50 YEARS & GROWING

THE HISTORY OF PAN PAC
VOL. II 1993-2023
MATTHEW WRIGHT

PAN PAC™
FOREST PRODUCTS LTD

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FUMIO SHINDO

REPRESENTATIVE DIRECTOR OF THE BOARD, EXECUTIVE VICE PRESIDENT
FORMER CHAIRMAN, PAN PAC FOREST PRODUCTS LTD (2019-2022)
DIRECTOR OF THE BOARD, SENIOR EXECUTIVE OFFICER,
OJI HOLDINGS CORPORATION.

Pan Pac Forest Products Ltd (Pan Pac) is a key member of Oji Group's Forest Resources and Environmental Marketing Business. Pan Pac was the first major overseas investment for the Group. As such, Pan Pac has been committed to the innovative manufacture of quality, value-added products and the development of new markets for them.

Pan Pac's business model is characterised by an integrated production line from forest to pulp and lumber, the products from which are exported to over 16 countries. As a result, Pan Pac has been able to maintain stable profits in the face of economic fluctuations of individual countries and product lines.

In line with one of Oji Group's management philosophies, 'Harmony with Nature and Society', Pan Pac's operations contribute towards Oji's Environmental Vision 2050 and Environmental Action Program 2030, through conserving biodiversity and the protection and cultivation of rare animals, such as the kiwi and other native species, as well as through the Pan Pac Environmental Trust that was established in 2020.

Pan Pac has also obtained Forest Stewardship Council® (FSC-C017103) Certification for its Forests and FSC® Chain-of-Custody Certification (FSC-C006931 and FSC-C106229) for its Pulp and Lumber mills.

As for its individual businesses, Pan Pac's Pulp business has been supplying mechanical pulp (TMP) to the Oji Group for nearly 50 years—almost since Pan Pac was founded. As described later, in 2012 Pan Pac started producing bleached chemi-thermomechanical pulp (BCTMP) and supplying it to companies outside the Oji Group. This is now the main product of the Pulp business.

In the forestry sector, Pan Pac is the largest forestry grower in Hawke's Bay, owning around 35,000ha of forest , managing around 1.5 million tonnes of wood, and exporting 400,000 tonnes of logs to China and other countries for earnings of around $200 million in 2020/21.

In terms of lumber, Pan Pac is New Zealand's largest producer of appearance grade lumber and exports its products to the US, China and other countries for use in windows, doors, mouldings and solid-wood furniture. In 2020-21, sales volume for lumber from both Pan Pac's Whirinaki and Otago operations was just under 500,000m3 with a value of over $200 million.

The Oji Group is looking forward to the further development of Pan Pac and will continue to support Pan Pac's growth strategy through capital investment.

In 2020, Oji invested in an upgraded Goldeneye scanner in the Lumber business to improve throughput and increase the outturn of higher-grade lumber. In 2021, another Oji investment resulted in the construction of an onsite kiln-dried warehouse, capable of storing up to 14,000m3 of kiln-dried product, driving greater efficiencies. Oji has also approved an upgrade of Pan Pac's sawmill log infeed facility, which is currently underway and scheduled to be completed in 2024. This upgrade will secure the sawmill's future and provide a safer and more efficient operation. The new infeed provides the basis for an increase in capacity and the introduction of new technologies in the future.

As mentioned above, Pan Pac had been supplying TMP to Oji Paper's mills in Japan since its founding. However, with the declining demand for newsprint in Japan, in 2012 Oji invested in Pan Pac's transition to a state-of-the-art screening and bleaching plant to produce BCTMP, which is used in board, towelling and paper products. In July 2021, following its final order from Tomakomai, Pan Pac ceased TMP production and transitioned to 100 percent market based BCTMP supply, producing up to 850 tonnes of BCTMP daily.

In addition to this, Pan Pac is actively promoting investment in the safety of its employees at work and in improving the local environment.

Oji looks forward to continuing to support Pan Pac's growth strategy and contribution to society.

Deputy Managing Director Kazuya Shimma (2015-2023) and Managing Director Tony Clifford (2020 - present)

INTRODUCTION
30 YEARS AT PAN PAC

TONY CLIFFORD | MANAGING DIRECTOR

It is with a great sense of pride that I present this introduction to the next instalment of the Pan Pac story. I joined Pan Pac in March 1992, so I was a new starter when we celebrated the first 20 years of Pan Pac in 1993. I have been fortunate over the last 30 years to work across most business units and subsidiaries of the company. Change is in the eye of the beholder and in my eyes, I have observed significant change in these last 30 years. When I began with Pan Pac our range of products were few. The sawmill produced green flitch for Japan and green dimensional boards for the New Zealand market with most of that going to CHH Waitane in Onekawa for remanufacturing. The pulpmill produced TMP for the shareholder's mill in Tomakomai. Today the Lumber business produces kiln dried, clear and sawlog grades of dimensional lumber for customers across the Pacific and Europe. The pulpmill converted from TMP to BCTMP in 2012 and now supplies packaging grade pulps to China, India and other countries.

In these 30 years not only have the production facilities been significantly upgraded and remodelled but the organisation structure and the changes and expectations on all employees have been numerous. In the late 1990s, the centralised workshops and project engineering teams were decentralised out to the Lumber and Pulp business areas to allow more specialisation, focus and growth in people capacity. The central support services of Health and Safety and Human Resources have grown from two people to a team of over 20 as the number of employees grew and the expectations from society and the shareholder increased. The IT division that had one person supporting our emerging network and server now numbers over 30 people and provides support for everything from cell phones to servers and software. The Forestry business was added to the Pan Pac name when Hawke's Bay Forests merged with Pan Pac in 1999. This created a whole new business unit now numbering more than 40 staff who manage the 35,000ha of estates across Hawke's Bay.

We are embarking on further developments, with the pulpmill undertaking feasibility to recover primary refiner heat and expand the annual mill capacity from 270,000 air-dried tonnes (ADT) to 340,000 ADT. The Lumber business is investigating the addition of CT Scanning at Whirinaki and the Phase 3 developments for Otago continue to be progressed.

While those items noted above have changed over the last 30 years, there remain some constants. We remain specialists in growing, harvesting, processing, selling and distributing radiata pine-based products to an international customer base. The people and culture of Pan Pac continues to evolve and we continue to present to our Shareholder as a viable and important part of their international holdings.

This book has been written by Matthew Wright, one of New Zealand's most published historians and author of the earlier Working Together, which covered the history of Pan Pac from its founding into the early 1990s. Content is drawn from Pan Pac Post, (internal company magazine) from interviews with staff, and from statistical data and other material held by Pan Pac, among other sources. I'd like to thank Matthew for his work; and my thanks also go to all those involved on the Pan Pac side: Kimberley Moody, project manager and liaison within Pan Pac; Kazuya Shimma; and the managers and staff who contributed time and information to this book.

RONGO AND SOROBAN

(THE ANALECTS OF CONFUCIUS AND ABACUS)

KAZUYA SHIMMA | DEPUTY MANAGING DIRECTOR (2015-2023)

I am delighted to be celebrating Pan Pac's prestigious 50th anniversary.

I joined Pan Pac in 2015 as its eighth Deputy Managing Director and was with the company for eight-and-a-half years. As a result, I am Pan Pac's longest-serving Deputy Managing Director.

Pan Pac's shareholder, Oji Holdings, was originally a paper company founded in 1873 by Eiichi Shibusawa, the famous industrialist who founded many of Japan's companies. Coincidentally, the year 2023, which marks the 50th anniversary of Pan Pac's operations, also marks the 150th anniversary of the founding of Oji Holdings' predecessor paper company. Oji, in Tokyo's Kita Ward, was chosen as the site for the paper company's factory. Oji was chosen because of its proximity to a river that provided large quantities of clean water for the papermaking process, the availability of cloth rags, a raw material for paper at the time, and its proximity to central Tokyo, a major consumer of paper. The site is now a commercial centre and golf course, but on the other side of the tracks from Oji Station on the Japan Railway line is the Paper Museum, the former home of Eiichi Shibusawa, and the Shibusawa Eiichi Memorial Museum. If any readers have the opportunity to travel to Japan, they would find it interesting to visit these places.

The company was originally called the Syoshi Company, meaning "paper-scooping company", but in 1893 it was renamed Oji Paper, after the town where it was founded.

The company's founder, Eiichi Shibusawa, is regarded as the "father of Japanese capitalism" and was instrumental in the establishment of some 500 companies, including the Tokyo Stock Exchange and the forerunner of today's Mizuho Bank. He was also instrumental in establishing a number of schools.

The book Rongo and Soroban = The Analects of Confucius and Abacus, which is based on a talk given by Eiichi Shibusawa, is still read by many Japanese. Rongo is a book that records the sayings and deeds of the famous Chinese philosopher Confucius (551 BC–479 BC), whose ideas have long influenced many in China in the form of Confucianism.

Soroban (abacus) is an ancient Chinese and Japanese tool for making calculations and is a symbol of commerce.

Eiichi Shibusawa had much to say in his book Rongo and Soroban = The Analects of Confucius and Abacus, but one of the main points he was trying to make was that both profit and morality are important in business. This means that you must be useful to the world and you must help people. In other words, if a business does not help the world and meet the needs of people, it cannot continue to make a profit and there is no point in doing it.

This applies to Pan Pac's business as well. We work every day to ensure that our business remains useful and sought after by our customers, employees, suppliers, the country of New Zealand itself, the people of Hawke's Bay and the Otago region, shareholders, banks, ports, transport companies and all other stakeholders.

It is important that we make decisions that, while possibly impacting the company's profits in the short term, are decisions that we believe will help the company in the long term if they are based on a business or investment that will benefit our stakeholders.

On the other hand, a business that does not serve its stakeholders but merely pursues its own interests will not do well. A simple example of this is our investment in safety and the environment. A core principle behind management of the Oji Group, including Pan Pac, is that we cannot grow our business in the long term without first making safety and the environment our top priorities.

ABOUT THE NEW ZEALAND AND JAPANESE TEMPERAMENTS

One of the most refreshing and striking things about working in New Zealand for me as a Japanese person is the way people here enjoy their lives and are much freer to express their opinions than in Japan, despite the differences in corporate positions. As you may know, in Japan, a very disciplined culture prevails, which is a good thing, as it leads to good security, including in emergencies, and excellent public transport. But on the other hand, it also has its downsides, such as a constrained way of living and more rigid, hierarchical relationships.

When I was living and working in Japan, I thought it was normal to live in such a constrained way, but after working here, I realised that there is another a way of life—a New Zealand way.

In Japan, economic development is no longer the only thing that matters, and diversity of thought is gradually becoming more accepted in society. However, compared to New Zealand, Japan still has a lot of things to improve. When I return to Japan in the future, I hope to use my experience here to contribute to making Japan a more vibrant place for people to work.

CHAPTER ONE
JOINT VENTURE

Pan Pac Forest Products Ltd (Pan Pac) has been an icon in Hawke's Bay for half a century, a major employer for the district and a significant contributor to the regional economy. The Pan Pac story has also been very much one of working together within the company, with suppliers, and with its Japanese joint-venture partners and later owners. During that half century the company has experienced highs and lows, has met challenges ranging from economic change to weather-driven regional disaster, and has constantly innovated to develop new products, new markets and to expand its expertise in the field.

The first two decades of Pan Pac's operations were detailed in the first book about the company's history, *Working Together: the history of Carter Oji Kokusaku Pan Pacific Ltd 1971-1993*, but to give the subsequent three decades due place this early story needs briefly re-telling. Pan Pac had its origins in the late 1960s with a chance meeting between Malcolm Martin, then the purchasing officer with Auckland timber merchants Carter Consolidated Ltd (Carters) – and Noel Hardy. From Hardy, Martin discovered that there was demand in Japan for mechanically produced wood pulp, a key ingredient in paper manufacture. The next day, he mentioned the issue to Richard and Ken Carter, who were in charge of finance and production. It happened that the company was looking for ways of using waste timber that was otherwise being burned. Turning that to pulp was an obvious option, and the two brothers mentioned it to their father and company owner, KCA (Alwyn) Carter. He was enthusiastic.

An effort to engage with business in Japan followed. It was a bold step. At a time when New Zealand's primary trading partners were Australia and Britain, Japan was a largely unknown quantity. New Zealand trade there was minimal, and New Zealand's business operations of the day were framed by a raft of regulations that intruded into many aspects of commercial operations. Nonetheless, the new market had clear potential, and Ken Carter first flew to Japan in 1968 to investigate the possibilities. That became the first of 14 such trips between then and 1972, totalling around a million miles of travel at a cost of around $100,000. His work was facilitated by Hozumi Tanaka and the Tokyo representative of US company Bauer and showed that there was a market for refiner groundwood pulp (RGP) in Japan.

The project soon gained a further dimension. While negotiations continued in Japan, Carters looked into establishing a pulping plant near Pōkeno, intending to feed it with surplus timber from their operations across the region. The smallest plant that could be economically operated would need to produce some 400 tonnes of pulp a day, demanding far more wood than Carters had available from their regional surpluses. That implied getting

cutting rights to a forest – and that, in turn, meant adding a sawmill to the mix to make best use of the wood that could be milled. As it happened, the government began looking for a buyer for a one-time surplus of wood coming to maturity in the enormous Kaingaroa State Forest in early 1969. This gave focus to Carters' efforts, which extended in Japan to finding buyers for lumber.

These steps produced a fundamental change of concept and scale. What had begun as an effort to turn waste-wood into a modest quantity of pulp was, instead, going to be a much larger project involving both pulp and lumber production. However, Carters stepped up to the challenge. One option was to seek a joint venture involving a Japanese company, opening up a source of capital and guaranteeing a market for the pulp. By early 1969, negotiations were underway with Kokusaku Pulp Company (Kokusaku), envisaging a 50:50 joint venture based around a plant near Napier in Hawke's Bay that was within road-transport distance of the forest to be cut.

Kokusaku produced about 45 percent of Japan's paper needs at the time and was interested in the Kaingaroa timber as a source of raw materials. The company sent a team to New Zealand in July 1969 to investigate. One of the members, Mr S. Tejima, recalled later that he was "overwhelmed" by the "boundless expanse" of the forest that reminded him of forests he had seen in Germany and Canada, but was all the more impressive because it was "completely artificial" and made of "a few fast-growing species such as Radiata, Douglas fir and so on."

Negotiations between Carters and Kokusaku went ahead throughout 1969, in parallel with the effort to obtain the timber. In a further bold move, Carters decided to bid for all the available Kaingaroa timber. This committed the company to a venture of significant scale, likely to double their turnover, and was a major step for Carters. At the time, the company operated seven plants across the North Island, from Auckland to Wellington. But they were not in the league of the main players in the New Zealand timber market, such as New Zealand Forest Products and Tasman Pulp and Paper. Adding a major pulp-and-sawmill operation to the mix was going to propel them into that larger club.

Carter executives flew to Japan in August 1969 to finalise arrangements for the proposed joint venture with Kokusaku, opening the way for a formal bid for the surplus Kaingaroa wood the following month. Nine other companies also bid for the timber, including New Zealand Forest Products, Robert Holt and Sons and the Japanese-based Oji Paper Co., Ltd (Oji). Government criteria for assessing the winning bid were complex, including estimated profitability of the industrial developments that might follow, likely foreign exchange earnings, and potential for new overseas markets. The Carter joint-venture proposal was unique, prompting the Deputy Director-General of Forests, A. P. Thomson, and R. W. M. Williams to go to Japan to investigate further.

This level of official interest was unprecedented, and what followed was described by Richard Carter as a "dirty tricks" campaign, in which other interested parties apparently attempted to squeeze out the Carter bid. Allegations included suggestions that the company might have difficulty managing a venture of the size now being proposed. The Director General of Forests, Lindsay Poole, finally told the media that the pressure tactics being deployed against Carters were "almost sickening". The commercial politics certainly complicated the tendering process, which eventually stretched from 6 months to 15, drawing government attention into detail such as plant location.

Where to locate the proposed plant was another issue that had potential to become contentious. The government did not want another 'timber town' such as Kawerau. However, Napier – a major centre in its own right on the east coast of the North Island – was a different matter, and as far as Carters were concerned had been lead contender from early in the process. It was physically closer to the available timber than Tauranga, and Napier's breakwater harbour was one of the main export harbours in the country at the time. In general, the idea was welcomed at regional level. Some Forest Service officials suggested there was a risk that a pulpmill using Kaingaroa timber near Napier might inhibit Hawke's Bay's own exotic production forests that had been under active development since the early 1950s. But to others, including local Forest Service officials, those same forests – given further time to grow and mature – offered every potential to keep the mill going from Hawke's Bay resource alone.

From Carters' perspective in 1969-70, these debates stood alongside the need to secure the Kaingaroa surplus as key to starting the whole venture. That took due time to resolve, but in September 1970 the government offered a compromise. About two-thirds of the total surplus – 220 million cubic feet – was offered to Carters for their proposed joint venture and plant near Napier. The remaining one-third went to Tasman Pulp and Paper. It satisfied nobody; Tasman Pulp and Paper objected on the basis that this quantity was not economic for them. It was also a problem for Carters; by this time the joint venture had been largely hammered out and the expected plant scaled on the basis of the full amount. Other sources of timber were now going to have to be found to make up the shortfall.

THE KAINGAROA STATE FOREST

The Kaingaroa State Forest was a key initial resource for Pan Pac. The wood surplus from the late 1960s made the joint venture and Whirinaki plant north of Napier possible in the first place and supplied much of the radiata pine required for early operations.

This forest – State Forest No. 1 – was the first and largest of the state forests planted by the government from the early twentieth century, largely to make use of land that was unsuited for pastoralism. The site was selected by the government in the late 1890s on the back of settler reluctance to use the relatively unproductive land of the central plateau. A nursery was established at Whakarewarewa, near Rotorua, in 1898, and planted the following year in pine seedlings. Other plantings went in at Waiotapu, and by 1910 experimental plantings of Corsican pine (Pinus nigra, var. austraiaca), various eucalypts, Radiata pine (Pinus radiata), and Douglas fir (Pseudotsuga menziesii) were being tried. On the basis of this early work, planting began in the Kaingaroa district in the First World War, initially under the auspices of the Ministry of Lands.

In 1919, the government formed the State Forest Service, under Leon MacIntosh Ellis, to oversee and develop exotic forests across New Zealand, all with an eye to timber production. However, Ellis had further ambition, also visualising a pulp industry. Work began in earnest on a planting programme to create a production forest in the Kaingaroa district in the late 1920s. This gained pace with the Great Depression, where tree-planting became a way of soaking up the unemployed. By 1935, a total of 121,405ha had been planted across the central plateau. An experimental sawmill run by the Forest Service began operations in 1940 as the first plantings came to maturity, and after the Second World War, the government granted Tasman Pulp and Paper a 25-year right to fell trees for pulp. A mill at Kawerau began operations in 1955. Two years later, exports began of whole logs to Japan.

All was underpinned by a government decision to expand its state forests across New Zealand, including in Hawke's Bay. The future of production timber in New Zealand seemed bright. Prospects became brighter still when a 1965 survey indicated that a good deal more wood was available from Kaingaroa, across a shorter timeframe, than previously estimated. This opened up the possibility of new industry, and there was talk of a pulpmill in Hawke's Bay. In the end, this surplus went to the Kawerau mill. However, in 1967-68 new methodology suggested that the sustainable yield from Kaingaroa was likely to be even higher. Then the storm that sank the 'Wahine' tore across the country, revealing that pre-war plantings, especially, were vulnerable to wind-throw.

That last issue drew prompt Forest Service attention: discussions under the Conservator, Andrew Kirkland, turned to whether a heavy cut was possible in the older blocks to reduce that risk, all without affecting ongoing projections for longer-term production. The unexpected additional yield discovered in the timber suggested this would be possible, creating the one-time surplus that drew attention from Carters. Kirkland arranged for 320 million cubic feet of timber (9,061,391 cubic metres) to be advertised for tender in May 1969.

THE PLANT AT WHIRINAKI

Initial plans for the joint venture with Kokusaku were straight-forward. The concept called for Kokusaku to buy the entire output of the intended plant – pulp and lumber – and ship it to Japan on dedicated vessels. That gained complexity when Kokusaku executives realised they could not take all the output of the planned mill. However, another company, Oji, was also interested. This company had been founded in 1873, opened its first paper mill in 1875, and in 1910 set up what became the world's largest newsprint-making plant at Tomakomai. They were a significant player in the Japanese paper market and by the late 1960s were looking overseas for wood supplies – including Kaingaroa timber as a possible source of chip-wood. The joint venture promised to add value in New Zealand, and Oji was brought in on that basis.

The specifics of the joint venture that followed were guided by New Zealand government regulation. Negotiations revolved around a 50:50 split between Carters and its Japanese partners, but New Zealand law of the day required 60 percent local ownership. This had to be complied with, but for practical purposes the split at operational level was 50:50. The practical shape of the venture, including a focus on a plant to be built near Napier, was finalised by late 1969, waiting only on the confirmation of Kaingaroa timber. As conceived, it created a captive market for the new company that would send pulp and lumber that was cut into flitches suitable for pallets and other industrial uses. Production was projected on a cost-plus basis: costs would, of course, be minimised but the general concept was that of a guaranteed profit for the supplier.

As a major and – at the time – relatively rare venture by New Zealand business in partnership with foreign companies, the joint venture had significant profile even during the planning stages. The Japanese ambassador, Kenijiro Yoshida, visited Napier in November 1970 and told city officials that pulp was in high demand in Japan, calling for closer relations at all levels. For a while there seemed to be the possibility of further trade leveraging off the joint venture. Due to Japanese import regulations, a new company, the Nippon New Zealand Trading Company (NNT),

was set up by Oji and Kokusaku to facilitate the timber and pulp sales contracts. The company had a wide ambit with interest in wider trade than simply pulp and timber, although in the end only a handful of other exports joined the list.

The joint venture was formally brought into being at a ceremony on 3 May 1971, in Auckland, by Alwyn Carter (Carters), Fumio Tanaka (Oji) and Kazuo Yoneda (Kokusaku). Greetings commemorating the event were recorded on a ceremonial scroll that later took pride of place in the Carters office. Other contracts were signed, confirming 20 years' worth of pulp and lumber sales. The company formed by the joint venture, Carter Oji Kokusaku Pan Pacific Ltd – 'Pan Pac' – was incorporated the same day. Carter Consolidated had 60 percent of the holdings, the two Japanese partners 40 percent. Initial authorised capital was $4 million, of which $2.5 million was fully paid up, the remainder set aside for a projected Stage 2 of the Hawke's Bay plant. In early 2020s' values the total was around $60 million. The Directors were: Alwyn Carter (Chair), W. D. Barclay, Ken Carter, Richard Carter, Kazuo Yoneda, Fumio Tanaka and Mr I. Kumeda. The next day, the signatories flew to Napier to visit the farm near Whirinaki that had been selected as the site for the new plant, followed by a celebratory dinner at Napier's La Ronde restaurant.

In this way Pan Pac was founded, emerging as a unique international venture that brought Japan and New Zealand businesses close together. Later, some Pan Pac staff considered the relationship closer to a marriage. It was a bold step at a time when New Zealand's economy was fenced with regulations and international constraints, underscoring the faith both parties had in each other, and in the future of the pulp and timber industry globally.

The first challenge was constructing the plant on the Whirinaki site – literally a green-fields effort built from bare ground. The site had been chosen only after a good deal of debate. Early planning looked at a range of possible sites, including siting the mill adjacent to the Napier breakwater harbour facility. This was rendered impractical on the back of Napier Harbour Board's own plans for development, which included reclamation timing that did not suit the needs of the joint venture. Another option was building the mill adjacent to the forest, on the basis that a fleet of trucks was going to be needed to carry the logs to Napier anyway and could as easily carry processed product. However, a remote forest edge on the central plateau carried with it issues of labour force, quite apart from risk attached to longer-term timber supply. It was recognised from the outset that Kaingaroa would only be an initial source and other sources would be brought in later, notably the state forests in Hawke's Bay that were likely to be approaching maturity as the Kaingaroa cut ran out.

By these measures, a site near Napier was the only realistic choice. It happened that a farm owned by Cecil Smith, near Whirinaki, met the criteria: it comprised 52.6ha of flat land backed by 352ha of hill country. It had a good water supply – essential for a pulpmill – and met a Japanese

requirement of being close to the sea. The land was thought able to support heavy buildings, and the site was within reach of Napier's export harbour. It was also within driving distance of Napier, where the majority of the workforce was expected to live. To facilitate the commute, the company envisaged a bus service between Napier and the mill. Smith was prepared to sell, and an engineering delegation from Kokusaku visited the proposed site in October, confirming its suitability.

Formal consents were needed from the Hawke's Bay Catchment Board and the Hawke's Bay County Council before the deal could be finalised. However, while the economic benefits of the plant were universally welcomed, the location prompted local protests, notably over the intended draw from Esk River. The river was a primary water source for the district, from which the mill intended to take 9.46 million litres a day. Local residents were also concerned that they would end up living next to what was described as a 'belching, screaming monster". These issues were met head-on by Carters, who wanted a consultative approach that took the neighbours into consideration. The company commissioned an investigation by leading expert T. J. Sprott, who discovered that the water draw would reduce minimum dry-weather water depths in the Esk River by about 9.3 millimetres. Nor was this the source for the water used in Whirinaki's small urban area. Similarly, the plant was going to be well-screened from the residential streets on the other side of State Highway 2, and effluent was going to contain – at most – 300 parts per million of wood solids.

Draft plans for the mill were published in December 1970. Test bores in the Esk River showed that Sprott's analysis had been correct, opening the way for Pan Pac to be granted a renewable 10-year water right by the Hawke's Bay Catchment Board. Gaining final consents made it possible to finalise arrangements to buy the Whirinaki site. Negotiations took some time; however, Smith finally agreed on a price of $250,000 (about $3.7 million in early 2020s values). That set the plant on its way, and the pressure went on to make progress. Initial plans called for production to begin by the end of the 1972 financial year. Tenders to build the plant to a tight 18-month schedule were called later in 1971, won by a consortium of Downer and Company with Comstock International.

Construction was a classic green-fields operation, starting from bare ground. Pan Pac hired Bill Hodge – the first Pan Pac employee – as project manager. He came across from Tasman Pulp and Paper, where he had been senior engineer. Others were hired to form the nucleus of a construction team to support Downer. The first construction offices and temporary workshop were set up on site in October 1971, and in November Downer called for carpenters – effectively, the first jobs provided by the mill project as a whole. Finding these tradespeople was not so easy: this was an age of high employment. However, by December, around 55 employees were on site including carpenters, engineers, drivers and labourers. Some were contractors, others were employed by the construction companies,

and a few were employed by Pan Pac itself – the first employees of the new company. For the first few weeks there was no phone connection to site, forcing Hodge to rent a house in Westshore as a temporary contact office. Other challenges included water: the Hawke's Bay Catchment Board refused to allow a draw of 11,356 litres an hour from the Whirinaki stream, forcing the constructors to run pipes to the Esk River.

The Whirinaki stream was a challenge in other ways: a flood-channel had to be built for it, crossing both State Highway 2 and private land. Hodge found the National Roads Board challenging to deal with, and then ran into a hostile private landowner. They agreed to finally meet, as Hodge put it, "Early in the morning on the bridge by the State Highway". This provoked office jokes about a shootout at dawn, but the meeting went very well and Hodge was able to get an agreement. Still, it was, as he put it: "Some days before people stopped asking me about the shootout".

Period bureaucracy was not limited to the road. This was the age of foreign exchange restrictions, and much of the key equipment would have to be imported. This carried potential challenges and complications, but Carters was able to obtain a blanket license, enabling more than $2.2 million worth of plant to be brought into the country (about $32.8 million in early 2020s money) including six 15-tonne refiners made by Swedish company Defibrator Ltd, motors to drive them from Japan, Kamyr dewatering gear from Canada, and flash-driers from Svenska Flaktfabriken.

All this had to be paid for. The initial project plan forecast costs of $8.5 million for this phase,about $126.7 million in early 2020s money. However, by late 1971 a 27 percent increase in wages over the development period – a result of New Zealand's burgeoning CPI inflation problem – had sent that spiralling to an estimated $12 million. The money was provided from three sources: Oji, Kokusaku, and a 10-year 4,004-million-yen loan from the Export-Import Bank of Japan. Alwyn Carter, Sprott and Mr K. Yonekura went to Japan to sign for the loan in April 1972.

Construction went ahead at pace during 1972, and by October the main buildings were up and much of the heavy equipment was in place. One of the larger items, an 86-tonne debarker, arrived by road from Auckland late that month. The construction effort was not limited to the Pan Pac site alone: one key consumable was electricity. This required a sub-station next door, which was built by the Hawke's Bay Electric Power Board. By early 1973 all was coming together, essentially on schedule. Commissioning work – getting the plant into operation – began well before construction was finished. The particular combination of equipment in the pulp process, including the dewatering plant, was unique, rendering the whole task essentially blank-page territory. One result was that the manual for the pulp operation – about 500 pages – had to be written from scratch by Jim Scott and other senior staff. Scott had long experience with the Caxton mill at Kawerau. Other work went into getting the chipper going. The pressure was on – for tax reasons, official

operations had to begin by 31 March 1973, and because initial wood supplies from Kaingaroa were still some weeks off, the mill actually began operations with timber brought in from Hawke's Bay plantings.

It had all been a rush, and some work remained to be done after operations commenced. The mill was officially opened on 27 June 1973 by the Prime Minister, Norman Kirk. The ceremony was hosted by Alwyn Carter and company officials, including leading officials from Oji and Kokusaku. It had taken over five years from the first glimmer of an idea to reach this point – a journey in which the vision and determination of the Carter family had been instrumental. In 1973, the Pan Pac operation was the most modern pulp-and-lumber mill in the world, bringing together a unique combination of equipment and producing an export product for a new market.

