

CORROSION PREVENTION PLAN

Tips for maintaining aircraft in a harsh environment

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THE SEA is calm, its gentle waves brushing the sugar-sand shoreline. In the distance, the rhythm of a steel drum echoes a familiar tune—"every little thing is going to be alright." But appearances can be deceiving. Beneath the tranquil waters, a silent killer waits. Patient and methodical, it poses a constant threat to everything it touches.

Unlike a James Patterson thriller novel, one cannot see this killer until it is too late. Corrosion is indiscriminate in its attack—and none are exempt. For aircraft operators, constant diligence and proactive defense are essential.

FLYING spoke with three companies leading the charge in the ongoing battle against corrosion: Tropic Ocean Airways, the world's largest amphibious commercial airline; Banyan Air Service, a full-service FBO maintaining aircraft in South Florida; and Pinnacle Aircraft Engines in Silverhill, Alabama, which knows all too well the effects that Gulf saltwater and tropical air have on powerplants.

Types of Corrosion

Tropic Ocean Airways CEO Rob Cervolò knows how to fly in tense situations.

As a former U.S. Naval aviator, and Top Gun graduate, Cervolò piloted the legendary F-14D Tomcat in support of Operation Iraqi Freedom, earning him two Air Medals. He built his business on the foundation laid during his time spent in operations, safety, training, maintenance, legal, and administration.

Asked how he kept his birds so clean and free of corrosion, he said it was simple.

"We maintain our fleet like the Navy does," Cervolò said. "That and a whole

lot of CorrosionX."

His mission is working. Tropic Ocean Airways holds an Argus Gold rating, signifying the highest operational safety standard in the industry.

Michael Jackson joined Tropic Ocean Airways in April as director of maintenance, responsible for the company's Cessna Grand Caravan fleet. These high-wing workhorses, a mix of wheeled and amphibious (seaplanes), ferry people to the tropical paradises of Nassau, the Bimini Islands, and Exuma.

When asked about what a nightmare it must be to operate an aircraft in those types of climates, he offered a surprising answer.

"Some of these airplanes have been flying in the water every day for 10 years," Jackson said. "But I don't see a lot of corrosion internally on the airplane... We do see a little surface corrosion on the outer skin, particularly around the cowl latches. This is due to the dissimilar metals between aluminum and stainless-steel latches and hardware. You will also see it on fastener heads, as well as within the nut plates."

JD Kuti, the president of Pinnacle Aircraft Engines, said that corrosion due to operating so close to the Gulf can certainly be a challenge.

"I have corrosion conversations weekly," he said with a laugh.

Reciprocating horizontally opposed aircraft engines are chunks of steel and aluminum vibrating in unison. They get hot, cool off, and ingest who knows what from the environment. What could go wrong?

Most of the corrosion Kuti said he sees is on steel components, which get surface pitting, especially on the camshaft. It doesn't take much to get started,



Above: It doesn't take much for corrosion to start as surface pitting on steel parts. Right: Tropic Ocean Airways is experienced in combating water and moisture.

LEFT: COURTESY OF PINNACLE AIRCRAFT ENGINES; RIGHT: TROPIC OCEAN AIRWAYS



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so he recommends not delaying in addressing it for too long. Once you get rust and surface corrosion, it creates a pit inside.

Combatting Corrosion

Any warrior knows you can engage the enemy without a weapon. In this case, we don't use guns or knives but grease and oil.

When asked about the go-to protective coating, Jackson did not hesitate: LanoCote. Tropic Ocean mechanics install their screws with it, applying it around the thread like an anti-seize compound. Each screw is treated with the same care and attention as engine components because they're stainless-steel screws being installed into steel nut plates set in an aluminum skin.

Additionally, everything is coated with either a white lithium grease, LPS Corrosion Inhibitor, CorrosionX, or the company's secret weapon, ACF-50. According to Lear Chemical Research, ACF-50 Anti-Corrosion Formula is a cutting-edge lubricant and corrosion inhibitor specifically engineered for the aerospace industry to treat metallic surfaces. This black magic concoction was

not available when I practiced maintenance years ago.

Banyan Air Service takes a more traditional approach to corrosion prevention.

Eric Smith, MRO technical sales manager, and Danny Santiago, avionics director, were kind enough to discuss how they keep owners' aircraft in pristine condition in South Florida. Alodine and anodizing are Banyan's baseline for care. What is the difference?

The AC43.13-1B teaches us that Alodine is a chemical process, whereas anodizing is an electric process. Banyan can apply Alodine in-house but sub-contracts anodizing to an outside vendor. Any new metal work, such as sheet metal skin repair, is coated with Alodine, primed, and painted.

Banyan, an authorized Pilatus PC-12 and PC-24 service center, sees these platforms roll through with a coating known as Mastinox. It must be effective because it coats the entire belly with it. According to the manufacturer, PPG, Mastinox is a nonchromate, corrosion-inhibiting jointing compound. Banyan will reapply as necessary on parts of a Pilatus, including reassembling components.

The effects of saltwater make a significant difference in corrosion prevention.

At his engine shop in Alabama, Kuti swears by Amsoil Engine Fogging Oil (FOG). He encourages his clients to keep a can with them—you never know when you might need to sit your aircraft down for a while. He also advises when the aircraft is due for an annual inspection, so it can be taken to the mechanic. As soon as the inspection is complete, Kuti says the shop runs the engine up to temps, pulls a compression test, and then FOGs the engine.

Maintenance Inspections

Tropic Ocean Airways boasts an adaptive maintenance program—and it learns something new every day.

One key element is going above and beyond. Every postflight ritual includes a thorough washdown with a salt emulsifier, an engine wash and rinse, and the airframe panels are inspected every 25, 50, and 200 hours, respectively. While it's true that Cessna has a maintenance program with recommended guidelines, most Caravans operate on the ground when taxiing and in the air.

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