and how we manufacture, and the impact of duties and freight", he adds.

Share distribution

Peter McKee came to Windsor as their Financial Accountant 11 years ago and is now the Chief Executive, and a shareholder. He was the driving force behind a new share distribution last year. A 60% shareholding remained with the founders, and the rest was distributed among key staff. Although there hasn't been a marked difference in the way the company operates, there is more

awareness of the shareholders' involvement and input. Mr McKee believes the move has been very positive for Windsor, with more benefits to come.

It was also an important change for the founder, Bill Studd, with more sharing of responsibilities. Immigrating to New Zealand in 1960, he returned to the UK with a Bachelor of Engineering in Mechanical Engineering from Canterbury University. He began his career working on jet engines for Rolls Royce Aero Engines. Now in his late fifties, Mr Studd maintains his passion for the business.

After nearly 30 years the firm's international success has been recognised. Windsor won a 2002 Trade New Zealand Export Award for more than doubling their annual foreign exchange earnings to $7 million over the previous two years.

Windsor's ongoing challenge is to grow those annual exports to more than $20 million by opening up new markets, particularly for its timber-drying kilns. As New Zealand's log production increases, Windsor will follow the logs exported for processing offshore. They will be concentrating on Chinese, Korean, and Indonesian markets in particular.

The award-winning achievement was helped by government funding for research and development, with $100,000 from the Technology New Zealand Grants for Private Sector Research and Development scheme. The application process was exhaustive, but the funding facilitated on-going research into the continuous drying kiln, and helped them develop leading-edge technology for steaming logs for veneer processing.

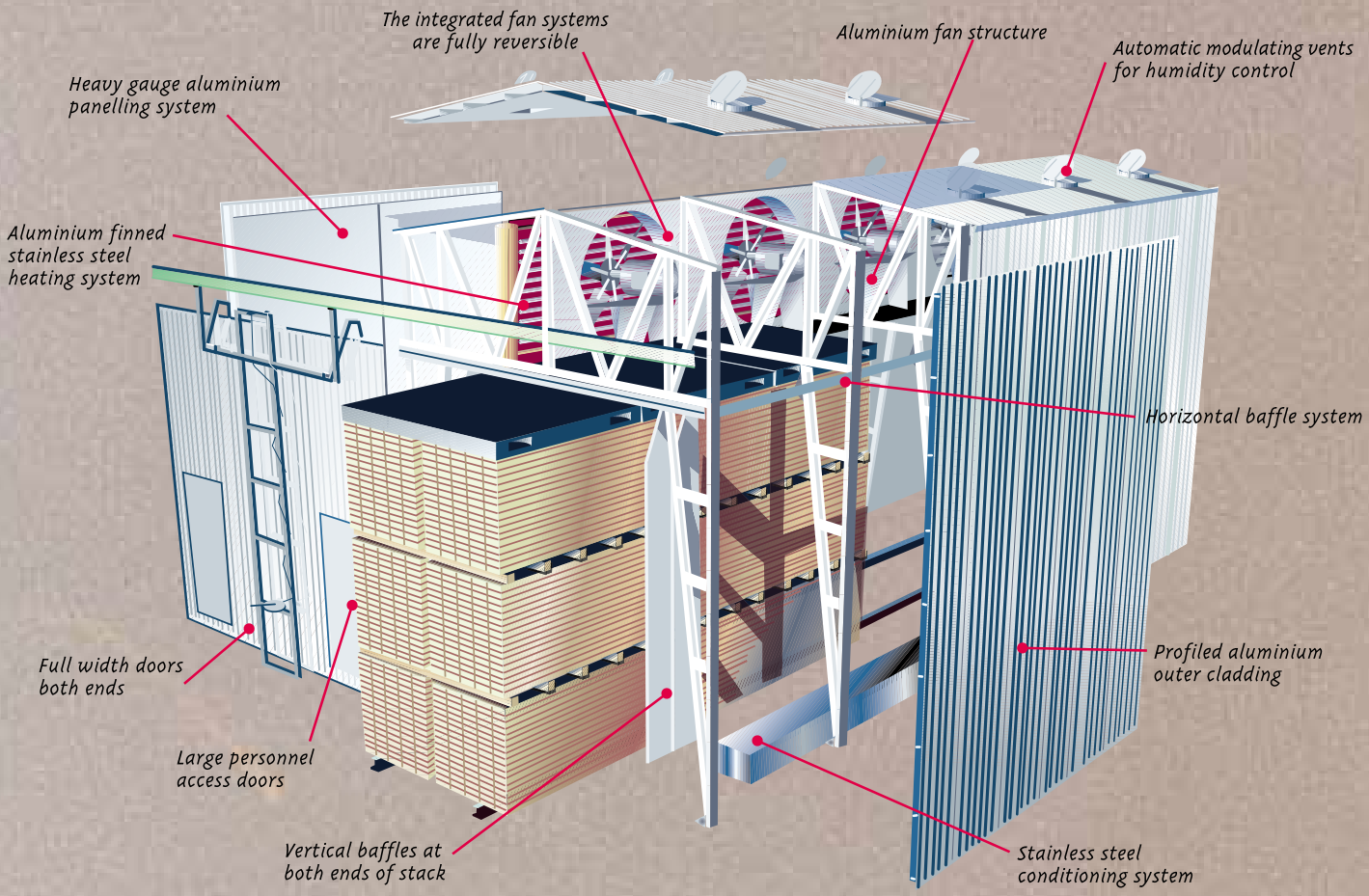
The result of this Windsor technology has been a big change for the wood veneer industry. "The logs peel better so there is less reject product and the resulting plywood glues better", says R&D Manager Tony Pepperell.

