

# ICAO

## CIRCULAR

CIRCULAR 223-AN/133



1989

### ACCIDENT/INCIDENT REPORTING (ADREP)

ANNUAL STATISTICS — 1986

*Approved by the Secretary General  
and published under his authority*

**INTERNATIONAL  
CIVIL AVIATION  
ORGANIZATION  
MONTREAL • CANADA**

*Published in separate English, French and Spanish editions by the International Civil Aviation Organization. All correspondence, except orders and subscriptions, should be addressed to the Secretary General.*

Orders for this publication should be sent to one of the following addresses, together with the appropriate remittance (by bank draft or post office money order) in U.S. dollars or the currency of the country in which the order is placed.

Document Sales Unit  
International Civil Aviation Organization  
1000 Sherbrooke Street West, Suite 400  
Montreal, Quebec  
Canada H3A 2R2

*Egypt.* ICAO Representative, Middle East Office, 16 Hassan Sabri,  
Zamalek, Cairo.

*France.* Représentant de l'OACI, Bureau Europe, 3 bis, villa Émile-Bergerat,  
92522 Neuilly-sur-Seine (Cedex).

*India.* Oxford Book and Stationery Co., Scindia House, New Delhi  
or 17 Park Street, Calcutta.

*Japan.* Japan Civil Aviation Promotion Foundation, 15-12, 1-chome, Toranomon,  
Minato-Ku, Tokyo.

*Kenya.* ICAO Representative, Eastern and Southern African Office, United Nations  
Accommodation, P.O. Box 46294 Nairobi.

*Mexico.* Representante de la OACI, Oficina Norteamérica, Centroamérica y Caribe,  
Apartado postal 5-377, C.P. 11590, México 5, D.F.

*Peru.* Representante de la OACI, Oficina Sudamérica, Apartado 4127, Lima 100.

*Senegal.* Représentant de l'OACI, Bureau Afrique occidentale et centrale,  
Boîte postale 2356, Dakar.

*Spain.* Pilot's, Suministros Aeronáuticos, S.A., C/Ulises, 5-Oficina Núm. 2, 28043 Madrid.

*Thailand.* ICAO Representative, Asia and Pacific Office, P.O. Box 614, Bangkok.

*United Kingdom.* Civil Aviation Authority, Printing and Publications Services,  
Greville House, 37 Gratton Road, Cheltenham, Glos., GL50 2BN.

---

## Do you receive the ICAO BULLETIN?

The **ICAO Bulletin** contains a concise account of the activities of the Organization as well as articles of interest to the aeronautical world.

The **Bulletin** will also keep you up to date on the latest ICAO publications, their contents, amendments, supplements, corrigenda and prices.

Available in three separate editions: English, French and Spanish.  
Annual subscription: U.S.\$20.00 (surface mail); U.S.\$25.00 (air mail).

TABLE OF CONTENTS

	Page
Introduction . . . . .	(iii)
TABLE I - Accidents and Incidents by Type of Operation and Aircraft Mass (1986) . . . . .	(v)
TABLE II - Accidents and Incidents to Aeroplanes by Type of Operation and Powerplant (1986) . . . . .	(vi)
PART I ACCIDENTS TO AEROPLANES	
Airline Operations . . . . .	I-1
General Aviation . . . . .	I-4
PART II ACCIDENTS TO HELICOPTERS	
Airline Operations . . . . .	II-1
General Aviation . . . . .	II-3
PART III INCIDENTS	
Airline Operations . . . . .	III-1
General Aviation . . . . .	III-3

**THIS PAGE INTENTIONALLY LEFT BLANK**

## INTRODUCTION

### General

The information in this publication is based on 531 accident and 82 incident reports of the ICAO ADREP system for the year 1986 for aircraft of a maximum certificated take-off mass over 2 250 kg. The statistics were compiled in October 1989.

A new coding scheme for factors was introduced in 1988. Old data were recoded to the new format. Factors were recoded only for the years 1983 and following. Some precision may have been lost in the process.

The presentation format of these statistics differs from previous years. This was done to simplify production and presentation. Due to lack of recoded data, only three years could be used for comparison with 1986.

