

PAPRO PROVIDES RESEARCH SUPPORT TO THE NEW ZEALAND PULP AND PAPER INDUSTRY

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*NEW ZEALAND FOREST RESEARCH INSTITUTE COMPLEX OFFERS
RANGE OF SERVICES TO FOREST PRODUCTS INDUSTRIES.*

THE SMELL OF SULFUR WAFTS AND EDDIES THROUGH Rotorua. But it doesn't emanate from a pulp mill. It comes from the earth, from bubbling pools of hot mud and boiling water. People are drawn to this area of New Zealand's North Island for the therapeutic baths, the scenery, the outdoor activities, and the cultural history.

The region—and really all of the North Island—has been shaped by volcanic activity. The native Maori used to use the craters of dormant volcanos as fortresses. Mt. Tarawera, less than 15 miles southeast of Rotorua, erupted 110 years ago.

Less than a kilometer from the steaming rocks and erupting geysers of the Whakarewarewa Thermal Reserve, near the southern outskirts of Rotorua, sit the offices and laboratories of the New Zealand Forest Research Institute (FRI). The Institute was established in 1947 to do research for the New Zealand Forest Service. It became the principal provider of forestry research for the New Zealand government and forest products industries. In 1992 it became a Crown Research Institute—a company wholly owned by the government—and last year had a staff of 424 in Rotorua, with an additional 19 staff on the South Island.

"Our driving purpose is to enhance New Zealand's competitive advantage in production forestry through research, development, innovation, and technology transfer spanning the complete production and processing cycle, from gene to market," said Frank Wood, FRI's chief executive.

The Institute's efforts are directed toward six core strategies:



Entrance to the New Zealand Forest Research Institute in Rotorua

- Increasing forest value through tree improvement
- Sustaining forest improvement and production
- Finding alternative species to *radiata* pine
- Extracting maximum forest value
- Enhancing the value of wood and paper products
- Securing an environmentally stable forest sector and forest systems.

PAPRO

The Pulp and Paper Research Organization of New Zealand (PAPRO), a division of the New Zealand Forest Research Institute, was established in 1984 to conduct fundamental and applied research. It employs about 50 technical and scientific staff, with Terry J. Fullerton serving as executive manager.



Stephen Wrathall checks samples in the chemical pulping area

Within PAPRO, the main areas of long-term study include waste minimization (encompassing chemical processing and effluent treatment), pulp and paper biotechnology, packaging materials, market kraft pulp, mechanical printing grades, and fiber processing. Funding for long-term research comes from the Foundation for Research, Science and Technology (FRST) and major pulp and paper companies in New Zealand.

Research conducted in Rotorua and in collaboration with other research groups has produced significant findings and results. Studies conducted with VTT Biotechnology and Food Research of Finland have led to the discovery of a mannanase enzyme that enhances modified kraft pulp bleaching, for example. Studies of *radiata* pine have also shown kraft fibers from that species appear to be particularly resistant to degradation during the recycling process, Fullerton reported.

Along with the University of Auckland, PAPRO has developed an 18-week diploma course in pulp and paper technology for professionals already working in the industry. Students spend about 20 hours each week on lectures, plus one day-long field trip each week. The main areas covered during the course are the forest industries, mechanical pulping, chemical pulping, paper-making, environmental and process control, and properties and uses of pulp and paper.

In addition, the staff provide confidential research and testing services. Available testing services include chemical composition, physical paper testing, optical assessment of paper, printability, environmental testing, microbiological identification, furnish analysis, routine bleachability, and pulping trials.

In the chemical pulping area Stephen Wrathall oversees sample preparation and evaluation. The lab can simulate low-, medium-, and high-consistency pulping; rapid displacement heating (RDH); ozone and peroxide



Some of PAPRO's testing facilities



The fiber processing plant's liquor impregnation vessel

bleaching; and a range of other processes. New pulping equipment, including an American LEWA SP 500 and M&K system, arrived this spring and was to be installed during a renovation of the lab.

FIBER PROCESSING

The 120-hectare campus of FRI and PAPRO in Rotorua includes an industrial-scale fiber processing plant that



John Welten at the Bailey Network 90 DCS terminals

capacity of 25 tons/day at 600 CSF; and a Thune SP 23 screw press with the same capacity.

The entire operation is controlled through a Bailey Network 90 distributed control system. **TJ**

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comprises a refiner pilot plant and a fiber separation plant. The processing plant can produce almost the full range of mechanical pulps, except for stone groundwood (SGW) and pressurized groundwood (PGW) grades.

The refiner plant is equipped with two 1500-rpm refiners: a Jylhä SD 52/36, 1.25-MW, single disc, pressurized refiner and a Bauer 410, 400 kW, double disc, atmospheric refiner. The first serves as the main refiner and can produce 12-20 tons/day of pulp; the second can produce 8-16 tons/day of pulp.

Typically, wood chips processed at the plant go from an atmospheric steaming bin to an upper chip plug screw feeder from which they are fed into a pressure vessel. The chips are impregnated with chemicals and sent through a preheater. A lower chip plug screw feeder then carries the chips to the pressurized refiner. An optional second-stage refining is available.

The fiber separation plant is equipped with two Ahlstrom, 45-kW Ahlsorter 1 pressure screens with variable speed rotors and a capacity of 50 o.d. tons/day. Two Celleco Hedemora S4 centri-cleaner satellite systems can operate with Cleanpac 700 or Tripac 90/270 units. Other equipment includes a 6 m³ Beloit Shark pulper; a 15 m², variable mesh screen Algas drum thickener with a