



Safety performance of helicopter operations in the oil & gas industry

2000 data

Report No. 6.61/333
November 2002



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Association
of Oil & Gas
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I Introduction

The report presents the safety performance of that part of the helicopter industry involved in E&P operations during 2000.

The report is based on submissions from 101 helicopter operators worldwide. The OGP membership acknowledges the support of these organisations, without which this report could not have been produced.

I.1 Measuring safety and operational performance

The method used in this report for measuring safety performance relative to the number of aircraft hours, flights, and fatal/nonfatal accidents is the same as used by regulatory authorities such as the UK CAA, US FAA, the insurance industry, and the oil industry. The definition of an aviation accident is the same as that used by the regulatory authority for the country for which the data are gathered. As such, some incidents may be reported as accidents by some countries, but not by others. Efforts have been made to report those serious incidents in the report narrative, but not in the statistical analysis. Since incidents are not necessarily reported, it would be difficult to track all occurrences and differences. Therefore, only confirmed accidents are reported statistically. All countries do however, count a fatal occurrence as an accident, so a comparison of fatal rates is especially valid. The data for the offshore oil industry segment is the most complete, and believed to be most accurate statistically. There are countries for which the data accumulated are incomplete, but the accidents for those areas have been included, so the accident rates if anything are overstated.

I.2 Measuring occupant exposure

A new key safety performance indicator has been added, *fatal exposure to the occupants of helicopters*, which is normally not tracked in the industry. This is expressed as the number of fatalities per one million occupants carried. This allows an analysis to be undertaken of the exposure to the occupants relative to different helicopter types and mission parameters flown.

I.3 Industry comparison

The oil industry helicopter accident rates are favorable when compared to rates for both helicopter and airplane operations outside the oil industry. For example, the accident rate per 100,000 hours for all commercial helicopter operations in the US was 3.76 and the fatal rate 0.70, while the OGP Offshore rates world-wide were 1.79 and 0.78 respectively. Improvements can still be made, the fatal risk to occupants overall is still high when compared to non-aviation activity fatal risk, and non-offshore industry segments (seismic, pipeline, geophysical, etc.) have much higher risk rates when compared to the offshore segment.

I.4 Year 2000 highlights

There are trends in the accident causes and oil industry activity segments in which accidents rates are higher than others. An analysis of these factors can provide information to focus safety initiatives.

I.4.1 Oil industry segment comparison

For 2000, Seismic and Pipeline activity accident rates/100,000 hours were approximately 27 times the Offshore rate (1.79) and their fatal exposure rate/million occupants was approximately 11 times the Offshore rate (1.00).

1.4.2 Oil industry helicopter type comparison

For 2000, Single Engine helicopters had the worst overall accident rate/100,000 hours at 5.16, followed by Medium Twins at 1.53, and Heavy Twins at 1.10 (Light Twins zero accidents in 2000). The only helicopter models with fatal accidents were Single Engine at 1.47/100,000 hours and Medium Twins at 0.91.

1.4.3 Accident causes (28 Total with 9 fatal)

- 6 (21%) were related in improper pilot procedure, 3 of which were related to loss of control at close proximity to the surface, and 2 related to helicopters snagging fuselage components in helideck surface hazards (nets/safety fences).
- 5 (18%) were caused by FITWO (Flying into Terrain, Water, Obstacles) accounting for 8 (47%) of the 17 total industry fatalities, with 2 of the 5 FITWO at night (40%) accounting for 3 fatalities. Helicopter night flight is believed to constitute a very small percentage of all the oil industry flights and night accidents are continuing at a high incident rate.
- 5 (18%) were due to technical fault (3 tail rotor related and 2 unknown).
- 4 (14%) were engine related (all Single Engine helicopters) with one fatality.

2 Year 2000 recommendations

Listed below are initiatives for the oil and gas industry to consider that have potential to improve overall safety performance and reduce risk to occupants. It is understood that installation of additional aircraft equipment and completion of additional training may be difficult to achieve for short-term or ad hoc charter of aircraft.

2.1 Reduce accidents in seismic and pipeline operations

2.1.1 Hazard analysis

The industry should consider implementation of a risk/hazard analysis program similar to that being used successfully by the International Airborne Geophysics Safety Association (IAGSA).

2.1.2 Equipment

Consider use of flight helmets for seismic, geophysical and other flight operations that are typically flown in close proximity to terrain.

2.2 Reduce engine related aircraft accidents

2.2.1 Training

Complete aeronautical decision making (ADM) for single pilot aircraft operations. Where reasonably available, schedule single engine aircraft pilots for periodic training at factory schools.

2.2.2 Equipment

For single engine aircraft, installation of engine monitoring systems is encouraged.

2.2.3 Technical

Establish daily Engine Trend Monitoring programs. Conduct engine power assurance checks at periodic intervals, daily is encouraged. Perform periodic engine cleaning and/or washing. Consider cleaning intervals more frequently than recommended by manufacturers. For Single Engine aircraft on long-term use, non-modular engine overhauls are encouraged, and for Allison engine equipped Single-Engine aircraft to reduce deceleration events, periodic change-out of the critical engine airlines is encouraged.

2.3 Reduce accidents caused by improper pilot procedure in close proximity to the ground and snagging of helideck surface hazards

2.3.1 Training

For small helicopters, additional training on loss of tail rotor effectiveness at low altitude and recovery procedures should be emphasized. Instruct pilots to report helideck hazards and obstacles.

2.3.2 Operations

Restrict use of skid equipped helicopters to helidecks with nets (or remove the net if possible). Provide proper marking of helideck surface hazards.

2.4.3 Technical

Consider the implementation of a Flight Data Analysis program on those helicopters equipped with a Flight Data Recorder.

