

Aircraft Corrosion

Corrosion control can be one of the aircraft industry's most effective weapons in the battle against airplane structural failures. Left undetected and/or untreated, corrosion can decrease the load-carrying capacity of primary structures or act as nucleation sites for fatigue or stress corrosion cracks. Thus corrosion can undermine the integrity of an aircraft and make it unsafe to fly. It is a problem that is not always acknowledged or easily solved and constant vigilance is necessary.

Why Do Aircraft Corrode?

Airframe problems associated with corrosion have plagued the aviation industry for decades. The metals that compose aircraft components are subject to several different forms of corrosion, a process accelerated by many factors including prolonged exposure to corrosive agents like industrial fluids, salts, and moisture, or more internal problems such as condensate formation and leaking lavatories and galleys. Some forms of corrosion such as stress corrosion cracking and corrosion fatigue can lead to catastrophic failure if not detected and treated.

Compounding the problems associated with corrosion is the age factor. Of the total number of commercial aircraft in operation, approximately one-fourth are over 20 years old. As a plane ages, it is repeatedly exposed to environments that accelerate the effects of corrosion. Even though some corrosion-control measures have been taken in an effort to enhance the safety of the aging planes now in operation, there is still much to be learned and much to be done.

How Can We Keep Aircraft Safe?

Implementing corrosion-prevention measures in the design and selection of materials used to repair and upgrade planes, in conjunction with effective maintenance procedures, is the best insurance against corrosion-related failures. When corrosion is discovered, it should be treated immediately. Expanding the amount of time between finding evidence of corrosion and repairing it increases the opportunities for problems to occur.

Corrosion control works best when qualified personnel who are trained in corrosion control are used to detect, evaluate, and repair corrosion-related damage. Inspectors must have access to the most current inspection and repair technology and receive training on how to use that technology effectively. By applying up-to-date corrosion control technology, the useful life of aircraft can be prolonged and overall maintenance costs reduced.

Conclusion

Controlling corrosion in today's air fleet must be an ongoing, dynamic process that starts with design and manufacturing and continues with maintenance and monitoring. It is a problem that is not going to go away. An investment in corrosion control is an investment in public safety, and it protects the industry's bottom line. Although significant progress has been made, we must continue to devote time and resources to corrosion control to increase the safety level of all those who fly.