THE U.S. NAVY'S BIRD AIRCRAFT STRIKE HAZARD (BASH) PROBLEM 1985-1989

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Reported Bird Strikes in the Navy

Each year the Navy suffers significant aircraft damage due to collisions with birds (bird strikes). The Naval Safety Center has recorded 6,365 strikes (an average of 707 annually) (figure 1) since 1981 when the Department of Defense standardized accident reports in military. Even though the number of reported strikes is high, the actual number is strikes is far higher. A 1989 study of the BASH problem at Naval Air Station Point Mugu showed that only 33% of bird strikes are reported. Therefore, Naval aircraft have probably taken close to 20,000 strikes (2,000 annually) since 1981.

A bird strike itself is not the problem though. Loss of aircraft, money and time is the problem. Since the inception of the BASH program, two aircraft have been lost to birds: an A-4 crashed north of Mayport, Florida in 1984 and an AV-8 crashed near Yuma, Arizona in 1986. Over $30 million have been lost due to bird since 1981 at an annual average of $2 million (figure 2). In these days of shrinking budgets, $2 million is a significant sum. We have been very fortunate that there have been no fatalities, USAF has not been so lucky.

Who Is Taking All These Bird Strikes?

Bird strikes occur on most of our Naval Air Stations (figure 3) and to almost every aircraft in the Navy's inventory (figure 4). Naval Air Station Cecil Field, Florida, has the distinction of having the most total strikes (152) and the Hermes, an experimental aircraft (E006), having the greatest strike rate 3766 strikes/100,000 hours). Of those aircraft types being flown over 500,000 annually, the Orion (P-3) had the greatest strike rate (72 strikes/100,000). The overall Navy bird strike rate was 33.4/100,000 hours.

Mission and type effect the susceptibility of an aircraft to a bird strike. Fifty percent (50%) of all the bird strikes were taken by patrol (25%) and attack (25%) aircraft (figure 5).

How Birds and Aircraft Meet

There are three ways to break down the encounter of a bird with an aircraft: (1) by altitude, (2) phase of the aircraft's flight, and (3) by time (season and hours). By examining these three categories, we can get a good feel about where bird strikes occur and which will lead to a method of reducing the bird strike problem at a given installation.

Birds can be encountered at nearly all flight levels. The highest strike ever recorded was to a vulture at 37,000 feet. However, most birds fly much closer to ground level: over 95% of all strikes are reported below 2,500' above ground level (AGL) (figure 6). In fact, 80% of all strikes taken by Navy aircraft occurs below 1,000 feet AGL. Therefore, it is not surprising that most of the known location strikes occur within the airdrome environment (figure 7). This is due to one reason, most bird activity occurs below 1,000 feet. The higher an aviator goes, the less likely a bird strike incident becomes. Therefore, aviators should consider altitudes whenever crossing known bird concentration areas, particularly during migration periods.

Bird strikes occur around the clock and throughout the year, but are most likely during certain periods. Migration seasons (April-May and September-October) are when there are the most birds in the air and when Naval aircraft take the most bird strikes (figure 8). There most dangerous time of the year to fly is during Fall after the breeding season.

How Can the BASH Problem Be Reduced

I have read the phrase "Beyond Command Capability" on many bird strike reports. This is a popular method to deny the problem. While there is not a fool-proof method to eliminate all bird strikes, there are ways to reduce chances of a bird strike that are both low cost and low effort.

A look at where the bird strikes occur will give a place to start in our efforts to reduce the number of bird strikes. Figure 7 shows that most strikes are over the airfield. Mr. Thomas Walker and C. Willard Bennett assisted four Naval Air Stations in developing a bird strike program during 1983. These four bases reported 57-78% fewer bird strikes in 1984 than in 1983. Bird strike reduction is possible through a variety of methods. The most common method is to convince aviators not to take off with birds on or near the runway and to identify and avoid landfills or other potential attractions to birds.

