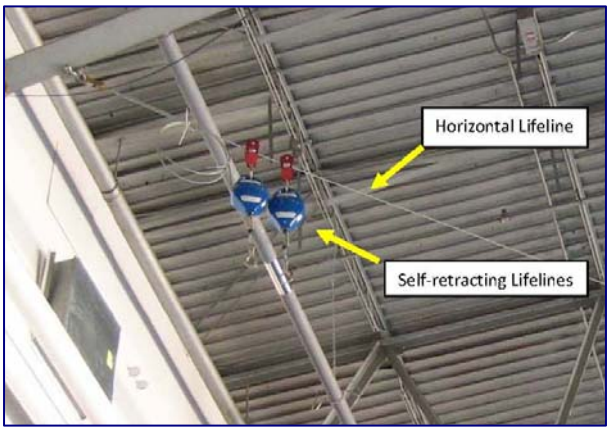
FALL ABATEMENT RESOLUTIONS FOR FIXED AND ROTARY WING AIRCRAFT

The Naval Facilities Engineering Command (NAVFAC) Mishap Prevention and Hazard Abatement (MPHA) Program provides funding for investigations into a wide variety of fall hazards. The MPHA Program Team participates in the procurement, development, and implementation of Occupational Safety & Health Administration (OSHA) compliant fall hazard resolutions at Navy shore sites in the U.S. and abroad. A major area of interest for the MPHA Team centers on fall hazard abatement resolutions during maintenance on fixed and rotary wing aircraft.

Navy enlisted and civilian personnel are required to maintain various external structural and mechanical components or internal electrical/electronic equipment while working at heights over four feet. Navy fixed wing aircraft squadrons (including C-2, C-9, C-20, C-37, C-40, C-130, P-3/EP-3, E-2C, EA-6B, F/A-18, and F-105) and rotary wing squadrons (with H-53 and H-60 variants) have reported potential fall hazard risks related to personnel performing maintenance while working at height.

F/A-18 Superhornet

When maintenance is performed inside hangars, using a combination of Horizontal Lifelines (HLLs) and Self-Retracting Lifelines (SRLs) is a viable fall hazard abatement option. The HLL is basically a long wire cable attached at each end to "engineered" anchor points and supported along its length by transfasteners, which allow the SRL to slide along the cable while maintaining constant contact with it.



Maintenance personnel wear full body harnesses, which are attached to individual SRLs or appropriate an overhead anchor point via carabineers [clips] or lanyards which are in turn connected to the HLL. The full-body harnesses are connected to the SRL to reduce fall related injuries by directing the force of a fall toward the body's pelvic area and maintaining the individual in an upright position. While these devices will not protect against an actual fall, in proper combination, the fall distance is limited

such that the person cannot fall to the ground. The restriction for using these devices is that the aircraft must be "parked" at specific locations within the hangars so that the HLLs/SRLs can be accessed.

The risk of falls from height is also a problem when the HLL/SRL combination is not feasible or when maintenance must be performed anywhere outside the hangars where aircraft can be parked (tarmac or flight line). For these cases, alternate fall abatement resolutions must be provided. The NAVFAC MPHA Team has introduced a number of OSHA compliant solutions that successfully mitigate or eliminate fall abatement risks for maintenance personnel working on both fixed and rotary wing aircraft.

MPHA Program funding allowed Naval Air Station (NAS) Key West, FL, to purchase four *Mobile Horizontal Rail Systems* (see photos below) that resolved fall hazards for personnel working on aircraft at height. The systems feature mobile stands with portable overhead anchor points and SRLs that allow workers to move around safely on a horizontal line without needing to unhook. The systems allow straight applications and curves as well as providing vertical movement when combined with a retractable type fall arrester or a flexible anchorage line.

Mobile Horizontal Rail Systems featuring portable overhead anchor points with Self-Retracting Lifelines are being used successfully at NAS Key West, FL to abate fall hazards during aircraft maintenance.

