

JOG corrects slab dishing in large transport yard



INDUSTRY

Industrial

STRUCTURE

Transport yard hardstand

PROBLEM

Subsidence

LOCATION

Hemmant, Brisbane

DURATION / YEAR

28 days / 2019

TECHNOLOGY

JOG Computer-Controlled Grouting

BUSINESS UNIT

Mainmark Australia

Summary

South East Queensland Hauliers (SEQH) is a full-service wharf logistics business that receives and delivers shipping containers on behalf of freight forwarders and customs brokers.

SEQH headquarters, located at Hemmant, operate 24/7, managing import and export shipping freight for the Port of Brisbane. Central to the facility is a large concrete hardstand that is used for loading, unloading and storage of 20ft and 40ft containers as well as a traffic corridor for heavy vehicles. These containers are then moved to rail or road for transportation.

Being in close proximity to the Brisbane River, the heavy concrete hardstand was built on reclaimed mangroves and designed to “float”. While the concrete slabs were laid on well compacted ground 3 years ago, the area has since been affected by serious subsidence.

Due to the high water-table, the substrate beneath the slab consists of soft marine mud, approximately 23m deep, that is continually affected by daily tidal flows. This issue has been exacerbated by failing joint seals between the concrete slabs that allowed additional water ingress to affect the soil substrate beneath the slab. As slab settlement continued to occur, the outer edges of the hardstand sat higher than the midline (known as dishing), which caused water to pool in the centre further compounding the problem.

With 40 tonne forklifts and 30 tonne containers moving around the site on a daily basis, SEQH tried to work around the issue by storing the heaviest containers on the outer edges of the hardstand area until a permanent solution could be identified.

Due to Mainmark’s experience in remediating structural issues affecting large transport yards, SEQH contacted Mainmark to help improve the ground beneath the concrete slab, and improve the strength and gradient of the hardstand.

JOG corrects slab dishing in large transport yard continued

Objectives

The overall objective was to remove the dishing in the slab which would cause the water to flow off the slab. 3500m² of the 12000m² hardstand was affected so lifting the slab required careful planning and absolute precision. The solution also needed to be delivered with minimal disruption to SEQH business operations, and without interrupting access to the hardstand area for heavy vehicles, or posing a safety risk to people or property.



SEQH needed to find a solution to remove dishing and water pooling along the hardstand's midline (seen in the background)

Solution

The heavy vehicle movements through the area posed considerable safety concerns which were overcome by Mainmark and SEQH working together to implement a strict plan designed to keep everyone on site safe at all times.

JOG Computer-Controlled Grouting (JOG) was selected as the ideal method for correcting the hardstand area. The highly precise process using computer-controlled injection technology and fast setting grout is ideal for correcting large areas and heavy structures, gradually and gently lifting them back to level.

The 400mm thick hardstand slab was constructed on "strengthening beams" measuring 250mm thick and 1200mm wide, which ran in both directions beneath the construction joints.

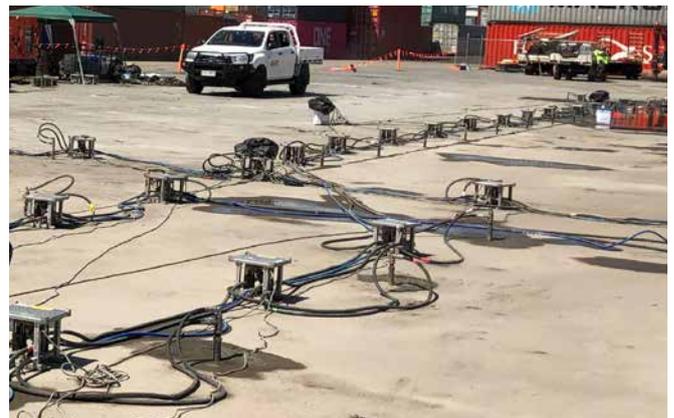
Mainmark re-levelled the hardstand by installing JOG grout delivery ports along the strengthening beams running under the slab construction joints. A total of 400 injection points were installed at 2.5m centres and 5m centres along the strengthening beam and across the slab area in a grid pattern.

JOG is delivered through sequenced injection points, each controlled from advanced grout monitors, to achieve a high degree of injection accuracy. Despite the immense size of the hardstand area, Mainmark technicians controlled the lift in increments less than 0.5mm across sections of up to 700m² at a time. This resulted in an overall lift to the hardstand's centreline of 120mm, improving the gradient by 20mm causing the water to drain away from the centre.

Using Mainmark's unique JOG process, all sections of the structure were supported and lifted together, enabling the large, heavy concrete slab and supporting beams to be raised at precise parameters while placing minimal stress on the hardstand structure.

The project was completed in approximately 28 days and caused minimal disruption to operations at the busy transport yard despite regular rainfall throughout the duration of the project. Once works were completed, the SEQH hardstand was able to resume regular service quickly.

SEQH Managing Director Brett Plummer explained that the project was completed in a timely manner, and with no day to day impact on business operations: *"The Mainmark team were efficient and workman like in their approach. They kept at it until the job was complete. This timeliness assisted us as we had to lease additional space to provide a safe work zone."*



Mainmark installed a total of 400 JOG injection points.