Southland, New Zealand

Manapōuri Power Station

Underground modernization

Manapōuri Power Station is New Zealand's largest hydro-electric power station, situated on the western arm of Lake Manapōuri in Fiordland National Park, in the South Island of New Zealand. The vast machine hall, blasted out of solid granite, sits more than 200 meters underground, connected to the lake's surface by an elevator. Water from the lake above constantly seeps through the bedrock into the shaft, corroding everything in its path. It's the deepest elevator and second tallest in the country – and we've just modernized it.

Challenges and highlights

- A modernization 200+m underground
- Extremely wet conditions
- Remote location

Schindler solutions

- Tailored modernization solutions coupled with experienced crew
- Quarterly extensive maintenance service
- Schindler Ahead RemoteMonitoring

Photo courtesy of Meridian Energy Ltd.

Project overview

1971 Construction end year	2019 -2021 Duration of modernization	1 Upgraded underground elevator	Updated, conventional Elevator control
-219 m Max travel height	1.75 m/s Max speed	Schindler Ahead RemoteMonitoring Innovation employed	

An all-out modernization

Replacing the elevator car, landing doors, machine, and controller

After modernization

Without the elevator

Stefan Kovacs
Maintenance Team Leader of Schindler New Zealand

A

219m
with improved safety and efficiency

2km
through the long tunnel

B

Machine hall

Project highlights

An all-out modernization

The owner of Manapōuri Power Station, Meridian Energy, approached us after one of the elevator's hoists ropes had snapped. Up to this point, employees at the station had used the elevator for over 40 years. With the elevator now out of order, employees had to drive through a 2km-long tunnel to get to the machine hall.

We proposed a complete modernization of the elevator system to improve its safety and efficiency, and to ensure it complies with the latest building standards. This included replacing the whole elevator car, landing doors, machine, and controller with our innovative new technologies and, in the process, future-proofing this geographically remote equipment for many years to come.

The humid shaft environment

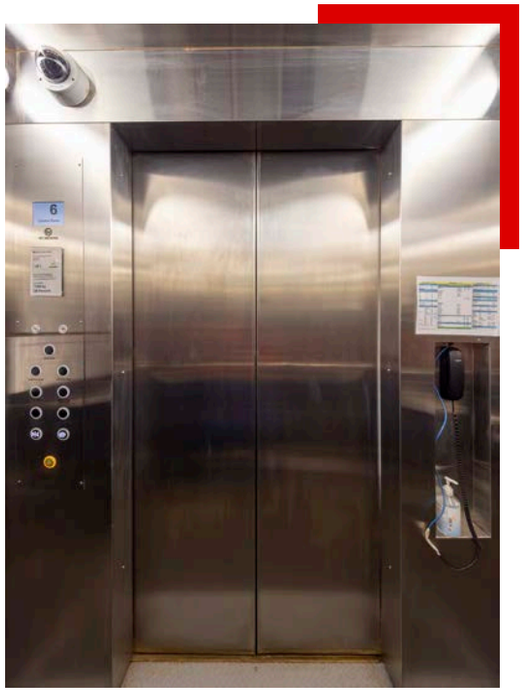
A constant battle against corrosion

Our first challenge was to design new hoist ropes that could withstand constant contact with water. Craig Player, an experienced Schindler Engineering Manager, led these efforts. Craig's team set out to develop the best rope solution possible for the project, taking into account factors such as rope length, stress tolerance, water resistance, rust prevention, and recyclability. They could count on the support of Schindler Global Large Projects and Brugg Lifting, a company specializing in elevator ropes. The team tested a range of options to ensure they installed the most water-resistant and resilient rope for this environment.

When the project started, the Installation Manager took our core installation crew down to the elevator pit – all dressed in raincoats! He recalled: "It was just like standing outside in the rain. Needless to say, no standard elevator equipment is built for this environment!"

