



USN & USMC CAD/PAD Mishaps and Engineering Investigations

Presented to:

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Presented by:

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Abstract



A summary of United States Navy and Marine Corps mishaps, Engineering Investigations, and Technical Manual changes for FY23 and FY24 by the CAD/PAD Fleet Maintenance Support Team. Status and key findings will be provided.

Mishap Totals

	Successful		Fatal	
	#	%	#	%
Aircraft				
F/A-18	91	82.7	19	17.3
AV-8	34	94.4	2	5.6
T-45	30	88.2	4	11.8
T-38	2	100.0	0	0.0
T-6	2	50.0	2	50.0
F-5	3	100.0	0	0.0
F-35	6	100.0	0	0.0
Totals	168	87.0	25	13.0

Data shows number of ejections from FY99 thru 1st QTR FY24

Fatal ejections caused by CAD/PAD - 0



FY23/24 Mishaps

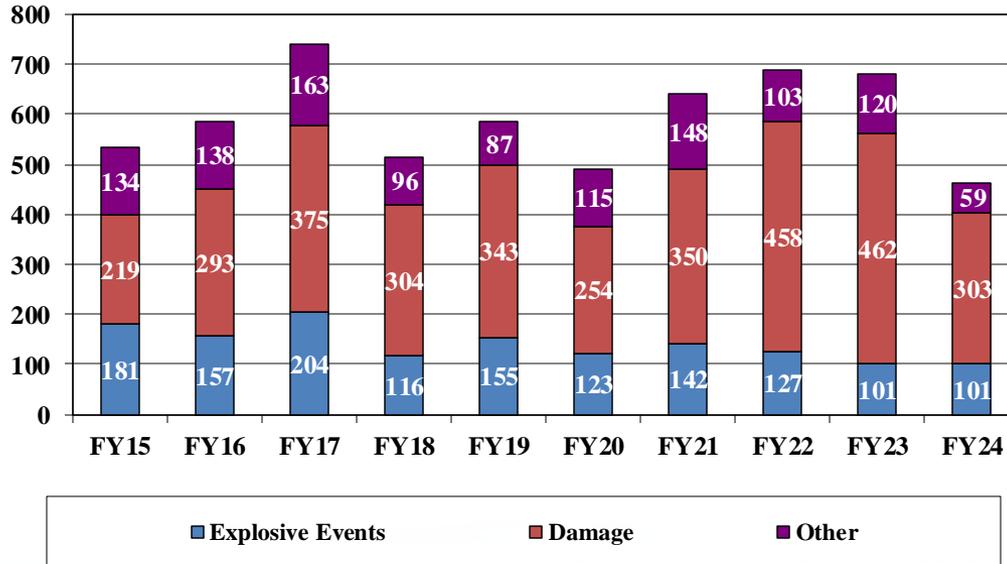
1. December 15, 2023: F-35B Crashed during landing at JRB Fort Worth TX. CAD/PAD MIST supported, good ejection.
2. January 17, 2023: T-6B Crashed in flight Baldwin County AL. CAD/PAD MIST supported, two good ejections.
3. June 1, 2023: F-5 Crashed during flight, off the coast of Key West FL. Good ejection, seat not recovered.
4. August 24, 2023: F/A-18D crashed during landing, MCAS Miramar CA. CAD/PAD MIST supported, one fatality.
5. August 27, 2023: MV-22 Crashed during training flight, Darwin Australia. CAD/PAD MIST supported, three fatalities.
6. September 17, 2023: F-35B Crashed during landing, Joint Base Charleston SC. CAD/PAD MIST Supported, good ejection.
7. May 28, 2024: F-35B crashed upon takeoff Albuquerque New Mexico. CAD/PAD MIST supported, good ejection.



