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INTRODUCTION

General

The information in this publication is based on 625 accident and 101 incident reports of the ICAO ADREP system for the year 1984 for aircraft of a maximum certificated take-off mass over 2 250 kg. The statistics were compiled in February 1987.

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 726 occurrences. Of these, 637 were Data Reports and 89 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 1984 with the preceding five years:
  - by phase of operation,
  - by type of occurrence,
  - by personnel factors,
  - by aircraft/powerplant factors,
  - by aerodrome factors,
  - by weather factors;
- The most frequent 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 (1984)

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	10	20	4	26	30	8	48	1	57	6
Aeroplanes between 2 250 and 27 000 kg	7	28	13	22	35	18	129	1	148	12
Non-scheduled Airline Operations										
Aeroplanes over 27 000 kg	2	9	4	7	11	17	17	49	83	6
Aeroplanes between 2 250 and 27 000 kg	19	95	31	83	114	39	103	0	142	40
Other Airline Operations										
Aeroplanes over 27 000 kg	1	0	0	1	1	0	0	0	0	0
Aeroplanes between 2 250 and 27 000 kg	4	19	10	13	23	14	8	0	22	9
Airline Operations (Total by mass)										
Aeroplanes over 27 000 kg	13	29	8	34	42	25	65	50	140	12
Aeroplanes between 2 250 and 27 000 kg	30	142	54	118	172	71	240	1	312	61
General Aviation										
Aeroplanes over 5 700 kg	6	25	9	22	31	13	22	0	35	15
Aeroplanes between 2 250 and 5 700 kg	31	298	80	249	329	86	83	6	175	110
II. ACCIDENTS TO HELICOPTERS										
Airline Operations	2	11	4	9	13	6	6	0	12	4
General Aviation	6	32	12	26	38	14	10	0	24	15
III. INCIDENTS										
Airline Operations	0	86	0	86	86	0	0	0	0	0
General Aviation	1	14	0	15	15	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 (1984)

	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										
Jet	10	62	3	69	72	5	47	1	53	5
Turbo-Prop	3	34	8	29	37	16	108	0	124	7
Piston	4	17	6	15	21	5	22	1	28	6
Non-Scheduled Airline Operations										
Jet	2	12	4	10	14	17	16	49	82	4
Turbo-Prop	8	19	10	17	27	15	49	0	64	13
Piston	11	83	21	73	94	24	55	0	79	29
Other Airline Operations										
Jet	2	7	3	6	9	5	1	0	6	3
Turbo-Prop	1	6	1	6	7	2	1	0	3	1
Piston	2	15	6	11	17	7	6	0	13	5
General Aviation										
Jet	2	21	3	20	23	5	6	0	11	4
Turbo-Prop	5	46	12	39	51	15	13	0	28	13
Piston	31	270	74	227	301	79	86	6	171	108

1) Preliminary Report
2) Accident/Incident Data Report

PART I

ACCIDENTS TO AEROPLANES

ACCIDENTS TO AEROPLANES

AIRLINE OPERATIONS

PHASE OF OPERATION

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
LANDING	672	47.9	147	45.2	***********!	
EN-ROUTE	313	22.3	87	26.7		!**********

TYPE OF OCCURRENCE

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
OVERRUN	81	5.7	14	4.2	********!	
DAMAGE TO AICRAFT IN FLIGHT	21	1.5	0	0.0	********!	
NOSE-DOWN/OVER	20	1.4	0	0.0	********!	
COLLISION TERRAIN	151	10.7	31	9.4	********!	
HARD LANDING	47	3.3	7	2.1	*******!	
DAMAGE TO AICRAFT ON GROUND	16	1.1	0	0.0	*******!	
UNDERSHOOT	57	4.0	17	5.2		!*******
LOSS OF CONTROL - GROUND/WATER	83	5.9	28	8.5		!***************
FORCED/PRECAUTIONARY LANDING	40	2.8	18	5.5		!***************
ENGINE FAILURE/DISINTEGRATION	121	8.6	40	12.2		!**********

PERSONNEL FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
FLIGHT CREW - DECISIONS	269	30.5	33	19.3	**********!	
FLIGHT CREW - PROCEDURES	566	64.3	101	59.0	**********!	
SUPERVISORY PERS./INADEQUATE DIRECTIVES,MANUALS, EQUIP.	19	2.1	0	0.0	***!	
MISC. PERS./PILOT OF OTHER A/C	10	1.1	5	2.9		!***
MAINT. SER., PERS./INADEQUATE MAINT./INSPECTION	31	3.5	16	9.3		!**********
FLIGHT CREW - OPERATION OF EQUIPMENT	139	15.8	40	23.3		!**********

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
ELECTRICAL SYSTEM	28	3.1	3	1.7	****!	
WINGS	14	1.5	8	4.6		!*********
FUEL SYSTEM (RECIP.)	17	1.9	11	6.4		!**********
LANDING GEAR	217	24.6	53	30.9		!**********

AERODROME FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
AERODROME CONDITION	144	16.3	22	12.8	**********!	