EARLY OPERATIONS

Initial operations on the Pan Pac site were filled with dust and mud, underscoring the green-fields nature of the project. Teething problems had to be ironed out of both the pulpmill and the sawmill equipment, demanding long hours of intense effort by staff. Barry Chapman, an early employee, recalled that many repairs were makeshift, leading to the term 'Pan Pac bandage', because "It was not uncommon for a leaking pipe to be bound with rags to get plant mobile again". The initial production target for the pulp side of the operation was around 400 air-dried tonnes (ADT) a day – something that initially demanded a good deal of ingenuity to reach. Staff spent many hours manually clearing blocked chip lifts, pulp lifts and jammed sawdust and chip screws. However, all these issues also fostered a sense of camaraderie – something that those of the day later recalled was somewhat lost as the plant settled down to routine operations.

The sawmill, too, went through teething problems, but was eventually in full production. Like the pulpmill, it was an innovative system for its day. As originally designed, the sawmill was intended to cut up to 10.36 million board-metres of timber annually on an assumed 240-day production year, taking into account downtime for maintenance. It was computer-controlled – a significant innovation at the time – and integral with the pulp process. Logs were delivered first to the wood-room, where those destined for pulping were selected out and chipped. The rest moved on to the sawmill – an operation that was largely mechanised and could be run by just three people. Product was limited primarily to flitches and a relatively limited quantity of boards, all sold to Japan.

By the mid-1970s, the mill was a significant part of the Hawke's Bay landscape. The steam rising from the pulpmill was visible from Napier, but perhaps the more crucial impact on the district was the jump in both employment and export product passing through Napier's breakwater harbour. The jobs the mill provided were a particular boost to the district, and many early staff remained with the mill for their working careers.

Pan Pac also gained public profile through its distinctive green-and-orange Kenworth prime movers that became a common sight on the Napier-Taupo Road in particular. The trucks were as integral to the operation as the plant itself, and in May 1972 the decision was made to buy a fleet of 20 – with options for five more. The trucks were ordered from Paccar of Canada via Wellington firm Dalhof & King NZ Ltd, assembled in Wellington, and arrived in early 1973 in time for the plant's commissioning. They were estimated to be capable of providing about 60 percent of the plant's needs, making up to two trips each along the Napier-Taupo Road daily, with the rest made up by contractors. More trucks followed, and by 1978 a total of 38 Pan Pac Kenworths were on the road, equipped with Fuller 13-speed gearboxes and a 335 hp Cummins diesel. By this time, the fleet had travelled 13 million km, around 320,000 km monthly, with just 11 accidents. To achieve this, the fleet went through around 100 tyres a month. Average vehicle load was around 25 tonnes of logs.

Later vehicles purchased for the fleet included Caterpillar-powered White prime-movers. By the mid-1980s, Mack Superliners were making an appearance. The deregulation of the trucking industry in the late 1980s altered the landscape, and by early 1989 the fleet included four Mack Ultraliners able to carry 44 tonnes – the first trucks in Hawke's Bay certified for such loadings. Trailers had to be modified as time went on to cope with different wood sizes from the various forests supplying Pan Pac.

The trucks were joined by other vehicles on site, notably a L70 Wagner 'lumberjack' forklift purchased for $100,000 (about $1.5 million in early 2020s money) that was able to lift 35 tonnes of logs in a single 'bite'. Curiously, one of its main early tasks involved running up and down the mill site to compact the soil. It was joined by two L-16 forklifts that also stood in for the Wagner when it was under repair. A second Wagner joined the fleet in 1976, ready for a planned expansion of the mill. Both were then replaced by two L-90 Wagners. A Kawasaki bulldozer was also purchased to move the wood chips, later replaced by Caterpillar D6s. Both the truck fleet and the onsite vehicles demanded maintenance facilities on the mill site – a major garage able to keep the fleet running. This was initially managed by Gary Hogan, joined by Stan Shotton from early 1975. Early challenges facing the mechanics included issues with the Cummins diesels, and the fact that – because they had been purchased at the same time – the trucks usually required simultaneous maintenance.

The mill had always been planned on a two-stage construction basis. The second stage was intended to include a second pulp line, bringing production up to around 700 ADT a day, and work began in 1973 alongside the initial operations of Stage 1. Ken Ross flew to Japan to discuss details of the planned expansion with the Japanese partners. Downer and Company were awarded the construction contract, and heavy equipment began arriving in August 1974. This included a chip-screener, additional chip storage and conveyor systems, four refiners and motors, and two

2,400 tonne presses. Construction went ahead during 1975. There was still public complaint. The fact that the second stage expansion had always been planned did not reduce further public concerns about noise and pollution. Once again, company officials had to show that the wastewater emerging from the screening plant was not polluted. The largest single noise producer on the plant was the debarker, and measures to reduce noise included setting it inside a concrete building.

The second stage was completed in January 1976 and boosted production to the point where the millionth tonne of product was produced a little over two years later – specifically, at 1:08pm on 9 August 1978. It was a significant milestone in what had become a difficult year for the company. A serious accident in the No. 1 woodroom resulted in the death of Ellwyn Moss. Other problems that year included issues with pulp quality that led to the Managing Director, Jim Scott, travelling to Japan to discuss the issue. Two refiners broke down. And then, at 11:40pm on 17 August, the No. 1 drier blew up – violently. The explosion was felt in Napier and completely destroyed the drier. A few weeks later, a similar but smaller explosion damaged the No. 3 drier. It took eight months to rebuild the No. 1 drier, with flow-on effects across the Pan Pac operation. Contractors harvesting Ponderosa pine were put out of work, along with 14 logging trucks and staff of the No. 2 woodroom. Around 50 people were affected and given other duties.

Pan Pac's second stage was was later followed in 2002 by another new development: a boiler designed to burn waste wood and bark, helping offset electricity needs. Energy was always a major part of the Pan Pac operation; the company needed it – especially electricity – in prodigious quantities for the pulp operation alone, but the sawmill and chippers, too, were electrically driven. Meeting those energy needs – again, with minimal environmental impact – was a challenge throughout the 50 years of company operations. Initial estimates in 1970, as the Pan Pac operation was being planned and scaled, suggested that the combined plant might use up to three times the quantity then being supplied to the entire city of Napier. At an estimated 38,000 kilowatts, the mill's estimated draw was one-and-a-half times the usual daily loading of the Hawke's Bay Electric Power Board. This was an enormous figure by the standards of the day and implied that the plant needed its own sub-station, something that could only be dealt with at national level.

Negotiations got under way between Carter Consolidated and the New Zealand Electricity Department in October 1970, but discussions took nearly two years to conclude. In the end, the department agreed to build a sub-station on an 11.5- acre site adjacent to the mill, for $1,290,000 in early-1970s money. This, like the mill itself, was a staged proposal: initially the sub-station tapped into the line from the Tuai hydro-electric station downstream of Lake Waikaremoana. The department proposed to then build a $5,000,000 line from the Wairakei hydro-electric scheme, adding a 240-megawatt co-generation plant on the sub-station itself, driven by four

Pratt and Whitney gas-turbines. Contrary to popular rumour, this was not built to provide power for Pan Pac – the board had wider aims in mind and intended to have it available to offset peak demand from Napier. In March 1973, Pan Pac signed a supply contract with the Hawke's Bay Electric Power Board, described by the board as a "momentous occasion". Alwyn Carter and Mr K Yonekura signed for Pan Pac.

However, drying the pulp took more energy still. Initial plans had called for oil-fired burners, but the oil crisis of 1973-74 changed the picture and forced the company to look for different solutions. It happened that one of the main waste products of the plant was bark – around 75,000 tonnes of it annually. Initially this was composted in a specially drained and prepared area near the plant. Japanese engineer Masahiko Asai believed much of the bark was burnable, which would get rid of the waste while simultaneously reducing the quantity of oil required for the flash-dryers. The result was an addition to the plant: a bark-burning Foster Wheeler boiler that produced up to 39,640 kilogrammes of steam an hour, while burning up to 300 tonnes of green waste daily. It came with a 43-metre stack and was built during 1976-77. Maximum power output was around 20 megawatts.

Oil consumption was cut by about half as a result of this boiler entering operation. The company's reliance on oil was completely eliminated in the early 1980s, when a natural gas pipeline was completed into Hawke's Bay, allowing Pan Pac and several companies to tap into this resource, including Wattie's, Tui Dairy Company and the Whakatu freezing works. Natural gas significantly cut pulp drying costs, although its usage as a proportion of Pan Pac's total energy steadily fell. By 2007, gas supplied just one percent of the energy needed by the company, largely due to a second boiler being completed on site in 2002, described later.

The key to the whole Pan Pac operation remained the wood supply. The original concept for the Whirinaki mill had been scaled around the 9.061 million cubic metres surplus from Kaingaroa. When only two-thirds of that was provided, Carters made the bold decision to proceed at the originally intended scale, planning to find other timber sources – a total of 4.729 million cubic metres, according to final calculations. In one sense it was not a huge risk: the mill had been built around the concept of obtaining a longer-term wood supply from the local state forests of Gwavas, Kaweka, Esk and Mohaka and there seemed every potential for the favourable Hawke's Bay climate to enable these to begin production a little earlier than estimated. However, that was still some way off in the 1970s. The immediate answer was the 10,118ha of private forests planted and cultivated by Hawke's Bay timber merchants Robert Holt & Sons.

By the late 1960s, much of this timber was approaching production stage, and Robert Holt & Sons were planting at the rate of just over 1,000ha per annum. They had just purchased 1,214ha near Whirinaki for further planting. The company were no strangers to the Pan Pac venture. They had launched an unsuccessful bid of their own for the Kaingaroa surplus.

Later, when the joint venture was announced, managing director Phil Baker had approached Carters with a proposal to also become involved. This initial suggestion was rebuffed. However, the outcome of the Kaingaroa bid changed the picture and, once the joint venture was signed up, Carters came back with an offer: essentially a merger, creating a new and larger company, Carter-Holt Ltd. This resolved the Kaingaroa problem. Robert Holt & Sons forests were thought able to support Pan Pac operations, alone, for up to 17 years. And that was without considering the longer-term outcomes of their ongoing plantation programme. The merger was a significant step up both for Carters and Robert Holt & Sons.

Another early question for Pan Pac was what to do with the 352ha stretch of hill country behind the plant site. There was early talk of running the land in cattle. However, 20 poplar seedlings were brought in from the Oji nursery in Japan as a test planting, and eventually the decision was made to turn it into a small production forest.

ROBERT HOLT & SONS

Robert Holt & Sons was a major player in the Hawke's Bay timber market from the nineteenth century, dominating the early industry in that province.
The company was founded in 1859 when Robert Holt arrived in Napier and set up a timber trading business. He followed that with a sawmill in 1870, a timber yard in Hastings and, later – as the railway reached the 'Ninety Mile Bush' south of the Takapau Plains – a major mill at Piripiri, north of Dannevirke. By the 1890s, this mill alone employed 22 staff and was able to put out nearly 600,000 linear metres of lumber per annum, much of it railed north to Holt's yards in Napier and Hastings.

At the turn of the twentieth century, a boom in demand for lumber prompted several companies to begin exploiting the Puketitiri Bush, a stand at the base of the Kaweka Forest northwest of Napier. Robert Holt's son John, who had been managing the Hastings timber yard, established a mill in the Puketitiri bush in 1906. This amalgamated with Robert Holt & Sons in 1914 and continued to operate until 1939-40, when the bush was cut out.
By this time the company was also operating mills in the Te Pohue district and engaging in a significant programme of exotic afforestation across Hawke's Bay.

Robert Holt & Sons remained a major player in the Hawke's Bay market and by the late 1960s their own exotic forests were reaching maturity. They had already expressed interest in Pan Pac – the new growth-focus of the milling industry in Hawke's Bay – and the amalgamation with Carters was, in many respects, the logical next step.

WORKING CULTURE

Pan Pac's working environment was characterised throughout its history by longevity of service. People often put their working lives into the mill, many arriving in the early 1970s as the mill began operations and not leaving until they retired, decades later. For example, in 2003, staff marking their 30-year plus anniversaries included Ken Ross (8/11/71), Brian Pritchard (4/7/72), David Brown (5/3/73), Merv Bryant (26/2/73), Bob Walters, (16/7/73), Russell Steed (24/2/73) and Michael Shivnan (31/7/73). That did not include people such as Gavin Crawley who, although not starting with Pan Pac until 1974, had actually been working on the site the year before.

Crawley's story was typical of the Pan Pac experience in many ways. In 1972, he was an air-tool mechanic/technician working for the Ministry of Works in the Hutt Valley. Crawley was attracted north by news of the green-fields plant then under construction at Whirinaki and, in his own words, he "arrived at the gates to Pan Pac on the 28th December 1972, without an appointment, on the off-chance that I might be able to get a job". He was interviewed by two men from Downer Comstock, offered a job on the spot and asked to start that very day.

As it happened, Crawley had left his gear back in Lower Hutt and had to go through the formalities of resigning from his job. But he was on the job at Whirinaki by early January 1973, assembling plant including the Nicholson Ring Debarker. When the plant was complete, he was made redundant from Downer Comstock but picked up a job with Pan Pac itself, becoming a permanent staff member in March 1974. Crawley told his wife that he would "Give it a go for maybe five years". He was still with Pan Pac four decades later, ultimately becoming Site Engineer, before retiring in December 2014 after 41 years and 9 months service.

The fact that many staff stayed on at the mill for their working lives – despite thinking, initially, that they might not – spoke volumes for the nature of the culture. It also meant that some employees were able to become extremely experienced at the job, moving across the company to different roles that gave them wide understanding of the whole nature of mill operation from production to sales. The road was not without its potholes, but such long tenure was an endorsement of what it meant to work for Pan Pac.

Some of Pan Pac's staff came from Japan, including a Resident Director who was typically appointed for a four-year term. They included Mr Aki Moriya (1984-88), Mr Yosh Kanamaru (1988-1992) and Mr Shinji Seto(1992-1996).[1] Many arrived with their families.

1 For full list see Appendix 1.

WILLIAM (BILL) C. HODGE

Bill Hodge was Pan Pac's second employee and a key figure in much of the early plant development. A talented engineer with multiple degrees in the field, Hodge specialised in designing and developing plant associated with pulp in particular. He joined the company in 1971 as project manager for the Whirinaki mill construction site, playing a key role in managing the entire green-fields project. Hodge served briefly as General Manager once Pan Pac began operations, before leaving in December 1973 to set up an engineering and forest consultancy. He moved to Nelson in 1974 to work for Baigent and Sons as project manager on a proposed pulpmill. This did not eventuate, but in 1976 he became project manager for a thermo-mechanical pulpmill development at Karioi, for Winstone Ltd.

Subsequently, Hodge became Head of Engineering for Tasman Pulp and Paper and was instrumental in rebuilding its plant after the magnitude 6.5 Edgecumbe earthquake of March 1987. In 2000, he went to Malaysia to manage construction of a newsprint plant. Hodge did not retire until he was in his early 80s, when he settled on a lifestyle block near Rotorua. He later moved to Auckland to be closer to family and passed away in February 2020 at the age of 88.

THE WOOD SUPPLY CRISIS

The 1980s brought major changes for Pan Pac, starting with the switch to thermo-mechanical pulp (TMP). The change came about because Japanese newsprint needs had changed, and RGP was proving unsuitable. A switch was discussed as early as 1977, and a report produced on the issue by Doug Ducker, Kaichi Hara and Yoshihiro Kanamaru. The challenge was creating pulp suitable for newsprint that could handle the new 700-metre-per-minute Japanese printers, particularly with New Zealand timbers. This was clearly where the market was going. The Tomakomai plant began experimental TMP production in 1977 and, on Christmas Day 1980, the decision was taken to convert the Pan Pac operation to the same system.

It was an expensive proposition: the initial budget ran to $33.5 million, more than the entire mill had cost to build to date (equivalent to about $159.4 million in early 2020s money). However, the system offered a way forward, and Downer & Co won the tender to build the new system. This included chip pre-heaters and five Sunds Defibrator RL (P) 565 refiners. The budget was revised down to $30 million and the conversion completed by May 1982. The original plant continued to produce RGP throughout, until the line was finally closed on 17 May, ahead of a 16-day shut-down that was required to complete work. The new plant suffered a variety of teething problems but also showed dividends. Just over $39 million worth of pulp was sold to Japan in the 1982 financial year, rising to over $54 million in 1984. One early challenge was pulp 'brightness', a crucial quality factor for the expected end-use.

Wood supply was becoming a general issue for Pan Pac by this time. By the late 1970s, Kaingaroa was not able to supply logs in the 80 percent sawlog/20 percent pulp-log ratio needed for mill operations. Cyclone Bernie, which struck in April 1982, produced massive wind-throw across the forest, further affecting production. The Forest Service now considered that Kaingaroa had barely sufficient reserve remaining to meet current commitments and proposed reducing the Pan Pac supply to 130,000 cubic metres annually. This was enough only to run a single-shift operation in the sawmill. Forest Service officials believed Pan Pac could obtain pulpwood from the existing Carter-Holt Holdings forests. Ken Carter protested, pointing out that Carter-Holt Holdings was not Pan Pac – they were "quite separate organisations, and must not be confused". Negotiations continued into 1984, at which point the incoming Minister of Forests, Koro Wetere, instructed the Forest Service to honour the original 1970 agreement. Other concessions included extending the sale of sawlogs into 1992 and making available 16-to-18-year-old radiata thinnings over a seven-year period from 1985.

The thinnings, largely from Kaingaroa, were found useful as chipwood, and were joined by other thinnings from Pan Pac's own forests: Tangoio (3,124ha), Waipatiki (375ha) and McKinnon (444ha).

By the late 1980s, Pan Pac's need to obtain large-scale access to wood was urgent. Even with the settlement that had returned supply to the original levels, the Kaingaroa resource was good only until 1992 and many contracts for local timber were expiring in 1990. Carter-Holt's own forests were not going to make up the difference. However, the issue was tied up from 1985 with a far-reaching government reconstruction of the public sector. A significant de-regulation and state asset privatisation programme, implemented by government at speed during the late 1980s, had a crucial impact on Pan Pac. One of the early moves associated with forest industries came in March 1987 when the government closed down the New Zealand Forest Service and put management of Hawke's Bay's various state forests into private hands. These forests had, implicitly, always figured in Pan Pac's longer-term plans for wood supply, but this shift opened up a variety of unknowns.

In the immediate, elements of the former Forest Service became the New Zealand Forestry Corporation in April 1987, under Andrew Kirkland, with a sales subsidiary: Timberlands. Pan Pac began discussions with the new corporation in May that year. Richard Carter explained that a secure wood supply was "fundamental to the future of Pan Pac" and that, in his opinion, "should have been resolved many years ago". Some 20 meetings followed in which it became clear that the new Forestry Corporation was primarily interested in putting its own house in order, settling its debts, and then offering cutting rights at reasonable rates. However, while an agreement was reached over existing contracts by September that year, the new corporation was reluctant to extend anything more than an interim 5-year license to Pan Pac, on the basis that the Hawke's Bay forests were still some way off full production maturity – and that the corporation, itself, was new. The corporatisation process involved the new state company buying the forests from government, and they were still negotiating a price with The Treasury.

Pan Pac had to accept what was offered, awaiting developments. All did not go well. The Treasury and the New Zealand Forestry Corporation failed to agree on a price for the forests, an impasse that the government decided to resolve by selling the wood direct to customers. This offered hope for a proposed 20-year sale agreement to Pan Pac that the company hoped to finalise in 1989. But then, in November 1988, the Forestry Corporation advised that negotiations were thought likely to prejudice sales of the Gwavas, Kaweka, Esk and Mohaka forests. It was a severe blow: Pan Pac had relied on these forests for longer-term operations, from the beginning of the joint venture. Now they appeared to have gone, and with wood supplies now projected to be only good for a year or so the future seemed bleak. Pan Pac's Managing Director, Stuart McKinlay, described the decision as "the last straw".

What had happened? Part of the issue was the new approach introduced by the government in the mid-1980s; much of the problem confronted by Pan Pac over its wood supply was driven from government policy offices, including The Treasury. Timberlands, for its own part, was eager to sell to Pan Pac, but hampered by the fact that the asset position remained unclear at this early stage in the reform of the state sector. Both Stuart McKinlay and Ken Ross from Pan Pac were heavily involved in the discussions with the government, as were senior officials from Carter Holt Harvey. The latter bore much of the weight of the crisis as their role in the joint venture included keeping the wood supply going. In this circumstance, the possibility of a newsprint plant being added to the Pan Pac operation at Whirinaki proved a useful bargaining counter. Richard Carter hinted in late 1988 that a secured wood supply might enable Pan Pac to expand into papermaking, simultaneously lifting pulp production to 1,350 tonnes a day – with a potential billion-dollar investment and relative returns to Hawke's Bay. The politics were manifest, but in the end the company was able to secure a two-year supply, renewed six-monthly and rolling over on that basis until the state asset position was sorted out. As McKinlay remarked later, this made it "impossible for Pan Pac to contemplate any major development plans", but "ongoing production … is reasonably assured". He and Ken Ross were eager to extend that to a five-year arrangement, given the likely timeframes involved, but had made no progress by April 1989.

The interim wood supply arrangement came just in time. Pulp production was due to increase six percent in 1989, to 212,000 tonnes, meeting a one-time spike in demand in Japan. Stands in Kaingaroa were being steadily cut out, and the last ponderosa pine was delivered to the mill on 10 July 1989. Clear-felling began from the Mohaka Forest north of Whirinaki, purchased by Pan Pac 'on truck'. That became the mill's primary wood supply as the 1990s turned and Kaingaroa continued to dwindle. However, longer-term cutting rights to the Hawke's Bay forests remained elusive. That was a frustration both for Pan Pac and for the joint venture partners, including NNT. One concern among Pan Pac directors and the joint-venture partners was that the state might offer a free-for-all bidding war despite its implicit earlier commitment to the Pan Pac wood supply.

The end of the Kaingaroa resource was marked with a symbolic closure. The final batch of trees – 70-year-old radiata, intended as sawlogs – were felled by Bruce Elliott, a long-standing contractor who had felled the very first trees for the company in 1973. The wood was delivered to the mill on 16 March 1992 by a Pan Pac-owned truck driven by Brian Glenny, who had delivered logs on the first day of operations, around 19 years earlier. And so the Kaingaroa resource – the initial trigger for the entire Pan Pac operation – reached its end.

In February 1986, Pan Pac marked the milestone of 1 million ADT of TMP pulp shipped to Japan.

Managing Director Doug Ducker (2004-2020)

PAN PAC'S MANAGING DIRECTORS

Pan Pac has had only five Managing Directors in its 50 years of operation. The first was William Hodge, the project manager for the construction, who became General Manager briefly from the plant's opening in 1973 until December that year. He was replaced by Jim Scott. Born on the West Coast in 1944, Scott had an Honours degree in Chemistry, a background in management, and had worked for Kempthorne Prosser before becoming Technical Superintendent at Caxton Paper Mills. He had been closely involved with the development and construction of Pan Pac, as Process Engineer.

Stuart McKinlay became Managing Director on 1 July 1984. McKinlay was born in Palmerston North in 1944 and educated at Canterbury University where he received a BE (Mech) degree with first class honours in 1965. McKinlay worked for New Zealand Forest Products at Kinleith, then spent time overseas during the 1970s working with British Columbia Forest Products Ltd in Canada. After returning to New Zealand, he began working for the Pulp Department of the Tasman Pulp and Paper Company before joining Pan Pac.

Doug Ducker took over the reins when McKinlay retired in mid-2004. A former Napier Boys High Head Prefect (1968), Ducker was a long-standing Pan Pac employee who had studied at the University of Auckland School of Engineering. He had been General Manager of the pulp operation for some years before becoming Managing Director.

Pan Pac's fifth Managing Director, Tony Clifford, was another former Napier Boys High Head Prefect (1981) and long-standing Pan Pac employee. Tony had an Honours degree in electrical and electronic engineering from Canterbury University and started at Pan Pac in 1992 as a project engineer, working on automation projects across pulp and lumber. He was managing the pulp operation before being appointed Managing Director on 1 February 2020, on Doug Ducker's retirement.

CHAPTER TWO
FORESTRY INTEGRATION

The wood supply crisis of the late 1980s and the end of the Kaingaroa resource in 1992 were significant way-points in the history of Pan Pac, and they came as the company's first twenty years of production drew to a close. The 1990s marked the beginning of a new phase in Pan Pac's history, a decade of adaptation and change as the joint venture came to an end, and where the perennial problem of wood supply and the relationship with Hawke's Bay's former state forests was finally resolved. This took time to reach its final shape, but the eventual outcome, in 1999, was one of the most significant shifts in company scale and structure since its founding: the acquisition by Pan Pac of Hawke's Bay Forests, with its cutting rights to Gwavas, Kaweka, Esk and Mohaka exotic production forests. This gave the company full vertical integration, from raw materials through to the final export products reaching the quayside. It turned the company into a full forest product venture and was such a significant move that the real question was not whether Hawke's Bay Forests were becoming part of Pan Pac, but whether Pan Pac was becoming part of the forestry concern. From the perspective of Pan Pac's subsequent expansion and evolution into the 2000s and beyond these developments - with their origins in the government policy changes of the late 1980s and the way these were then given practical resolution into the 1990s - were a key turning point, creating a clear distinction from Pan Pac's first twenty or so years of operations.

This decade also brought further focus on ways of extracting maximum value from the wood resource. That had always been part of the Pan Pac story. However, the shift away from the original Kaingaroa resource and the new focus on both Hawke's Bay forests and private woodlots during the decade created new pressure to lift the game. The nature of Hawke's Bay's forests – a mix of pine species with some eucalyptus – was very different from that of Kaingaroa. The outcome was a significant change of focus for the company. Up to the early 1990s, the sawmill operation had been ancillary to pulp production, producing flitch that was sold into the Japanese market by Oji, along with limited quantities of green boards that were sold to the Carter Holt Harvey plant in Onekawa. That was not going to work in the new environment, where the pressure was on to make best use of the available logs and maximise the yield, something the original Pan Pac sawmill could not do. The need to redevelop the sawmill and, with it, Pan Pac's lumber business, was clear.

THE ORIGINS OF HAWKE'S BAY'S STATE FORESTS

One of the rationales for siting the Pan Pac operation near Napier had been the existence of Hawke's Bay's own exotic production forests with their potential for long-term wood supply. Gwavas, Kaweka, Esk and Mohaka spread from the foot of the Ruahine Range in Central Hawke's Bay to the rugged hinterland northwest of Napier. These forests were all established by the late 1960s and one – Gwavas – already provided timber via a thinning programme. All were thought likely to be reaching full production status by the late 1980s or early 1990s and able to produce the various grades of wood needed for the mill.

The history of these forests became entwined with that of Pan Pac through the merger, although originally the concept of a 'state forest' had little to do with exotic production planting and began in the 1890s as a government conservation effort. This was the origin of the Kaweka State Forest. The forest came into statutory existence in 1900 when 10,678ha of land from the Black Birch range to the western crest of the Kaweka, butting up against Pastoral Run 11, were gazetted as State Forest 21. This region was partly covered in birch that was regenerating after a variety of fires. At the time, there were no particular plans to plant exotic forests, and nothing further was done by the government in the area until 1940 when 23,557ha encompassing three former pastoral runs were added. A further 6,355ha was added in 1950 under the Forest Act, and 685.5ha in 1954.

The idea of using back-country land in Hawke's Bay for exotic afforestation gained pace in the mid-twentieth century, generally as an extension of the Kaingaroa effort. The specific trigger was the Second World War. Significant areas of Hawke's Bay's often rugged back-country land had fallen into disuse by the time war broke out in 1939, in part a result of the inter-war depression, and the war effort then drew off labour and stifled ongoing pest-control programmes. By the war's end in 1945 the situation was becoming critical. Scrub had regenerated across wide areas, bringing with it a significant fire risk. War had also reduced both hunting and pest-control, and back-country pests such as opossums, rabbits and deer – both red and sika – were growing in number. The damage these animals could do to unstable terrain was clear. The challenges posed by a neglected back-country was further underscored during the summer of 1945-46 when a disastrous combination of drought and wartime scrub regrowth led to major fires across Hawke's Bay.

Attention had already turned by this time to addressing the problem. New pest-control initiatives were joined by efforts to conserve land in danger of erosion. Turning the land to productive use was part of the mix, given impetus in 1943 when the government established a new economic

stabilisation programme. This was a direct response to pre-war economic issues and led, among many other things, to policies designed to make use of otherwise unproductive land, to develop new export markets for a more diverse range of products, and to create jobs. Exotic afforestation in the central plateau had shown the potential for Hawke's Bay. Parts of the Glenselwyn block near the base of the Ruahine Range were taken up by government that year with the intent of creating an exotic production forest. Planting began across this region in 1944 at a density of 950 trees per acre, primarily radiata, creating what was known as the Gwavas State Forest: the forest took its name from an adjacent pastoral run that dated back to the 1860s.

Gwavas was the first of a series of state forests that followed across the district during the immediate post-war years, primarily driven by the need to control backcountry scrub growth and erosion across the district. The bulk of the task fell on the Forest Service. It was a challenge, bringing together large-scale back country management programmes with a significant tree-planting and silviculture effort. All had to be carefully planned and managed. Constructing an artificial forest was not as simple as identifying what the Forest Service called 'compartments', planting them at annual intervals, and then allowing the trees to grow. Many factors affected the nature of the wood that emerged from these forests. Altitude affected the density, and lower-altitude trees tended to be better for lumber. But equally, trees at these altitudes tended to branch more, requiring more intensive early tending and pruning. Pine forests also represented a monoculture that had to be carefully monitored for tree health. Experiments were undertaken with mixed plantings of gum and pine, among other approaches, to manage this last problem.

