

Ecological Strategy to Prevent Vulture Menace to Aircraft in India

R.B. Singh

S.D.S.M. College, Palghar - 401 404.

ABSTRACT

Vultures are sincere scavengers. Though seen with disgust, they work silently as effective biological incinerators of nature by feeding and digesting the diseased and rotten animal carcasses. Vultures are shifting their natural habitat and proliferating unnaturally in the cities because of encroachment of forests, unplanned industrialisation, urbanisation, and uncivilised way of life prevailing in the society. Hence, the problem of vulture menace to aircraft has arisen. Vulture strikes to aircraft can be minimised by promptly lifting the dead animals/carcasses from different parts of the city to the permanent feeding ground, which should be out of buffer zone area and away from the flying path, and simultaneously discouraging the illegal skinning, specially in the vicinity of aerodrome. In this paper, an ecological solution of the vulture strike to aircraft is highlighted.

1. INTRODUCTION

Vulture is a popular name for few species of birds that are basically carrion feeders. Vultures come under two families, namely, *Cathartidae* comprising new world vultures, and *Accipitridae* (sub-family *Aegyptiinae*) comprising the old world vultures. Though, the new world vultures (*Condor*) are distantly related to the old world vultures, yet they are similar in appearance and habits. Both feed on the flesh of large mammal carcasses. Though many birds and mammals feed on carrion, yet a few of them compete with vultures for badly decomposed remains. Such type of food cannot be carried back to the nest in beak or feet as eagles do with a fresh kill but must be swallowed and later regurgitated and half-digested for the young ones. It has been reported that vultures can, without ill effect, digest most of the diseased organisms from carcasses which may harm other animals and man¹⁻³.

The pattern of distribution of *Condor* and Genus *Gyps* is gradually shifting from their original ranges because of diminishing habitat and natural food sources and also their killing. Among these species, *Condor* (America) and *Cape vulture* (Africa) appear to have an uncertain future. As compared to this, the situation in India is entirely different. The Indian *Griffon* vultures seem to be thriving well when seen from the surface. In fact, there is no decline in the population of *Griffon* vultures in totality and they are thriving to the extent that certain species (Indian whitebacked vulture, *Gyps bengalensis*) has proliferated at many areas. But the very nature of proliferation of these species gives a foreboding of the future status of *Griffon* vultures in India. There seems to be two major problems threatening the Indian *Griffon*: (i) diminishing of natural habitat and natural food sources, and (ii) unnatural proliferation of vultures around towns and cities. The later poses a problem

to aviation and gradually inducing the aviation authorities towards decisions favouring mass killing of vultures by toxicants. The mass killing of vultures would be an immense loss to humanity and thus cause havoc with the ecology, environment and human health. India will lose the only efficient biological incinerator. Therefore, it was felt necessary to find out amicable long-term solution to this problem.

2. TUSSELE BETWEEN BIRD & AIRCRAFT

In the modern aviation period, man has entered into jet era and invented supersonic aircraft for civil and military use. By inventing the supersonic jet aircraft along with changed strategy of air warfare, man has entered into the bird layer (space up to which birds are flying in the sky) which results in frequent collision of aircraft with birds. This is a big problem throughout the world. It is just not possible for any country, rich or poor, to afford loss of valuable aircraft, property on the ground and invaluable human lives. But unfortunately, this huge loss is all due to a bird only.

Most of the international airlines operate through the Indian airfields during the night and as such they rarely run the risk of bird strike in India. But on the other hand, most of the Indian airlines operate during the day time, hence bird strikes occur because of the activities of most of the birds throughout the day inside and outside the airports. Indian airfields are generally near the big cities which accommodate huge population of unnatural proliferation of vultures and kites. Thus, the concentration of vultures and kites per unit volume of air space is the highest near the big cities. This is the basic cause of bird strikes in India.

3. STATISTICS OF BIRD MENACE TO AIRCRAFT

Study of vital statistical records reveal that there were a total of 3028 birds strikes to aircraft all over the world during 1970. Out of these, 60 per cent occurred to aircraft engine and engine cowling, 15 per cent to fuselage, 13 per cent to windshield and 3 per cent to aircraft nose. Heightwise

distribution indicated that up to 75 per cent of all the bird strikes occurred up to 152.8 m. According to the distribution of flight phase, about 45 per cent bird strikes occurred at the time of aircraft landing, 38 per cent during its take off and 14 per cent during its approach. Table 1 shows the official and unofficial reporting of bird strikes in different years.

As per the laid down airworthiness requirements, a combat aircraft's windshield is designed to withstand an impact of 2 kg bird at 750 km/hr. In India, out of 428 incidents of birds strike reported to Bombay Natural History Society (BNHS) during 1980-88, 208 incidents occurred due to 49 species of birds weighing more than 50 g and vultures (5.0-5.5 kg) top the list being involved in more than 35 per cent cases followed by Pariah kite (0.650-1kg) in 26 per cent cases.