FY23/24 Saves

1. July 24, 2024: MV-22 Gas Generators saved aircraft and aircrew.
2. May 8, 2024: AH-1Z Fire ext. cartridge saved aircraft and aircrew.
3. April 9, 2024: EA-18G Fire ext. cartridge saved aircraft.
4. February 2, 2024: MH-60R Fire ext. cartridge saved aircraft and aircrew.
5. February 1, 2024: EA-18G Fire ext. cartridge saved aircraft.
6. January 31, 2024: F/A-18F Fire ext. cartridge saved aircraft.
7. December 13, 2023: C-2 Fire ext. cartridge saved aircraft and aircrew.
8. November 9, 2023: E-2D Fire ext. cartridge saved aircraft and aircrew.
9. October 25, 2023: E-2D Fire ext. cartridge saved aircraft and aircrew.
10. October 23, 2023: MH-60S Fire ext. cartridge saved aircraft and aircrew.
11. August 24, 2023: F/A-18F Fire ext. cartridge saved aircraft.

Fleet Deficiencies



Major Fleet-Reported Categories

Maintenance Related Damage

- Bent SMDC line or tip
- Damage/Damaged human error
- Broken mounting studs
- Broken electrical leads
- Dropped
- Failed booster tip inspection

Explosive Events

- Avoidable inadvertent actuations
- System worked as designed

Other

- Corrosion
- TFOA (Things Falling Off Aircraft)
- Failed to fire
- Unable to read technical data

- FY23 and FY24 EI TOTALS
 - Currently Open: 23
 - Opened in FY23/24: 12
 - Closed in FY23/24: 10
- FY23 Deficiency Total
 - 683
- FY24 Deficiency Total
 - 463
- FY23 and FY24 Totals:
 - 1146



MD65 Failed to Fire EI



Prior to flight, release and control checks were completed and passed. Stores were loaded and CADs were installed. In-flight attempt was made to fire JAIM 260 missile loaded on station 7. Station 7 indicated that the JAIM-260 was hung. Post-flight analysis and determined that missile reported consent to store separation, aircraft energized relays for station 7 CADs, firing pulse to CADs was initiated to LAU-116 where pulse to CADs was commanded, store remained on station (Hung). On completion of the live fire exercise, weapon & sensors integration team performed a full release and control check to ensure no faults and/or issues were present. Then they performed an additional full ground test to ensure none of the testing degraded the system. Ground testing came back with go status display and no “SMS Degrade” or flagged MSP codes for the SMS were noted. The LAU-116 was turned in to FRC west for additional testing. The SDCC was turned in to the advanced weapons lab for further testing. Both suspect CCU-45/B impulse cartridges were recalled for engineering investigation.



MD65 Fail to Fire Lot: PSI16B003-004

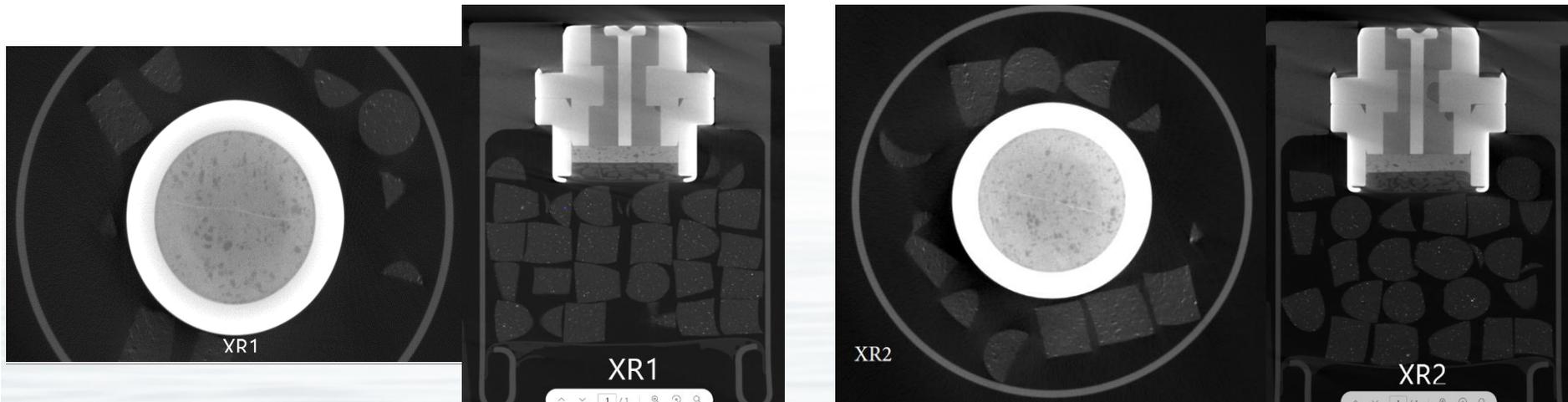
- Initial visual inspection:
 - Both CADs displayed evidence of mishandling, corrosion and mislabeling. The cup closure assemblies appeared discolored with broken epoxy sealant and an appearance that additional epoxy had been applied.
 - Container open and expiration dates on both CADs were labeled with incorrect expiration dates on them. Inspection of the rest of the MD65s from this lot at station weapons revealed numerous labeling/marketing discrepancies as well as mishandling.



