

**BIRD STRIKES HAZARDS**

**BY**

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# **Introduction**

**Birds are a serious hazard to aviation. A bird or a flock of birds that suddenly rise from a runway or surrounding areas may collide with landing or departing aircraft and cause it to crash and may cause human loss (Godin, 1994). Bird collision with air craft is commonly known as. "Bird Strike". Collision with mammals while occurring much less frequently can also be serious (Centre for Transportation Studies at the University of Minnesota, 2002).**

**Damage to aircrafts results from collision with the engine and/ or fuselage. Although most bird strikes do not result in crashes, they do involve extensive structural and mechanical damage to aircraft. This makes bird strike a serious economic problem.**

**In USA up to \$300 million in losses every year (Minnesota University Studies, 2002). It is also a safety concerns for airports, and can cost in delayed schedules that result in lost revenue.**

**From 1985 to 2011 USA air force had 95383 wildlife strikes; loss of 38 aircrafts and damage to aircraft resulting in 33 fatalities and loss of 820 million USD.**

**Since the first airstrike in 1905, birds strike increased for two reasons:**

**1) The environment is cleaner and 2) airplanes are quieter so birds have less ability to detect and avoid airplanes.**

**Birds strike happen mostly during take off, climb, approach and landing (96%). Most birds strike involve large birds such as geese, gulls, vultures etc.**

**During the early days of aviation, when aircrafts flew at low speeds birds can get out the way. Bird's strikes were infrequent and damage was mainly confined to cracked windshields. The likelihood of loss of aircraft and/or human lives was remote. With the introduction of jet aircraft, bird strikes become as serious hazard and costly problem (Godin/1994).**

**Fast speeds mean birds have less time to react to approaching aircraft. The force generated by bird impact with fast – moving aircraft is tremendous. Light –weight turbine engines are vulnerable to bird strike damage.**

**Aviation Administrations world wide have management plan to alleviate bird hazards to civilian airports and military airbases (Fig. 1, 2).**

## **Airports and problem Analysis (Bird attractants at Airports): •**

**Bird hazards vary from airport to airport. The occurrence of birds at airport varies according to habitat availability, weather, season of the year, and time of day (Godin, 1994). The main reasons for the presence of birds at airports are natural and human-made habitats that offer food, water and cover. Many airports are located along migrating routes used by birds (Khartoum Airport). The first step in reducing Bird hazards is to recognize these attractants.**

# *Bird species causing serious bird strikes*

Common English Names	Scientific Names
1. Cattle Egret (flying across) , Little Egret	<i>Bubulus ibis ibis, Egretta garzetta</i>
2. Pelicans and Storks e.g. Great White Pelican, Pink-Backed Pelicans, Marabou Stork	<i>Pelecanus onocrotalus, Pelecanus rufescens, Leptoptilos crumeniferus</i>
3. Abdim's Stork (2.2).	<i>Ciconia abdimii.</i>
4. Ducks and Geese e.g. Fulvous Duck, White-Faced Duck, Spur-winged Goose	<i>Dendrocygna bicolor, Dendrocygna viduata, Plectropterus gambensis</i>
5. Black kite (1,2,4,5,6,3) inside the airport (on runway) soaring above and below taking off planes.	<i>Milvus migrans.</i>
6. Vultures and Eagles e.g. Ruppell's Vulture, Brown snake Eagle	<i>Gyps ruepellii, Circaetus pectoralis</i>
7. Cranes e.g. Common (Eurasian) Crane, Demoiselle Crane, Crowned Crane	<i>Grus grus, Anthropoides virgo, Balearica pavonina</i>
8. Bustards e.g. Arabian Bustard, Kori Bustard	<i>Ardeotis arabs, Ardoeotis kori</i>

9. Gulls e.g. Lesser Black-Backed Gull	<i>Larus Fuscus</i>
10. Spur-winged Plover (1,2,6,4).	<i>Vanellus spinosus.</i>
11. Chestnut-bellied Sand Grouse (2) .	<i>Pterocles exustus</i>
12. Domestic Pigeon (1,2,2,12,6,3 .....etc) feeding on runway – southern part.	<i>Columba livia.</i>
13. Namaqua Dove (common).	<i>Oena capensis.</i>
14. Mourning Dove (2,2,1,2).	<i>Streptopelia decipiens.</i>
15. Palm Swift (1,2,1 .....etc).	<i>Cypsiurus parvus.</i>
16. White-vented Bulbul (1,2,1,2).	<i>Pycnotus barbatus.</i>

17. Crested Lark (1,2,1,2).	<i>Galerida cristata.</i>
18. House Sparrow (2,5,20,6) ( found all over the airport and breeding ).	<i>Passer domestiais.</i>
19. Silver bill.	<i>Lonchura malabrica.</i>
20. Black crowned Sparrow Lark (2,2)	<i>Eremapterix nigriceps albifrons.</i>
21. Blue – eared Starling (4,6,12)	<i>Lamprotornis chalybaeus.</i>
22. Weavers	

In the UK the most commonly struck species is Black-headed Gull. In the USA the top five species causing substantial damage are:

1. Canada Goose – weight 3.6 kg.
2. Turkey Vulture – WT 1.45 kg.
3. Rock Pigeon.
4. Mallard- WT 1.08 kg.
5. Snow Goose – WT 2.45 kg.

