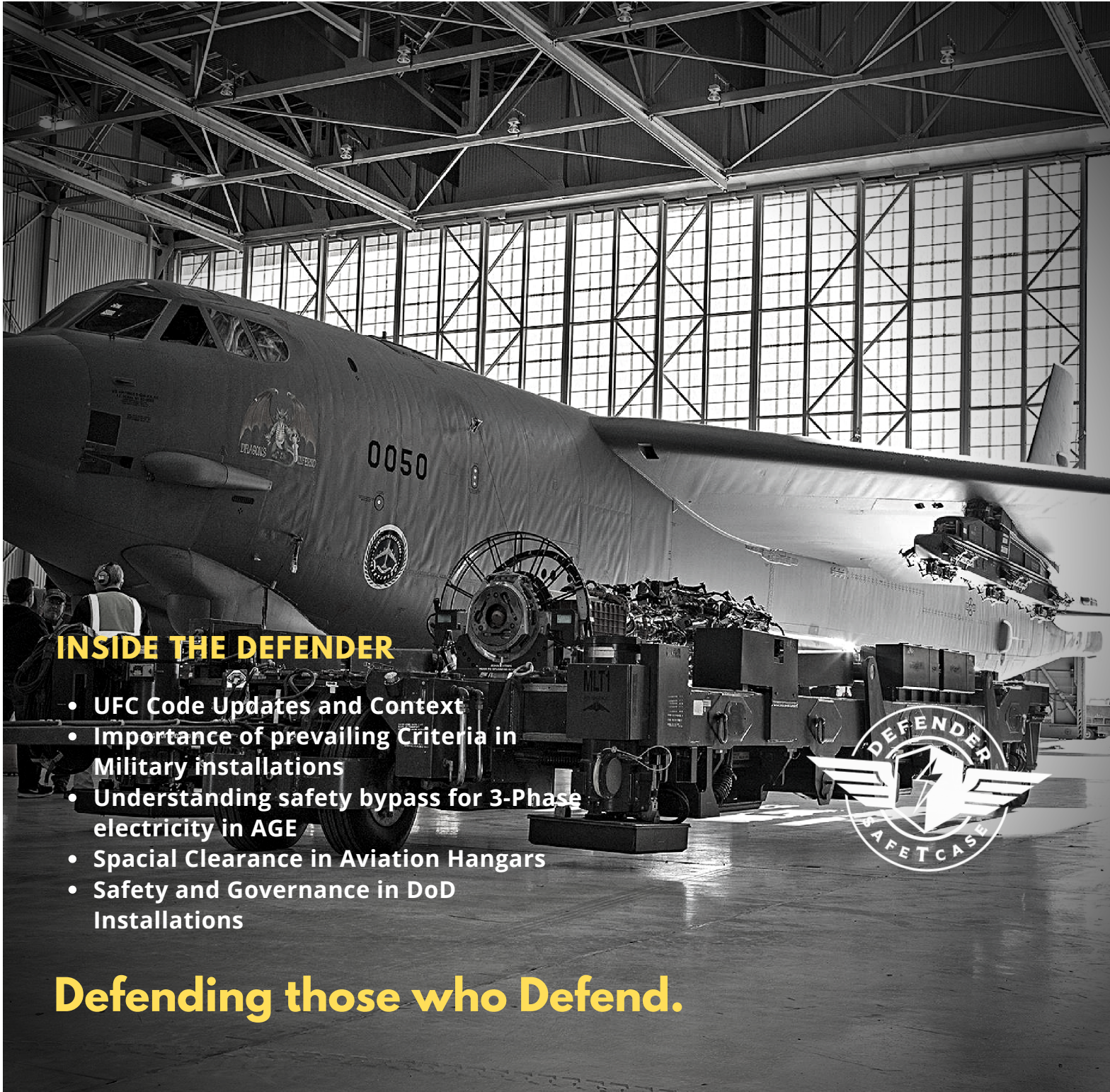


THE DEFENDER

NEWSLETTER PROVIDING PERTINENT CODE UPDATES, CONTEXT, AND
INSIGHTS FOR DOD AVIATION FACILITIES



INSIDE THE DEFENDER

- UFC Code Updates and Context
- Importance of prevailing Criteria in Military installations
- Understanding safety bypass for 3-Phase electricity in AGE
- Spacial Clearance in Aviation Hangars
- Safety and Governance in DoD Installations

Defending those who Defend.