2.4 Reduce accidents caused by flying into terrain, water or obstacles (FITWO)

2.4.1 Equipment

Installation of additional equipment in the aircraft that could provide additional alert to the pilot when operating in close proximity to the ground or water. Items that could be considered include radio altimeters with visual and audio alerts and ground proximity warning systems. For night flights, install helicopter emergency egress lighting systems.

2.4.2 Training

Where reasonably available, instrument training in flight simulators for aircrews. Recurring instrument and night training programs and maintenance of night currency at periodic intervals.

2.4.3 Management

Emphasis on customer support of operational procedures that may reduce risk, such as: enforcement of weather minima. Development of adverse weather criteria to provide guidance on when flying operations should be restricted. Conduct offshore night flights to full IFR standards and where possible reduce night flights.

2.4.4 Technical

Consider the implementation of a Flight Data Analysis program on those helicopters equipped with a Flight Data Recorder.

2.5 Reduce accidents caused by aircraft malfunction

Vibration monitoring or Health and Usage Monitoring Systems (HUMS) systems are encouraged, where available, to monitor critical components, such as tail rotor gearboxes/hangar bearings, etc.

2.6 Survivability

2.6.1 Equipment

Upper Torso Restraints (UTR) and improved egress modifications that have been approved for the aircraft model should be installed for long-term aircraft. Portable emergency beacons should be carried in life rafts and by pilots while flying

2.6.2 Training

Periodic Helicopter Underwater Escape Training (HUET) should be conducted for frequent flying passengers and all crewmembers.

2.7 Sharing of incident, accident and hazard reports

The oil and gas industry should continue to encourage the sharing of aircraft accident, incident, and hazard reports among member and operators.

It is hoped that by sharing this information with all operators, global participation in the annual review will be encouraged, and safety initiatives can then be focused on reducing accidents where trends are apparent.

Appendix A – Operational data

Operational data - summary

	Passengers carried	Hours flown	Number of flights
Offshore	9,337,352	891,844	2,657,031
Seismic	86,379	28,231	127,492
Geophysical	0	4,121	8,209
Pipeline	87,264	12,908	20,740
Other support	582,933	38,291	131,179
2000 World-wide	10,093,928	975,395	2,944,651
1999 World-wide	8,910,469	917,457	3,101,319
1998 World-wide	10,284,263	1,174,476	3,699,876

Operational data - details

Number of helicopters by type

	Single engine (SE)	Light twin (LT)	Medium twin (MT)	Heavy twin (HT)	Total fleet
Offshore	433	102	403	162	1,100
Seismic	40	3	8	1	52
Geophysical	7	0.2	2	0	9
Pipeline	19	4	4	6	33
Other support	15	9	20	14	58
2000 World-wide	514	118	437	183	1,252
1999 World-wide	598	114	430	191	1,333
1998 World-wide	641	123	481	193	1,438

Hours per type of helicopter

	Single engine (SE)	Light twin (LT)	Medium twin (MT)	Heavy twin (HT)	Total fleet
Offshore	361,933	53,894	308,615	167,402	891,844
Seismic	25,718	792	1,531	190	28,231
Geophysical	3,135	150	0	836	4,121
Pipeline	7,786	886	1,355	2,881	12,908
Other support	8,711	3,238	15,979	10,363	38,291
2000 World-wide	407,283	58,960	327,480	181,672	975,395
1999 World-wide	381,474	52,070	306,895	177,018	917,457
1998 World-wide	476,427	71,027	433,153	193,869	1,174,476

Passengers (pax) per type of helicopter

	Single engine (SE)	Light twin (LT)	Medium twin (MT)	Heavy twin (HT)	Total fleet
Offshore	3,064,516	404,985	3,679,401	2,188,451	9,337,352
Seismic	72,564	779	11,949	1,087	86,379
Geophysical	Not normally carried				
Pipeline	10,275	2,226	17,106	57,657	87,264
Other support	41,505	12,873	348,243	180,312	582,933
2000 World-wide	3,188,860	420,863	4,056,699	2,427,507	10,093,928
1999 World-wide	2,223,792	305,432	4,006,764	2,374,482	8,910,469
1998 World-wide	2,671,556	377,518	4,860,980	2,374,209	10,284,263

Number of flights per type of helicopter

	Single engine (SE)	Light twin (LT)	Medium twin (MT)	Heavy twin (HT)	Total fleet
Offshore	1,414,035	195,493	833,004	214,499	2,657,031
Seismic	122,298	938	4,104	152	127,492
Geophysical	5,385	3	1,730	1,091	8,209
Pipeline	8,655	611	5,510	5,964	20,740
Other support	22,372	3,167	74,189	31,451	131,179
2000 World-wide	1,572,745	200,212	918,537	253,157	2,944,651
1999 World-wide	1,449,221	156,686	1,088,683	315,729	3,010,319
1998 World-wide	1,892,480	217,607	1,295,897	293,892	3,699,876

Fleet operational data, 2000**Averages per helicopter**

	Offshore	Seismic	Geophysical	Pipeline	Other support	World-wide
Pax per day/5 day week	35,913	332	0	336	2,242	38,823
Flights per day (365days/year)	7,280	349	22	57	359	8,068
Average flight duration (minutes)	20	13	30	37	18	20
Annual hours per aircraft	811	543	458	391	660	779
Flights per aircraft	2,416	2,452	912	629	2,262	2,352
Pax flown per aircraft	8,489	1,661	0	2,644	10,051	8,062

Appendix B – Accident data

Helicopter accident data by aircraft type

Number of accidents

	#fatal accidents	#accidents (fatal & non-fatal)	#engine related
Single engine	6	21	4
Light twin	0	0	0
Medium twin	3	5	0
Heavy twin	0	2	0
2000 totals	9	28	4†
1999 totals	8	25	6
1998 totals	9	22	5