WEATHER FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
WEATHER/SNOW	24	2.7	1	0.5	**********!	
WEATHER/DOWNDRAFT-UPDRAFT OR MOUNTAIN WAVE	23	2.6	1	0.5	**********!	
WEATHER/RAIN	34	3.8	9	5.2		!**********
WEATHER/OBSTRUCTIONS TO VISION-SMOKE,HAZE,SAND,DUST	8	0.9	5	2.9		!**********
WEATHER/UNFAVOURABLE WIND CONDITIONS	38	4.3	11	6.4		!**********

ACCIDENTS TO AEROPLANES

AIRLINE OPERATIONS

PHASES OF OPERATION	TOTAL NO.	TOTAL %	OVER 27 000 NO.	OVER 27 000 %	2250 TO 27 000 NO.	2250 TO 27 000 %
LANDING	147	45.3	23	39.0	124	46.7
EN-ROUTE	87	26.8	13	22.1	74	27.9
TAKE-OFF	57	17.6	14	23.8	43	16.2
TAXI	23	7.1	6	10.2	17	6.4
STANDING	11	3.4	3	5.1	8	3.1
TOTAL	325	100.0	59	100.0	266	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE	TOTAL NO.	TOTAL %	OVER 27 000 NO.	OVER 27 000 %	2250 TO 27 000 NO.	2250 TO 27 000 %
ENGINE FAILURE	40	12.3	6	10.2	34	12.7
GEAR COLLAPSED	35	10.8	3	5.1	32	12.0
COLLISION OBJECT	33	10.1	8	13.6	25	9.4
COLLISION TERRAIN	31	9.5	0	0	31	11.6
LOSS OF CONTROL - GROUND/WATER	28	8.6	5	8.5	23	8.6
LOSS OF CONTROL IN FLIGHT	22	6.8	1	1.7	21	7.9
FORCED/PRECAUTIONARY LANDING	18	5.6	0	0	18	6.8
UNDERSHOOT	17	5.2	1	1.7	16	6.0
WHEELS-UP LANDING	14	4.3	2	3.4	12	4.5
OVERRUN	14	4.3	6	10.2	8	3.0
* TOTAL ABOVE *	252	77.1	32	54.2	220	82.1
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	75	22.9	27	45.8	48	17.9
* TOTAL *	327	100.0	59	100.0	268	100.0

ACCIDENTS TO AEROPLANES

AIRLINE OPERATIONS

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

ENGINE FAILURE OCCURS 40 TIMES (12 PERCENT) OF TOTAL 327

FLIGHT CREW - PROCEDURES	35.0
FLIGHT CREW - OPERATION OF EQUIPMENT	30.0
MAINTENANCE,SERVICING,INSPECTION PERSONNEL	20.0
FUEL SYSTEM (RECIP.)	20.0
POWERPLANT ALL TYPES - MISCELLANEOUS	12.5
OPERATIONAL SUPERVISORY PERSONNEL	10.0
ENGINE STRUCTURE (RECIP.)	10.0

GEAR COLLAPSED OCCURS 35 TIMES (11 PERCENT) OF TOTAL 327

LANDING GEAR	77.1
FLIGHT CREW - DECISIONS	17.1
MAINTENANCE,SERVICING,INSPECTION PERSONNEL	17.1
MISCELLANEOUS	11.4
FLIGHT CREW - OPERATION OF EQUIPMENT	8.6
AERODROME CONDITION	8.6

COLLISION OBJECT OCCURS 33 TIMES (10 PERCENT) OF TOTAL 327

AERODROME CONDITION	30.3
FLIGHT CREW - PERCEPTION	24.2
WEATHER	24.2
FLIGHT CREW - OPERATION OF EQUIPMENT	18.2
FLIGHT CREW - DECISIONS	15.2
FLIGHT CREW - PROCEDURES	15.2
LANDING GEAR	12.1
TERRAIN	9.1

COLLISION TERRAIN OCCURS 31 TIMES (10 PERCENT) OF TOTAL 327

FLIGHT CREW - PROCEDURES	38.7
WEATHER	38.7
FLIGHT CREW - PERCEPTION	12.9
FLIGHT CREW - DECISIONS	12.9
MISCELLANEOUS	9.7

ACCIDENTS TO AEROPLANES

AIRLINE OPERATIONS

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

LOSS OF CONTROL - GROUND/WATER OCCURS 28 TIMES (9 PERCENT) OF TOTAL 327

FLIGHT CREW - AIRCRAFT HANDLING	42.9
AERODROME CONDITION	32.1
FLIGHT CREW - OPERATION OF EQUIPMENT	28.6
LANDING GEAR	25.0
FLIGHT CREW - DECISIONS	21.4
FLIGHT CREW - PERCEPTION	14.3
WEATHER	14.3
FLIGHT CREW - PROCEDURES	10.7
MAINTENANCE/SERVICING/INSPECTION PERSONNEL	10.7

LOSS OF CONTROL IN FLIGHT OCCURS 22 TIMES (7 PERCENT) OF TOTAL 327

WEATHER	45.5
FLIGHT CREW - PROCEDURES	40.9
FLIGHT CREW - AIRCRAFT HANDLING	31.8
FLIGHT CREW - OPERATION OF EQUIPMENT	18.2
MISCELLANEOUS	18.2
FLIGHT AND NAVIGATION INSTRUMENTS	13.6

