

Flight Cable Terminal Corrosion

One Little Corrosion Pit Won't Hurt Anything Will It?

By Dave McFarlane

"I removed the safety wire and looked at the cable terminal and all I saw under magnification was a couple of really small pits."

"Surely that can't be enough to hurt anything."

"It would take a lot of years to take away any real metal at this rate."

"I can just watch it, can't I?"

Don't be fooled. Stainless steel is its own animal when it comes to corrosion and you can't compare it to steel rust or aluminum corrosion. 300 series stainless steel is very corrosion resistant most of the time as oxygen from the air combines with chromium in the steel to form a thin corrosion proof coating that seals the surface. When it does corrode, the evil is often in its innocent surface appearance that is hiding a serious subsurface attack on the grain boundary structure of the metal. The smallest little pit on the surface can progress through the interior of the part and leave the bond of the metal granular structure so weak that with the slightest little force, the terminal will just fall apart.

This type of corrosion is called intergranular corrosion. A similar boundary layer corrosion attack can occur when cyclic high stress loads are applied to stainless steel. Both types of corrosion are accelerated by water, mid-strength sulfuric acid, chlorides (salt), or other electrolytes. These types of corrosion attacks to the inner structure of a cable terminal can happen when the stainless is still pretty and shiny on the outside. It is hard to detect by examining the surface.

When inspecting flight cable terminals for corrosion, use magnification to look for very small pits. They are the entrance for moisture/electrolytes to enter the interior of the terminal where the real damage can happen. If even one small pit is found the cable assembly must be taken out of service. Often a few small dents can be found on the surface of the terminals where metal has galled to the swaging dies during production or contaminants were present when the cable terminal was swaged. These defects are harmless and can be ignored. The way to identify the difference between corrosion pits and dents is that dents or scratch will have a smooth defined bottom surface whereas the corrosion pit will have a rough non defined bottom.