† 2 seismic and 2 offshore

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	16	20	28	8
Light twin	0	0	0	0
Medium twin	4	6	1	9
Heavy twin	4	2	6	0
2000 totals	24	28	35	17
1999 totals	61	18	29	50
1998 totals	37	23	13	47

Aircraft damages classification

	Minor	Major	Total loss
Single engine	1	2	18
Light twin	0	0	0
Medium twin	0	2	3
Heavy twin	1	1	0
2000 totals	2	5	21
1999 totals	1	10	14
1998 totals	0	5	19

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
Single engine	1.47	5.16	1.68	1.34
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.91	1.53	1.53	0.54
Heavy twin	0.00	1.10	0.00	0.79
2000 totals	0.92	2.87	1.20	0.95
1999 totals	0.87	2.72	3.80	0.83
1998 totals	0.77	1.87	3.00	0.62

Accident causes & information

	#fatalities due to engine malfunction	Total	Engine related	Other tech.	Lightning	fitwo	Tie down proc.	Ext. load proc.	Control malf.	Obstacle strike
Single engine	1	21	‡(1) 4	4	0	3	1	1	0	2
Light twin	0	0	0	0	0	0	0	0	0	0
Medium twin	0	5	0	1	0	2	0	0	1	1
Heavy twin	0	2	0	0	1	0	0	0	0	0
2000 totals	1	28	(1) 4	5†	1	5 (2 nt)	1	1	1	3
1999 totals	1	25	(1) 6	4	1	7 (1 nt)	0	0	0	0
1998 totals	0	22	5	0	1	5 (3 nt)	1	2	3	0

	Mid air	Pilot proc.	Fuel starv.	Refuel proc.	Pax cont	Wx	Aircraft overload	Hard landing	Helideck design or size issue
Single engine	0	5	1	0	0	0	0	0	0
Light twin	0	0	0	0	0	0	0	0	0
Medium twin	0	0	0	0	0	0	0	0	0
Heavy twin	0	1	0	0	0	0	0	0	0
2000 totals	0	6	1	0	0	0	0	0	0
1999 totals	0	0	0	2	2	3	0	0	0
1998 totals	2	0	0	1	0	0	1	1	0

† 2 unknown, 3 tail rotor

‡ Brackets under 'engine related' indicate number of fatalities resulting from engine malfunction

nt: night

Helicopter accident data by activity

Number of accidents

	#fatal accidents	#accidents (fatal & non-fatal)	#engine related
Offshore	7	16	2
Seismic	1	7	2
Geophysical	No accidents reported		
Pipeline	1	4	0
Other support	0	1	0
2000 World-wide	9	28	4
1999 World-wide	8	25	6
1998 World-wide	9	22	5

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Offshore	7	17	11	13
Seismic	5	4	6	3
Geophysical	No accidents reported			
Pipeline	8	5	12	1
Other support	4	2	6	0
2000 World-wide	24	28	35	17
1999 World-wide	61	18	29	50
1998 World-wide	37	23	13	47

Aircraft damages severity

	Minor	Major	Total loss
Offshore	1	2	13
Seismic	1	2	4
Geophysical	No accidents reported		
Pipeline	0	0	4
Other support	0	1	0
2000 World-wide	2	5	21
1999 World-wide	1	10	14
1998 World-wide	0	5	19

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
Offshore	0.79	1.79	1.00	0.60
Seismic	3.54	24.80	13.75	5.49
Geophysical	No accidents reported			
Pipeline	7.75	30.99	8.37	19.29
Other support	0.00	2.61	0.00	0.76
2000 World-wide	0.92	2.87	1.20	0.95
1999 World-wide	0.87	2.72	3.80	0.87
1998 World-wide	0.77	1.87	3.00	0.62

Industry fatality rates per 100 million exposure hours, passengers & crew

	Accidents (IFAR)	Incidents (IFIR)
Offshore	289	155
Seismic	6,113	2,038
Geophysical	No accidents reported	
Pipeline	1,399	1,399
Other support	0.00	0.00
2000 World-wide	352	186
1999 World-wide	1214	194
1998 World-wide	928	197

Offshore - helicopter operational data - summary

	Passengers carried	Hours flown	Number of flights
North Sea	1,750,079	146,097	246,223
Gulf of Mexico	3,451,511	441,908	1,394,679
Other	4,129,762	303,839	1,016,129
2000 World-wide	9,337,352	891,844	2,657,031
1999 World-wide	8,097,983	828,911	2,767,737
1998 World-wide	9,764,538	1,029,503	3,029,243
1997 World-wide	9,771,259	950,343	3,184,797

Offshore - helicopter operational data - details

Number of helicopters by type

	Single engine	Light twin	Medium twin	Heavy twin	Total fleet
North Sea	0	1	48	82	131
Gulf of Mexico	385	76	106	15	582
Other	48	25	249	65	387
2000 World-wide	433	102	403	162	1,100
1999 World-wide	473	95	386	152	1,106
1998 World-wide	465	117	444	181	1,207
1997 World-wide	479	165	398	164	1,206

Hours per type of helicopter

	Single engine	Light twin	Medium twin	Heavy twin	Total fleet
North Sea	0	314	42,722	103,061	146,097
Gulf of Mexico	316,029	38,126	79,736	8,017	441,908
Other	45,904	15,454	186,157	56,324	303,839
2000 World-wide	361,933	53,894	308,615	167,402	891,844
1999 World-wide	326,514	47,341	287,584	167,472	828,911
1998 World-wide	372,688	68,152	404,058	184,605	1,029,503
1997 World-wide	359,341	96,270	301,671	193,061	950,343