FORCED/PRECAUTIONARY LANDING OCCURS 18 TIMES (6 PERCENT) OF TOTAL 327

WEATHER	16.7
TERRAIN	16.7

UNDERSHOOT OCCURS 17 TIMES (5 PERCENT) OF TOTAL 327

WEATHER	82.4
FLIGHT CREW - PROCEDURES	64.7

WHEELS-UP LANDING OCCURS 14 TIMES (4 PERCENT) OF TOTAL 327

FLIGHT CREW - PROCEDURES	57.1
LANDING GEAR	50.0
WEATHER	28.6
FLIGHT CREW - OPERATION OF EQUIPMENT	21.4

OVERRUN OCCURS 14 TIMES (4 PERCENT) OF TOTAL 327

FLIGHT CREW - DECISIONS	42.9
FLIGHT CREW - PERCEPTION	35.7
AERODROME CONDITION	35.7
WEATHER	35.7
FLIGHT CREW - PROCEDURES	28.6

ACCIDENTS TO AEROPLANES

GENERAL AVIATION

PHASE OF OPERATION

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
LANDING	1792	50.4	245	41.3	1984 LESS FREQUENT
EN-ROUTE	949	26.7	225	37.9	1984 MORE FREQUENT

TYPE OF OCCURRENCE

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
COLLISION OBJECT	503	14.2	70	11.7	1984 LESS FREQUENT
LOSS OF CONTROL - GROUND/WATER	217	6.1	23	3.8	1984 LESS FREQUENT
WHEELSUP LANDING	181	5.1	17	2.8	1984 LESS FREQUENT
GEAR RETRACTED	96	2.7	6	1.0	1984 LESS FREQUENT
UNDERSHOOT	99	2.8	26	4.3	1984 MORE FREQUENT
LOSS OF CONTROL IN FLIGHT	271	7.6	56	9.4	1984 MORE FREQUENT
GEAR COLLAPSED	256	7.2	58	9.7	1984 MORE FREQUENT
FORCED/PRECAUTIONARY LANDING	229	6.4	74	12.4	1984 MORE FREQUENT

PERSONNEL FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
FLIGHT CREW - DECISIONS	497	21.8	121	37.4	1984 MORE FREQUENT
FLIGHT CREW - PROCEDURES	1305	57.2	252	78.0	1984 MORE FREQUENT

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
POWERPLANT ALL TYPES - MISCELLANEOUS	150	6.5	3	0.9	1984 LESS FREQUENT
LUBRICATION SYSTEM (RECIP.)	18	0.7	12	3.7	1984 MORE FREQUENT
ENGINE STRUCTURE (RECIP.)	96	4.2	28	8.6	1984 MORE FREQUENT
LANDING GEAR	379	16.6	73	22.6	1984 MORE FREQUENT

AERODROME FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
AERODROME CONDITION	249	10.9	26	8.0	1984 LESS FREQUENT

WEATHER FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
WEATHER/RAIN	92	4.0	9	2.7	1984 LESS FREQUENT
WEATHER/SNOW	51	2.2	4	1.2	1984 LESS FREQUENT
WEATHER/LOW CEILING	196	8.6	30	9.2	1984 MORE FREQUENT
WEATHER/HIGH TEMPERATURE	4	0.1	3	0.9	1984 MORE FREQUENT
WEATHER/UNFAVOURABLE WIND CONDITIONS	103	4.5	21	6.5	1984 MORE FREQUENT

ACCIDENTS TO AEROPLANES

GENERAL AVIATION

PHASES OF OPERATION	TOTAL NO.	TOTAL %	OVER 5 700 NO.	OVER 5 700 %	2250 TO 5 700 NO.	2250 TO 5 700 %
LANDING	245	41.4	23	47.0	222	40.9
EN-ROUTE	225	38.0	12	24.5	213	39.2
TAKE-OFF	107	18.1	11	22.5	96	17.7
TAXI	12	2.1	3	6.2	9	1.7
STANDING	4	0.7	0	0	4	0.8
TOTAL	593	100.0	49	100.0	544	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE	TOTAL NO.	TOTAL %	OVER 5 700 NO.	OVER 5 700 %	2250 TO 5 700 NO.	2250 TO 5 700 %
ENGINE FAILURE	98	16.5	6	12.3	92	16.9
FORCED/PRECAUTIONARY LANDING	74	12.5	1	2.1	73	13.4
COLLISION OBJECT	70	11.8	7	14.3	63	11.6
COLLISION TERRAIN	62	10.5	2	4.1	60	11.0
GEAR COLLAPSED	58	9.8	5	10.3	53	9.8
LOSS OF CONTROL IN FLIGHT	56	9.5	5	10.3	51	9.4
UNDERSHOOT	26	4.4	4	8.2	22	4.1
LOSS OF CONTROL - GROUND/WATER	23	3.9	3	6.2	20	3.7
HARD LANDING	18	3.1	4	8.2	14	2.6
OVERRUN	18	3.1	3	6.2	15	2.8
* TOTAL ABOVE *	503	84.5	40	81.6	463	84.8
* TOTAL NUMBER OF OCCURRENCES NOT LISTED	*92	15.5	9	18.4	83	15.2
* TOTAL *	595	100.0	49	100.0	546	100.0