The initial focus was around Gwavas. The government continued to acquire land in the area, primarily former backcountry stations that were systematically sold to the state into the early 1950s and progressively incorporated into the exotic production forest. Total afforested area eventually totalled around 8,426ha. The first wood to come from Gwavas was in the form of prunings in 1957-58, mostly radiata. Thinning was also undertaken, initially by poisoning, but after 1962 by removing the trees. Some of these were found usable as fenceposts, and the larger examples were sold to Robert Holt & Sons for milling. Production thinning continued into the early 1970s, buoyed by what was called an 'insatiable' demand for small round-wood. By this time, sections of forest planted during the mid-1940s were approaching production status and clear-felling began alongside the thinning work. Production was in full operation by the 1973-74 financial year and, in August 1974, a contract was let to Carter Holdings to fell 16,990 cubic metres of wood annually for five years, providing timber suitable for both sawlogs and pulp.

The Esk Forest also emerged in the years after the Second World War. Back-country erosion had been a particular issue in the former grazing runs north of Te Pohue. Two of these were gazetted as soil conservation

reserves in 1945. However, the Forest Service felt the erosion issues in this locality were less acute than problems north of the Ohurakura Road, and that both runs were well-suited to exotic afforestation. Further review identified nearby blocks that also had potential as exotic production forests, although there were arguments to retain some areas in pastoral use. This was the origin of what became the Esk Forest, although it did not emerge without protest. A decision to begin afforestation across several of these blocks was made in 1948, prompting protests from the Tutira branch of Federated Farmers that believed up to 70 percent of the expected forest was ploughable. This prompted a further government investigation that identified around 1,500ha as suitable for afforestation. At a public meeting in 1950, local residents expressed general approval, and planting of the Esk Forest began that year, working from a headquarters site near the Ohurakura Road turnoff. Further blocks were added to the production forest as time went on, and the total afforested area, ultimately, came to some 7,558ha.

The third – and most northerly – of the state production forests to be planted was Mohaka, northwest of Whirinaki. This was once again swept up in the general push to make use of otherwise unproductive back-country land in the years immediately after the Second World War. By 1950, around 7,932ha of state-owned land in the Mohaka region had been passed across to Forest Service, and in August that year officials inspected the area to determine which areas were best suited to afforestation. They concluded that around 6,779ha could be planted in exotic timbers, although perhaps not completely; up to 55 percent of the area was unsuited to planting, and 522ha of the state forest could not be planted at all. Afforestation began in 1958 and – as elsewhere – additional blocks were added over time, enabling a significant production forest to be developed, eventually encompassing some 15,585ha.

The last of the exotic state forests to be planted was Kaweka. By 1956, the area gazetted as the Kaweka State Forest amounted to 51,637.5 ha. However, this was principally a conservation area and only a small proportion was suitable for exotic afforestation. Much of the land was in poor condition, either suffering erosion or under significant scrub cover. In part this was a consequence of the Second World War when the less productive areas of back-country were abandoned by pastoralists. Pests such as opossums, rabbits and deer were also rife. All this drew the Forest Service into wider back-country management. At Kuripapango, for instance, the service actively allowed scrub to re-grow as a method for retaining the soils. Afforestation finally went ahead in suitable areas from 1964, notably in the regions around Kuripapango at the southern end of the ranges. The production forest eventually totalled some 7,522ha. In 1972, the rest of State Forest 21 was gazetted as the Kaweka State Forest Park and set aside for recreational use, coming under management plans designed to minimise erosion and preserve the landscape.

The expansion and development of the Hawke's Bay forests was not achieved without controversy. Although the land on which they were established was considered largely unsuitable for pastoral use, the advent of practical aerial topdressing and giant discing from the early 1950s altered the cost calculation for some areas, provoking debate over whether the land might have been better used for farming. The counter-argument – that trees, too, needed a certain quality of soil – was valid, but did not gain much ground against the emotion stirred by sale of often long-standing family holdings to the state. These issues faded as time went on. Different issues arose in the 1990s when the land on which the forests stood was subject to claim under the Treaty of Waitangi. This was a complex matter that primarily involved Crown and claimants and, to this extent, was a step removed from the ownership of the cutting rights.

CARTER HOLT HARVEY AND CUTTING RIGHTS 1990-93

Pan Pac had been established with the longer-term intent of using Hawke's Bay's state forests as a primary wood supply. However, although the company was drawing from these forests by the early 1990s, it took much of the decade to administratively integrate these production forests with Pan Pac's sawmill and pulp operations. The issues originated in the convoluted way in which government divested itself of its forest operations. As we have seen, the changes of government policy from the mid-late 1980s had thrown a spanner into Pan Pac's original plans for a long-term wood supply. The interim solution achieved in 1988, involving a two-year license with rolling extensions, was always only a stopgap. Attention then turned to longer-term arrangements. These revolved around who might receive cutting rights for the Hawke's Bay state forests that were partially in production at the time. All were expected to achieve full production status during the 1990s.

For a while, the position of Pan Pac and its joint-venture owners in this calculation seemed precarious. The responsibility for wood supply initially fell on Carter Holt Harvey, which reasonably expected to get the cutting rights as had originally been projected. However, the government of the late 1980s had different ideas, initially canvassing an open tender for the cutting rights in Hawke's Bay that Carter Holt Harvey would then have opportunity to top. This provoked a retort from Richard Carter, who told Napier's Daily Telegraph that it was "staggering" that government was considering price and not the fact that the dispute put the jobs of the 350-strong Pan Pac operation and its 150 odd supporting contractors at risk. The degree to which relations had broken down was made clear by the fact that, by this time, Pan Pac and its joint-venture partners were considering legal action against the government. Pan Pac's position – and that of its joint-venture partners – was simple enough. As Stuart McKinlay reported to Pan Pac staff, the new government position ignored the:

Assurances and understandings given by the government in earlier years in respect to Pan Pac's rights to the Hawke's Bay forests. We think that it is entirely wrong that we should be put at risk and have to compete with other interested parties simply on the basis of the highest bid being accepted. To sell the forests on the basis of the highest tender, totally ignores Pan Pac's existence here in the Hawke's Bay.[2]

In fact, Carter Holt Harvey and Pan Pac were not the only companies affected by the government's restructuring of the late 1980s; Tasman Pulp and Paper had run into similar issues with its own wood supply. As we will see in a later chapter, Pan Pac also ran into difficulty with electricity supply for the same reasons. It was in many respects symptomatic of the day, a time when old structural certainties in the role and place of government had been abruptly turned on their heads, but where a new equilibrium had yet to emerge. The effects extended across both society and the business sector, provoking significant dislocation. However, that was small comfort for Pan Pac and its joint-venture owners at the turn of the 1990s; they had long expected access to the Hawke's Bay forest resource, but now, at the eleventh hour, were being confronted with unexpected obstacles.

Efforts to negotiate a price for cutting rights continued behind the scenes but were given flavour by the pending court action. In April 1990, the Minister of State Owned Enterprises, Richard Prebble, invited Carter Holt Harvey to pre-emptively bid for the Hawke's Bay forests and other wood in Canterbury, but rejected the offered figures. The government then took the Hawke's Bay forests off the sales list, because of the pending court case. This began in May that year, in the High Court in Wellington. It was a complex case that lasted 51 days and drew in former senior officials among others. In the end, Justice McGechan told the parties they should not feel restrained from reaching a negotiated settlement, and on 29 August 1990, Carter Holt Harvey concluded a $383 million deal to purchase cutting rights in some 96,000ha of state forests, primarily in Hawke's Bay, but also including blocks in Auckland and Canterbury. In Hawke's Bay, the forests were Mohaka (12,488ha), Kaweka (6,262ha), Gwavas (5,859ha) and Esk (5,355ha). Because the land on which they grew was under claim via the Waitangi Tribunal, rights were issued for five years with automatic annual extensions after 1995.

The final challenge was that the government wanted the money up-front. This posed some problems. Carter Holt Harvey had just spent around $900 million obtaining a controlling stake in Elders Resources New Zealand Forest Products. Ken Carter flew to Japan to raise what was needed and obtained $260 million, in part by on-selling cutting rights to Japanese concerns, but in part also by selling down the Carter Holt Harvey stake in the joint venture to just 10 percent. The company retained its role managing the wood supplies for Pan Pac and Carter Holt Harvey Forestry Ltd took over forest cutting and management in Hawke's Bay

2 *Pan Pac Post*, No. 30, March 1990.

from 1 November 1990. This had some impact on Pan Pac staffing: Stan Evans, the Logging Supervisor, transferred from Pan Pac to the new company. There were also changes in the haulage operation, organised by the Wood Resources Manager, Brian Pritchard.

In this way, Pan Pac finally obtained a long-term wood supply, enabling planning for the future to be put on a firm basis. This threw focus on the need to find new markets to support further expansion and development of the mill.

END OF THE JOINT VENTURE

The joint venture – the core of the Pan Pac operation in its first decades – came to an end with the close of the 1992-93 financial year, when Carter Holt Harvey sold its remaining 10-percent stake in Pan Pac to the two Japanese shareholders. It was around 26 years since the venture had been proposed by Carter Consolidated and very much the end of an era.

The end of the joint venture did not mean the end of the association with Carter Holt Harvey, which continued to manage Hawke's Bay forests, now the prime wood source for the mill. However, it did alter company reporting structure and ownership. The reorganisation was overseen by Managing Director Stuart McKinlay. At the beginning of July, the company name was changed to Pan Pacific Forest Industries (NZ) Ltd. As McKinlay remarked in the staff newsletter, the Pan Pac Post, that Christmas, this was a significant achievement for a company that – although New Zealand based – was wholly Japanese owned. In September, the company superannuation scheme was brought 'in house', and members were given the opportunity to pull out of the older Carter Holt Harvey scheme, to reinvest in the new Pan Pac scheme, or put their money elsewhere.

The shift to wholly Japanese ownership came as Pan Pac was preparing to mark 20 years of active pulp and sawmilling operations in Hawke's Bay, a significant milestone featuring a week of activities from 13 to 18 September 1993. Staff were given a small gift as a memento, and on 16 September a formal function was held in the Napier War Memorial Hall, acknowledging the history of the company. The Chairman of Directors, Mr Amari, took the occasion to announce a donation of $1.6 million to restore the Napier Municipal Theatre (around $2.77 million in early 2020s money). The next day, the company hosted all its retired staff and their partners at an afternoon tea at the mill, followed by dinner at Napier's Golden Crown restaurant. The week ended with a staff function at the Centennial Hall, in Napier's McLean Park.

However, all these changes came within the backdrop of a difficult trading year. There had been issues with pulp quality, particularly after December 1992 when unscreened chips were temporarily used, producing a very high level of shives – unseparated fibres – in the pulp. That same year the Japanese discovered rubber particles in one batch, claiming back nearly $200,000 that

Pan Pac had to meet. Issues with foreign objects contaminating the pulp had to be dealt with by tightening the production processes. A drop in demand for pulp in Japan – largely on the back of reduced demand for newsprint – also affected the pulp operation. Meanwhile sawmilling operations were described as "busy, challenging and volatile".

The result was a focus on costs and a need to adapt to the changing circumstance. A new future beckoned. And it was one in which Pan Pac became a very different company from the one originally envisaged.

SAWMILL RECONSTRUCTION

The early 1990s brought significant changes to the sawmill operation and, with it, Pan Pac's business. A sawmill had been included in the company's original business plans to make best use of the available wood but had largely been incidental to pulp production. By the early 1990s, the original sawmilling plant was ageing, unable to produce lumber to modern commercial standards, and did not maximise product yield. The flitch that emerged typically contained a good deal of board-quality wood that had to be sold at flitch prices, and the board-wood that did come off the plant was limited. A study concluded that the sawmill did not meet the standards now expected of world export markets. Given the need to maximise yield from available logs, it was clear that the sawmill could "no longer be regarded as an ancillary piece of plant on this site". It was, instead, a "vital processing unit in its own right, requiring efficient and uninterrupted operation, if it is to be internationally competitive".

Challenges included the fact that at the time Pan Pac had very few customers for its lumber. The flitches were sold via the Japanese shareholders into Japan's domestic market, and the green board that came off the mill was sold to Carter Holt Harvey's Waitane mill in Onekawa. The nature of the wood supply also posed challenges. Hawke's Bay's exotic forests contained a high proportion of radiata pine that had particular growth characteristics and specific, but often variable, proportions and quality of both core and outer wood.

With more logs becoming available as the new forests came 'online' the decision was taken to redevelop the sawmill, essentially doubling its production from 400 cubic metres to 800 cubic metres daily and lifting recovery rates from 50 percent to 54 percent. The project was pushed by Fred Staples, then General Manager of the sawmill operation. He arranged for Bruce Ayling, Tony Clifford, and a small support team to design the new systems and obtained quotes and information from around the world. The process went ahead in two stages, starting with a $4.2 million high-tech

green-wood optimising edger that was installed in 1993. Pan Pac's sawmill was one of only a handful of sawmills worldwide to install one. It was joined by a Windsor Medium Temperature Accelerated Kiln, essentially to test production of furniture-grade boards and similar outputs and explore the markets for these products. It took some time during 1994 to bring this machinery into full production, and tuning was continuing mid-year. Sean Wright was instrumental in developing the kiln drying schedules and operational aspects of the kilns to meet the needs of customers. Maintenance was no longer seen as the task of 'gas-axe and welder boys', but part of an integrated and skilled process designed to keep precision high-tech equipment working.

The implication of the shift was that Pan Pac now had to maximise the yield of outer wood, for which new sawing equipment was needed. This was always envisaged as the second stage of the process. Oji, as major shareholder, was keen to see the development and wanted the wood sold into the Japanese market. This was not an easy matter to achieve. Toyoo Shinji, then running Nippon NZ Trading, pointed out that Japanese-designed milling equipment was required largely to meet the quality specifications with variations of less than 1mm, otherwise the board could not be sold into Japan. However, to simply buy such equipment for Pan Pac posed problems of its own. While the Japanese equipment was designed for smaller logs and could handle a maximum diameter of 600mm, the logs expected from the Hawke's Bay forests were likely to be up to 800mm in diameter, implying that these larger logs would simply have to be sold. Introducing such equipment also required two or three primary lines instead of one to achieve the same through-put, in which circumstance the whole system simply lost viability. But Pan Pac's team – Sawmill Manager Fred Staples, Electrical Engineer Tony Clifford and Plant Engineer Bruce Ayling – could not win the economic argument against the constraints of the multiple primary saw lines needed to achieve the required through-put capacity.

Instead, they put the project on hold for 12 months, and travelled around the globe on fact-finding missions, obtaining specific details of sawmills from Japan to the US and Canada. Many of the Japanese mills, themselves, were not meeting the expected standard, but they were usually closer to it than the North American mills. However, the comparison was not exact, because in the US and Canada production went through a moulder, meaning that this – and not the initial sawing – determined the size of product. It was also clear that North American equipment could cut to the same accuracy as the Japanese, providing the saw-shop technology was up to par; the difference came down to sharpening and preparation. There was quite a science to the whole process and the team referred to it as "The war of the vernier callipers".

"THE WAR OF THE VERNIER CALLIPERS"

TONY CLIFFORD

We travelled across New Zealand, Japan, Canada and the US and after visiting about 20 mills we had our measuring systems sorted. I would do the board measuring in sawmill yards with the vernier callipers while calling the numbers out to Fred or Bruce who would record them on a prepared data sheet. In the car travel to the next mill, Fred would call out the hundreds of data points as I entered them into a Casio programmable calculator that held the formulas for within board and between board variation and calculated the overall mill variation. I well remember getting nauseous looking down at a small screen for what seemed like hours, but it had the benefit that we knew the performance of the last mill before we started measuring sawing accuracy at the next mill. On a couple of occasions, we had the answers before we left the mill and the mill managers were always surprised their sawing variation was actually about double what they thought it was. After a while, we could just about guess what the sawing variation was just by looking at the state of the sawing machinery and the sawshop equipment. I was pleased to be able to present the very same pair of vernier callipers we used on that trip that I had kept secure for over 16 years to Fred Staples at his retirement dinner in 2012.

The team selected Canadian equipment able to process logs up to 860mm diameter. However, getting approval for the required capital expenditure remained challenging. Clifford recalled a tense meeting with the shareholders at head office Tokyo, "Six or eight hours of win-lose situation", in which there were long periods where nobody said anything. Finally, one of the Japanese managers (Kimiyoshi Uranishi) pointed out that the data collected by the Pan Pac team was indisputable: even Japanese mills were not meeting their own standards. Therefore, Pan Pac could proceed if they could meet the accuracy of the Japanese market. It was enough. A proposal was raised for $50 million in capital expenditure that was approved by the shareholder on Christmas Eve 1995. An initial project team had already been formed by this time. In January 1996, machinery quotes were updated and the engagement of consultants to support the project started in earnest.

What emerged was a sophisticated modern sawmill. New production benchmarks were also introduced: Japanese standards of sawing accuracy and finish, Swedish standards of electronics and computerisation, North American methods for productivity and through-put, and European standards of saw-doctoring. A key factor was the quality of work in the sawshop – the maintenance workshop that kept the blades sharp and to specification. This was re-housed into a single workshop, a change from earlier days, and new equipment included a Hyper Tensioner that used an oxy-hydrogen flame to heat-treat band-saw blades.

The fully rebuilt sawmill cut its first logs on 10 November 1997. The system was designed to underpin a five-year plan, increasing dimensional timber output from 30,000 cubic metres annually in 1995 to 90,000 cubic metres by 1999. Flitch output was expected to increase by 20 percent from 80,000 cubic metres in 1994/95 to 100,000 cubic metres in 1997/98. Expanding markets for dry timber showed the way forward, and further kilns were also planned – totalling seven by 1997/98 – to bring output up and meet expected growth in markets, including potential local sales to Carter Holt Harvey's Waitane Timber Products. Initial sales to Waitane were well received; the wood was reported to be "straighter and of better quality than they have been able to obtain through their own kilns".

This sawmill development set the pattern for Pan Pac's lumber business into the twenty-first century, opening up capabilities to better meet available markets. The focus became improving and refining the capability of the sawmill: identifying bottlenecks and fixing them, adding scanning systems into the drymill, and improving performance with variable speed drives and additional hydraulic pressure. Safety improvements included adding a bin-lock system, introduced a few years after the rebuilt sawmill opened. This prevented the bin sorters lowering when in maintenance mode, a source of accidents in equivalent US installations.

This new output required marketing. Efforts to find new lumber markets had been underway since the sawmill expansion was confirmed and were led by Mike Pollock from 1994. New customers were sought both overseas and within New Zealand, where trials were run for two Rotorua companies. Interest was also expressed from lumber buyers in the US. The list of customers grew from two – the Japanese shareholders and Waitane Timber Products – to include Tumu Timbers, Claymark Industries, Waipawa Timber Supplies, Rembrandt Fine Arts, Jenkins Timber, Pana Home Innosho and Universal Board Systems of Hong Kong.

Interest from the US market introduced new requirements for Pan Pac including a different approach to grading that included clear-rip solutions as well as cross cutting. Domestic lumber grades were largely determined by maximum knot size for structural grades and clear component lengths for appearance grades. This required the manual graders in the drymill to be upskilled to grade 'random widths' using US remanufacturing rules. It also introduced a new volume tally method in board-feet, as opposed to New Zealand's usual metric measure of cubic metres. At the time, the conversion had to be done manually in the Pan Pac inventory system. Up to 16 grades of timber were being produced at this stage, a radical shift from the two grades of prior years and reflecting a strategic Pan Pac decision to customise lumber for specific customers. All this produced results; in the last six months of 1999 the sawmill produced 93,000 cubic metres of lumber, of which 56 percent was sold to Japan, 9 percent to Asia, 21 percent to New Zealand, 8.5 percent to Australia, 2.5 percent to the US and 2 percent to the Middle East.

ENVIRONMENTAL ISSUES OF THE 1990S

One of the more significant developments on the Pan Pac site during the 1990s was a new effluent treatment plant. The mechanical pulp operation, by nature, initially did not use the chemicals required for other pulping processes. Effluent produced from the pulping processes was primarily wastewater, with traces of natural pine residue and suspended wood particles. This was over-optimistically described as 'fish food' by Jim Sprott during initial public discussions over the environmental impact of the discharge, but certainly was far less toxic than the effluent of some industrial processes of the day. Initial plans called for it to be pumped out to sea via a 300-metre pipeline, and work began on this system in October 1972. Much of the task involved preparing the ground, including running a trench across State Highway 2, for a one-day 'pull' in which the completed pipe was dragged into final position. Work included building a temporary wharf. The 'pull' took place on 7 February 1973, which turned out to be the hottest day of a hot summer with the temperature soaring to 39°C.

Discharge rights for the pipeline were renewed in 1981 and again in 1991 – the latter requiring paperwork that included a 180-page report. However, the original decision to simply pump this effluent out to sea met with opposition from the local community, and Pan Pac decided to construct a $3 million treatment plant on site to remove the solids. This began operations in December 1996, although it took some time to iron out all the teething problems. The plant was designed to screen the effluent with 0.5 millimetre rotary screens, then flocculate the suspended solids using trace amounts of polyethylene oxide. These could then be floated and scraped off as sludge, dewatered and incinerated in the biofuel boiler. The system removed about 90 percent of the suspended solids and resins from Pan Pac's wastewater, rendering the water going into the effluent pipe essentially drinkable, and materially reducing the quantity of materials entering the ocean.

WOOD SUPPLY AND TRANSPORT FLEET

The acquisition by Carter Holt Harvey of the cutting rights to Hawke's Bay's state forests did not wholly solve Pan Pac's wood issue. By the early-mid 1990s these forests were able to provide about half Pan Pac's wood requirements, and up to 100,000 tonnes annually of production thinnings for pulping were available from the Hawke's Bay state forests by this time. However, because they had been planted incrementally, parts of the forests were still some years from full production status and, in any case, Pan Pac needed wood not just in specific quantity, but also particular qualities.

This highlighted another issue with the Hawke's Bay wood supply. Significant sections of the state forests had also been planted in various species of pine, such as Douglas fir, interspersed in places with other tree types altogether, such as larch and eucalyptus. This was a consequence of early Forest Service experiments in mixed afforestation in an effort to avoid problems of disease associated with monocultures. However, eucalyptus could not be used by Pan Pac either in the sawmill or for pulping, and the minor species of pine that formed a proportion of the available wood produced pulp that was too low in brightness.

The situation was not a total loss to Pan Pac: Gavin Wright, Pan Pac's Wood Resources Manager, organised contracts to have around 3,000ha of eucalyptus felled and sold for processing to plants in Kawerau. However, the availability of pine required resolving. Plans were afoot to begin harvesting wood from Pan Pac's own forests in 1997, around 3,943ha in the Tangoio Forest and near Waipatiki. However, more than this was needed and the job fell on the mill's Wood Resource Department, under Brian Pritchard, to sort out. Pan Pac's wood buyer, Dallas Seymour, was responsible for sourcing what was needed. This work included scouting for private wood-lots on existing farmland. These were often well-suited to produce pulpwood. Other wood – mostly thinnings but some sawlogs – came from Carter Holt Harvey Forests Ltd's plantings in their Lake Taupō and Mangatu forests. A significant number of private wood-lots were coming to maturity across the eastern part of the North Island, and Pan Pac was able to access them.

The wood-supply process also had to be resilient enough to cope with disaster. Unprecedented gales swept Hawke's Bay in November 1994, damaging the Mohaka Forest and disrupting wood supply to the mill. An estimated 120,000 tonnes of timber were lost in the wind-throw, though were expected to be recoverable given time. This took three months, requiring additional roading crews to build access routes to the fallen timber, extra logging crews and trucks to work on the fallen trees. More than 60 trucks averaged 118 loads per day, ultimately carrying some

6,396 loads of timber down the Napier-Wairoa Road to the mill. This was not the full yield from the wind-throw, and other timber was trucked elsewhere.

One key shortfall remained chipping wood – meaning not just wood able to be chipped, but wood of the correct quality to produce chips suitable for end-product pulp. That was solved by efforts to obtain appropriate chips from a variety of suppliers across the North Island. By the mid-1990s, up to 60 percent of Pan Pac's chip needs were being bought in this way, requiring up to a dozen deliveries a day and supplementing the 600-odd tonnes produced by Pan Pac's own chipmill. One key supplier was Renalls, a Masterton-based wood company with its own chipmill, whose output alone provided up to half Pan Pac's needs in the 1995-96 financial year. Another was East Coast Lumber in Wairoa. Loads of wood chips were brought in by trucks that often 'back-loaded' fertiliser for the return journey. The effort was seen as long-term, because Hawke's Bay's own forests were thought likely to yield more saw-wood than pulpwood. This strategy threw focus on Pan Pac's transport fleet – both the vehicle fleet owned by the mill, and the vehicles run by various owner-operator contractors. Plans went ahead in 1996 to renew much of Pan Pac's own fleet.

THE PAN PAC VEHICLE FLEET

By the late 1990s, Pan Pac's vehicle fleet consisted of three 1992-model Kenworth K100E, two 1994 Foden S-106, two 1995 Foden S-106 S108, two 1996 Foden S-108, and two 1997 Foden S-108. All featured Cummins diesels with road-speed governing and gear-down protection designed to keep the diesels in efficient rev-ranges. Much of this technology was intended to improve vehicle life, improve driver comfort, and reduce running costs. Idle shut-down was available, turning the engine off automatically if the vehicle was not being operated. There were also engine protection systems designed to alert either the driver – or maintenance engineers – of potential problems before major damage occurred. Another advantage of the trucks was their weight: they were up to a tonne lighter than earlier vehicles, which translated into a tonne more payload and, on average, 36 trips less per annum to deliver the same weight of logs. Fuel usage that year dropped by around 145,000 litres on the back of these developments. Vehicles on the mill site included the Wagner Log Loaders and, by the mid-1990s, the older 60-ton L90 was supplemented by a smaller L80 N.F., with narrower fork spacing designed to make it easier to unload trucks.

PAN PAC FOREST PRODUCTS EMERGES

The former state forests in Hawke's Bay became increasingly important to Pan Pac operations during the 1990s. By the 1995-96 financial year, the former Hawke's Bay state forests were budgeted to provide 345,000 tonnes of the 645,000 tonnes of wood the mill required. This was estimated to rise to 420,000 tonnes by the year 2000. The forests were managed by Carter Holt Harvey, but the cutting rights were bought for $200 million by Oji-Sankoku Forests Ltd, who set up a company, Hawke's Bay Forests, to manage them in 1997. A number of Carter Holt Harvey staff transferred across to the new company, which operated from offices in Napier. The possibility of Pan Pac itself purchasing these rights had been raised in the 1980s. Stuart McKinlay suggested in mid-1989 that, if such a purchase went ahead, it would be "The most significant capital investment in the company's history".

There were clear reasons for proceeding down this line – not least of which was securing the wood supply. The forest resource also opened up potential business opportunities, including direct sale of logs not usable by the mill. The decision to proceed was taken by a Pan Pac directors' meeting in February 1999, and on 31 March Pan Pacific Forest Industries (NZ) Ltd amalgamated with Hawke's Bay Forests, forming Pan Pac Forest Products Ltd. The new company was still primarily owned by Oji Paper Co., Ltd and Nippon Paper Industries Co., Ltd.

It was one of the largest developments in Pan Pac's history to that time, turning it into a very different company: one that did not merely process wood products, but that was also actively involved in silviculture on a significant scale. The scale of the acquisition was such that there was some question as to whether Pan Pac was a pulp-and-sawmill company with a forest resource, or whether it was a forestry company that ran a pulpmill and sawmill. The name chosen for the amalgamated company reflected that general purpose. As Stuart McKinlay put it, the name was "chosen to give a clear message" that Pan Pac was involved in the "production and marketing of 'products of the forest'". The amalgamation brought a large part of the supply chain into the company structure and – at the same time – opened up new markets for logs the mill could not use itself.

In its new form, the company was divided into three operating business units: Forests, Pulp and Lumber. The Forests business was run from a Napier office on what became Prebensen Drive. This aspect – forest management and harvesting – was new to Pan Pac, although the company was familiar with the general process and principle. The task was also relatively complex, involving a significant degree of forward-planning. The team in the Napier office included a three-person engineering team that helped decide which sections would be logged, where the roads

and logging locations would be, produced harvesting maps, and managed building or upgrading the forest roads needed to reach these sites. Harvest planning was often projected up to three years ahead, with supporting road networks organised a year or so in advance. Much of the relevant work – from planting to harvesting and the supporting engineering – was contracted out. The main contractor for the engineering side was MW Lissette Ltd, under Bruce Lissette, which maintained over 1,000km of forest roads, quarries and land preparation. The company owned a fleet of bulldozers, trucks, graders and excavators, with over 15 employees and a significant number of sub-contractors.

