

MAKING AN IMPACT

In our work with industry, IRL science and engineering help solve problems and also create opportunities.

SOLVING PROBLEMS

Ensuring correct temperature readings

Infrared thermometers measure temperature without contact and low-cost hand-held versions are widely used in the building industry, in low-temperature processing industries and, in particular, in the food industry and food retail outlets, where correct temperatures and good hygiene are essential. These thermometers work by measuring the infrared radiation emitted by the target object, but there are several other factors that can affect the reading, usually resulting in measurement errors. These factors have been the focus of research by Peter Saunders of IRL's Measurement Standards Laboratory, leading to big improvements in the way the thermometers are used and in their accuracy. "One of the factors that needs to be taken into account in using infrared thermometers is that as well as emitting radiation, objects also reflect radiation from other sources," he says. "The thermometers are designed to compensate for reflections to some degree, but if the reflected radiation is large, then the temperature reading will be inaccurate. What's worse is that the temperature of the thermometer itself, which is usually not known, also affects the reading." His theoretical work was then put to the test by an Auckland firm, Teltherm, which offers an accredited calibration service for thermometers and pressure gauges. "Producers were complaining that their products were being rejected when they were temperature-tested using hand-held infrared devices," Teltherm's Anne Evans says. "In our lab, where we test these instruments, we were also seeing errors that we could not quantitate for all the different makes and models used in New Zealand, but using Peter Saunders' research we can now offer New Zealand industry an accurate IANZ Temperature Report for a fraction of the price that a research lab could." Teltherm also enlisted Peter Saunders' help in educating auditors on how to measure goods using an infrared thermometer and the errors that can occur. "Four months later we are beginning to see the results of that exercise as our customers start asking for ice points (an easily reproduced reference point to check the continued accuracy of a thermometer between calibrations) and seek regular checks on their instruments," Anne Evans says. "Overall, the project has been a remarkable success," she concludes.

Proving plastic blocks work

Customers of Auckland-based power solutions company TransNet were asking if the concrete blocks used to stop power poles developing a lean and eventually falling over could be replaced with something lighter. As power poles are inserted, one block is placed at the bottom of the hole and another at ground level, and between them they prevent the pole being displaced due to the constant tension of the wires. The problem was that the concrete blocks are very heavy and staff installing them were vulnerable to back injuries, especially in an industry where the average age of linesmen is around 50 years. TransNet decided to experiment with plastic blocks. The issue, Managing Director Spencer Winn says, was: Would they work? "There were plenty of doubters who thought the plastic blocks would not be sturdy enough to do the job, including me, but rigorous testing by IRL showed that they would work," he says. "We had the testing done in time for the plastic blocks to go on show at an important trade show in New Zealand and have made our first sales of the new product."

Shock testing for naval equipment

The Royal New Zealand Navy uses IRL's facilities in Auckland to shock test equipment that is being developed or purchased for installation on its ships. The testing ensures any equipment destined for use at sea can withstand shock from a major explosion associated with a mine or missile attack. Commander David Fairweather, the navy's Engineering Change Commander, says being able to access the shock testing facilities at IRL has important benefits. "If this shock testing platform wasn't available to us we would be forced to look overseas for the service, probably in the US or Europe. Having local facilities also allows us to source equipment manufactured locally – rather than having to favour overseas suppliers whose product has been able to be shock tested. It also allows New Zealand manufacturers the opportunity to compete in the international military sales market," he says. "Either way, having this facility saves us time and money."