### 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 613 occurrences. Of these, 544 were Data Reports and 69 were Preliminary Reports. Preliminary reports do not contain factors and are therefore excluded from 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 coding instructions; nonetheless, there may be some unintentional bias on the part of the person coding the information.
- b) Some occurrences 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 on these tapes are not compatible with the ADREP coding system, precision is not attainable in all cases.
- c) Accidents reported to ICAO before 1988 were classified in a format that differs from the one used now. These data were recoded to the extent possible.

### Notes on the Statistical Tables

- a) Each accident/incident may be described by up to five events. For each event, a type of event, a corresponding phase of operation and up to 10 descriptive factors can be coded.
- b) 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 is the same, showing the following:

- Phases of operation for that section;
- Types of events for that section;
- A comparison of the year 1986 with the preceding three years by:
  - phase of operation,
  - type of event,
  - personnel factors,
  - airframe factors,
  - powerplant factors,
  - aircraft systems factors,
  - helicopter components factors (when applicable),
  - aerodrome factors, and
  - weather factors.

TABLE I - ACCIDENTS AND INCIDENTS BY TYPE OF OPERATION AND AIRCRAFT MASS (1986)

I. ACCIDENTS TO AEROPLANES

	Number of Reports		Number of Occurrences			Number of Fatalities				Number of Aircraft Destroyed
	PR (1)	DR (2)	Fatal	Non-Fatal	Total	Crew	Pax	Other	Total	
Scheduled Airline Operations										
Aeroplanes over 27 000 kg	15	39	9	45	54	24	420	15	459	6
Aeroplanes between 2 250 and 27 000 kg	5	33	10	28	38	13	84	0	97	11
Non-scheduled Airline Operations										
Aeroplanes over 27 000 kg	1	5	1	5	6	3	0	0	3	2
Aeroplanes between 2 250 and 27 000 kg	18	84	25	77	102	29	92	1	122	34
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	7	21	8	20	28	13	0	0	13	10
Airline Operations (Total by mass)										
Aeroplanes over 27 000 kg	16	45	10	51	61	27	420	15	462	8
Aeroplanes between 2 250 and 27 000 kg	30	138	43	125	168	55	176	1	232	55
General Aviation										
Aeroplanes over 5 700 kg	2	19	11	10	21	25	34	0	59	11
Aeroplanes between 2 250 and 5 700 kg	17	219	70	166	236	81	108	1	190	87
II. ACCIDENTS TO HELICOPTERS										
Airline Operations	0	9	4	5	9	4	45	3	52	4
General Aviation	4	32	7	29	36	8	8	0	16	11
III. INCIDENTS										
Airline Operations	0	73	0	73	73	0	0	0	0	1
General Aviation	0	9	0	9	9	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 (1986)

	Number of Reports		Number of Occurrences			Number of Fatalities				Number of Aircraft Destroyed
	PR (1)	DR (2)	Fatal	Non-Fatal	Total	Crew	Pax	Other	Total	
<b>Scheduled Airline Operations</b>										
Jet	15	83	8	90	98	24	420	15	459	6
Turbo-Prop	4	31	6	29	35	8	55	0	63	8
Piston	1	16	5	12	17	5	29	0	34	3
<b>Non-Scheduled Airline Operations</b>										
Jet	1	13	0	14	14	0	0	0	0	2
Turbo-Prop	2	16	8	10	18	15	75	0	90	8
Piston	16	71	18	69	87	17	17	1	35	27
<b>Other Airline Operations</b>										
Jet	0	1	0	1	1	0	0	0	0	0
Turbo-Prop	3	2	2	3	5	6	0	0	6	1
Piston	4	23	6	21	27	7	0	0	7	9
<b>General Aviation</b>										
Jet	1	20	7	14	21	21	33	0	54	8
Turbo-Prop	3	46	18	31	49	22	22	0	44	21
Piston	15	180	56	139	195	63	87	1	151	69

(1) Preliminary Report

(2) Accident/Incident Data Report



**PART I**

**ACCIDENTS TO AEROPLANES**

**AIRLINE OPERATIONS**

Distribution of cases and percentage of each according to phase of operation

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	14	3.1
TAXIING	12	2.7
TAKE-OFF	63	14.2
EN-ROUTE	113	25.4
MANOEUVERING	8	1.8
APPROACH	75	16.9
LANDING	137	30.8
POST-IMPACT	21	4.7
UNKNOWN	2	0.4
TOTAL	445	100.0

