

BIRD STRIKE COMMITTEE EUROPE

WP/9

MILITARY AIRCRAFT
BIRD STRIKE ANALYSIS
1982

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MILITARY AIRCRAFT BIRDSTRIKE ANALYSIS - 1982

INTRODUCTION

1. Despite the abbreviated and simplified format for military birdstrike reporting, there has now been a disappointing return of data for the three years 1980-82 when only four air forces complied with BSCE requirements. Details of birdstrike data received since 1977 is summarised in the following table:

	1977	78	79	80	81	83
Belgian Air Force (BAF)	-	-	x	x	-	-
Royal Danish Air Force (RDAF)	-	x	x	x	x	x
French Air Force (EMAA)	-	-	(x)	-	-	-
German Air Force (GAF)	-	-	x	-	x	x
Royal Netherlands Air Force (RNLAf)	x	-	-	-	-	-
Royal Norwegian Air Force (RNoAF)	x	-	x	-	-	-
Royal Air Force (RAF)	x	x	x	x	x	x
Swedish Air Force (SAF)	x	x	x	-	x	x
United States Air Force (Europe) (USAF(E))	x	x	(x)	x	-	-
Total	5	4	6(8)	4	4	4

((x) denotes record in unusable format)

2. In the process of compiling these analyses, it is readily apparent that the small number of countries supplying information can lead to a significant degree of distortion, particularly in Table 3, 'Bird Species', where one country's data can swamp those with a lesser incident of birdstrikes. In order to improve the relevance of these analyses, therefore, all participating military representatives are urged to forward national data to the Chairman of this Analysis Working Group in good time for conclusion at the next BSCE meeting.

It is important that national data is presented in the format of the attached analysis; local amendments cannot be incorporated into this overall analysis and records must therefore be discounted or listed with the unknowns. The format of the military analysis has been changed several times over past years and has been progressively simplified from the very comprehensive format of the civil records to the much abbreviated format attached; this format has been used since 1978. These changes were presumably in response to national reservations over the security aspect of some of the data supplied, particularly that relating to specific aircraft types and identifying roles and flying rates. Although this has resulted in the loss of some of the more valuable information such as aircraft height and speed related to the number of bird struck, the limitation is acknowledged and it is accepted that the reduced reporting criteria are better than none at all. If any nation still has serious reservations over supplying information on military birdstrikes in the attached format, it is suggested that they make them known to the Chairman of this Working Group who may then raise the topic for further discussion if necessary at the next BSCE meeting.

BIRD SPECIES

4. In this analysis, an attempt has been made to illustrate the trends of strike frequency over the past five years of the most commonly involved bird species; Annex A shows the trends for Gull sp., Lapwing and Hirundidae/Apodidae Sp. It is readily apparent from this Annex that, with the exception of a minor peak for Lapwings in 1978 and for Gulls in 1980, both species show a progressive decline in a percentage of the total of birds positively identified. This decline has been countered by an increase in the percentage total of Swallows, Martins and Swifts. The percentage of birds identified in 1982 rose slightly to 38% of the total.

PARTS OF AIRCRAFT STRUCK AND EFFECTS

5. Of the parts of aircraft struck, only engines show any significant trend over the period 1978-82; this is illustrated in Annex B. A disturbing trend has been in the increase in damage resulting in deformed structure. By implication, this is a more severe and serious degree of damage than that represented by denting or to skin. Perhaps surprisingly, the percentage of hit involving no damage has maintained a relatively steady average of 63%.

