



ICAO

Second Meeting of the Asia/Pacific Wildlife Hazard
Management Working Group (AP-WHM WG/2)

Virtual Meeting, 27 to 29 May 2020

**Agenda Item 4: Progress Update on Tasks assigned to States and
International/Regional Organizations**

**CASE STUDY ON AIRPORT WILDLIFE STRIKE HAZARD ASSESSMENT AND
IMPLEMENTATION OF MITIGATION MEASURES**

(Presented by Thailand)

SUMMARY

This paper presents the case study of effective control and reduction of wildlife hazard in Thailand. The need of coordination among relevant organizations, such as aerodrome operators, aircraft operators and air traffic controllers, is crucial to implement such mitigation measures.

This paper is prepared in response to Task 1/6.

1. INTRODUCTION

1.1 Wildlife hazard management is the reduction of the risk to aviation safety from wildlife through management and control of hazardous wildlife at an aerodrome and its vicinity. It depends on aerodrome operators to assess and manage hazards posed by wildlife on and around aerodromes. The wildlife management programme is a tool to manage wildlife hazard, used by the State which recommended by ICAO.

2. DISCUSSION

2.1 Wildlife hazards should be assessed through a procedure for recording and reporting. The procedure also identifies wildlife trends at the aerodrome on wildlife strikes to aircraft. Based on the results of the assessment, specific measures or recommendations could be formulated to mitigate or reduce wildlife risk at the aerodrome.

Thailand's regulations and requirements regarding wildlife hazard management

2.2 Thailand has promulgated regulations to require wildlife hazard management to be conducted at each aerodrome. The aerodrome operator has to develop and implement its own wildlife hazard control programme/plan. The regulations are as follows.

A. Requirement of the Civil Aviation Authority of Thailand (CAAT) No. 14 Aerodrome Standards on Wildlife Strike Hazard Reduction section stipulates that the presence of wildlife on and in the aerodrome vicinity poses a serious threat to aircraft operational safety. The owner

or operator of an aerodrome shall assess the wildlife strike hazard on an aerodrome, or in the vicinity of 13 km radius from the aerodrome reference point, through:

- (1) the establishment of a procedure for recording and reporting wildlife strikes to aircraft in accordance with the regulatory framework;
- (2) the collection of information from aircraft operators, aerodrome personnel, and other sources on the presence of wildlife on or around the aerodrome constituting a potential hazard to aircraft operations; and
- (3) an ongoing evaluation of the wildlife hazard by sufficient competent personnel.

The owner or operator of an aerodrome shall take actions to decrease the risk to aircraft operations by adopting measures to minimize the likelihood of collisions between wildlife and aircraft.

The owner or operator of an aerodrome shall take actions to eliminate or to prevent the establishment of garbage disposal dumps or any other sources which may attract wildlife to the aerodrome, or its vicinity, unless an appropriate wildlife assessment indicates that they are unlikely to create conditions conducive to a wildlife hazard problem.

Where the elimination of existing sites of garbage disposal is not possible, the owner or operator of an aerodrome shall ensure that any risk to aircraft posed by these sites is assessed and reduced to as low as reasonably practicable.

The owner or operator of an aerodrome shall report to or establish coordination procedure with a local authority to give due consideration to aviation safety concerns related to land developments in the vicinity of the aerodrome that may attract wildlife.

B. Regulation of CAAT on Standards for Public Aerodrome Manuals B.E. 2562 issued in 2019 requires the operator of the certified aerodrome must include the following particulars in an Aerodrome Manual, under wildlife hazard management;

- (1) arrangements for assessing wildlife hazards
- (2) arrangements for implementing wildlife hazard control programme/plan
- (3) the names and roles of the persons responsible for dealing with wildlife hazards, and their telephone numbers during and after working hours.

C. Regulation of Department of Civil Aviation on Standards of Aerodrome Operating Procedures B.E. 2557 issued in 2014 requires the aerodrome operators to establish wildlife hazard management and standard procedures. The procedures shall be incorporated into the Aerodrome Manual and including of;

- (1) wildlife hazard control programme/plan should include;
 - (a) roles of the persons responsible for dealing with develop and implement wildlife hazard control programme/plan
 - (b) reporting, collecting and recording procedures on wildlife
 - (c) analyze and assess wildlife risk to adopt control measures
 - (d) land use management on and around the aerodrome
 - (e) expelling and deterring techniques to decrease the risk to aircraft operations
 - (f) coordination with stakeholders to eliminate or prevent the establishment of garbage disposal dumps or any such other sources which may attract wildlife to the aerodrome or its vicinity
- (2) wildlife safety risk assessment
- (3) the potential hazard of wildlife to be notified to pilots
- (4) wildlife reports to be summited to CAAT

D. Requirement of CAAT No. 22 on Reporting of Civil Aviation Occurrences issued in 2019 which State Safety Programme (SSP) Document stipulated that CAAT to develop the requirements on the mandatory and voluntary occurrence reporting system as a reporting

mechanism to report and collect safety data from the Civil Aviation Organizations and Operators.