UNIFIED CRITERIA

IMPORTANCE OF CONSISTENCY FOR MISSION READINESS

DEFINING THE WHY

UFC documents provide planning, design, construction, sustainment, restoration, and modernization criteria, and apply to the Military Departments, the Defense Agencies, and the Department of Defense (DoD) Field Activities. In 2002, the DoD issued a directive (4270.5) for Military Construction, along with the Under Secretary of Defense's Acquisition Defense & Logistics memorandum. UFC's are issued electronically and are effective upon issuance to ensure the most efficient distribution and alignment throughout the DoD facilities.

Why are they important?

The UFC sets a standard to ensure that all DoD facilities maintain mission readiness, while establishing consistency across various agencies, departments, and locations (as much as possible). The UFC is dynamic; criteria are updated regularly when new information, technology or methods are available. This impacts current operations through the modernization of current practices, equipment, or construction, as well as the new designs and planning.

UFC are issued specifically for DoD facilities and operations.



CRUCIAL CONSISTENCY

Aviation in Defense

Our Country's Military Defense is heavily reliant on our ability to deliver payload offense and provide airborne defense through our aviation systems. This has, and is projected to remain, a strategic pillar in our defense portfolio.

Considering the multiple branches of our military that maintain aviation crafts, it is important to provide a consistent standard for facilities that may receive aircraft from another armed or un-armed military installation or branch, in either regular operations, joint exercises, or in active theater. The UFC provides this consistency across all DoD facilities.

UFC 4-211-01

Issued 13 April 2017 - Change (Updated 2 May 2020)

Description: This UFC provides criteria for planning and design of Aircraft Maintenance Hangars for the aircraft of the combined DoD United States Armed Forces.

This UFC creates a single source for common DoD Aircraft Maintenance Hangar criteria and an accurate reference to individual Service-specific documents. It facilitates updates and revisions and promotes agreement and uniformity of design and construction between the Services.

ELECTRICAL SAFETY

Section 3-7.13 Aerospace Ground Equipment (AGE) Electrical Power Provisions

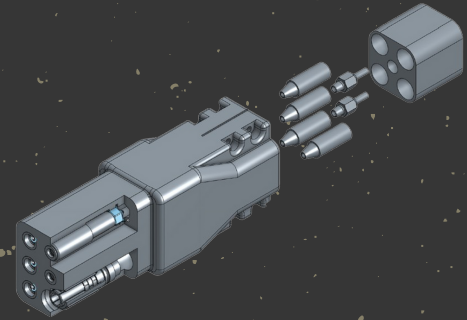
Permanently installed electrical power receptacles supporting portable AGE equipment provided with electrical control interlocking shall utilize the electrical interlocking circuit. Hangar mounted AGE equipment receptacles shall not provide three phase power until the interlocking pins have been correctly mated, utilizing a control interlock circuit. - Updated 2020

It has been shown that specific AGE plugs, such as 480VAC 60 Hz Hydraulic Mule 200-300 amp equipment, can be inserted into AGE supporting receptacles 180 degrees out of rotation causing a personnel safety and equipment risk. Electrical circuit control interlocking is required to reduce this risk.

Take Away: the process of providing 3-phase electrical power to crafts and systems exposes users and equipment to safety risks that could have negative impacts on life, safety, and mission readiness. By utilizing available measures to reduce the risk of electrical shock, arc flash electrocution, or improper connection and disconnection; users will reduce the chances of accidents with negative impacts on mission readiness, operations, and life safety.

A recent informal survey of DoD Facilities (Q4 2020) found that many active Aircraft Maintenance Facilities are not utilizing systems with interlocking pins and safety bypasses.

Noncompliance with the UFC standard exposes users of the maintenance facility to an unnecessary risk of Arc Flash hazards and creates a mission readiness risk should a Arc Flash event occur in a maintenance facility.



PLUG PROBLEM

In the May 2020 Update - the UFC state that AGE must have the interlocking safety pins (commonly referred to as E&F circuits) to prevent Arc Flash hazards. The ability to supply power through a UFC compliant plug with interlocking safety pins is a key component in all electrical disconnect (AGE) systems. Most, if not all, power systems utilize plugs that feature interlocking safety pins: 400Hz, 270 DC.



