Bird strikes on helicopter in German Air Force

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Some years ago birdstrikes on helicopter were rare, but with introduction of the new helicopter generation such incidents and accidents increased.(Figure 1)

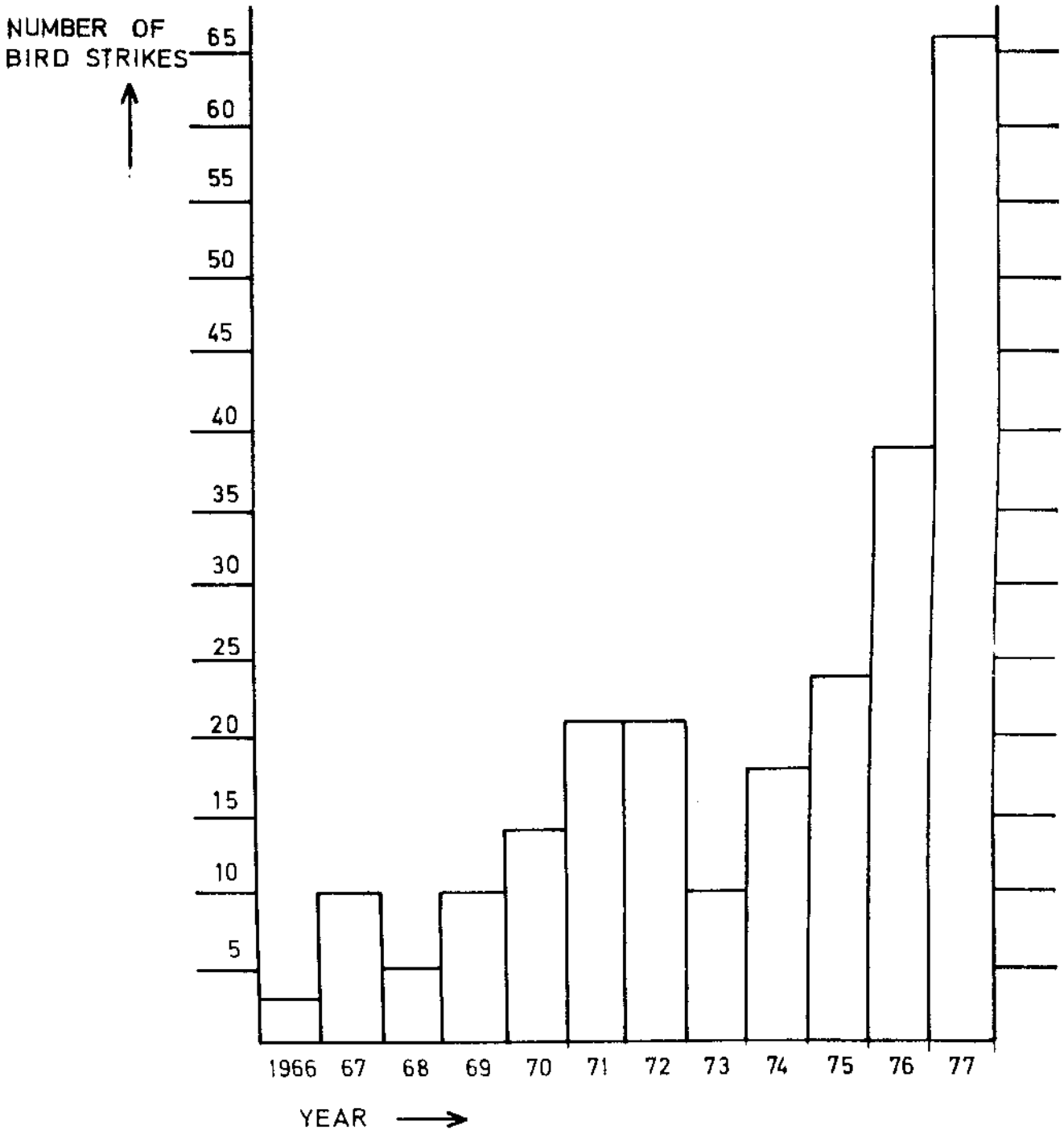
Some figures may document that also for helicopter a birdstrike can be an uncalculated risk. Figure 2 shows the engine nr.2 of a CH 53 damaged by a pigeon and figure 3 the cockpit of an Alouette II broken by a pigeon , too.

