Corrosion Services
supporting corrosion control efforts across the equipment lifecycle

The DoD defines corrosion as “the deterioration of a material or its properties due to a reaction of that material with its chemical environment.”


Corrosion destroys equipment, decreasing readiness and reliability while causing safety hazards and increasing maintenance and other ownership costs. The Department of Defense (DoD) estimates corrosion costs the department over $23 billion annually. In addition, the Army attributes more than 50 aircraft accidents and 12 fatalities to corrosion since 1985.* Concurrent Technologies Corporation (CTC) is working to support corrosion control efforts across the equipment lifecycle — from design and materials selection through operation and maintenance.

Since 2000, CTC has been performing a wide variety of corrosion services for government and commercial clients. We have focused laboratories at CTC’s facilities in Johnstown, PA and Huntsville, AL.

Whether you need to estimate component service life, compare materials performance, or determine the condition of your materials, CTC can find the solution that’s right for you.

We can collect and analyze data to characterize corrosion problems. We can then test, evaluate, demonstrate, and validate the most appropriate and cost-effective prevention and control solutions – saving you time and money.

**CTC corrosion test equipment and capabilities include:**

- Programmable Auto-Technology 40 cu.ft. cyclic corrosion chamber, capable of more than 50 different pre-programmed corrosion tests, including those specified in ASTM B117, SAE J2334 and GM9540P
- Two (2) Q-Panel Q-Sun accelerated weathering xenon arc weatherometers that simulate the entire spectrum of sunlight with capabilities of varying the irradiance, temperature, humidity, water spray, and exposure duration.

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**Material investigations**

- Collect and analyze data to characterize corrosion problems
- Determine the current material's condition
- Identify alternative materials and determine expected performance
- Estimate component service life in given environment using alternative materials

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**Technology evaluations and demonstrations**

- Conduct laboratory corrosion testing on materials, coatings, etc. using state-of-the-art equipment
- Conduct outdoor exposure testing
- Monitor corrosion and degradation of assets using advanced sensor systems
- Draft guidelines and Joint Test Protocols (JTPs) for corrosion evaluations
- Employ Non-Destructive Testing (NDT) techniques and technologies to monitor corrosion and degradation

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**Outreach and awareness**

- Disseminate demonstration findings
- Identify need areas for corrosion prevention
- Train personnel to implement corrosion mitigation strategies

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**Better Corrosion Detection**

Demonstrated the ability of 4 NDT technologies to detect, at varying degrees, corrosion found on aircraft airframes. We also fabricated and applied Corrosion Under Paint (CUP) Test Standards, utilizing a patented process, to facilitate NDT. These standards could be applied to any military asset that suffers from corrosion and is or could be inspected using NDT techniques. With NDT, costly, unneeded repairs and repainting can be avoided, without compromising safety.

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**Optimized Corrosion Prevention Process**

Validated an alternative oven heating process for removing cosmoline, a rust preventive for assets in storage. Our findings resulted in a new process for parts with simple geometries such as pinions and gears. This process offers increased shop throughput and reduced hazardous material usage and waste. Corpus Christi Army Depot should realize a 55-80% reduction in labor hours compared to traditional removal methods including hand scraping.

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**Improved Aircraft Corrosion Inspection Practice**

Developed an enhanced tool kit to maintain H-60 aircraft. With the kit, maintenance specialists can remove forward bridge tie rods and eccentric bushings, which are particularly susceptible to maintenance-induced damage during corrosion inspection. Such damage in critical areas require aircraft to be removed from service for more maintenance, which decreases aircraft availability, generates waste in the form of scrapped parts, and increases ownership costs.
CTC has conducted corrosion testing that has added value for many clients, including:

- Office of the Secretary of Defense (OSD) Office of Corrosion Policy and Oversight
- U.S. Army Tank-automotive and Armament Command (TACOM)
- U.S. Army Aviation and Missile Command (AMCOM)
- U.S. Army Natick Soldier Center
- U.S. Army Research Development and Engineering Command (RDECOM)
- U.S. Army Corps of Engineers
- U.S. Naval Air Systems Command (NAVAIR)
- U.S. Naval Surface Warfare Center (NSWC)
- U.S. Air Force Research Laboratory (AFRL)
- Federal Aviation Administration (FAA)
- Lockheed Martin
- Honeywell Engines, Services & Systems
- Honeywell Turbo Technologies
- Trane Residential Systems

For more than 20 years, CTC has been identifying, demonstrating, evaluating, and fielding technologies in support of DoD readiness, sustainability, and the Warfighter. Over the years, our corrosion mitigation support has involved identifying, demonstrating, and transitioning a wide range of environmentally friendly technologies that can be used to measure, control, and prevent corrosion. Examples:

- Designed and installed a prototype corrosion inhibitor application facility
- Demonstrated non-line-of-sight and other alternatives to replace electroplated hard chromium
- Demonstrated alternative manufacturing processes for applying coatings on base metals
- Developed and tested a corrosion sensor for detecting the onset of corrosion underneath coatings on tactical vehicles
- Helped installations overcome challenges to implementing a new Chemical Agent Resistant Coating (CARC).

Superhydrophobic Coatings

Investigated extremely water-repellant coatings to determine if their rapid water runoff properties can reduce corrosion as well as provide waterproofing, anti-icing, anti-fouling, and drag-reduction benefits. We identified 12 potential coatings and 43 potential coating additives for military applications. We are fostering technology transition of these coatings, such as for deicing applications to replace chemical deicers.

Inhibiting Saltwater Corrosion in Helicopters

Developed a gasket kit that provides corrosion prevention to nose bay avionics while allowing electrical conductivity. This kit significantly inhibits saltwater corrosion while reducing ownership costs of the H-60, maritime multimission helicopters. To put savings into perspective, addressing nose bay corrosion damage requires approximately 350-400 labor hours and 9-10 weeks of down time per MH-60R helicopter for a cost of $1.8 million annually.

Non-Toxic Coatings for Electrical Connectors

Evaluated 3 alternative coatings for electrical connectors in ground systems such as Stryker vehicles. We developed and applied a test protocol to conduct laboratory and outdoor exposure testing addressing Army needs—beyond military specification. Our real-world assessment showed how electrical connectors with these coatings will perform on filed Army assets, particularly when mated to connectors with a legacy system of cadmium/hexavalent chromium.
Concurrent Technologies Corporation (CTC) is an independent, nonprofit, applied scientific research and development professional services organization. Together with our affiliates, Enterprise Ventures Corporation (EVC) and CTC Foundation, we leverage research, development, test and evaluation work to provide transformative, full lifecycle solutions. To best serve our clients’ needs, we offer the complete ability to fully design, develop, test, prototype, and build. We support our clients’ core mission objectives with customized solutions and strive to exceed expectations.

CTC’s and EVC’s quality management systems are certified to the ISO 9001:2015 (Quality) and 14001:2015 (Environmental) standards, and to AS9100D:2016 (Quality-Aerospace-Related Products).

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