PLUG ENTRY

Current connections to many 3-phase power systems for AGE require users to open an electrical cabinet where they are directly exposed to high voltage, frequency, and power; to make a connection at a 90 angle underneath the electrical contact. The design rationale was to limit exposure to electricity and prevent plug unseating.

This dynamic creates an attachment that does not release in the event the cord is pulled away unintentionally and can provide damage to the electrical cabinet and the connected equipment. This creates a safety risk and operational hazard for the facility.

SPACIAL CLEARANCE IN AVIATION HANGARS

THE REAL ESTATE PROBLEM

Section 4-2.1.1 Minimum Aircraft Maintenance Bay Clearances

Table 2-1 establishes the minimum clearances for aviation hangars; however, this serves as a minimal standard only. Users must coordinate with the maintenance unit staff to determine if additional space is required to maintain the aircraft beyond the clearances indicated in Table 2-1: Minimum Aircraft Maintenance Bay Clearances. Specific airframe or service requirements may increase these minimum clearances. Provide additional clearances where required by an approved document such as the design aircraft's Facility Requirements Document (FRD) or a Service-specific standard design, defined Service hangar type, or other approved criteria. For example, the FRD may require additional clearance aft of the aircraft to remove the engine.

Table 2-1 (Unified Facilities Criteria Section 4-2.1.1)

SEE CLEARANCES A THROUGH H ON FIGURES 2-1 THROUGH 2-4		AIR FORCE AND ARMY		NAVY - NOTE 10				NOTES:	
		WINGSPAN < 100' 30.48M	WINGSPAN > 100' 30.48M	HANGAR TYPE I	HANGAR TYPE II	HANGAR TYPE III	HANGAR TYPE IV		
FIGURE 2-1 AND 2-2	A	AIRCRAFT TO NEAREST FIXED OBSTRUCTION ALONG BACK WALL	10'-0" 3.05M	15'-0" 4.57M	10'-0" 3.05M	10'-0" 3.05M	20'-0" 6.01M	15'-0" 4.57M	1, 2, 3
	B	AIRCRAFT TO INSIDE FACE OF HANGAR DOOR	10'-0" 3.05M	10'-0" 3.05M	7'-6" 2.29M	10'-0" 3.05M	15'-0" 4.57M	15'-0" 4.57M	1, 2, 4
	C	AIRCRAFT TO NEAREST FIXED OBSTRUCTION ALONG SIDE WALL	10'-0" 3.05M	15'-0" 4.57M	7'-6" 2.29M	10'-0" 3.05M	20'-0" 6.01M	15'-0" 4.57M	1, 2, 3
	D	AIRCRAFT TO ADJACENT AIRCRAFT	10'-0" 3.05M	15'-0" 4.57M	7'-6" 2.29M	10'-0" 3.05M	20'-0" 6.01M	15'-0" 4.57M	1, 2, 5
	E	AIRCRAFT TO HANGAR DOOR JAMB	10'-0" 3.05M	10'-0" 3.05M	6'-0" 1.83M	8'-6" 2.59M	18'-6" 5.64M	13'-6" 4.12M	1, 2, 6
FIGURES 2-3 AND 2-4	F	AIRCRAFT TO NEAREST FIXED OR MOBILE OVERHEAD OBSTRUCTION	10'-0" 3.05M	10'-0" 3.05M	5'-0" 1.52M	5'-0" 1.52M	5'-0" 1.52M	5'-0" 1.52M	1, 7, 8
	G	AIRCRAFT TO UNDERSIDE OF DOOR HEAD	7'-0" 2.13M	7'-0" 2.13M	5'-0" 1.52M	5'-0" 1.52M	5'-0" 1.52M	5'-0" 1.52M	1, 7, 8
	H	HOOK HEIGHT (SADDLE OF HOOK)	Army: Per Std Design Air Force: Per FRD		Refer to Table 7-1				1, 7, 9

Takeaway

The available area required for the safe operation and maintenance of active DoD maintenance bays becomes increasingly scarce and important as the necessary equipment required to service and maintain aircraft increases in quantity, size, and sophistication. The ability to preserve or minimize the available space on aviation hangar facility is seen as advantageous for multiple reasons: 1) safety considerations for clearances in operating and maneuvering equipment, personnel, and tools 2) prevention of unintended contact with aircraft that can result in damage 3) increased flexibility to accommodate different aircraft in an emergency scenario 4) resulting in overall improved responsiveness and mission readiness.