Passengers per type of helicopter

	Single engine	Light twin	Medium twin	Heavy twin	Total fleet
North Sea	0	79	458,975	1,291,025	1,750,079
Gulf of Mexico	2,318,379	206,094	759,015	168,024	3,451,512
Other	746,137	198,812	2,461,411	729,402	4,135,762
2000 World-wide	3,064,516	404,985	3,679,401	2,188,451	9,337,353
1999 World-wide	2,173,924	277,607	3,624,427	2,022,025	8,097,983
1998 World-wide	2,442,448	361,797	4,598,209	2,362,044	9,764,538
1997 World-wide	2,753,768	686,145	4,159,934	2,171,412	9,771,259

Number of flights per type of helicopter

	Single engine	Light twin	Medium twin	Heavy twin	Total fleet
North Sea	0	306	127,406	118,511	246,223
Gulf of Mexico	1,051,258	134,035	192,289	17,197	1,394,679
Other	362,777	61,152	513,309	78,791	1,016,129
2000 World-wide	1,414,035	195,493	833,004	214,499	2,657,031
1999 World-wide	1,376,632	147,406	981,547	262,152	2,767,737
1998 World-wide	1,404,852	213,711	1,204,177	269,503	3,029,243
1997 World-wide	1,561,146	330,917	1,050,120	242,614	3,184,797

Offshore - fleet operational data, 2000

Averages per helicopter

	North Sea	Gulf of Mexico	World
Pax per day/5 day week	6,731	13,275	35,913
Flights per day	675	3,821	7,280
Average flight duration (minutes)	36	19	20
Annual hours per aircraft	1,115	759	811
Flights per aircraft	1,888	2,399	2,419
Pax flown per aircraft	13,359	5,930	8,489

Offshore - world wide helicopter accident data, 2000

Number of accidents

	#fatal accidents	#accidents (fatal & non-fatal)	#engine related
Single engine	4	10	2
Light twin	0	0	0
Medium twin	3	5	0
Heavy twin	0	1	0
2000 totals	7	16	2
1999 totals	5	17	3

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	3	11	10	4
Light twin	0	0	0	0
Medium twin	4	6	1	9
Heavy twin	0	0	0	0
2000 totals	7	17	11	13
1999 totals	38	11	23	26

Aircraft damages

	Minor	Major	Total loss
Single engine	0	0	10
Light twin	0	0	0
Medium twin	0	2	3
Heavy twin	1	0	0
2000 totals	1	2	13
1999 totals	1	7	9

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
Single engine	1.11	2.76	0.89	0.71
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.97	1.62	1.68	0.60
Heavy twin	0.00	0.60	0.00	0.47
2000 totals	0.78	1.79	1.00	0.60
1999 totals	0.60	2.05	2.10	0.61

Offshore – Gulf of Mexico accident data, 2000

Number of accidents

	#fatal accidents	#accidents (fatal and non-fatal)	#engine related
Single engine	3†	9	2
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	3†	9	2
1999 totals	1	9	2

† one engine related. There was one single engine ditching due to engine failure, not recorded as an accident

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	3	8	8	3
Light twin	0	0	0	0
Medium twin	0	0	0	0
Heavy twin	0	0	0	0
2000 totals	3	8	8	3
1999 totals	7	4	9	2

Aircraft damages classification

	Minor	Major	Total loss
Single engine	0	1	8
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	0	1	8
1999 totals	2	2	5

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
Single engine	0.95	2.85	0.89	0.86
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.00	0.00	0.00	0.00
Heavy twin	0.00	0.00	0.00	0.00
2000 totals	0.68	2.04	0.59	0.65
1999 totals	0.25	2.29	0.50	0.62

Offshore - North sea accident data, 2000

Number of accidents

	#fatalities	#accidents (fatal and non-fatal)	#engine related
Single engine	No activity		
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	1	0
2000 totals	0	1	0
1999 totals	0	2	0

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	No activity			
Light twin	0	0	0	0
Medium twin	0	0	0	0
Heavy twin	0	0	0	0
2000 totals	0	0	0	0
1999 totals	0	0	0	0

Aircraft damages classification

	Minor	Major	Total loss
Single engine	No activity		
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	1	0	0
2000 totals	1	0	0
1999 totals	0	2	0

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
Single engine	No activity			
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.00	0.00	0.00	0.00
Heavy twin	0.00	0.97	0.00	0.84
2000 totals	0.00	0.69	0.00	0.41
1999 totals	0.00	1.37	0.00	0.74

Offshore – Six year world wide helicopter accident data

Number of accidents

	#fatal accidents	#accidents (fatal and non-fatal)	#engine related
1995	6	10	NR
1996	7	15	NR
1997	5	11	2
1998	6	11	2
1999	5	17	3
2000	7	16	2
6 year avg	6.0	13.3	2.3

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
1995	35	8	19	24
1996	8	8	0	16
1997	41	13	12	42
1998	25	16	6	35
1999	38	11	23	26
2000	9	15	11	13
6 year avg	26.0	11.8	11.8	26.0

Aircraft damages classification

	Minor	Major	Total loss
1995	0	5	5
1996	1	3	11
1997	1	3	8
1998	0	2	11
1999	1	7	9
2000	1	2	13
6 year avg	0.7	3.7	9.5

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
1995	0.82	1.36	2.10 E	0.41
1996	0.85	1.82	1.20 E	0.59
1997	0.53	1.16	2.90	0.35
1998	0.58	1.07	2.40	0.36
1999	0.60	2.05	2.10	0.61
2000	0.79	1.79	1.00	0.60
6 year avg	0.70	1.54	1.95	0.49

Industry fatality rates per 100 million exposure hours, passengers & crew

	Accidents (IFAR)	Incidents (IFIR)
1995	671	168
1996	432	189
1997	963	115
1998	709	122
1999	701	135
2000	289	155
6 year avg	628	147