3 - BIRD SPECIES

1982

COMMON NAME	LATIN NAME	APPROX WEIGHT	CATEGORY	NUMBER OF STRIKES	% BASED ON 567
(Various)	Larus Sp	400-1800	B	102	18.0
	Apus Apus	40	A	57	10.0
	Vanellus vanellus	200	B	44	7.8
	Columbiforme Sp	250-500	B	37	6.5
	Larus ridibundus	300	B	26	4.6
	Alauda arvensis	40	A	25	4.4
	Buteo buteo	800	B	22	3.9
	Hirundo/Delichon Sp	20-40	A	21	3.7
	Larus argentatus	1000	B	20	3.5
	Columba palumbus	500	B	18	3.2
	Sturnus vulgaris	80	A	16	2.8
	Falco tinnunculus	200	B	14	2.5
	Delichon urbica	20	A	13	2.3
	Turdus philomelus	70	A	11	1.9
	Fringilla coelebs	25	A	11	1.9
	Hirundo rustica	20	A	11	1.9
	Buteo Sp	1000	B	9	1.6
	Columba livia var	480	B	7	1.2
	Larus canus	400	B	6	1.0
	Pluvialis apricaria	180	B	6	1.0
	Turdus pilaris	100	A	5	0.9
	Turdus iliacus	60	A	5	0.9
	Corvus Sp	500	B	5	0.9
	Motacilla alba	20	A	4	0.7
	Emberiza citrinella	30	A	4	0.7
	Phasianus colchicus	1100	B	4	0.7
	Anas platyrhynchos	1000	B	4	0.7
	Carduelis cannabina	20	A	3	0.5
	Turdus merula	100	A	3	0.5
	Acciptridae	1100	B	3	0.5
	Haematopus ostralegus	500	B	3	0.5
	Strigiformes	300	B	3	0.5
	Plectrophenax nivalis	35	A	2	0.4
	Asio otus	270	B	2	0.4

COMMON NAME	LATIN NAME	APPROX WEIGHT	CATEGORY	NUMBER OF STRIKES	% BASED ON 567
House Sparrow	<i>Passer domesticus</i>	30	A	2	0.35
Willow Sparrow	<i>Passer hispaniolensis</i>	30	A	2	0.35
Ortolan Bunting	<i>Emberiza hortulana</i>	25	A	2	0.35
Kite	<i>Milvus milvus</i>	1000	B	2	0.35
Rook	<i>Corvus frugilegus</i>	500	B	2	0.35
Redlegged Partridge	<i>Alectoris rufa</i>	450	B	2	0.35
Magpie	<i>Pica pica</i>	220	B	2	0.35
Dunlin	<i>Calidris alpina</i>	50	A	1	0.175
Hawfinch	<i>Coccothraustes Coccothraustes</i>	50	A	1	0.175
Greenfinch	<i>Carduelis chloris</i>	29	A	1	0.175
Brambling	<i>Fringilla montifringilla</i>	25	A	1	0.175
Great Tit	<i>Parus major</i>	20	A	1	0.175
Lesser Whitethroat	<i>Sylvia curruca</i>	20	A	1	0.175
Whinchat	<i>Saxicola rubetra</i>	20	A	1	0.175
Meadow Pipit	<i>Anthus pratensis</i>	18	A	1	0.175
Sand Martin	<i>Reparia reparia</i>	18	A	1	0.175
Robin	<i>Erthacus rubecula</i>	18	A	1	0.175
Redpoll	<i>Carduelis flammea</i>	15	A	1	0.175
Stonechat	<i>Saxicola torquata</i>	14	A	1	0.175
Great Black-backed Gull	<i>Larus marinus</i>	1690	B	1	0.175
Frigate Bird	<i>Fregata aquila</i>	1620	B	1	0.175
Bittern	<i>Botaurus stellaris</i>	1200	B	1	0.175
Shelduck	<i>Tadorna tadorna</i>	1080	B	1	0.175
Guillemot	<i>Uria aalge</i>	915	B	1	0.175
Lesser Black-backed Gull	<i>Larus fuscus</i>	820	B	1	0.175
Curlew	<i>Numenius arquata</i>	770	B	1	0.175
Hooded Crow	<i>Corvus corone</i>	550	B	1	0.175
Hobby	<i>Falco subbuteo</i>	200	B	1	0.175
Red-footed Falcon	<i>Falco vespertinus</i>	150	B	1	0.175
Ruff	<i>Philomachus pugnax</i>	140	B	1	0.175
Mistle Thrush	<i>Turdus viscivorus</i>	130	B	1	0.175
Fulmar	<i>Fulmaris glacialis</i>	750	B	1	0.175
White Stork	<i>Ciconia ciconia</i>	3400	C	1	0.175
Grey Goose	<i>Anser anser</i>	3325	C	1	0.175
Unknown	-	-	-	922	
Total	-	-	-	1489	100

Notes:

