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## ACCIDENT/INCIDENT REPORTING (ADREP)

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## INTRODUCTION

### General

The information in this publication is based on 583 accident and 84 incident reports of the ICAO ADREP system for the year 1985 for aircraft of a maximum certificated take-off mass over 2 250 kg. The statistics were compiled in February 1988.

### Purpose

The purpose of the ADREP statistics is to provide data that may be useful for general safety studies and accident prevention. For more specific needs the ADREP system provides information in response to specific ADREP requests.

### Data Base

These statistics are based on 667 occurrences. Of these, 576 were Data Reports and 91 were Preliminary Reports. Preliminary reports do not contain factors and are therefore excluded in the compilation of statistics on factors.

### Limitations

When considering the information presented, the reader must be aware of the following limitations and conventions:

- a) The ADREP manual contains specific coding instructions; nonetheless, there may be some unintentional bias on the part of the person coding the information particularly in the coding of factors.
- b) Some accidents are reported to ICAO on computer tapes and processed through a conversion programme before they are entered in the ADREP data bank. Since some of the data reported are not compatible with the ADREP coding system, precision is not attainable in all cases.

### Notes on the Statistical Tables

- a) For each accident/incident there may be up to two types of occurrences and up to 13 factors. Thus, the totals in these categories will frequently exceed the total number of reports.
- b) Factors may be related to the first as well as to the second type of occurrence or to both. Accordingly, a factor may be counted twice for a given occurrence.

- c) Factors are combined in groups of related factors. For instance, the factors "Pilot misjudged speed" and "Pilot misjudged distance" are both included in the group "Flight Crew - Perception". Groups of factors are listed only if they occur more than twice.
- d) In the lists presenting comparisons, only data representing significant differences are presented. "Significant" here means that the difference exceeds the average difference in a given list by more than one standard deviation. Accordingly, lists in which none of the groups of factors show a significant difference are omitted.

### Format

There are three parts:

- Part I Accidents to Aeroplanes;
- Part II Accidents to Helicopters; and
- Part III Incidents.

Each part is divided into separate sections for "Airline Operations" and "General Aviation".

The format within each section or subsection is the same, showing the following:

- A comparison of the year 1985 with the preceding five years by:
  - phase of operation,
  - type of occurrence,
  - personnel factors,
  - aircraft/powerplant factors,
  - aerodrome factors, and
  - weather factors;
- The phases of operation for that section;
- The ten most frequent types of occurrence for that section;
- The most frequent factors related to each of the types of occurrence.

TABLE I - ACCIDENTS AND INCIDENTS BY TYPE OF OPERATION AND AIRCRAFT MASS (1985)

I. ACCIDENTS TO AEROPLANES

	Number of Reports		Number of Occurrences			Number of Fatalities				Number of Aircraft Destroyed
	1) P.R.	2) D.R.	Fatal	Non-Fatal	Total	Crew	Pax	Other	Total	
Scheduled Airline Operations										
Aeroplanes over 27 000 kg	14	25	8	31	39	66	1129	0	1195	6
Aeroplanes between 2 250 and 27 000 kg	10	36	17	29	46	36	175	0	211	24
Non-scheduled Airline Operations										
Aeroplanes over 27 000 kg	6	5	5	6	11	26	369	0	395	5
Aeroplanes between 2 250 and 27 000 kg	20	88	29	79	108	36	46	0	82	37
Other Airline Operations										
Aeroplanes over 27 000 kg	0	1	0	1	1	0	0	0	0	0
Aeroplanes between 2 250 and 27 000 kg	2	29	8	23	31	11	1	0	12	12
Airline Operations (Total by mass)										
Aeroplanes over 27 000 kg	20	31	13	38	51	92	1498	0	1590	11
Aeroplanes between 2 250 and 27 000 kg	32	153	54	131	185	83	222	0	305	73
General Aviation										
Aeroplanes over 5 700 kg	6	25	10	21	31	14	15	1	30	14
Aeroplanes between 2 250 and 5 700 kg	23	249	76	196	272	83	106	0	189	104
II. ACCIDENTS TO HELICOPTERS										
Airline Operations	5	4	3	6	9	3	6	0	9	6
General Aviation	5	32	10	27	37	9	3	0	12	15
III. INCIDENTS										
Airline Operations	0	77	0	77	77	0	0	0	0	0
General Aviation	0	7	0	7	7	0	0	0	0	0

1) Preliminary Report  
2) Accident/Incident Data Report

TABLE II - ACCIDENTS AND INCIDENTS TO AEROPLANES BY TYPE OF OPERATION AND POWERPLANT (1985)