Distribution of cases and percentage of each according to type of event

<u>TYPE OF EVENT</u>	CASES	PERCENT
AIRFRAME FAILURE	5	1.1
COLLISION WITH OBJECT	42	9.4
COLLISION WITH TERRAIN	51	11.5
COLLISION WITH MOVING AIRCRAFT	8	1.8
COMPONENT/SYSTEM FAILURE	20	4.5
DAMAGE TO AIRCRAFT	8	1.8
EVACUATION	8	1.8
FIRE/EXPLOSION/FUMES	39	8.8
FLIGHT CREW ILLNESS/INCAPACITATION	1	0.2
GEAR COLLAPSED/RETRACTED	39	8.8
INJURIES TO PERSONS	21	4.7
LOSS OF CONTROL	55	12.4
MISSING AIRCRAFT	1	0.2
NOSE DOWN/OVERTURNED	5	1.1
OVERRUN	18	4.0
POWER LOSS -FIRST ENGINE	29	6.5
POWER LOSS -ADDITIONAL ENGINE	5	1.1
PROPELLER FAILURE	2	0.4
SECURITY OCCURRENCE	4	0.9
TAKE-OFF/LANDING OCCURRENCE	10	2.2
LANDING OCCURRENCE	32	7.2
WHEELS-DOWN LANDING ON WATER	1	0.2
WHEELS-UP LANDING	18	4.0
DIVERSION	1	0.2
ALTITUDE RELATED EVENT	2	0.4
EQUIPMENT/SYSTEM RELATED EVENT	3	0.7
WEATHER RELATED EVENT	12	2.7
OTHER	5	1.1
TOTAL	445	100.0

Comparison of the year 1986 with the preceding three years

PHASE OF OPERATION	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
TAKE-OFF	230	18.5	63	14.2	*****!	
TAXIING	46	3.7	12	2.7	*****!	
POST-IMPACT	53	4.3	21	4.7	! **	
MANOEUVERING	16	1.3	8	1.8	! **	
EN-ROUTE	293	23.5	113	25.4	!*****	
APPROACH	186	14.9	75	16.9	!*****	

EVENT	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
POWER LOSS -FIRST ENGINE	118	9.5	29	6.5	*****!	
COLLISION WITH OBJECT	149	12.0	42	9.4	*****!	
GEAR COLLAPSED/RETRACTED	131	10.5	39	8.8	*****!	
LOSS OF CONTROL	175	14.0	55	12.4	*****!	
POWER LOSS -ADDITIONAL ENGINE	29	2.3	5	1.1	*****!	
COMPONENT/SYSTEM FAILURE	65	5.2	20	4.5	****!	
AIRFRAME FAILURE	18	1.4	5	1.1	***!	
NOSE DOWN/OVERTURNED	10	0.8	5	1.1	! **	
DAMAGE TO AIRCRAFT	14	1.1	8	1.8	!****	
EVACUATION	13	1.0	8	1.8	!****	
OVERRUN	41	3.3	18	4.0	!****	
LANDING OCCURRENCE	80	6.4	32	7.2	!****	
WEATHER RELATED EVENT	23	1.8	12	2.7	!****	
TAKE-OFF/LANDING OCCURRENCE	12	1.0	10	2.2	!*****	
INJURIES TO PERSONS	36	2.9	21	4.7	!*****	
FIRE/EXPLOSION/FUMES	78	6.3	39	8.8	!*****	

PERSONNEL FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW PROCEDURES	294	27.9	77	25.3	*****!	
FLIGHT CREW OPERATION OF EQUIPMENT	166	15.8	42	13.8	*****!	
AERODROME/HELIPORT OPERATION	23	2.2	3	1.0	*****!	
ATC USE OF PROCEDURES	11	1.0	1	0.3	****!	
FLIGHT CREW DECISIONS	211	20.1	59	19.4	****!	
PASSENGER ACTION	4	0.4	3	1.0	!****	
A/C HANDLING MISCELLANEOUS	9	0.9	5	1.6	!****	
FLIGHT CREW PERCEPTION	114	10.8	38	12.5	!*****	
FLIGHT CREW A/C HANDLING	219	20.8	73	24.0	!*****	

