

FIBRE OPTIC CABLES keep the world talking

BY MARK BARRATT-BOYES AND KEITH INGRAM

Ninety-five percent of New Zealand's communications with the outside world are transmitted through fibre optic strands less than half the diameter of fine human hair, protected in cables that lie across the ocean floor.

The most important of these cables for New Zealand is the 32,500km Southern Cross Cable Network. It links Auckland's Takapuna Beach with Hawaii, the United States coast in California and Oregon, back to Hawaii, Fiji and Sydney, before completing the loop at Muriwai Beach on the western coast of Auckland, at depths of up to 8km below the surface.

Its six strands, three to send and three to receive, transmit vast amounts of data, including bank details, phone calls, internet information and movies, at up to 480 gigabytes per second, equivalent to transferring eight full-length movies every second.

Seventy percent of failures in the global undersea cable network come from fishing and anchorage damage, and on average there is one cable failure every three days around the world, says Mike McGrath of Telecom New Zealand.

"We've had none here for many years. We believe this to be due to good legislation, good enforcement and a good cable awareness education programme." That includes distributing thousands of chartlets each year to illustrate Auckland's no

fishing or anchoring submarine cable protection areas.

But tied up at Auckland's Queens Wharf between April 23 and June 3 was the network's biggest insurance policy, the 140m cable repair ship *Ile de Ré*, on a rare extended visit. The ship was launched in Poland in 1983 as a roll-on, roll-off vehicular ferry. The telecommunications company Alcatel-Lucent bought her, cut her off above the waterline, split her amidships and relaunched her in 2001 as a multi-purpose cable ship.

She is jointly contracted by several telco companies, including Telecom New Zealand, from her home port of Noumea, New Caledonia, and is responsible for an area from Singapore to half way between Fiji and Hawaii, including Australia and New Zealand.

"If she sits in Noumea all year and does nothing I'm happy," says Mike McGrath, who is Telecom's international technology operations manager.

When not required for urgent cable repairs, the *Ile de Ré* may also be used to lay new cable, and she can carry up to 3250 nautical miles of cable and new repeaters for this role. She is in fact due to lay two new cables, one between Sydney and Hawaii, the other between Sydney and Noumea.

However, even when working on this exacting task of laying new cable, the officers and crew must be prepared

to stop, chop and buoy the cable off, mark it and depart with all due haste to the site of an emergency fault.

The crew may also undertake repairs beyond her designated zone, as happened in December 2006 after an earthquake off Taiwan triggered an undersea landslide. Fourteen cables were damaged, and the *Ile de Ré* carried out two of the 21 repairs in the area.

The *Ile de Ré*, named after a small island off the western coast of France, steams at 12 knots in transit and 17 knots full steam. Her four 1500kW thrusters can also push her sideways at up to five knots. Her skipper, Captain Christophe Girard, and his crew of about 51 can have her ready for sea in eight hours.

As she is totally self-sufficient, she can remain at sea and on station doing repairs for up to two months. To do this she must not only carry sufficient supplies for the crew, but also bunkering fuel and water, lube oils and spares so that they can carry out any mechanical repairs on board while on station.

Her officers, who are currently French, Danish and English, work a two months on, two months off roster. They mix freely with her Filipino crew and share a spacious common area of three interlinked messrooms, with a common dining area, lounges and a games area. There is also a gymnasium with exercise machines, sauna and a plunge pool. The ship is dry, with

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no alcohol on board, but tea, coffee and orange juice is always available. The crew works a standard 12 hours on, 12 off roster when on station during a repair.

Because the ship is contracted for service and repair work to a number of telecommunications companies who may have differing specifications and standards, an owner's representative is generally on board when working on any cable to monitor the work, and test and approve the standards of jointing or cable-laying. For this purpose, there are two spacious owners' representative suites.

At the top deck there is the spacious bridge, which is divided into two. The for'ard part is for transiting, navigation and watchkeeping, while the aft section overlooking the stern is the primary control area when the ship is working a cable, doing repairs or laying new cable.

This area includes a panel for the Dynamic Positioning System, or DP. There is also an oceanographic mapping area to record the cable's position on its designated pre-surveyed route, a main communications and weather data area, and a refreshment area for the watchkeepers.

During repairs, the computerised DP system operates her twin engines and four side-thrusters to keep her precisely over the required spot, in winds of up to 50 knots and sea state seven. It also monitors pitch and roll, tide, wind and cable tension.

When there is a cable fault, the technology on board the *Ile de Ré* comes into its own. Cable system repeaters are spaced every 50km or so along the cable to boost the signal, and can also help to locate a fault. These submarine cable systems are designed to last 25 years therefore some spares are carried on board, primarily spare repeaters, which the ship's staff test every six months.

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