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BIRD STRIKES ANALYSIS IN ESTONIA 1989-1991

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ABSTRACT

This working paper is continuation of WP20 at BSCE 20. During period 01.01.1989-17.07.1991 55 bird strikes were registered with Estonian aircraft in 13 airports and its vicinity in European part of the former USSR. There were no deaths, injuries or aircraft losses but 5 engines were damaged. Total loss has formed about 300 000 roubles in old prices.

Introduction

This report covers bird strikes, which occurred since 01.01.1989 till 17.07.1991, when position of aviational ornithologist was closed due to difficult economical situation in Estonian Civil Aviation Department (ECAD). The mass reduction of the staff took place especially after 01.12.1991, when ECAD was reorganized in new firm "Estonian Air". ECAD recorded 55 bird strikes during 1989-1991. These strikes caused neither aircraft losses nor injuries, but 10 strikes resulted in damages of various degree to aircraft. Only 1 bird strike was included in this review after 17.07.91 - very serious collision 03.08.91 with capital repairs of engine D-30 from Tu-134.

1.Bird Strikes by Impact Location

Distribution of bird strikes by impact location was the following (number of strikes with damage is pointed in brackets): Radome-2; Windscreen-3; Nose-1; Engine-8(5); Wing-7(3); Fuselage-3; Landing gear-7; Tail-1; Lights-2(2); Part unknown -22.

2.Bird Strikes by Aircraft Type

Table 1 shows distribution of incidents by aircraft type and different years.

Aircraft type/Year	1989	1990	1991	Total
Tu-134	10	3	3	16
Yak-40	12	4	2	16
An-2	3			3
Unknown	8	8	4	20
Total	31	15	9	55

Decrease of bird strikes number can be explained by the following reasons:

-dropping of aircraft movements due to raising of ticket prices and absence of fuel;

-stopping of aviation-chemical works in agrolandscapes with use of aircraft An-2;

-worsening of count quality as consequence of more careless relation of aerodrome staff to their official duties due to numerous economical problems.

On the other hand, Estonian airports in 1990 have became international ones. Now Estonian aircraft carry out regular flights in capitals of Finland, Sweden, Hungary and Frunkfurt A M. Number of charter flights by little aircraft increased very considerably.

3. Bird Strikes by Phase of Flight

There is a great number of incidents, when only died birds were found on aerodromes without detail information about collisionsTherefore picture in general is expedient: ON aerodrome -38, NEAR aerodrome-5, EN ROUTINE-4, unknown-8.

Incidents took place on Tallinn aerodrome and its vicinity -30(54,5%), Kuresaare-6(10,9%), Kärdla-2(3,6%)-both in 1990, Tartu-1(1,8%). In 1 collision it were registered on the following aerodromes: Pulkovo (in 1990) and all the rest in 1989: Borispol, Rostov-on-Don, Cheliabinsk, Krivoi Rog, Krasnodar, Adler. 2 incidents were fixed on routine Kuresaare-Tallinn, 1 in the region of Rapla town, 1 on the routine Tallinn-Borispol, 1 - Pskov-Tartu. Besides that, 1 incident took place at local airport Kihnu on Kihnu island in Riga Gulf and another one on landing point for aviation-chemical works in Kungla (North-Eastern Estonia).

Totally, 45 (81,8%) bird strikes occurred in Estonia, 7 (12,7%)-abroad, 3 (5,5%) - unknown.

4. Bird Strikes by Altitude

Distribution of incidents by altitude was the following: 0-100 m-41 (74,5%), 101-400m-5 (9,1%), 401-1000m-1 (1,8%), 1001-2000m-2 (3,6%), unknown -6 (10,9%).

5. Times of Day and Year when Bird Strikes Occur

Distribution of incidents by time of day was the following: night (00.01-06.00)-2 (3,6%); morning (06.01-12.00)-21 (38,2%); day (12.01-18.00)-15 (27,3%); evening (18.01-24.00) -12 (21,8%); unknown - 5 (9,1%).

Table 2

Year/month	1	2	3	4	5	6	7	8	9	10	11	12	
1989	2				4	3	7	12	2	1			31
1990	1	1	1		1	1	7	2	1				15
1991			2		2	4	----1----------						9

Table 2 shows distribution of incidents by months in different years. More than two thirds of the strikes occur during summer months (i.e. July and August), the peak month has been August in 1989, July in 1990 and unknown month in 1991, because data for the last years are uncomplete.