To prevent fast corrosion, we applied rust prevention on all exposed steel parts and built a working platform above the elevator car as a semi-roof. In the machine room, we installed a heat pump and a dehumidifier.

But that was just the hardware part – we also put together our best team: Schindler Project Manager Fabio Fadigas, who led a ten-member team averaging 20 years of experience. Before becoming branch manager in Wellington, Fabio had led large projects in South America and Asia for over 12 years.



A constant battle against corrosion

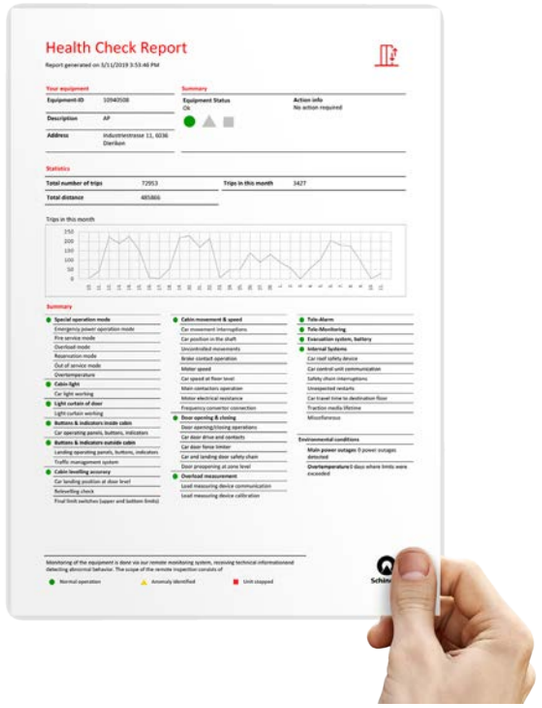
Photo courtesy of Meridian Energy Ltd.

Look out far, look in deep

There's no road to access the power station. To get there, our team had to take a plane from Wellington to Queenstown, then drive for three hours, and finally take a ferry or a 50-min barge ride across the lake, where the dam is located. The trip alone takes two days, so our team would spend two weeks at a time at the station, bringing much of their kit to cover any unforeseen challenges.

The unique conditions experienced in the underground shaft also brought its fair share of challenges. Snow, rain, water, mosquitoes – all were part of daily life on-site. Special hoisting methods were also designed. For instance, to install the elevator hoist motor, We had to use special hoisting methods to install the elevator hoist motor. We used a special truck fitted with a huge crane to lower the motor all the way down the 219-meter shaft to the machine hall.

Once the installation phase was over and our experienced crew had left the station, it was time to hand over to Schindler Ahead to take ongoing care of the equipment.