Municipalities in India are the worst offenders. The waste dumping grounds, which attract vultures and kites, are situated near airports. A US-based firm manufacturing aircraft engines highlighted the process of accumulation of garbage around airports and high grown grass inside the airfields as the causative agent of bird attraction in the way of aircraft (Mid Day, 18 January 1994). Encroachment of land and dumping of garbage around airports compelled the IAF authorities in Chandigarh to reschedule the flying hours (Indian Express, 15 June 1995). Virtually every busy airport in India faces serious bird menace due to rapid urbanisation as well as basic civil indiscipline (Indian Express, 02 February 1996). A recent study indicates that the bird hazards still result in huge loss of life and large scale damage to aircraft, making the flying hazardous and uneconomical. Dr Robert B. Grubh who led the research team at 22 airports in India is of the opinion that proliferation and concentration of vultures and kites on the aircraft path in the vicinity of the airport accounted for 75 per cent of bird strikes.

4. ECOLOGICAL STRATEGY TO PREVENT VULTURE MENACE

The study on bird hazard project was undertaken at different airports during 1982-89. The data obtained on population of vulture at permanent feeding grounds of Korakendra, Bapane, Mumbai and the nine surrounding roosting sites was analysed during 1986-89. By implementing some of the recommendations submitted to the Defence Ministry through BNHS, the rate of bird hits has come down from 8.52 per cent per thousand in 1982 to 2.21 per cent per thousand in 1992. In the author's opinion, more can be done to bring down vulture strike incidents if the implementing authorities are aware about the biological clock of vulture¹. Some of the points regarding vulture menace to the aviation are:

- Windshield can withstand an impact of 2 kg bird at 750 km/hr (vulture weighs 5.0-5.5 kg).
- There is unnatural proliferation of vultures around big cities where most of the airfields are existing and vultures are coming in the flight path of aircraft and causing hits.
- All over the world, vultures are facing threat of extinction.
- Vultures are the only efficient biological incinerators who are playing a very important role in the public health, specially in the developing countries.

From these points, it is clear that neither vultures nor aircraft can be exterminated from the air space. Therefore, a long-term amicable solution for the co-existence of vulture and aircraft is required. These observations are based on the study undertaken at different time intervals of the day. Figure 1 shows the average number of whitebacked vultures observed at Korakendra carcass processing plant (permanent feeding ground) and nine surrounding roosting sites at an interval of half-an-hour over a period of 18 months (1986-89).

At Korakendra, the number of vultures gradually increased as the day advanced from 0700-1000 hr. At 1000 hr, the maximum number of

Table 1. Incidents of bird strikes in India

Year	Number of strikes	Reference (+) remark (*)
January 1954	1	* Indian Air Force
1970	20	* Civil & military aircraft
1980	174	* Civil & military aircraft
1970-81	800	* Indian Air Force + Management of problem birds in aviation and agriculture
1980-88	428	* Reported to BNHS
1992	120	+ The Indian Express (IE), 23 February 1993 * Details are: Mumbai (26), Delhi (17), Hyderabad (15), Bangalore (12) & Calcutta (7)
January-June 1993	45	+ IE, 23 February 1994 * Details are: Delhi (8), Calcutta (8), Mumbai (4), Jaipur (3), Varanasi (3)
January 1994	1	+ IE, 06 March 1994 * Mirage 2000 destroyed but the pilot escaped
April 1994	1	+ IE, 16 April 1994 * 151 Passengers had a miraculous escape
January 1993-April 1994	112	+ The Hindustan Times, 06 May 1994 * Highest in Delhi (20)
July 1994	1	+ IE, 24 July 1994 * VIP's present-PA Sangma & SC Shukla
September 1995	1	+ IE, 21 August 1995 * MiG-27
Annually	100	+ IE, 24 February 1996
August 1996	1	+ IE, 15 August 1996 * Jaguar
February 1995	1	* Modiluft
June-August 1995	4	* IA
December 1995	1	* Saudi
April 1996	1	* Damnia
June 1996	1	* Ethiopian
December 1996	1	* Damnia
August 1997	1	* IA
November 1997	1	* Saudi