**1. Food:** Most airports support an abundance variety of foods such as seeds, grass, insects, earthworms, small birds and small mammal's rats, cats... etc.). Khartoum Airport attracts birds such as Black Kite, *Milvus migrans*, Pigeon, *Columba livia*, Doves, *Streptopelia senegalensis*, *Oena capensis*, *Streptopelia decipiens*, House sparrow, *Passer domestica*, Abdim's Stork *Ciconia abdimii*... etc.

**Occasionally food becomes available through careless waste disposal practices (temporary garbage cans sometimes left open).**

**This attracts birds. Landfills near airports provide food, loafing for birds such as gulls, Abdim's stork, pigeons, Doves...etc.**

**2. Water:** Birds are attracted to open water for drinking, bathing, feeding, loafing, roosting... etc. Rainy periods provide temporary water pools at many airports (Khartoum Airport, Heglig Airport, Pologue Airport...etc.). Recommended distance between wildlife attractants such as landfills and aircraft movement areas, loading ramps or parking areas, for approach or departure airspace is five miles (University Minnesota Studies, 2002).

**3. Cover:** Birds need cover (shelter) for resting, loafing, roosting, nesting and protection. Trees, shrubs, weed patches and airport structures provide suitable habitat to meet these requirements. Pigeons, House Sparrows Starlings, Swallows often roost at these structures.

**4. Migration:** Many airports are located along traditional annual bird migration routes (Khartoum airports). Birds may suddenly appear on or over an airport even though airport itself offer no particular attraction.

Migratory birds can fly at high altitude e.g. Bar-headed Goose fly over Mt Everest 9000 m high. Ruppells Vulture was sucked into a jet engine at 12,000 m over the ivory coast.

Eagles and vultures can fly at a speed of about 95 km per hour, Peregrine Falcon can fly at a speed of about 240 km per hour or more.

Some birds migrate at night, others at daytime

**5. Local movements:** some birds often make daily flights across airports from their feeding, roosting and nets areas.

# **Damage Prevention and Bird Control Measures (solution):**

**Bird strike hazards require constant attention. Many airports have management plan to deal with these problems. Before attempting to reduce bird hazards at an airport, it is important to assess the problems, identify contributing factors and analyze the threat. Scaring or dispersing birds away from airport is usually difficult because birds are tenaciously attracted to available food, water and cover.**

**Wildlife biologist trained in ornithology and behavior should be selected to conduct thorough ecological study of the airport and its vicinity. The study should determine which species of birds are involved, what attracts them, abundance and peak use periods and special hazard zones. It should include control, recommendations to reduce the frequency of bird occurrence at the airport.**

## **Habitat modification:**

**Several habitat management practices can make an airport less attractive to birds. These include draining standing water, removing or thinning trees and managing grass height to 7-14 Inches. Modified building to reduce or eliminate roosting or nesting sites, Elimination of open garbage cans and temporary garbage collection from airport.**

## **Exclusion:**

**Three meter high fence can exclude mammals but not birds. Hangers with open superstructure often attract birds to nest and roost. Birds can be netted and removed from this building. Their dropping is both health and damage concern.**

## **Visual repellent:**

**Birds of prey and dogs effigies can frighten birds away from airport. Spikes**

## **Frightening:**

**Frightening birds away from the airport by the use of equipment that scare birds away. This provide temporary relief and require constant monitoring. This will harass and scare birds and protect aircraft within airport perimeter. Bird dispersal patrol team should be established, trained and of highly motivated personnel.**

**They need to communicate with tower personnel. One of this equipment is wailer (phoenix airport wailer III, Figure 4): This is the state of art electronic bird deterrent which creates a zone where it is uncomfortable for most species of birds to remain. This system is programmed in such a way to produce sequence of sounds. These sounds are combination of electronic and natural sounds (predator calls, pest alarm calls and distress calls "kill").**

**The sounds are randomly arranged from speaker to speaker for varying durations and at variable intervals. This unique feature lessens the likelihood of habituation with pattern, which often happen with conventional scare devices. The system had eight speakers. Each system covers 760 meters (2500 feet) of the runway and approximately 45 M (150 feet) back. The system is programmed to set up predator/ Prey situation.**

**Another deterrent equipment is gas exploder ([Zon gun](#)), pyrotechnics which can be mounted on the back of a small truck and operated for a few minutes before landing and takeoff of an aircraft. It also can be mounted at certain places in the air field and operated or timed to operate at require times. The equipment be periodically move from one place to another to prevent birds from getting accustomed to the blasts coming from a known location. These systems are in use in USA Canada. Russia, Azerbaijan, Kazakhstan and Singapore.**

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**Spikes**: preventing raptors and large birds from perching •  
on electrical poles, buildings... etc

**Shooting:** shooting bird with shotguns or rifles can be used under certain conditions. Permit from wildlife administration is needed. Shooting is not practical or desirable.