The Civil Aviation Organization shall perform operation in accordance with risk management standards appearing in the mandatory occurrence report by having the CAAT efficiently monitor and follow up such operation.

The CAAT has the authority to order the Civil Aviation Organization, Operator or other persons or organizations apart from the Civil Aviation Organization to provide additional data relating to the occurrence as deemed appropriate.

The Civil Aviation Organization shall develop both mandatory and voluntary occurrence reporting system as part of its safety management system to systematically collect and gather safety data and safety information retrieved from report and occurrence analysis, including all other related safety data and information.

An occurrence report is submitted to CAAT by using “European Co-ordination Centre for Accident and Incident Reporting Systems (ECCAIRS)” software in which the collected data is categorized using common aviation taxonomies and definitions or PDF forms.

*Airport wildlife strike hazard assessment and implementation of mitigation measures:
The case study of Airport of Thailand (AOT)*

Bird and Wildlife Hazard Surveys and Assessments at AOT’s Airports

2.3 Wildlife hazards should be assessed through a procedure for recording and reporting. The procedure also identifies wildlife trends at the aerodrome on wildlife strikes to aircraft. Based on the results of the assessment, specific measures or recommendations could be formulated to mitigate or reduce wildlife risk at the aerodrome.

2.4 AOT has developed and implemented a bird hazard control management programme according to requirements issued by CAAT. The assessment of bird hazards based on surveys conducted under different seasons for all AOT’s airports. The collected data comprise of the number of birds, change of environments, and other risk factors used to analyze and recommend appropriate methods for bird hazards prevention. Details of surveys for the year 2018 are in the following table.

AOT’s Airports	Number of survey per year
Suvarnabhumi Airport	3 times of survey per year in 3 seasons (October/February/August)
Don Mueang International Airport	3 times of survey per year in 3 seasons (November/April/August)
Chiang Mai international Airport	1 time of survey in Summer (February)
Hat Yai International Airport	1 time of survey in Rainy season (June)
Phuket International Airport	1 time of survey in Summer (April)
Mae Fah Luang-Chiang Rai International Airport	1 time of survey in Summer (March)

Bird and Wildlife Hazard Assessment Methods at AOT’s Airports

2.5 AOT currently applies the methods of Qualitative Risk Assessment Matrix by following the Transport Canada Guidelines (2005) to bird hazard assessment methods to identify high-risk bird species for defining management and control measures.

2.6 There are two factors used in the Risk Matrix for assessing the level of risk posed by birds: Potential of damage and Potential of Strikes are as follows:

2.6.1 Potential of Damage, based on the size and weight of birds categorized into small, medium and large.

Size and weight of birds	Description
Small < 300 g.	very small and small
Medium 300 – 1,000 g.	small to medium and medium to large
Large > 1,000 g.	large to very large

2.6.2 Potential of Strike, based on factors from the surveys which can be classified into 3 levels: low, medium and high. High number of birds, hazardous behaviors such as flight patterns of individual birds and birds in flocks poses a high potential of strike. The calculation formula is as below:

$$\text{Percentage of Abundance} = \frac{\text{Times of Birds Found} \times 100}{\text{Survey Times}}$$

High = 67 – 100 %

Medium = 34 - 66 %

Low = 1 – 33 %

Risk Assessment Table

Bird Strike Risk Assessment		Potential of Strike		
		High (3)	Medium (2)	Low (1)
Potential of Damage	High (3)	Very high	Very high	Medium
	Medium (2)	Very high	Medium	Medium
	Low (1)	Medium	Low	Low

Risk Levels and Preventive and Corrective Actions

High-risk level

Risk Characteristics: Large-sized birds with high population, high potential of strike and high potential of damage

Preventive and Corrective Actions: Short-term and long-term environmental management plans and immediate controls of bird populations

Medium-risk level

Risk Characteristics: Medium-sized birds with high population, potential of strike but very low potential of damage

Preventive and Corrective Actions: Short-term and long-term environmental management plans and controls of bird populations

Low-risk level

Risk Characteristics: Small-sized birds with low to medium population, low potential strike and low potential of damage. However, they can induce birds of prey into the airport area.

Preventive and Corrective Actions: Environmental management plans

Once the surveys and assessments are completed. AOT’s airports will develop operational plans with their own based on physical characteristics of each airport.

Wildlife Hazard control of AOT’s airports

2.7 AOT establishes the operational plan that covers all the related subjects, from surveying the bird and animal population, evaluating the airport’s environment, eliminating their habitat and food source, and managing the ecological system, in order to reduce the bird population. AOT also collects the statistical data, for predicting and identifying the animal movement routes in the airport and vicinity, in order to provide the appropriate warning to pilots, through the aeronautical information service.

Preventive measures against potential harms from birds and animals of AOT’s airports

2.8 The following are the preventive measures used at AOT’s airports:

2.8.1 Evaluate the environment and manage factors that attract birds and animals to prevent resting roosting and feeding.

2.8.2 Strictly monitor the area all the time and when threat is found, it must be deal with immediately, using the appropriate methods.