	Number of Reports		Number of Occurrences			Number of Fatalities				Number of Aircraft Destroyed
	1) P.R.	2) D.R.	Fatal	Non-Fatal	Total	Crew	Pax	Other	Total	
<b>Scheduled Airline Operations</b>										
Jet	13	63	9	67	76	68	1129	0	1197	7
Turbo-Prop	9	35	11	33	44	28	149	0	177	14
Piston	2	22	5	19	24	6	26	0	32	9
<b>Non-Scheduled Airline Operations</b>										
Jet	5	14	4	15	19	19	306	0	325	4
Turbo-Prop	5	10	6	9	15	14	65	0	79	6
Piston	16	84	24	76	100	29	44	0	73	32
<b>Other Airline Operations</b>										
Jet	0	3	1	2	3	2	1	0	3	1
Turbo-Prop	0	10	3	7	10	5	0	0	5	4
Piston	2	20	4	18	22	4	0	0	4	7
<b>General Aviation</b>										
Jet	4	15	7	12	19	11	8	1	20	8
Turbo-Prop	6	49	18	37	55	20	32	0	52	21
Piston	19	217	61	175	236	66	81	0	147	89

1) Preliminary Report

2) Accident/Incident Data Report



**PART I**

**ACCIDENTS TO AEROPLANES**

# ACCIDENTS TO AEROPLANES

## AIRLINE OPERATIONS

### PHASE OF OPERATION

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING	447	48.3	157	43.4	*****!	
EN-ROUTE	225	24.3	106	29.3		!*****

### TYPE OF OCCURRENCE

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
GEAR COLLAPSED	101	20.9	33	9.1	*****!	
INJURIES TO PERSONS ON GROUND	17	1.8	1	0.2	*****!	
HARD LANDING	24	2.8	5	1.3	*****!	
AIRFRAME FAILURE	18	1.9	2	0.5	*****!	
OVERRUN	46	4.9	13	3.6	*****!	
LOSS OF CONTROL - GROUND/WATER	47	7.2	22	6.0	*****!	
LOSS OF CONTROL IN FLIGHT	70	7.5	32	8.8		!*****
ENGINE FAILURE/DISINTEGRATION	86	9.2	40	11.0		!*****
FORCED/PRECAUTIONARY LANDING	35	3.7	22	6.0		!*****
COLLISION TERRAIN	97	10.4	50	13.8		!*****

### PERSONNEL FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
FLIGHT CREW - PERCEPTION	98	17.4	21	11.4	*****!	
FLIGHT CREW - OPERATIONAL DECISIONS	154	27.4	63	34.2		!*****
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	360	64.1	145	78.8		!*****

### AIRCRAFT/POWERPLANT FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING GEAR	148	26.3	37	20.1	*****!	
ENGINE STRUCTURE (RECIP.)	13	2.3	1	0.5	*****!	
FLIGHT AND NAVIGATION INSTRUMENTS	6	1.0	4	2.1		!***
EXHAUST SYSTEM (RECIP.)	1	0.1	3	1.6		!****

### AERODROME FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
AERODROME CONDITION	88	15.6	12	6.5	*****!	

### WEATHER FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/DOWNDRAFT-UPDRAFT OR MOUNTAIN WAVE	8	1.4	0	0.0	*****!	
WEATHER/THUNDERSTORM ACTIVITY	14	2.5	2	1.0	*****!	
WEATHER/FOG	38	6.7	10	5.4	*****!	
WEATHER/RAIN	25	4.4	11	5.9		!*****
WEATHER/ICING CONDITIONS-AIRFRAME ICING	12	2.1	7	3.8		!*****
WEATHER/SNOW	14	2.5	8	4.3		!*****

## ACCIDENTS TO AEROPLANES

### AIRLINE OPERATIONS

#### PHASE OF OPERATION

	CASES	PERCENT
LANDING	157	43.5
EN-ROUTE	106	29.4
TAKE-OFF	80	22.2
TAXIING	13	3.6
STANDING	5	1.4
 * TOTAL *	 361	 100.0

#### TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
COLLISION TERRAIN	50	13.9
ENGINE FAILURE/DISINTEGRATION	40	11.1
COLLISION OBJECT	37	10.2
GEAR COLLAPSED	33	9.1
LOSS OF CONTROL IN FLIGHT	32	8.9
LOSS OF CONTROL - GROUND/WATER	22	6.1
FORCED/PRECAUTIONARY LANDING	22	6.1
WHEELS-UP LANDING	18	5.0
SYSTEM FAILURE	17	4.7
OVERRUN	13	3.6
 * TOTAL ABOVE *	 284	 78.7
 * TOTAL NUMBER OF OCCURRENCES NOT LISTED *	 77	 21.3
 * TOTAL *	 361	 100.0