- 3.1 Bird weights and Latin names can be obtained from Canadian Field Note. No 51, by G Kaiser, unless there is positive evidence to the contrary, the AVERAGE weight should be assumed.
- 3.2 The bird Categories based on current Civil Airworthiness requirements are:
 CAT A below .11 kg ($\frac{1}{4}$ lb)
 CAT B .11 kg to 1.81 kg ($\frac{1}{2}$ lb to 4 lb)
 CAT C over 1.81 kg to 3.63 kg (4 lb to 8 lb)
 CAT D over 3.63 kg (8 lb)
- 3.3 Those birds not positively identified should be tabled as Unknown.
- 3.4 Large (CAT C or D) birds are often not positively identified, but the Category these are assumed to be in should be stated.
- 3.5 Percentages should be based on the total of identified birds.
- 3.6 Table 3 could be repeated restricted to own country only.

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TABLE 7 PART OF AIRCRAFT STRUCK

PART	WEIGHT UNKNOWN	CAT A	CAT B	CAT C & D	TOTAL	% BASED ON 150
Nose (excluding radome and windscreen)	112	15	46	-	173	10.9
Radome	70	11	16	1	98	6.2
Windscreen	197	24	21	1	243	15.3
Fuselage(excluding the above)	196	29	59	1	285	17.9
Engine:-						
1 engine struck	221	68	79	2	370	23.3
2 out of 3 struck	-	-	-	-	-	-
2 out of 4 struck	-	1	2	-	3	0.2
3 out of 4 struck	-	-	-	-	-	-
all struck (on multi-engined aircraft)	8	-	1	-	9	0.6
Wing + Air Intakes	156	9	55	1	221	13.9
Rotor/Propeller	21	2	12	-	35	2.2
Landing Gear	33	3	28	-	64	4.0
Empennage	11	-	19	-	30	1.9
Underwing Stores/Tanks	48	-	10	-	58	3.7
Part Unknown	68	4	28	-	100	
TOTAL	1141	166	376	6	1689	100.1

NOTES:-

- 7.1 The Total in Table 7 and 7A may be higher than other tables, as one bird can strike several parts.
- 7.2 The percentages should be based on incidents where the part struck is known.
- 7.3 Multiple strikes should be counted as one strike, unless for example both wings or both landing gears are struck, when two incidents should be recorded.