Offshore – Six year Gulf of Mexico helicopter accident data
Number of accidents

	#fatal accidents	#accidents (fatal and non-fatal)	#engine related
1995	3	5	NR
1996	4	7	NR
1997	1	6	1
1998	1	3	1
1999	1	9	2
2000	3	9	2
6 year avg	2.2	6.5	1.5

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
1995	7	3	2	8
1996	7	4	0	11
1997	6	6	11	1
1998	0	2	1	1
1999	7	4	9	2
2000	3	8	8	3
6 year avg	5.0	4.5	5.2	4.3

Aircraft damages classification

	Minor	Major	Total loss
1995	1	1	3
1996	1	2	4
1997	1	2	4
1998	0	1	3
1999	1	4	4
2000	0	0	9
6 year avg	0.7	1.7	4.5

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
1995	0.73	1.21	1.40 E	0.33
1996	0.91	1.58	1.90 E	0.42
1997	0.21	1.27	0.20	0.35
1998	0.22	0.66	0.20	0.22
1999	0.25	2.29	0.50	0.62
2000	0.68	2.04	0.59	0.65
6 year avg	0.50	1.51	0.80	0.43

Offshore – Six year North Sea offshore accident data

Number of accidents

	#fatalities	#accidents	#engine related
1995	0	2	0
1996	0	2	0
1997	2	3	1
1998	0	1	0
1999	0	2	0
2000	0	1	0
6 year avg	0.3	1.8	0.2

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
1995	0	0	0	0
1996	0	0	0	0
1997	11	2	0	13
1998	0	0	0	0
1999	0	0	0	0
2000	0	0	0	0
6 year avg	1.8	0.3	0	2.2

Aircraft damages classificaton

	Minor	Major	Total loss
1995	0	2	0
1996	0	1	1
1997	0	1	2
1998	0	1	0
1999	0	2	0
2000	1	0	0
6 year avg	0.2	1.2	0.5

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flight stages
1995	0.00	1.65 E	0.00	0.85 E
1996	0.00	1.26 E	0.00	1.20 E
1997	1.19	1.78	4.90	1.08
1998	0.00	0.61	0.00	0.39
1999	0.00	1.37	0.00	0.74
2000	0.00	0.69	0.00	0.41
6 year avg	0.20	1.23	0.80	0.78

Offshore – world wide accident causes & information

	Engine related	Bird strike	Tail rotor	Lightng	fitwo	Tie down proc.	Ext. load proc.	Control malf.	Obstacle strike
Single engine	2	0	2	0	1 (night)	1	0	0	0
Light twin	0	0	0	0	0	0	0	0	0
Medium twin	0	0	0	0	2 (1 night)	0	0	1	1
Heavy twin	0	0	0	1	0	0	0	0	0
2000 totals	2	0	2	1	3 (2 night)	1	0	1	1
97-99 totals	7	1	3	3	11 (6 night)	1	1	4	0

	Mid air	Pilot proc.	unknown	Fuel proc.	Pax cont	Wx	#fatalities due to single engine malfunction
Single engine	0	2	1	1	0	0	1†
Light twin	0	0	0	0	0	0	0
Medium twin	0	0	1	0	0	0	0
Heavy twin	0	0	0	0	0	0	0
2000 totals	0	2	2	1	0	0	1†
97-99 totals	3	0	0	1	1	3	1‡

† – GOM ‡ – Angola

Offshore – Gulf of Mexico accident causes & information

	Engine related	Bird strike	Tail rotor	Severe weather	fitwo	Tie down proc.	unknown	Pax con.	Obstacle strike
Single engine	2	0	2	0	1	0	1	0	0
2000 totals	2	0	2	0	1 (nt SE)	0	1	0	0
97-99 totals	4	1	1	2	5	1	0	1	0

	Mid air	Pilot proc.	Fuel starv.	Helideck design or size issue	#fatalities due to single engine malfunction
Single engine	0	2	1	0	1†
2000 totals	0	2	1	0	1
97-99 totals	2	0	0	0	0

† – Engine failure with apparent inability to maintain rotor RPM

Offshore – North Sea accident causes & information

	Severe weather	Engine related	Helideck design or size issue	Lightning	fitwo
Medium twin	0	0	0	0	0
Heavy twin	0	0	0	1	0
2000 totals	0	0	0	1	0
97-99 totals	1	1	0	3	1

Seismic accident data**Number of accidents**

	#fatalities	#accidents (fatal and non-fatal)	#engine related
Single engine	1	7	2
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	1	7	2
1999 totals	2	6	3
1998 totals	0	7	3

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	3	3	6	3
Light twin	0	0	0	0
Medium twin	0	0	0	0
Heavy twin	0	0	0	0
2000 totals	5	4	6	3
1999 totals	1	4	1	4
1998 totals	3	4	7	0

Aircraft damages classification

	Minor	Major	Total loss
Single engine	1	2	4
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	1	2	4
1999 totals	0	3	3
1998 totals	0	3	4

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flights
Single engine	3.89	27.22	40.10	5.72
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.00	0.00	0.00	0.00
Heavy twin	0.00	0.00	0.00	0.00
2000 totals	3.54	24.80	13.75	5.49
1999 totals	5.64	16.91	22.50	6.97
1998 totals	0.00	8.91	0.00	1.59

Seismic helicopter accident causes & information

	Engine related	Tail rotor	Obstacle strike	Flight into terrain	Snagged load	Rapid fuel procedure
Single engine	2	1	2	0	1	0
2000 totals	2	1	2	0	1	0
98-99 totals	6	0	0	1	1	1

	Fuel procedure	Unknown	Pilot procedure	Hard landing	Aircraft overload	#fatalities due to single engine malf.
Single engine	0	0	1	0	0	0
2000 totals	0	0	1	0	0	0
98-99 totals	1	1	0	1	1	0