Full-body fall protection harnesses certified by the American National Standards Institute were included with each *Mobile Horizontal Rail System*. The systems were delivered and assembled by the manufacturer who also provided Navy maintenance personnel with training on the proper use of the harnesses and maintenance of the mobile stands.

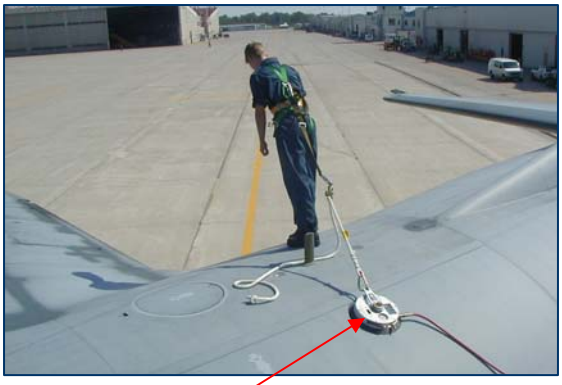
The *Mobile Horizontal Rail Systems*, one large, one medium, and two small (the difference being the overall height of the stand and maximum working height), have been in at use at NAS Key West since November

2008. They have proven very successful in protecting personnel from potential falls while working around FA-18 and F-105 fighters and H-60 helicopters.

The MPHA Program provided Naval Air Facility (NAF) Washington, D.C with two large and one medium *Mobile Access Platforms* (portable overhead anchor points with an elevated working platform and multiple SRLs). The platforms permit maintenance access for the larger fixed wing aircraft (i.e. C-2, C-20, C-37, C-40, C-130, P-3/EP-3, E-2C, and EA-6B). As at NAS Key West, the package included full-body harnesses, and the project included manufacturer assembly of the platforms and training on the proper use and care of the equipment and harnesses.

Mobile Access Platforms permit maintenance access for the larger fixed wing aircraft at NAF Washington, D.C.

NAF Washington was also provided with three 2-pad vacuum based fall abatement systems with storage carts to accomplish safe maintenance on their C-130s and C-37s (an additional system is scheduled for delivery in FY 2009). The system can be used anywhere an aircraft is parked. It consists of a vacuum pad, vacuum module, vacuum hose, full harness, safety lanyard and work positioning rope. The vacuum pads are compressed against the aircraft



Vacuum pads are compressed against the aircraft skin by atmospheric pressure and held in place due to the negative pressure beneath the pads.

skin by atmospheric pressure and held in place due to the negative pressure beneath the pads. It's a compact, lightweight fall protection solution, which can be positioned to provide an anchor point for fall protection equipment on the aircraft wings, fuselage and stabilizer areas. Alternatively, the vacuum anchors can be connected in series with a horizontal lifeline to cover the entire wing span. The system is powered by compressed air or nitrogen. Because it is completely non-electrical, the requirements for long electrical cables, mobile generators and a battery charging system are not required. In the event of a failure of the air/nitrogen supply an audible warning alarm sounds, and the pads maintain a safe working vacuum for a minimum of 20 minutes.

Vacuum anchor systems with storage carts were also provided to NAS Joint Reserve Base (JRB) New Orleans, LA; NAS Brunswick, ME; NAS JRB Pt. Mugu, CA; NAS Jacksonville, FL; and NAS JRB Willow Grove, PA. The new vacuum systems are currently being utilized by site personnel with excellent results. Several helicopter fall abatement systems are on the delivery schedule for FY 2009.

Storage cart accompanies the vacuum anchor system.

In order to expedite funding, procurement, delivery, and training for aircraft fall abatement resolutions, NAVFAC has established three "Global" fall abatement items in the Hazard Abatement (HA) database; one for the wrap-around helicopter stands; another for the vacuum based anchor systems; and a final entry for the mobile platforms/horizontal rail systems. As sites report fall issues associated with aircraft maintenance, funding is identified and applied to the appropriate HA item, and the resolution is provided to the sites.

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