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Project News

Army Protects Hangars, Towers, and Tanks at Fort Campbell

By Gretchen Jacobson

It is home of the renowned 101st Airborne Air Assault Division "Screaming Eagles" and one of the largest military installations in the world. Located between Clarksville, Tennessee, and Hopkinsville, Kentucky, Fort Campbell spans 105,000 acres. It supports the U.S. Army's third-largest military population and the seventh largest in the Department of Defense (DoD).

Campbell Army Airfield—the Army's largest—covers 2,500 acres and also serves as a secondary landing site for National Aeronautics & Space Administration flight operations. The fort, which opened in 1942, is named in honor of Brigadier General William Bowen Campbell, who served as Colonel of the First Tennessee Volunteers and distinguished himself as the state's last Whig governor from 1851-1853.

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The 101st Airborne Screaming Eagles are also members of the world's only air assault division. Their tactics, logistics, and training are all based on the soldiers' ability to form a coordinated combat team, with helicopters as their primary means of transportation.

Today Fort Campbell's primary mission is to advance the combat readiness of the Screaming Eagles and the non-divisional units posted there through training, mobilizing, and deploying. To provide top-level combat training, the fort maintains 48 live fire ranges, three high-impact areas, five drop zones, 200 artillery firing points, 51 maneuver areas, a special operations training center, and two airfields.

Corrosion Concerns at the Fort

Good maintenance at all Fort Campbell facilities is crucial to keep training operations running smoothly and mission-ready. But the fort's steel structures can be vulnerable to the elements. Those that pose special maintenance challenges include steel aircraft hangars, flight control towers, and deluge tanks used for fire suppression. When exposed to sunlight, changing humidity levels, and hot and cold cycles typical of the region, these facilities become conducive to weathering and atmospheric corrosion.

When these structures are coated, they become susceptible to peeling, spalling, and other deterioration caused by weathering and underlying corrosion. In decades past, lead-based paint was used as a primer. When such paint peels, it creates a lead dust hazardous to workers, especially those who labor in enclosed spaces such as hangars. The failed paint also contaminates soil and requires extensive environmental cleanup.

In addition to the paint deterioration, there have been serious incidences of metallic tank corrosion. If the deluge tanks develop leaks, helicopter flight training must be cancelled for safety reasons. This occurred in 2002, when leaks on a deluge fire suppression system impacted all flight operations, including proficiency training and potential deployment.

New Protective Coating Solutions

After these events the DoD Corrosion Policy and Oversight Office, under the auspices of the Office of the Secretary of Defense (OSD), launched a project to seek and analyze new protective coatings being developed and produced by the coatings industry. The Army Corps of Engineers' Engineer Research and Development Center (ERDC) Construction Engineering Research Laboratory (CERL) began evaluating and testing surface-tolerant coatings for their potential use in protecting steel structures from corrosion at the fort.

These coatings are designed for application over a variety of surface conditions, including bare steel or existing deteriorated coatings. Examples include moisture-cure polyurethanes, which cure by absorbing moisture from the air, and air-dry fluoropolymer coatings, used to overcoat existing coatings on steel. Both provide corrosion protection.

"The novel aspect of surface-tolerant coatings is that they can go over existing coatings with minimal surface preparation required," said L. David Stephenson, Associate Project Lead at ERDC-CERL. "You can simply scrape off loose paint and power wash—there is no need to blast off old paint."

ERDC-CERL has also evaluated the new "self-healing" coatings, considered a breakthrough in decreasing the repair and maintenance typically required to maintain coating quality. Self-healing coatings are made by incorporating microcapsules that contain film-formers and corrosion inhibitors into commercially available paint primers at the time of coating application.

"When a self-healing coating is scratched, the microcapsules break and release their inhibitors and film formers, which protect the underlying steel and repair coating damage," Stephenson explained.

The project at Fort Campbell has involved implementing the coatings for two hangars, a flight control tower, and two deluge tanks. Workers are applying moisture-cured polyurethanes to the hangars and deluge tanks, fluoropolymer coatings to the flight tower, and self-healing coatings to some of the critical portions of the deluge tanks, such as the lower rings. According to Stephenson, the work is about 90 percent complete.

Ongoing evaluations show that the use of surface-tolerant and self-healing coatings will extend the life of the Fort Campbell structures by 30 years. The advantages include restoration of the structures to their optimum conditions, reduced maintenance, fewer downtimes, and increased safety.

"This OSD project has the potential for far-reaching impact across the Army and the Tri-Services as well," said Stephenson. "Specifications and standards will be developed, including updates, along with a final report describing the details of the project. In this way, surface-tolerant and self-healing coatings technologies can be implemented Army-wide, and expanded to the Navy and Air Force."

The final OSD report, "Surface Tolerant Coatings for Aircraft Hangars, Flight Control Tower, and Deluge Tanks at Ft. Campbell," is scheduled for release in late March 2006.



Applying surface-tolerant coatings to structures like this Campbell Army Airfield flight tower requires very little substrate preparation.