Mr Pepperell says that exporting has allowed Windsor to grow from a small engineering company to one controlling around 80% of the New Zealand kiln market; kilns now account for nearly three quarters of their production.

Think tank

Their R&D process is flexible. Mr McKee talks of a 'think tank', which takes its inspiration from individuals or group discussions, and is open to ideas from anywhere. They recognise that the best ideas don't always come from the obvious sources. They can grow out of discussions on site, at tea-breaks or lunchtime, or even from jottings on a pad beside the bed – "And sometimes it's the answer ... even the next world-leading idea," says Mr Pepperell. Often the marketing comes before the design. A concept is developed, and sold – then it's up to the design teams to deliver the product to the client. "Slightly risky," Mr Pepperell concedes.

Behind a successful business there is usually a strong team commitment, and Windsor is no exception. Their R&D endeavours rely on engineering expertise, which they value very highly, supporting its development with a commitment to the Apprenticeship Training NZ programme. Windsor currently has three apprentices on its staff. There are always



About the kilns

The key to commercial timber drying is to dry as fast as possible, whilst maintaining quality. Timber quality depends on a number of factors: some – such as the care of timber before and after drying, and the skill of the operator – are outside Windsor's control. Their brief is to maximise kiln performance, ensuring that schedule settings are reached rapidly, maintaining them within close limits, and keeping drying conditions uniform throughout the chamber.

Windsor's range of kilns covers schedules operating between 40° and 220°C to suit product specification. The reversible fans provide even airflow across the timber stack in the range from 3m/sec to 12m/sec. In high and ultra-high temperature kilns, rapid heat-up minimises schedule duration and provides plasticisation of the timber which in turn reduces distortion and twist during drying.

Most of the Windsor kilns use indirect heating for high-quality results, utilising combinations of high-pressure hot water, steam and thermal oil depending on temperature and duration requirements. They have also produced a small number of direct gas-fired kilns.

Boards dry at different rates, the differences being more pronounced in some timbers. This is offset by drying to an average moisture content 2–4 per cent below the final moisture content required, then conditioning the timber to bring it up to the required level and reduce variability. Conditioning uses steam at atmospheric pressure, generated in a water bath on the floor of the kiln. In-kiln conditioning is normal for medium-temperature kilns, conditioning in a separate chamber for high-temperature kilns.

Windsor offers either in-kiln steam conditioning systems, or stand-alone conditioning chambers for higher throughput operations. There are also single-track or double-track options, the more uniform temperature distribution of the single track giving superior drying results.