Geophysical helicopter accident data
Number of accidents

	#fatalities	#accidents	#engine related
2000 totals	No accidents		
1999 totals	No accidents		
1998 totals	1	1	0

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
2000 totals	No accidents		No accidents	
1999 totals	No accidents		No accidents	
1998 totals	1	1	0	2

Aircraft damages classification

	Minor	Major	Total loss
2000 totals	No accidents		
1999 totals	No accidents		
1998 totals	0	0	1

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ 100k occupants	#accidents/ 100k flights
2000 totals	No accidents		No accidents	
1999 totals	No accidents		No accidents	
1998 totals	8.88	8.88	2.25	12.66

Geophysical helicopter accident causes & information

	Engine related	Injuries due to engine malfunction	Flight into terrain, water or obstacles
Sngl eng (98)	0	0	1

Pipeline helicopter accident data

Number of accidents

	#fatalities	#accidents	#engine related
Single engine	1	4	0
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	1	4	0
1999 totals	0	1	0
1998 totals	1	2	0

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	8	5	12	1
Light twin	0	0	0	0
Medium twin	0	0	0	0
Heavy twin	0	0	0	0
2000 totals	8	5	12	1
1999 totals	0	0	0	0
1998 totals	3	1	0	4

Aircraft damages classification

	Minor	Major	Total loss
Single engine	0	0	4
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	0
2000 totals	0	0	4
1999 totals	0	1	0
1998 totals	0	0	2

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flights
Single engine	12.84	51.37	52.83	46.22
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.00	0.00	0.00	0.00
Heavy twin	0.00	0.00	0.00	0.00
2000 totals	7.75	30.99	8.37	19.29
1999 totals	0.00	7.47	0.00	2.89
1998 totals	8.74	17.48	4.92	2.86

Pipeline helicopter accident causes & information

	Engine related	Pilot procedure	fitwo	Control problems	#fatal due to single engine malfunction
Single eng (00)	0	2	2	0	0
Heavy twin (99)	0	0	1	0	0
Medium twin (98)	0	0	0	2	0

Other industry helicopter accident data**Number of accidents**

	#fatalities	#accidents	#engine related
Single engine	0	0	0
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	1	0
2000 totals	0	1	0
1999 totals	1	1	0
1998 totals	1	1	0

Injury classification

	Injuries		Severity	
	Passengers	Crew	Injured	Fatal
Single engine	0	0	0	0
Light twin	0	0	0	0
Medium twin	0	0	0	0
Heavy twin	4	2	6	0
2000 totals	4	2	6	0
1999 totals	22	3	5	20
1998 totals	5	1	0	6

Aircraft damages classification

	Minor	Major	Total loss
Single engine	0	0	0
Light twin	0	0	0
Medium twin	0	0	0
Heavy twin	0	0	1
2000 totals	0	1	0
1999 totals	0	0	1
1998 totals	0	0	1

Aviation accident rates

	#fatal accidents/ 100k hours	#accident/ 100k hours	#fatalities/ million occupants	#accidents/ 100k flights
Single engine	0.00	0.00	0.00	0.00
Light twin	0.00	0.00	0.00	0.00
Medium twin	0.00	0.00	0.00	0.00
Heavy twin	0.00	9.65	0.00	3.18
2000 totals	0.00	2.61	0.00	0.76
1999 totals	3.22	3.22	2.89	1.04
1998 totals	2.29	2.29	1.29	0.81

Other industry helicopter accident causes & information

	Procedure	Engine related	fitwo	#fatal due to single engine malfunction
Heavy twin (00)	1	0	0	0
Heavy twin (99)	0	0	1	0
Single engine (98)	0	0	1	0

Appendix C – Data by country

	Type of helicopter						Passengers carried						Hours flown						Landings and takeoffs						Tot				
	SE		LT		MT		HT		Tot		SE		LT		MT		HT		Tot		SE		LT			MT		HT	
Angola	8	19	11	2	1	1	315,542	162,421	477,963	13,209	8,925	22,134	147,209	31,870	179,079														
Argentina	3	5	2				3,042	7,914	10,956	870	618	1,488	6,144	6,323	12,467														
Australia	7	33	15	10	3		5,942	177,562	265,517	2,988	11,068	23,387	10,982	39,065	69,830														
Azerbaijan		3	2	1				11,500	25,500		761	1,211		1,420	2,300														
Bangladesh		1	1					10,293	10,293		580	580		1,730	1,730														
Barbados		0							4					5	5														
Bolivia	1	2	1				353	1,484	1,837	270	310	580	412	102	514														
Brazil	4	54	45	5	54			280,336	367,398	82,013	45,749	52,669	107,748	11,668	127,634														
Brunei		3						24,588	24,588		3,071	3,071		4,245	4,245														
Cameroon		2	2					14,002	14,002		1,347	1,347		4,257	4,257														
Canada	9	21	0	10	21		4,684	121,534	132,893	7,946	0	20,200	20,264	7,284	27,548														
Chile	1	25	1	12	11	25	348	40,296	152,159	672	5,184	17,712	769	8,060	21,877														
Colombia	7	35	17	11	35		1,232	350,974	555,144	354	13,565	21,561	956	73,024	101,200														
Congo	2	4	2				63,073	11,133	74,206	1,807	783	2,590	25,742	3,177	28,919														
Denmark	0	7	1	6	7			10,293	54,264		761	6,396		1,730	4,963														
Ecuador	7	15	4	3	15		5,000	7,380	23,766	3,500	2,490	8,575	805	6,980	10,620														
Egypt	8	23	15				49,269	265,026	314,295	5,228	14,895	20,123	24,241	59,567	83,808														
Eq. Guinea		4	4					21,100	21,100		2,648	2,648		2,800	2,800														
Egypt		0	0					128	128		13	13		20	20														
Gabon		4	4					31,101	31,101		2,391	2,391		7,179	7,179														
India		0	0					33	37		5	12		6	8														
Indonesia	2	32	13	5	32		1,320	54,607	157,918	478	7,258	12,392	783	11,861	23,226														
Ireland		1	1					3,848	3,848		356	356		1,296	1,296														
Israel		0	0					127	276		5	19		16	66														
Kazakhstan		3	2	1	3			6,009	9,508		674	1,128		1,358	1,668														
Libya		2							19,413		964	964		1,696	1,696														
Malaysia		14	6	8	14			72,216	227,894		5,749	15,827		14,054	28,511														
Mexico	6	31	5	20	31		4,819	397,518	443,054	1,800	12,532	17,942	4,985	40,942	66,677														
Mozambique	0	0					354		354	94	94		124	124															
Myanmar		2	2					12,000	12,000		1,175	1,175		1,200	1,200														
Namibia		2	2					9,403	9,403		771	771		3,463	3,463														
Netherlands		14	11	4	14			104,817	132,032		10,368	12,567		36,576	41,790														
New Zealand		1	1					9,830	9,830		931	931		1,730	1,730														
Nigeria	11	49	4	34	49		277,322	391,500	689,522	16,719	24,308	43,228	124,978	66,668	198,668														
Norway		35	5	30	35			143,613	708,109		6,527	38,759		33,336	61,581														