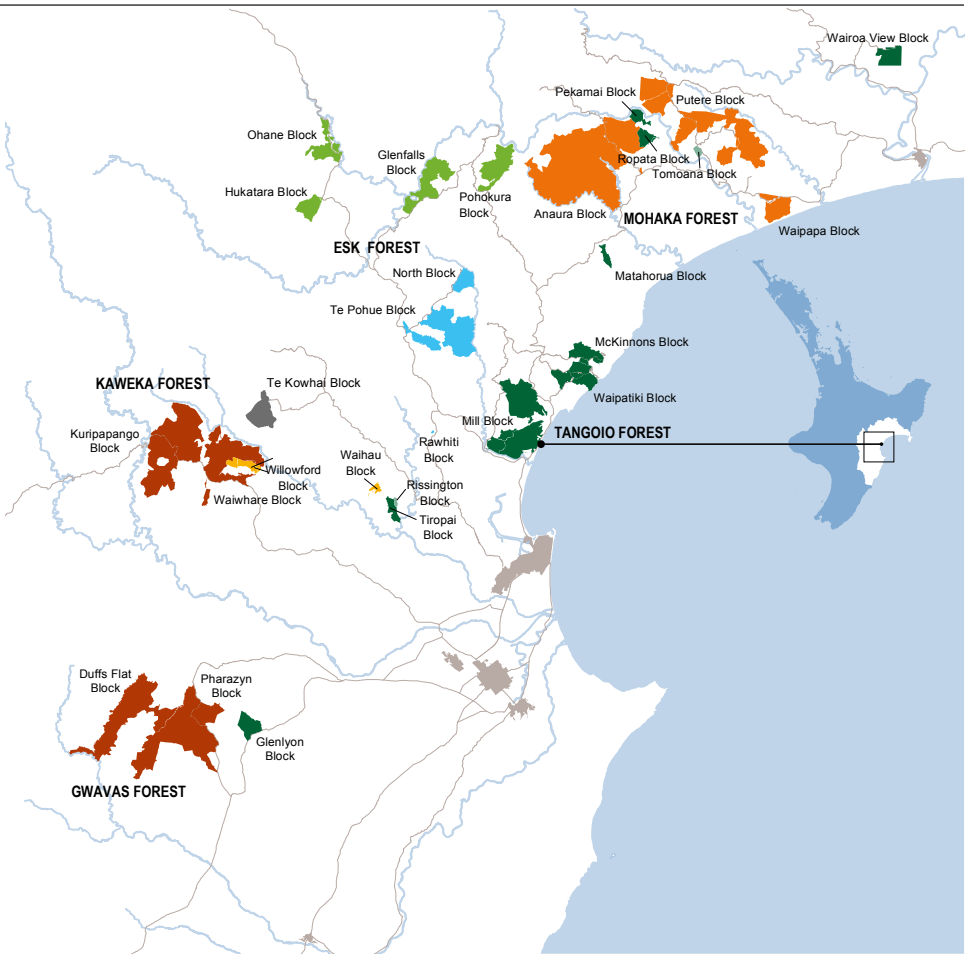
The scale of work conducted annually across the forests was significant. In 2001-02, for example, the Forest Engineering Team planned over 2,000ha of harvests, organised 30km of new roading, upgrades for 40km of existing roads, 300 new landings and pads for processing the felled trees and arranged for a quarter-million cubic metres of road metal – 35,000 truck-loads – to be carted on to the forest roads. The following year, a new concept was introduced: forest processing sites. These replaced multiple numbers of 'landing' sites for felled trees with a more centralised forest site able to process up to 300ha of felled trees. Whole trees were brought to the site on off-road trucks, where the trees were trimmed and reduced for logs for loading on to trucks taking them to the mill. Up to 28 truckloads – some 850 tonnes of wood – could be processed daily on these sites. They had significant advantages over the smaller landing pads, because they could be built on the flat and carried reduced risks over earlier landing pads. Environmental impacts were also reduced through reduced soil disturbance.

This enormous operation became part of Pan Pac Forest Products Ltd. The new structure hit the ground running. In the 1999-2000 financial year, the Forestry Division handled more than 1,000,000 tonnes of logs – 20 percent more than budgeted – and generated revenues of $68 million, including sales of eucalyptus pulpwood to Fletcher Paper. The division also provided some 65 percent of the wood required by Pan Pac. Production was also up at Whirinaki: the sawmill produced 194,000 cubic metres of lumber, 12,000 cubic metres more than budgeted, with revenues of $48 million – a 68 percent increase on the prior financial year. Pulp production reached nearly 223,000 ADT – 15,000 ADT more than budgeted – with $77 million worth of sales.

These figures reflected strong demand for Pan Pac's products and underscored the initiatives of the mid-to-late 1990s, including the push to find new markets and the capital spent on rebuilding the sawmill. Pulp production had been assisted by an organisational restructure that divided the operation into four areas: Fibre Supply, Utilities, Refining and Processing. Of these, Fibre Supply focused on providing chip supply for refining and on supplying the fuel needed by Utilities, which used waste from onsite processes to produce steam for the pulp dryers and lumber kilns. The Refining section pulped the woodchips; and Processing took the pulp, dewatered and dried it, baled it, labelled and loaded it for export.

These developments stretched the capacity of the Whirinaki plant as it stood at the time. Much of the lumber output was possible because the new kilns had come into service, doubling the capacity. However, that also increased the draw on the wood waste boiler and reduced the steam available for pulp drying. This could be offset by drawing on the natural gas burners, but that was expensive. Meanwhile, wood waste was piling up faster than it could be used in the boiler. As McKinlay pointed out, "A new No. 2 Wood Waste boiler seems inevitable".

Prospects looked bright at the turn of the millennium, and there was talk of acquiring further forest areas to support expected expansion.



- Ngati Pahauwera Development Trust (15,484 ha)
- Te Kopere o te o Hineuru Trust (4,255 ha)
- Maungaharuru Tangitu Trust (3,303 ha)
- Heretaunga Tamatea Settlement Trust/Mana Ahuriri Incorporated (15,947 ha)
- Pan Pac Freehold Land (7,637 ha)
- Crown Lease (970 ha)
- Forestry Right (133 ha)
- Willowford; Waihau Cutting Rights (465 ha)

WOOD SUPPLY AND PAN PAC'S RELATIONSHIPS

A significant part of Pan Pac's operation over 50 years has been the relationships built with suppliers, customers, and the local community in Hawke's Bay. All have been crucial to the ongoing operation of the company. The nature and style of these relationships has evolved over that period but has reflected the primary business of the company: producing pulp and lumber, initially for a captive market and later for a more diverse range of customers, while optimising yield from the available wood. These activities were framed by a series of ongoing engagements with the shareholders, customers, suppliers, and the communities in which Pan Pac has operated: the Whirinaki community adjacent to the plant, the wider public of Hawke's Bay; and, after 2014, the Milburn community.

Pan Pac's key relationships were entwined with its core business. One foundation of Pan Pac's operation throughout was a steady wood supply from private lots across Hawke's Bay and, at times, much of New Zealand. This was necessary not just to make up volumes, but to ensure that the grades of wood needed for the mill's production were arriving at the right time and in the right quantities. A broad supply base was key to this process, and at times up to half the wood required for the mill had been provided from these sources. The relationship with these suppliers and the organising body, the Farm Forestry Association, was important to Pan Pac. The relationship with this group was exemplified in March 2001 when Pan Pac hosted a dinner for 400 attending the National Farm Forestry Association Conference in Hawke's Bay. The event was held at the Tuna Nui homestead, with keynote speakers including McKinlay, Hastings Mayor Jeremy Dwyer, and Chair of the Hawke's Bay Regional Council (HBRC) Ross Bramwell. The conference included visits to the mills and the Kaweka Forest. In 2003, Pan Pac donated funds to support the Association's publication 'Tree Planting Guide'.

Engaging with a farming community that often had wood-lots available was reinforced by regular Pan Pac stands at the annual Hawke's Bay Agricultural and Pastoral (A&P) Show, held near Hastings in October every year. The stands underscored the company's operations from tree to product – everything from bales of pulp to furniture made with Pan Pac pine. The company also sponsored show events such as chainsaw carving competitions.

A significant business relationship that emerged during the early twenty-first century was with local iwi. Much of the land on which the former Hawke's Bay

Bruce Evans from Pan Pac and Tipene Cottrell from Wharerangi Marae, with a storyboard developed for Tiropai Forest (2021)

state forests grew had been under claim from Māori under the Treaty of Waitangi since the 1980s. This was not strictly a Pan Pac matter: the relationship was between Māori and Crown. However, it took many years for the issues to be worked through and settlements to be achieved. In May 2012, the state-owned land on which the Mohaka Forest stood was returned to Ngāti Pāhauwera. The cutting licenses rolled over from the Crown arrangements. Subsequent arrangements in 2013 and 2014 saw segments of the Esk Forest east of the Maungaharuru range, along with Te Pohue and North Block, transfer to the hands of Maungaharuru-Tangitū Trust (MTT) in May 2014. Other sections of the forest west of that range went to Ngāti Hineuru in July the same year.

Some business relationships were indirect, an extension of Pan Pac's sustained and ongoing general engagement with the Hawke's Bay community. These included associations with the Hawke's Bay Chamber of Commerce who, as one example, received regular donations from Pan Pac towards the annual Hawke's Bay Business Awards.

CHAPTER THREE
A NEW MILLENNIUM AND OJI PAPER

The first decade of the twenty-first century was busy for Pan Pac. There was a further shift of ownership when, in 2007, Oji Paper Co., Ltd became the sole shareholder. Pulp continued to be sold to Japan but was also offered to new markets elsewhere. There was a significant step up in lumber production, made possible not just by plant redevelopment, but also by the dramatic expansion of Pan Pac's customer base, which continued into the new century.

These were new ventures for Pan Pac. Under the original joint venture, the company had sold all its products into a defined and essentially captive market in Japan. That began changing in the 1990s, and efforts to market company products across the world gained pace in the early 2000s. While the company continued to produce pulp for its Japanese shareholders – essentially as a contract manufacturer – there was potential to make spot sales elsewhere, turning the company focus on to world pulp markets and the styles of pulp required to fill them. Lumber offered further sales opportunities, particularly as Pan Pac moved into kiln-dried timber. Meeting new markets worldwide demanded agility and an ability to adapt to changing customer need, if necessary through new equipment and processes. These factors shaped the way Pan Pac evolved over the first two decades of the twenty-first century.

By 2000, Pan Pac Lumber Marketing was developing business relationships both in New Zealand and Japan for lumber products. The New Zealand side was initially managed by Kirsten Corbin (later by Don Johnson) and the Japanese side by James Nimmo. Later, Colin McGregor was to play an important role in increasing sales to Japan. The New Zealand market was seen as the more important, providing a basis from which the export market could build, and Danny Bond was brought on as Key Account Coordinator, followed by Peter Symes. Pan Pac lumber already had an excellent reputation for quality and was being used by New Zealand industries for a wide range of products from mouldings to laminated posts, window frames, pallets and bins, and more, some of which were exported.

Selling overseas was more challenging. The Japanese market was highly competitive, and not just in terms of timber products. Pallet-grade timber, for instance, competed against both plywood and plastic. In China, attempts to compete on the cuttings-grade market came up against similar products from Russia, Chile and Scandinavia. During 2000, Pan Pac sold around 25,000 cubic metres of lumber to the Markor Furniture Company in Tianjin. McKinlay joined Geoff Alexander, Yoshi Tanabe and James Nimmo on a visit to China

in February 2001, primarily to visit the Markor plant but also to investigate the possibility of selling pulp to the First Paper Corporation in Yantai. This company had taken a sample purchase of 2,000 tonnes but was reluctant to buy more until brighter-quality pulp could be provided. McKinlay felt that China had huge potential to expand Pan Pac's business – the country was rapidly developing, and short of both wood and wood products.

Acquisition of the cutting rights to Hawke's Bay's main forests opened up other business opportunities. Although much of the area had been planted in radiata, these forests included other species of pine and areas of eucalyptus. All were in various stages of growth and not all the wood was suitable for Pan Pac's purposes. Felling these trees enabled the land to be then re-planted in radiata. The issue then was dealing with the supply of unsuitable wood. This was dealt with in several ways. One approach involved selling whole logs to other companies across the North Island. Customers included Napier Pine Ltd, Waipawa Timber Supplies, East Coast Lumber Ltd, and others. By the end of the 1990s, industrial grade logs were also being sold to South Korea.

Another approach to the wood surplus involved chipping the logs. Minor pine species were not suitable for use in the TMP grade pulp that was made at the time. However, the chips could be exported. This also resolved another problem: the sawmill expansion of the 1990s also produced more chips at a time when there were no plans to expand pulp production – in fact, pulp production was decreasing due to Oji's reducing demand for TMP. The result was a general oversupply of chip. Exporting the surplus had multiple advantages. It was a fast and low-capital solution to the oversupply of unsuitable fibre in the region. It also made it difficult for other companies to compete: if left to the open market, there was a possibility that a local competitor would make long term contracts for the chip, making it unavailable for Pan Pac's growth in future.

Plans to develop a chip storage facility at Napier's breakwater harbour were floated in 1999. In July 2000, Pan Pac concluded a 20-year agreement with the Port of Napier to lease space for chip storage, and deliveries to the port began the same month. The requirement included a specialist chip conveyor designed to move chips from the storage facility to the ship. The concept design of the loading system was a collaboration between Australian company Cortex, Stephen Mansell, Mechanical Project Engineer, and Phil Hardie, Fibre Supply Manager, from Pan Pac. Reputedly, visiting Cortex engineers built a model of the system in their motel room, from toilet-roll cores, for Patton Engineering designers to work from.[3] Construction of the stockpiling and ship loading equipment continued around the growing stockpile of chips. By late 2000, around 40,000 tonnes of chips had been piled on the leased land, awaiting completion of the chip conveyor, ready for loading on the specialist chip-carrier *Shin Oji*. The

3 Noted in http://patton.co.nz/portfolio_page/wood-chip-conveyor/

Shin Oji, chartered by Oji Paper, arrived on 18 December 2000 and took four days to load. Company plans called for a total pile size of around 60,000 tonnes – about 1.5 shiploads – with projected annual sales of 150,000 tonnes, rising after some years to 250,000 tonnes.

This side of the business proved very successful; the millionth tonne of wood chips left Napier aboard the *Oji Universe* in December 2007, the 29th chip-carrying voyage. The moment was marked with a small ceremony and gift exchange aboard the ship. Oji Paper gave Pan Pac a cloisonne plate, the ship's owner NYK Shipping Company gave Pan Pac a framed photo of the ship, and the Lambert Group – who provided equipment and staff for loading the ships – gave Pan Pac a framed photo of their machinery at work.

In July 2000, as part of the process of expanding and rationalising its markets, Pan Pac bought Nippon New Zealand Trading Co. Ltd. The company had been set up in 1971 to facilitate Pan Pac's export to its Japanese customers. Now, as a wholly owned subsidiary, it was able to solely represent Pan Pac and manage the necessary shipping operation. This included charters for the two ships dedicated to the company's products: the *Sunny Napier II* and *Pan Pac Spirit*. These had been managed from Japan, but that function now transferred to the Pan Pac offices in Whirinaki, putting Ross Dobbie and the Shipping Department "on a rapid learning curve".

Chip exports continued until March 2016, when the last of 92 loads sailed. The average annual export volume of wood chip achieved over the 16 years of operation was 175,000 tonnes. This was down on the planned volume of 250,000 tonnes per year, mainly due to reduced demand from Oji Paper, lack of profitability and the burgeoning log export business to China. Log exports to China had been almost non-existent in 2000, and nobody anticipated that it might grow. In the event, demand grew rapidly and was sustained. Indeed, the rapid and massive growth of the Chinese log export industry, generally, had a huge effect on the availability and pricing of wood for all New Zealand processing industries.

One of the factors leading to the cessation of chip exports was also the fact that the pulpmill was expanded. As covered in more detail in the next sections, the pulpmill switched to a new process, BCTMP, increasing chip demand by around 150,000 tonnes annually. By design this was going to absorb the amount being exported. However, when the expanded BCTMP plant opened in 2012 a significant amount of work was needed to make it reliable, mainly due to plant issues and learning curves associated with a new product. Having the chip export business was invaluable during this volatile initial period, as Pan Pac was able to divert chips away from the pulpmill to the port if there was 'trouble at mill'. By 2016, the pulpmill was reliably producing BCTMP, and the decision was taken to mothball the chip export facility. The ship loading equipment was completely removed in 2021.

SHIPPING

Expanded markets increased the focus on overseas transport. From the outset, the bulk of Pan Pac's products had been taken to their export destinations – typically Japan – by dedicated ships chartered from Kawasaki Kisen Kaisha Ltd, known as K Line, a company originally established by Kawasaki Heavy Industries in 1919. Delivery voyages from Napier typically took Pan Pac lumber to Saiki, Osaka or Chiba, and all the pulp to Tomakomai, home of the Oji mill. Voyages were not incident-free; during one stormy passage across Hawke's Bay in January 2009 the *Sunny Napier II* rolled violently off the East Cape and lost around 40 percent of her deck cargo of green flitch and dimensional lumber – around $1 million worth of lumber. None of the lumber washed up ashore, possibly because the density of green lumber is such that it does not float, and the lost cargo sank to the seabed.

Two ships operated the route carrying Pan Pac cargoes in the 1990s: the bulk carrier MV *Hawke's Bay* and the *Sunny Napier II*, a 23,842-tonne dead-weight bulk freighter constructed by the Imabori Shipbuilding Company. Able to cruise with full load at about 14 knots, the motor-ship had a crew of 22, including 9 officers. She was owned by Navix Line but chartered to Nippon New Zealand Trading Company for the Pan Pac run.

The MV *Hawke's Bay* was retired in 1999 after 15 years in service, during which time she carried 2.2 million tonnes of Pan Pac pulp and lumber. She was replaced on charter by the *Pan Pac Spirit*, a bulk carrier of some 36,466 tonnes dead-weight (22,073 gross registered tonnage), 173 metres long and beam 29 metres, with a speed of 15 knots. She was built by the Oshima Shipbuilding Company for K Line and completed in 1998, arriving in Napier on her maiden voyage on 25 February 1999. Some work was needed to prepare the gantries for loading, but once set up the ship was able to take 9,000 tonnes of pulp and lumber in a 16-hour working day.

The *Sunny Napier II* continued on charter, completing 100 voyages in July 2008. The charters were progressively renewed, and she made her final departure from Napier at the end of 2016, after 23 years of service on the run, during which she carried more than 2 million ADT of pulp and 950,000 cubic metres of lumber.

When Pan Pac began exporting wood chips in 2000, cargoes were initially carried by the specialist chip-carrier *Shin Oji*, a 45,334-tonne dead-weight vessel built by Imabari Shipbuilding, commissioned in 1986.

CHALLENGES AND OBSTACLES

The first years of the millennium were not all plain sailing for Pan Pac. The decade was perhaps the most challenging the mill had faced since its foundation. Several significant external factors bore down hard from the middle of the 2000s. These could be anticipated, even hedged against, but could never be wholly averted and the results affected profitability and workflows.

One of the larger issues Pan Pac had to confront as it expanded its export markets was the fluctuating value of the dollar. The New Zealand dollar had been 'floated' in 1985, rising and falling relative to other currencies on the basis of currency market movements, instead of the government-regulated values of prior decades. The practical outcome was that when the New Zealand dollar was low – typically measured relative to a 'basket' of other currencies known as the Trade Weighted Index – exporters did better; when it was high, importers were favoured. However, by the end of the 1990s, a low dollar was a mixed blessing for Pan Pac because of the company's debt exposures in Japan. These were raised to fund the sawmill renewal and expansion. Debt levels, and subsequent costs and liabilities, rose as the dollar fell. The latter part of 2000 was a particularly difficult time, sending Pan Pac's indirect overhead costs skyrocketing to $14 million. The six-monthly profit fell to $1 million below the equivalent six-monthly period in 1999 – despite sales revenues from lumber rising by 28 percent against the equivalent period. The cost and liabilities attached to the Yen-denominated loan continued to fluctuate with the dollar into the early 2000s.

One of the key forces driving fluctuations in the exchange rate was New Zealand's internal monetary policy. During the early 2000s, the wholesale interest rate set by the Reserve Bank – the Official Cash Rate – climbed as part of the bank's mandate to fight inflation. This made investing in New Zealand dollars attractive and led to increases in the value of the dollar, cutting profits for exporters. For a company such as Pan Pac – whose income streams were almost wholly derived from the export market – this was a major headache. Geoff Alexander, General Manager of the Lumber Division in 2003, pointed out that the exchange rate had reduced lumber revenue by 20 percent, but costs had not changed. All that could be done was to find ways of cutting those costs while, at the same time, improving income in various ways. Matters were not helped that year by an over-supply of lumber from New Zealand and Chile into the American furniture market – a traditional destination for lumber – softening the market.

The other major issue was the wholesale cost of electricity. Despite the natural gas pipeline and boilers on the Whirinaki site, power was required in significant quantities. The problem was that the reforms the government had imposed across the national electricity generation and reticulation system during the 1990s simply did not work. The national grid had been developed as a unified and balanced operation controlled from Twizel, with a significant flow north from the South Island's predominantly hydro-based generators through a high-voltage DC cable between the South and North Islands. The overall scheme was designed to be self-balancing; if demand outstripped supply in one area, another generator could be brought into the mix. However, this power was distributed to 61 different local authorities. In 1986, government split the electricity system from the Ministry of Energy to create the Electricity Corporation of New Zealand, while awaiting the report of a 'task force' looking into the whole approach. This reported back in 1989, recommending a split between generator and transmission systems, privatising the local distributors, and other shifts that reflected the trend to deregulate and artificially create a market if one did not already exist.

ELECTRICITY MARKET

The opinion on a functional electricity market remains contested. In 2022, the Electricity Authority tasked with developing and monitoring the 'market' concluded that there are "elements of market power" in play that is increasing the costs of electricity to consumers by reducing competition. However, the report concludes that making any structural change to the markets could cause more harm than good. Pan Pac, through its membership of the Major Electricity Users Group (MEUG), has protested against the influence of market power by the four large generators, but at this time of writing there is little optimism of reform from the regulator. Wholesale electricity prices have doubled since 2018 and while some of the increase is due to baseline cost increase of gas, coal and emission costs (ETS) there remains around $40/MWhr of costs that cannot be attributed to costs increases that would not occur in a fully open and functioning market situation. In the opinion of Pan Pac, the oversupply of electricity generation between 2008 (GFC) and 2018 (gas shortages) kept wholesale prices artificially low as latency of new generation brought online during that period exceeded demand growth – this projected a false sense of market function that ended abruptly in 2018 when shortages of alternative fossil fuels emerged.

This, essentially, is what happened to New Zealand's national electricity generation and distribution network. The new framework took much of the 1990s to develop and finalise. Waypoints included the creation of a wholesale electricity market in October 1996, in which electricity prices were set by offers from the generators and bids from traders and wholesale buyers. In April 1999, the national generation system was split into three competing segments. Instead of working together as originally designed, the various generation systems now competed with each other for market share and profit in which price discipline was – in theory – maintained by competition. The system had never been designed for this arrangement, and one result was an inability to cope with adverse conditions such as droughts – leading to power shortages for the first time since the 1970s – coupled with often explosive volatility in the wholesale price of power.

This last was the key problem for major wholesale buyers such as Pan Pac, not just in terms of the cost of that power, but also because volatility made it difficult to predict future costs and create reliable forward business plans. Matters were not helped by industry practices such as spilling extra water from the hydro dams, bumping the wholesale price higher.

It did not take long for the issue to come to a head. Wholesale power prices began spiking in March 2001. Then in April and May spot prices rose by about 500 percent and remained high into August. Pan Pac had a hedge contract in hand, which helped, but this only covered up to 40 Mw of the total 78 Mw energy demand. The company also bought into the Comit System, a service that predicted spot prices up to 3-5 hours ahead. This made it possible to manage the pulp refiner operation around periods of lower spot price, although it was not a complete solution because users were required to advise the market of a change in usage two hours ahead, meaning that if prices fluctuated in ways not anticipated it was impossible to avoid higher costs. Nor did this system alleviate the generally high cost of power. One result was that power costs in June 2001 alone ran some $2 million over budget. Still, by July the process of load-shedding – in which the refiners and pulp operations were shut down at times of very high wholesale prices – was gaining both result and momentum. It did not cure the problem, but it alleviated the issues.

For Pan Pac, one downstream problem was that the power crisis came just as the company was trying to persuade the Japanese shareholders to support major developments in the pulpmill – the very process reliant on that electricity. McKinlay summed up the frustration: "The irony of this situation is that one or more of the government-owned SOE generators are getting the benefit of windfall profits at our expense".[4] The issue was serious: a two-fold increase in wholesale power price was enough to destroy the profitability of the pulp operation. At times during the 2001 crisis, the added cost of power exceeded the sales value of the pulp it produced.

4 *Pan Pac Post*, August 2001.

Something had to be done. Pan Pac was far from alone in this view – every major electricity user was affected, and it had also drawn the attention of a new government, elected at the end of 1999, which initiated an investigation. The failure points in the new electricity system were clear, but the investigation took time. Legislation designed to give the government authority over some of the profit-making practices adopted by the fragmented power system was not passed until August 2001.

Despite this legislation, a combination of low lake levels and high demand provoked further wholesale price spikes into September that year. Ongoing government efforts to introduce governance arrangements over the electricity system did not prevent further price volatility in the second quarter of 2003, hitting Pan Pac's bottom line and forcing the pulpmill to again reduce production. But even by July, wholesale prices were spiking to more than 10 cents a kilowatt-hour, well over the pulpmill's budgeted 5.5 cents. McKinlay wrote to the Minister of Energy pointing out "how the electricity market has failed and is wrecking New Zealand's productive sector". One consequence of the shortfall was a cut-back in pulp production, meaning Pan Pac could not produce low-freeness pulp for the China market. McKinlay felt that "If the production cutbacks continue, we will probably fall short of producing the contracted 240,000 tonnes of pulp for our Japanese shareholders".

These experiences prompted a decision by Pan Pac to build a full power plant at the Whirinaki site, using surplus steam from the onsite boilers and providing up to 15 percent of the mill's needs, helping smooth out the risks attached to the volatile wholesale market. The proposal was helped by the fact that a second boiler was already under construction, larger than the first and able to produce around 36 megawatts equivalent power.

This second boiler was authorised in 2001 for an estimated cost of $18 million. The type selected was a Bubbling Fluid Bed boiler, a new type designed by US firm Babcock & Wilcox. The design was commonly used internationally to handle wood waste and featured a bed of sand at the bottom of the firebox, overlaid with the fuel. Air blown through the sand from below made it 'bubble'. The system could handle wetter fuels and burned cleaner, reducing pollution. Construction was contracted to Easteel Industries of Dannevirke in mid-2001. A wood-shaving handler was included as part of the arrangement but contracted separately.

The new boiler was commissioned in August 2002, a lengthy process that included completing a 'hydro' test in which the boiler was pressurised to 100 bar – 100 times sea-level atmospheric pressure – and checked for leaks. Even after steam began flowing, the project team under Mark Whittleston had work to complete, including labelling, some paintwork, fine tuning, and documenting the maintenance procedures. The new boiler included a conveyor belt to bring wood shavings into a feed silo. Plans included a further belt to carry effluent sludge for burning. Although resource consents had been received to permit Pan Pac to run

both boilers simultaneously, it took some time for this to happen because the first boiler was shut down for overdue maintenance.

By this time, Pan Pac was actively looking into ways of generating its own electricity as a partial solution to price volatilities. Investigation into a possible in-house power plant began in January 2003 and continued through the year, framed by an ongoing power price crisis – the second in three years. By December 2003, plans focused on a steam turbine and generator designed to use all the surplus steam from the mill's two boilers, generating about 10-15 percent of Pan Pac's electricity needs. It was another means of exploiting the mill's waste, smoothing the otherwise rocky road of the wholesale market, and hedging the company against future shortages.

The decision to build the $13.3 million plant was taken in April 2004. The project team included Mark Whittleston, Neil Plumpton, Peter Fisher, Steve McKee and Bruce Ayling. Lower Hutt engineering company Process Developments Ltd was hired to assist with project management and design. The generator and turbine were ordered from German heavy engineering company Siemens AG. Tenders were also called for the cooling towers and superheater supply. Work went ahead at pace during 2005; the heavy equipment was on its way by March, by which time the generator hall was well progressed and significant progress had been made on the infrastructure, including larger-diameter steam pipes. Assembling all this on site was a significant project – the turbine, gearbox and frame alone weighed some 65 tonnes. The superheater was installed on the No. 2 boiler in July. By August, all was ready to commission, a multi-week process involving Siemens engineers. The generator began operating under Pan Pac control on 7 October. The average output was around 8 megawatts; however, the plant was capable of producing up to 13.5 megawatts if necessary.

Pan Pac's power plant was not the only one built in the area. The government responded to the 2003 shortages and skyrocketing wholesale prices by authorising a new 155-megawatt oil-fired plant at its Whirinaki substation, next door to Pan Pac. This was commissioned in June 2004 as a reserve station for the district – and not, as urban rumour sometimes had it, to power Pan Pac.

By early 2007, up to 40 percent of Pan Pac's energy came from the two biofuel boilers, either directly as steam or indirectly as electricity produced via the steam turbine and generator. Efforts were under way to find efficiencies, including by recovering energy from secondary refiner exhaust steam, enabling it to heat the No. 1 pulp drier. Similar modifications to the No. 3 and No. 4 pulp driers were authorised that year. The new power plant helped offset the volatility of the electricity market, although it was not all smooth sailing. Price spikes in 2008 were also problematic. Matters were not helped when the turbine was damaged when the generator was accidentally manually closed onto the grid, out of sync with the grid. As it tried to sync with the grid, in a few milliseconds the turbine and gearbox were stressed beyond their design limits and failed.

One of the larger challenges in the mix remained fuelling the boilers. The original single-boiler installation used bio-waste from the sawmill, but the two-boiler installation needed more fuel than this process produced. Active investigations began during 2003 into ways of using the significantly larger supply of biofuels available as waste from the forestry operations. Up to 80,000 tonnes of what were called 'landing residue' or 'slash' – the broken wood and detritus unsuited for production - were being produced annually by Pan Pac's forest operations, and attention turned to bringing this down to the Whirinaki site for use as boiler fuel. The idea carried several advantages, including a reduction in slash management costs. Perhaps more crucially, using biofuel generated as a by-product of Pan Pac's own operations had advantages relative to net CO_2 emissions under the Kyoto Protocol. By 2007, other wood was being obtained from Napier's Redclyffe dump, including pallet timber, to supplement supplies for the boilers.

PACIFIC WOOD PRODUCTS AND REMANUFACTURING

The visit by senior Pan Pac staff to China in early 2001 underscored the potential scale of the Chinese market, both for lumber and pulp. But it was also clear that brighter grades of pulp would be needed to fully exploit the potential. McKinlay went to Tokyo with Yoshi Tanabe, the Resident Japanese Director at the time, where he met with shareholders to discuss developments in the plant. One item on the agenda was the second wood-waste boiler, expected to cost around $18 million. A new chipmill with a likely price-tag of $15 million was also discussed, along with ideas for expanding the sawmill operation into remanufacturing.

