



Best Practices for Mitigation of the Hazards posed by Birds to Aircraft

November 2020



SÁLIM ALI CENTRE FOR ORNITHOLOGY AND NATURAL HISTORY

(A Centre of Excellence under the Ministry of Environment,
Forest and Climate Change, Govt. of India)
Anaikatty P.O., Coimbatore - 641 108, Tamil Nadu

Best Practices for Mitigation of the Hazards Posed by Birds to Aircraft

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PREAMBLE

Birds and human share the sky for their movement. Bird strike to aircraft is a serious hazard for both birds and aircrafts. It is estimated that hundreds of people have been killed in bird–aircraft collisions worldwide. As the number of flights increase and the bird population undergo changes, severity of the situation continues to increase.

Salim Ali Centre for Ornithology and Natural History (SACON) is a Centre of Excellence (CoE) under the Ministry of Environment, Forest and Climate Change (MoEFCC), Government of India, specializing studies on birds for the last 30 years. Recently SACON has conducted studies on bird hazards to aircrafts in four civil airfields in the country such as Rajiv Gandhi International Airport, Hyderabad; Coimbatore International Airport, Coimbatore; Sardar Vallabhbhai International Airport, Ahmedabad and Kannur International Airport, Kerala. In addition, SACON has been guiding Ornithology Cell of Indian Airforce for their studies and management on bird strikes and mitigation measures. From these experiences, it has been understood that there are some broad guidelines which are applicable to many airports in managing the bird hazards in the country. We intend to communicate these to airport authorities through this brief Best Practice Guide. We also recognize that, many of the problems are site specific and it needs local solutions which will be different from the general strategies explained here. However, these strategies are fundamental in nature and should be strictly followed in the airports to minimise the bird hazards.

Authors



Introduction

Bird–aircraft collisions have been a serious threat to aviation in recent years. Habitat management in airfields and areas adjacent to them is one of the important components in any integrated approach to reduce the hazards posed by birds to aviation. Location-specific habitat management information is needed to reduce the number of bird–aircraft conflicts. The habitat management is aimed at reducing the attractiveness of sites for challenging bird species by reducing the availability of food, water, cover and roosting sites.

Best practices in the mitigation of hazards posed by birds to aircraft are envisaged for Indian civil airfields on the basis of the present ecological understanding of the issues. Most of the problems are site-specific, depending on the pattern of landscape elements around an airport and the resultant bird community structure in and around the airport. Hence, the best practices listed here should be viewed and understood in the light of the following considerations:

- (i) Birds are flying organisms that have been living in this world for the last 150 million years, and their movements are influenced, not controlled, by the availability of food and other resources.
- (ii) The presence or absence of each species of bird at a location is controlled by a multitude of factors, and hence it is not predictable at all times.
- (iii) Not all the bird species in an airport are known to be hazardous / problematic; only a small number of them are problematic due to their movements around the runway and in the vicinity of the airport.





- (iv) Birds seen in and around an airport are a subset of a larger assemblage in the landscape. Hence the structural heterogeneity of the larger landscape also influences the movements of the birds.
- (v) The movements of birds between regions and continents, such as migration, can also be a significant factor, depending on the specific location of an airport.
- (vi) Bird strikes may take place due to many external factors, and hence they need not indicate the rigorousness of the measures taken by the authorities to mitigate the hazards posed by birds within an airport.
- (vii) A systematic study of the birdlife of an airfield and understanding the bird community structure and its changes are essential for mitigating the hazards posed by birds.

1. Habitat Management

A short monoculture of grass inside an airport is better than tall grass cover or removal of grass.

- ✈ The height of the grass cover should be maintained at <15 cm. Maintaining this height might reduce the food supply and cover for many large and flocking bird species and make them easier to detect.
- ✈ Grass species with larger grain size (e.g. *Dicanthium* spp.) should be eliminated systematically by cutting and removal before they flower.
- ✈ Removal of cut grass from the operating area of the airport is necessary since it may help reduce the extent of the habitat available for termites and other insects and for insectivorous birds in turn.
- ✈ Eradication of termites within the airport through anti-termite





treatment is suggested. The mounds should be completely destroyed physically after the treatment. The holes that are found near the runway should be filled with soil, or they will act as suitable habitats for reptiles and small mammals (hares, mongooses, etc.).