Complying with these clearance requirements and achieving the desired areas can be achieved in multiple ways, including the relocation of equipment, and selection of equipment that does not require floor mounting in the maintenance bay – such as a wall mounted electrical disconnect box fed from a source that is remotely located.



SAFETY IN DOD FACILITIES

WHO'S IN CHARGE OF SAFETY?

The element of safety governance in on DoD facilities can be confusing based on the facility, the users, and the operations of the facility. This can produce an opaque dynamic where the safety and operational standards may be enforced differently amongst different DoD locations. Additionally, virtually all standards are dynamic. They change to adopt to new trends, technology, or information.

Understanding the different governing entities and how they are utilized is important when navigating throughout the various facilities and branches of Government installations. Safety standards are often referenced in construction and service contracts and operational policies. Many times, a safety standard may reference another standard, in part or in its entirety.

As an example, the construction environment of a DoD facility may have different safety governance than a facility that is in full operation. The United States Corps of Engineers (USACE) will often oversee the construction of DoD facilities and have EM-385 requirements for safety. Other times, a different organization may oversee construction operations: Department of Public Works (US Army property) Contracting Squadron (US Air Force property). These contracting entities will often abide by OSHA safety standards during construction.

Once construction is complete the prevailing safety standard will often times shift away from EM-385 to OSHA standards which may reference various other practices listed in the NFPA and the NEC.

Takeaway

Although various agencies, organizations, and governing bodies may have jurisdictional authority on a DoD facility, they are generally in agreement about the basic standards for safety protocols and often refer back to one another for specific safety sections. Considering that most agencies and organizations maintain a dynamic standard; underscores the importance of the UFC as a presiding publication and standard.

Engineering Manual 385-1-1 (EM-385) – Safety and Health Requirements Manual that is published and updated by the US Corps of Engineers (USACE). It is primarily intended for DoD construction applications that would prevail over new construction or the renovation and repair of existing structures/facilities where construction is required.

Occupational Safety & Health Administration (OSHA) - With the Occupational Safety and Health Act of 1970, Congress created the Occupational Safety and Health Administration (OSHA) to ensure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.

National Fire Protection Association (NFPA)– issues over 300 consensus codes and standards intended to minimize the possibility and effects of fire and other risks. The NFPA 70 addresses the life and safety elements of electricity and is referred to as the National Electrical Code (NEC).

National Electrical Code (NEC) – is adopted in all 50 states as the Benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards. The NEC is updated regularly to incorporate new information and technology. The NEC establishes a code, or standard, on the electrical installations, construction, and practices.



ELECTRICAL SAFETY

UNDERSTANDING SAFETY STANDARDS & MANAGEMENT IN DOD INSTALLATIONS

WHO'S IN CHARGE OF SAFETY?

Specifically relevant to how electrical power and the associated hazards of supplying electrical power in a DoD Facility, the following prevail:

OSHA 29 CFR 1910 – requires employees to wear appropriate face and eye protection (PPE) when accessing environments where an electrical explosion risk exists. This section of the OSHA regulation puts the responsibility of providing the PPE for employees on the employer and not the employee.

NFPA 70E – addresses standard electrical safety in the workplace. Article 130.5 requires an Arc Flash assessment with labels and boundaries to provide a clear and consistent communication regarding the risks of Arc Flash. This is important so those who are in the presence of Arc Flash risk can take appropriate measures in PPE and operations to protect themselves and others.

Institute for Electrical and Electronics Engineers (IEEE) 1584 – provides an industry standard for procedures and methods of calculating Arc Flash Incidents

The Unified Facilities Criteria (UFC) remains the prevailing standard for design and operations of active DoD facilities. The UFC references various safety and operational standards and is updated regularly.

The Defender SafeTCASE allows DoD installations to meet the UFC mandates and comply with the various safety standards that reference electrical safety, and Arc Flash hazards with a solution that is simple, reliable, and comprehensive.

AN ENGINEERED SOLUTION

Takeaway

The Defender SafeTCASE was engineered and built as a response to safety and maintenance challenges that are common in a DoD aviation facility. After responding to service calls to repair electrical cabinets that were torn away from the wall due to cord tension, a solution was engineered to provide Safety, Reliability and Accessibility. To learn more about the Defender SafeTCASE and how it can help your facility meet UFC standards as well as optimize the facility layout, while protecting the life and safety of your operators - visit the SafeTCASE website at www.defendercc.com/SafeTCASE