ACCIDENTS TO AEROPLANES

GENERAL AVIATION

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

ENGINE FAILURE OCCURS 98 TIMES (17 PERCENT) OF TOTAL 595

FLIGHT CREW - PROCEDURES	28.6
FLIGHT CREW - OPERATION OF EQUIPMENT	27.6
ENGINE STRUCTURE (RECIP.)	27.6
MISCELLANEOUS	22.4
FLIGHT CREW - DECISIONS	15.3
MAINTENANCE/SERVICING/INSPECTION PERSONNEL	12.2
FUEL SYSTEM (RECIP.)	12.2
WEATHER	8.2
LUBRICATION SYSTEM (RECIP.)	6.1
FLIGHT CREW - OTHER	3.1
IGNITION SYSTEM (RECIP.)	3.1
POWERPLANT INSTRUMENTS (RECIP.)	3.1
POWERPLANT ALL TYPES - MISCELLANEOUS	3.1

FORCED/PRECAUTIONARY LANDING OCCURS 74 TIMES (12 PERCENT) OF TOTAL 595

TERRAIN	28.4
FLIGHT CREW - DECISIONS	16.2
FLIGHT CREW - OPERATION OF EQUIPMENT	6.8
FLIGHT CREW - AIRCRAFT HANDLING	6.8
FLIGHT CREW - PROCEDURES	5.4
WEATHER	5.4
LANDING GEAR	4.1

COLLISION OBJECT OCCURS 70 TIMES (12 PERCENT) OF TOTAL 595

FLIGHT CREW - PROCEDURES	32.9
FLIGHT CREW - PERCEPTION	28.6
WEATHER	18.6
FLIGHT CREW - DECISIONS	15.7
LANDING GEAR	12.9
TERRAIN	11.4
AERODROME FACILITIES	7.1
FLIGHT CREW - OPERATION OF EQUIPMENT	4.3
MAINTENANCE/SERVICING/INSPECTION PERSONNEL	4.3

ACCIDENTS TO AEROPLANES

GENERAL AVIATION

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

COLLISION TERRAIN OCCURS 62 TIMES (10 PERCENT) OF TOTAL 595

FLIGHT CREW - PROCEDURES	53.2
WEATHER	41.9
FLIGHT CREW - DECISIONS	21.0
FLIGHT CREW - PERCEPTION	9.7
FLIGHT CREW - OTHER	8.1
TERRAIN	6.5
MISCELLANEOUS	6.5
FLIGHT CREW - OPERATION OF EQUIPMENT	4.8

GEAR COLLAPSED OCCURS 58 TIMES (10 PERCENT) OF TOTAL 595

LANDING GEAR	58.6
MAINTENANCE,SERVICING,INSPECTION PERSONNEL	12.1
AERODROME CONDITION	10.3
MISCELLANEOUS	8.6
FLIGHT CREW - OPERATION OF EQUIPMENT	6.9
TERRAIN	6.9
FLIGHT CREW - DECISIONS	5.2
FLIGHT CREW - AIRCRAFT HANDLING	5.2

LOSS OF CONTROL IN FLIGHT OCCURS 56 TIMES (9 PERCENT) OF TOTAL 595

FLIGHT CREW - PROCEDURES	58.9
FLIGHT CREW - AIRCRAFT HANDLING	55.4
WEATHER	55.4
FLIGHT CREW - DECISIONS	28.6
FLIGHT CREW - OPERATION OF EQUIPMENT	17.9
FLIGHT CREW - PERCEPTION	8.9
FLIGHT CREW - OTHER	8.9
FLIGHT CREW - MEDICAL	7.1
FLIGHT CONTROL SURFACES	7.1
OPERATIONAL SUPERVISORY PERSONNEL	5.4
WINGS	5.4

UNDERSHOOT OCCURS 26 TIMES (4 PERCENT) OF TOTAL 595

WEATHER	76.9
FLIGHT CREW - PROCEDURES	73.1
FLIGHT CREW - DECISIONS	50.0
FLIGHT CREW - AIRCRAFT HANDLING	19.2
TERRAIN	15.4
FLIGHT CREW - PERCEPTION	11.5
FLIGHT CREW - OPERATION OF EQUIPMENT	11.5

ACCIDENTS TO AEROPLANES

GENERAL AVIATION

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

LOSS OF CONTROL - GROUND/WATER OCCURS 23 TIMES (4 PERCENT) OF TOTAL 595

FLIGHT CREW - AIRCRAFT HANDLING	69.6
FLIGHT CREW - DECISIONS	52.2
FLIGHT CREW - PROCEDURES	39.1
AERODROME CONDITION	30.4
WEATHER	26.1
TERRAIN	21.7
LANDING GEAR	13.0