An equipment health check report generated by Schindler Ahead RemoteMonitoring

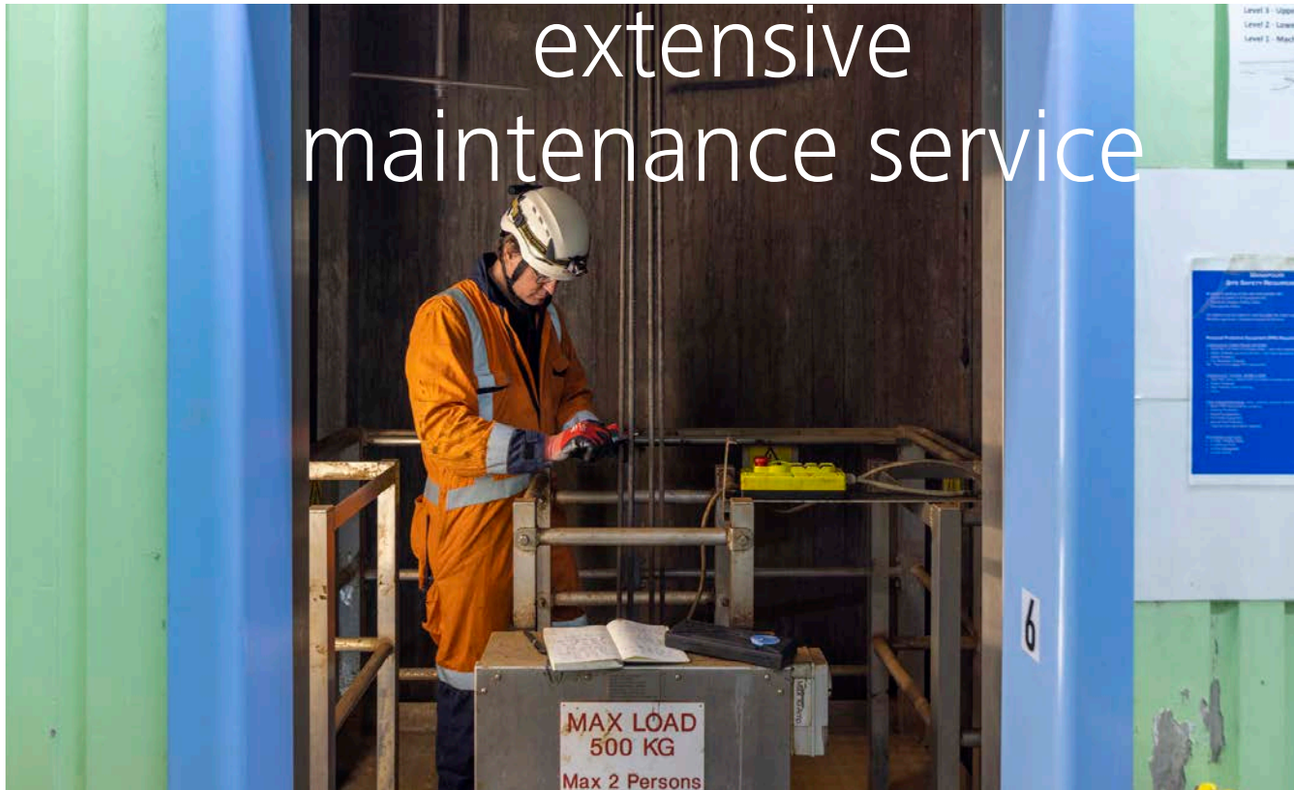
Schindler Ahead is an intelligent closed-loop platform that connects service technicians and property stakeholders to the Internet of Elevators and Escalators (IoEE). Among its many tools, Schindler Ahead RemoteMonitoring enables predictive maintenance. By installing the IoEE Cube in the controller on top of the car at Manapōuri, our maintenance team in Wellington are able to monitor the operation and status of the elevator remotely. If there are any signs of malfunction, they will be able to run basic diagnostics through the cube and coordinate with Meridian's service team to solve the problem immediately.

Given the high wear and tear caused by the unusual environment, our service technicians carry out an extensive maintenance service every quarter. Stefan Kovacs, a Schindler veteran with over 36 years of experience, leads the service team for the site. "We go over everything, lubricate all the necessary components and work to combine our visits with possible repairs and improvements," he said. "It takes two of our technicians two entire days to complete the whole process."

Our teams completed the elevator upgrade in less than a year. Now, the 16 employees at Manapōuri Power Station can enjoy the convenience and safety of a new state-of-the-art elevator.

It's a uniquely challenging and fascinating project. As Fabio put it: "If it wasn't for the loyal people who've been working hard for us for a long time, we wouldn't be able to pull it off."

Schindler Ahead RemoteMonitoring + extensive maintenance service



“Replacing New Zealand’s second highest elevator was not a straightforward task. The elevator shaft is not a normal working environment as there is constant water coming through the rocks and out into the elevator shaft. The elevator is vital to our daily operation: Schindler customized the entire solution and made its modernization a success.”

Blair Falconer
Site Manager, Manapōuri Hydro Power Station

Photo courtesy of Meridian Energy Ltd.