6. Birds Involved in Strikes

Table 3

Latin name	English name	ICAO category	Number of strikes
Anas L.	Duck	B	1
Anas platyrhynchos	Mallard	B	2
Apus apus	Swift	A	2
Vanellus vanellus	Lapwing	B	1
Laridae	Gull	B	7
Larus ridibundus	Black-headed Gull	B	4
Larus argentatus	Herring Gull	B	2
Larus canus	Common Gull	B	3
Columba L.	Pigeon	B	1
Acc. nisus sive Flconid.	Sparrow Hawk or Falcon	B	1
Perdix perdix	Partridge	B	1
Passeriformes excluding	Corvidae	B	5
Riparia riparia	Sand Martin	A	6
Hirundo rustica	Swallow	A	2
Delichon urbica	House Martin	A	3
Hir. rust. sive Del. urb.	Swallow or Martin	A	3
Alauda arvensis	Skylark	A	2
Corvus corone cornix	Hooded Crow	B	1
Strigidae L.	Owl	B	3
Unknown species or group		?	6
Total			55

Gulls were involved in 32,7% of incidents where the bird species was known, swallows and martins in 24,5% of incidents. Participation of owls in strikes - 6,1% is considerably higher, than earlier.

During one week at the middle of August 1989 some thousand individuals of Sand Martins (Riparia riparia) were resting on runway of Kuresaare aerodrome. About 10 Martins perished during each take-off of aircraft Yak-40.

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There were not bird strikes involved birds over 1,8 kg.

7. Damages Caused by Bird Strikes

Number of bird strikes with damages formed 18,2% (10 from 55). Total 5 engines, 2 lights and covering of 3 wings were damaged, all on different aircraft. Among 5 engines, 4 engines D-30 were repaired on Tu-134A and 1 engine AI-25 on Yak-40. In 5 incidents with damaged engines, 2 engines were replaced completely and in 3 incidents only separate damaged blades were replaced without capital repairs.

Twice authority of ECAD was forced to direct the additional aircraft in transit airports for removal of waiting passengers. It were in Borispol 15.05.89 and in Cheliabinsk 04.07.89. In Cheliabinsk aircraft stood under repair during 112 hours, in Adler (Sochi) 12.10.89 - 55 hours. The total standing idle (demurrage) of aircraft formed about 200 hours.

It is very difficult to estimate the total damages from bird strikes. According to preliminary data, it are equal about 300 000 roubles in old prices.

Table 4 shows list of the most serious bird strikes with Estonian aircraft in 1989-1991.

Table 4

The most serious bird strikes with Estonian aircraft in 1988-1991

N	Date	Aircraft type	Bird species	Number of birds	Airport or routine	Phase of flight	Speed (km/h)	Altitude (m)	Damaged part of aircraft
1.	13.01.89	Tu-134A	Passerines	5-10	Borispol (Kiev)	Taking -off	320	100-200	3 blades in left engine replaced
2.	06.05.89	An-2	Passerines	1	Pskov-Tallinn	en rout.	180	300	bird went through wing
3.	15.05.89	Tu-134A	?	1	Tallinn-Borispol	?	?	?	engine replaced demurrage-5 hours
4.	04.07.89	Tu-134A	Passerines	flock	Cheliabinsk	Descent or approaching	?	?	3 blades in right engine replaced engine completely demurrage-112 hours
5.	08.08.89	Yak-40	Gull ?	1	Kuresaare-Tallinn	Descent	400	1600	dent on front edge of right wing 10 x 10 sm and in depth about 3 mm
6.	17.09.89	Tu-134	Duck ?	1	Krasnodar	Descent	280	90	left main light broken, demurrage - about 10 hours
7.	12.10.89	Tu-134	?	1	Adler (Sochi)	Descent	320	400	dent 30 x 40 sm and in depth 4 sm on front edge of left wing
8.	18.03.90	Yak-40	Dark bird of mean size	1	Tallinn	Climbing	280	300	small dent on front edge of right wing
9.	12.07.90	Yak-40	Gulls	4	Kärdla	Taking-off	170	0-2	right light destroied. right engine damaged in 4 places; 1 dent 0,5x1 mm on blade of outer directing apparatus; 3 dents on blades of 1st stage of low pressure compressor: 2 dents by 0,5x1 mm and 1 dent - 2x1 mm
10.	03.08.91	Tu-134A	?	1	?	?	?	?	engine replaced completely

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