

GUIDANCE ON ASSESSING THE RISK OF ATTRACTIONS OF BIRDS BY AREAS AND FACILITIES CLOSE TO AERODROMES

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Bird strike prevention in Denmark is very much affected by the fact, that Denmark is a small, densely populated country, and different interests in the land use frequently result in conflicts. Consequently, spatial planning is well developed and indeed necessary in order to avoid these conflicts.

During the last 10 years, we have experienced difficulties for Danish aerodromes in convincing the environmental and planning authorities that establishing new areas and facilities may attract birds, which can pose hazards to aviation.

The aerodromes have appealed decisions from the municipalities on establishing such areas/facilities. Unfortunately we have seen in a number of cases that the Danish Nature Protection Board of Appeal has decided against the interest of aviation. The Board has argued that there has not been sufficient evidence in the actual cases, and that more specific documentation was needed.

The best way to avoid establishing of such areas/facilities is to address the issue as early as possible in the planning phase, and before municipalities or other authorities have decided to establish the facility. Therefore, the Bird Strike Committee of Denmark, decided in 2007 to prepare a new guidance, mainly applied for the aerodromes (Christensen T.K. et al. 2010). The object was to develop a simple, practical method to assess the risk for a specific aerodrome, if a new facility is being planned in the vicinity of the aerodrome. The new method is a further development of the guidelines presented by the Danish National Environmental Research Institute at the IBSC meeting in Brazil in 2008 (Christensen 2008).

Unfortunately, only very few studies in local dispersal and daily movements of birds are published. Thus, the stated data of the mobility of bird species as present in the following tables are mostly based of generally knowledge of the birds involved. As a consequence the guidance will be revised when improving data appear.

This risk assessment model is intentionally addressed to nonexperts and is limited in its scope.

THE METHOD

The method is divided into two parts:

- A simple assessment of whether birds attracted by a new area/facility are able to disperse to the aerodrome
- A more qualitative assessment of other factors not dealt with in the risk assessment.

RISK ASSESSMENT

The core of the risk assessment is to assess whether a bird species, that could be attracted to a given area/facility, would have a typical range of action that stretches out to the aerodrome.

The risk assessment is done from input of three parameters:

- Bird species,
- Mobility
- Distance to the aerodrome.

The number of bird species in the guidance has been limited to a manageable number, in this case 23 species, based on the following criteria:

- It is potentially attracted to the area/facility
- It is registered in collisions in the Danish bird strike statistics in 1992-2008
- It fulfills at least to of these criteas:
 - Body weight > 0.1 kg
 - Registered in flocks in more than 25 % of the registered collisions
 - Damage in at least 2 % of the collisions
 - At least 0.5 % of total number of collisions with species identified.

An assessment of whether the individual bird species is likely to appear in each of the areas/facilities mentioned in the Danish bird strike legislation, was made based on general knowledge about birds. The following areas/facilities were included:

- Technical waste plants
- Sewer treatment plants
- Rainwater ponds
- Fish farming,
- Mink farming
- Artificial lakes,
- fire ponds
- Restored gravel pits
- Wetlands

The mobility assessed is divided into five categories: 0-1 km, 0-3 km, 0-5 km, 0-13 km, 0->13 km. Each of these categories has been assigned a value from 1-5:

0-1 km	0-3 km	0-5 km	0-13 km	0->13 km
1	2	3	4	5

Table 1: Assigned values to mobility of bird species.

The distance from the aerodrome to the facility is similarly assigned a value from 1-5:

0-1 km	1-3 km	3-5 km	5-13 km	>13 km
1	2	3	4	5

Table 2: Assigned values to distance from aerodrome.

For all the 23 selected bird species the mobility was assessed using the values from table 1, and a value of the risk of each bird species was computed by subtracting the value of the mobility from the value of the distance to the aerodrome from table 2.

Table 3 shows all the bird species, their value of mobility, and the computed risk.

The value of the risk will be from -4 to 4, and the higher the value the higher the risk of overflying the aerodrome.