The concept of remanufacturing was another aspect of Pan Pac's ongoing push to maximise the financial return from the wood supply. The rebuilt sawmill, opened in the late 1990s, had been designed to improve the quality of lumber provided to customers. However, only about 75 percent of the outerwood yield was going into the targeted cuttings and ripping grades. The rest became 'industrial' wood, sub-standard for the initial purpose, but able to meet another customer's needs if reworked. It had a sales potential of its own, but markets could not be found for all of it. Remanufacturing, or 'reman' in Pan Pac's vocabulary, was intended to eliminate the problem and restore value by re-working the lumber to the specific grade and size needs of each customer – in effect, customising each order by sorting and then cutting it to the needed lengths.

By the time Pan Pac's management met their shareholders in Tokyo, the company had already hired a Remanufacturing Manager to investigate the process: Tony Desmond. Initial work began with test production of Shikumi, kiln-dried lumber cut to specific length for pallet components. The viability

depended on separating wood into its 'end components' for less cost than the value added by doing so. Initial work was designed to discover that viability. If adopted, the process implied additional plant that – depending on the customer base – did not necessarily have to be onsite at Whirinaki.

The outcome was Pacific Wood Products (PWP), a separate subsidiary company established by Pan Pac in rented premises in Pandora, Napier's industrial area. Capital expenditure amounted to around $9 million, and operations began around December 2001. One early target market was the Japanese demand for pallet components, but this was not successful because of the latencies – Japanese buyers needed the material sooner than it could be provided from New Zealand. This side of the business was closed after two years. However, there were markets for kiln-dried outer-wood, including other New Zealand-based remanufacturing companies who were buying high-grade outer-wood and cutting it up themselves. PWP also turned to making finger-joint blocks: clearwood blocks designed to be glued and jointed together to make useful lengths of clearwood. However, again, the supply was far greater than the market demand.

In November 2003, Tony Clifford was appointed to a new role at PWP as CEO, coming to that position from his former role as Business Development Manager – Lumber, which he had held for three years. His new role was to facilitate the expansion of the PWP business from one that produced finger-joint block and components into a fully-fledged remanufacturing enterprise.

A business plan was developed by Tony and the PWP management team to develop a 'pilot plant' to add finger-jointing capability along with edge gluing and laminating. The building at 65 Thames Street was extended to accommodate this new Finger-Jointer line. Edge gluing and moulding were accommodated within the existing footprint of the main building. The moulder was purchased new, while the finger-jointer and edge gluing press were refurbished units purchased from Brightwood, a long-standing Pan Pac lumber customer in Oregon, USA. The finger-jointer and laminating capabilities were then developed by PWP and sold into the New Zealand and Australian markets, although there was some friction because the resulting products competed with those produced by some of Pan Pac and PWP's customers.

PWP developed a reputation for producing high quality finger-jointed and edge-glued boards and was a preferred supplier to Tenon Wood Products (Taupō) who purchased the PWP products in a raw moulded form, then treated and primed the products in their own facilities in Rotorua and Taupō. These products were exported to US home centres under the Fletchers/Tenon Wood Products brand. Unfortunately, PWP did not have treating and priming facilities, so all PWP finished product had to first be shipped to Rotorua and then returned to Napier for final packaging and export. The logistical costs and timing latency involved in doing so made it difficult to compete in this treated market against other New Zealand remanufacturers.

Ways of adding value to the wood being processed through the PWP operation continued to be explored. One option was to find ways of processing the mid-length clear boards of up to 1.8 metres being produced as a by-product of the target grades of long-length clears, up to 5 metres, being produced for the US DIY clear-board market. This was achieved in 2008 when PWP purchased most of the edge-glued panel making assets and the customer base of Legacy Timber, a Whangarei based company. High grade clear wood, quarter sawn edge glued panels were produced in many thicknesses and widths. These panels were sanded, shrink wrapped and supplied to Porta Mouldings who distributed them to Mitre 10 and Bunnings stores across New Zealand. A small portion of these panels was also supplied directly by PWP into the Japanese retail chains of 'DoIt Company' and 'Joyful Honda'.

These developments initially looked promising. However, by early 2011 it was clear that PWP was not making much money. The decision had to be made to either scale up the business or close it. There was little appetite within Pan Pac to expand it, in part because the plant was competing with Pan Pac's own domestic remanufacturing customers. The question was complicated by issues with the site. While PWP owned the building, the land itself was leasehold and the owners would not sell it to Pan Pac, meaning that any growth would also require a significant investment in land and buildings on top of the plant and machinery. As a result, the plant was closed down in an orderly fashion that year. Existing orders were completed over a period of six months. Some of the staff were re-employed by Pan Pac into various roles, but others left the group.

RESTRUCTURING AND NEW SHAREHOLDING

The first decade of the twenty-first century brought significant changes of both senior management and organisational structure. Stuart McKinlay retired as Managing Director in September 2004. "I take great pride in what has been achieved by Pan Pac over the 20 years that I have had the privilege to serve this Company," he wrote in the staff newsletter. "We have some outstanding people, and it is people that make the difference."

Doug Ducker, a long-standing Pan Pac employee who had been General Manager of the Pulp Division, was appointed Managing Director. Doug had joined Pan Pac as a process engineer in 1974, arriving from Bluff where he had been working in the aluminium smelter. Ken Ross, another long-standing senior executive, retired at the same time as McKinlay, and the moment was opportune to reorganise senior management, reducing the directors' structure to just two based in New Zealand: Doug Ducker, as Managing Director primarily responsible for operations and Yoshi Tanabe, the resident Japanese Director whose main responsibility was representing shareholder interests in Pan Pac.

The new directorial team shortly had to face a new challenge. In mid-2005, the Chairman of the Board, Mr Shinoda, and Pan Pac's pulp customer representatives, Mr Kizuka of Oji Tomakomai and Miss Murai of Nippon Paper Industries, warned that ongoing high exchange rates and high pulp production costs would probably reduce sales volumes. The guaranteed sale to Tomakomai had always been the keystone of Pan Pac's operation. Lumber markets in the US and China had not grown as expected. To cap it off, the value of the forest resource was dropping on the back of low log prices. This challenged the viability of proposed pulp and sawmill developments and, indeed, the viability of the whole Pan Pac operation.

Doug Ducker felt that changes would have to be made. The company had been operating with the structure established in 1999 after the amalgamation with Hawke's Bay Forests, but had significantly evolved its business, including through subsidiary companies such as PWP, which was remanufacturing lumber. One of the strengths of the company was its vertical integration: its involvement with product from seedling through to grown tree and finally finished pulp and lumber products.

An Organisational Structure Review was initiated in August 2005 and completed in October, with input from the Mercer H. R. Consulting Group and a programme known as 'Alignment for Success'. The analysis showed that the company was very inward looking and had less focus on enhancing value and selling product than it could have. Proposals to remedy the situation included scrapping the existing divisional model and replacing it with a four-pronged cost-centre model. The four suggested elements were: Forest Plantation Development & Management, Fibre Supply & Transportation (Logistics), Manufacturing (the pulpmill, sawmill, drymill and energy plants) and Sales. The elevation of sales to a major element of company operations underscored the new focus. However, this restructuring proposal was not entirely implemented as proposed. Each General Manager wanted to retain ownership of sales and production, and as events panned out this actually proved more valuable than the Mercer proposals.

Change was still needed and during 2006 the Forest business and Shipping department were reorganised into a smaller Forestry team and a Logistics unit, under Brian Pritchard. Logistics had the job of getting logs, chips and biofuel to the manufacturing division, then taking product from manufacturing to market – meaning road and sea transportation. Reconstruction of the Pulp and Lumber business units awaited appointment of new General Managers of Manufacturing and Sales, later in the year. There were knock-on effects for corporate support: a Business Information and Finance unit was established and the Engineering, IT and Financial groups redeployed. Longer-term plans called for accommodating all these units on the Whirinaki site, but for now the logistics unit had to operate from offices in Napier's Prebensen Drive.

These developments were joined by significant external change, a major external reorganisation of Pan Pac's ownership, together rendering the middle years of the decade among the more turbulent in Pan Pac's history. In 2006, Pan Pac's accountability to the Oji Paper Group was moved to the Strategic Raw Materials division. Then, in mid-2007, an even more significant shift occurred in the ownership structure. For some time, Oji Paper had held around 87 percent of Pan Pac's shareholding, with the remainder owned by Nippon Paper Industries. In mid-2007, Oji bought out the Nippon Paper Industries share, becoming sole shareholder of Pan Pac and rendering the New Zealand operation a wholly owned subsidiary of the Oji Paper Group. At the time, this company was the world's seventh largest forestry and paper business, with 10 paper/pulpmills and 14 paperboard and tissue mills in Japan alone. They also owned over 190,000ha of forest in Japan and more than 140,000ha elsewhere.

Adverse external events also beset the Pan Pac business. In 2006, an unseasonably cold June produced snowfalls of up to 40cm above 600 metres, and 20cm above 400 metres. This caused significant damage to over 600ha of Pan Pac's forests, notably Mohaka and Kaweka.

Other events in the wider world also had severe impact, particularly the Global Financial Crisis (GFC) that began in 2007 and broadly lasted until 2009-10, which threatened to produce the worst global downturn since the Great Depression of the early 1930s. While New Zealand weathered the storm fairly well, in general, exporters such as Pan Pac nonetheless felt the effects. In October 2008, there was a sharp drop in demand for lumber. Orders were cancelled, lead times shortened, and, for a while, the sawmill's order book was lean. The result was a reduction in working hours that lasted into 2009. Pulp demand was also affected. The economic crisis broadly collapsed Japan's export market for recycled fibre, prompting Oji to use this instead of pulp usually imported from Pan Pac. Fortunately, the mill had been experimenting with low-freeness grades that took longer to produce but could engage a different market slot. An initial 2008 order for 20,000 tonnes of this product was expanded to 40,000 tonnes, with calls for a 70,000-tonne batch in 2009. In the face of the GFC, there was serious consideration of switching all production to low-freeness grades, reducing annual output by one-third to 200,000 ADT, but meaning the mill could keep running.

The need to continue to adapt to changing markets – coupled with the push to find new markets – prompted significant development of the plant on the Whirinaki site during the early 2000s. One area that had never been updated since the 1970s was the chipmill. Plans to replace it with an updated low-noise plant were first floated in 2000, for a cost then estimated to be around $10-$12 million. However, it was 2008 before the expenditure, now budgeted at $14.95 million, was approved. This decision came just in time: the old plant was being called on to produce ever-larger quantities of wood chips and had to be nursed along by maintenance teams. The new chipmill included a 4 metre by 22 metre drum debarker ordered

from Finland and was designed to chip the logs with a 2.95 metre disc chipper, screening them on a 3.6 metre by 6 metre vibrating screen. Both the latter plant items came from US sources, the motors to drive the chipper from Taiwan. Work began on the new plant in July 2008. The new chipper was similar to the worn-out original, but significantly larger.

In 2007, Michael Reaburn joined as General Manager of Lumber. Michael drove expansion of the business area, with further upgrades to the sawmill and a Solidwood project that was approved by the Board of Directors in March 2008. This came – as Ducker noted – at a time when "many New Zealand sawmills are reducing output or in some cases closing". Equipment orders were placed the following month and construction went ahead in April. New plant included a tray sorter/stacker, gang saw, and a dedicated kiln: No. 11. The tray sorter/stacker and gang saw were commissioned in early November and production began, initially with training. The kiln was commissioned in early December. In 2010, an auto grader was added to the drymill that, with a new trimsaw, eventually allowed output to rise from 24 to 28 finished pieces per minute.

LOG HARVESTING AND THE LOGMAISTER SCANNER

The amalgamation with Hawke's Bay Forests created opportunities for Pan Pac, but also came with challenges. Planting continued and cut-over areas were replanted in radiata. Rationalising harvesting operations and optimising log quality were key issues in the early 2000s.

Harvesting operations demanded a variety of techniques, depending on the terrain and prevailing weather conditions. In low-land regions with slopes of less than about 20 degrees it was possible to extract trees with skidders and tractors, whereas more rugged terrain required cable-logging and haulers. Some of the terrain in the Mohaka region was particularly challenging. This was a legacy of the government policy of the early-mid twentieth century, in which forests were relegated to otherwise unproductive back country. However, it carried significant costs as harvesting moved into this rougher terrain.

By the early 2000s, around 70 percent of Pan Pac's felling operation around Hawke's Bay was in rougher country, demanding up to a dozen separate hauler operations with associated crews. This was less than optimal, and a good deal of work went into improving the whole process, including introducing a contractor performance system. Operations Manager Damon Wise recalled this was a "painful process of two years". Forest operations were rationalised from around 17 individual contractors to one large contractor, DG Glenn Logging Ltd, and four owner-operators.

One of the larger challenges in the process involved bucking – preparation of the felled tree stem for further processing by cutting it down into suitable logs. The challenge of optimising value when cutting trees down into logs had long been understood. Efforts to address it were made as early as 1913 and mathematical solutions found by the mid-twentieth century. However, applying these in practice was difficult. As late as the 1990s, mechanised systems were not able to do the job well: they could handle volume but not optimise effectively. Conversely, human operators working with devices such as the Timbertech log-optimising calliper – a hand-held tool – could usually get the best out of any tree stem.

The problem was still the yield-loss rate, an issue even for the best operators. In addition, training was specialised and demanded significant experience and skill. A mistake could reduce a log suitable for specific lengths and sizes of lumber into a lower-value item that could only be chipped. A good deal of time and effort was put into managing this quality, and into training those involved, but it was not as efficient as it could have been.

Centralising log-making at Whirinaki offered efficiencies, concentrating the process into a single site at the mill. This had actually been done during Pan Pac's early operations with logs from Kaingaroa. In 2002, a delegation from Pan Pac visited the Carter Holt Harvey yard in Northland, which had been trialling centralised stem processing, and the decision was made to do the same in Hawke's Bay. This implied trucking 20-metre stems, a longer load than normal, but still road-legal and offering significant efficiencies. It also promised an improved work environment, and the logical extension of the concept was to bring the processing down to the Pan Pac site at Whirinaki.

Into this mix came a new technology, a machine known as the Logmaister Scanner. This had been initially prototyped by Awdon Technologies with database supplied by Interpine Forestry Ltd, and further developed by Logjiztix Ltd of Gisborne, a company owned by Andy Dick and Mike King.[5] The system was developed initially for use in forest ground bases – the sites where tree stems were assembled and prepared for bucking and transport. It was designed to handle up to 200 stems a day. This was significantly better than the manual process. The unit was designed for disassembly and reassembly within 24 hours, and to fit within the typical platform area of a standard landing ground.

5 Andy Dick, 'The Logmaister log merchandiser', paper presented to a meeting of the Timber Measurement Society, Fall 2007

THE LOGMAISTER SCANNER

Described as a 'mobile log merchandising plant',[6] the Logmaister Scanner in its initial form consisted of a scanner-head moving on rails, overlooking a log deck, which assessed logs up to 38 metres in length, displaying results on a screen showing branch zones and defects which the operator marked and input into the system. Once a log had been fully scanned and the defects noted, an algorithm was able to indicate where the log could be optimally cut to maximise results.

Once analysed, the stem was given a unique tag-identification and the data passed to the processing side, an excavator-mounted unit wirelessly networked to the scanner. Here the operator could see the cutting solution on screen and manoeuvre the stem to be cut accordingly.

This looked promising, and Pan Pac initially hired the machine in 2003 for trials at forest landing grounds in Mohaka and Kaweka. However, it was not wholly successful. Yield gains were clear: 7 percent increase in value in Mohaka and 3.2 percent in Kaweka, by comparison with inventory projections. But these sites were too remote for easy maintenance of the gear. The experience gave focus and impetus to the drive to centralise stem processing. In late 2003, the machine was brought down to the Whirinaki site and installed to centrally process a proportion of the stems being brought to the mill for processing. Initial trials here were highly successful, and ways were found to increase through-put from 400 tonnes a day to 2,500 tonnes, adding a second scanning head and using double shifts by staff employed by DG Glenn Logging Ltd.

Despite the physical pounding taken by the machinery as a result of these extended operations, it proved reliable. From early 2006 to late 2007, it was out of action for only three days, due to a hydraulic leak that proved difficult to trace. Expected maintenance included normal replacement of hydraulic hoses and mechanical parts. By the end of September 2007, the system was processing up to 2,700 cubic metres of stems daily. Between April 2004 and October 2007, the system had produced logs estimated to be of approximately $63 million in value.[7]

The system became known as the Pan Pac Processing Yard (PPPY or 3PY). Advantages for Pan Pac included a significant reduction in the workforce on the harvesting side; this came down to five extraction crews, four of them using haulers. Although it represented a cost reduction, the main advantage was risk reduction. Much of the movement of logs and chainsaw

6 Andy Dick, 'The Logmaister log merchandiser', paper presented to a meeting of the Timber Measurement Society, Fall 2007.

7 Ibid.

work in the forest work-spaces – always liable to produce serious accidents – had been eliminated. The landing areas could be made smaller. There were also transport efficiencies, further streamlined by sorting logs at the forest end so that logs of specific grades were delivered together. A further benefit was the fact that short offcuts, previously simply left as residues in the forest, were now available on the Pan Pac site for chipping.

This system was clearly the way forward. However, it was also evident that something with significantly greater capacity than the hired and modified Logmaister system was needed. This took Pan Pac into what was later described as the 'bleeding edge' of stem optimisation and led to what was effectively a classic piece of Pan Pac engineering ingenuity. In 2010, Wise met with Don Scott of Gisborne-based Awdon Technologies to develop a new plant for the Pan Pac site. The initial plan was ambitious: a significant processing facility with three saws, a transverse deck and x-ray scanning capability. Cost was estimated to be around $10-$11 million. However, the capital expenditure was rejected by Oji.

Undeterred, Scott and Wise agreed to meet in a Wairoa cafe and worked up a new system, essentially on the back of a napkin. This included transverse log handling and was a 'No. 8 wire' solution by comparison with the original but considered do-able. This was again put to the directors who agreed, providing it did not draw on Pan Pac resources. The result was an arrangement by which the machine would be built and operated by DG Glenn Logging, on the Pan Pac site. Construction was initially handled by Scott, but after some months he withdrew from direct management. The problem then was what to do with the half-built equipment; $1 million had already been spent. Wise decided to take Pan Pac's available transporters north to Gisborne, load all the equipment and machinery and bring it back to Napier. Here, he and others from Glenn's worked on it over weekends and evenings for about eight months. Scott was brought back in as consulting engineer.

The result was a stem processing plant staffed by DG Glenn Logging that became a significant addition to the Pan Pac site, completed in 2012 around a year over time and $1 million over budget, but able to do what was intended. It was still operating a decade after it had been built, underscoring the quality of the design.

The entire 3PY system brought significant changes at the forest end of the operation that was primarily handled by DG Glenn Logging Ltd and now had only to deal with felling, branch removal and loading 18 metre or 20 metre stems on to waiting transports. Much of the work was being done by heavy machinery by this time, for example, logs were handled at the loading end with Hyundai 290LC-8 or Hitachi Zaxis 330 loaders. In easier country, logs were dragged to the processing and loading sites by CAT 527 skidders, among other equipment.

JOINT VENTURES IN THE US AND CHINA

Ongoing marketing developments through the first decade of the twenty-first century produced a significant customer base in both China and the US, prompting Pan Pac to set up subsidiaries in both nations: Pan Pac Timber in Tianjin, and Pan Pac USA in Portland.

During the early 2000s, Pan Pac became involved with a new joint venture in the US, Aotearoa Lumber Company, again as part of the drive to secure a new lumber market. By this time, forest harvesting included a significant quantity of pruned-logs, producing good clearwood that Pan Pac was able to sell to Kaingaroa-based remanufacturing company KLC Ltd. This company had been founded in 1987 and was selling clearwood boards into the US – specifically, the do-it-yourself (DIY) hobby market, where major hardware retail chain Home Depot was buying this wood in significant quantity for individual sale to retail customers. The problem was that Pan Pac was processing far more pruned logs than KLC could use.

There was a ready market for this material in the US, but Pan Pac lacked the infrastructure and contacts in the US market that KLC had. However, KLC was unable to fund any expansion. The result was an offer by Pan Pac to buy half the US business, creating joint venture Aotearoa Lumber Company (ALC), a New Zealand registered company. ALC was the shareholder, along with Rick Campbell (US resident) of KLC Holdings LLC. This gave KLC enough capital to expand its operations in Kawerau, and thus, buy more Pan Pac lumber. It was an example of the way different milling businesses could work symbiotically to the benefit of both, but in the end the effort failed. The US market was highly competitive, and it was not possible for KLC to push price increases to Home Depot to justify the costs attached to Pan Pac lumber. Pan Pac continued to sell DIY clear boards into the US for some years via PWP, but the margins were thin and in the end the company decided not to bid for the right to supply two Home Depot distribution centres in Texas, instead withdrawing from the business. Those distribution centres were eventually taken over by Southern Cross Forest Products, who – in a curious closing of the circle – eventually went into liquidation, at which point Pan Pac purchased their sawmilling assets in Otago.

A further joint venture effort in China was very successful. By the early 2000s, wooden furniture was in high demand in China, and was also being exported, and there were good prospects for selling suitable grades of board. Pan Pac was already selling into this market, primarily to Tianjin-based furniture maker Markor, a major manufacturer that was growing its business rapidly, opening factories at the rate of about one per annum with around 1,000 employees each. This scale of business required prodigious lumber input. Pan Pac was not the only supplier to Markor. Other

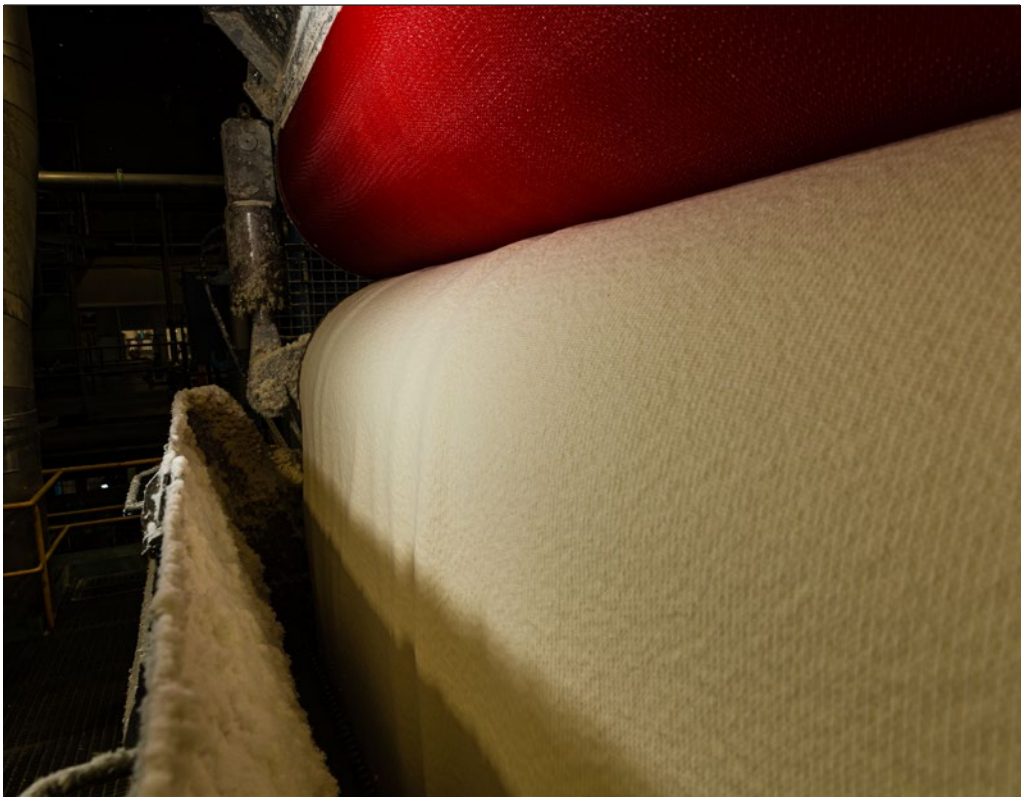
New Zealand firms were also selling lumber to the Chinese concern, along with other suppliers in the US. Lumber produced by Pan Pac was initially stored on the Whirinaki site and in warehouses in Napier. However, the supply chain across the Pacific was a weak point, so Pan Pac decided to open a warehouse in Tianjin to hold specific furniture grades, essentially gaining a direct presence in the Chinese market where it would be possible to become a just-in-time supplier for Markor and other furniture makers.

The outcome was a new venture: Pan Pac Timber (Tianjin) Co., Ltd (PPTT), which operated a bonded warehouse and small office with a sales team, rented from Markor. The fact that the warehouse was bonded meant that duty was not paid on any timber until it was sold and moved, opening up the potential to move large volumes of wood into the Chinese market at relatively minimal cost. PPTT was able to keep control of pine being supplied to Markor for some years. However, demand for pine eventually dropped as Chinese furniture manufacture turned to hardwoods. Improved shipping to the eastern Chinese seaboard also meant that Pan Pac could guarantee just-in-time supply for the pine orders that remained at 4-6 weeks' notice from Hawke's Bay. The decision to close the warehouse and associated business PPTT was made in October 2012. Because the building was leased, no capital was required or lost with the closure, and the PPTT staff moved to Pan Pac.

SOCIAL EVENTS

As one of Hawke's Bay's largest employers, the Pan Pac operation has had a significant staff culture, with an active social club that engaged in sports matches, barbecues and other events. A Pan Pac Social and Recreational Club was formed to provide financial support for Pan Pac employees wanting to organise or participate in social, sporting or recreational activities. Significant events sponsored by the Club included annual fishing competitions, typified by a major contest in 2003 that attracted 28 boats and 97 entrants. Grants were also made on occasion, covering entry into a lawn tennis tournament, squash nights, and even on one occasion an air fare to support a visit to Tomakomai.

Top: *Kids' Christmas Party at Eskdale Park, December 2019.*
Above: *Pan Pac Legends Volleyball Team, 2019.*



CHAPTER FOUR
BLEACHED CHEMI-THERMO MECHANICAL PULP

One of the most significant site developments at Whirinaki during the first decade of the twenty-first century involved the pulp process, marking a further watershed in Pan Pac's history. The pulp traditionally produced at Pan Pac was typically able to be used for newsprint production, but not for higher quality grades of paper or other packaging products. This pulp had traditionally been sold exclusively to Pan Pac's Japanese shareholders, principally for the plant at Tomakomai, making Pan Pac a contract producer for its shareholders. However, as markets changed during the early 2000s it became clear that newsprint production was slowing. One answer was diversification. Other grades of pulp were saleable elsewhere in the world, notably Bleached Chemi-Thermo Mechanical Pulp (BCTMP). This had been developed in the late 1980s and was first produced to large scale by Canadian company Millar Western. It included a bleaching step, typically using hydrogen peroxide, which produced pulp of around 75 ISO. This was considerably brighter than the 56 ISO typical of unbleached product.

The BCTMP process was more cost-efficient than other means of making brighter pulp and opened up potential for sales to makers of carton board, including products able to be used for commercial packaging. There was potentially a huge market, and in 2007 – with TMP demand dropping on the back of steadily falling need for newsprint – Pan Pac began looking into adding a BCTMP option to the pulpmill. Progress was relatively slow, but by 2010 the project had progressed to the point where it was possible to discuss practical steps with Oji Paper. By this time a shift away from older styles of pulp was becoming essential: the Oji Group was facing a dramatic fall in demand for newsprint, projected to reduce by 30 percent within five years. Conversely, there was a strong BCTMP market in Asia, notably China where BCTMP was used not merely for board and packaging production, but also to produce print-grade papers.

The way forward seemed clear. It was also a relatively bold step: soft-wood BCTMP, which Pan Pac could produce from its pine, was new for Oji. In short, although the mill itself was a relatively small part of the wider Oji business empire, BCTMP pulp was going to be very much at the leading edge of Oji's pulp product range.

Key issues to resolve included differences of opinion over possible BCTMP processes, such as whether to pre-bleach. Pan Pac was in favour of Dilution Water Sulphination (DWS) whereas Oji Paper, via a pre-feasibility study, preferred an impregnation method. Other challenges for Pan Pac included finding ways to manage the chip quality to produce both TMP and BCTMP simultaneously. There were also physical issues associated with the installation, such as plant footprint size and the need to alter existing buildings, all of which affected the cost of conversion. Other question marks hung over which production lines to convert. In and around these were energy supply issues. All were interlinked. Senior Pan Pac management, including Doug Ducker, Fred Staples and Tim Sandall finally met with senior Oji executives in February 2010 to work through the issues identified in pre-feasibility studies and analysis. This confirmed a schedule to produce a feasibility study by May, when the Oji board meeting was held in Tokyo.[8]

The decision to proceed to convert two-thirds of the pulpmill capacity to BCTMP was taken in December 2010. It was a significant milestone in the history of Pan Pac, marking the transition from being a company that supplied pulp to its shareholders alone, into a market driven BCTMP supplier with potential to operate globally. The fact that the new product was going to rely on marketing and sales efforts outside Japan was well understood; indeed, approvals for the development were not given until demand had been identified.

By this time, planning for BCTMP was well advanced. At a budgeted $70 million, the conversion to BCTMP was one of the largest capital developments for Pan Pac since the Stage 2 expansion of the mid-1970s. Yet the required scale was unsurprising: BCTMP was a significantly new process for Pan Pac and every part of the pulping operation was affected, from chipping through to effluent. The effluent issue brought in external authorities, as the outflows from the BCTMP process differed from those of TMP and required a variation to the existing effluent discharge resource consents. The effluent plant also had to be redeveloped, gaining new tanks and a clarifier. The capital cost of that task alone came to $20 million of the $70 million total budgeted for the BCTMP plant.