Various Dryspec and Kilnwatch control systems are available to meet particular needs. A special range of kilns also offers noise minimisation to meet statutory requirements.

The Windsor kiln range

Type	Timber temperature	Operating	Heatup	Drying time	Fillet velocity	Heating medium
Accelerated low temperature	High value appearance grades	40–80°C	8hrs	3–7 days	2–8 m/sec	HPHW, Steam, Thermal oil
Accelerated conventional temperature	High value appearance grades	80–110°C	4 hrs	36–80 hrs	6–8 m/sec	HPHW, Steam, Thermal oil
Medium temperature	High value appearance and structural grades	90–110°C	2 hrs	20–48 hrs	6–8 m/sec	HPHW, Steam
High temperature	Structural grades	120– 60°C	1hr or less	6–18 hrs	6–12 m/sec	HPHW to 140°C, Steam, Thermal oil
Ultra-High temperature	Structural grades	160 – 220°C	1hr or less	3–8 hrs	7–16 m/sec	Steam, Thermal oil

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at least three, and sometimes as many as five or six.

They see a sad lack of general commitment by industry to educating future generations of engineers. New Zealand has the infrastructure to develop good design people and experienced engineers, but there is a general lack of support for those coming through the system. The assumption that the "market" would provide the skills that were needed has proved to be mistaken.

"If the bigger engineering groups don't accept responsibility for training people themselves, for their own needs, then they can't blame the high school leavers choosing to do something other than engineering", says Mr Pepperell.

Mr McKee agrees. "I don't think there is enough encouragement [for] young people to look at engineering as a career option". This applies to professional engineering, as well as the traditional trade area. Windsor run a graduate recruitment programme, where they offer a recent graduate a two-year contract. Although there is no ongoing commitment after the contract has expired, they often hire the graduates in question. But each year recruiting becomes more difficult – the pool seems to have become smaller, and many graduates head straight overseas. Windsor themselves have recently employed several migrant engineers, whose applications were the strongest received for the positions advertised.

Their business competitors are taken very seriously. While Windsor may dominate the New Zealand market, their international competitors are in Germany, Italy and North America. The main competitor is Germany; support from banks allows German manufacturers to come into NZ and sell product for a small down-payment, with finance at low interest rates for five years – something New Zealand manufacturers can't match.

New drying processes are being proposed all the time – such as microwave or radio-frequency drying – so Windsor has to keep up with current ideas. Competitors have made claims that sounded very good, for products that seemed quite sound on paper, and perhaps an improvement on Windsor's own systems. To counter such claims they spent money assessing one product that used a technology quite different from their own to see if it could really perform as claimed. They built a prototype vacuum dryer, on a commercial scale. After a six-month series of tests, they concluded that the product didn't add value at all. The $300,000 test model still sits on the Granada site. Findings from the investigation were made available to FRI and the industry.

Their clients appreciate the way Windsor push the boundaries of the kilns, as they themselves are trying to be the leaders in their own industry. "Sometimes our equipment gets a much harder time than they say it's going to," says Mr Pepperell. They confess that they have many special clients, who contribute ideas for new products; the combined expertise of both companies often results in the next great product.

Service and satisfaction

So what's their edge? Apart from their superior product, customised solutions to suit each client, and delivering on time, it's about customer service and satisfaction, pure and simple.

"In just about every industry, face to face contact is most important – the clients are often under a lot of pressure to choose someone else's equipment or buy cheaper," says Mr Studd. And Windsor will go the extra mile – literally: when a small client in a remote location phones and says "Everything's going fine but you guys said you'd be dropping in," Mr Studd's response is to drop in.

Always on the lookout for opportunities, they have been involved in developing a joint-venture border biosecurity product with three partners. It uses kiln heat to disinfect imported vehicles, removing environmental threats such as the Asian Gypsy Moth. Tests have already been carried out, again with funding support through Technology New Zealand.

Windsor broke into the United States market in 2000 with a sale to forestry giant Weyerhaeuser in Arkansas, the biggest timber company in the world. Its softwood is similar to New Zealand's radiata pine so the Windsor kiln technology lends itself well. They are confident of increasing their penetration of this promising market over the next few years.

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