Al Jasra Interchange – Loop Road Widening

Bahrain

Micro pile wall to widen road section under a bridge.

The project

The Al-Jasra interchange required the section of the road below the bridge to be widened. This involved cutting back around 4.0m of the sloped embankment under the bridge which would only be possible if the cut face was retained permanently.

The challenge

In order to retain the sloped embankment, any solution proposed had to fit under the low headroom of 6.0m under the bridge deck to the top of the road level and minimum 3.8m from the top of cut level of sloped embankment. In order to minimize traffic disruption to one lane from two, the time allowed for constructing an earth retention system was two months.

The solution

The earth retention system by contiguous micropiles of 300mm Ø, reinforced by solid 100mm bar, was designed. The unsupported length of the micropile wall was 2.5m above road level and up to 6.5m were below road level with 4.5m embedded in weak limestone formation. An improvised excavator mounted mast was used to drill under the 3.7m headroom and under the bridge. The rest, under open sky, were drilled conventionally. Temporary steel casing, solid 100mm rebar and tremie pipes, for placing concrete, were lowered in sections of 1.5m. Flowing concrete with 10mm aggregate was used and placed before inserting the rebar while working in low head room locations.

Project facts

Owner(s)
Ministry of Works, Bahrain

Keller business unit(s)
Keller Grundbau GmbH, Bahrain

Main contractor(s)
Haji Hassan Group

Solutions
Excavation support

Markets
Infrastructure

Techniques
Micropiles