The project demanded extensive development and construction work on the Pan Pac site, including new structures to house the necessary equipment and chemicals. Work began in January 2011. The primary contractor responsible for assembling and commissioning the machinery was Austrian company Andritz. However, much of the work required to construct the buildings and the foundations on which the plant was to be assembled – along with the new effluent system – was done by a range of contractors. Some were local, including Eric Wiig whose company applied chemical-resistant coatings to components. Other companies contracted for work on the project included Amtech Construction, who handled

8 See Minutes, BCTMP Discussion with Oji Paper 15-17 February 2010.

grouting; Fitzroy Engineering, who fabricated and installed stainless steel piping; and Universal Engineering, who constructed stairways, among other elements. The new effluent tanks were built by Concrete Structures.

The decision to switch to BCTMP required hydrogen peroxide, stored in a 300-tonne tank on site. Hydrogen peroxide, a chemical used as hair bleach, but in concentrated form also able to be used as rocket fuel, decomposed slowly to non-toxic ingredients – specifically, oxygen and water. However, it had the potential to suffer rapid decomposition if it was contaminated, producing very large volumes of oxygen and steam; and the rate at which it was produced had the potential to violently rupture the tank. A hydrogen peroxide tank had exploded at Sweden's Skoghall pulpmill in July 2009 after the wrong chemicals were loaded into it, propelling the top section of the tank like a rocket. This was not the only such incident globally.

The risk of such sudden unplanned disassembly was nonetheless low for any one installation, but the consequences of a failure were high. An explosion that destroyed the tank was considered to pose little physical risk outside the Pan Pac site, particularly because the decomposition products were water and oxygen. However, it was expected to be violent enough to badly injure or kill anybody in the immediate vicinity. Special precautions to prevent a contamination accident included training delivery drivers in the standard operating procedures, adding clear signage, electronic delivery verification and – most crucially – physically separating the hydrogen peroxide delivery point from those of other chemicals delivered to site. The tank was also positioned well away from most of the usual working spaces. Physical steps at the delivery point included fitting the input pipe with a hose coupling that only the hydrogen peroxide supplier could use. The tank itself was fitted with temperature alarms that warned of any contamination via the temperature rise, along with an emergency water deluge system and twelve tank-top vents designed to relieve pressure. These were backed up with solid emergency response procedures.

The hydrogen peroxide storage system began operating in 2012 but was soon caught up in new legislation. In 2015, the government introduced new workplace health and safety regulations, in part as a result of the 2010 Pike River mine disaster. Companies operating what were classified as major hazard facilities, meaning sites where hazards were such that accident or failure would result in one or more deaths, were required to have them certified. Pan Pac was classified as an upper tier facility under this legislation thanks to the hydrogen peroxide tank. This also meant the company required WorkSafe certification both of its compliance with new construction codes, and of its operating procedures.

Obtaining that certification proved challenging. On the plus side, the tank and associated equipment was new and had already been built to the latest standards: the size, metal thicknesses and other values were all to code. However, it was not being operated in a manner that could be certified. Getting to that point was a three-year project, led by Roger Jones, that

involved five people writing a mammoth 'safety case' relative to the tank and its processes – the story of how it was being managed – and covering all eventualities in every conceivable detail. This 'thesis' was then submitted to WorkSafe for assessment, enabling the certificate to be issued.

However, the issue ran further than just certifying the tank once. The legislation included annual audits to ensure that operating processes were up to scratch. Pan Pac could not afford to lose its license, as this would mean the end of BCTMP production that was increasingly important to the company. Thus, certification became an ongoing process that also meant the company had to institute a significant change of mindset towards risk issues. This was more difficult. The typical risks confronted by the company were of a different nature, such as an accident during harvesting, or in the sawmill, or a fire in one of the pulp driers. These were relatively more frequent activities. An exploding peroxide tank was an extremely low frequency event with the frequency calculated to be around one such event, per tank, every 10,000 years. This seemed so miniscule as to be scarcely worth considering. But it was necessary to have the facility certified. As Tony Clifford noted later, "We had to alter the DNA of Pan Pac", by which he meant altering attitudes to workplace risks – a change that was still underway in 2022.

Efforts to develop an international customer base ran in parallel with the planning and construction process of the new plant. The initial focus was China, where soft-wood BCTMP was already being sold and demand ran well ahead of available supplies. There was particular opportunity for BCTMP sales to two of Pan Pac's existing Chinese customers, IP Sun and Shandong Bohui, who were commissioning carton board production lines in 2012 and required BCTMP in enormous quantities. These plants dwarfed the Pan Pac Whirinaki operation; as Clifford noted, one of the Bohui lines would "easily cover the length from and including the pulpmill and sawmill at Pan Pac". However, there was also potential to generate new customers both in China and India. During the last half of 2011, senior Pan Pac staff, including Ducker and Pulpmill Technical Manager Peter Allan, made four journeys to India and China to establish an initial market for Pan Pac's BCTMP. Initial talks confirmed that the specified product targeted by the Pan Pac system – with 75 ISO brightness – was also in demand. Bulk sales contracts could not be concluded until after sample supply and testing, but it was clear the company was on the right track.

The project's completion was publicly announced in September 2011 by Mr Kazuhisa Shinoda, President and Chief Executive Officer of Oji Paper, during a visit to Napier. The primary and secondary effluent plants were handed over to Pan Pac in December 2011 and January 2012. The primary contractor Andritz began commissioning work on the new BCTMP plant, beginning with cold start-up and functional tests. While this went on, Pan Pac staff were brought up to speed on the new process.

The BCTMP plant was fully commissioned over Easter weekend 2012 and ran production trials for two weeks. Early problems included a high level of shives – tiny unrefined fibres – appearing in the end product, up to 0.15 percent instead of the 0.1 percent target. This was a result of the need to achieve high levels of freeness, a term meaning the rate at which water drained from the pulp. The way to achieve that was to cut back the refining process, saving energy and reducing production cost as an incidental benefit, but the downside was a higher level of shives. The answer to that problem was already incorporated into the BCTMP plant: a screener and second refining step to deal with the proportion of product that needed it. However, the trick was getting all this to work correctly, which took time and experience with the system.

Fred Staples retired in mid-April 2012 as the BCTMP systems came online. He had been a key player in the development and delayed his retirement to oversee the introduction of the new system, saying he was "keen to leave with the future assured for Pan Pac and its employees". In a farewell message to pulp staff, Staples said he hoped that "a repeat of the original RGP mill in 1973 will reoccur, in that the project's success will result in Stage 2 BCTMP".[9] Tony Clifford was appointed General Manager of Pulp and the new plant was formally handed over by Andritz on 10 May 2012.

There was only one downside to the development. The BCTMP project had been initiated before the GFC had fully unfolded but was not commissioned until afterwards. In 2012, both the US and Europe were still recovering from the ravages of the worst economic downturn since the Great Depression of the early 1930s. As a result, demand for board was slower than expected. However, it was also clear that with demand for TMP steadily falling, BCTMP and a sustained effort to market it was the way forward.

The project also had an impact on Pan Pac's shipping arrangements. Up until then, most of the pulp had been sent to Tomakomai, using two charter vessels that made up to a dozen voyages a year. The reduction in TMP production by 2015 was expected to reduce the voyages required to just four. Initial shipments of BCTMP to China were achieved via Swire Shipping break-bulk vessels, on a liner service basis. However, this restricted the number of ports to which the product could be delivered and, with that, Pan Pac's ability to service its customers. However, during a review of shipping services in 2014 the freight aggregator company Kotahi Logistics LP – owned by Fonterra and Silver Fern Farms – was able to offer a cheaper option involving 20-foot general purpose shipping containers. Pan Pac switched to this service, opening up ports and hence customers across China, India and Indonesia. One outcome was that Napier Port had to expand its container packing facilities to handle annual figures of up to 200,000 ADT of BCTMP that was being loaded into the containers and passing through the port.

9 BCTMP Newsletter, 13 April 2012.

Much of this product was taken to Napier's breakwater harbour by 'Super-B Train' big rigs. These enormous units, 24.5 metres long, took advantage of a 2010 shift in road regulation, itself urged by Pan Pac, that increased maximum allowable vehicle size and weight. The 11-axle design was developed by Kraft Engineering of Rotorua, a major trailer manufacturer, to meet the requirements of NZTA and Pan Pac. The trucks were dubbed 'high productivity motor vehicles' (HPMVs) and built as a multi-company venture with Pan Pac, Kraft, Fruehauf and Emmerson Transport Ltd.
The first two ordered for Pan Pac completed road trials in December 2011, and the company received an operating permit in January 2012. These rigs could carry significantly more pulp in one load than earlier B-trains: six pallets of TMP versus four of the older vehicles, and eight pallets of BCTMP. A further two vehicles joined the small fleet, and the whole development produced significant efficiency gains.

Super B Train rig.

THE BCTMP PROCESS

In contrast with thermo-mechanical pulp, the BCTMP process required a range of chemicals to treat the pulp mix. None of these chemicals were particularly exotic. The first in the mix was a 15 percent solution of sodium sulphite, a common food preservative, which was added to the dilution water of the primary refiners to soften the lignin. A 60 cubic metre silo was built to store the supply required by Pan Pac, which was delivered as a bulk powder and fed automatically into a mixing tank.

The bleaching itself was achieved with a combination of chemicals. The main agent was a 40 percent solution of hydrogen peroxide. When used for bleaching pulp, the hydrogen peroxide was stabilised with sodium silicate to prevent it decomposing into oxygen and water. Because the bleaching mix had to be alkaline with a pH of more than 7, sodium hydroxide ('caustic soda') was added to bring the pH up to about 11. These chemicals were then recirculated for the second stage of the bleaching process. However, once bleaching had occurred, it was necessary to bring the pH level of the mix back down to neutral, which was achieved with a 2 percent dilution of sulphuric acid.

One problem with the bleaching process was that it was likely to be slowed by ionic manganese and iron in the wood, and by ionic iron in water drawn from the Esk River. To reduce this problem a chelating agent, diethylene triamine pentaacetic acid (DPTA) was added to pull metallic ions from the pulp and reduce the quantity of bleaching agent. DPTA is an ingredient used in some household soaps and fabric softeners.

The fact that the chemical mix was made up of relatively well-known and commonly used compounds did not reduce the need for caution. Most of the materials were corrosive in the concentrations either used in process, or as stored on site. The sulphuric acid, for example, was stored in 98 percent concentration. The biggest danger was the hydrogen peroxide storage, which led to Pan Pac becoming a Major Hazard Facility (MHF) site, as detailed in this chapter.

CHAPTER FIVE
EXPANSION AND EVOLUTION

The second decade of the twenty-first century brought further changes to Pan Pac's ownership structure. During 2012, parent company Oji Paper restructured itself to become primarily a holding company, Oji Holdings Corporation. From October that year, Pan Pac's ownership transferred to Oji Green Resources Co., Ltd (OGR), which owned most of Oji's forestry and pulp manufacturing operations. Apart from Pan Pac, companies under the OGR umbrella included Celulose Nipo Brasileira S A Cenibra in Brazil, companies in Japan, and Jiangsu Oji Paper in China. Flow-on effects for Pan Pac included greater accountability and communication back to the parent company, including advising any serious health and safety incidents.

By this time, the pulpmill at Whirinaki was making the transition to BCTMP production, with its new market-driven dynamic. The sawmilling and lumber operation also continued to adapt as the company focused on optimisation. The sawmill was the single largest appearance grade operation in New Zealand, with a diverse range of customers for its lumber products. About one-third of the lumber went to New Zealand customers, some of whom remanufactured the wood for export or who were brokers for international clients. More than half Pan Pac's lumber sales came from Asia – China, Japan, Vietnam, Taiwan and other countries. Japan was primarily buying flitch for pallets, packaging and to make cable drums. Other product made from Pan Pac lumber in Japan was exported. In the early 2010s, Pan Pac was also making steady sales of lumber into the US, where it was primarily used to make door and window frames. Efforts were underway to expand Pan Pac's markets into the Middle East, where there was a growing need for flitch. Europe's demand for clearwood to turn into furniture was also drawing attention. The company was also selling both chips and logs. It was very much a 'forest products' company.

Innovation was a watchword for the business. Compared to the central plateau, where there was an 'ecosystem' of different and generally complementary timber businesses with pulpmills, sawmills and remanufacturing plants all within relatively economic transport distance of each other, Pan Pac's Hawke's Bay operation was far enough away to destroy the economics of transporting part-prepared wood. In the central plateau, companies could focus on specific sawlogs, or pruned butts, or other grades, and rely on nearby businesses to use the rest of the available wood. Pan Pac, by contrast, had to take on responsibility for maximising yield from the whole of its trees. That meant developing a significant range of capabilities

Top: *Sake barrel opening ceremony to celebrate the BCTMP Pulp business expansion to China and SE Asia, April 2014. Left: Doug Ducker, Pan Pac MD; Steve Joyce, Minister for Economic Development; Craig Foss, Minister of Commerce; Yasuaki Nogawa, Japanese Ambassador to New Zealand; Kazuhisa Shinoda, Chair of Oji Holdings.*
Above: *Newly commissioned Pulp Operations Centre, 2012, combining refining and processing into the area, manned by two long-term employees: Dennis Dawson and Charlie Clayton.*

coupled with agility and an innovative approach to marketing. By the end of the first decade of the 2000s, Pan Pac was able to handle around 75 percent of all wood arriving at the Whirinaki site. The only material the company could not deal with was the 20-25 percent of logs judged to be export grade. These were sent, whole, elsewhere – typically to China.

However, the first years of the decade were another difficult period for Pan Pac. The 2012-13 financial year produced a financial loss – not an auspicious start for the new ownership arrangements. A project known as 'Operation Turnaround' followed. As a result, much of Pan Pac's fortieth full year of operations – 2013 – featured significant cutbacks, including closure of the staff cafeteria, superannuation programme and transport provisions. Staff remuneration was also constrained. Challenges that year included ongoing teething issues with BCTMP production, difficulties not helped by indifferent prices for the exported product on the back of the GFC. The new effluent treatment plant was also problematic, creating public relations issues on top of the technical challenges needed to solve the problems with the plant itself. It was a time of retrenchment. The overseas subsidiary companies, except those tied up with US contractual obligations, were closed down by the end of the year.

By October 2013, after the implementation of the turnaround plan, things were looking better. The company was ahead of budget and the sawmill and lumber operations were producing at record rates, some 415,899 cubic metres for 2012-13. Improved export pricing helped the log export side of the business, not dented by a significant storm that damaged around 198ha of trees in September. Much of the windthrow proved usable, albeit with increased recovery costs. A further bright note was that, while BCTMP sales only returned $33 million – against the projected income of $43 million – wholesale electricity prices were good and relatively stable. Electricity made up one-quarter of the cost of BCTMP production.

The situation continued to improve into 2014. New markets were found for BCTMP, including in India, which became Pan Pac's second biggest pulp market after China that year. TMP continued to flow to the Tomakomai mill in reducing budgeted volumes, around 120,000 tonnes in 2014. Lumber sales during the 2013-14 financial year topped 400,000 cubic metres for the second year in a row, helped by clearwood sales into the US that were 154 percent of the budgeted value. Sales were also strong into China where thick lumber was in demand for edge-glued panels. Customer demand was higher than Pan Pac could supply.

By 2016, the Whirinaki plant accounted for 5.4 percent of Hawke's Bay's total gross domestic product. Company assets, including cutting rights, were approaching a value of one billion dollars. These were significant figures, underscoring the extent to which Pan Pac had grown and developed since the early 1970s. And this expansion, as events panned out, was not limited to Hawke's Bay.

Doug Ducker speaking at the 40th Joint Meeting of the Japan – New Zealand Business Council held in Matsuyama-city Ehime prefecture on 78 November 2014, which was also attended by Mr Shinoda, Chair of Oji Holdings.

PAN PAC FOREST PRODUCTS (OTAGO)

From its foundation, the primary Pan Pac operation had been centred on the Whirinaki mill site and – after the acquisition of Hawke's Bay Forests – the surrounding forest regions, initially administered from offices in Napier. That changed with the acquisition of a milling operation in Otago. The opportunity arose after the Otago lumber firm Southern Cross Forest Products Ltd was placed into receivership in March 2014, and the receiver – KordaMentha – offered the assets to potential buyers, including Pan Pac.

Southern Cross Forest Products had been founded in 1994, changing to the SCFP name in 2003. The company operated six plants, including two older plants purchased in Thames. The appeal for Pan Pac was in the two Otago sawmills, one at Milburn established as recently as 2012, and an older plant at Millstream. The Milburn sawmill was similar to Pan Pac's in many respects. However, it was on a far smaller scale, around one-eighth the capacity of the Whirinaki sawmill, able to handle only smaller grade logs and lacking kilns, a boiler and a de-filleter. The operation had a capacity to produce around 50,000 cubic metres of saleable lumber per annum.

The opportunity came at a crucial moment for Pan Pac. Demand for lumber from existing customers was running beyond the ability of the Whirinaki mill to supply – a shortfall of up to 72,000 cubic metres of kiln dried board and 36,000 cubic metres of flitch per annum. The possibility of quickly meeting that shortfall by purchasing an existing milling operation was appealing. The Otago mills had a good local wood supply that included a significant proportion of pruned logs, enabling clearwood lumber production with its higher value and better returns.

Proposals discussed within Pan Pac during mid-2014 called for a two-phase programme. Initially, the company would buy both Milburn and Millstream operations and run them to supply the order shortfall from existing customers. However, the older Millstream site did not offer a long-term future. The installation dated back to 1987 and the equipment and plant condition was described in one report as 'no good', suitable only to be sold for scrap. But it would provide a stopgap until the Milburn plant could be expanded and updated with kilns, boiler, de-filleter, and an expanded green-milling capacity. At that point, the Millstream site could be sold.

Pan Pac put up a $6.1 million holding offer for the two sites in May, enabling due diligence to go ahead. The final offer, based on market valuation, was $4.5 million, of which nearly $3.3 million was for the Milburn site. Some speed was considered essential: the Milburn site had shut down after the receivers stepped in, Millstream was due to close down in June, but there were advantages to retaining the employees. Quick entry

Top & Above: *The Pan Pac Forest Products (Otago) plant at Milburn, 2021.*

to the market was also thought likely to help secure wood resources in the district – exploiting Pan Pac's long experience with wood supply – that were independent of any in Hawke's Bay. A final longer-term advantage was the fact that Otago wood offered ways to expand Pan Pac's lumber business without drawing on Hawke's Bay's own wood resources.

In November, Pan Pac purchased the two mills, creating Pan Pac Forest Products (Otago) Ltd. This was a separate company that was wholly owned by Pan Pac who bought the whole of its output and managed the sales and marketing. The purchase was made on the basis of the planned development at the Milburn site. This Phase II development on the Milburn site got underway during 2016, budgeted initially at around $17.4 million, but ultimately rising to $23 million. This was designed to bring production volumes up to 97,000 cubic metres annually, on the basis of a 239-day production year and a 40-hour week. The plan involved a significant expansion of the plant, including a bio-energy boiler and improved sawmill facilities featuring a Windsor Continuous Dry Kiln.

Much of this work was 'green fields'. Apart from a new drymill building, purchases included a bin sorter extension, a primary skewing infeed and auto log turner, a de-filleting line, and a new yard access road and employee parking. The work leveraged the experience gained from operating the Whirinaki site and its developments over the years, and several staff from the Whirinaki Lumber team were seconded to Milburn. Barry Edmondson was seconded as site manager for over a year, while Kevin Burgess, Kevin Banks, Allan Bradley and Ken Lord were also onsite for a period of months. Blair Watson was appointed as Operations Manager in July 2016. The number of jobs onsite expanded from 29 to 37.

Contracts went locally where possible. Calder Stewart of Milton received the contract for the drymill excavation and structure and for the new road and parking. The bin sorter extension went to PW Engineering of Mosgiel, and the de-filleting line design and equipment supply to BM Design/ Hancock Engineering of Mosgiel. Other equipment, such as the hot water boiler and auto log turner, had to be sourced internationally. The boiler came from Polytechnik of Austria and the auto-log turner from USNR of the US. The expanded plant became fully operational in 2017, leveraging Pan Pac's experience in the field. The Milburn sawmill was Pan Pac's first operation outside Hawke's Bay and underscored one of the ways by which the company had been transformed from its early incarnation as a joint venture with a single customer.

The Milburn sawmill is sited at the southern end of a 40ha block, similar in size to the Whirinaki mill site. By the early 2020s, plans were in hand to use this additional space to develop the mill into a major plant able to produce up to 500,000 cubic metres of lumber annually. At the time of writing, the site layout and engineering plans for a new sawmill, extra kilns and boilers were well advanced, along with exploration of market opportunities for the products.

SEPTEMBER 2015 STORMS

Unprecedented storms and heavy rain struck Hawke's Bay during September 2015, a one-in-20-year event that caused significant damage to Pan Pac's forests. Rain initially peaked at 170mm on 21 September and continued to fall at somewhat lower rates for the next week, when a 381mm downpour drenched already soaked terrain. Main highway closures followed, preventing Pan Pac's logging trucks getting through to the mill and putting pressure on the wood supply. Even heavier rain was briefly recorded in both the Mohaka and Putere forest areas, where local falls of up to 500mm in a day were registered.

The outcome was significant damage to the landscape, with landslips and slope failures. However, at Putere there was a further outcome; the downpour came at a time when harvested areas were at most risk of erosion. Old root systems had rotted and slash from 2011-14 was washed downstream, where it caught against the Ngamahunga stream bridge and the Dufty Road culvert in the Waihua Valley, among other places. The volume was less than it might have been due to Pan Pac's policy of recovering as much wood as possible from any harvest, a decision made in the wake of a 2010 flood event on the Waikari River. But it was still an embarrassment for the company. Neighbours and local district councils were quickly contacted in an urgent communications initiative.

Work began on cleaning up the mess. Some 50ha of land, including new plantings, had been lost in the disaster. The slips were re-sown from the air with grass, ahead of replanting. It took around two months to clear the slash from the stream beds.

MECHANISING FOREST HARVESTING

Forest harvesting remained a significantly manual task into the 2010s. The introduction of centralised stem processing at Whirinaki had reduced the numbers involved in the harvesting operations across Hawke's Bay's various forests and woodlots, but the work remained risky at times, particularly tree felling as it was a manual process. Serious accidents occurred too often. Nor was the felling operation the only hazard. In late April 2014, a crew van with eight occupants collided with an empty logging truck on a road in Putere forest, injuring all in the van, some seriously.

Safety issues drew fresh attention from the end of March 2016, when a staff member of DG Glenn Logging was killed in an accident while setting up a hauler. For Pan Pac Operations Manager Damon Wise this tragedy was a catalyst for change. Although other companies had been

introducing mechanised tree felling systems, Pan Pac was still manually felling trees. Wise began a programme to bring heavy machinery into the picture, reducing the risk to human life and limb. The broad plan involved mechanising the entire process. Aside from safety improvements, the concept also brought necessary efficiencies. There was no need to have enough heavy equipment for every felling team, as a transporter could carry gear where it was needed.

The outcome was a significant reduction of the forest workforce, and a reduction of the scale of risks associated with felling and log handling. It also brought necessary cost efficiencies. Not all trees could be machine-cut; the heavy equipment could not operate in some areas, and manual felling was still required. However, the workforce was streamlined and a felling certification procedure developed. Anybody involved in felling had to be certificated and re-checked every six months – they either met the standard or lost the certification. Systems were also put in place to make sure the highest risk jobs were done by the most experienced people.

The company went from 30 breaker-outers to 3, but the benefit was reduced risk exposure. A 'flying squad' of half a dozen experienced fellers and breaker-outers were set up to take control anywhere they were needed – a task always signed off by Pan Pac management.

SAWMILL AND LUMBER EVOLUTION

By the early 2010s, Pan Pac's sawmill and lumber operation had evolved well beyond the scale and scope of the 1970s plant and was a significant arm of Pan Pac's overall business. The primary focus was on adding value in ways that other companies could not match. This was key to the whole sawmilling operation; Pan Pac could not compete cost-wise with Chinese-based mills that were simply cutting up logs for chips and core-wood.

However, adding value competitively was a challenge. One key hurdle was geography: New Zealand's location at the bottom of the South Pacific added shipping costs that companies elsewhere did not have to meet. Finding the best value-added approach was also challenging. Potentially lucrative options, such as remanufacturing, also meant that Pan Pac was going to be competing with its own customers. Nor was Pan Pac of a scale sufficient to compete with large overseas plants in areas such as furniture component manufacture. But there were other options and strategies for the lumber operation.

Michael Reaburn, General Manager Lumber, noted that one of the cornerstones to company success was engaging with customers and playing to Pan Pac strengths. There was significant demand globally for clearwood, which was lumber from pruned trees that lacked knots. Pan Pac had good access to radiata clearwood and excellent supply chains within

New Zealand, and this was where the business turned its focus. One of the keys to the process was reliability, product quality, timeliness, and building solid relationships with customers – including keeping delivery promises. As Reaburn remarked: "This is where you get customers that are both loyal and willing to pay more money, because they value the relationship and also value the fact that they are going to get the product – they know it's good and high quality, and they know it's going to meet their needs. We've done a lot of work into customising end products for specific customers." For example, this approach enabled Pan Pac to persuade one customer to close a warehouse it was operating in China, on the basis that Pan Pac could reliably deliver product once a fortnight.

One new product that offered good sales potential by the early 2000s was thermally modified timber (TMT). This was something new to Pan Pac, but the potential to move away from commodity sales into value-added product was obvious. A project got under way to investigate production. In theory it was straight-forward; TMT was a modernised version of an older method for heating timber, slowly and over a long period, to temperatures of about 200°C, driving out all but 5-7 percent of the moisture. This produced a more physically stable and more durable product that was well-suited for outdoor use such as decking and garden furniture. The process was chemical-free, involving only heat and steam. However, the practical side was significantly more complex. Temperatures and conditions had to be precisely right to produce the results, and the challenge was making this work safely and reliably with radiata pine. There were also emissions issues relative to the volatiles being driven out of the wood.

A pilot kiln was set up during 2010 and small-scale experimental production began. Results were promising, with good interest from customers. A plan to build a $2.2 million TMT processing kiln was approved in May 2013. The new plant included kiln, trolleys and a cooling shed along with systems to control the emissions from the kiln. Commissioning began in April 2014, but swiftly ran into problems. Staff within Pan Pac and some of the neighbours complained about odours. The issue was that the TMT process drove volatiles such as terpenes and formaldehydes from the wood. These were then burned in an emissions-control system known as Eflox. In theory, this reduced the volatiles to negligible levels, but this was not happening in practice. Pan Pac undertook a safety audit with an external consultant, resulting in plans to improve the exhaust fans and upgrade the system. This implied a further cost of around $1.1 million.

The upgrade work was complete by March 2015 and commissioning restarted, but it became clear that the emissions problem had not been solved. Staff concerns were such that the union became involved, leading Pan Pac to engage independent Occupational Health doctors to give over 110 staff a health check. A general hazard assessment process was also undertaken of the sawmill and lumber operation. By July, it was clear a further upgrade of the TMT emissions control system was required, essentially doubling the size of the Eflox burner.

A WorkSafe prohibition notice was then placed on the kiln allowing testing, but no production until the issues had been resolved and WorkSafe had confirmed safety. The necessary work was completed by December and work began again on commissioning the plant. It was in operation by 21 February 2016. However, two days later, there was a significant emission from the plant after the LPG supply to the kiln shut off, also closing down the Eflox system. An attempt to restart the system was made, but the kiln temperature continued to rise, leading to vents opening and concentrated volatiles being released into the air. There was a delay in the alarm being sounded. Four staff and three contractors were affected with sore throats and queasiness. Four were examined at a local medical centre and one, who lost consciousness, was taken briefly to hospital, but recovered relatively quickly.

The accident provoked a sharp union response. The staff involved issued a health and safety strike notice, refusing to load wood into the kiln. The issue was reported in the media and drew public concern, including from Green MP Catherine Delahunty who hosted a public meeting in Napier to discuss the issue.[10] The accident crystallised general local concerns about the plant, including noise and effluent issues. Pan Pac held a community meeting with the local Whirinaki residents. However, a residents' petition was set up and delivered to the HBRC, signed by 60-odd people, complaining about the smell of the TMT and effluent plants, among other issues.

For Pan Pac, safety concerns were joined by the fact that, despite all due process, testing and planning, the TMT kiln emissions and operating procedures were clearly in trouble. The plant was shut down and orders for TMT had to be fulfilled at a European plant. Exactly why the TMT plant was in difficulty was unclear, as similar plants were operating elsewhere in the North Island without such issues. The company looked more closely into the safety procedures and examined the possibility of a backup Eflox system, at a likely cost of a further $3.2 million. Efforts to obtain redress from the German kiln maker, Mahild, were also looked into. But in the end, the decision was taken not to proceed with TMT and to convert the kiln to a conventional system. Requests for quotations were sent to four potential firms in mid-2017 and conversion work got underway. This process had its own difficulties, notably a need for the pipe-work to meet seismic regulations.

It was a disappointing end to the project, one of the few failures in Pan Pac's history. All was not lost, however. At the time the sawmill could produce more than the existing kilns and drymill could handle. Work was underway to expand the capacity of the drymill, rendering the kilns the main bottleneck in the lumber operation. Converting the TMT kiln into a standard kiln was thought likely to add 16,000 cubic metres capacity annually. This was less than the 23,600 cubic metre capacity of a purpose-built conventional kiln but still thought likely to ease the bottleneck

10 New Zealand Herald, 23 March 2016, https://www.nzherald.co.nz/nz/concerns-over-toxic-fumes-from-napier-mill/7TNHPT6T33PHLIXJ2WRUFKV3EI/

and allow the lumber side of the business to process the full output of the sawmill. It was also a way of recovering some of the otherwise lost investment in the TMT venture. However, the conversion was never completed due to seismic concerns.

The frustration was that TMT remained a potentially lucrative option for lumber, and other TMT kilns of similar design were operating elsewhere with no problem. Although consideration was later given to re-visiting the whole TMT operation, in the end the plant was dismantled and sold off. The whole episode had been a very rare experience for Pan Pac: a step into a new production system and technology that had simply not worked.