## ACCIDENTS TO AEROPLANES

### AIRLINE OPERATIONS

#### TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

COLLISION TERRAIN OCCURS 50 TIMES (14 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	54.0
WEATHER	32.0
FLIGHT CREW - OPERATIONAL DECISIONS	22.0
TERRAIN	16.0
FLIGHT CREW - PERCEPTION	12.0
OPERATIONAL SUPERVISORY PERSONNEL	10.0
FLIGHT CREW - AIRCRAFT HANDLING	8.0

ENGINE FAILURE/DISINTEGRATION OCCURS 40 TIMES (11 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	32.5
WEATHER	30.0
FLIGHT CREW - OPERATION OF EQUIPMENT	27.5
MAINTENANCE, SERVICING, INSPECTION PERSONNEL	20.0
FLIGHT CREW - OPERATIONAL DECISIONS	15.0
FUEL SYSTEM (RECIP.)	15.0
POWERPLANT ALL TYPES - MISCELLANEOUS	12.5
OPERATIONAL SUPERVISORY PERSONNEL	10.0
EXHAUST SYSTEM (RECIP.)	7.5
ELECTRICAL SYSTEM	7.5

COLLISION OBJECT OCCURS 37 TIMES (10 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	32.4
WEATHER	24.3
FLIGHT CREW - OPERATIONAL DECISIONS	21.6
FLIGHT CREW - PERCEPTION	16.2
TERRAIN	13.5
MISCELLANEOUS PERSONNEL	8.1
AERODROME CONDITION	8.1

GEAR COLLAPSED OCCURS 33 TIMES (9 PERCENT) OF TOTAL 361

LANDING GEAR	51.5
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	12.1
AIRPORT SUPERVISORY PERSONNEL	12.1
AERODROME CONDITION	12.1
FLIGHT CREW - OPERATION OF EQUIPMENT	9.1

## ACCIDENTS TO AEROPLANES

### AIRLINE OPERATIONS

#### TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

LOSS OF CONTROL IN FLIGHT OCCURS 32 TIMES (9 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	75.0
WEATHER	50.0
FLIGHT CREW - OPERATIONAL DECISIONS	31.3
FLIGHT CREW - OTHER	15.6
TERRAIN	9.4

LOSS OF CONTROL - GROUND/WATER OCCURS 22 TIMES (6 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	100.0
WEATHER	54.5
FLIGHT CREW - OPERATIONAL DECISIONS	36.4
LANDING GEAR	18.2
TERRAIN	13.6

FORCED/PRECAUTIONARY LANDING OCCURS 22 TIMES (6 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	36.4
FLIGHT CREW - OPERATION OF EQUIPMENT	22.7
TERRAIN	22.7
FLIGHT CREW - OPERATIONAL DECISIONS	13.6

WHEELS-UP LANDING OCCURS 18 TIMES (5 PERCENT) OF TOTAL 361

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	44.4
FLIGHT CREW - OPERATION OF EQUIPMENT	27.8
LANDING GEAR	27.8

SYSTEM FAILURE OCCURS 17 TIMES (5 PERCENT) OF TOTAL 361

LANDING GEAR	35.3
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	23.5

OVERRUN OCCURS 13 TIMES (4 PERCENT) OF TOTAL 361

TERRAIN	46.2
AERODROME CONDITION	30.8
FLIGHT CREW - OPERATIONAL DECISIONS	23.1
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	23.1
LANDING GEAR	23.1
WEATHER	23.1

## ACCIDENTS TO AEROPLANES

### GENERAL AVIATION

PHASE OF OPERATION

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING	1508	47.8	225	45.8		*****
EN-ROUTE	915	28.9	167	34.0		*****

TYPE OF OCCURRENCE

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
ENGINE FAILURE/DISINTEGRATION	491	15.6	68	13.7		*****
WHEELS-UP LANDING	152	4.8	17	3.4		*****
GEAR COLLAPSED	249	7.9	33	6.6		*****
COLLISION AIRCRAFT	70	2.2	6	1.2		*****
GEAR RETRACTED	49	2.2	7	1.4		*****
SYSTEM FAILURE	52	1.6	12	2.4		*****
LANDING BESIDE LANDING AREA	7	0.2	5	1.0		*****
OVERRUN	111	3.5	22	4.4		*****
UNDERSHOOT	100	3.1	23	4.6		*****
FORCED/PRECAUTIONARY LANDING	241	7.6	47	9.5		*****