	Mobility	Distance to airport				
		>13 km	5-13 km	3-5 km	1-3 km	0-1 km
		(5)	(4)	(3)	(2)	(1)
Mute swan	1	-4	-3	-2	-1	0
Greylag goose	4	-1	0	1	2	3
Cormorant	5	0	1	2	3	4
G. black.b. gull	3	-2	-1	0	1	2
Heron	4	-1	0	1	2	3
Pheasant	1	-4	-3	-2	-1	0
Shelduck	1	-4	-3	-2	-1	0
Mallard	5	0	1	2	3	4
Herring gull	5	0	1	2	3	4
Buzzard	3	-2	-1	0	1	2
Tufted duck	5	0	1	2	3	4
Hooded crow	4	-1	0	1	2	3
Oystercatcher	2	-3	-2	-1	0	1
Wood pigeon	4	-1	0	1	2	3
Common gull	5	0	1	2	3	4
Domestic dove	3	-2	-1	0	1	2
Teal	4	-1	0	1	2	3
Black h. gull	5	0	1	2	3	4
Lapwing	2	-3	-2	-1	0	1
Kestrel	3	-2	-1	0	1	2
Golden plover	3	-2	-1	0	1	2
Starling	3	-2	-1	0	1	2
Sand martin	3	-2	-1	0	1	2

Table 3: Computed risk assessment for birds. Positive risk values are indicated in blue.

Areas/facilities

For each of the areas/facilities a table was prepared, showing the risk for the bird species from this particular facility overflying the aerodrome in this particular distance. Two examples – for sewer treatment plants and for wetlands/artificial lakes - are shown below.

Bird species	Mobility	Distance to airport				
		>13 km (5)	5-13 km (4)	3-5 km (3)	1-3 km (2)	0-1 km (1)
Herring gull	5	0	1	2	3	4
Common gull	5	0	1	2	3	4
Black h. gull	5	0	1	2	3	4
Tufted duck	5	0	1	2	3	4
Mallard	5	0	1	2	3	4
Heron	4	-1	0	1	2	3
Hooded crow	4	-1	0	1	2	3
Gr. black-b. gull	3	-2	-1	0	1	2
Starling	3	-2	-1	0	1	2
Domestic dove	3	-2	-1	0	1	2

Table 5: Computed risk values for bird species attracted to sewer treatment plants.

Bird species	Mobility	Distance to airport				
		>13 km (5)	5-13 km (4)	3-5 km (3)	1-3 km (2)	0-1 km (1)
Comorant	5	0	1	2	3	4
Mallard	5	0	1	2	3	4
Herring gull	5	0	1	2	3	4
Tufted duck	5	0	1	2	3	4
Common gull	5	0	1	2	3	4
Bl.-headed gull	5	0	1	2	3	4
Greylag goose	4	-1	0	1	2	3
Heron	4	-1	0	1	2	3
Hooded crow	4	-1	0	1	2	3
Wood pigeon	4	-1	0	1	2	3
Teal	4	-1	0	1	2	3
Gr. Black-b gull	3	-2	-1	0	1	2
Kestrel	3	-2	-1	0	1	2
Golden plover	3	-2	-1	0	1	2
Starling	3	-2	-1	0	1	2
Oystercatcher	2	-3	-2	-1	0	1
Lapwing	2	-3	-2	-1	0	1
Mute swan	1	-4	-3	-2	-1	0
Pheasant	1	-4	-3	-2	-1	0
Shelduck	1	-4	-3	-2	-1	0

Table 4: Computed risk values for bird species attracted to wetlands and artificial lakes.

OTHER FACTORS

A range of other factors can affect the bird strike frequency caused by a new area/facility attracting birds. These factors must be dealt with as a supplement to the risk assessment.

Severity: The severity of a bird strike is proportional to the weight of the bird. Thus, it must be taken into consideration, if the potential bird hazards identified in the risk assessment include heavy birds.

The location: The location of the facility compared to the aerodrome and to other areas attracting birds is important. If a new area/facility is placed in a way, that the aerodrome is between this area and other larger areas suitable for birds, this will increase the risk of bird strikes. This issue is treated more carefully in Christensen (2008)

Local variations: Obviously, the size of the new area/facility is important, as well as the size and number of other areas nearby. Such more complex cases are not treated in this guideline, and the aerodrome in concern must consult their wildlife consultant for further advising.

REFERENCES

Christensen, T. K. 2008. Risk Assessment in relation to restoration of wetlands (lakes and wet meadows) in proximity to airports, a basic model

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