HEALTH AND SAFETY

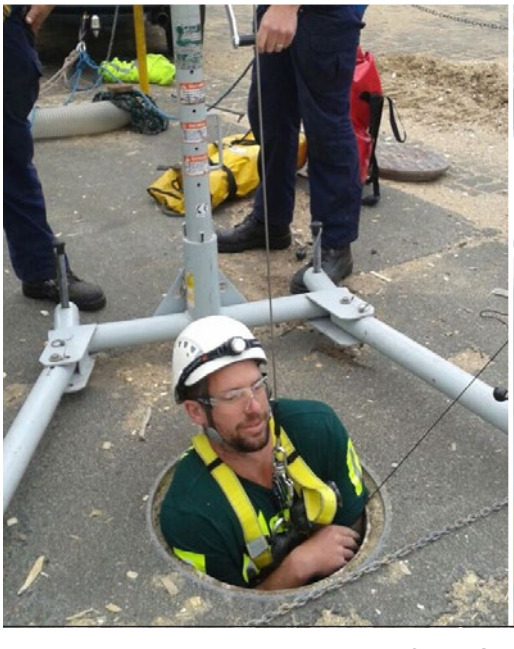
Safety had been a key issue for Pan Pac throughout its history. With an operation involving tree felling, movement of heavy logs, extensive on-road trucking operations, a sawmill and energy-rich processes, there was a need for strict safety protocols from the outset. Management focus on safety was continuous and took direction from the Japanese shareholders, whose business plans integrated health and safety with all other goals. The process was as much education as anything else: teaching people to look out for hazards, to think about the way equipment worked, and to proactively avoid potential accidents.

Efforts included incentives such as safety awards for staff who went for a year, or five years, or 10, without a lost-time accident. One 10-year award was issued in 2000. Targets were regularly set for minimal lost-time injuries. But accidents still happened and the process of managing safety was a constant and ongoing effort.

There was a major shift in the late 2010s. A new Health and Safety at Work Act was introduced by government and prompted Pan Pac to look closely at its safety processes. This resulted in gaps being identified and led to a new and robust safety management system, introduced in mid-2018. This brought staffing changes. In 2014, Pan Pac had employed a single health and safety manager across all operations, but the new system involved safety professionals within each operating division, joined with three people who worked across the organisation.

The new health and safety regulations also required a different approach than in earlier years, both to direct health and safety in the workplace and the way that risks were perceived and calculated.

Next Page – Top: *2013 – First Safety Recognition Award recipients, from left: Jonathan Joe, Neil Polly, Bill Westerlaken and Dave Coe.*
Middle: *NZ Fire Service Training Day at Pulpmill 2019.*
Bottom left: *Confined Space Rescue Training December 2015.*
Bottom Right: *Otago celebrated 5 years Lost Time Injury (LTI) free in 2020.*




PAN PAC
FOREST PRODUCTS (OTAGO) LTD
2/10/20 - 5 Years LTI Free

COMMUNITY RELATIONSHIPS AND SUPPORT

As one of Napier's biggest employers – and one of the largest single contributors to the GDP of Hawke's Bay – Pan Pac swiftly became integral with the local community. This was recognised by the company through a wide range of initiatives across its half-century of operations, primarily involving donations and sponsorships but also a range of hands-on activities by staff in areas related to the company's operations. This included regular participation, from 1992, in the annual Conservation Week – when staff from the Forest business (and later, other areas of the company) accompanied students from a range of Hawke's Bay schools to visit local forests and engage in native tree planting.

Particular relationships were developed with the local Whirinaki community, including owners of properties neighbouring the mill site and in the settlement of Whirinaki proper, on the other side of the railway line. Pan Pac, as noted in the previous chapter, was by nature of its operations and product considerably 'greener' than many industrial operations, but there were still matters of concern to the neighbours. Noise, dust and effluent were all issues to be dealt with.

The company began by meeting local residents on a regular basis at informal afternoon teas, to discuss and respond to any concerns. These were also opportunities to share information about the expected future of the mill and its likely growth. These grew into the Pan Pac Community Consultation Group, first mooted in late 1992 and consisting of representatives elected from the local community who could meet formally with Pan Pac senior management and discuss concerns.

Relationships were also fostered through sponsorship and donations into the local community. Many of these were focused on groups or organisations that related in some way to the company's operations or its staff. Notable examples included the annual Bay Forests Rural Fire District annual Wajax competition, to which Pan Pac contributed sponsorship. Money also went towards community groups or projects that reflected Pan Pac's operations in various ways, such as the Japan Society of Hawke's Bay which received an annual donation; or sponsorship for Sisters Cities NZ Inc. Money was also given to Forest Industries training and, later, to the New Zealand Journal of Forestry Online Project.

At times, donations were made to community causes. One of the largest public donations made by Pan Pac towards a local community project was given in support of Napier's art deco Municipal Theatre. The theatre had been originally constructed as part of the city rebuild following the disastrous earthquake of 1931. Designed by Napier Borough Council architect JT Watson in 1937, the theatre opened in mid-1938 with seating

for 1,154 people and was widely regarded as a significant example of modernist architecture. By the 1980s, the building was showing its age and a major redevelopment programme began in 1992. This was designed to refurbish the theatre while preserving its architectural heritage. In August 1993, Pan Pac marked 20 years of its own operations in Hawke's Bay by donating $1.6 million – about $2.8 million in early 2020s money – towards the refurbishment.

The contribution was designed to symbolise Pan Pac's long-term commitment to the Napier community and the wider Hawke's Bay district. The refurbishment was completed in May 1997 and included a new Pan Pac Foyer – a significant extension of the building which retained the art deco style and was also usable as a venue in its own right. The Napier City Council marked the occasion with a variety concert, attended by Pan Pac representatives including shareholders from Japan.

The company also became a significant sponsor of the Hawke's Bay Helicopter Rescue Trust, initially providing around $45,000 annually for three years between 2001-06 in support of the district's rescue helicopter, becoming one of its major backers alongside the Lowe Corporation. The service operated both a rescue helicopter and a fixed-wing air ambulance, and by the early 2000s was conducting up to 320 helicopter rescues and 370 fixed-wing ambulance missions annually. From 2019, Pan Pac sponsored the service with a $55,000 annual grant.

Pan Pac also followed a policy of supporting a range of Hawke's Bay community causes including school fundraisers, sports and public events – including sheep dog trials. Humanitarian causes drew significant attention, sometimes leading to multiple donations over a number of years. Regular sums were given to the New Zealand Red Cross and the Brain Injury Association. Other causes included Project Hope, a youth suicide assistance programme and Cranford Hospice. Between 1992 and 2022, Pan Pac provided over $3.8 million to the Hawke's Bay region as sponsorships or direct donations.

Not all community support involved money. At times, Pan Pac has donated trailer-loads of firewood. In 2020, the company donated two truckloads of lime to the Waipatiki Community Association, in support of their native plant nursery. During the Covid-19 lockdowns that year Pan Pac also donated firewood to more than 50 Pasifika and Māori whānau in Hawke's Bay, through the Tihei Mauri Ora Emergency Response Centre.

Other community initiatives included facilitating ongoing access to some of the Pan Pac forests for recreational purposes. These had long been available, but one initiative during the 2010s was the provision of tracks suitable for the Hawke's Bay Mountain Bike Club. This was the largest such club in the country and had around 4,000 members by 2020, riding on carefully planned trails through specified sections of Pan Pac's forestry blocks.

Top: *2012 Wairakei Golf Marathon to raise money for Leukaemia & Blood Cancer New Zealand.*
Above: *Relay for Life, 2012.*

Top: *Matthew Tuite, Lumber Production Engineer, speaking to high school students at the Hawke's Bay Forestry Group Industry Careers Day 25 October 2018.*
Above: *Pan Pac provides land near the mill for use by the Hawke's Bay Mountain Bike Club.*

Top & Above: *The first 200-metre length of the treated wastewater pipeline extension being deployed in December 2017.*

ENVIRONMENTAL EVOLUTION

The 2010s brought fresh attention to Pan Pac's environmental impact. The switch to BCTMP also changed the game. It involved a significant upgrade of the treatment plant with a two-stage secondary treatment process, costing around $20 million. It was scaled to handle a possible full conversion of pulp output to BCTMP, increasing the effluent by about one-third from the initial figure. One unexpected outcome of the treatment process was a shift in colour of the effluent from grey to red-brown, essentially due to an interaction between lignin in the waste water and the process. While this risked breaching the existing discharge consents, advice from the consultants Scion and later the Cawthron Institute suggested it was unlikely to cause significant change in the clarity of the sea around the discharge pipe. However, the discharge was clearly visible at sea and provoked a number of complaints to HBRC, which considered the discharge in breach of Pan Pac's consents and issued a non-compliance notice on 23 January 2013.

The issue could not be solved easily or cheaply. A camera was set up to photograph the discharge area and collect data. One option was further treatment of the waste, but this was prohibitively expensive and involved additional chemical processing. It was finally concluded that the best solution involved diluting the effluent to levels of 500:1, coupled with a 2-kilometre extension of the pipe, including a new 400-metre-long diffuser. This also came with a bureaucratic payload; separate resource consents were required from HBRC to occupy the coastal marine area, to construct the extended pipe and to disturb the seabed during construction of the pipe. A variation on the existing discharge consent was also required to accommodate the new system. Pan Pac applied for these consents in August 2014, which were granted in September 2015. However, this was opposed by Maungaharuru-Tangitū Trust (MTT) who appealed the decision and requested that the Environment Court decline the consents.

This led to significant work during 2016, including a conference in July between ecological experts that concluded that the proposed pipe extension and dilution would likely work. An initial three-day hearing in Hastings in late August resulted in a 61-page report backing an interim decision to grant the consents, 'subject to resolution of conditions', with costs to be 'resolved on final issue of consent'.[11] This was issued in late November 2016, pending a final decision by the court. The final decision was made in February 2017 to grant the resource consents, leaving costs to lie where they fell. Pan Pac achieved a consent to occupy the seabed and discharge treated wastewater for another 35-year period, which was a record duration for any discharge consent granted by the Environment Court. It showed the extent of consultation, compromise and scientific evidence that Pan Pac provided in its application processes.

11 Environment Court Decision No. 2016 NZEnvC 232.

Pan Pac also kept up with necessary international developments. The move away from environmentally damaging chlorofluorocarbons prompted a significant shift in the anti-explosion systems in the pulp dryers. A system first installed in 1979 used a small charge to blast halon into any dryer that had caught fire, starving it of oxygen. But the following decade saw a global swing away from this class of chemicals because of their effects on the ozone layer. Investigations revealed that an alternative using bicarbonate of soda as a dry powder was just as effective.

One ongoing focus that gained pace during the early twenty-first century was finding innovative ways to use any waste products produced by Pan Pac's mills. The biofuel boilers, which were a way of using the waste, also produced around 27,000 tonnes of ash annually. This was initially buried in the Pan Pac landfill. By the mid-2010s, the effluent plant was also producing up to 28,000 tonnes of sludge annually. This was burnt in the boilers, although it was not an ideal fuel because of its high moisture content. Oji policy called for up to 95 percent of waste to be diverted from the landfills by 2020, so in 2018 experimental work began on a way of up cycling the ash and sludge through vermicomposting. This had been introduced with high success at other pulpmills in New Zealand and involved mixing the waste and sludge, then seeding it with worms, producing high-quality compost that had a ready market across New Zealand.

Pan Pac's forests achieved Forest Stewardship Council®(FSCC017103) Certification in December 2001. The Pulp and Lumber mills also attained FSC® Chain-of-Custody certification (FSC-C106229 and FSC-C006931) providing a guarantee that the sourcing of fibre and the manufacturing of FSC® products through to shipment is in accordance with FSC® criteria.

Pan Pac was more environmentally focused than ever as the twenty-first century entered its third decade. Environmental responsibility always had been part of the company's basic philosophy. The whole concept of the Pan Pac plant when first mooted – producing export material from renewable resources, with little environmental impact – was certainly 'green' by the standards of late 1960s. However, as the decades passed the environmental bar was lifted and gained mainstream force. By the late 1990s, issues associated with human-driven climate change were clear, and international agreements such as the Kyoto Protocol, to which both Japan and New Zealand were signatories, created specific frameworks against which industries of the signatory nations had to operate.

In many ways, Pan Pac had advantages over other industries. The company was using natural resources that, by design, were being produced renewably and sustainably. But that did not reduce the need to find ways of reducing environmental impact. By the early twenty-first century, the company had established four environmental principles:

- To develop its business in an environmentally responsible manner.
- To understand and manage its impact on the surrounding community and environment through open communication with community stakeholders.
- To be proactive in seeking out best practice environmental processes and technology.

To continuously improve environmental performance through seeking efficiencies and opportunities for improvements by ongoing reviews of its targets and objectives.[12]

In many respects, Pan Pac had an advantage over any non-forest industrial operation of similar scale. It was, from the outset, designed to process renewable resources. Its lifeblood came in the form of large-scale production forests that were constantly replanted, whose usage was managed to ensure a continuous supply of wood, and which played a role in the global environment.

12 Quoted from https://ppet.org.nz/#abouttrust

PAN PAC'S COMMUNITY ENVIRONMENTAL INITIATIVES

Environmental issues became a significant focus of Pan Pac's engagement with community causes from the early twenty-first century. In early 2003, Pan Pac donated $28,125 to the Guthrie Smith Trust arboretum project, because it "aligns closely with our own forestry activities and our environmental philosophy". The Trust operated on the property formerly owned by Herbert Guthrie-Smith, a pioneering sheep-farmer and ecologist, and had been running an outdoor education centre since 1976. By 2003, this centre was drawing some 4,000 visitors a year. The arboretum was planned to include over 2,000 trees of 50 varieties, requiring around $12,000 annually for five years to both plant and protect the trees. The Pan Pac donation was to support these costs.

One environmental cause with which Pan Pac built a long-standing association was the Environment, Conservation and Outdoor Education Trust (ECOED). This was set up in 2002 to support the North Island Brown kiwi population in Hawke's Bay. By the early 2000s, the wild kiwi population of the district was in decline, largely because of a 95 percent casualty rate suffered by chicks at the hands of introduced predators, including stoats and feral cats. ECOED's plans called for establishing a 40ha pest-free 'creche' for kiwi chicks at the Lake Opouahi Scenic Reserve. Here, chicks rescued from the wild could grow in safety before being released into the Kaweka Forest Park. Thanks in large part to encouragement from the late Brian Pritchard, then General Manager Forests, Pan Pac supported the project with an annual donation from 2008. In 2020, the 300th kiwi was released into the wild.

Top Left: *Managing Director Tony Clifford, and ECOED General Manager Kahori Nakagawa with Matariki, the 300th kiwi released back to the wild, September 2020.*

Top Right: *Brian Pritchard, GM Forests, with one of the 20 pāteke (brown teal ducks) released at the Pan Pac ECOED kiwi creche at Lake Opouahi. Sadly, Brian passed away in 2018.*

Above: *2021 Field day at Greg Hartree's property. Greg was Pan Pac Hawke's Bay Farm Forester of the Year.*

Planting at Esk River, June 2021.

PAN PAC ENVIRONMENTAL TRUST

The Pan Pac Environmental Trust was set up in 2019 as part of the consultation and agreements reached between Pan Pac and stakeholders, when applying for effluent consent renewal to Hawke's Bay Regional Council, as a way to offset the business's less than minor effect on the environment and to achieve tangible environmental improvements within the local community. The Trust brought together many of the themes of environmental responsibility that Pan Pac had been pursuing, particularly over the prior 20 years. It was a major initiative supported by Pan Pac itself with an annual grant of $100,000.

The key focus of the Trust was to support projects that benefitted the environment and culture of Hawke's Bay. Projects completed to date include increasing the propagation of critically endangered ngutukākā (kākābeak), pest and predator control in the Kaweka ranges and Mohaka Forest, revegetating damaged hillsides on pastoral farms following Cyclone Gabrielle, wilding pine removal from native areas in Maungataniwha Pine Forest, supporting a nursery adjacent to Waiōhiki Marae and another near the Esk River, along with native planting in that area. Cultural projects included a three-year sponsorship of Raising Future Kaitiaki Programme run by MTT and local hapū.

FIRST QUEEN ELIZABETH II COVENANT

In 2019 Pan Pac purchased a 298-hectare block of forest land just north of the mill, which included 68 ha of well-established indigenous forest. This had previously belonged to the Fisher family. Pan Pac worked with government agencies to place the indigenous forest under Queen Elizabeth II covenant, securing it as a reserve for future generations. Known as Pākuratahi Bush, this unique area had been well-protected from the ravages of livestock and pests and contained a number of relatively rare tree species. In mid-2021, Pan Pac was given funding approval via the Jobs for Nature fund to fence the bush off against deer and plant a further 12ha in indigenous plants.

Pan Pac's first QEII Covenanted forest, Pākuratahi Bush.


PAN PAC
FOREST PRODUCTS LTD

CHAPTER SIX
MAJOR CHALLENGES

Pan Pac approached the third decade of the twentieth century as a very different company from the one that had begun operations in the early 1970s. It was significantly larger, operating in a competitive global market, and had but one major shareholder. The contrast with the Pan Pac that had opened its doors for business nearly 50 years earlier was clear.

The general expansion of Pan Pac and the evolving regulatory environment within New Zealand demanded significant changes to the way the company was organised and operated, along with a distinct shift of business philosophy. This included the introduction of focused support services within the three main business units: forests, pulp and lumber.

This development was first clear in the early 1990s, gaining pace as a significant shift from the original operating concept. When initially set up, support services for all Pan Pac operations were centralised. For example, Engineering served all the business units from a central operation – in effect, providing a 'shed service' to the company. This was, in part, a reflection of the original setup, reflecting late-1960s business thinking. However, over time, the centralised engineering arrangement proved less than optimal, as different parts of the company were fighting for resources. As the company continued to grow, a better solution was to establish dedicated services – notably engineering – within each major business unit. These eventually extended to shipping, sales and operational planning for each of the units.

This meant added authority and autonomy for the general managers of each division who now took on the full vertical function of their operations, including controlling their input costs and labour. The move meant that the general managers of pulp, lumber and forests all had line responsibility for the day-to-day function of making product and selling it. As Tony Clifford noted in 2022:

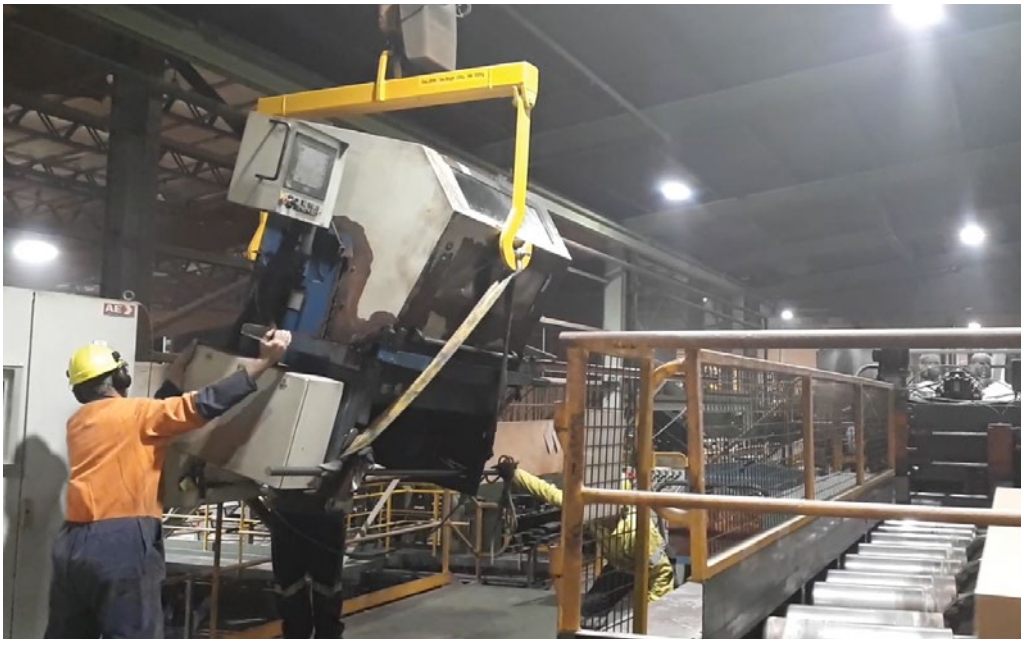
> *That's a recognition that the business units are being run more independently than they were 30 years ago. There is a case to argue for and against, but our business has got a lot bigger and more complex, so it's not feasible to manage a lot of the day-to-day business activities in a centralised form. Furthermore, those managers of those business units then have direct responsibility for how they allocate resources within their division.*

However, it did not mean that Pan Pac was wholly devolved, either in terms of its support functions or structurally as an institution. As Clifford explained, it would have been easy for the general managers of each division to make decisions on a 'what's best for me' basis, but that did not happen:

To the credit of previous executive teams, all business decisions are made for the net benefit of Pan Pac rather than individual business units. But at the same time, the individual business units have sufficient autonomy to maximise profit.

To an extent, this mix of centralised and decentralised support services – a grid, criss-crossing the company with vertical and horizontal services – was a hybrid model, and a balancing act. But it was a practical one for Pan Pac, in effect structuring company operations around a matrix in which the three main business units were vertically integrated and had sufficient resource to operate as efficiently as possible, including key support such as health and safety. However, centralised support was also provided in the form of horizontal central corporate offices, able to provide coordination, specialist support and education across the business.

As the business continued to grow, the need for significant central resource also expanded, not least because of a changing regulatory environment that the company needed to have the resource and capacity to meet. This was particularly true for the environmental side – where a central corporate office could provide a high-level overview and direction – along with human resources. In the early 1990s, human resources consisted of one manager and an assistant. By the early 2020s, this service had grown to a full 'People and Culture' team with more a dozen staff. Other horizontal services included accounting and finance that grew centrally, although dedicated management accountants were assigned to each of the business units.



Replacement grinders being installed in the Sawshop in the Sawmill, December 2019. These were the most advanced of their type in New Zealand.

The other benefit of company growth and the expansion of a central corporate resource covering key support areas was that it became possible to hire specialists in particular fields. As Clifford explained:

> *When you get to the scale and can hire a specialist with both qualifications and experience, you move the portfolio forward at a much faster rate than if somebody is looking after it part time and is a generalist. This has been a double benefit: Pan Pac growing in scale has allowed us to justify having more people in these support functions, but we are able to hire specialists, and those specialists make a big difference to the performance of those portfolios.*

This was especially true for information technology (IT). The IT department grew from a single person looking after all Pan Pac's computing needs – including the mainframes – to a full department that included two staff dedicated to mobile technology alone. Other specialist roles emerged as the company continued to develop, including an organisational development position that was instituted in mid-2021.

All of this was possible to achieve through the ongoing expansion of the business. In the early 1970s, Pan Pac did not have the scale to make the business model it was using by the early twenty-first century feasible, even if such model was possible within the business philosophy of the day. Changing business philosophies, company growth and significant regulatory changes around the environment, health and safety and human resources all contributed to the structural evolution of the company.

One aspect had not changed over that time: the strength of Pan Pac's people. In many respects, people had always been Pan Pac's greatest strength. A strong working culture had been built in the mill and its associated workplaces: the forests, the offices and plants overseas and in Hawke's Bay. The focus was always on working together, a term that meant much more than the teamwork necessary in a high-risk operating environment such as the mill. It also referred to the fact that the mill was founded on a meeting of two nations, with their distinct cultures working together towards a common aim.

That core strength – Pan Pac's people – came to the fore during the early 2020s as the company was confronted by two major crises in quick succession. These events tested the resilience of the company and its people: and the fact that the company survived these dramatic events was in large part due to the strengths that Pan Pac and its people brought to the table.

THE COVID-19 PANDEMIC

News of a deadly new virus tearing through one country after another in the first weeks of 2020 seemed initially distant from New Zealand; but the realities of globalisation meant it was only a matter of time before it reached local shores. New Zealand was no stranger to biosecurity, which was crucial to an economy reliant on agrarian products. The principles of swift isolation, contact tracing and ring-fencing had been shown to work – and work well – with plant and animal disease. This experience gave New Zealand an advantage in the face of what became known as the Covid-19 pandemic. At a time when many nations were debating the economic impact of national lockdowns versus the benefits to public health, the New Zealand government met reports of early cases by closing the borders and implementing a sharp and very hard lockdown, closing down the entire country in late March 2020 with just 48 hours' notice. This essentially quarantined the nation's population in their homes and shut down all but essential services.

For Pan Pac, those 48 hours were a scrabble. Much revolved around enabling non-operational staff who could work from home to do so, making it a particularly busy time for the IT department. Remote working facilities had to be expanded to accommodate all those who would be working from home. Other facilities had to be set up to enable the skeleton staff remaining at the plant to operate safely under lockdown restrictions, as maintenance and safety relative to aspects of plant operation could not be abandoned. The IT work to support working from home included providing 29 additional laptops, scaling up the number of Citrix servers and increasing internet bandwidth. The number of users of video conferencing tool Microsoft Teams increased by 300 percent in the last week of March 2020. Special precautions on site included putting up 300 Covid-19 instruction signs, adding 65 cleaning stations, and distributing hand sanitiser.

In the weeks that followed, Pan Pac staff who were able to work remotely used 36,878 mobile call minutes, sent 25,646 texts, and made 954 1:1 calls in Microsoft Teams. Meanwhile, the skeleton staff at the Whirinaki plant underwent 156 Covid-19 compliance checks, and 27 at Milburn. Over 200 litres of liquid hand sanitiser was used during the period.

The wider challenge for Pan Pac was the impact of the pandemic on company business. The company continued to pay all staff as normal, and the non-operational side continued to run through staff working from home, but the 'Level 4' lockdown required a complete close-down of pulp and lumber production. The cost of lost sales to Pan Pac over this period was around $45 million. During 2020, Managing Director Tony Clifford began lobbying government for a certification system by which industries such as Pan Pac – where many people worked essentially alone – could continue operating at reduced levels. It was estimated that output perhaps

as high as 60 percent or 70 percent of normal might be possible. However, the government was not interested, primarily on the basis that there would never be another such lockdown following this one. This initially seemed to be the case. The initial lockdowns stamped out the Covid-19 virus across New Zealand, and life within the country returned to normal.

Pan Pac resumed its operations, including ongoing development of plant and processes. One initiative later in 2020 involved establishing a new storage facility for the kiln-dried timber Pan Pac was producing, reducing the load on external storage. It also carried the advantage of providing further product-quality assurance for customers. Plans for a warehouse on the Whirinaki site were well advanced by early 2021, calling for a building near the drymill that was large enough to store 14,000 cubic metres of timber. The floor space required for that purpose made the building approximately the size of two rugby fields.

All was disrupted during the second half of 2021 by a further Covid-19 outbreak, this time from the Delta variant of the original virus. The entire country was once again locked down. This was another heavy blow for Pan Pac, which had been making a profit of approximately $1 million a week. With lockdown that turned to a loss, because the $1 million weekly wages for its 400-odd staff, along with its fixed costs bill, did not stop. Clifford explained to Hawke's Bay Today on 25 August that the effect was destructive, and a protracted lockdown also threatened the company's supporting contractor infrastructure. He was frustrated with the 'blanket approach to lockdown', particularly as the cost of any certification to operate at Level 4 was minimal. "We just need a government agency to stand up", he remarked.[13] This didn't mean normal output – staff health had to be balanced against production – but to be able to operate even at a lower rate was important.

Risks to Pan Pac included loss of market share. While Pan Pac had 'significant customer loyalty', there was a risk of being seen as unreliable, driving customers to buy from other countries.[14] Pan Pac was not alone: Manufacturing New Zealand and Exporting New Zealand made clear that the issue was faced by all New Zealand exporters. Closures in the timber industry generally – not just Pan Pac – also threatened New Zealand's housing construction programmes. However, government response through the Ministry of Business, Innovation and Employment, emphasised that Level 4 was a 'stay at home' step, effectively quarantining the entire population, in which any contact, such as being at work, risked bursting the home 'bubble' and creating chains of transmission.[15]

The issue ran to the heart of the whole Covid-19 response strategy of balancing public health and safety against the employment, industry and business that was required for the same population to survive

13 Hawke's Bay Today, 25 August 2021.

14 https://baybuzz.co.nz/groundhog-day-for-pan-pac/

15 Noted in https://www.newsroom.co.nz/business-lockdown-plan-fell-on-deaf-ears

and prosper. While industry had one view of where that balance might be, the government had another. For Pan Pac, the practical outcome was that the company had to effectively grin and bear it, carrying the losses provoked by lockdown. In the historical sense, the Covid-19 impact on Pan Pac was in much the same league as the wood crisis of the late 1980s and the power price crises of the early 2000s: a major issue that hit the company's bottom line heavily, but which was unrelated to the company itself.

The Covid-19 pandemic did not end quickly. The initial government system of alert levels and quarantining was replaced in December 2021 by a new Covid-19 Protection Framework, which included mandatory 7-day isolation for anyone who contracted the virus. This was not lifted until August 2023.

Top: *From left: Bevan Malcon, Hoani Raukawa, Barry Edmondson, Danny Eagleton, Roger Jones, Carl McParland, Tony Clifford, Dylan Stuijt and Richard Chapman with the last unit of TMP produced for Tomakomai by Pan Pac, 21 July 2021.*

The dislocations provoked by Covid-19 and the 2021 lockdown rendered a key historical event that year virtually invisible. On 21 July 2021, Pan Pac manufactured the very last TMP pulp for Oji Tomakomai. This market had been a key part of the original rationale for the pulpmill's founding, and it had originally been a captive market. While volumes had been steadily dropping for years – and its end was clearly only a matter of time – the switch away from TMP was complete. From mid-2021, Pan Pac was exclusively producing BCTMP for the wider global market. This, as much as any of the other changes that had taken place since the early 1970s, underscored the way the company had evolved over its half-century of operations.

