



Navigating Tough Terrain with Advanced Smart Technology Solutions.

Case Study

The Te Ara o Te Ata project exemplifies how DYWIDAG, Groundfix, and Alliance New Zealand's collaborative efforts and advanced technology overcame challenges in a remote, ecologically sensitive area. Utilizing a cableway and smart anchor technology minimized environmental impact and enabled efficient, simultaneous work, offering significant time and cost savings.



PRODUCTS

DYWIDAG Smart Anchor Systems
Infrastructure Intelligence (II)

LOCATION

Mt Messenger, New Zealand

SCOPE

| Design | Material Supply | Testing
| Inspection | Reporting |

OWNER

New Zealand Transport Agency

GENERAL

CONTRACTOR

Groundfix
Project Alliance New Zealand

Context

The Te Ara o Te Ata project sought to improve connectivity and safety on State Highway 3. The project required close collaboration between DYWIDAG, Groundfix and the project Alliance using innovative technology and design to overcome the unique challenges on this extremely remote site. By conducting testing and monitoring of anchors remotely, considerable time and money was saved. The project included the construction of two bridges of approximately 125m and 30m length, and a 235m tunnel.

A highly secluded and ecologically fragile region of New Zealand's North Island, a new bypass was constructed to circumvent the steep, winding and narrow Messenger Mount Road. This area boasts dense forests and serves as the habitat for numerous distinctive plant and animal species, making it imperative to minimise the environmental impact of the construction.

Implementing a 1,100-meter cableway for machinery transport allowed successful passage over the top dense forests, minimizing ecological impact and eliminating the need for a damaging haul road. This approach accelerated the construction schedule by approximately one year, optimizing project efficiency without harming the environment and reducing the disruption and congestion of the existing road.



Solution

This project showcases the creative approach taken to overcome challenges in anchoring a cableway at a remote site, featuring a central tower and backstays secured by ground anchors. Meticulous planning of drilling equipment and techniques was crucial for the difficult terrain, particularly for the helicopter-access-only northern anchor point.

To tackle the challenges, test anchors were installed before starting the primary work. These tests identified weak mudstone with unexpectedly low skin friction. Facing restrictions on the size of machinery an under-reaming technique was implemented to enhance the load-bearing capacity of the boreholes. This method efficiently met anchor load requirements by optimizing the boreholes' depth and diameter.

The project included the installation of multi-strand anchors, which reached depths of 18 metres on the north side with 11 strands, boasting ultimate loads of 2871 KN, and 15 metres on the south side with ultimate loads of 2317 KN and 200mm boreholes in the mudstone.

Acknowledging the critical function of these anchors for the cableway's integrity, a monitoring system was implemented using DYWIDAG's Smart Anchor technology. This system allows for the real-time tracking of anchor loads and relays this data to a remote platform. This method facilitates ongoing monitoring of the anchor loads, eliminating the need to physically access difficult anchor locations. Designers found the real-time load data extremely beneficial, prompting the decision to install additional anchors before starting the cableway construction, enhancing the project's safety and efficiency.

Due to the site's extreme remoteness, the collaboration between the client, contractor, and supplier was crucial for integrating this technology and fostering innovative solutions. The introduction of the cableway significantly streamlined the construction process by avoiding the creation of a disruptive haul road, therefore speeding up the project's completion and minimizing disruption to the existing roadway.



MT MESSENGER PROJECT SITE



SMART ANCHOR DRILLING