HARD LANDING OCCURS 18 TIMES (3 PERCENT) OF TOTAL 595

FLIGHT CREW - AIRCRAFT HANDLING	66.7
WEATHER	38.9
FLIGHT CREW - PROCEDURES	27.8
WINGS	16.7

OVERRUN OCCURS 18 TIMES (3 PERCENT) OF TOTAL 595

FLIGHT CREW - DECISIONS	100.0
AERODROME CONDITION	44.4
FLIGHT CREW - PROCEDURES	22.2
WEATHER	22.2
FLIGHT CREW - PERCEPTION	16.7
LANDING GEAR	16.7

PART II

ACCIDENTS TO HELICOPTERS

ACCIDENTS TO HELICOPTERS

AIRLINE OPERATIONS

PHASE OF OPERATION

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
EN-ROUTE	47	52.2	7	30.4	**********	
TAKE-OFF	10	11.1	6	26.0		**********

TYPE OF OCCURRENCE

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
PROPELLER/ROTOR FAILURE	11	12.2	1	4.3	**********	
HARD LANDING	4	4.4	0	0.0	********	
LOSS OF CONTROL IN FLIGHT	16	17.7	5	21.7		*******
DITCHING	4	4.4	2	8.7		*******
FORCED/PRECAUTIONARY LANDING	7	7.7	3	13.0		*********
ENGINE FAILURE/DISINTEGRATION	10	11.1	5	21.7		**********

PERSONNEL FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
FLIGHT CREW - OPERATION OF EQUIPMENT	4	8.0	0	0.0	*****	
FLIGHT CREW - DECISIONS	7	14.0	3	30.0		**********
FLIGHT CREW - PROCEDURES	26	52.0	7	70.0		**********
MAINT. SER., PERS./INADEQUATE MAINT./INSPECTION	1	2.0	3	30.0		**********

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
ROTOR ASSEMBLIES	8	16.0	0	0.0	**********	
FUEL SYSTEM (TURBOPROP/TURBOJET)	1	2.0	2	20.0		**********
POWERPLANT ALL TYPES - MISCELLANEOUS	1	2.0	3	30.0		**********
TURBINE ASSEMBLY (TURBOPROP/TURBOJET)	1	2.0	3	30.0		**********

WEATHER FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
WEATHER/LOW CEILING	4	8.0	0	0.0	**********	
WEATHER/OBSTRUCTIONS TO VISION-SMOKE,HAZE,SAND,DUST	3	6.0	1	10.0		**********
WEATHER/FOG	2	4.0	1	10.0		**********

ACCIDENTS TO HELICOPTERS

AIRLINE OPERATIONS

PHASES OF OPERATION	CASES	PERCENT
LANDING	10	43.5
EN-ROUTE	7	30.4
TAKE-OFF	6	26.1
* TOTAL *	23	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE	CASES	PERCENT
LOSS OF CONTROL IN FLIGHT	5	21.7
ENGINE FAILURE	5	21.7
FORCED/PRECAUTIONARY LANDING	3	13.0
COLLISION TERRAIN	2	8.7
COLLISION OBJECT	2	8.7
DITCHING	2	8.7
ROLL-OVER	1	4.3
FIRE/EXPLOSION	1	4.3
PROPELLER/ROTOR FAILURE	1	4.3
* TOTAL ABOVE *	22	95.7
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	1	4.3
* TOTAL *	23	100.0

ACCIDENTS TO HELICOPTERS

AIRLINE OPERATIONS

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

LOSS OF CONTROL IN FLIGHT OCCURS 5 TIMES (22 PERCENT) OF TOTAL 23

ENGINE FAILURE OCCURS 5 TIMES (22 PERCENT) OF TOTAL 23

POWERPLANT ALL TYPES - MISCELLANEOUS	60.0
TURBINE ASSEMBLY (TURBOPROP/TURBOJET)	60.0

FORCED/PRECAUTIONARY LANDING OCCURS 3 TIMES (13 PERCENT) OF TOTAL 23

FLIGHT CREW - AIRCRAFT HANDLING	100.0

COLLISION TERRAIN OCCURS 2 TIMES (9 PERCENT) OF TOTAL 23

COLLISION OBJECT OCCURS 2 TIMES (9 PERCENT) OF TOTAL 23

DITCHING OCCURS 2 TIMES (9 PERCENT) OF TOTAL 23

ROLL-OVER OCCURS 1 TIME (4 PERCENT) OF TOTAL 23

PROPELLER/ROTOR FAILURE OCCURS 1 TIME (4 PERCENT) OF TOTAL 23

ACCIDENTS TO HELICOPTERS

GENERAL AVIATION

PHASE OF OPERATION

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
					1984 LESS FREQUENT ! 1984 MORE FREQUENT
LANDING	87	29.7	11	21.1	********** !
EN-ROUTE	147	50.3	29	55.7	! **********