Habitat manipulations should be closely coordinated with the natural resources specialists. Habitat manipulation includes changes in grass height and other land management practices, removal of nesting or roosting sites, and improving drainage to reduce water sources. Bird dispersal is possible using pyrotechnics, distress calls, shooting, Avitrol, and hazing with vehicles. Each program is different. The objective of a comprehensive BASH program is to use as many techniques as necessary to reduce the hazard. A review of the Air Force's experiences indicates that repeat visits by trained professionals are required to keep the programs dynamic and responsive to changing conditions and populations.

Who Can Help?

As with any problem, it is necessary to consult with someone who is knowledgeable about it. The four places available to installations for help in combating your BASH problems are the Naval Facilities Engineering Command (NAVFAC)'s Natural Resources Branch for assistance in habitat manipulation, NAVFAC's pest management branch, the Naval Safety Center, and the U.S. Air Force BASH Team.

Naval aircraft take a considerable amount of damage from birds each year and endanger the lives of our aviators. The chance of serious loss of life and dollars can be reduced by instituting a BASH program at local installations. The authors would like to thank Mr. William Broyles, Naval Safety Center for providing the raw data for this manuscript.

BIRD STRIKES BY YEAR
1981-1989

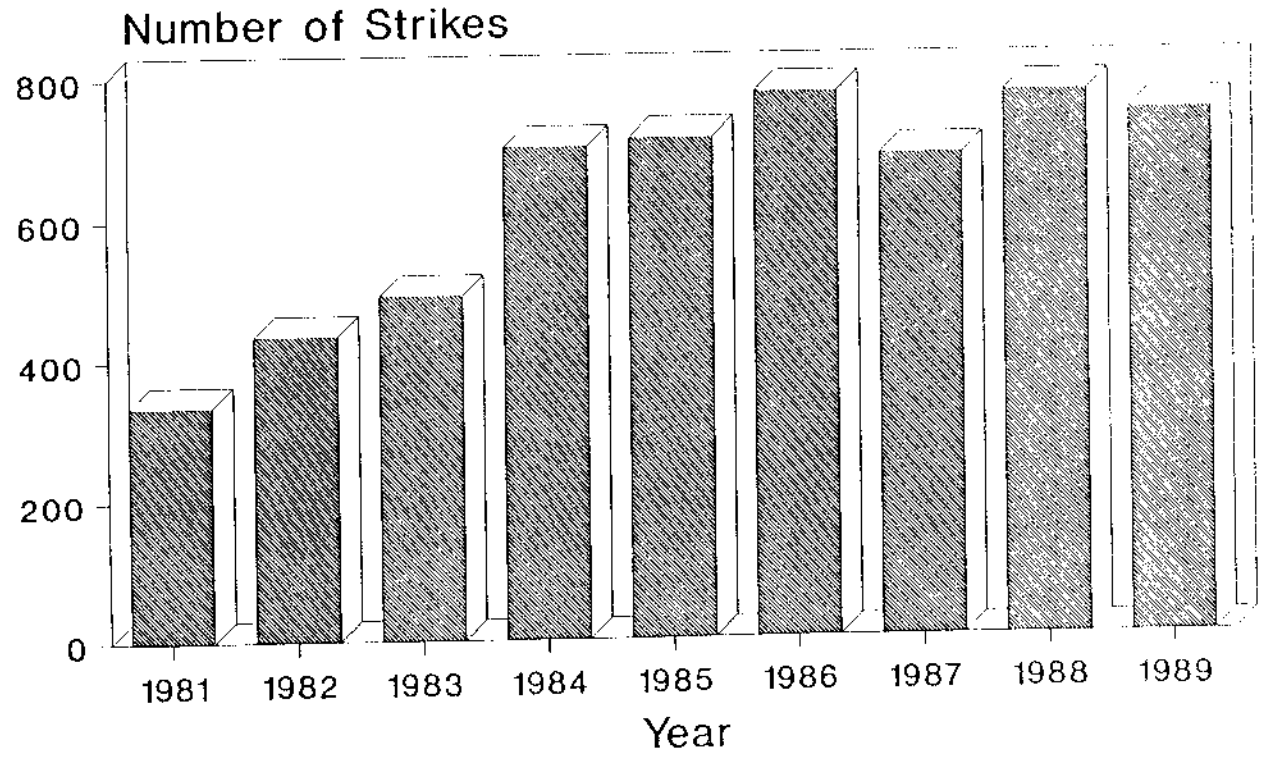

Figure 1

COST TO THE NAVY
1985-1989

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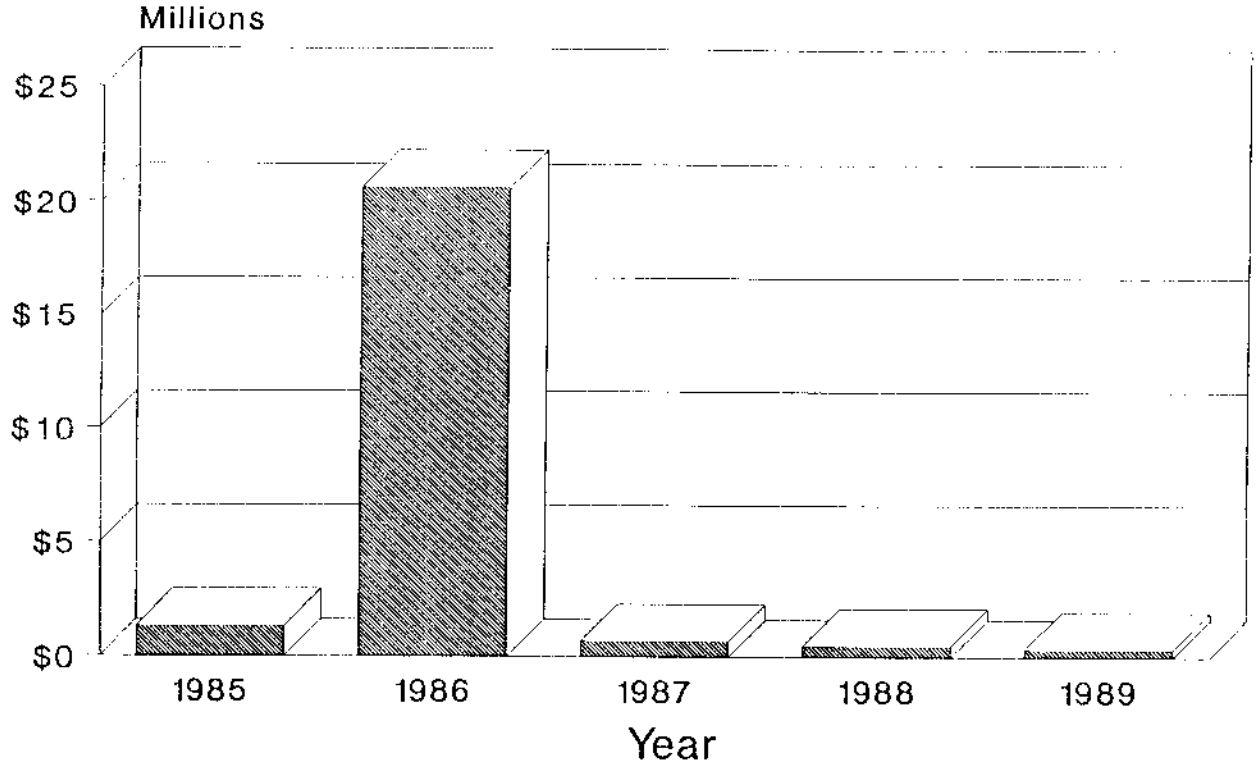

Figure 2

BIRD STRIKES BY NAVAL AIR STATION
1985-1989

Base Location	Total Strikes
Cecil	152
Moffett	150
Corpus Christi	126
Whidbey Island	121
Oceana	120
Jacksonville	110
Chase	109
Brunswick	101
Mayport	100
Norfolk	86