	Type of helicopter					Passengers carried					Hours flown					Landings and takeoffs				
	SE	LT	MT	HT	Tot	SE	LT	MT	HT	Tot	SE	LT	MT	HT	Tot	SE	LT	MT	HT	Tot
Peru	2			0	2	1,613			42	1,655	422			25	447	1,067			53	1,120
Philippines			3		3	4,721		4,721		4,721			1,624		1,624			500		500
PNG	9		1	0	10	58,350		5,044		63,394	8,218		942	203	9,363	70,850		4,532	579	75,961
Qatar			20		20	147,264		147,264		147,264			12,943		12,943			30,850		30,850
Russia				4	4	5,449			5,449	5,449				1,183	1,183				1,082	1,082
Sakhalin				2	2				760	760				853	853				138	138
Saudi Arabia	7		10	3	20	19,678		131,868	67,972	219,518	3,960		9,010	2,158	15,128	19,332		37,912	12,354	69,598
South Africa	2		1	5	8	2,676		630	28,757	32,063	51		149	2,268	2,468	40		199	3,426	3,665
Spain			2		2			11,217		11,217			903		903			745		745
Sudan	1		1		2	552		3,240		3,792	654		627		1,281	311		702		1,013
Thailand			13	4	17			85,010	48,160	133,170			9,792	4,056	13,848			18,078	3,480	21,558
Trinidad			4		4			20,026		44,296		2,751	1,110		3,861		10,648	3,325		13,973
UK	2	1	30	42	76	187	81	196,405	655,343	852,016	492	557	24,712	56,468	82,229	360	335	54,470	81,819	136,984
USA	26	3	10	0	39	28,796	2,079	85,279	307	116,461	14,415	943	3,495	26	18,879	25,371	1,354	7,479	20	34,224
USA-GOM	385	76	106	15	582	2,318,379	206,094	759,015	168,024	3,451,512	316,029	38,126	79,736	8,016	441,907	1,051,160	134,035	192,289	17,197	1,394,680
Venezuela	5				5	8,652				8,652	4,380				4,380	4,316				4,316
Yemen	3				3	17,677				17,677	2,727				2,727	31,545				31,545

Appendix D – Accident details

Helicopters 2000

Date	Activity	Model	Type	Country	Fatal	Injuries		Severity of injuries		Helicopter damage	Cause	Description
						Pax	Crew	Injury	Fatal			
04-May-00	Offshore	B412	MT	Abu Dhabi						Substantial	Obstacle strike	Tail rotor struck crane
02-Aug-00	Offshore	S76A	MT	Brazil	1	3	2		5	Lost	FITWO	CFIT
20-Mar-00	Offshore	B206B3	SE	GOM		2	1	3		Lost	Pilot procedure	Loss or TR effectiveness
29-Apr-00	Offshore	B206L3	SE	GOM			1	1		Lost	TR	TR failure, improper bolt install, with inadequate fuel to RTB
24-May-00	Offshore	AS350B	SE	GOM		1	1	2		Lost	TR	TR failure
31-May-00	Offshore	B206	SE	GOM			1	1		Lost	Pilot procedure	TR skid caught in safety fence
08-Sep-00	Offshore	B206	SE	GOM			1	1		Lost	Fuel	Pilot unable to get fuel offshore
28-Oct-00	Offshore	AS350B	SE	GOM	1		1		1	Lost	Engine	Engine failure, did not maintain rotor RPM
01-Dec-00	Offshore	B206B3	SE	GOM						Lost	Engine	Engine failure
26-Dec-00	Offshore	B206B3	SE	GOM	1		1		1	Lost	FITWO	Disappeared at night
29-Dec-00	Offshore	B407	SE	GOM	1		1		1	Lost	Unknown	Disappeared - offshore flight
15-Feb-00	Offshore	AS332L	HT	UK						Minimal	Lightning strike	Lightning strike
08-Mar-00	Offshore	S76A	MT	Indonesia	1		2		2	Lost	Unknown	Tech failure- unconfirmed
15-Apr-00	Offshore	B212	MT	Nigeria						Substantial	MR	Grip failure and hard landing
10-Nov-00	Offshore	B206	SE	Nigeria	1	2	1	2	1	Lost	Tie down	Tied down to deck
16-Aug-00	Offshore	B412	MT	Iran	1	1	2	1	2	Lost	FITWO	Crashed into sea at night
17-May-00	Other	B214ST	HT	Saudi		4	2	6		Substantial	Pilot procedure	Maintenance test flight, aircraft rolled on side in high winds
03-Jun-00	Pipeline	B206	SE	Algeria	1	3	2	4	1	Lost	FITWO	Crashed in dust
08-Jun-00	Pipeline	AS316	SE	Bolivia		3	1	4		Lost	Pilot procedure	Wire strike avoidance at 13,000', loss of control
11-Sep-00	Pipeline	B206	SE	UK		1	1	2		Lost	FITWO	CFIT in bad weather
28-Sep-00	Pipeline	B206B3	SE	Canada		1	1	2		Lost	Pilot procedure	Loss of control at low altitude
18-Jan-00	Seismic	AS350	SE	Brazil						Minimal	Pilot procedure	Skid caught in net
04-May-00	Seismic	AS350D	SE	US	1	3	3	3	3	Lost	TR	TR failure with heavy load alt
19-Jun-00	Seismic	B206B3	SE	US			1	1		Lost	Sling load	Cable did not release
24-Aug-00	Seismic	AS350B	SE	Canada						Substantial	Engine	Loss of power with sling load
10-Oct-00	Seismic	H369D	SE	US			1	1		Lost	Engine	Engine failure
22-Oct-00	Seismic	AS350B	SE	Canada						Lost	Obstacle strike	Tree strike & loss of TR thrust
31-Dec-00	Seismic	H369D	SE	Canada			1	1		Substantial	Obstacle strike	Tree strike with sling load

