

INNOVATION, SUSTAINABILITY + DIGITAL IN PRACTICE

ISDIP

ISDIP 116		Dust-Free Overhead Drilling Innovation	
Date	January 2026		
Business Unit	BPC		
Project & Region	Downtown Ferry Terminal Electrical Upgrade – Northern Region		
ISC Themes	<ul style="list-style-type: none">• Using Resources• Emissions, Pollution and Waste	<ul style="list-style-type: none">• People and Place• Innovation	

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1 What Happened?

As part of the Downtown Ferry Terminal Project, the team was required to install a large number of anchors into the underside of the existing concrete structure at Queens Wharf. This involved drilling approximately 20,000–30,000 holes overhead, to a depth of around 140 mm, directly above workers and over water.

This task presented several significant challenges:

Environmental risk:

Drilling concrete overhead generates large volumes of fine dust. Because the work was being carried out directly above the harbour, there was a high risk of concrete dust and debris entering the marine environment.

• Health and safety risk:

Overhead drilling exposes workers to **silica dust**, falling debris, and fatigue from sustained overhead work. Traditional drilling methods would require extensive PPE controls and still leave residual dust exposure.

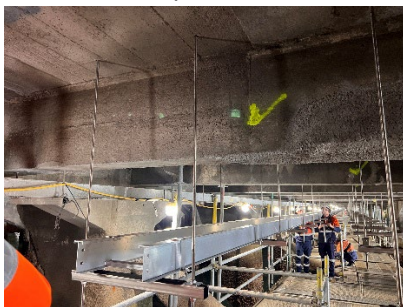
• Access constraints:

The work area was difficult to access, limiting the ability to use larger plant or fixed dust extraction systems.

• Productivity and quality issues:

Standard drilling methods require holes to be cleaned (blown, brushed, or vacuumed) before epoxy installation. With thousands of fixings, this added time, rework risk, and variability in anchor quality.

Given the scale of the work and the sensitive environment, a conventional approach would have increased environmental exposure, worker fatigue, and programme risk.



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2 What Are We Doing Differently?

To address these challenges, **Danny McDonough (Electrical Superintendent)** and the site team developed and implemented an integrated, battery-powered dust-free drilling system, specifically suited to overhead work in environmentally sensitive locations.

The innovation combines:

- **Battery-operated concrete drills**
- **Battery-operated backpack-mounted vacuum units**
- **Specialised dust-extraction drill bits with integrated vacuum ports**
- **Bluetooth connectivity between the drill and vacuum**



Close-up of the dust-extraction drill bit showing the vacuum holes in the bit

How the system works

The drill bits are designed with internal extraction holes that capture dust at the point of generation. Dust is immediately drawn through the drill bit and into the vacuum unit, meaning it never escapes into the surrounding environment.

The drill and vacuum are paired via Bluetooth, so when the operator activates the drill, the vacuum automatically turns on. When drilling stops, the vacuum shuts off, conserving battery life and removing reliance on manual activation. Both the drill and vacuum are fully battery powered, eliminating the need for trailing cables or fixed extraction systems and making the setup ideal for confined or hard-to-access spaces.

Key benefits

Environmental protection

- Prevents concrete dust from entering the harbour
- Significantly reduces airborne dust generation at source

Health and safety

- Dramatically lowers silica dust exposure
- Reduces falling debris during overhead drilling
- Allows standard PPE to be used with added protection rather than extreme controls

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Efficiency and productivity

- Holes are drilled clean, allowing epoxy to be installed immediately without secondary cleaning
- Estimated **15–20% time saving** compared to traditional drilling methods
- Reduced rework and more consistent anchor installation

Worker usability

- Minimal learning curve; crews adopted the system immediately
- Backpack-mounted vacuum allows mobility and sustained use
- Battery life supports several hours of continuous drilling with swap-out batteries

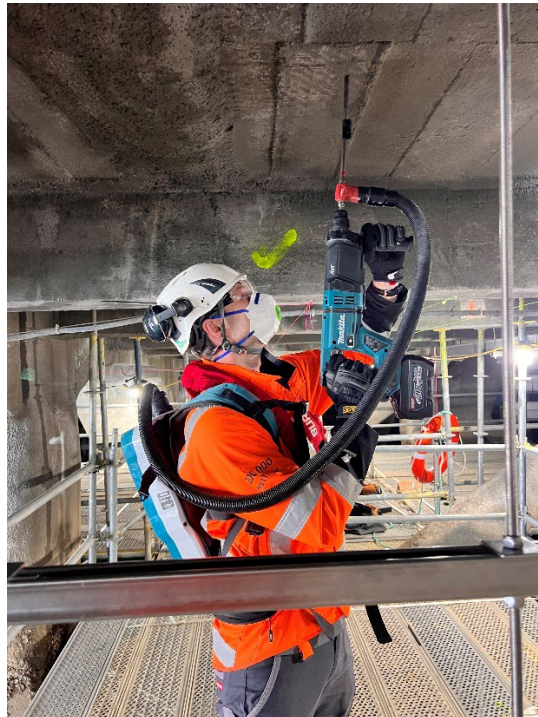
Adaptability

- Works in overhead, horizontal, and vertical drilling orientations
- Applicable to a wide range of concrete drilling and epoxy fixing tasks beyond this project

Outcome

By combining equipment from different manufacturers and adapting it to suit the task, the team delivered a **bespoke solution** that reduced environmental risk, improved worker safety, and increased productivity—while maintaining flexibility on a complex live waterfront project.

This innovation was developed on site by the project team to respond to a unique combination of environmental, safety, and access constraints. The approach is transferable to other projects involving overhead drilling, marine environments, or high-volume epoxy fixings.



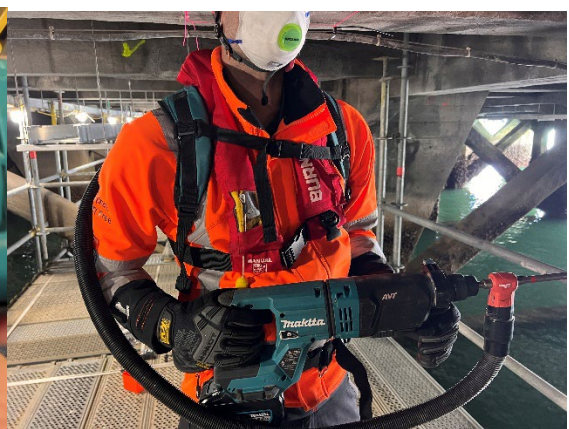
Worker wearing the backpack-mounted vacuum demonstrating ergonomics and mobility

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Side-by-side comparison - traditional drilling dust vs dust-free system outcome



Detail shot of drill and vacuum setup highlighting Bluetooth-connected battery tools

3 More Information

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