FIGURE 3

AIRCRAFT STRIKE RATE 1985-1989
100,000 FLIGHT HOURS MINIMUM

AIRCRAFT STRIKE RATE 1985-1989
100,000 FLIGHT HOURS MINIMUM

Type Aircraft	Number of Strikes	Flying Hours	Strikes/ 100,000hrs
T-44	157	199089	94.5
P-3	894	1237880	72.2
AV-8	112	159839	70.1
C-9	144	230123	62.6
A-6	382	708826	53.9
C-130	118	305000	38.7
F/A-18	223	644842	34.6
A-4/TA-4	295	855597	34.5
SH-60	76	227030	33.5
T-2	138	424817	32.5

FIGURE 4

BIRD STRIKE BY AIRCRAFT TYPE
1985-1989

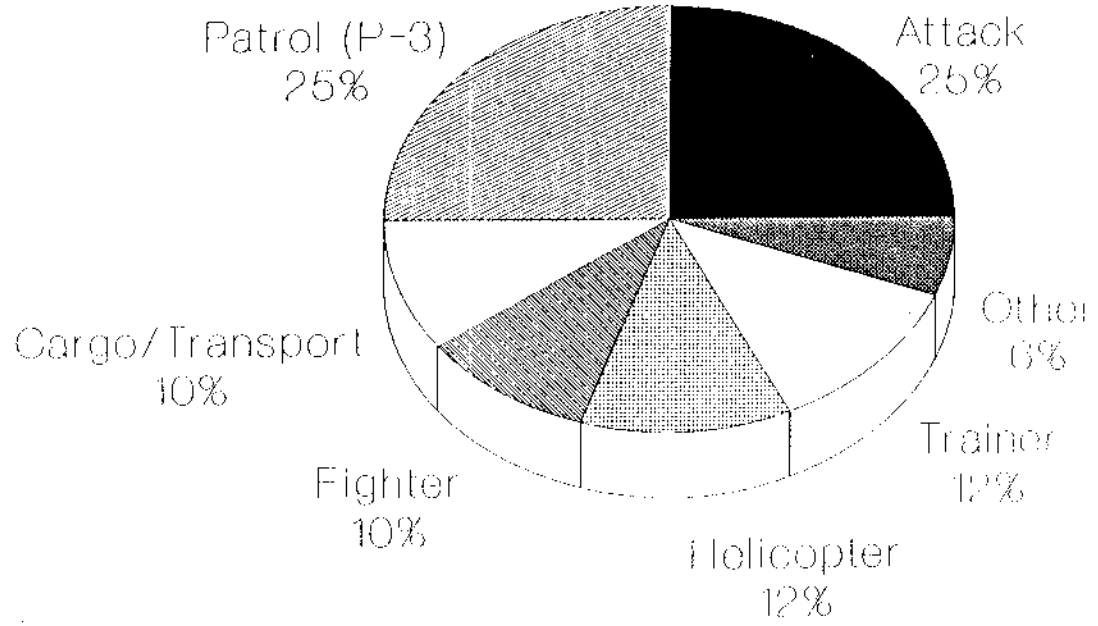

Figure 5

BIRD STRIKES BY ALTITUDE
1985-1989

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1985-1989

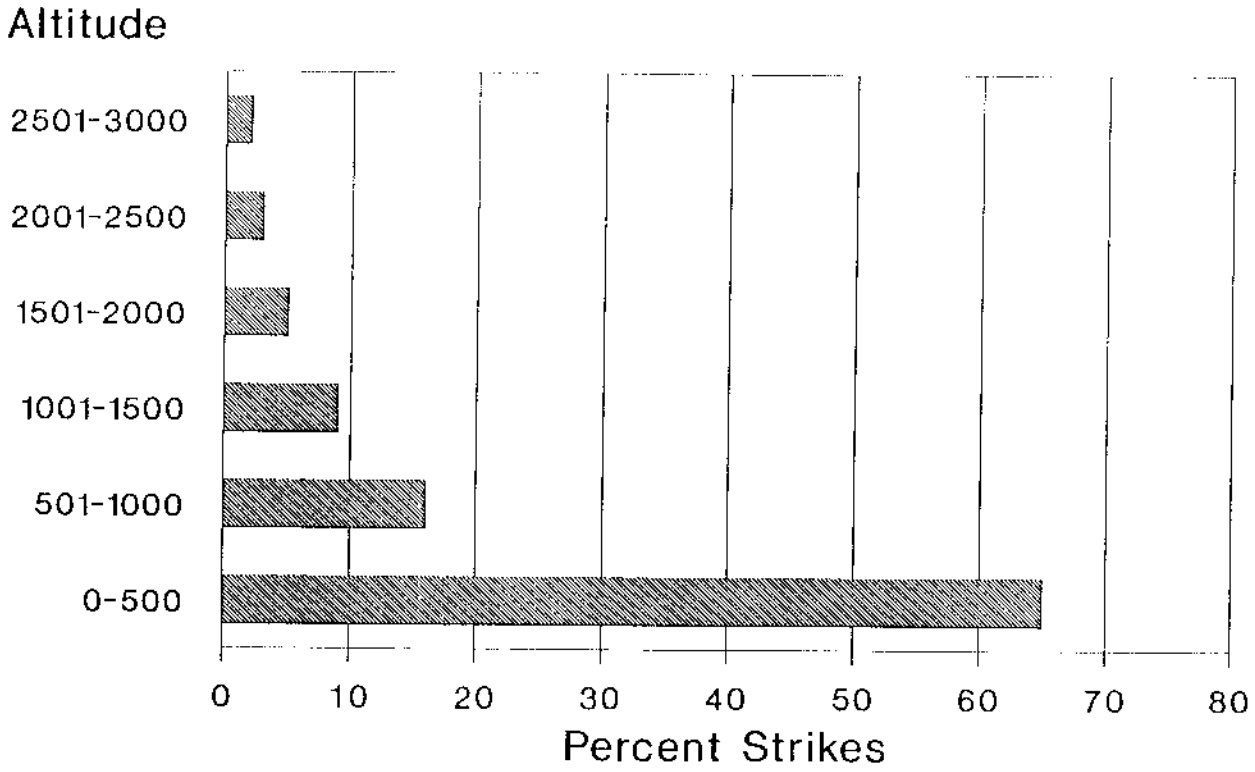