TABLE 7A

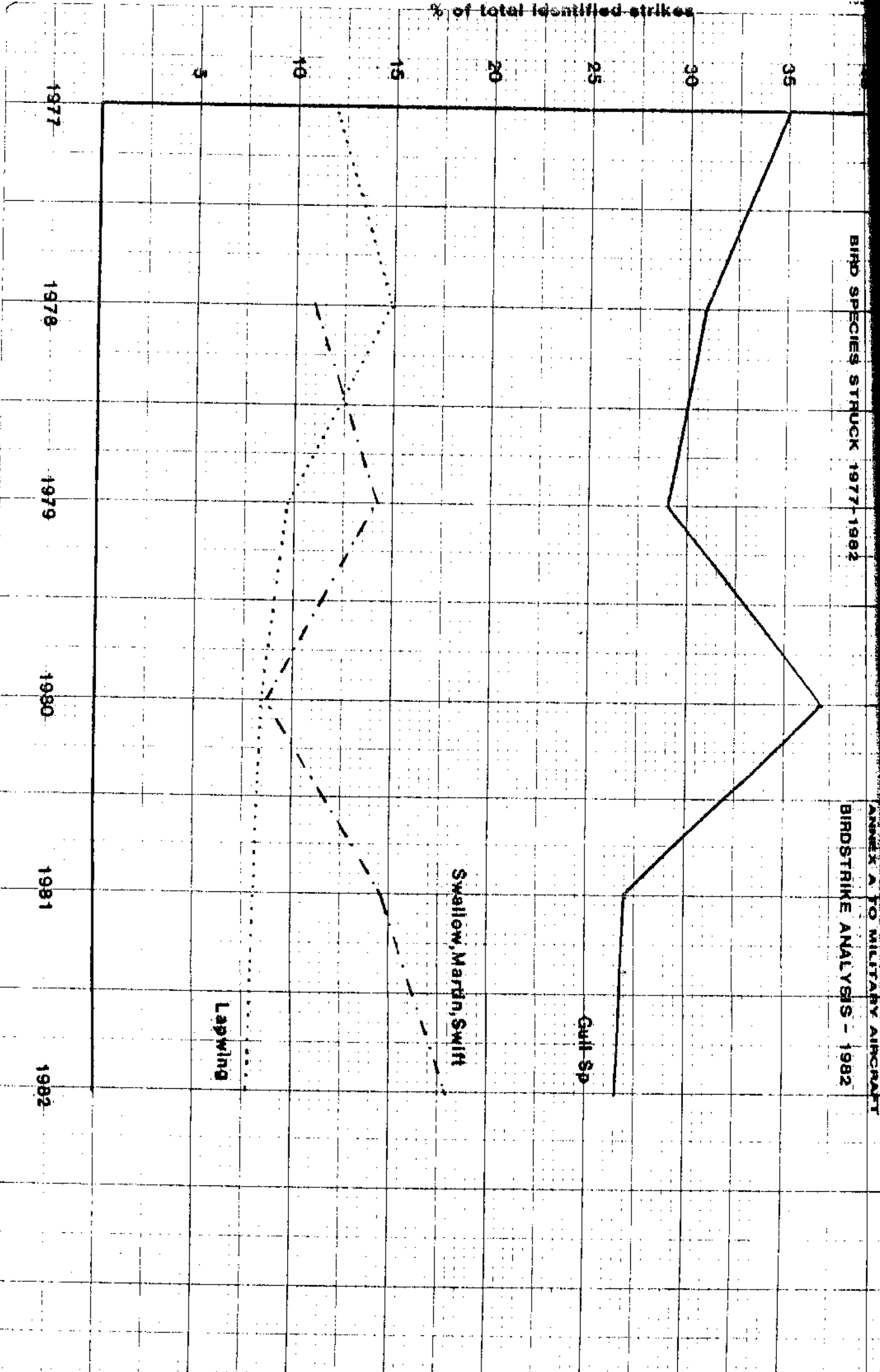
EFFECT OF STRIKE

1982

EFFECT	WEIGHT UNKNOWN	CAT A	CAT B	CAT C	CAT D	TOTAL	% BASED ON 1658
Loss of Life/Aircraft	1	-	-	-	-	1	0.1
Flight Crew Injury							
Major							
Minor							
Slight							
Premature Engine Change:-							
on single engined A/C	20	6	15	1	-	42	2.5
1 on a 2 engined A/C	32	2	19	-	-	53	3.3
1 on a 3 engined A/C	-	-	-	-	-	-	-
1 on a 4 engined A/C	3	-	2	-	-	5	0.3
2 on a 3 engined A/C	-	-	-	-	-	-	-
2 on a 4 engined A/C	-	2	-	-	-	2	0.1
3 on a 4 engined A/C	-	-	-	-	-	-	-
all engines on a multi	2	-	1	-	-	3	0.2
Windscreen Cracked/Broken	17	3	17	-	-	37	2.2
Radome Changed	17	4	11	1	-	33	2.0
Deformed Structure	27	-	29	1	-	57	3.4
Skin Torn	24	6	22	-	-	52	3.1
Skin Dented	126	23	50	1	-	200	12.1
Propeller/Rotor Damaged	8	-	5	-	-	13	0.8
Aircraft System Lost	3	-	1	-	-	4	0.2
Underwing Stores/Tanks damaged	30	1	11	-	-	42	2.5
Miscellaneous	26	2	25	-	-	53	3.2
Nil Damage	733	171	157	-	-	1061	64.0
Unknown	4	-	2	-	-	6	
TOTAL	1073	220	367	4	-	1664	100

NOTES:

- 7A.1 Multiple strikes should be counted as one strike, unless for example both wings are damaged, or both windscreens are broken, in which case two incidents should be recorded.
- 7A.2 Definition of Injury requiring medical treatment:
 - Major - causing absence of 21 days or over.
 - Minor - causing absence of 7 to 21 days.
 - Slight - injury not in above 2 categories.
- 7A.3 Injuries as a consequence of a strike, eg. ejection injuries should be included.
- 7A.4 Aircraft system lost includes for example electrical, hydraulic, brake, air conditioning, de-icing.