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- ✦ Sewage treatment plants or open canals passing through or near the airfield should be covered completely to avoid visits by birds in search of food.
- ✦ Water flows associated with irrigation and open stagnant water of any type should be prevented inside airfields and near airports.
- ✦ Location of slaughter houses and waste dumping yards very close to airports should be completely avoided or a scientific waste management system should be implemented to avoid attracting carnivores and scavenging birds such as the Black Kite and House Crow.
- ✦ Any ornamental plants and avenue trees that are to be raised within the airport premises should be selected carefully. Planted trees and plants that provide roosts for flocking birds (mynas, crows, parakeets etc.) and plant species that produce fleshy fruits and showy flowers should be avoided.
- ✦ Feeding of birds by people close to the airport (within a radius of 2 km) should be discouraged or stopped.





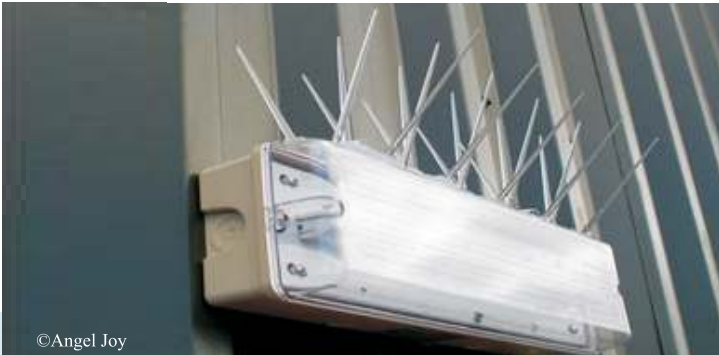
2. Air Traffic Control (ATC)

- ✈ Conducting ornithological training for the ATC staff focusing on the problematic birds will help them greatly in taking appropriate strategic decisions from the ATC tower to reduce the number of bird hits.
- ✈ Understanding the relationships between bird flight patterns and the wind speed, wind direction and flight takeoff and landing zones may be helpful in mitigating the bird strike during periods of intense bird activity.
- ✈ Increasing the awareness of pilots about birds and their behaviour could also reduce the risk of accidents/bird strikes.

3. Bird Strike Control and Management

- ✈ A database of available bird species within 10 km radius of the airport must be prepared.
- ✈ Regular inspection of the runway and continuous monitoring of birds on the runway and in the landing and takeoff zones before and after flight activity may prevent bird strikes at lower altitudes.
- ✈ Pyrotechnics such as carbide bird scarers, cartridges, acoustic devices, shotgun blanks, starter pistols and flare pistols have to be used in combinations.
- ✈ Permanent placement of bird scarers and zon guns have proved to be of little use in managing bird hazards. However, intelligent use of these devices, with regular changing of their positions, can be effective in reducing the movements of birds on the runway and in adjoining areas.
- ✈ Infrared light can be used at night as a bird-hazard mitigation





measure. Also flash light can be used in lesser power output. In USA and Africa LED flash lights have been used to search and deter the nocturnal ground hiding birds and proved it has positive impact.

- ✈ It is recommended that buildings in aerodromes be covered with bird-proofing barriers to prevent birds from perching on them regularly.
- ✈ New buildings at aerodromes should be designed such that they do not provide perches for birds (bird-unfriendly designs should be adopted).
- ✈ Durable spike covers can be fitted on lampshades, poles, signboards, etc. in airfields to prevent birds from perching on them.
- ✈ Abandoned buildings, hangars, vehicles and containers that are not in use inside the airport premises should be removed without delay. Birds may use these facilities for roosting, nesting and hiding.
- ✈ An existing institutional facility may be used or an additional institutional mechanism established to regulate the land use pattern and cropping pattern or any bird-attracting landscape use with the involvement of the stakeholders.





4. Documentation and Informed Decision Making

- ✈ One of the most important factors in the long-term management of the hazards posed by birds to aircraft is the availability of reliable, well curated data on the bird movement patterns at a location.
- ✈ Appropriate real-time assessment of the data and decision making are critical for the management of bird strikes.
- ✈ There will be stochastic movements of bird flocks that are unpredictable due to many ecological reasons. An emergency system should be instituted to handle the situations arising from such bird movements.
- ✈ Conducting regular training programmes for the Bird Hazard Combat Team of the airport to impart basic knowledge about common birds and problematic birds and their biology, ecology and behaviour will make a marked difference to the manner in which unexpected eventualities are managed.

5. Immediate Measures for Short-term Results

- ✈ The use of some physical methods such as netting, trapping and relocation could be attempted for flocking urban birds such as the Blue Rock Pigeon. Trapping can be attempted using cage traps or netting fly traps, and the birds should be relocated at least 50 km away from the captured locations because pigeons are known for their strong homing behaviour.
- ✈ Insecticides are being used across the world to reduce insect activity levels and in order to keep away insectivorous birds. Many available herbal insect repellents such as "neem extracts" are a better option





in this regard as they chase insects away from an area, instead of killing them. In the case of swarms of insects, dead insects in air field can also attract more birds, and hence repellents are definitely a better option.