PERSONNEL FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
MISC. PERS./PILOT OF OTHER A/C	42	2.1	1	0.3		***
MAINT. SER./ PERS./INADEQUATE MAINT./INSPECTION	101	3.1	10	3.6		***
FLIGHT CREW - AIRCRAFT HANDLING	61	3.0	15	5.4		****
FLIGHT CREW - PERCEPTION	270	13.7	45	16.4		*****
FLIGHT CREW - OPERATION OF EQUIPMENT	382	19.3	63	22.9		*****
FLIGHT CREW - OPERATIONAL DECISIONS	480	24.3	85	31.0		*****
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	1249	63.3	200	72.9		*****

AIRCRAFT/POWERPLANT FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
POWERPLANT ALL TYPES - MISCELLANEOUS	115	5.8	8	2.9		*****
PROPELLER AND ACCESSORIES (RECIP.)	27	1.3	1	0.3		*****
OTHER SYSTEM	5	0.2	2	0.7		***
POWER LEVER (THROTTLE) TURBOPROP/TURBOJET)	0	0.0	2	0.7		****
ENGINE STRUCTURE (RECIP.)	97	4.9	16	5.8		*****

AERODROME FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
AERODROME CONDITION	193	9.7	20	7.3		*****

WEATHER FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/ICING CONDITIONS-AIRFRAME ICING	65	3.3	5	1.8		*****
WEATHER/LOW CEILING	171	8.6	20	7.3		*****
WEATHER/THUNDERSTORM ACTIVITY	27	1.3	0	0.0		*****
WEATHER/RAIN	83	4.2	8	2.9		*****
WEATHER/FOG	115	7.3	17	6.2		*****
WEATHER/OBSTRUCTIONS TO VISION-SMOKE,HAZE,SAND,DUST	14	0.7	7	2.5		*****

## ACCIDENTS TO AEROPLANES

### GENERAL AVIATION

#### PHASE OF OPERATION

	CASES	PERCENT
LANDING	225	45.8
EN-ROUTE	167	34.0
TAKE-OFF	87	17.7
TAXIING	10	2.0
STANDING	2	0.4
 * TOTAL *	 491	 100.0

#### TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
ENGINE FAILURE/DISINTEGRATION	68	13.8
COLLISION OBJECT	64	13.0
COLLISION TERRAIN	56	11.4
FORCED/PRECAUTIONARY LANDING	47	9.5
LOSS OF CONTROL IN FLIGHT	45	9.1
GEAR COLLAPSED	33	6.7
LOSS OF CONTROL - GROUND/WATER	26	5.3
UNDERSHOOT	23	4.7
OVERRUN	22	4.5
WHEELS-UP LANDING	17	3.4
 * TOTAL ABOVE *	 401	 81.3
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	92	18.7
 * TOTAL *	 493	 100.0

## ACCIDENTS TO AEROPLANES

## GENERAL AVIATION

## TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

## ENGINE FAILURE/DISINTEGRATION OCCURS 68 TIMES (14 PERCENT) OF TOTAL 493

FLIGHT CREW - OPERATION OF EQUIPMENT	41.2
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	33.8
ENGINE STRUCTURE (RECIP.)	16.2
FLIGHT CREW - OPERATIONAL DECISIONS	11.8
MAINTENANCE/SERVICING/INSPECTION PERSONNEL	11.8
POWERPLANT ALL TYPES - MISCELLANEOUS	11.8
WEATHER	11.8
FUEL SYSTEM (RECIP.)	10.3
MISC./UNDETERMINED	8.8
OPERATIONAL SUPERVISORY PERSONNEL	5.9
FLIGHT CREW - OTHER	4.4

## COLLISION OBJECT OCCURS 64 TIMES (13 PERCENT) OF TOTAL 493

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	29.7
FLIGHT CREW - PERCEPTION	28.1
WEATHER	18.8
FLIGHT CREW - OPERATIONAL DECISIONS	15.6
AERODROME CONDITION	6.3
FLIGHT CREW - AIRCRAFT HANDLING	4.7
LANDING GEAR	4.7
TERRAIN	4.7

## COLLISION TERRAIN OCCURS 56 TIMES (11 PERCENT) OF TOTAL 493

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	42.9
WEATHER	33.9
FLIGHT CREW - PERCEPTION	19.6
FLIGHT CREW - OPERATIONAL DECISIONS	16.1
TERRAIN	10.7
FLIGHT CREW - OPERATION OF EQUIPMENT	5.4

## FORCED/PRECAUTIONARY LANDING OCCURS 47 TIMES (10 PERCENT) OF TOTAL 493

TERRAIN	29.8
FLIGHT CREW - OPERATIONAL DECISIONS	14.9
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	12.8
FLIGHT CREW - OTHER	6.4
LANDING GEAR	6.4



