

**■ Marine Structures****Reference Details:**

**Owner** City of Baltimore, Department of public works, MD, USA +++ **Engineer** Gannet Flemming, Baltimore, MD, USA +++ **Contractor** Brayman Construction Company, Saxonburg, PA, USA

**DSI Units** DSI USA, North East Division, Fairfield, NJ, USA

**DSI Services** Supply of 57 DYWIDAG Double Corrosion Protected Strand Anchors, lengths up to 44 m; Technical assistance



## DYWIDAG Double Corrosion Protected Strand Anchors secure Loch Raven Dam

### Loch Raven Dam Retrofit, Baltimore, MD, USA

Loch Raven Dam, located about 10 miles (16 km) outside of Baltimore, was constructed in 1912 to a height of 188 feet (57m). 10 years later the dam was raised approximately 60 feet to its current elevation of 288 feet above sea level and a 288-foot (88m) wide spillway was added.

The City of Baltimore began to rehabilitate its Loch Raven Dam in the fall of 2003, installing post-tensioned DYWIDAG-Rock Anchors through the gravity dam and into the underlying bedrock. Silt and Debris that have accumulated at the base in front of the dam will be removed and roller compacted concrete (RCC) set to stabilize the toe and the face of the dam.

Because the dam's 23 billion gallon (87 million m<sup>3</sup>) reservoir holds water for more than 1 million residents in the Baltimore area, the three-year rehabilitation will take place while the dam's spillway

continues in operation.

This major structural transformation at Loch Raven Dam became necessary due to state and federal regulations that require the dam to withstand future significant storm events.

The \$29-million project will be divided into two phases, with half of the dam rehabilitated in each phase. In this way water can run over the structure during construction if a large storm occurs. Construction is expected to be completed by the fall of 2005.

DSI supplied 57 DYWIDAG Double Corrosion Protected Strand Anchors, ranging from 23 to 58 strands per anchor. The longest anchors are up to 145'. Each anchor consisted of strand, greased and sheathed in the free length then, fully encapsulated with corrugated HDPE the entire length. Fabrication of the anchors took place in DSI's Bolingbrook, IL. facility.

Stressing was performed with a 1,400 ton center hole ram supplied by DSI. The specifications required application of an alignment load to each strand of the tendon prior to test loading the entire anchor. DSI's staff in Fairfield, N.J. designed and built a simple seating chair utilizing a plunger, which extended the normal seating abilities of a monostrand jack. This way, alignment loads can be applied to individual strands more accurately than drift seating the wedge.

Technical assistance during the beginning of stressing operations was also provided by DSI.