

TechBriefs

Savannah River National Laboratory

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At a glance

- > New means for volumetric assessment
- > Reduction in inspection time and cost
- > Increased safety and reliability
- > Non-invasive test method
- > Detects and locates detrimental flaws
- > U.S. patent 6,311,565

Contact Information

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SoundAnchor™ Nondestructive Testing Method

The SoundAnchor™ method uses ultrasonic energy for volumetric assessment of subterranean tower anchor rods without unearthing the individual rods or destabilizing the structure.

Flaws in anchor rods can degrade their performance and cause catastrophic collapse of towers. Such flaws can be difficult to detect and normally occur below ground. Only a small portion of the anchor rod is exposed with the remaining portion buried in the earth. The far end of the anchor rod is often encased in a reinforced concrete anchor block.

Background

To maintain the proper level of performance, anchor rods should be examined periodically to ensure the integrity of the rod is not compromised due to corrosion or stress-related flaws. The present method is to unearth each rod for visual inspection. This complex and costly task requires ground surveys, digging permits, deep excavation, shoring, confined spaces, partial destruction of the concrete anchor block, potential damage to the rod, temporary weakening of the tower structure, refilling, and compacting.

Also, visual inspection can detect obvious flaws but cannot detect small-scale corrosion or cracking. Any part of the rod encased in the concrete anchor block cannot be inspected.

How it works

The Sound Anchor™ method is simple and quick, potentially reducing costs to as little as one tenth of the cost of current practice. The portable equipment can be operated by one person, eliminating the need for a construction crew.



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Technology transfer

The Savannah River National Laboratory (SRNL) is the U.S. Department of Energy's (DOE) applied research and development laboratory at the Savannah River Site (SRS).

With its wide spectrum and expertise in areas such as homeland security, hydrogen technology, materials, sensors, and environmental science, SRNL's cutting edge technology delivers high dividends to its customers.

The management and operating contractor for SRS and SRNL is Savannah River Nuclear Solutions, LLC. SRNS is responsible for transferring its technologies to the private sector so that these technologies may have the collateral benefit of enhancing U.S. economic competitiveness.

The surface is prepared by removing a minimal amount of material, usually within a 3/8" diameter area, from the exposed portion of the anchor rod to enable adequate transducer contact for transmission of the ultrasonic energy. Additional material removal is not required for subsequent inspections.

The ultrasonic energy travels down the rod axis and is reflected back from its underground end. By analyzing the received signals and patterns, degradation can be identified anywhere within the volume or along the length of the rod.

To prevent surface corrosion following testing, a commercially available galvanized zinc spray coating is applied. The coating is easily brushed away for subsequent testing and is simply reapplied after the next testing interval.

The SoundAnchor™ method produces a permanent record of the examination and can be used to trend rod condition over time or monitor the effectiveness of cathodic protection systems used to minimize damage to the buried rod by acting as a sacrificial anode. Such trending is useful for predictive maintenance programs, allowing ample time for replacement well ahead of the risk of failure.

Successfully demonstrated

The SoundAnchor™ method and equipment have been demonstrated on full-scale mockups and used to inspect 27 rods on nine towers at the Savannah River Site and 300 meter tower at the Department of Energy's Y-12 Facility in Oak Ridge, Tennessee.

Commercial applications

Commercial applications for this system include the inspection of radio, television, communication and cellular towers of the most prevalent guyed variety.

Partnering opportunities

The U. S. Patent and Trademark Office has issued Patent No. 6,311,565 on the SoundAnchor™ Nondestructive Testing Method.

SRNS invites interested companies with proven capabilities in this area of expertise to develop commercial applications for this process under a cooperative research and development agreement or licensing agreement. Interested companies will be requested to submit a business plan setting forth company qualifications, strategies, activities, and milestones for commercializing this invention. Qualifications should include past experience in the commercial uses of similar processes, reasonable schedule for commercial process launch, an established customer base, and evidence of sufficient financial resources for process development and launch.

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