AIRFRAME FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
AIRFRAME	12	4.8	1	1.7	*****!	
STABILIZER	8	3.2	1	1.7	***!	
DOOR	7	2.8	1	1.7	**!	
FUSELAGE	11	4.4	2	3.3	**!	
LANDING GEAR	170	67.5	41	68.3	! **	
A/C FURNISHING	12	4.8	8	13.3	!*****	

POWERPLANT FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
ENGINE	72	61.0	16	47.1	*****!	
POWERPL LUBRICATION SYSTEM	9	7.6	4	11.8	!****	
POWERPLANT INSTALLATION	3	2.5	3	8.8	!*****	
PROPELLER	11	9.3	6	17.6	!*****	

AIRCRAFT SYSTEMS FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
FUEL SYSTEM	69	44.8	7	14.3	*****!	
ELECTRICAL POWER	23	14.9	5	10.2		***!
AEROPLANE FLIGHT CONTROL	15	9.7	8	16.3		!****
AUTOFLIGHT SYSTEM	4	2.6	5	10.2		!****
HYDRAULIC SYSTEM	15	9.7	10	20.4		!*****

AERODROME FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
AERODROME/HELIPORT LIGHTING	10	8.5	1	4.2		*****!
RUNWAY SURFACE STATE	94	80.3	22	91.7		!*****

WEATHER FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
SKY CONDITION	63	28.5	10	14.7	*****!	
ATMOSPHERIC RESTRICTIONS TO VISION	58	26.2	14	20.6		*****!
WIND	93	42.1	43	63.2		!*****

### GENERAL AVIATION

**Distribution of cases and percentage of each according to phase of operation**

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	6	0.9
TAXIING	17	2.6
TAKE-OFF	113	17.1
EN-ROUTE	165	25.0
MANOEUVERING	65	9.9
APPROACH	81	12.3
LANDING	158	24.0
POST-IMPACT	52	7.9
UNKNOWN	2	0.3
<b>TOTAL</b>	<b>659</b>	<b>100.0</b>

**Distribution of cases and percentage of each according to type of event**

<u>TYPE OF EVENT</u>	CASES	PERCENT
AIRFRAME FAILURE	7	1.1
COLLISION WITH OBJECT	91	13.8
COLLISION WITH TERRAIN	106	16.1
COLLISION WITH MOVING AIRCRAFT	3	0.5
COMPONENT/SYSTEM FAILURE	31	4.7
DAMAGE TO AIRCRAFT	3	0.5
FIRE/EXPLOSION/FUMES	65	9.9
GEAR COLLAPSED/RETRACTED	41	6.2
LOSS OF CONTROL	101	15.3
MISSING AIRCRAFT	1	0.2
NOSE DOWN/OVERTURNED	21	3.2
OVERRUN	16	2.4
POWER LOSS -FIRST ENGINE	82	12.4
POWER LOSS -ADDITIONAL ENGINE	16	2.4
PROPELLER FAILURE	1	0.2
TAKE-OFF/LANDING OCCURRENCE	9	1.4
LANDING OCCURRENCE	27	4.1
WHEELS-UP LANDING	15	2.3
ALTITUDE RELATED EVENT	1	0.2
EQUIPMENT/SYSTEM RELATED EVENT	1	0.2
DISPATCH RELATED EVENT	1	0.2
WEATHER RELATED EVENT	17	2.6
OTHER	1	0.2
UNKNOWN	2	0.3
<b>TOTAL</b>	<b>659</b>	<b>100.0</b>

**Comparison of the year 1986 with the preceding three years**

<u>PHASE OF OPERATION</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
LANDING	675	31.9	158	24.0	*****!	
APPROACH	304	14.4	81	12.3	*****!	
EN-ROUTE	436	20.6	165	25.0		!*****
POST-IMPACT	66	3.1	52	7.9		!*****