+ IE
17 February 1998

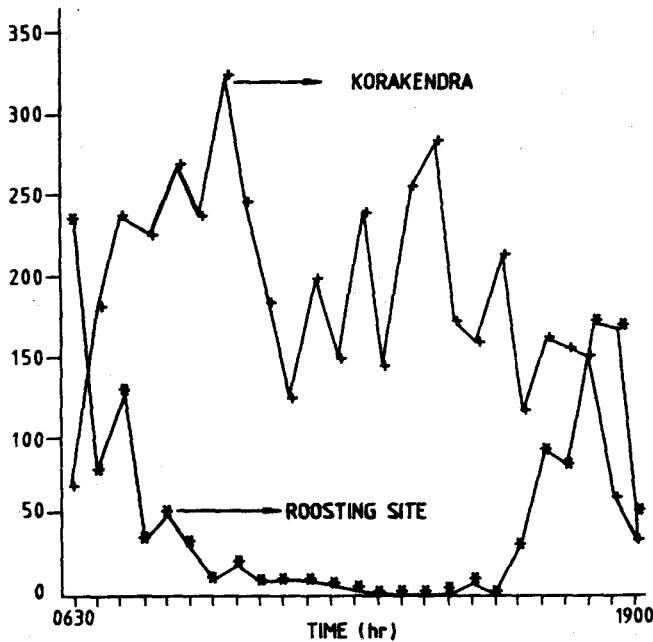


Figure 1. Vulture population at Korakendra and roosting sites

vultures increased five times of the first observation and vultures from different roosting sites were seen heading towards Korakendra. At Korakendra, this period is the best period for the visiting vultures to feed without external interference, as workers normally resume their duties between 1000 to 1700 hr. The maximum number of vultures remained almost constant from 1000-1600 hr at the permanent feeding ground and then gradually decreased from 1600 hr at the permanent feeding grounds, as the vultures started moving onwards to the roosting sites.

At different roosting sites, the number of vultures gradually decreased as the day advanced from 0700 to 1000 hr. At 0700 hr, the collective average number of vultures was 235 and at 1000 hr, the number came down to 10 vultures. The number of vultures gradually increased from 1600 hr onwards as they gradually left the permanent feeding ground to the surrounding roosting sites. This graph shows that the population of vultures at the permanent feeding ground (Korakendra) was inversely proportional to population at different surrounding roosting sites.

At 1000 hr, the maximum number of vultures on the permanent feeding ground can be attributed

to the availability of food, rise in temperature, clear weather condition and noninterference of workers. Between 1000 and 16000 hr, the number of vultures remained fairly constant as birds were not getting food properly because of interference of workers, dogs and crows. From the graph, it is evident that the number of vultures increased between 1700 and 1800 hr at permanent feeding ground and again decreased after 1800 hr and finally to nil. This can be attributed basically to two factors (i) noninterference by workers at Korakendra after 1700 hr, and (ii) extent of hunger of vultures which roost nearest to the feeding ground. To and fro traffic of vultures between the closer roosting sites and the feeding ground was evident in the late evening and also in the early morning when vultures used to fly at the lowest height. Because of the nearest roosting, vultures were opportunistic and could get food positively at the feeding ground without interference of workers. Therefore, to the vultures roosting nearby and spending their own energy in the flight for a short distance will be an asset.

The study of vultures at different places in India in general and Mumbai, in particular, clearly indicates the relationship between the permanent feeding ground of Korakendra and the roosting sites. Based on the ecological study of vultures, the following measures should be considered to bring down the vulture strike to aircraft to the possible minimum level, provided the measures are implemented in toto:

- (a) Dead animals from different sources and waste of slaughter houses must be kept in covered places till the time the same could be removed to the carcass processing plant.
- (b) Casual skinning of small/big animals in the vicinity of aerodromes should be prohibited strictly.
- (c) Every big city must have the modern carcasses processing plants strictly away from the buffer zone area (i.e., 25 km away from the radius of aerodrome).

- (d) Carcasses processing plants outside buffer zone area must be constructed after considering the geography and the flying path strategy for civil and military aircraft.
- (e) Local public should be made aware about the severity of the problem of bird strike.
- (f) There must be good cooperation between the concerned authorities/departments to implement the programme smoothly instead of wasting time in the official dealings.
- (g) Law should be enacted to punish the real culprit through the autonomous court/body to deal quickly.

ACKNOWLEDGEMENT

This study was sponsored by Aeronautical Research & Development Board, Ministry of

Defence, New Delhi, through BNHS. Thanks are due to Dr Robert B. Grubh for his useful suggestions. The author is grateful to Dr A.P.J. Abdul Kalam, SA to RM, for giving the appropriate direction for this work.

REFERENCES

1. Houston, D. C. & Cooper, J. E. The digestive tract of the whitebacked *Griffon* vulture and its role in disease transmission among wild ungulates. *J. Wildl. Dis.*, 1975, 11 (3), 306-13.
2. Mundy, P.J. & Brand, F.E. An investigation of vultures and anthrax in southern Africa. *Rhod. Vet. J.*, 1978, 9, 36-39.
3. Sanford, R. Wilbur & Jerome, A. Jackson. Vulture biology and management. University of California Press, USA, 1983.

Contributor

Dr RB Singh obtained his PhD on biological and microbiological studies on whitebacked vulture from Meerut University in 1991. He has been working as lecturer at S.D.S.M. College, Palghar, since 1989. He worked on the bird hazard project as Senior Research Fellow at IARI (1982-84) and Biologist/Scientist at BNHM (1984-89). His areas of research interest include: isolation and identification of pathogenic microbes with regard to public health and wild life, and applied ecological aspects in wild life. He has contributed 20 papers/reports in national/international journals and has also attended several conferences and seminars.