CASE STUDY
LEAK SEAL

Shell Lake Dam Foundation Leak Repair

The City of Sand Springs, Oklahoma, identified a foundation leak in Bay 10 of the Shell Lake Dam, necessitating repairs to ensure the dam's structural integrity. The city's Public Works Department contracted with a qualified firm to address the issue, and Keithline Engineering Group was retained to provide engineering design and oversight for the project.

Initial Assessment

An inspection by Keithline Engineering revealed an active boil, or leak, in the concrete footing of Bay 10. The leak, measuring approximately 5" by 7", exhibited increasing water movement and was deemed a priority for repair. The engineering team determined that the water was likely traveling between the concrete footing and the porous sandstone underlayment before exiting through the hole in the concrete. This leak was transporting a small amount of material under low pressure. It was also determined the owner had made prior unsuccessful attempts to seal the area with bentonite.

Proposed Solution

After consulting with Alchatek, Keithline Engineering specified a leak-sealing solution centered around the injection of Spetec PUR H100. Alchatek recommended this hydrophobic polyurethane grout for its ability to expand and create a dense, impermeable seal upon contact with water. The repair strategy involved drilling through the concrete and injecting the grout into the concrete/sandstone interface to create a grout curtain. This approach aimed to stop the leak at its source and prevent further water migration.

Procedures

1. Preparation:
    - Hammer-drilled 1/2-inch injection ports were installed into the concrete foundation at designated locations.
    - Saturated oakum rope or hydraulic cement was applied to temporarily plug the hole during the injection.
2. Injection Process:
    - Spetec PUR H100 was injected through installed packers using positive displacement pumps.
    - Injection proceeded until the grout formed a complete polyurethane barrier around the boil and stopped water infiltration.
    - The process included monitoring grout expansion and ensuring proper confinement within the concrete/sandstone interface.
3. Post-Sealing:
    - Following the injection, all nipples were removed, and drilled holes were patched with hydraulic cement to a minimum depth of 12 inches.

Results and Conclusion

The injection grouting successfully sealed the foundation leak in Bay 10 of Shell Lake Dam. Spetec PUR H100 formed a durable polyurethane barrier, effectively stopping water flow and preventing further erosion of material from beneath the dam footing. The swift and effective repair was achieved in a matter of hours. Restek, Inc. precisely executed the specifications. The result is a solution that preserves the long-term structural integrity of the Shell Lake Dam, showcasing the value of proactive maintenance in preserving critical water resources.