## ACCIDENTS TO AEROPLANES

### GENERAL AVIATION

#### TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

#### LOSS OF CONTROL IN FLIGHT OCCURS 45 TIMES (9 PERCENT) OF TOTAL 493

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	86.7
WEATHER	46.7
FLIGHT CREW - OPERATIONAL DECISIONS	24.4
FLIGHT CREW - AIRCRAFT HANDLING	11.1
FLIGHT CREW - OTHER	8.9
FLIGHT CREW - OPERATION OF EQUIPMENT	6.7

#### GEAR COLLAPSED OCCURS 33 TIMES (7 PERCENT) OF TOTAL 493

LANDING GEAR	69.7
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	18.2
MISC./UNDETERMINED	15.2
MAINTENANCE, SERVICING, INSPECTION PERSONNEL	12.1
TERRAIN	9.1

#### LOSS OF CONTROL - GROUND/WATER OCCURS 26 TIMES (5 PERCENT) OF TOTAL 493

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	84.6
AERODROME CONDITION	42.3
FLIGHT CREW - OPERATIONAL DECISIONS	23.1
LANDING GEAR	23.1
WEATHER	19.2

#### UNDERSHOOT OCCURS 23 TIMES (5 PERCENT) OF TOTAL 493

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	73.9
WEATHER	30.4
FLIGHT CREW - OPERATIONAL DECISIONS	26.1
FLIGHT CREW - PERCEPTION	13.0
FLIGHT CREW - OPERATION OF EQUIPMENT	13.0

#### OVERRUN OCCURS 22 TIMES (5 PERCENT) OF TOTAL 493

FLIGHT CREW - OPERATIONAL DECISIONS	54.5
WEATHER	40.9
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	31.8
FLIGHT CREW - PERCEPTION	22.7

#### WHEELS-UP LANDING OCCURS 17 TIMES (3 PERCENT) OF TOTAL 493

FLIGHT CREW - OPERATION OF EQUIPMENT	52.9
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	35.3
LANDING GEAR	23.5

**PART II**

**ACCIDENTS TO HELICOPTERS**

## ACCIDENTS TO HELICOPTERS

## AIRLINE OPERATIONS

PHASE OF OPERATION

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING	20	35.7	8	53.3		*****

TYPE OF OCCURRENCE

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LOSS OF CONTROL IN FLIGHT	12	21.4	0	0.0	*****	
COLLISION OBJECT	4	7.1	3	20.0		*****

PERSONNEL FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
FLIGHT CREW - OTHER	1	3.4	1	25.0		*****
FLIGHT CREW - OPERATIONAL DECISIONS	4	20.6	2	50.0		*****
FLIGHT CREW - PERCEPTION	3	17.2	2	30.0		*****

AIRCRAFT/POWERPLANT FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
POWERPLANT ALL TYPES - MISCELLANEOUS	4	13.7	0	0.0	*****	
TRANSMISSION ROTOR DRIVE SYSTEM	4	13.7	0	0.0	*****	
MISCELLANEOUS UNITS AND ASSEMBLIES (ROTORCRAFT)	4	13.7	0	0.0	*****	
ROTOR ASSEMBLIES	2	6.9	1	25.0		*****

WEATHER FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/FDG	1	3.4	1	25.0		*****

## ACCIDENTS TO HELICOPTERS

### AIRLINE OPERATIONS

<u>PHASE OF OPERATION</u>	CASES	PERCENT
LANDING	8	53.3
EN-ROUTE	5	33.3
TAKE-OFF	2	13.3
* TOTAL *	15	100.0

<u>TEN MOST FREQUENT TYPES OF OCCURRENCE</u>	CASES	PERCENT
COLLISION OBJECT	3	20.0
COLLISION TERRAIN	2	13.3
PROPELLER/ROTOR FAILURE	2	13.3
LOSS OF CONTROL - GROUND/WATER	1	6.7
ROLL-OVER	1	6.7
UNDERSHOOT	1	6.7
ENGINE FAILURE/DISINTEGRATION	1	6.7
OTHER	1	6.7
DITCHING	1	6.7
FORCED/PRECAUTIONARY LANDING	1	6.7
* TOTAL ABOVE *	14	93.3
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	1	6.7
* TOTAL *	15	100.0

**ACCIDENTS TO HELICOPTERS****AIRLINE OPERATIONS****TYPE OF OCCURRENCE****FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)****COLLISION OBJECT OCCURS 3 TIMES (20 PERCENT) OF TOTAL 15****COLLISION TERRAIN OCCURS 2 TIMES (13 PERCENT) OF TOTAL 15****PROPELLER/ROTOR FAILURE OCCURS 2 TIMES (13 PERCENT) OF TOTAL 15****LOSS OF CONTROL - GROUND/WATER OCCURS 1 TIME (7 PERCENT) OF TOTAL 15****LANDING BESIDE LANDING AREA OCCURS 1 TIME (7 PERCENT) OF TOTAL 15**