2.8.3 Evaluate and manage the potential risks that may lead to harmful effects of birds and animals in the 13 km radius of the airport including land use management.

2.8.4 Review and improve the plan appropriately in accordance with the current ecological system.

Example of risk assessment at VTBS

Risk Levels	Type of birds		Preventive and Corrective Actions	
	2018	2019	2018	2019
High-risk	<ul style="list-style-type: none"> ○ Asian openbill ○ Lesser Whistling Duck ○ Little Egret ○ Painted Stork 	<ul style="list-style-type: none"> ○ Asian openbill ○ Little Egret ○ Painted Stork 	Short-term and long-term environmental management plans and immediate controls of bird populations	
Medium-risk	<ul style="list-style-type: none"> ○ Eastern Cattle Egret ○ Intermediate Egret ○ Spot-billed Pelican 	<ul style="list-style-type: none"> ○ Eastern Cattle Egret ○ Intermediate Egret ○ Purple Heron ○ Lesser Whistling Duck 	Short-term and long-term environmental management plans and controls of bird populations	
Low-risk	<ul style="list-style-type: none"> ○ 30 type of birds 	<ul style="list-style-type: none"> ○ 29 type of birds 	Environmental management plans	

Recommended Corrective Actions at VTBS	
2018	2019
Use repellent and harassment technique to disperse Painted Stork, Spot-billed Pelican and Lesser Whistling Duck from airport.	Use repellent and harassment technique to disperse Asian openbill, Painted Stork, Purple Heron, Little Egret and Whistling Duck from airport.
Bird feeding prohibited at airport.	Drainage ditches clearing to prevent vegetation and eroded soil clogged up.
Inspect grass area to ensure there is no swamp left at airside.	Cover of drainage ditches to prevent Painted Stork and Little Egret at night.
Vegetation cutting to prevent migrated bird nesting.	Maintain water level in drainage ditches at 50 cm.
Cover of drainage ditches to prevent resting of birds at night.	

Example of risk assessment at VTBD

Risk Levels	Type of birds		Preventive and Corrective Actions	
	2018	2019	2018	2019
High-risk	<ul style="list-style-type: none"> ○ Asian openbill ○ Purple Heron ○ Lesser Whistling Duck ○ Black-headed ibis 	<ul style="list-style-type: none"> ○ Asian openbill ○ Purple Heron ○ Lesser Whistling Duck 	Short-term and long-term environmental management plans and immediate controls of bird populations	
Medium-risk	<ul style="list-style-type: none"> ○ Eastern Cattle Egret ○ Little Egret ○ Intermediate Egret 	<ul style="list-style-type: none"> ○ Eastern Cattle Egret ○ Little Egret ○ Intermediate Egret ○ Pigeon 	Short-term and long-term environmental management plans and controls of bird populations	
Low-risk	<ul style="list-style-type: none"> ○ 30 type of birds 	<ul style="list-style-type: none"> ○ 29 type of birds 	Environmental management plans	

Recommended Corrective Actions at VTBD	
2018	2019
Use repellent and harassment technique to disperse Black-headed ibis, Purple Heron and Lesser Whistling Duck from airport	Use repellent and harassment technique to disperse Asian openbill, Purple Heron, Intermediate Egret, Eastern Cattle Egret, Little Egret and Lesser Whistling Duck from airport.
Inspect at approach light to prevent nesting of Whistling Duck.	Vegetation cutting to prevent resting, nesting and feeding.
Vegetation cutting on apron to avoid attracting of Spotted Dove, Red Collared Dove and Zebra Dove	Water bodies and ditches should have steep slopes and maintain water level at 50 cm. to discourage wading birds from feeding in shallow water.
Graded grass area to prevent water bodies to be habitat of Asian openbill and Black-headed ibis.	Netting on taxiway boundary area to reduce feeding and resting of Asian openbill.
Cut the tree to prevent roosting of Asian openbill and Little Cormorant.	
Inspect the abandoned structures to prevent roosting of Common Myna and White-vented.	

Thailand wildlife strike occurrences statistics 2018 – 2019

2.9 Wildlife strike occurrences divided into bird strike and wildlife collision occurrences:

- Number of bird strike occurrences by year

Number of bird strike occurrences	
2018	1036
2019	851

- Number of wildlife collision occurrences by year

Number of wildlife collision occurrences	
2018	6
2019	8

- Number of bird strike occurrences in Thailand by month

Number of bird strike occurrences	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	59	43	51	69	111	106	122	85	76	65	78	73
2019	55	32	39	62	83	76	81	76	72	46	47	32

- Number of bird strike occurrences at VTBS and VTBD by month

VTBS	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	29	30	31	39	77	80	85	41	42	26	27	32
2019	34	9	11	22	26	19	45	41	29	19	9	10

VTBD	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2018	6	3	9	9	8	7	20	14	14	15	18	12
2019	7	8	11	6	16	17	12	22	17	10	23	10

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- note the information in this paper; and
- discuss any relevant matters as appropriate.

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