BIRD SPECIES STRUCK 1977-1982

ANNEX A TO MILITARY AIRCRAFT
BIRDSTRIKE ANALYSIS - 1982

% of total identified strikes

Swallow, Martin, Swift

Gull Sp

Lapwing

1977

1978

1979

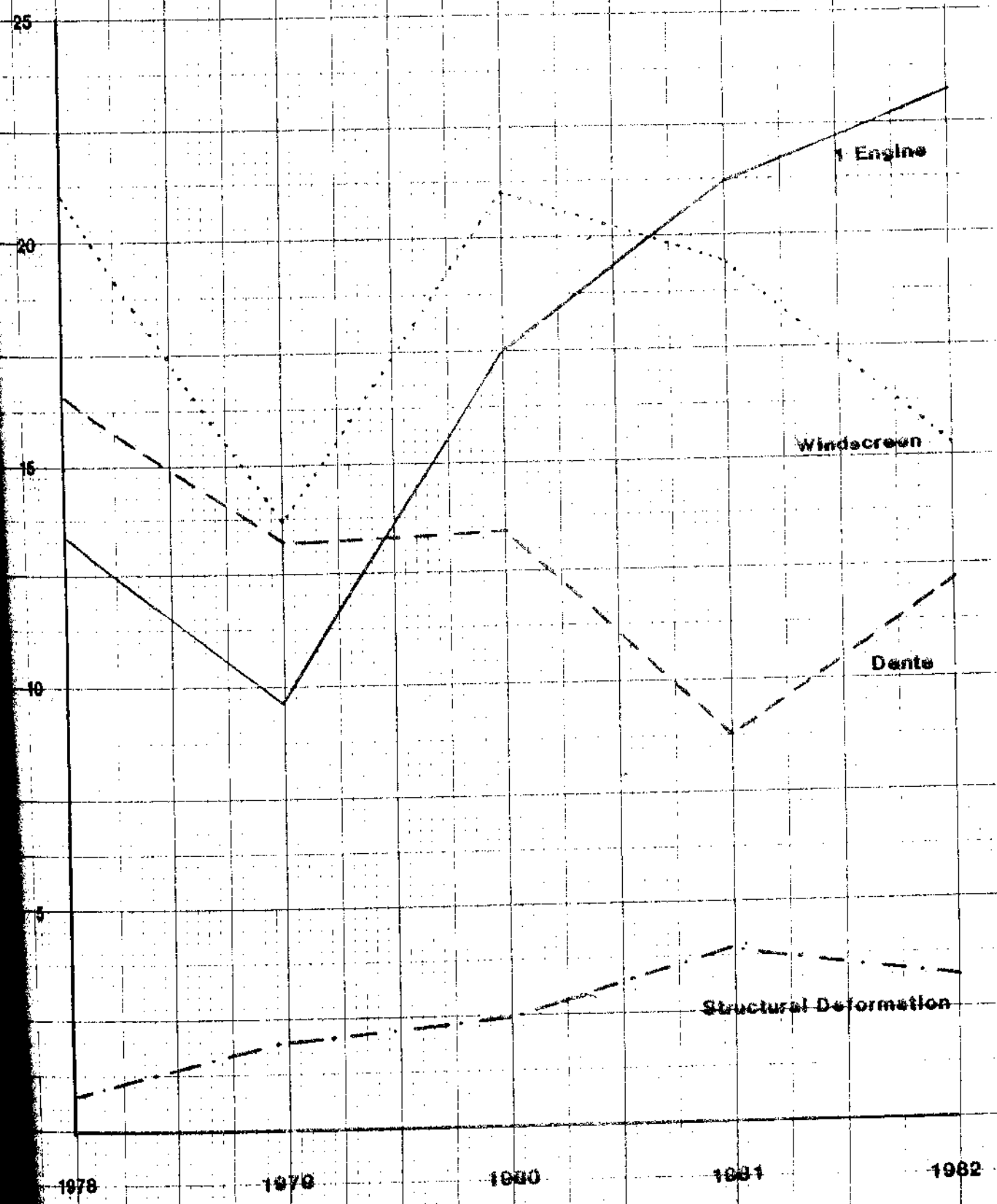
1980

1981

1982

ANNEX B TO MILITARY AIRCRAFT
BIRDSTRIKE ANALYSIS - 1982

PART STRUCK AND EFFECT 1977-1982



ANNEX A TO MILITARY AIRCRAFT