TYPE OF OCCURRENCE

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
					1984 LESS FREQUENT ! 1984 MORE FREQUENT
ROLL-OVER	16	5.5	0	0.0	********** !
HARD LANDING	27	9.3	2	3.9	********** !
COLLISION TERRAIN	38	13.1	4	7.8	********** !
LOSS OF CONTROL IN FLIGHT	31	10.6	3	5.8	********** !
GEAR COLLAPSED	1	0.3	2	3.9	! ********
COLLISION OBJECT	28	9.6	7	13.7	! **********
FORCED/PRECAUTIONARY LANDING	22	7.5	8	15.6	! **********

PERSONNEL FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
					1984 LESS FREQUENT ! 1984 MORE FREQUENT
FLIGHT CREW - OTHER	10	5.8	0	0.0	********** !
FLIGHT CREW - MEDICAL	9	5.2	0	0.0	********* !
MAINT. SER. PERS./IMPRPER MAINT./MAINT. PERS.	7	4.1	0	0.0	******** !
SUPERVISORY PERS./OTHER	0	0.0	1	3.5	! ******
MISC. PERS./DRIVER OF VEHICLE	0	0.0	1	3.5	! ******
FLIGHT ENGINEER/OTHER	0	0.0	1	3.5	! ******
MAINT. SER., PERS./INADEQUATE MAINT./INSPECTION	3	1.7	2	7.1	! *********
FLIGHT CREW - OPERATION OF EQUIPMENT	12	7.0	5	17.8	! **********

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
					1984 LESS FREQUENT ! 1984 MORE FREQUENT
POWERPLANT ALL TYPES - MISCELLANEOUS	15	8.8	1	3.5	********** !
FUEL SYSTEM (TURBOPROP/TURBOJET)	7	4.1	0	0.0	******** !
MISCELLANEOUS UNITS AND ASSEMBLIES (ROTORCRAFT)	2	1.1	2	7.1	! **********
LANDING GEAR	5	2.9	3	10.7	! **********
FUSELAGE	2	1.1	3	10.7	! **********

WEATHER FACTORS

	1979-1983 NO.	1979-1983 %	1984 NO.	1984 %	COMPARISION OF 84 WITH 78-83
					1984 LESS FREQUENT ! 1984 MORE FREQUENT
WEATHER/HIGH DENSITY ALTITUDE	6	3.5	0	0.0	********** !
WEATHER/LOW CEILING	5	2.9	2	7.1	! **********
WEATHER/FOG	4	2.3	2	7.1	! **********

ACCIDENTS TO HELICOPTERS

GENERAL AVIATION

PHASES OF OPERATION

	CASES	PERCENT
EN-ROUTE	29	55.8
LANDING	11	21.2
TAKE-OFF	7	13.5
STANDING	3	5.8
TAXI	2	3.8
* TOTAL *	52	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
ENGINE FAILURE	11	21.6
FORCED/PRECAUTIONARY LANDING	8	15.7
COLLISION OBJECT	7	13.7
PROPELLER/ROTOR FAILURE	5	9.8
COLLISION TERRAIN	4	7.8
LOSS OF CONTROL IN FLIGHT	3	5.9
GEAR COLLAPSED	2	3.9
HARD LANDING	2	3.9
OTHER	2	3.9
DITCHING	2	3.9
* TOTAL ABOVE *	46	90.2
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	5	9.8
* TOTAL *	51	100.0

ACCIDENTS TO HELICOPTERS

GENERAL AVIATION

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

ENGINE FAILURE OCCURS 11 TIMES (22 PERCENT) OF TOTAL 51

FLIGHT CREW - OPERATION OF EQUIPMENT	27.3
MISCELLANEOUS	27.3

FORCED/PRECAUTIONARY LANDING OCCURS 8 TIMES (16 PERCENT) OF TOTAL 51

WEATHER	37.5

COLLISION OBJECT OCCURS 7 TIMES (14 PERCENT) OF TOTAL 51

FLIGHT CREW - PROCEDURES	71.4

PROPELLER/ROTOR FAILURE OCCURS 5 TIMES (10 PERCENT) OF TOTAL 51

COLLISION TERRAIN OCCURS 4 TIMES (8 PERCENT) OF TOTAL 51

TERRAIN	75.0

LOSS OF CONTROL IN FLIGHT OCCURS 3 TIMES (6 PERCENT) OF TOTAL 51

GEAR COLLAPSED OCCURS 2 TIMES (4 PERCENT) OF TOTAL 51

HARD LANDING OCCURS 2 TIMES (4 PERCENT) OF TOTAL 51

OTHER OCCURS 2 TIMES (4 PERCENT) OF TOTAL 51

DITCHING OCCURS 2 TIMES (4 PERCENT) OF TOTAL 51

PART III

INCIDENTS

INCIDENTS

AIRLINE OPERATIONS

PHASE OF OPERATION

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
TAXI	52	13.0	6	5.9	****************!	
LANDING	132	33.0	42	41.5		!********************

TYPE OF OCCURRENCE

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
AIRFRAME FAILURE	27	6.7	3	2.9	****!	
SYSTEM FAILURE	46	11.5	29	28.7		!********************

