CASE STUDY
DEEP LOCK®

Active Rail Bridge Pier Stabilization

A cracked granite pier supporting an active freight rail line moved approximately ¼ inch every time a train crossed. With the Hudson River below and rail service still running, continued movement created a serious structural and operational risk.

Initial Assessment

The planned carbon fiber wrap required a stable substrate before epoxy work could proceed. Active pier movement prevented warranty approval, while existing grout bags, riprap, and rail operations blocked excavation or underpinning options.

Proposed Solution

A geotech contractor selected **AP Lift 430** with the Deep Lock® process to stabilize soils beneath the pier while trains stayed active. The polyurethane foam was chosen for deep injection, fast reaction, void filling, and support below difficult access zones.

Procedures

1. Laid out offset injection pattern around pier base
2. Rock-drilled through grout bags and obstruction zones
3. Installed 36 injection pipes: 18 to -10 ft and 18 to -5 ft
4. Injected 35 lb at deep points and 25 lb at shallow points
5. Pumped approximately 150 gal total
6. Monitored crack movement during train loading
7. Stopped injection when lift indicated full contact

Results

- Reduced crack movement to a minimum
- Stabilized the pier for epoxy repair and carbon fiber wrap
- Kept freight rail active during stabilization
- Avoided excavation and underpinning disruption
- Completed stabilization in two injection visits

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