Analysing the distribution of helicopter-birdstrikes over the months there are not so remarkable picks as on jets. The single pick in summertime could be declared by the higher frequency of flights(figure 4) but movement periods are not to analyse. The flight stages on which strikes happened show an expected maximum up to 200 ft(GND), but the bird species document the real danger for helicopter by birdstrikes, for pigeons,ducks, gulls, crows and buzzards may induce an accident.

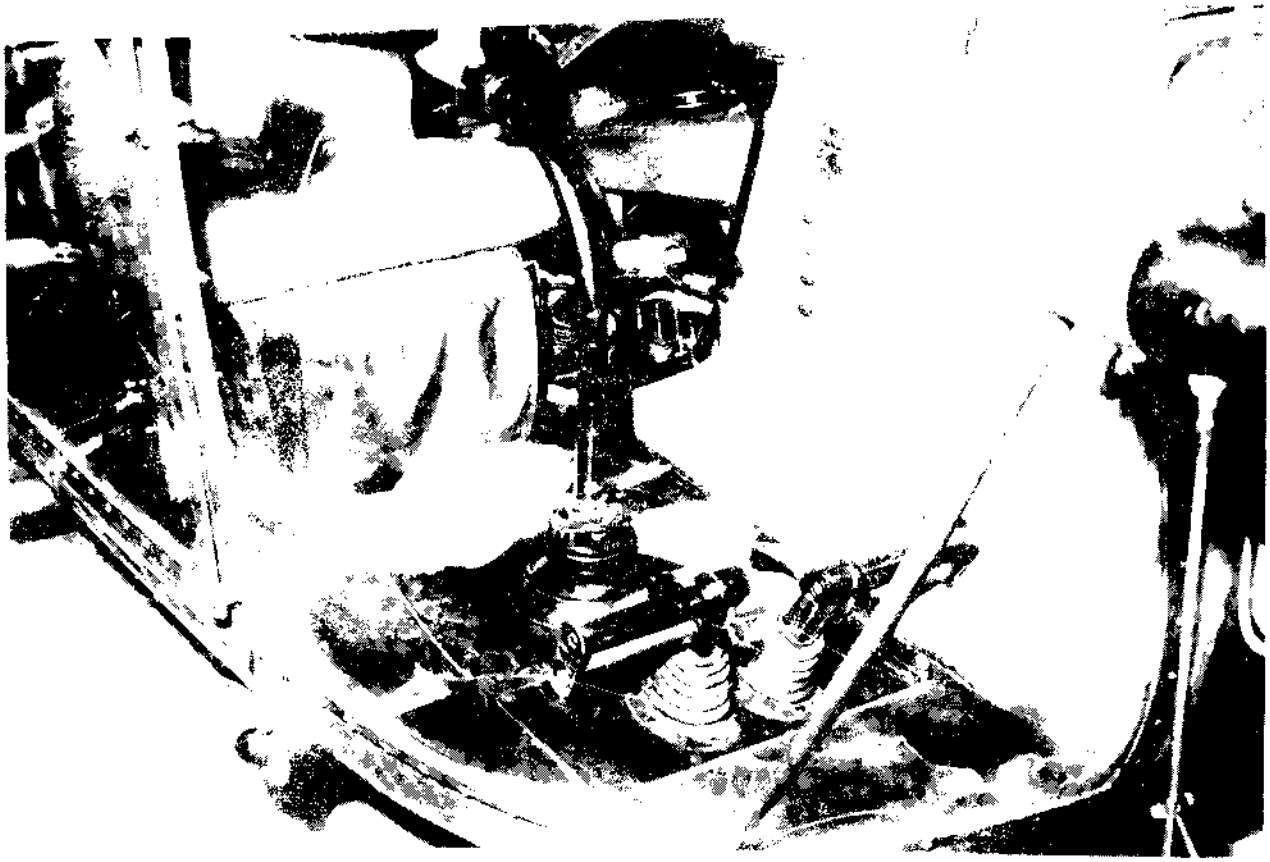
In figure 5 it was tried to calculate the costs of damages and perhaps it is interesting to see that rotor and engine were damaged mostly. Especially in this fact the real danger for helicopters has to be seen.

