



Water tank construction in adverse site conditions

Building a new water tank in a difficult location may not be all that uncommon, but building a water tank on a coal mining site is unique and offered some interesting geotechnical and engineering challenges.

That was the situation faced by Greatario Engineered Storage Systems and Dillon Consulting Limited when designing and erecting a new water storage tank to meet the need for added fire protection capability for the Town of Stellerton, Nova Scotia.

The tank, measuring 37.5 m diameter by 4.7 m high, has a capacity of 4,800 cu.m and was supplied by Engineered Storage Products Company; it will be used mainly for fire flows. The structure is situated on a former strip mine site comprised of coal mine tailings. While the site was advantageous from an initial cost standpoint, it presented a challenge when it came to the design for the foundations. Not only was the foundation on tailings an issue, the site elevation, required for head pressure, was exposed to the extreme cold winter winds and there was a need to ensure freezing did not become a problem.

Pioneer Coal commenced the site preparation work in May 2005 and this was completed in three months. Two metres of tailings, acting as a surcharge to consolidate the underlying fills, were left in place for nine months and settlement readings were taken on a monthly basis. Since the cost of piles was prohibitive, the foundation would need to be closely monitored for settlement to ensure uni-

form settlement took place. The answer to being able to correct any differential settlement problem was to use the addition of grout tubes under the foundation. This provided a system by which grout could be added under pressure to adjust the tank for any differ-

ential settlement. Survey bolts were placed on the foundation to accurately record the position of the tank.

The tank was constructed with a ring-wall foundation, but equipped with a steel floor, which has the ability to flex 2" to 3". However, a special concrete raft slab was designed around the interior perimeter underneath the steel floor to prevent any flexing where the tank wall meets the steel floor.

Since the main use for the tank is for fire flows, it meant there would be minimal water movement. In order to avoid freezing, the tank is completely insulated, including the interior of the Temcor aluminum geodesic dome. In addition, the tank is equipped with a Tide Flex mixing system to mitigate any ice build-up and prevent water stagnation.

"The tank has been in service for six months and is performing well" according to the Town of Stellerton Engineer, Tony Addis. "The project was designed, tendered, constructed and commissioned on time and within budget. The fact that the tank components were manufactured in advance simplified the on-site construction process."

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