PERSONNEL FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
MAINT. SER. PERS./IMPRPER MAINT./MAINT. PERS.	19	5.6	2	2.3	****!	
FLIGHT CREW - MEDICAL	11	3.2	0	0.0	****!	
FLIGHT CREW - DECISIONS	18	5.3	10	11.6		!********
FLIGHT CREW - PROCEDURES	56	16.5	26	30.2		!**********************
MAINT. SER., PERS./INADEQUATE MAINT./INSPECTION	11	3.2	15	17.4		!**********************

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
LANDING GEAR	96	28.4	22	25.5	******!	
PROPELLER AND ACCESSORIES (RECIP.)	8	2.3	0	0.0	*****!	
HYDRAULIC SYSTEM	8	2.3	6	6.9		!**********
TURBINE ASSEMBLY (TURBOPROP/TURBOJET)	13	3.8	9	10.4		!**********
ELECTRICAL SYSTEM	15	4.4	10	11.6		!**********
FLIGHT CONTROL SURFACES	13	3.8	10	11.6		!**********
WINGS	3	0.8	8	9.3		!**********

WEATHER FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
WEATHER/CLEAR AIR TURBULENCE	7	2.0	0	0.0	*********!	
WEATHER/HAIL	4	1.1	0	0.0	*****!	
WEATHER/FOG	9	2.6	5	5.8		!**********
WEATHER/LOW CEILING	9	2.6	6	6.9		!**********

INCIDENTS

AIRLINE OPERATIONS

PHASES OF OPERATION

	CASES	PERCENT
LANDING	42	41.6
EN-ROUTE	33	32.7
TAKE-OFF	19	18.8
TAXI	6	5.9
STANDING	1	1.0
* TOTAL *	101	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
SYSTEM FAILURE	29	28.7
ENGINE FAILURE	13	12.9
LOSS OF CONTROL - GROUND/WATER	9	8.9
FIRE/EXPLOSION	7	6.9
WHEELS-UP LANDING	6	5.9
COLLISION OBJECT	6	5.9
GEAR COLLAPSED	4	4.0
NEAR MISS	4	4.0
COLLISION AIRCRAFT	3	3.0
AIRFRAME FAILURE	3	3.0
* TOTAL ABOVE *	84	83.2
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	17	16.8
* TOTAL *	101	100.0

INCIDENTS

AIRLINE OPERATIONS

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

SYSTEM FAILURE OCCURS 29 TIMES (29 PERCENT) OF TOTAL 101

LANDING GEAR	48.3
MAINTENANCE/SERVICING/INSPECTION PERSONNEL	37.9
FLIGHT CONTROL SURFACES	20.7
FUSELAGE	13.8
ELECTRICAL SYSTEM	13.8
HYDRAULIC SYSTEM	13.8
FLIGHT CONTROL SYSTEM	13.8
FLIGHT CREW - PROCEDURES	10.3
WINGS	10.3

ENGINE FAILURE OCCURS 13 TIMES (13 PERCENT) OF TOTAL 101

TURBINE ASSEMBLY (TURBOPROP/TURBOJET)	69.2
COMPRESSOR ASSEMBLY (TURBOPROP/TURBOJET)	23.1

LOSS OF CONTROL - GROUND/WATER OCCURS 9 TIMES (9 PERCENT) OF TOTAL 101

FLIGHT CREW - AIRCRAFT HANDLING	77.8
FLIGHT CREW - PROCEDURES	44.4
FLIGHT CREW - OPERATION OF EQUIPMENT	33.3
WEATHER	33.3

FIRE/EXPLOSION OCCURS 7 TIMES (7 PERCENT) OF TOTAL 101

ELECTRICAL SYSTEM	71.4

WHEELS-UP LANDING OCCURS 6 TIMES (6 PERCENT) OF TOTAL 101

INCIDENTS

AIRLINE OPERATIONS

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

COLLISION OBJECT OCCURS 6 TIMES (6 PERCENT) OF TOTAL 101

WEATHER	100.0
FLIGHT CREW - DECISIONS	50.0

GEAR COLLAPSED OCCURS 4 TIMES (4 PERCENT) OF TOTAL 101

NEAR MISS OCCURS 4 TIMES (4 PERCENT) OF TOTAL 101

COLLISION AIRCRAFT OCCURS 3 TIMES (3 PERCENT) OF TOTAL 101

AIRFRAME FAILURE OCCURS 3 TIMES (3 PERCENT) OF TOTAL 101

FLIGHT CONTROL SURFACES	100.0

INCIDENTS

GENERAL AVIATION

PHASE OF OPERATION

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
LANDING	66	35.6	9	50.0		!**********

TYPE OF OCCURRENCE

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
WHEELSUP LANDING	23	12.4	0	0.0	********** !	
ENGINE FAILURE/DISINTEGRATION	25	13.5	1	5.5	******* !	
SYSTEM FAILURE	16	8.6	3	16.6		!*******
NEAR MISS	0	0.0	4	22.2		!**********

PERSONNEL FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
FLIGHT CREW - OPERATION OF EQUIPMENT	14	9.1	0	0.0	********** !	
MAINT. SER., PERS./INADEQUATE MAINT./INSPECTION	10	6.5	0	0.0	********* !	
FLIGHT CREW - MEDICAL	1	0.6	1	7.1		!*********
MISC. PERS./PILOT OF OTHER A/C	2	1.3	2	14.2		!**********
ATC PERS./INADEQUATE SPACING OF A/C	1	0.6	2	14.2		!**********