Fig.1

TOTAL NUMBER OF BIRD STRIKES WITH HELICOPTERS (GAF) 1966 - 1977



CH-53 04-05-1977, [illegible] GMT
inflight 15 NM SW of Rheine Bentlage
height 300 ft GND - 120 KIAS
pigeon weight 500 g
birdstrike to engine 2
blades of the first compressor stage dam[illegible]



AL II 05-09-19[illegible]

approach to Itzehoe, [illegible]

birdstrike to Cockpit, [illegible]

Fig. 4

Bird Strikes with Helicopters classified in flight level, months and bird species (time of reference 1966 - 1977)

flight stage	J	F	M	A	M	J	J	A	S	O	N	D	total	bird species
landing taking off traffic pattern	1	6	5	1	5	5	7	7	2	10	3	3	55	Buzzard, Gull, Lapwing, Crow, Pigeon, Tern, Swift, Swallow, Skylark
0 - 199 ft	3	3	4	3	7	6	7	8	10	7	6	9	73	Buzzard, Duck, Crow, Pigeon, Blackbird, Yellowhammer, Swallow, Sparrow
200 - 499 ft	0	1	2	2	4	3	7	6	5	7	6	3	46	Buzzard, Falcon, Duck, Pigeon, Redshank, Redwing, Starling, Swallow
500 - 999 ft	0	2	3	2	2	3	5	7	0	0	1	1	27	Crow, Starling, Swift, Swallow
over 1000 ft	0	0	0	0	3	3	1	2	0	1	1	0	13	Buzzard, Swallow
unkown	1	4	2	3	3	4	1	5	3	4	0	0	26	Gull, Duck, Crow, Pigeon, Skylark, Robin, Sparrow
total	5	16	16	11	24	24	31	33	20	27	17	16	240	

Fig. 5

Bird Strikes to Helicopters with Damage, 1966 - 1977

1st Sikorsky CH 53 G

engine inspection with damage	1 x	app.	2.500,-- DM
engine inspection without damage	6 x	app.	13.816,-- DM
main rotor blad cap	2 x	app.	2.130,-- DM
cockpit	1 x	app.	952,-- DM
			19.198,-- DM

2nd Bell UH - 1 D

main rotor	1 x	app.	4.840,-- DM
cockpit	2 x	app.	773,-- DM
aiframe	7 x	app.	351,-- DM
			5.964,-- DM

3rd Alouette SE 3130/SA 318 C

engine inspection without damage	2 x	app.	1.520,-- DM
main rotor cap (1 main rotor head with blad change)	33 x	app.	61.194,-- DM
cockpit	15 x	app.	7.670,-- DM
antenna	2 x	app.	458,-- DM
			70.842,-- DM

4th Sea King MK 41

engine inspection with damage	2 x	app.	3.150,-- DM

5th Sikorsky H 34

main rotor blad cap	1 x	app.	310,-- DM

Sikorsky CH 53 G	19.198,-- DM
Bell UH - 1 D	5.964,-- DM
Aluette	70.842,-- DM
Sea King MK 41	3.150,-- DM
Sikorsky H 34	310,-- DM
Total	99.464,-- DM

Discussion on WP 4

Junker-Hansen: Have you found any connection between the frequency of birdstrikes to helicopters and their speed? This is of special interest now because a new generation of faster helicopters has begun to come into use.

Hild: It seems as if the higher speed of modern helicopters has made them more vulnerable to collisions with birds. However, this has not been possible to evaluate statistically so far because we have not distinguished between slow and high speed helicopters.

Thorpe: What type of damages from birdstrikes do you think are the most dangerous ones, on the engines or on the fuselage?

Hild: Damages affecting the engines are the most dangerous ones.