THE INVISIBLE DANGER
ELECTROSTATIC DISCHARGE

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Aviation Safety Blog
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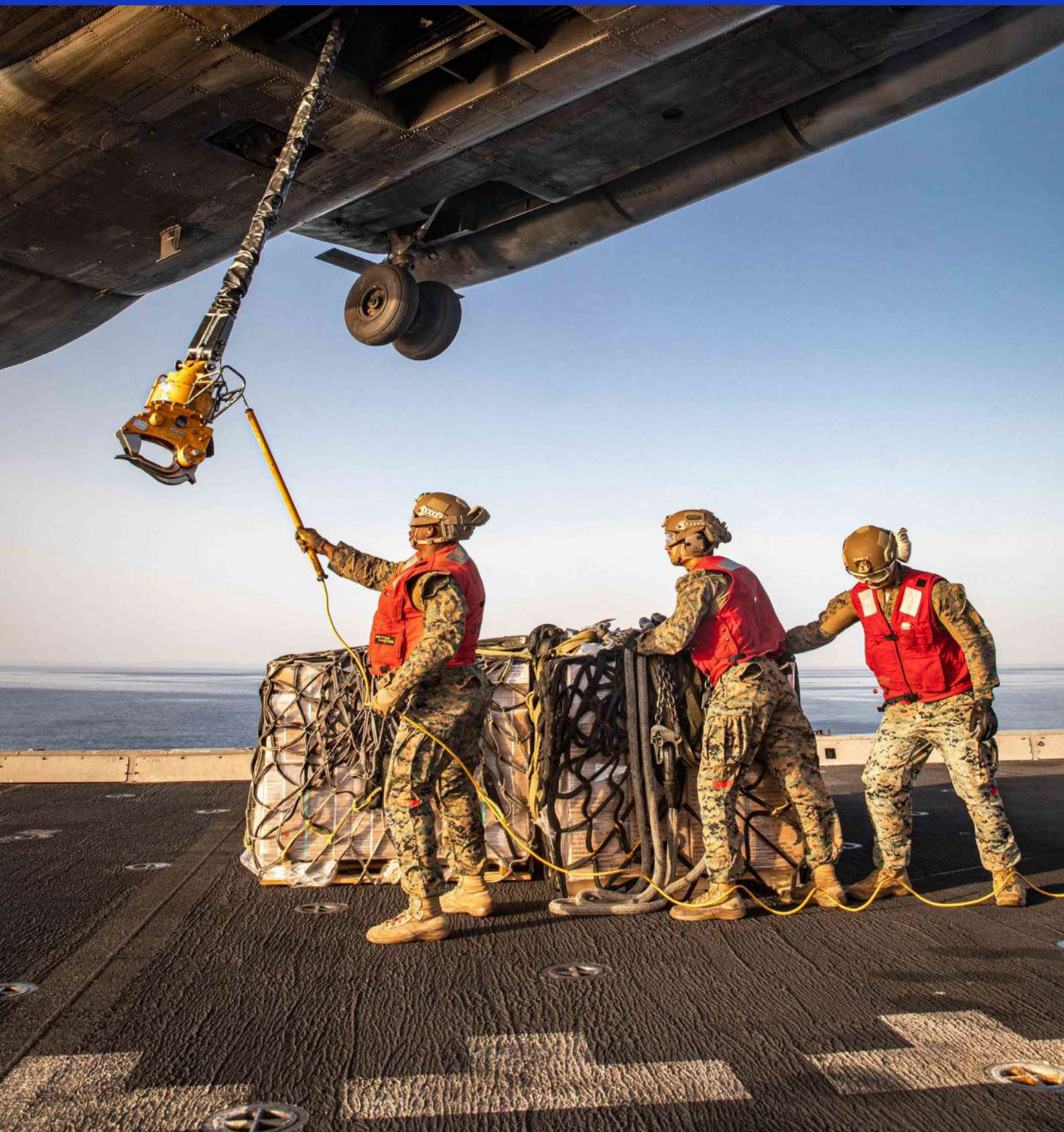


ELECTROSTATIC DISCHARGE

Aircraft technicians' jobs are inherently dangerous. From flight line and flight deck operations, to performing maintenance in the hangar, to towing and loading aircraft with ordnance, maintenance technicians must constantly pay attention and keep their heads on a swivel. There are a lot of distractions, such as moving equipment, vehicles and even the sudden rise in audible decibel. Still, one danger we cannot see or forget is static discharge from aircraft and equipment.

Static electricity is the accumulation of electric charge on an insulated body. Static electricity charges are generated by the separation of like and unlike bodies. Sources of static energy include friction, induced charged and triboelectric charge. Induced charge occurs when an object is immersed in an electric field. Triboelectric charge occurs when certain materials become electrically charged after contacting one another and are then separated (such as through rubbing).