Figure 6

BIRD STRIKES BY PHASE OF FLIGHT
1985-1989

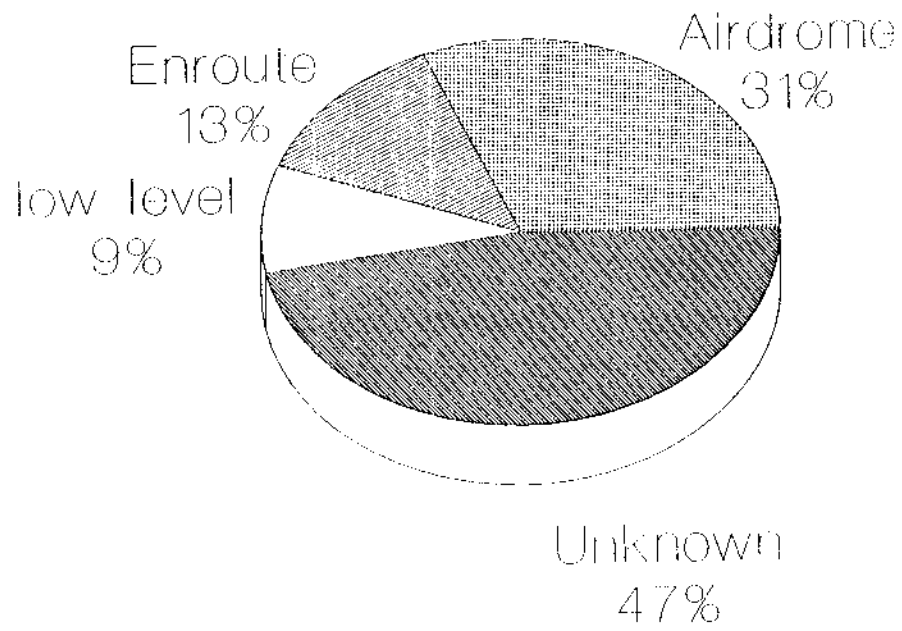

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Figure 7

BIRD STRIKES BY MONTH
1985-1989

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1985-1989

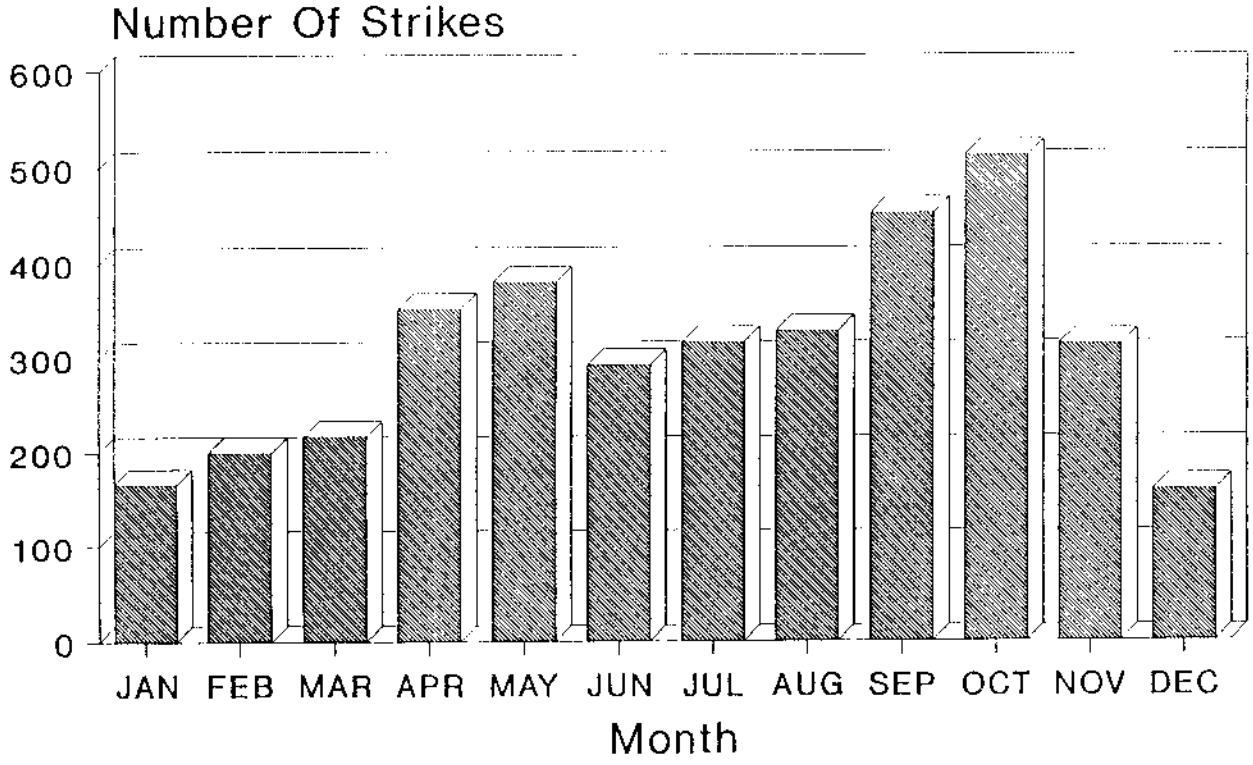

Figure 8