EVENT

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
OTHER	89	4.2	1	0.2		
LANDING OCCURRENCE	148	7.0	27	4.1	*****!	
GEAR COLLAPSED/RETRACTED	185	8.7	41	6.2	*****!	
OVERRUN	78	3.7	16	2.4	*****!	
WHEELS-UP LANDING	71	3.4	15	2.3	****!	
COLLISION WITH MOVING AIRCRAFT	27	1.3	3	0.5	***!	
TAKE-OFF/LANDING OCCURRENCE	14	0.7	9	1.4	**!	!***
WEATHER RELATED EVENT	37	1.7	17	2.6	***!	!***
COMPONENT/SYSTEM FAILURE	78	3.7	31	4.7	**!	!***
LOSS OF CONTROL	298	14.1	101	15.3	***!	!****
COLLISION WITH TERRAIN	272	12.8	106	16.1	**!	!*****
FIRE/EXPLOSION/FUMES	92	4.3	65	9.9	**!	!*****

PERSONNEL FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW PROCEDURES	419	24.2	91	19.3	*****!	
FLIGHT CREW DECISIONS	378	21.8	90	19.1	*****!	
FLIGHT CREW PERCEPTION	199	11.5	48	10.2	****!	
AERODROME/HELIPORT OPERATION	18	1.0	0	0.0	***!	
FLIGHT CREW A/C HANDLING	418	24.1	159	33.7	**!	!*****

AIRFRAME FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
AIRFRAME	25	7.3	1	1.4	*****!	
LANDING GEAR	242	70.8	48	68.6	*****!	
WINDOW	8	2.3	1	1.4	***!	
WING	31	9.1	7	10.0	**!	!***
FUSELAGE	8	2.3	3	4.3	**!	!*****
A/C FURNISHING	3	0.9	2	2.9	**!	!*****
STABILIZER	16	4.7	5	7.1	**!	!*****
DOOR	6	1.8	3	4.3	**!	!*****

POWERPLANT FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
PROPELLER	26	11.0	3	5.7	*****!	
IGNITION SYSTEM	20	8.5	2	3.8	*****!	
POWERPL FUEL SYSTEM	23	9.7	3	5.7	*****!	
ENGINE	131	55.5	31	58.5	*****!	!*****
POWERPL LUBRICATION SYSTEM	21	8.9	8	15.1	*****!	!*****
ENGINE EXHAUST SYSTEM	6	2.5	5	9.4	*****!	!*****

AIRCRAFT SYSTEMS FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FUEL SYSTEM	117	66.1	28	50.9	*****!	
FLIGHT AND NAVIGATION SYSTEMS	15	8.5	3	5.5	***!	
HYDRAULIC SYSTEM	13	7.3	7	12.7	**!	!*****
ELECTRICAL POWER	12	6.8	13	23.6	**!	!*****

AERODROME FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
RUNWAY SURFACE STATE	87	77.0	12	100.0		!*****

WEATHER FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
ATMOSPHERIC RESTRICTIONS TO VISION	66	23.4	12	14.0	*****!	
SKY CONDITION	91	32.3	29	33.7		!***
WIND	119	42.2	41	47.7		!*****

# PART II

## ACCIDENTS TO HELICOPTERS

### AIRLINE OPERATIONS

Distribution of cases and percentage of each according to phase of operation

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	2	8.3
TAKE-OFF	1	4.2
EN-ROUTE	11	45.8
MANOEUVERING	4	16.7
APPROACH	1	4.2
LANDING	4	16.7
POST-IMPACT	1	4.2
TOTAL	24	100.0

Distribution of cases and percentage of each according to type of event

<u>TYPE OF EVENT</u>	CASES	PERCENT
AIRFRAME FAILURE	1	4.2
COLLISION WITH OBJECT	2	8.3
COLLISION WITH TERRAIN	4	16.7
FIRE/EXPLOSION/FUMES	3	12.5
DYNAMIC SYSTEM FAILURE	1	4.2
LOSS OF CONTROL	6	25.0
NOSE DOWN/OVERTURNED	1	4.2
POWER LOSS -FIRST ENGINE	3	12.5
LANDING OCCURRENCE	2	8.3
WEATHER RELATED EVENT	1	4.2
TOTAL	24	100.0

Comparison of the year 1986 with the preceding three years

<u>PHASE OF OPERATION</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
TAKE-OFF	11	23.4	1	4.2	*****!	
APPROACH	7	14.9	1	4.2	*****!	
EN-ROUTE	18	38.3	11	45.8		!*****

<u>EVENT</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
LOSS OF CONTROL	16	34.0	6	25.0	*****!	
POWER LOSS -FIRST ENGINE	7	14.9	3	12.5	****!	
DYNAMIC SYSTEM FAILURE	3	6.4	1	4.2	****!	
COLLISION WITH TERRAIN	6	12.8	4	16.7		!*****

PERSONNEL FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW DECISIONS	12	28.6	3	14.3	*****!	
FLIGHT CREW OPERATION OF EQUIPMENT	3	7.1	2	9.5		!***
FLIGHT CREW PERCEPTION	4	9.5	3	14.3		!*****
FLIGHT CREW A/C HANDLING	9	21.4	6	28.6		!*****

POWERPLANT FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
ENGINE	7	58.3	4	36.4		*****!