Totals:

No. accidents: 28

No. accidents with fatalities: 9

Passengers injured: 24

Crew injured: 28

Number of injuries: 35

Number of fatalities: 17

Damage minimal: 2

Damage substantial: 5

Damage total loss: 21

Accidents caused by tech: 10

Accidents caused by FITWO: 5

Accidents caused by lightning: 1

Accidents caused by fuel: 1

Accidents caused by tie down: 1

Accidents caused by sling load: 1

Accidents caused by obstacle strike: 3

Accidents caused by pilot procedure: 6

Airplanes 2000

Date	Activity	Model	Type	Country	Fatal	Injuries		Severity of injuries		Damage	Cause	Description
						Pax	Crew	Injury	Fatal			
17-Mar-00	Other	DA 900	TT	US						Lost	Engine	Over-ran runway
02-Nov-00	Other	Cit. 2	TT	Canada		5		5		Minimal	Pilot procedure	Hard landing
11-Nov-00	Seismic	FU24A	SP	Myanmar						Substantial	Engine	Loss of power, forced to ditch

Totals:

No. accidents: 3	Damage minimal: 1	Accidents caused by fuel: 0
No. accidents with fatalities: 0	Damage substantial: 1	Accidents caused by tie down: 0
Passengers injured: 5	Damage total loss: 1	Accidents caused by sling load: 0
Crew injured: 0	Accidents caused by tech: 1	Accidents caused by obstacle strike: 0
Number of injuries: 5	Accidents caused by FITW: 0	Accidents caused by pilot procedure: 2
Number of fatalities: 0	Accidents caused by lightning: 0	

Marine transfer 2000

Date	Activity	Model	Type	Country	Fatal	Injuries		Severity of injuries		Damage	Cause	Description
						Pax	Crew	Injury	Fatal			
21-Feb-00	Pilot	H369	SE	Australia						Substantial	FITW	Flew into water

Totals:

No. accidents: 1	Damage minimal: 0	Accidents caused by fuel: 0
No. accidents with fatalities: 0	Damage substantial: 1	Accidents caused by tie down: 0
Passengers injured: 0	Damage total loss: 0	Accidents caused by sling load: 0
Crew injured: 0	Accidents caused by tech: 0	Accidents caused by obstacle strike: 0
Number of injuries: 0	Accidents caused by FITW: 1	Accidents caused by pilot procedure: 0
Number of fatalities: 0	Accidents caused by lightning: 0	

Totals all aircraft, 2000

No. accidents: 32	Damage minimal: 3	Accidents caused by fuel: 1
No. accidents with fatalities: 9	Damage substantial: 6	Accidents caused by tie down: 1
Passengers injured: 29	Damage total loss: 22	Accidents caused by sling load: 1
Crew injured: 28	Accidents caused by tech: 13	Accidents caused by obstacle strike: 3
Number of injuries: 40	Accidents caused by FITW: 5	Accidents caused by pilot procedure: 7
Number of fatalities: 17	Accidents caused by lightning: 2	

What is OGP?

The International Association of Oil & Gas Producers encompasses the world's leading private and state-owned oil & gas companies, their national and regional associations, and major upstream contractors and suppliers.

Vision

- To work on behalf of all the world's upstream companies to promote responsible and profitable operations.

Mission

- To represent the interests of the upstream industry to international regulatory and legislative bodies.
- To achieve continuous improvement in safety, health and environmental performance and in the engineering and operation of upstream ventures.
- To promote awareness of Corporate Social Responsibility issues within the industry and among stakeholders.

Objectives

- To improve understanding of the upstream oil and gas industry, its achievements and challenges and its views on pertinent issues.
- To encourage international regulators and other parties to take account of the industry's views in developing proposals that are effective and workable.
- To become a more visible, accessible and effective source of information about the global industry, both externally and within member organisations.
- To develop and disseminate best practices in safety, health and environmental performance and the engineering and operation of upstream ventures.
- To improve the collection, analysis and dissemination of safety, health and environmental performance data.
- To provide a forum for sharing experience and debating emerging issues.
- To enhance the industry's ability to influence by increasing the size and diversity of the membership.
- To liaise with other industry associations to ensure consistent and effective approaches to common issues.



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