## ACCIDENTS TO HELICOPTERS

### GENERAL AVIATION

**PHASE OF OPERATION**

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	X	NO.	X	1985 LESS FREQUENT	1985 MORE FREQUENT
EN-ROUTE	16	48.2	40	67.8		!*****

**TYPE OF OCCURRENCE**

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	X	NO.	X	1985 LESS FREQUENT	1985 MORE FREQUENT
PROPELLER/ROTOR FAILURE	16	8.0	2	3.3	*****!	
DITCHING	7	3.5	0	0.0	*****!	
COLLISION TERRAIN	19	9.6	8	13.5		!*****
FORCED/PRECAUTIONARY LANDING	21	10.6	10	16.9		!*****

**PERSONNEL FACTORS**

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	X	NO.	X	1985 LESS FREQUENT	1985 MORE FREQUENT
FLIGHT CREW - OPERATION OF EQUIPMENT	16	14.6	3	9.3	*****!	
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	31	28.4	8	23.0	*****!	
FLIGHT CREW - OPERATIONAL DECISIONS	7	6.4	1	3.1	*****!	
FLIGHT CREW - AIRCRAFT HANDLING	3	2.7	3	9.3		!*****
MAINT. SER. PERS./INPROPER MAINT./MAINT. PERS.	3	2.7	3	9.3		!*****
MAINT. SER. PERS./INADEQUATE MAINT./INSPECTION	2	1.8	3	9.3		!*****
FLIGHT CREW - PERCEPTION	12	11.0	7	21.8		!*****

**AIRCRAFT/POWERPLANT FACTORS**

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	X	NO.	X	1985 LESS FREQUENT	1985 MORE FREQUENT
TRANSMISSION ROTOR DRIVE SYSTEM	22	20.1	3	9.3	*****!	
FUEL SYSTEM (TURBOPROP/TURBOJET)	1	0.9	5	15.6		!*****
COMPRESSOR ASSEMBLY (TURBOPROP/TURBOJET)	3	2.7	7	21.8		!*****

**WEATHER FACTORS**

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	X	NO.	X	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/UNFAVOURABLE WIND CONDITIONS	5	4.5	0	0.0	*****!	
WEATHER/HIGH DENSITY ALTITUDE	5	4.5	0	0.0	*****!	

## ACCIDENTS TO HELICOPTERS

## GENERAL AVIATION

PHASE OF OPERATION

	CASES	PERCENT
EN-ROUTE	40	67.8
LANDING	10	16.9
TAKE-OFF	7	11.9
STANDING	2	3.4
* TOTAL *	59	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
ENGINE FAILURE/DISINTEGRATION	14	23.7
FORCED/PRECAUTIONARY LANDING	10	16.9
COLLISION TERRAIN	8	13.6
COLLISION OBJECT	5	8.5
LOSS OF CONTROL IN FLIGHT	4	6.8
HARD LANDING	3	5.1
ROLL-OVER	2	3.4
COLLISION AIRCRAFT	2	3.4
FIRE/EXPLOSION	2	3.4
AIRFRAME FAILURE	2	3.4
* TOTAL ABOVE *	52	88.1
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	7	11.9
* TOTAL *	59	100.0

## ACCIDENTS TO HELICOPTERS

### GENERAL AVIATION

#### TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

ENGINE FAILURE/DISINTEGRATION OCCURS 14 TIMES (24 PERCENT) OF TOTAL 59

COMPRESSOR ASSEMBLY (TURBOPROP/TURBOJET)	50.0
FUEL SYSTEM (TURBOPROP/TURBOJET)	35.7
MAINTENANCE, SERVICING, INSPECTION PERSONNEL	28.6
POWERPLANT ALL TYPES - MISCELLANEOUS	21.4

FORCED/PRECAUTIONARY LANDING OCCURS 10 TIMES (17 PERCENT) OF TOTAL 59

TERRAIN	30.0
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COLLISION TERRAIN OCCURS 8 TIMES (14 PERCENT) OF TOTAL 59

TERRAIN	50.0
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COLLISION OBJECT OCCURS 5 TIMES (9 PERCENT) OF TOTAL 59

FLIGHT CREW - PERCEPTION	60.0
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LOSS OF CONTROL IN FLIGHT OCCURS 4 TIMES (7 PERCENT) OF TOTAL 59

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	75.0
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HARD LANDING OCCURS 3 TIMES (5 PERCENT) OF TOTAL 59

ROLL-OVER OCCURS 2 TIMES (3 PERCENT) OF TOTAL 59

COLLISION AIRCRAFT OCCURS 2 TIMES (3 PERCENT) OF TOTAL 59

FLIGHT CREW - PERCEPTION	100.0
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AIRFRAME FAILURE OCCURS 2 TIMES (3 PERCENT) OF TOTAL 59