WEATHER FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
ATMOSPHERIC RESTRICTIONS TO VISION	6	50.0	1	33.3		*****!
WIND	3	25.0	2	66.7		!*****



**GENERAL AVIATION**

**Distribution of cases and percentage of each according to phase of operation**

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	3	4.2
TAKE-OFF	7	9.7
EN-ROUTE	24	33.3
MANOEUVERING	21	29.2
APPROACH	2	2.8
LANDING	10	13.9
POST-IMPACT	5	6.9
TOTAL	72	100.0

**Distribution of cases and percentage of each according to type of event**

<u>TYPE OF EVENT</u>	CASES	PERCENT
AIRFRAME FAILURE	1	1.4
COLLISION WITH OBJECT	6	8.3
COLLISION WITH TERRAIN	12	16.7
COMPONENT/SYSTEM FAILURE	2	2.8
DAMAGE TO AIRCRAFT	3	4.2
FIRE/EXPLOSION/FUMES	5	6.9
DYNAMIC SYSTEM FAILURE	5	6.9
INJURIES TO PERSONS	2	2.8
LOSS OF CONTROL	9	12.5
NOSE DOWN/OVERTURNED	1	1.4
POWER LOSS -FIRST ENGINE	14	19.4
POWER LOSS -ADDITIONAL ENGINE	3	4.2
LANDING OCCURRENCE	7	9.7
OTHER	2	2.8
TOTAL	72	100.0

**Comparison of the year 1986 with the preceding three years**

<u>PHASE OF OPERATION</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
LANDING	46	18.5	10	13.9	*****!	
TAXIING	6	2.4	0	0.0	*****!	
TAKE-OFF	30	12.1	7	9.7	*****!	
AIRCRAFT STANDING	8	3.2	3	4.2		!***
MANOEUVERING	70	28.2	21	29.2		!***
POST-IMPACT	10	4.0	5	6.9		!*****
EN-ROUTE	69	27.8	24	33.3		!*****

<u>EVENT</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
OTHER	19	7.7	2	2.8	*****!	
COLLISION WITH OBJECT	27	10.9	6	8.3	*****!	
DYNAMIC SYSTEM FAILURE	23	9.3	5	6.9	*****!	
LOSS OF CONTROL	34	13.7	9	12.5		****!
COLLISION WITH TERRAIN	38	15.3	12	16.7		!****
DAMAGE TO AIRCRAFT	7	2.8	3	4.2		!****
POWER LOSS -FIRST ENGINE	43	17.3	14	19.4		!*****
POWER LOSS -ADDITIONAL ENGINE	4	1.6	3	4.2		!*****
LANDING OCCURRENCE	17	6.9	7	9.7		!*****
FIRE/EXPLOSION/FUMES	10	4.0	5	6.9		!*****

PERSONNEL FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW PROCEDURES	20	18.0	1	5.6	*****!	
FLIGHT CREW DECISIONS	17	15.3	1	5.6	*****!	
A/C HANDLING MISCELLANEOUS	4	3.6	0	0.0	*****!	
ATC USE OF PROCEDURES	3	2.7	0	0.0	****!	
FLIGHT CREW OPERATION OF EQUIPMENT	10	9.0	2	11.1	!***	
FLIGHT CREW PERCEPTION	20	18.0	5	27.8	!*****	
FLIGHT CREW A/C HANDLING	36	32.4	8	44.4	!*****	

AIRFRAME FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
LANDING GEAR	8	44.4	1	20.0	*****!	
FUSELAGE	6	33.3	1	20.0	*****!	