Potential hazards considered during each scenario are:

a. Static electrical shock to personnel
b. Ordnance actuation or malfunction
c. Uncommanded ordnance or stores release
d. Damage or upset to electronic subsystems

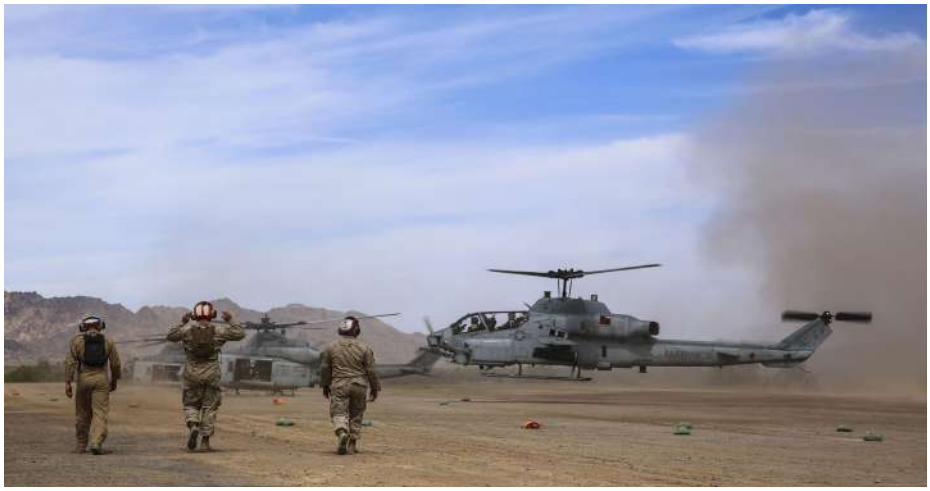
Something as simple as high winds kicking up dust and blowing that dust into the aircraft can create a triboelectric static hazard. Electric storms can travel over an electrostatic field, resulting in large, induced charges on parked aircraft. Friction hazards can come from the clothing worn to simply fueling an aircraft. These examples can result in an electrostatic build-up that can cause severe to lethal injuries if touched, or initiate fires and explosions.

So how do we protect ourselves from these hazards? By ensuring aircraft, equipment, and in some cases, personnel are properly grounded, wearing appropriate clothing and not operating in unfavorable weather conditions.

While performing maintenance or fueling and loading aircraft, ensure the aircraft is properly grounded. A static ground point offers the positive charge of the static electricity a path of least resistance that will protect personnel working on the aircraft. The aircraft must be properly grounded to prevent personnel injury due to shock, uncommanded ordnance actuation, or fires during fueling from arching sparks resulting from electrostatic discharge.

Grounding points need to be checked every two years to ensure they function properly. The grounding point is then stenciled with the date it was tested and the amount of resistance (Ohms) recorded, and that information is also logged. It is highly recommended that unit post the grounding point test results from the Naval Facilities Engineering Systems Command (NAVFAC) or equivalent somewhere in the hangar, preferably near a common access point. This way, if the markings are not legible or missing completely, personnel from the unit can see if the ground has been tested without wasting time by going to the safety representative, quality assurance, or tracking down the answer from NAVFAC. Refer to your type-model-series instructions on proper aircraft grounding and the MIL-HDBK-274A for proper grounding point

maintenance and inspections as well as the proper use and inspections of grounding equipment, such as grounding reels, straps and rods.



Ordnance Marines move toward an AH-1Z Viper as it lands during operations that are a part of Assault Support Training 1 in support of the semiannual Weapons and Tactics Instructor Course 2-17, at the Chocolate Mountain Aerial Gunnery Range, California. (U.S. Marine Corps photo by Cpl. Harley Robinson)

Static electrical charges are generated on clothing by friction, especially by removing garments. When fueling or during ordnance-handling evolutions, maintainers should refrain from removing layers of clothing, particularly in dry climates such as Yuma, Arizona. The buildup of static electrical charges can be minimized using cotton clothing. Prepare yourself for the day. If you know you will be outside for an extended period on a hot, dry day, wear appropriate clothing to prevent the need to shed layers. If you must remove layers, step away from the fueling or ordnance-handling site and ground yourself before re-approaching the area.

Though flight lines can be equipped with lightning protection if a storm is rolling in and time permits, hold off on performing maintenance outside. Per NAVAIR00-80T-103 (NATOPS Conventional Weapons handling Procedures Manual Ashore), ALL ordnance-handling evolutions shall cease when lightning is observed within 10 miles and while in thunderstorms generating an electrical strength of +2,000 volts per meter.

Injury or damage to equipment can happen suddenly when dealing with electrostatic discharge. Though we cannot see the danger, it is present, and we need to ensure we are taking the necessary steps and precautions to prevent electrostatic mishaps. It can sneak up on you when you least expect it.

Cover: U.S. Marine Corps Lance Cpl. Marcellus Collinsmack (left), attached to the 22nd Marine Expeditionary Unit, connects a grounding strap to a CH-53E Super Stallion helicopter, assigned to Marine Medium Tiltrotor Squadron (VMM) 263 (Rein.), during cargo lift training on the flight deck of the San Antonio-class amphibious transport dock ship USS Arlington (LPD 24), May 25, 2022. (U.S. Navy photo by Mass Communication Specialist 1st Class John Bellino)