



## **One Dam, Two Spillways: Comparative Armoring Approaches at Crosley Lake Dam**

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The Indiana Department of Natural Resources (IDNR) undertook the Crosley Lake Dam rehabilitation to upgrade to current dam safety standards for safely conveying the design storm. Initial designs proposed articulated concrete block (ACB) armoring for both the principal and emergency spillways on this significant hazard classified dam; however, escalating construction costs led IDNR to consider a more economical alternative. The final design incorporated two spillways engaging at the same discharge elevation: one armored with ACBs and the other with an impermeable engineered synthetic turf revetment (ESTR). This configuration provided a unique opportunity to directly compare two systems designed for similar hydraulic performance within the same project site and under identical flow conditions. Both spillways were designed for velocities approaching 27 ft/s. The ACB spillway design followed a Factor of Safety based method, evaluating shear stress, velocity, uplift resistance, and product specific parameters. The impermeable ESTR design also employed a Factor of Safety analysis, but with velocity as the governing design parameter. The ESTR's impervious geomembrane distinguishes it from the open-jointed ACB system by eliminating subgrade infiltration and potential internal erosion. Both systems were keyed at the toe, and the ESTR was used in combination with concrete A-Jacks® for energy dissipation before discharging into the natural waterway. The presentation will examine the dual-spillway design process, focusing on hydraulic performance, constructability, and cost. Bid records indicate that incorporating the ESTR spillway provided measurable cost savings while maintaining hydraulic resilience. Lessons learned from subgrade preparation, traffic-bearing requirements, and installation logistics will be presented, offering insight into how two armoring systems achieved the same regulatory goal by different means—one through material impermeability, and the other through a permeable, interlocked concrete armor that stabilizes the surface by countering uplift forces and protecting the underlying geotextile and subgrade.