Work began on a new 14,000 square metre warehouse on the Whirinaki site to house kiln-dried lumber, reducing reliance on external storage. In late 2021 approval was given to spend $13.8 million on a new lumber log infeed system for the sawmill, with capacity to handle an additional 200,000 sawlogs annually.

CYCLONE GABRIELLE AND PROJECT PHOENIX

The Covid-19 crisis had been a major issue for Pan Pac, but the dislocation and cost were dwarfed by a fresh crisis that emerged almost directly on the heels of the pandemic. The early 2020s brought unusually chaotic weather to New Zealand, including a historically unprecedented number of extreme events. Storms that hit the upper North Island in January 2023 caused particular damage to homes and infrastructure. Then, in the first days of February, meteorologists in New Zealand's MetService identified the risk of a cyclone forming over the Coral Sea out of a small low-pressure system found north of Fiji. This expected storm had developed by 8 February and was dubbed Cyclone Gabrielle by Australia's Bureau of Meteorology, the body responsible for naming and tracking such systems. As the weather system began moving towards New Zealand, the Australians handed over to the Tropical Cyclone Warning Centre in Wellington.

The danger that this new weather system posed was clear, given intensity by the fact that it was expected to hit regions already sodden by unprecedented rain in January on the back of ex-tropical Cyclone Hale. The MetService began issuing severe weather warnings on 9 February. Cyclone Gabrielle strengthened as it moved, reaching Category 3 status on 10 February. Next day, Saturday 11 February, the MetService upgraded its weather warnings first to Orange and then Red across the northern and eastern regions of the North Island, including Hawke's Bay. The cyclone was expected to provoke widespread damage, including flooding. Warnings to avoid unnecessary travel were also issued as a result of expected hazardous driving conditions, likely to be at their worst in Hawke's Bay around midnight on 13 February.

From Pan Pac's perspective the pending cyclone posed a significant threat, not just in the forests where wind-throw was a risk, but also to staff driving to and from the Whirinaki site over the Esk River bridge at shift changes. The company Crisis Management Team (CMT) met to discuss the issue at an online Teams meeting on Sunday 12 February at 4:00pm. The decision was made to close the forests and hibernate the Whirinaki site from 8:00pm on Monday 13 February, reopening at 8:00am on Tuesday when the worst of the weather was expected to have passed. By Monday, it was clear that the cyclone was moving on the expected track and going to hit Hawke's Bay as forecast. The Whirinaki plant was closed down by 8:00pm that evening, leaving just four staff on site to monitor the pulp mill and boilers, with two security contractors and one truck driver who had parked his vehicle to take a rest.

Nobody expected the mill site to flood, but the catastrophe that followed was far worse than anybody anticipated. Cyclone Gabrielle struck Hawke's Bay on 13 February, bringing high winds and unprecedented rain, particularly in the river catchments. Falls recorded at Glengarry reached nearly 540mm, while even lowland sites such as Napier airport recorded 203.8mm – the second highest since records there began in 1950. There were many slips, in places closing roads. High winds added complication, downing trees and in some cases sending them into the swollen rivers. Elsewhere, trees were simply thrown to the ground or fell as the soil slipped away beneath them.

The most serious issue for Pan Pac was the fate of the Whirinaki site. The Esk River rose to unprecedented levels, and in the early morning of 14 February breached the stop-banks behind Pan Pac, sending water, detritus, and silt flooding through the mill to a depth of 2 metres. The seven staff on site climbed to higher ground and were rescued by boat. Just before 7.00am the Communications team sent an emergency SMS text message to all staff, telling them not to come in to work. That morning power went out across Napier and a wide swathe of the surrounding district, cutting all communications. The rising Tutaekuri river, it turned out, had flooded the Redclyffe power station behind Taradale and destroyed it, taking out virtually the entire power network for a significant part of the region.

It was the worst disaster in Pan Pac's history. The mill site had been flooded before, but not to this extent; and it was compounded by the fact that it was part of a district-wide disaster, arguably the worst to strike Hawke's Bay since the magnitude 7.8 quake of 1931. There was widespread destruction and loss of life across the district, including devastating floods in key watersheds, particularly the Esk valley. Bridges were out, isolating communities such as Rissington and others up the Napier-Puketitiri Road. Napier itself was almost isolated: the railway line was cut and all but one of the road bridges on the Tutaekuri river were destroyed. The city and a wide part of the district around was entirely without power, something that Unison – the company operating the network – initially warned might take weeks, not days, to fix. That, in turn, threatened everything from water reticulation to sewerage disposal. Loss of power also destroyed virtually all communications. The cellphone system went down as batteries ran out in the cell towers.

First priority for Pan Pac's CMT was getting back into contact with staff to ensure they were safe. This took some days. Next priority was developing plans to return to operations. Napier port provided a dedicated office, with generators, from which senior Pan Pac management initially worked for several weeks. The plan that emerged was a four-step recovery and rebuild programme. This was announced to staff 10 days after the disaster during an all-staff meeting at Napier's Municipal Theatre. Tony Clifford acknowledged the loss and impact of the disaster on the community, while Deputy Managing Director Kazuya Shimma explained that Oji Group in Japan had expressed full support for Pan Pac's recovery. They had also donated

$120,000 in total to the four local councils – Napier, Hastings, Central Hawke's Bay and Wairoa. Shimma-san referred to the legend of the phoenix and the vision that Pan Pac would rise again. Thus, Project Phoenix was born.

Pan Pac also offered support for its neighbours during this early emergency period. The Whirinaki community had been badly hit by the cyclone and remained without power and fresh water for more than a fortnight. Pan Pac loaned the community four generators and provided access to a tanker of potable water brought on to the Whirinaki mill site.

Recovery took months. The recovery project initially envisaged the first packets of lumber being produced in October and first pulp in November. This was many months ahead, marking the longest period Pan Pac had ever been out of production in its 50-year history – but it could not be achieved more swiftly, giving dimension to the scale of the disaster that had befallen both Pan Pac and the wider region.

First steps involved finding administrative space. The Whirinaki site offices were unusable, and the company leased space in Napier's Public Trust building, on Tennyson Street, as well as in Ford Street in Onekawa, and Mahia Street in Ahuriri, sufficient for about 100 staff. Later, the Mahia Street office staff were moved to a bigger, more permanent premises in Bower Street. Meanwhile, work began at the Whirinaki site. It was an enormous task that began with making the site safe – a task that alone involved staff and contractors working hard in challenging conditions. A full clean-up operation followed. This required hundreds of workers, often using shovels and squeegees, with support of sucker trucks and specialist equipment, to clear water and – ultimately – move over 75,000 cubic metres of silt. Only then could the damage to the plant and equipment be properly assessed. Singapore-based disaster recovery company Belfor, an international concern, were called in to assist. One of the key tasks involved electrical recovery: all of the 24 electrical rooms on the Pan Pac site had been damaged by water and silt. A team of 10 Belfor contractors worked for months, precision cleaning electrical components and switchboards with specialised cleaning and drying equipment.

The fact that Pan Pac was going to recover from the catastrophe and resume operations was important not just for the company but also for the wider district. By 2023, Pan Pac was one of the largest single employers in Hawke's Bay, responsible for a measurable proportion of regional GDP, and a significant exporter at national level. The recovery process drew attention at the highest levels: dignitaries who visited the site during this period included Prime Minister Chris Hipkins, Minister of Economic Development Barbara Edmonds, Minister of Regional Development Kiri Allan, Minister for Cyclone Recovery and Finance Minister Grant Robertson, the Chair of the Cyclone Recovery Taskforce Sir Brian Roche, Napier MP Stuart Nash, and National Party Spokesperson for Forestry Joseph Mooney.

Top : *The effects of Cyclone Gabrielle on the Whirinaki site, February 2023.*
Above: *Cleaning silt out of the Security building.*

Top : *Inside one of the Electrical Rooms, showing how high the water level reached.*
Above Right: *Slip in Gwavas Forest post-Cyclone Gabrielle, February 2023.*
Above Left: *The effects of Cyclone Gabrielle on the Whirinaki site, February 2023.*

Top Left: *Retrieving logs that had floated on to a neighbouring property, March 2023.*
Top: Right: *Cleaning out one of the Electrical Rooms, June 2023.*
Above: *Prime Minister Chris Hipkins and Deputy Managing Director Kazuya Shimma in the kiln dried warehouse, discussing the impact of the cyclone on Pan Pac's operations, 14 May 2023. (Hawke's Bay Today. Photo credit: Warren Buckland.)*

While this went on, forestry teams began assessing damage in Pan Pac's estates. This was made difficult: slips and damaged culverts had left access roads damaged or blocked. Bridges were out. Pan Pac staff and contractors worked alongside other members of the Hawke's Bay Forestry Group and the Hawke's Bay Regional Council to clear and repair roads and bridges and remove woody debris from neighbouring properties. This work continued for many months. Damage across Pan Pac's forest estates amounted to about 4 percent of the total holding, including 10-15 year old trees, although all this was a small proportion of the total tree loss across the district.

These direct efforts to restore Pan Pac's forests and Whirinaki plant to operational status were joined by a longer-term project, shared with Pan Pac's adjacent industrial neighbours Contact Energy and Transpower, to investigate the infrastructure required to prevent similar floods in future. This initially involved engaging river engineers and planners to survey the area and assess the issues. What became known as the Whirinaki Resilience Project, sponsored by Pan Pac, Transpower and Contact Energy, and supported by the HBRC, was incorporated into the Napier City Council and Hastings District Council's Cyclone Response Locality Plans. It involved ongoing engagement with local iwi, Whirinaki residents and landowners near the Esk River mouth.

There was little question that the site floods of 2023 and associated damage across the district to the infrastructure on which Pan Pac relied to operate had posed one of the greatest challenges the company had yet faced in its half-century long history. It was of scale similar to the wood crisis of the late 1980s, and potentially as threatening to the company's future. Pan Pac's recovery from the disaster is a testament to the strength of the company and its staff: to the philosophy of innovation, of finding answers to seemingly insoluble challenges, that had been built across 50 years of operations and which now stood Pan Pac in good stead. Following a massive effort by the company and its people, the Chipmill was operational by October 2023, with the Lumber and Pulp operations set to follow in January and March 2024, respectively.

COUNTING THE COST OF CYCLONE GABRIELLE	
Equipment, vehicles, office repair and replacements	$150 million
Business interruption	$100 million
Inventory damage	$10 million
Forestry crop and roading damage	$40 million
Total	**$300 million**

CHAPTER SEVEN
FIFTY YEARS OF INNOVATION

Half a century of continuous operations had made Pan Pac iconic in Hawke's Bay, and a significant exporter at national level. The Whirinaki plant has provided employment for several generations, giving it a lasting and prominent social place for the Napier and wider Hawke's Bay community alongside its economic position. This place has been further reinforced by the ongoing effort to build relationships with the local community. The Milburn plant underscored the way in which a regional operation has become national.

Several enduring themes have been evident across company operations from the outset. The earliest was working together – meaning not just the usual teamwork and collegiality found in many organisations, but also reflecting the unique relationship around which the company was founded in the late 1960s: the international joint venture. Pan Pac was, very much, a case of New Zealand and Japan working together, an association that outlasted the joint venture.

Another significant theme has been the way Pan Pac evolved and adapted to both maximise the yield from the available wood to meet the changing business environment, and to meet changing markets. The abrupt change of business environment in the late 1980s, on the back of a complete reversal of prior government policies towards state activities, was a major challenge on several levels. The first was that the decision by government to commercialise its divestment of former state forests was a direct threat to the long-term wood supply on which Pan Pac had been founded. While this was resolved, ongoing government reform of other traditional state sectors had extended by the 1990s to the national power system with effects on electricity prices from the latter part of the decade. This, again, represented a new factor in the business environment that Pan Pac had to meet. One outcome was an increased focus on Pan Pac's own power generation capacity, driven to a large part by waste products from the mill's own production, as a means of stabilising costs.

The rise of the lumber side of the business and the plant required to exploit available lumber markets was a significant shift in company operation that decade. At the same time, pulp production also adapted to changing markets of its own, leading to the expansion of interests in China and elsewhere and to the adoption of different types of pulp to meet different manufacturing needs. This continued, with vigour, into the twenty-first

century. The fact that Pan Pac pulp was even used in a seed mix to spray grass across the verges of a new Sydney motorway was indicative of the way that the company had sought new opportunities and markets worldwide.

Other shifts during the period included an increasing focus on environmental responsibility. This had always been part of the Pan Pac philosophy but gained particular impetus and ground on the back of new regulations and philosophies towards reducing environmental impact. In this regard, Pan Pac had always been significantly 'green', a company founded at the outset to use renewable wood supplies to make bio-degradable product: pulp for newsprint and lumber, all with relatively little in the way of effluent. However, the pressure to reduce net environmental impact intensified, particularly from 2012 with the switch to BCTMP.

By the early 2020s, Pan Pac capitalisation had reached around $1 billion. The company was managing a significant estate of renewable forest and was producing high-quality lumber and bleached pulp products that were being sold into a range of markets worldwide. It was a future that, perhaps, was never envisaged by the founders of the joint venture in 1967, a time when New Zealand's exotic forests were coming to maturity. They had hopes of a bright future, of course, but the specific evolution was always going to be unknown.

As events turned out, the company they founded rode the stormy seas of the late twentieth century, with its local economic revolution and sharp global political changes. The venture underwent changes of ownership, transformed itself into a forest producer – in contrast to a forest consumer – and by the second decade of the twenty-first century was well placed to handle the changing and volatile world that was unfolding globally. The scale of the operation, with an economic contribution making up around 6 percent of Hawke's Bay's GDP,[16] underscored the extent to which the company had developed over the years.

This global aspect remained perhaps the most crucial side of the company's evolution over 50 years. The joint venture, bringing in Japanese interests, was in many respects an innovation for its day, as one of the first major enterprises to involve Japanese business in New Zealand. At the time, the nature of that joint venture also defined the scope of the market that initially comprised just three major customers for which Pan Pac was effectively a captive supplier. However, that changed dramatically from the early twenty-first century, prompting a significant evolution of Pan Pac's business, engaging a wider international market that included China, customers across Southeast Asia, and the US among others.

16 https://www.panpac.co.nz/pan-pac-ends-2021-on-a-high-note/

By the early 2020s, Pan Pac was selling into Europe, the Middle East, Asia, Japan, Korea, Taiwan and the US – a total of between 21 and 25 different countries around the globe. It was a clear sign of just how far the company had moved from the original business model of a single and, essentially, incidental supplier of flitch and low-grade lumber to a single Japanese customer.

It was a significant transformation of business direction that required adaptation of product to those markets, in turn requiring a very different philosophy from the vision that had originally driven the company. Into that also flowed tremendous change in the business environment. The Pan Pac that entered its second half-century of operations in the early 2020s was very different from the one that had begun producing pulp and lumber in 1973. It had moved from supplying a sole captive market for pulp to a supplier of both BCTMP and of value-added lumber products into a competitive international market. Much of this development flowed from an ongoing drive to find innovative ways of obtaining best value from wood. It was an enviable achievement, one made possible by a consistently high calibre of staff across the period, by a blend of New Zealand and Japanese thought, and by a constant drive to innovate.

That success was measured both in profitable returns, in market share, and in intangibles such as goodwill and a repute for both quality product and reliability. All these remained hallmarks of Pan Pac and its operations as it entered its sixth decade of operations, looking forward to new challenges into the twenty-first century. It was an enviable record.

*Commemorative planting of kowhai trees at Milburn **(right)** and Whirinaki **(above)**, marking the 150th anniversary of the Oji Group, July 2023.*

GLOSSARY

A&P Agricultural and Pastoral

ADT Air Dried Tonnes (of pulp)

BCTMP Bleached chemi-mechanical pulp

Buck A log prepared for further processing

DWS Dilution Water Sulphination

GDP Gross Domestic Product

GFC Global Financial Crisis (2007-10)

HBRC Hawke's Bay Regional Council

IT Information Technology

MTT Maungaharuru-Tangitū Trust

NNT Nippon New Zealand Trading Company

PPFP Pan Pac Forest Products

PPFPO Pan Pac Forest Products Otago

PPTT Pan Pac Timber (Tianjin) Co.

PPPY Pan Pac Processing Yard (also 3PY)

PWP Pacific Wood Products

RMP Refiner-mechanical pulp

Shive Wood particles in pulp

SMS Short Message Service

TMP Thermo-mechanical pulp

TMT Thermally modified timber

APPENDICES

APPENDIX 1
JAPANESE DIRECTORS

DEPUTY MANAGING DIRECTOR	
1973-1980	Chushin Ota
1981-1985	Keiichi Shimakawa
1985-1990	Toyoo Shinji
1990-1995	Shinji Kakui
1995-2000	Mitsuru Kaihori
2000-2005	Yoshikatsu Tanabe
2010-2015	Hiroyuki Nishimura
2015 -2023	Kazuya Shimma

RESIDENT DIRECTOR	
1971-1973	Ken Yonekura
1973-1976	Shoichi Okawa
1976-1981	Tsutomu Onodera
1981-1984	Kaichi Hara
1984-1988	Akihiko Moriya
1988-1992	Yoshihiro Kanamaru
1992-1996	Shinji Seto
1996-1999	Hirokuni Tokunaga
1996-2001	Toshifumi Motohashi
2001-2004	Ryuji Ouchi
2005-2010	Jun Yamakawa
2011-2016	Koji Aoyama

APPENDIX 2
PULP PRODUCTION

FINANCIAL YEAR	TOTAL PRODUCTION (ADT*)	JAPAN RGP (ADT)	JAPAN TMP (ADT)	BCTMP (ADT)	OTHER (TMP OUTSALES) (ADT)	UTILISATION (%)
73/74	79,279	79,279	0	0		57%
74/75	103,734	103,734	0	0		74%
75/76	120,616	120,616	0	0		86%
76/77	183,707	183,707	0	0		77%
77/78	198,21	198,21	0	0		83%
78/79	183,8	183,8	0	0		77%
79/80	210,341	210,341	0	0		88%
70/81	203,068	203,068	0	0		85%
81/82	172,181	172,181	0	0		72%
82/83	164,37	15,1260	149,200	0		67%
83/84	183,987	0	184,000	0		75%
84/85	200,245	0	200,200	0		82%
85/86	198,842	0	198,800	0		81%
86/87	201,072	0	201,100	0		82%
87/88	202,304	0	202,300	0		83%
88/89	201,889	0	201,900	0		82%
89/90	219,689	0	219,700	0		90%
90/91	204,364	0	204,400	0		83%
91/92	216,009	0	216,000	0		88%
92/93	200,163	0	200,200	0		82%
93/94	190,027	0	190,000	0		78%
94/95	189,364	0	189,400	0		77%
95/96	214,480	0	214,500	0		88%
96/97	238,027	0	238,000	0		97%
97/98	217,578	0	217,600	0		89%
98/99	212,725	0	212,700	0		87%
99/00	226,614	0	226,600	0		92%

FINANCIAL YEAR	TOTAL PRODUCTION (ADT*)	JAPAN RGP (ADT)	JAPAN TMP (ADT)	BCTMP (ADT)	OTHER (TMP OUTSALES) (ADT)	UTILISATION (%)
00/01	234,555	0	221,900	0	12,670	96%
01/02	245,347	0	245,300	0		100%
02/03	241,025	0	237,500	0	3,530	91%
03/04	210,008	0	200,700	0	9,27	79%
04/05	239,561	0	229,100	0	10,42	90%
05/06	215,399	0	209,000	0	6,35	81%
06/07	205,404	0	205,400	0	0,00	78%
07/08	227,086	0	223,700	0	3,38	86%
08/09	215,475	0	207,800	0	7,72	81%
09/10	210,618	0	210,618	0	0,00	79%
10/11	200,211	0	200,211	0	0,00	76%
11/12	195,961	0	195,961	0	0,00	74%
12/13	199,678	0	131,201	68,477	0,00	71%
13/14	244,839	0	122,414	122,425	0,00	87%
14/15	258,213	0	108,209	150,004	0,00	91%
15/16	263,208	0	93,739	169,469	0,00	93%
16/17	273,129	0	81,472	191,657	0,00	97%
17/18	274,248	0	77,291	196,957	0,00	97%
18/19	265,817	0	78,158	187,659	0,00	94%
19/20	243,933	0	63,793	180,14	0,00	86%
20/21	227,297	0	41,563	185,734	0,00	80%
21/22	238,857	0	19,194	231,483	6,190	84%
22/23	228,191	0		221,345	6,846	81%

* Air Dried Tonnes

APPENDIX 3
LUMBER PRODUCTION

TABLE 3.1 :
WHIRINAKI LUMBER PRODUCTION AND SALES 1974-1994 (TO 31 MARCH)

FINANCIAL YEAR	SAWMILL M^3	SALES M^3
March 1974	28,064	
March 1975	47,611	
March 1976	65,790	63,330
March 1977	72,946	67,625
March 1978	76,446	85,578
March 1979	92,113	83,028
March 1980	96,193	96,708
March 1981	107,038	112,583
March 1982	95,880	94,858
March 1983	72,111	66,330
March 1984	65,708	71,153
March 1985	70,196	66,307
March 1986	73,292	79,833
March 1987	71,637	70,854
March 1988	72,575	68,639
March 1989	74,922	69,156
March 1990	86,762	87,035
March 1991	87,127	86,822
March 1992	94,062	87,706
March 1993	95,918	98,526
March 1994	102,492	99,915

* Air Dried Tonnes

TABLE 3.2
WHIRINAKI LUMBER PRODUCTION AND SALES
1995-2022(TO 31 MARCH, DATA FOR 1996 UNAVAILABLE)

FINANCIAL YEAR	LOG M^3	SAWMILL M^3	RECOVERY	KILNS M^3	DRYMILL M^3	PURCHASES - EXTERNAL	SALES M^3
1995	252,244	105,108	41.7%	9,688	7,926		101,963
1996							
1997	283,970	120,195	42.3%	13,297	13,165		118,830
1998	265,582	110,433	41.6%	14,049	13,911		115,028
1999	339,604	146,273	43.1%	31,123	33,737		135,032
2000	404,667	193,765	47.9%	71,499	68,953		184,314
2001	429,053	221,053	51.5%	89,152	89,904		208,965
2002	430,632	216,159	50.2%	112,038	102,593		207,600
2003	452,462	245,819	54.3%	148,784	142,565		236,764
2004	459,831	255,989	55.7%	157,070	146,870		256,504
2005	496,771	275,666	55.5%	174,877	157,976		272,335
2006	501,920	289,148	57.6%	182,497	166,212	3,264	263,153
2007	506,026	282,788	55.9%	180,883	167,350	6,950	270,263
2008	523,291	288,884	55.2%	183,726	165,823	1,822	256,634
2009	484,780	259,774	53.6%	161,153	146,675	510	228,212
2010	554,175	305,029	55.0%	187,369	174,894		283,214
2011	584,438	323,550	55.4%	205,563	194,321		303,664
2012	707,917	396,949	56.1%	236,238	221,529		360,969
2013	744,938	415,898	55.8%	257,066	241,038		404,396
2014	763,968	429,562	56.2%	270,351	253,746		402,636
2015	727,201	411,026	56.5%	260,354	244,918		393,675
2016	732,948	418,909	57.2%	262,805	246,437	3,117	438,204
2017	787,007	452,994	57.6%	285,467	268,816	10,030	496,692
2018	786,347	454,251	57.8%	294,140	275,072	10,002	527,070
2019	754,288	434,506	57.6%	287,299	267,920	3,776	508,626
2020	731,056	421,359	57.6%	278,393	261,822	6,568	508,999
2021	731,910	423,149	57.8%	282,690	267,654	4,635	496,684
2022	741,352	424,110	57.4%	283,214	270,085	253	484,288
2023		336,088	57.3%	223,868	215,881	177	434,578

TABLE 3.3
OTAGO LUMBER PRODUCTION AND SALES TO WHIRINAKI (TO 31 MARCH, DATA FOR 2022 ESTIMATED)

FINANCIAL YEAR (ENDING 31 MARCH)	LOG M^3	SAWMILL M^3	RECOVERY	KILNS M^3	DRYMILL M^3	SALES TO WHIRINAKI M^3
2016	69,821	34,623	49.6%	24,610	23,389	32,591
2017	107,384	54,131	50.4%	37,411	37,364	51,871
2018	172,746	88,004	50.9%	69,100	68,450	86,136
2019	178,754	92,275	51.6%	76,572	76,126	93,591
2020	175,818	92,170	52.4%	76,841	74,473	89,878
2021	180,165	98,283	54.6%	80,535	80,687	97,832
2022	145,652	79,449	54.5%	59,453	60,906	81,851
2023	151,728	84,642	55.8%	63,682	64,020	83,897

APPENDIX 4
FOREST PRODUCTION

TABLE 4.1
SUMMARY DATA FOR PAN PAC FORESTS

YEAR	AVERAGE AGE OF TREES HARVESTED	AVERAGE STEMS HARVESTED PER HECTARE	AVERAGE TONNES HARVESTED PER HECTARE	NET STOCKED AREA (HA, AS AT 31 MARCH)	HA PLANTED IN PAN PAC FORESTS
2000	27.5	250	570	31,177	1,184
2001	28.0	244	576	31,935	1,708
2002	28.2	250	642	31,681	1,713
2003	28.1	202	569	31,596	1,645
2004	28.1	198	570	31,245	1,558
2005	29.5	198	586	31,782	1,532
2006	29.7	208	636	32,700	1,522
2007	29.3	194	628	32,787	1,426
2008	29.1	204	649	32,624	1,328
2009	29.5	202	689	32,816	1,198
2010	28.8	217	683	33,043	1,474
2011	29.3	216	712	33,506	1,776
2012	29.4	239	742	33,801	1,457
2013	29.6	233	753	34,016	1,398
2014	29.4	272	725	33,809	1,102
2015	29.7	279	782	33,937	1,194
2016	30.0	284	815	34,601	1,779
2017	30.2	284	794	34,404	900
2018	29.8	293	778	34,871	810
2019	28.9	300	803	34,749	953
2020	29.5	297	797	34,959	930
2021	28.6	299	775	35,329	1,182
2022	28.2	325	771	34,579	930
2023	28.0	344	763	34,702	1,164

TABLE 4.2
HA HARVESTED FROM PAN PAC FOREST ESTATES BY SPECIES

YEAR	PINUS RADIATA	DOUGLAS FIR	MINOR SPECIES	NON-RADIATA	TOTAL
2000	1,109	124	162	286	1,395
2001	908	206	159	365	1,272
2002	970	278	188	466	1,436
2003	907	339	237	575	1,482
2004	861	466	260	726	1,586
2005	886	241	154	395	1,281
2006	1,115	55	52	107	1,222
2007	1,136	0	10	10	1,146
2008	1,339	11	30	41	1,380
2009	1,139	6	9	15	1,153
2010	1,193	0	1	1	1,193
2011	1,057	0	0	0	1,058
2012	1,154	0	3	3	1,157
2013	1,069	25	16	41	1,110
2014	1,099	0	1	1	1,101
2015	1,047	1	24	26	1,072
2016	1,034	1	2	3	1,038
2017	986	0	20	20	1,006
2018	987	1	1	1	988
2019	917	0	0	0	917
2020	849	4	21	25	874
2021	854	0	3	3	857
2022	854	0	3.1	3.1	857.1
2023	850	12	12.5	24.5	874.5

TABLE 4.3
TONNES HARVESTED FROM PAN PAC FOREST ESTATES BY SPECIES

YEAR	PINUS RADIATA	DOUGLAS FIR	MINOR SPECIES	NON-RADIATA	TOTAL
2000	632,058	47,069	46,320	93,389	818,836
2001	522,597	75,132	66,166	141,298	805,193
2002	622,587	113,573	80,919	194,492	1,011,571
2003	515,835	122,939	79,479	202,418	920,671
2004	490,633	138,615	85,773	224,388	939,409
2005	519,092	64,906	53,116	118,022	755,136
2006	708,475	18,168	21,811	39,979	788,433
2007	713,001	0	3,196	3,196	719,393
2008	868,855	2,816	12,076	14,892	898,639
2009	784,265	1,731	5,600	7,331	798,927
2010	813,980	0	531	531	815,042
2011	752,408	0	143	143	752,694
2012	856,085	0	1,740	1,740	859,565
2013	804,757	10,357	8,115	18,472	841,701
2014	797,122	136	1,218	1,354	799,830
2015	817,969	382	15,356	15,738	849,445
2016	842,949	784	1,595	2,379	847,707
2017	782,117	0	7,834	7,834	797,785
2018	767,786	400	574	974	769,734
2019	736,259	162	694	856	737,971
2020	677,104	1,989	9,338	11,327	699,758
2021	661,588	200	2,270	2,470	666,528
2022	772,154	12	2,715	2,727	774,881
2023	749,342	117	208	326	749,667

APPENDIX 5
WOOD SUPPLY AND DESTINATIONS

(TONNES)

YEAR	PAN PAC LUMBER	PAN PAC PULP	EXPORT	DOMESTIC SALE	TOTAL
2006	512,506	436,142	144,265	178,665	1,271,578
2007	525,080	489,911	199,758	175,494	1,390,243
2008	512,309	601,472	160,434	182,463	1,456,678
2009	478,787	627,484	135790	151,412	1,393,473
2010	537,114	498,646	187,122	159,112	1,381,994
2011	557,126	566,751	170,493	141,142	1,435,512
2012	674,363	582,288	167,770	104,282	1,528,703
2013	704,837	530,505	178,718	151,647	1,565,707
2014	724,839	451,399	255,153	173,650	1,605,041
2015	691,570	456,662	196,989	133,875	1,479,096
2016	689,024	396,458	225,469	129,404	1,440,355
2017	739,648	401,195	261,192	151,709	1,553,744
2018	742,317	415225	313,828	122,426	1,593,796
2019	717,282	414280	353,697	142,088	1,627,347
2020	692,603	375511	355,362	134,765	1,558,241
2021	687,962	355763	418,435	83,585	1,545,745
2022	688,329	322,467	437,189	105,948	1,553,933
2023	559.482	309,486	90,356	432,749	1,392,073

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