**Summary and recommendations:**

Birds control products can be categorized according to the manner they deter or disperse birds to:

- 1\ Novelty avoidance.**
- 2\ Startle reaction.**
- 3\ Predator mimics.**
- 4\ Warning signals and killing.**

**Birds tend to avoid novel stimuli and/or stimuli that startle birds by suddenness or loudness of their presentation (Rochard, 1996). Birds tend to avoid synthetic sounds produced electronically by the phoenix wailer (this has obvious survival value). They can lose their effectiveness (habitation). Similarly "startle" devices (gas cannons) can also lose their effectiveness. There is biological basis to these products.**

**Stimuli that communicate "warning signals" to the target bird that a predator is nearby (distress/alarm calls), or has been in the vicinity**

**(Model of dead prey bird), work well. Habituation does not readily occur.**

**Bird control products and techniques are categorized in to the broad categories (Harris, Davies, 1998).**

## **Not Recommended:**

**High intensity sound, Micro waves and lasers. Also use of smoke, magnets, lights and dyes.**

## **Limited Recommendation:**

**Gas cannons (but habituation can be lessened by moving them around).**

**Phoenix wailers are effective than synthetic electronic noises if they are containing distress, alarm calls.**

**Scarecrows, Predator models, Hawk Kites are also susceptible to habituation.**

## **Highly Recommended:**

**It is important to gain an understanding of the numbers and species of birds at the airport and to determine those species and time that create the greatest threat to aircraft safety.**

**The bird control program should focused on birds of concern, The study should induce annual cycle of bird presence (migration, nesting...etc.).**

## **Habitat Modification**

**The best approach for long term bird control at airports is Habitat Modification. This addresses the root cause of bird problems that is attracting birds. Habitat management is to install Physical barrier such as fencing. Buildings, signs and light fixture need to be supplied with perch barriers. Habitat modification should be supplemented by phoenix wailer Mark III, zon gun and shooting if necessary.**

# Accidents

Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

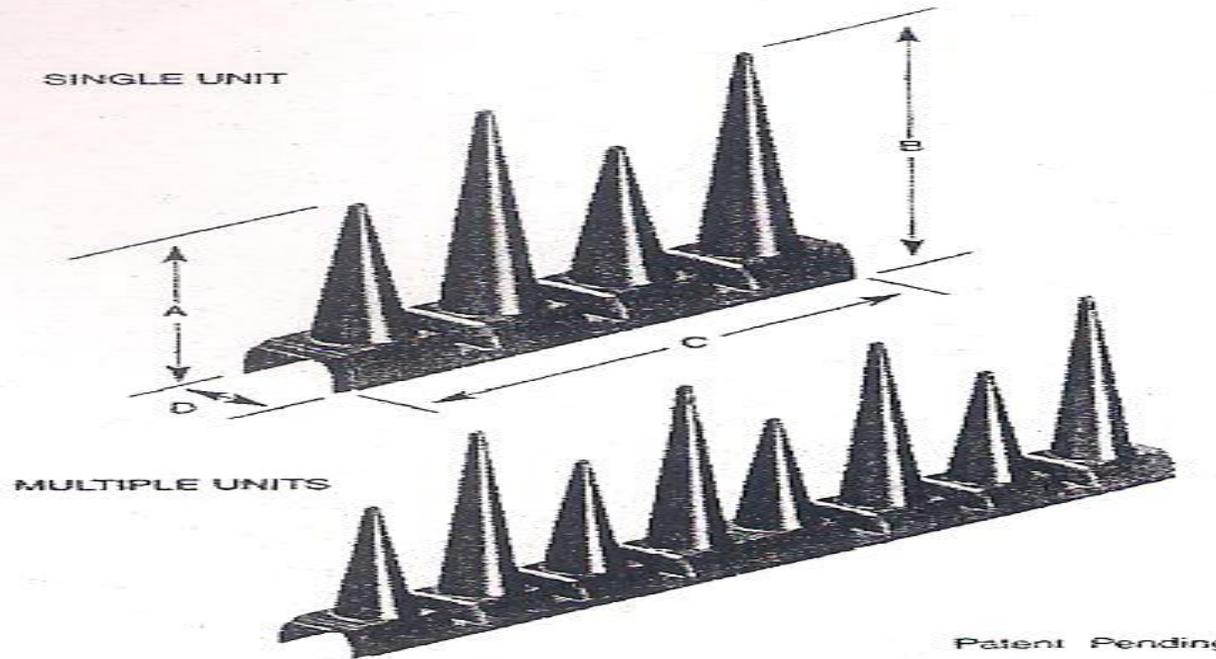


# Figure 8: Striking bird on Heathrow



Figure 9: bird struck the engine of Nepal plane killing 19 passengers and crew





**Mini Xena Birds Discouragers (Spikes).**



**Zon Guns**



**Zon Gun on Portable Tripod**



THANK YOU