POWERPLANT FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
POWERPL FUEL SYSTEM	7	15.9	1	6.7	*****!	
ENGINE	30	68.2	13	86.7	!*****	

AIRCRAFT SYSTEMS FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
FUEL SYSTEM	11	68.8	1	50.0	*****!	
HYDRAULIC SYSTEM	5	31.3	1	50.0	!*****	

HELICOPTER COMPONENTS FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
TAIL ROTOR DRIVE SYSTEM	8	18.2	2	13.3	***!	
MAIN ROTOR	9	20.5	4	26.7	!****	
HELICOPT CONTROL SYSTEMS	9	20.5	7	46.7	!*****	

WEATHER FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
ATMOSPHERIC RESTRICTIONS TO VISION	7	41.2	1	33.3	****!	
SKY CONDITION	4	23.5	1	33.3	!*****	

# PART III

## INCIDENTS

### AIRLINE OPERATIONS

Distribution of cases and percentage of each according to phase of operation

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	12	11.5
TAXIING	10	9.6
TAKE-OFF	16	15.4
EN-ROUTE	29	27.9
MANOEUVERING	1	1.0
APPROACH	10	9.6
LANDING	26	25.0
TOTAL	104	100.0

Distribution of cases and percentage of each according to type of event

<u>TYPE OF EVENT</u>	CASES	PERCENT
AIRFRAME FAILURE	2	1.9
CARGO RELATED	2	1.9
COLLISION WITH OBJECT	3	2.9
COMPONENT/SYSTEM FAILURE	19	18.3
EVACUATION	7	6.7
FIRE/EXPLOSION/FUMES	10	9.6
FLIGHT CREW ILLNESS/INCAPACITATION	4	3.8
GEAR COLLAPSED/RETRACTED	8	7.7
LOSS OF CONTROL	3	2.9
NEAR COLLISION	12	11.5
OVERRUN	3	2.9
POWER LOSS -FIRST ENGINE	6	5.8
POWER LOSS -ADDITIONAL ENGINE	1	1.0
TAKE-OFF/LANDING OCCURRENCE	3	2.9
LANDING OCCURRENCE	4	3.8
WHEELS-UP LANDING	9	8.7
ALTITUDE RELATED EVENT	1	1.0
EQUIPMENT/SYSTEM RELATED EVENT	6	5.8
WEATHER RELATED EVENT	1	1.0
TOTAL	104	100.0

Comparison of the year 1986 with the preceding three years

<u>PHASE OF OPERATION</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
TAKE-OFF	77	22.1	16	15.4	*****!	
LANDING	95	27.3	26	25.0	*****!	
POST-IMPACT	4	1.1	0	0.0	***!	
APPROACH	36	10.3	10	9.6	**!	
EN-ROUTE	81	23.3	29	27.9	*****!	
AIRCRAFT STANDING	19	5.5	12	11.5	*****!	

EVENT	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
COLLISION WITH OBJECT	36	10.3	3	2.9	*****!	
POWER LOSS -FIRST ENGINE	45	12.9	6	5.8	*****!	
COMPONENT/SYSTEM FAILURE	88	25.3	19	18.3	*****!	
LOSS OF CONTROL	25	7.2	3	2.9	*****!	
LANDING OCCURRENCE	10	2.9	4	3.8		!***
TAKE-OFF/LANDING OCCURRENCE	6	1.7	3	2.9		!***
FIRE/EXPLOSION/FUMES	28	8.0	10	9.6		!***
GEAR COLLAPSED/RETRACTED	19	5.5	8	7.7		!****
FLIGHT CREW ILLNESS/INCAPACITATION	4	1.1	4	3.8		!*****
EVACUATION	10	2.9	7	6.7		!*****
WHEELS-UP LANDING	15	4.3	9	8.7		!*****
NEAR COLLISION	9	2.6	12	11.5		!*****

PERSONNEL FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW PERCEPTION	26	14.9	5	7.4	*****!	
FLIGHT CREW DECISIONS	24	13.8	6	8.8	*****!	
AERODROME/HELIPORT OPERATION	3	1.7	0	0.0		!***
FLIGHT CREW OPERATION OF EQUIPMENT	31	17.8	11	16.2		!***
FLIGHT CREW PROCEDURES	38	21.8	16	23.5		!***
ATC USE OF PROCEDURES	8	4.6	9	13.2		!*****