PROPELLER/ROTOR FAILURE OCCURS 2 TIMES (3 PERCENT) OF TOTAL 59



**PART III**

**INCIDENTS**

# INCIDENTS

## AIRLINE OPERATIONS

### PHASE OF OPERATION

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
TAXIING	38	14.0	8	8.2	*****	
STANDING	0	2.9	8	8.2		[*****]

### TYPE OF OCCURRENCE

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
AIRFRAME FAILURE	18	6.6	1	1.0	*****	
OTHER	11	4.0	1	1.0	*****	
TEMPORARY LOSS OF CONTROL IN FLIGHT	8	2.9	0	0.0	*****	
LOSS OF CONTROL - GROUND/WATER	16	5.9	3	3.0	*****	
GEAR COLLAPSED	11	4.0	7	7.2		[*****]
WEAR MISS	4	1.4	5	5.1		[*****]
ENGINE FAILURE/DISINTEGRATION	31	11.5	15	15.4		[*****]

### PERSONNEL FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
MAINT. SER. PERS./IMPROPER MAINT./MAINT. PERS.	13	5.5	2	2.6	*****	
MISC. PERS./GROUND SIGNALMAN	4	1.7	0	0.0	*****	
FLIGHT CREW - AIRCRAFT HANDLING	3	1.2	4	5.1		[*****]
FLIGHT CREW - PERCEPTION	12	5.1	7	9.0		[*****]
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	63	18.4	19	24.6		[*****]
PRODUCTION/DESIGN/POOR/INADEQUATE DESIGN	0	0.0	5	6.4		[*****]

### AIRCRAFT/POWERPLANT FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
FUSELAGE	15	6.4	0	0.0	*****	
TURBINE ASSEMBLY (TURBOPROP/TURBOJET)	17	7.3	2	2.6	*****	
FLIGHT CONTROL SURFACES	18	7.7	3	3.9	*****	
LANDING GEAR	69	29.6	20	25.9	*****	
ELECTRICAL SYSTEM	19	8.1	4	5.1	*****	
FLIGHT CONTROL SYSTEM	10	4.2	6	7.7		[*****]
COMPRESSOR ASSEMBLY (TURBOPROP/TURBOJET)	7	3.0	6	7.7		[*****]
POWERPLANT ALL TYPES - MISCELLANEOUS	5	2.1	6	7.7		[*****]

### AERODROME FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
AERODROME CONDITION	10	4.2	3	3.9	*****	

### WEATHER FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/UNFAVOURABLE WIND CONDITIONS	3	2.1	0	0.0	*****	
WEATHER/OBSTRUCTIONS TO VISION-SMOKE/HAZE/SAND/DUST	2	0.8	2	2.6		[*****]
WEATHER/ICING CONDITIONS-AIRFRAME ICING	4	1.7	5	6.4		[*****]

**INCIDENTS****AIRLINE OPERATIONS****PHASE OF OPERATION**

	<b>CASES</b>	<b>PERCENT</b>
LANDING	35	36.1
EN-ROUTE	26	26.8
TAKE-OFF	20	20.6
STANDING	8	8.2
TAXIING	8	8.2
<b>* TOTAL *</b>	<b>97</b>	<b>100.0</b>

**TEN MOST FREQUENT TYPES OF OCCURRENCE**

	<b>CASES</b>	<b>PERCENT</b>
SYSTEM FAILURE	17	17.5
ENGINE FAILURE/DISINTEGRATION	15	15.5
FIRE/EXPLOSION	8	8.2
GEAR COLLAPSED	7	7.2
COLLISION OBJECT	7	7.2
NEAR MISS	5	5.2
WHEELS-UP LANDING	4	4.1
OVERRUN	4	4.1
LOSS OF CONTROL - GROUND/WATER	3	3.1
COLLISION AIRCRAFT	3	3.1
<b>* TOTAL ABOVE *</b>	<b>73</b>	<b>75.3</b>
<b>* TOTAL NUMBER OF OCCURRENCES NOT LISTED *</b>	<b>24</b>	<b>24.7</b>
<b>* TOTAL *</b>	<b>97</b>	<b>100.0</b>

## INCIDENTS

## AIRLINE OPERATIONS

## TYPE OF OCCURRENCE

FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)

## SYSTEM FAILURE OCCURS 17 TIMES (18 PERCENT) OF TOTAL 97

LANDING GEAR	52.9
FLIGHT CONTROL SYSTEM	41.2
MAINTENANCE, SERVICING, INSPECTION PERSONNEL	17.6
FLIGHT CONTROL SURFACES	17.6
HYDRAULIC SYSTEM	17.6

