

New Generation of Sacrificial Anodes for Reinforced Concrete

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Keywords: Concrete, Cathodic Protection, Sacrificial Anode, New Generation

Corrosion of steel in reinforced concrete remains a major concern in the durability and maintenance of civil infrastructure. While traditional galvanic anodes offer a simple and maintenance-free solution, they are often limited by low current output and a relatively short service life. To address these limitations, a patented multi-stage sacrificial galvanic anode was developed—introducing a new generation of hybrid anodes capable of delivering both immediate and long-term corrosion protection without the need for external power sources or complex control systems.

This innovative system features an internal booster mechanism that can be activated either upon installation or at a later stage, depending on the specific needs of the structure. This activation phase delivers a strong polarization current, helping to displace aggressive ions and re-establish a protective alkaline environment around the steel reinforcement. As the high-output phase diminishes, the system naturally transitions into a long-term protection mode, supplying a stable, self-regulating galvanic current. The specially engineered backfill enables this multi-phase functionality by preserving ionic conductivity and preventing passivation, ensuring reliable performance over an extended service life.

Beyond this core design, ongoing long-term field and laboratory trials have introduced a transformative advancement: staged or delayed activation of anodes using integrated power boosters. These trials—now ongoing for over 30 months—demonstrated that anode activation can be programmed to occur in phases. Some anodes were activated immediately, others after a two-month delay, and a final group only recently—more than two years after installation. This ability to adjust the current over time allows the system to give the right level of protection as the structure changes, which helps the anode last much longer. This new generation of sacrificial anodes sets a precedent for high-performance, low-maintenance corrosion control in reinforced concrete applications.

Graphical Abstract