AIRFRAME FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
WING	10	7.5	1	2.4	*****!	
DOOR	7	5.2	1	2.4	*****!	
LANDING GEAR	90	67.2	27	65.9		!***
A/C FURNISHING	7	5.2	4	9.8		!*****
FUSELAGE	6	4.5	4	9.8		!*****

POWERPLANT FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
ENGINE	61	70.9	8	50.0	*****!	
IGNITION SYSTEM	4	4.7	2	12.5		!*****
POWERPL FUEL SYSTEM	3	3.5	2	12.5		!*****

AIRCRAFT SYSTEMS FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
FUEL SYSTEM	16	22.5	3	13.0	*****!	
ELECTRICAL POWER	13	18.3	5	21.7		!***
AIR CONDITIONING AND PRESSURIZATION	5	7.0	7	30.4		!*****

AERODROME FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
RUNWAY SURFACE STATE	16	72.7	4	100.0		!*****

WEATHER FACTORS	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	X	NO.	X	1986 LESS FREQUENT	1986 MORE FREQUENT
WIND	13	48.1	3	37.5	*****!	
SKY CONDITION	9	33.3	3	37.5		!*****
ATMOSPHERIC RESTRICTIONS TO VISION	5	18.5	2	25.0		!*****

**GENERAL AVIATION**

**Distribution of cases and percentage of each according to phase of operation**

<u>PHASE OF OPERATION</u>	CASES	PERCENT
AIRCRAFT STANDING	1	7.7
TAXIING	4	30.8
TAKE-OFF	1	7.7
EN-ROUTE	3	23.1
LANDING	4	30.8
TOTAL	13	100.0

**Distribution of cases and percentage of each according to type of event**

<u>TYPE OF EVENT</u>	CASES	PERCENT
COLLISION WITH OBJECT	1	7.7
COMPONENT/SYSTEM FAILURE	2	15.4
FIRE/EXPLOSION/FUMES	2	15.4
FLIGHT CREW ILLNESS/INCAPACITATION	1	7.7
GEAR COLLAPSED/RETRACTED	1	7.7
INJURIES TO PERSONS	1	7.7
LOSS OF CONTROL	1	7.7
NEAR COLLISION	1	7.7
LANDING OCCURRENCE	2	15.4
WHEELS-UP LANDING	1	7.7
TOTAL	13	100.0

**Comparison of the year 1986 with the preceding three years**

<u>PHASE OF OPERATION</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
TAKE-OFF	12	19.0	1	7.7		*****!
EN-ROUTE	21	33.3	3	23.1		*****!
APPROACH	6	9.5	0	0.0		*****!
LANDING	23	36.5	4	30.8		***!

<u>EVENT</u>	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
LOSS OF CONTROL	12	19.0	1	7.7		*****!
GEAR COLLAPSED/RETRACTED	7	11.1	1	7.7		****!

PERSONNEL FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
FLIGHT CREW OPERATION OF EQUIPMENT	10	29.4	1	10.0	*****!	
FLIGHT CREW A/C HANDLING	6	17.6	0	0.0	*****!	
FLIGHT CREW DECISIONS	4	11.8	0	0.0	*****!	

AIRFRAME FACTORS

	1983-1985		1986		COMPARISON OF 1983-1985 WITH 1986	
	NO.	%	NO.	%	1986 LESS FREQUENT	1986 MORE FREQUENT
LANDING GEAR	10	71.4	3	60.0	*****!	

— 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.

**Procedures for Air Navigation Services (PANS)** are approved by the Council for world-wide application. They contain, for the most part, operating procedures

regarded as not yet having attained a sufficient degree of maturity for adoption as International Standards and Recommended Practices, as well as material of a more permanent character which is considered too detailed for incorporation in an Annex, or is susceptible to frequent amendment, for which the processes of the Convention would be too cumbersome.

**Regional Supplementary Procedures (SUPPS)** have a status similar to that of PANS in that they are approved by the Council, but only for application in the respective regions. They are prepared in consolidated form, since certain of the procedures apply to overlapping regions or are common to two or more regions.

---

*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.

**ICAO Circulars** make available specialized information of interest to Contracting States. This includes studies on technical subjects.

**PRICE: U.S.\$2.50**  
(or equivalent in other currencies)

© ICAO 1989  
12/89, E/P1/1500

Order No. CIR223  
Printed in ICAO