

Fun On Detachment = F.O.D.

By Lt. Karl Schultz

FOD incidents damage or destroy millions of dollars' worth of U.S. Navy equipment each year. Similarly, thousands of maintenance hours are wasted replacing FODed engines. We have several prevention techniques: FOD walkdowns; FOD checks; and in the case of the H-53E, the addition of engine-air-particle separators (EAPS). Yet, FOD incidents continue to be a persistent, costly, and unnecessary drain on Navy resources.

During 1999, Helicopter Support Squadron Four had nine FOD incidents. We analyzed the data from these incidents, trying to find common traits. If we succeeded, it would help us to reduce, or, ideally, to eliminate future FOD incidents.

Before analysis began, several hypotheses were developed. The first was that a particular maintenance action, or combination of maintenance actions, just before an incident might have been leading to FODs. The second theory was based on the anecdotal belief that the EAPS themselves cause as many FODs as they prevent. The third possibility was that no pattern would emerge, and each FOD incident would be unre-

lated to the others.

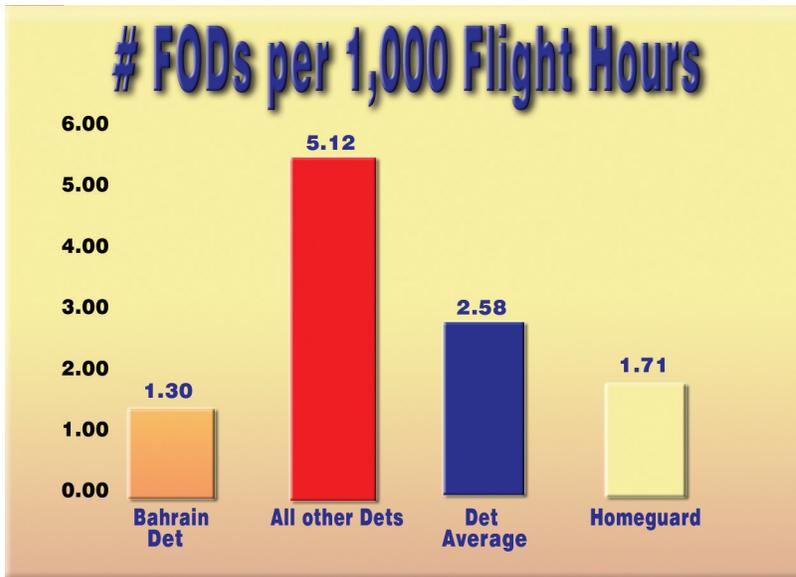
The chart below shows all our incidents for the last calendar year, including location, major maintenance done before a FOD, and possible causes of each FOD. This data was gleaned from each of the nine FOD reports filed last year.

Analysis of this data yielded two interesting points. The first is that a 25-hour inspection preceded five of nine FODs, and the second is that six of nine occurred while detached—an unexpected result.

Despite the fact that 55.5 percent of FOD incidents were preceded by a 25-hour inspection, this was discarded as a common link. Although this appears to be a trend, closer analysis proved otherwise. This inspection is done on each aircraft an average of once every 14 days, while the average time between inspection and discovery was 7.2 days. Because of the sheer number of inspections, you would expect half of the FODs to be preceded by a 25-hour inspection. Also, many of the FODs were discovered immediately after a 25-hour inspection. This is thought to be more a factor of discovery than cause. With the inlet guide

Date of FOD	Found During	Eng No.	Loc	Recent Maintenance Performed (Julian date)										Cause	EAPS Probability	
				28 day	Boost Pump Line	25 hr	Roll Servo	D Phase	EAPS Inst	Rotor Blade Rprs	Eng Repl	Eng Start	10 Hr			
99069	25 hr	#2	Tel. Aviv	99061	99064										Intake Duct	No
99102	Taxiing	#1	Bari			99101									Unknown	Possible
99204	Post Flight	#2	Bahrain					99202	99200						Unknown	Probable
99263	28 Day	#1	Sig			99258				99263					Unknown	Possible
99292	Post Flight	#2	Sig			99278				99292					Unknown	Possible
99295	QA Insp	#2	Sig			99279	99294								Unknown	Possible
99348	Pre Flight	#3	Bari			99348									Unknown	Very Probable
99350	Post Flight FCF	#3	Bari								99350				EAPS	Certain
99352	Pre Flight	#2	Bari									99342	99351		NGB Spring Tab	No

This chart tracks FODs and recent maintenance, which helps to identify trends.



FODs are more prevalent on detachments, but the story is more complex.

vanes open, a vigilant plane captain can see farther into the engine and is more likely to see evidence of a FOD, which previously had gone undiscovered. For these reasons, this point was discounted as a possible correlating factor.

However, the difference between detachment and home-based FOD incidents seems to be real and important. By analyzing the hours flown at homeguard, Bahrain, and other detachment sites, our FODs per flight hour show the true picture.

The chart above shows that we had 1.71 FOD incidents every thousand-flight hours at home and 2.58 FODs every 1,000 hours on the road. Our permanent detachment in Bahrain—no longer in existence—fared slightly better, with an average of 1.30 FODs every 1,000 hours, but this makes the remaining road performance much worse. When the Bahrain det is removed, the rate becomes 5.12 FODs every 1,000 hours, or three times more likely to occur than homeguard.

Satisfied with our conclusions, we still sought the answer to the question “why.” We believe the increase in FODs is due to one or more of following factors: First, the physical condition of airfields and operating ramps at foreign fields; they are not as well maintained as most of the ones we use. Basewide FOD walkdowns are not as common, and trash or rubble often is seen near or on taxiways. While this is a possible contributing factor, our only recourse is to redouble our efforts at daily FOD walks and to avoid areas known to be FOD laden.

While none of our incidents were found to be

maintenance related, we know we have to improve our FOD awareness and maintenance care on the road. Maintenance has the potential to be more hurried and leads to possible shortcuts in published procedures. Also, the fast and dynamic pace on detachment possibly could preclude thorough preflights and daily FOD walks.

Addressing our anecdotal theory about the EAPS, we determined that the EAPS barrels definitely contributed to one FOD incident and were likely contributors to at least two others. Although this is a small percentage of incidents, it is a portion that we can control and one we’ve attempted to reduce by implementing preventive-maintenance procedures, including periodic visual inspections and removal of EAPS barrels for X-ray analysis during each phase inspection.

FOD never will be eliminated completely. Machines break, and birds or debris occasionally will fly into an intake, but, with heightened awareness of the causes of FOD incidents, we are hoping to significantly reduce the dollars and man-hours lost each year to FOD.

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I found the FOD tracking program and analysis very interesting. Another possible cause factor is suggested in the title. Fun on detachment can be a contributing factor, whether it’s from rushed maintenance before liberty or from reduced capability after liberty. A day of maintenance after a late night, with or without alcohol, will impair the ability of maintainers to do their best work. All it takes is one 10-cent fastener to cause a lot of damage and more work.—Ed.