

**Repair & Strengthening****Reference Details:**

Owner City of New York,
Department of Environmental
Protection, New York, NY, USA
+++ **Contractor** Nicholson
Construction Co., Cuddy, a
Soletanche Bache Co. PA, USA
+++ **Engineer** JV Gannett
Fleming, Harrisburg, PA, USA /
Hazen Sawyer PC, New York
City, NY, USA +++ **Consulting
Engineers** Freeze & Nichols /
EGS Engineering / Donald
Bruce, USA

DSI Unit DSI USA, BU
Geotechnics, Toughkenamon,
PA, USA

DSI Scope Supply of 83
DYWIDAG Double Corrosion
Protected Multistrand Anchors
with 39 to 58 strands between
50 m to 70 m long; rental of
stressing systems and
accessories

**50-70 m long DYWIDAG Multistrand Anchors tie down Gilboa Dam****Stabilization of the Gilboa Dam, Schoharie, NY, USA**

The Gilboa Dam, constructed in 1926, is located about 50 km southwest of Albany. It is one of several dams in the Hudson Valley that provide New York City with water. As operator of these dams, the NYC Department of Environmental Protection has a long standing commitment to upgrading its dams to modern design criteria. An examination of the dams situated west of the Hudson River revealed that all of them, except for the Gilboa Dam, complied with the current standard of safety and the state standards for existing dams.

As a result, the NYC Department of Environmental Protection decided to carry out initial immediate measures to stabilize the Gilboa Dam at short notice.

Within the scope of these stabilization measures, a debris barrier was erected first, providing clean surfaces for the construction work carried out and relieving the dam of the weight of debris.

Subsequently, the capacity of the outlet tunnel for the Schoharie Reservoir was increased by about 200,000 m³ to a total of nearly 2.2 million m³ per day as a result of the widening of the tunnel inlet. To drain additional volumes of water without allowing the dam to be overtopped, four siphons were put in place. As a result, overtoppings are practically unnecessary, thereby significantly decreasing the erosion of the stone dam wall.

Only after the siphon work was completed did the actual reinforcement measures needed to stabilize the dam wall by means of multistrand anchors begin. The dam's owner placed very specific requirements on the double corrosion protected multistrand anchors to be used. For example, the strands in the anchors had to be fully degreased and special water-tight sheathings were specified. DSI met these requirements by providing its DYWIDAG Double Corrosion Protected Multistrand Anchors manufactured in its Toughkenamon facility.

After the contract was awarded, DSI USA supplied four 15 to 20 strand test anchors that were between 12.5 m and 33.5 m long. After the anchors were successfully tested on the construction site and approved, an additional 79 39 to 58 strand DYWIDAG Double Corrosion Protected Multistrand Anchors were manufactured and supplied. 47 anchors were installed vertically across the entire length and height of the dam wall within the scope of the stabilization project. An additional 32 anchors were installed into the individual layers of the dam wall with inclinations ranging from 45 to 48 degrees on the downstream side. The 35 cm diameter multistrand anchors had to be correctly inserted, grouted and post-tensioned in the borehole, presenting a great challenge for the construction site personnel.

DSI USA supplied a total of 83 Double Corrosion Protected Anchors with 39 to 58 strands which were between 50 m and 70 m long. The challenging prestressing operations were successfully carried out using a 15,000 kN stressing jack that was specially developed by DSI.

Due to the extremely tight schedule, the Gilboa Dam stabilization challenged the organizational and operational abilities of all parties involved. Specific job planning and intensive cooperation between those involved led to the successful completion of this demanding geotechnical construction site.