AIRCRAFT/POWERPLANT FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
FUSELAGE	8	5.2	0	0.0	******* !	
COMBUSTION ASSEMBLY (TURBOPROP/TURBOJET)	0	0.0	1	7.1		!**********
FUEL SYSTEM (TURBOPROP/TURBOJET)	0	0.0	1	7.1		!**********
WINGS	1	0.6	2	14.2		!**********
FLIGHT CONTROL SYSTEM	11	7.1	3	21.4		!**********

AERODROME FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
AIRWAYS FACILITIES	0	0.0	1	7.1		!**********

WEATHER FACTORS

	1979-1983 NO.	%	1984 NO.	%	COMPARISION OF 84 WITH 78-83 1984 LESS FREQUENT	1984 MORE FREQUENT
WEATHER/FOG	1	0.6	2	14.2		!**********

INCIDENTS

GENERAL AVIATION

PHASES OF OPERATION

	CASES	PERCENT
LANDING	10	50.0
EN-ROUTE	6	30.0
TAKE-OFF	4	20.0
* TOTAL *	20	100.0

TEN MOST FREQUENT TYPES OF OCCURRENCE

	CASES	PERCENT
NEAR MISS	4	20.0
SYSTEM FAILURE	4	20.0
LOSS OF CONTROL - GROUND/WATER	3	15.0
GEAR COLLAPSED	2	10.0
HARD LANDING	1	5.0
OVERRUN	1	5.0
COLLISION OBJECT	1	5.0
FIRE/EXPLOSION	1	5.0
ENGINE FAILURE	1	5.0
FLIGHT CREW ILLNESS/INCAPACITATION	1	5.0
* TOTAL ABOVE *	19	95.0
* TOTAL NUMBER OF OCCURRENCES NOT LISTED *	1	5.0
* TOTAL *	20	100.0

INCIDENTS

GENERAL AVIATION

TYPES OF OCCURRENCE
RELATED FACTORS WITH PERCENTAGES OF THE OCCURRENCE IN WHICH THE FACTOR WAS CODED

NEAR MISS OCCURS 4 TIMES (20 PERCENT) OF TOTAL 20

SYSTEM FAILURE OCCURS 4 TIMES (20 PERCENT) OF TOTAL 20
FLIGHT CONTROL SYSTEM 75.0

LOSS OF CONTROL - GROUND/WATER OCCURS 3 TIMES (15 PERCENT) OF TOTAL 20

GEAR COLLAPSED OCCURS 2 TIMES (10 PERCENT) OF TOTAL 20

HARD LANDING OCCURS 1 TIME (5 PERCENT) OF TOTAL 20

OVERRUN OCCURS 1 TIME (5 PERCENT) OF TOTAL 20
WEATHER 100.0

ENGINE FAILURE OCCURS 1 TIME (5 PERCENT) OF TOTAL 20

FLIGHT CREW ILLNESS/INCAPACITATION OCCURS 1 TIME (5 PERCENT) OF TOTAL 20

TEMPORARY LOSS OF CONTROL IN FLIGHT OCCURS 1 TIME (5 PERCENT) OF TOTAL 20

— END —

ICAO TECHNICAL PUBLICATIONS

The following summary gives the status, and also describes in general terms the contents of the various series of technical publications issued by the International Civil Aviation Organization. It does not include specialized publications that do not fall specifically within one of the series, such as the Aeronautical Chart Catalogue *or the* Meteorological Tables for International Air Navigation.

International Standards and Recommended Practices are adopted by the Council in accordance with Articles 54, 37 and 90 of the Convention on International Civil Aviation and are designated, for convenience, as Annexes to the Convention. The uniform application by Contracting States of the specifications contained in the International Standards is recognized as necessary for the safety or regularity of international air navigation while the uniform application of the specifications in the Recommended Practices is regarded as desirable in the interest of safety, regularity or efficiency of international air navigation. Knowledge of any differences between the national regulations or practices of a State and those established by an International Standard is essential to the safety or regularity of international air navigation. In the event of non-compliance with an International Standard, a State has, in fact, an obligation, under Article 38 of the Convention, to notify the Council of any differences. Knowledge of differences from Recommended Practices may also be important for the safety of air navigation and, although the Convention does not impose any obligation with regard thereto, the Council has invited Contracting States to notify such differences in addition to those relating to International Standards.

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The following publications are prepared by authority of the Secretary General in accordance with the principles and policies approved by the Council.

Technical Manuals provide guidance and information in amplification of the International Standards, Recommended Practices and PANS, the implementation of which they are designed to facilitate.

Air Navigation Plans detail requirements for facilities and services for international air navigation in the respective ICAO Air Navigation Regions. They are prepared on the authority of the Secretary General on the basis of recommendations of regional air navigation meetings and of the Council action thereon. The plans are amended periodically to reflect changes in requirements and in the status of implementation of the recommended facilities and services.

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