- ✈ Breeding of birds in the airport premises should be prevented by all means. Open soil patches are most suitable for the breeding of ground-nesting birds such as lapwings. Hence the maintenance of grass cover with an average height of <15 cm within the airport is advised.
- ✈ Periodic removal of visible eggs and nests from the airport can disturb the breeding birds, and as a result they may search for alternate places. Bird eggs and nests should be searched regularly until all breeding efforts stop.
- ✈ Remote controlled drones fitted with silhouettes of birds of prey have been found to yield good results in the Netherlands, Canada, Russia, etc. The use of these devices can be attempted experimentally to chase birds away from the airfield.

6. Awareness Creation and Public Participation

Many activities of people living in the surroundings of airports are also a significant reason for the increased incidence of bird strikes in recent years. The waste dumping and bird-feeding practices of people (for various religious and recreation reasons) attract and keep very large flocks of birds in the vicinity of airports. Hence awareness should be created among the public about the potential problems of bird hazard to aircraft arising from these activities. In this regard, the Airport Environment Management Committee should be proactive, and representatives of the local administrative bodies and local community should be involved.





7. Bird Species-wise Recommendations

7.1. Black Kite

- ✦ Black Kites have been found sitting in many airports on the ground or soaring at low heights above the apron, runway and taxiway.
- ✦ Because they are high soarers, their presence near the approach path zone is most dangerous for flights landing and taking off.
- ✦ Regular cleaning of the runway, apron, taxiways and perimeter road and checking the entire airport for any small animal or bird carcasses is important.
- ✦ Any carcass or remains of an animal or bird found in airside will become an attractant for the Black Kite.
- ✦ Application of Bird scarers may result in driving away Black Kites that soar high above the approach path of the aircrafts.
- ✦ There should be strictly no food waste accumulation within the airside.
- ✦ Implementation of proper scientific waste management practices within and in close proximity of the airport is critical to reduce or avoid bird strikes involving Black Kites.





7.2. Lapwing

- Lapwings, being ground nesting birds, lay their eggs on bald, stony patches of land in preference to thickly vegetated areas, including grasslands.
- To discourage lapwing activity, appropriate short grass cover should be developed and maintained preferably <15 cm height, inside the airfield.
- Regular patrolling must be carried out within the airside area to identify and map resting and nesting sites of lapwings.
- If found, lapwings eggs must be removed immediately from the airport grounds.

7.3. Pigeon

- Trap and relocate safely all the pigeons in the airside and terminal buildings.
- Avoid water stagnation within the airside.
- The right grass cover should be maintained, especially near the runway.



- ✦ The grass should be cut before it produces seeds.
- ✦ The terminal building should be bird-proofed.

7.4. Egret

- ✦ Egrets are generally active at airports throughout the daytime. In the morning and evening, they move from and to the roosting site, which is generally outside the airside. Stagnation of water should be completely avoided.



- ✦ Open drainage systems should be avoided inside the airfield.
- ✦ Appropriate maintenance of grass height is very important.
- ✦ Egrets follow grass-cutting machines, and hence cutting of grass must be avoided close to the periods of peak flight activity. Bird scarers must be deployed along with the grass-cutting team.

7.5. Crow

- ✦ Food waste dumping areas located around the airport must be relocated far away from the airport compound.
- ✦ There should strictly be no waste accumulation within the airside.
- ✦ Establishment of scientific waste management practices within the airport is critical for reducing and avoiding bird strikes involving scavenging birds





7.6. Peafowl

These birds must be chased away from the airside repeatedly by using different scaring devices. Open scrub lands are the preferred breeding habitat of Peafowl, and hence, this habitat should not be present within and close to the airport premises.

7.7. Francolin

A short but thick cover of grass area must be maintained near the runway and in the open grasslands between the apron and taxiways, to prevent congregation of francolins.



7.8. Roller

- ✈ Rollers are normally found perched on the poles, name boards and electric wires if any available in the premises.
- ✈ Avoid such perching areas inside the airport. Place bird spikes in essential poles and boards inside the airport.



7.9. Waterfowl / water birds

- ✈ Water bodies near the Airport premises will attract birds such as storks, herons, cormorants, ibises, ducks, geese, terns etc..
- ✈ Deter water birds from sitting on the banks of water bodies from immediate surrounds of the runway region especially from the approach paths.



- Fill the water stagnant areas near the runway with earth.
- Cover the banks of the water bodies with nets so that water fowls/water birds cannot come and land.



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