



CASE STUDY

Project: Ebco Industries Galvanizing Kettle Richmond, B.C.	Geotechnical Engineer: Levelton & Assoc., Richmond, B.C.	Structural Engineer: Bogdonov Pao & Assoc., Vancouver, B.C.	Contractor: Vickars Construction Burnaby, B.C.
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Job Description:

A large steel reinforced concrete kettle for galvanizing tank measuring approximately 55' long and 14 ½' wide had been found to be settling for that last 4-5 years since the surrounding water table was artificially lowered by means of drainage.

This latter was found necessary due to cracking that had occurred in the concrete outer kettle and the water penetration into the kettle was causing problems with steaming and heat loss into the surrounding sub soils. Persistent settlement of the kettle was also affecting the footing foundations of the large A-frame building over surrounding the kettles and the acid washing stations at the site. In view of the ongoing settlement and the difficulties of tipping of the kettle it was elected to underpin it at the same time maintain the kettle in full operation so as not to cause the added expenses of commissioning and decommissioning and operating a galvanizing kettle.

Repair:

Geotechnical and structural engineering consultations deduced that adding some support to the edges of the tank in a predetermined locations would not unduly risk the structure of the tank but would increase the availability of the support which had been reduced by lowering the water table. It was deduced that this then would stabilize the tank for the long term and the plan was instituted using Helical PULLDOWN™ Micropiles and AB Chance underpinning brackets to be attached to the perimeter foundations of the tank.

Six 4' square holes were hand excavated, 3 on either side of the long axis of the tank approximately equidistant into the bases of these excavations was a pair of helical PULLDOWN™ Micropiles employing an 8-10-12 triple helix lead



with a 6" grout column placed through a 6" diameter 10' long PVC sleeve which was pulled down with the lead and the piles subsequently placed through the PVC sleeve. The pile was placed under the direction and auspices of Levelton & Associates geotechnical engineers and the torques for placement of the piling and the grout takes for each of the piles were given to the engineer of record for certification of the piling and adequacy of capacity.

Once this was completed the underpinning bracket assemblies were attached to the perimeter foundation of the tank in the usual way and they were loaded and locked off at 20,000 lbs overall load. The tank itself was carefully measured and monitored for the ensuing 1 ½ years to 2 and it has been no appreciable movement in the tank that is measurable since the institution of the underpinning. Once the underpinning repair was completed the holes were simply backfilled to grade and the grade slab surrounding the tank was repoured in its entirety making that good.