## ENGINE FAILURE/DISINTEGRATION OCCURS 15 TIMES (16 PERCENT) OF TOTAL 97

COMPRESSOR ASSEMBLY (TURBOPROP/TURBOJET)	40.0
WEATHER	33.3
POWERPLANT ALL TYPES - MISCELLANEOUS	26.7
PRODUCTION/DESIGN	20.0

## FIRE/EXPLOSION OCCURS 8 TIMES (8 PERCENT) OF TOTAL 97

## GEAR COLLAPSED OCCURS 7 TIMES (7 PERCENT) OF TOTAL 97

LANDING GEAR	85.7
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## COLLISION OBJECT OCCURS 7 TIMES (7 PERCENT) OF TOTAL 97

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	100.0
FLIGHT CREW - PERCEPTION	85.7

## NEAR MISS OCCURS 5 TIMES (5 PERCENT) OF TOTAL 97

AIR TRAFFIC SERVICES PERSONNEL	80.0
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## WHEELS-UP LANDING OCCURS 4 TIMES (4 PERCENT) OF TOTAL 97

LANDING GEAR	75.0
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## OVERRUN OCCURS 4 TIMES (4 PERCENT) OF TOTAL 97

## LOSS OF CONTROL - GROUND/WATER OCCURS 3 TIMES (3 PERCENT) OF TOTAL 97

## COLLISION AIRCRAFT OCCURS 3 TIMES (3 PERCENT) OF TOTAL 97

# INCIDENTS

## GENERAL AVIATION

### PHASE OF OPERATION

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING	39	47.5	3	30.0	*****!	
EN-ROUTE	25	30.4	5	50.0		!*****

### TYPE OF OCCURRENCE

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
FIRE/EXPLOSION	7	8.5	0	0.0	*****!	
LOSS OF CONTROL - GROUND/WATER	4	7.3	0	0.0	*****!	
GEAR RETRACTED	5	6.1	0	0.0	*****!	
PROPELLER/ROTOR FAILURE	2	2.4	1	9.0		!*****
SYSTEM FAILURE	8	9.7	2	18.1		!*****
FORCED/PRECAUTIONARY LANDING	1	1.2	2	18.1		!*****

### PERSONNEL FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS	19	28.3	5	71.4		!*****

### AIRCRAFT/POWERPLANT FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
LANDING GEAR	19	28.3	1	14.2	*****!	
PROPELLER AND ACCESSORIES (RECIP.)	1	1.4	1	14.2		!*****
WINGS	3	4.4	2	28.5		!*****
ENGINE STRUCTURE (RECIP.)	2	2.9	2	28.5		!*****

### WEATHER FACTORS

	1980-1984		1985		COMPARISON OF 1980-1984 WITH 1985	
	NO.	%	NO.	%	1985 LESS FREQUENT	1985 MORE FREQUENT
WEATHER/POG	3	4.4	0	0.0	*****!	

**INCIDENTS****GENERAL AVIATION****PHASE OF OPERATION**

	<b>CASES</b>	<b>PERCENT</b>
EN-ROUTE	5	50.0
LANDING	3	30.0
TAKE-OFF	2	20.0
<b>* TOTAL *</b>	<b>10</b>	<b>100.0</b>

**TEN MOST FREQUENT TYPES OF OCCURRENCE**

	<b>CASES</b>	<b>PERCENT</b>
SYSTEM FAILURE	2	18.2
FORCED/PRECAUTIONARY LANDING	2	18.2
WHEELS-UP LANDING	1	9.1
GEAR COLLAPSED	1	9.1
NEAR MISS	1	9.1
COLLISION OBJECT	1	9.1
AIRFRAME FAILURE	1	9.1
ENGINE FAILURE/DISINTEGRATION	1	9.1
PROPELLER/ROTOR FAILURE	1	9.1
<b>* TOTAL *</b>	<b>11</b>	<b>100.0</b>

**INCIDENTS****GENERAL AVIATION****TYPE OF OCCURRENCE****FACTORS RELATED TO THE TYPE OF OCCURRENCE (3 OR MORE FACTORS ONLY)**

SYSTEM FAILURE OCCURS 2 TIMES (18 PERCENT) OF TOTAL 11

WHEELS-UP LANDING OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

FLIGHT CREW - PROCEDURES/REGULATIONS/INSTRUCTIONS 100.0

GEAR COLLAPSED OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

NEAR MISS OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

AIRFRAME FAILURE OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

ENGINE FAILURE/DISINTEGRATION OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

PROPELLER/ROTOR FAILURE OCCURS 1 TIME (9 PERCENT) OF TOTAL 11

**— END —**

## ICAO TECHNICAL PUBLICATIONS

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