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Bridge Wire and NDT

- Computed tomography scan displays both ignition elements and bridge wires intact.
- Igniter circuit test indicate circuits are within acceptable specification range of 1.1 +/- 0.15 ohm.
 - XR1: 1.19Ω
 - XR2: 1.17Ω



Ignition Element Depth Insp.

- LAU-116 firing pin length tolerance is .026 - .067.
- The results for the measuring of firing pin indents on the cartridges are as follows:
 - XR1: .029"
 - XR2: .041"



- Results for the firing pin electrode lengths of subject LAU-116 are as follows:
 - Forward measured between 0.023 and 0.044
 - Aft measured between 0.024 and 0.033



Ballistic Test Results



- XR1 was subjected to ballistic testing, XR2 was retained for further analysis if required.
- XR1 was set up in test configuration and showed pre-firing circuit connection was good.
- XR1 was pre-conditioned to – 65 degrees F and ballistically functioned.



Conclusion

- Both suspect CAD's (XR1 and XR2) passed all NDT analysis.
- Comparison measurements of the indents on both CAD ignition elements and the firing pin electrodes of the LAU-116 indicate a deficit between contact of the firing pin electrode and the CAD ignition element.
- XR1 ballistically functioned when commanded during testing.
- NSWC IHD E25 In-Service Engineering believes that if the LAU-116 firing pins were long enough to fill the void of the dimples in the XR1 and XR2 then they would have ballistically functioned during flight.
- PMA-201 AAE and FST measured firing pins on BRU-32 and LAU-116 in the fleet. They found that there are different lengths and widths between the two rack and launcher firing pin systems.
- PMA-201 AAE, FSAT and NSWC CAD/PAD are developing a test to measure variances between different racks and launchers that would measure dimple depths, widths and current on stores cartridges.



NA 11-100-1.1 Tech Man



- The NA 11-100-1.1 is the authoritative source for all fleet related CAD/PAD technical information. It is authored, published and maintained by the CAD/PAD FMST.
- FY23 Changes and Revisions
 - Changes: 15
 - Intermediate Rapid Action Changes: 5
 - Revisions: 2
 - Published and distributed 367 CD manuals.
- FY24 Changes and Revisions
 - Changes: 45
 - Intermediate Rapid Action Changes: 2
 - Revisions: 2
 - Published and distributed 346 CD manuals.



NA 11-100-1.1 Updates



- New authoring tool will allow complete plug and play system for authoring team.
- Allows us to host our technical manual on JTDI
 - Eliminates CD need reducing cost and allowing the fleet to download the manual on computer.
 - Will allow authoring team to make redacted manuals faster, easier, cheaper, and in house.



Questions?



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